ESSAYS ON MISPRICING OF EQUITY SECURITIES

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Abstract: Mispricing of equity securities is an area of research with many implications for academicians, individual investors, money managers, and executives. The first essay in this dissertation explicitly studies the consistency of residual income based measures of mispricing and the second essay analyzes several determinants of mispricing. The first essay returns to fundamental principles of valuation by using multiple implementations of the residual income model to estimate intrinsic value. Estimates of intrinsic value are compared to market values and firm years are assigned to valuation deciles using the markets valuation error. Relative valuation decile assignments are very robust to different cost of equity specifications and also to two different earnings and book value specifications. Valuation decile assignments are remarkably persistent over time for the most overvalued and undervalued equities. Application of the valuation deciles to acquisitions produces results consistent with prior published research, indicating that the valuation deciles are capturing mispricing. The second essay assigns firms to valuation deciles for the full 1964–2009 period and examines the determinants of the observed mispricing. The results show that investors systematically overvalue scaled R&D expenditures and undervalue scaled cash flow. In addition, investor sentiment is positively related to overvaluation. However, when sentiment is high, investors undervalue scaled net fixed assets. Standard risk explanations for the observed mispricing are not supported by the results. Altman's Z-Score, leverage, β, and the standard deviation of return on assets are all positively related to overvaluation, and firm age and firm size are negatively related to overvaluation.

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1 Measuring Mispricing

1.1 Introduction and Motivation

Academicians, individual investors, money managers, and many others have long sought to properly value shares of stock and to thereby determine which stocks are overvalued and which stocks are undervalued. Naturally, the proposition that shares of stock in a going concern have value is uncontroversial. The specific *amount* of value is more ambiguous and perhaps the subject of controversy, despite the attempts of academicians and practitioners over many decades to implement a systematic approach to valuation. All manner of different approaches to determining value and assessing overvaluation have been attempted over time, but, surprisingly, some significant gaps in knowledge remain. This is perhaps due to the fact that many studies employ valuation techniques as a means to study some other topic of interest, and therefore the energies of the researchers tend to be focused on a robustness approach in which the researchers tinker with assumptions in the valuation model and then check to find out if the main findings of interest are affected. This approach is in contrast to an approach which focuses upon the robustness of the valuation measures themselves and what changes in assumptions do to relative measures of overvaluation and undervaluation. The end result of this pattern is that a distinct shortage exists of explicit examinations of what happens to estimates of relative overvaluation and undervaluation of equities when changes are made in the inputs of the different valuation models. This study seeks to explicitly address some elements of that shortage for the residual income model specifically.

Meanwhile, although disagreements about stocks' value in the marketplace are not required to generate trade in stocks, such disagreements generally do exist and some trade in stocks results. Columns and articles in financial magazines and on financial websites regularly dedicate space to discussing this disagreement by presenting competing arguments side by side for why the current market price makes a stock overvalued or undervalued. The techniques employed can vary widely, and although some such articles will present a range of possible values for the stock, the specific determination of that range is rarely delineated clearly, and the effect of particular assumptions is often ignored altogether. Another perspective embraces market efficiency and simply views the current market price as the best estimate of a stock's value, regardless of what the financial press says about the matter.

In the midst of this murky world of valuation and the subsequent determination of overvaluation it is sensible to turn to a very brief overview of a selected set of historical developments in the history of common stock valuation. Over a century ago, Irving Fisher (1906) examined the nature of capital and income and concluded that capital derived its value from the present value of the associated income stream. This philosophy serves as the foundation for models based upon discounted dividends, earnings, or residual income. Some of the earliest literature which eventually led to the valuation approach utilized in this essay focused on attempts to value goodwill and other intangibles. By 1920 an excess earnings approach was described in a publication by the I.R.S. for use in handling the valuation of businesses affected by Prohibition (United States Treasury Department (1920)). This model employed an estimation of the tangible assets of a firm and the earnings in excess of the normal return on the tangible assets. Within a couple of decades Graham and Dodd (1951) presented a valuation approach which capitalized estimates of future dividends and earnings to estimate the intrinsic value of a firm's stock. The issues surrounding the choice of the capitalization rate were discussed at some length by Graham and Dodd (1951), as were the issues pertaining to the estimation of the future dividends and earnings. Perhaps one of the most famous valuation approaches was formalized by Gordon and Shapiro (1956) with the presentation of the constant growth dividend discount model of firm valuation.

Since the early decades of the theoretical development of the different valuation models several developments in finance theory shifted the approach to valuation. Under certain assumptions Miller and Modigliani (1961) showed that dividends are irrelevant. As later shown by Ohlson (1995), with clean surplus accounting and autoregression of abnormal earnings the dividend discount approach can be shown to be equivalent to the residual income model. This finding meant that some of the earlier approaches to valuation were not so different from each other as was once thought, although some of the models may be more forgiving of errors in assumptions than others. Although various studies implementing valuation models were performed over the decades, and although some studies were performed which evaluated the valuation models themselves in one way or another, an increasing focus upon market efficiency became pervasive in the finance literature. This emphasis upon market efficiency created a problem: instead of viewing market deviations from intrinsic value as estimated by a valuation model to be evidence of overvaluation or undervaluation, such deviations could be viewed as evidence of poor models. In effect, valuation models came to be judged by how closely they approximated the market price, which implicitly assumes that the market is pricing stocks efficiently. For example, Penman and Sougiannis (1998) evaluated truncation biases associated with different valuation models by comparing the intrinsic values estimated using the models with the market price.

This essay returns to the fundamental concept that shares of stock have some intrinsic value due to future earnings. Implementations of the residual income model are employed to generate estimates of intrinsic value. Estimates of the intrinsic values of stocks using realized earnings and book value data enable the determination of which stocks were relatively overvalued and which stocks were relatively undervalued at observed market prices. This approach using realized earnings makes it possible for a more fundamental set of questions about the residual income model approach to valuation to be addressed. How robust are relative valuation measures to different specifications of the residual income model? How do relative valuations change over time for stocks?

The return to fundamental principles in this study has produced some interesting findings. Overall, the relative valuation measures derived from the residual income estimates of intrinsic value demonstrate a remarkable degree of stability across various model specifications and in different market conditions. An analysis of acquisitions to validate the measures of relative valuation demonstrates properties consistent with prior research in many respects.

One finding is that substantially overvalued firms tend to remain overvalued for a protracted period of time. This effect may be seen in Figure 1. Beginning in 1964, firms are assigned to valuation deciles for the calendar year using the capm5 $VERR$ measure employed in this study. Decile one contains the most relatively undervalued firms during the calendar year, and decile ten contains the most relatively overvalued firms during the calendar year. Then, the subsequent valuation decile membership for each firm is determined for every calendar year over the next ten years to the extent the data is available. This process is rolled forward each year until it has been applied to every calendar year during the entire 1964–2009 period. The resulting decile data is analyzed in event time, with the initial valuation decile assignment occurring at time T, enabling all of the overlapping ten year periods of data over the 1964–2009 period to be aligned on a uniform ten year time line.

Each line in Figure 1 plots the average decile assignment over ten years for firms initially assigned to each of the respective valuation deciles. On average, firms beginning in the most overvalued decile, decile ten, only revert to an average decile assignment of a bit less than seven after ten years. In general, the most undervalued firms, represented by decile one, revert to an average decile assignment of over four after five years. Thus, the reversion of overvalued and undervalued firms on average to more moderate levels of relative valuation is slower than might be expected. This finding is reminiscent of the findings of Lemmon, Roberts, and Zender (2008)

Figure 1
Evolution of Average Annual Decile Assignments

Beginning in 1964, firms are assigned to valuation deciles for the calendar year using the capm5 *VERR* measure. Decile one contains the most relatively undervalued firms during the calendar year, and decile ten contains the most relatively overvalued firms during the calendar year. Then, the subsequent valuation decile membership for each firm is determined for every calendar year over the next ten years to the extent the data is available. This process is rolled forward each year until it has been applied to every calendar year during the entire 1964–2009 period. The resulting decile data is analyzed in event time, with the initial valuation decile assignment occurring at time *T*, enabling all of the overlapping ten year periods of data over the 1964–2009 period to be aligned on a uniform ten year time line.

Each line plots the average decile assignment over ten years for firms initially assigned to each of the respective valuation deciles. For example, firms which are in decile 10 at time *T* and which remain in the sample through time *T+1* have an average decile assignment of roughly nine and a half at time *T+1*. Firms with missing decile assignments at a specified time horizon are omitted from the average decile assignment depicted on the graph for that time horizon despite being present at time *T*.

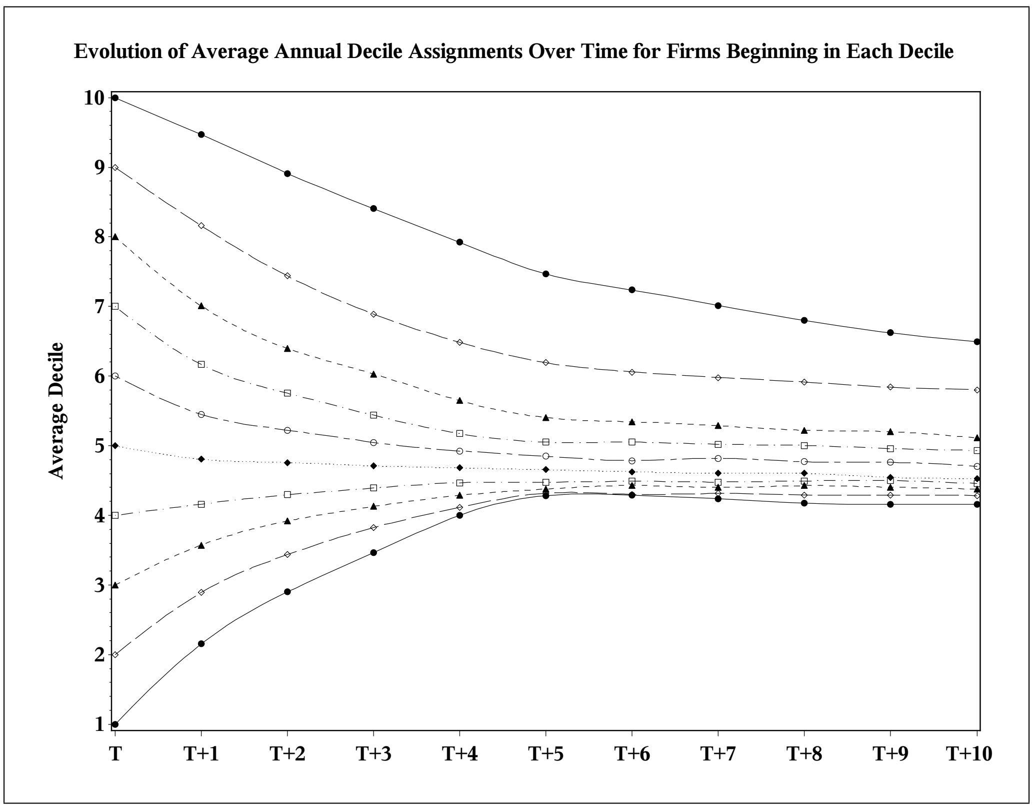
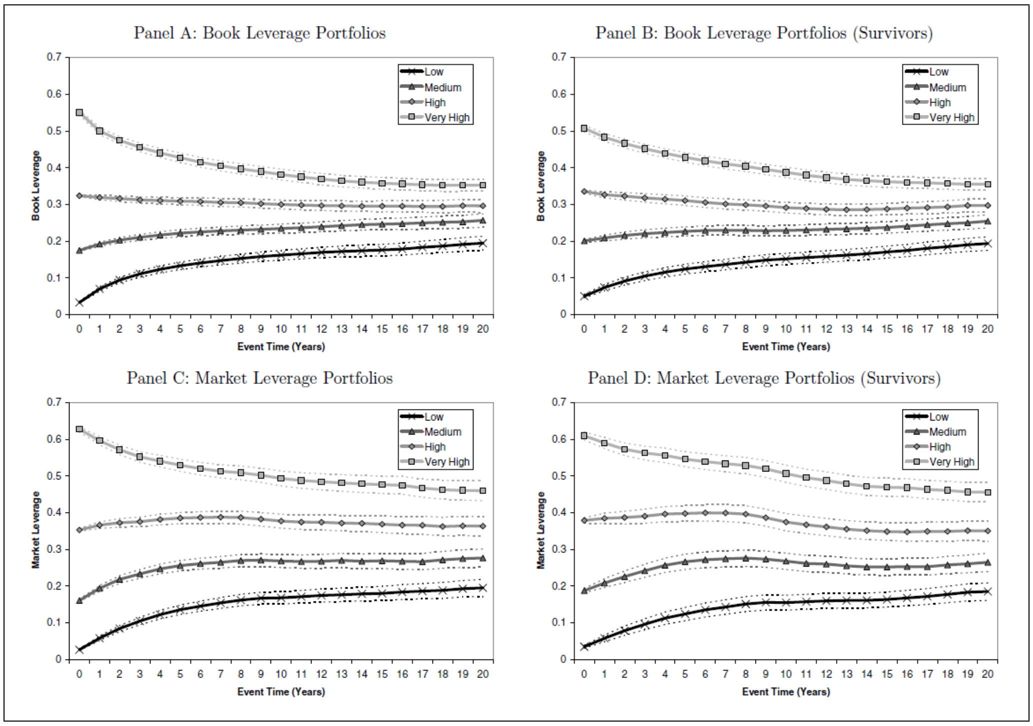


Figure 2
Evolution of Leverage Ratios from Lemmon et al. (2008)

This figure is a presentation of Figure 1 from the study by Lemmon et al. (2008). As described by Lemmon et al. (2008), firms were assigned to four leverage portfolios each year, and then the average leverage ratio for each portfolio was tracked over time. The aggregate average of the leverage ratios for each of the four portfolios at each point relative to the portfolio assignment date is displayed in each of the plots below.



in a study of capital structure. Lemmon et al. (2008) returned to fundamental issues associated with capital structure and found that capital structure for firms tends to be remarkably persistent. A key figure from the study by Lemmon et al. (2008) has been presented in Figure 2. As is evident, just as a return to fundamental issues in capital structure resulted in the realization that capital structure is quite stable over time, a return to fundamental issues in relative valuation results in the curious finding that the most overvalued firms are persistently overvalued on average for a prolonged period of time, and also that even the most undervalued firms revert to more moderate levels of relative valuation more slowly than might be expected.

The mispricing of equity securities has potentially significant implications. For example, widespread mispricing could be entangled with the effect of firm size as measured by market value or the book-to-market ratio in common asset pricing approaches. The effect of investor sentiment in investment choices could also relate to mispricing. If mispricing consistently arises from, or may be predicted by, observable factors, lucrative investment strategies could be employed. As noted above, the data presented in Figure 1 suggest that mispricing is persistent for several years, and therefore its effects may not be averaged out using short time horizons. Significantly, systematic and persistent mispricing is inconsistent with an efficient market. Random market fluctuations could produce mispricing, but such random mispricing should not be persistent in an efficient market. Pricing errors in general could occur in an efficient market, but market efficiency suggests that such pricing errors should be transient as investors buy undervalued equities and sell or short sell overvalued equities. The systematic and long lasting mispricing depicted in Figure 1 is inconsistent with either of those explanations and is consequently inconsistent with market efficiency. Robustly measuring mispricing could therefore have extremely significant theoretical and empirical implications, but robustly measuring mispricing must necessarily begin by using some theoretical model to find the value of a firm's common equity.

Stock valuation models typically focus upon finding the present value of expected future benefits of ownership. The specific implementations of that broad construct vary markedly. Some models have focused upon discounting dividends, while others have focused upon discounting some measure of cash flows or earnings. The various implementations have utilized different estimates of the discount rate, the relevant time horizon, the terminal value, etc. This essay will not resolve those differences. Rather, the goal of this study is to ultimately measure mispricing in a robust manner, and measuring mispricing requires estimating the value of a firm's common equity.

To enable the exploration of mispricing, an excess earnings valuation model is employed to determine the intrinsic value of common stock. The excess earnings model employed is an implementation of the residual income model, which adds book value to the discounted future earnings in excess of a required return on equity to find the value of the common stock. The earnings in excess of the required return on equity are often also termed abnormal earnings. Other common valuation models use discounted dividends or cash flow. Although forms of the residual income model have been in existence since at least the early twentieth century, Ohlson (1995) showed that with clean surplus accounting and autoregression of the abnormal earnings the dividend discount approach can be shown to be equivalent to the residual income model. However, the residual income model has a few features which make it more attractive to implement than various other models. First, the residual income model does not require that a firm pay dividends, which circumvents a difficulty associated with dividend discount models. Second, discounting abnormal or excess earnings instead of discounting cash flow or dividends makes the residual income model less sensitive to truncation of the period of time used in the model. In effect, the terminal value calculation required in finite implementations carries less weight for the residual income model than it does for models based upon cash flow or dividends. Third, Penman and Sougiannis (1998) found that models based upon accruals earnings, such as the residual income model, did a better job of matching observed stock prices over finite time horizons than other dividend or cash flow models of valuation. Fourth, the residual income model tends to minimize the impact of overstating or understating revenues or expenses in a given period. If earnings are overstated in one period, leading to higher excess earnings in that period, the book value used in the next period to calculate the excess earnings for the residual income model will be higher, shifting the estimated excess earnings in the second period in a downward direction which at least partially offsets the initial overstatement of earnings for the first period. The theoretical model for the intrinsic value of common equity underlying this study is presented in Equation 1. In the following equation, *BVPS* represents the book value per share, *EPS* represents the earnings per share, and r represents the applicable cost of equity.

$$IV_t = BVPS_t + \sum_{i=1}^{\infty} \frac{EPS_{t+i} - (r * BVPS_{t+i-1})}{(1+r)^i} \tag{1}$$

As noted above, the value of the firm's common equity using the excess earnings model is the sum of the current book value and the discounted earnings in excess of a required return on the book value. All valuation models require strong assumptions, and this model is no different. However, some valuation models are more sensitive to the assumptions which are made than others. In the case of the model presented in Equation 1, the assumptions required fall into two broad categories: assumptions made by the theory underlying the model, and assumptions required during implementation of the model. The key assumptions made by the theory underlying the residual income model are that clean surplus accounting applies, that current period dividends decrease book value but not current earnings, and that there is autoregression of the abnormal earnings. Clean surplus accounting means that all changes in book value arise from earnings less net dividends, where net dividends refers to the amount of dividends net of capital contributions. A discussion of the assumptions required during the implementation of the model is particularly relevant, as measures of mispricing are subject to the nature of the implementation assumptions made when the intrinsic value of a firm's equity is calculated. Thus, an introduction to those implementation assumptions is in order.

When considering the empirical implementation of the model in Equation 1, obviously book values, earnings, and discount rates are required. To determine the sensitivity of the equity valuation model in Equation 1 to different specifications of book value and earnings, two approaches are used in this study. The first approach uses realized book values per share and earnings per share before extraordinary items. The second approach abandons the use of per share data and values all of a firm's common equity by using realized aggregate book values and realized measures of earnings. In addition, the second approach also uses a different definition of book value compared to the first approach. The earnings estimate the second approach uses excludes depreciation and amortization expenses, among other things.

In the quest for a robust measure of mispricing consideration must be given to the cost of equity required by the model displayed in Equation 1. Eight different cost of equity specifications are used to determine the sensitivity of the valuation measures to the choice of the cost of equity. Additional details regarding the cost of equity figures are discussed in the Methodology section.

Implementation of the model in Equation 1 requires that a finite period of time be used. This produces two interrelated issues. First, the choice of a finite time horizon limits the amount of information included in the model. Fortunately, because this model is based upon excess earnings instead of total dividends, cash flows, or earnings, this choice is of less concern for this model than for some other models. Second, the use of a finite time horizon requires a terminal value estimation in the place of the infinite series of excess earnings. Importantly, the terminal value estimation is of less significance for the excess earnings approach employed than for several other valuation models. This is the case because the terminal value for this model incorporates the estimated earnings in excess of the required return, not the full future earnings, cash flows, or dividends used by some models.

When mispricing measures are calculated using the estimated intrinsic values derived from the different model specifications briefly described above, the results are found to be quite robust. The different model specifications are used to assign firm level observations to valuation deciles. The valuation deciles are highly correlated across model specifications, decile assignment methods, and market conditions. This finding, in combination with the theoretical underpinnings of the model, suggests that the relative valuation measures developed may be used to address other areas of research affected by mispricing.

The remaining sections of this essay are organized as follows. Section 1.2 reviews the relevant literature pertaining to the excess earnings approach to firm valuation. The methodology used in the implementation of the valuation model to determine firm value and the methodology used in the calculation of the valuation measures to determine mispricing are presented in Section 1.3. The empirical results for the valuation measures and their robustness across the different specifications are discussed in Section 1.4. The relative valuation measures derived are applied to a sample of acquisitions to confirm that the results obtained are consistent with prior literature and to further examine the relationship between relative overvaluation and acquisitions. Those results are presented in Section 1.5, and Section 1.6 concludes this essay.

1.2 Valuation Literature Review

In this section the literature relevant to the excess earnings approach to firm valuation is reviewed. Although the approach has been in use for nearly a century in one form or another, some of the most significant theoretical work was done in the mid-1990s. Despite the passage of time, some gaps in knowledge about the model remain, particularly in the area of how different model specifications such as discount rates and alternative measures of earnings and book values affect relative estimates of valuation. The review of the literature is mostly laid out in chronological order after a brief discussion of the reasons behind the selection of the residual income model.

As discussed in the Introduction, there are other common valuation models available which use discounted dividends or cash flow. Importantly, Ohlson (1995) showed that with clean surplus accounting and autoregression of the abnormal earnings the residual income model may be derived from the common dividend discount approach to firm valuation. However, the residual income model has a few features which make it more attractive to implement than various other models. First, the residual income model does not require that a firm pay dividends, which circumvents a difficulty associated with implementations of dividend discount models. Second, combining book value with the discounting of abnormal or excess earnings instead of discounting total cash flow or dividends makes the residual income model less sensitive to truncation of the period of time used in the model. In effect, the terminal value calculation required in finite implementations carries less weight for the residual income model than it does for models based upon cash flow or dividends. Third, Penman and Sougiannis (1998) found that models based upon accruals earnings, such as the residual income model, did a better job of matching observed stock prices over finite time horizons than other dividend or cash flow models of valuation. Fourth, the residual income model tends to minimize the impact of overstating or understating revenues or expenses in a given period. If earnings are overstated in one period, leading to higher excess earnings in that period, the book value used in the next period to calculate the excess earnings for the residual income model will be higher, shifting the estimated excess earnings in the second period in a downward direction which at least partially offsets the initial overstatement of earnings for the first period. These desirable characteristics of the residual income model compared to dividend and cash flow models led to the selection of the residual income model for use in this study.

Some of the earliest literature which eventually led to the valuation approach utilized in this essay focused on attempts to value goodwill and other intangibles. One of the earliest discussions of the business valuation of goodwill appeared in the Appeals and Revenue Memorandum 34 from the I.R.S. (United States Treasury Department (1920)). In that publication, as well as in other early publications, the focus on goodwill stems from the attempt to quantify the value contributed by the goodwill or other intangibles in excess of the value contributed by the tangible assets. Earnings produced by an enterprise in excess of a normal rate of return on the tangible assets were attributed to the intangible assets and capitalized to determine the value of the intangible assets. Preinreich (1936) discussed the historical legal developments associated with goodwill and connected the value of goodwill to excess profits and excess return on investment. While exploring the implications of depreciation methods, Preinreich (1938) provided a valuation formula for assets regardless of the book value and depreciation method used–and the formula provided utilized the book value of the asset and the present value of excess profits derived from the asset.

In the case of capital budgeting, Peasnell (1981) sought to connect asset valuations based upon a discounted cash flow approach with valuations based upon accounting profits. If income is interpreted as a profit in excess of the cost of capital return, Peasnell (1981) showed that the standard discounted cash flow approach could be transformed into an approach based upon accounting profits. In a related article, Peasnell (1982) showed that the net present value of an asset could be defined in terms of a form of accounting profit in excess of the opportunity cost of capital. Specifically, finding the economic value of an asset is possible using clean surplus accounting profits and the appropriate adjustment to account for capital valuation errors. Clean surplus accounting means that all changes in book value arise from earnings less net dividends, where net dividends refers to the amount of dividends net of capital contributions. This ability to find the economic value of assets by using clean surplus accounting profits provides a very useful demonstration of the natural link between accounting figures and asset valuation in the capital budgeting case and also in broader asset valuation cases such as the valuation of common equity.

Penman (1991) found that market-to-book ratios were informative about the persistence of return on equity (ROE), which has implications for firm valuation in the context of excess profit valuation models. Firms with higher market-to-book ratios were found to be slower to experience reversion to the median ROE if the beginning ROE was high as well as faster to experience reversion to the median ROE if the beginning ROE was low. After discussing the difficulties facing discounted dividend valuation models due to the arbitrary nature of dividends and the problems discounted cash flow valuation models involve by requiring infinite forecasts, Penman (1992) focused upon valuation approaches pricing current earnings with the price-to-earnings (P/E) ratio and pricing book values with the price-to-book (P/B) ratio. When pricing book values, Penman (1992) emphasized implications of the excess earnings approach to valuation. Specifically, the residual income model indicates that the difference between price per share and book value per share should be equal to the present value of the excess, or abnormal, earnings. Penman (1992) also pointed out one implication of the residual income model is that the expected growth in book value should drive the connection between price and current book value. Interestingly, Penman (1992) proposed using different combinations of P/E and P/B ratios to tease out more refined implications than those which are provided by either measure alone. In this framework, P/E ratios are indicative of the level of projected future earnings relative to present earnings while P/B ratios are indicative of the level of projected future earnings relative to what book values would be expected to produce.

A series of papers in 1995 examined some of the theoretical underpinnings of the excess earnings approach to valuation and its implications. Ohlson (1995) began with a discounted dividends approach to valuation and showed that the excess earnings approach to valuation could be derived if clean surplus accounting is assumed, if current dividends reduce book value but not current earnings, and if the abnormal earnings follow an autoregressive process. Furthermore, Ohlson (1995) showed that if current dividends are assumed to reduce current book values but not current earnings, then the excess earnings valuation model also possesses the property that dividends are irrelevant to the value of the firm as discussed in Miller and Modigliani (1961). Feltham and Ohlson (1995) showed that the change in price resulting from a change in earnings is larger for accrued earnings than for cash earnings when the excess earnings valuation approach is used and the accounting is conservative. Feltham and Ohlson (1995) defined conservative accounting to be when market value exceeds book value on average. In addition, Feltham and Ohlson's (1995) analysis revealed that a larger change in price would result from changes in either accrued or cash earnings if excess earnings were more persistent.

Articles focusing upon the application of the excess earnings approach and addressing questions raised by the approach were also published in 1995. If the excess earnings valuation approach is to be used, the forecast horizon which is necessary for the model should be examined. When Value Line forecasts of earnings for one, two, and four years into the future were used in regressions of price upon the components of an excess earnings model, Bernard (1995) found that even a four year time horizon lacking a forecast for year three could explain nearly 70% of the variation in stock prices. In an article discussing common questions about the models used by Ohlson (1995) and Feltham and Ohlson (1995), Lundholm (1995) addressed issues pertaining to nonaccounting information, dividend signaling, and the effects of the linear information assumption. An example showed that nonaccounting information is incorporated in the model via future earnings. Lundholm (1995) also showed that in the Ohlson model the effect of dividend signaling upon the stock price is secondary to the impact of the dividend upon the stock price due to the reduction in available assets used to generate future earnings. Thus, the excess earnings approach to valuation is not inconsistent with the existence of dividend signaling. Although the linear information assumption is not necessary for the application of the model, Lundholm (1995) demonstrated by example that the presence of that assumption is necessary to make the dividend policy irrelevant. Interestingly, Lundholm (1995) noted that to the extent that conservative accounting consists of understating book value, offsetting increases in excess earnings should be created in the future when the excess earnings valuation approach is used. However, the Feltham-Ohlson model was noted as not being robust to some other definitions of conservative accounting.

A study by Penman and Sougiannis (1998) compared various dividend, cash flow, and earnings based valuation methods and found that methods based upon accrual earnings more closely matched observed stock prices over finite time horizons. In the course of comparing the different methods, Penman and Sougiannis (1998) utilized an efficient market framework by measuring valuation accuracy relative to observed prices. The methods based upon accrual earnings generally exhibit their widest deviation from observed prices at particularly high or low book-to-price (B/P) or earnings-to-price (E/P) values.

In a study examining the connections between current ROE, future ROE, P/B, and P/E ratios, Penman (1996) found that the P/B is related to future residual income. This result is consistent with the excess earnings approach to valuation. Because of the connection between P/B and future residual income, P/B is related to future ROE. On the other hand, Penman (1996) found that E/P ratios did not demonstrate the same level of relationship to future residual income. Rather, E/P ratios are related to the difference between present and future ROE values.

In a particularly interesting application of an excess earnings valuation approach, O'Hanlon and Peasnell (2002) developed a model using a residual income approach over a historical period to determine the economic value created during that period. The authors noted that one significant application of this approach would be to combine it with value-based management. Significantly, in this framework the economic value created may be calculated by only resorting to an examination of the residual incomes.

An excess earnings valuation approach dependent upon a no arbitrage condition and clean surplus accounting was detailed by Feltham and Ohlson (1999). In this updated approach to the earlier models by Ohlson (1995) and Feltham and Ohlson (1995) the authors moved away from the assumption of risk neutrality. Feltham and Ohlson (1999) noted that the use of risk-adjusted discount rates, although serviceable in practice, lacked theoretical support in the context of the excess earnings valuation approach. The issue of the impact of the truncation of the period examined when using the excess earnings valuation approach instead of a cash flow valuation model was also addressed. In applying the excess earnings approach to valuation, truncation is less problematic if the value of the operating assets on the books is sufficiently similar to market value and if the value of the abnormal earnings tend to zero as the time horizon becomes long (Feltham and Ohlson (1999)). Ohlson (2005) proposed a further modification to the excess earnings approach to valuation by suggesting that the book values in the formula be replaced by capitalized earnings. This approach avoids complications associated with determining the proper book value per share which may result from the issuance or repurchase of shares and from other causes of ambiguity regarding the proper measure of book value per share. The various propositions included in Ohlson's (2005) study also suggested that shifting towards the use of capitalized earnings instead of book values in the excess earnings formula should never result in a worse model.

As the preceding literature review shows, the residual income model has several very desirable properties as a base valuation model. Ohlson (1995) showed that with clean surplus accounting and autoregression of the excess earnings the excess earnings approach to firm valuation is equivalent to the dividend discount approach. Even with a four year time horizon lacking year three Bernard (1995) found that a residual income model using Value Line data could explain a significant portion of variation in stock prices. The reliance upon excess earnings in the model instead of total earnings or dividends reduces the effect of the terminal value calculation in finite period implementations, leading to better performance despite truncation, as documented by Penman and Sougiannis (1998). However, the impact of alternative cost of equity and earnings and book value specifications upon relative valuation measures derived from the model remains to be seen, and that gap in knowledge is what this study seeks to address.

1.3 Valuation Methodology

The valuation methodology has been divided into two sections: a section addressing the calculation of the intrinsic value estimates for firms and a section detailing the calculation of the valuation error measures. The intrinsic value estimates are calculated using eight different discount rate specifications and two different measures of earnings and book values. Estimated intrinsic values are then used to calculate valuation error measures as detailed in the second section. Valuation errors or mispricing naturally lie along a spectrum. Shares of equity selling at market prices less than intrinsic value are undervalued, and shares of equity selling at market prices greater than intrinsic value are overvalued. However, as intrinsic values are estimated with uncertainty no matter what model is used, the precise tipping point between undervalued and overvalued equities is unclear. Nevertheless, with the approach used in this study the valuation measures are quite clear about which equities are *relatively* more overvalued or undervalued even if the precise tipping point between undervalued and overvalued is murky for individual equities. Therefore, in the context of this study, because undervaluation and overvaluation refer to opposite ends of the same unified valuation spectrum, the most overvalued firms are considered to be the least undervalued, and vice versa. Consequently, overvaluation is frequently used to refer to the spectrum of valuation generally for the sake of convenience.

1.3.1 Calculation of Firm Value

As this study focuses upon the spectrum of valuation ranging from undervaluation to overvaluation, the calculation of firm value is one of the study's most important aspects. As noted in the Introduction and Motivation section, an excess earnings approach to firm valuation is utilized. When implementing the valuation model in Equation 1, various choices may be made regarding the earnings, book values, discount rates, and time horizon to use in the abnormal earnings valuation model. Because the focus of this study is upon determining relative overvaluation, realized historical values are used for the book values and the earnings figures in the model instead of relying upon forecasts. This choice of historical, or realized, results is driven by the focus in this study upon measuring the intrinsic value of firms in order to assess the extent to which firms were overvalued or undervalued. In a study by Brown and Cliff (2005) examining overvaluation and investor sentiment the authors note that the valuation methodology based on analysts' forecasts used by Lee, Myers, and Swaminathan (1999) produced an intrinsic value measure which responded to investor sentiment. Estimates of intrinsic value based upon analysts' forecasts are therefore problematic when the true intrinsic value of the firm is desired because sentiment and other biases can influence analysts' forecasts. Put differently, this essay uses historical earnings and book value figures for the simple reason that the outcomes have actually occurred, the figures have been audited, and the numbers have been reported–the earnings and book value numbers used in the model are not projections of outcomes but actual *known* outcomes.

Earnings figures, book values per share, and other company data are obtained from COMPUSTAT through Wharton Research Data Services (WRDS). In effect, perfect foresight is assumed to facilitate more direct measurement of overvaluation and undervaluation. Several types of companies are dropped from further analyses. All valuation data for utilities, banking, insurance, real estate, and financial trading firms is dropped. Also, valuation data for all firms with SIC codes from 4950–4991 is dropped, resulting in the elimination of the miscellaneous sanitary services, steam and air conditioning supply, irrigation systems, and cogeneration firms with those SIC codes. Finally, firms with missing SIC codes are dropped. For firms in the sample with SIC codes the dropped firms correspond to industry groups 31 and 45–49 using the 49 industry groupings available through Professor French's website. Following the approach by D'Mello and Shroff (2000) to perform a finite implementation of the residual income model presented in Equation 1 produces the valuation formula in Equation 2 which is applied to the remaining firms in the sample. Equation 2 is as follows:

$$IV_t = BVPS_t + \sum_{i=1}^{5} \frac{EPS_{t+i} - (r * BVPS_{t+i-1})}{(1+r)^i} + \frac{TV}{r * (1+r)^5} \tag{2}$$

In Equation 2 the present values of the excess earnings are determined for a five year time horizon. Because the emphasis in this study is upon determining overvaluation and undervaluation relative to known earnings and book value outcomes, annual data is used over the five year time horizon. Annual financial statements are subject to external audits, thereby increasing the quality of the figures used in the calculation of the intrinsic value of the firms in the sample following Equation 2. It is important to note that a finite time horizon implementation of the excess earnings approach produces representative results using a time horizon with as few as four years, as noted by Bernard (1995). Furthermore, Feltham and Ohlson (1999) showed in a theoretical paper that the excess earnings approach is less affected by truncation if excess earnings tend to zero and if operating asset book values reasonably approximate market values. In both cases the importance of the excess earnings terms in the residual income model is diminished if the conditions are met, producing the result that an estimated intrinsic value based on a truncated time period can more accurately approximate the true intrinsic value of a firm despite the truncation. According to Feltham and Ohlson (1999), this result favors the residual income approach over a typical cash flow approach, which is not normally expected to have future cash flows which tend towards zero and which is not based upon excess cash flows. In an implementation of the residual income model similar to the one used in this essay, D'Mello and Shroff (2000) used a five year perfect foresight model with an adjustment treating the average excess earnings from the last two years of the time horizon as a perpetuity. This study mirrors that general approach in many respects. The terminal value calculation is presented below:

$$TV = \{[EPS_4 - (r * BVPS_3)] + [EPS_5 - (r * BVPS_4)]\}/2 \qquad (3)$$

To avoid introducing a survivorship bias, firms are not required to have earnings or book value data for the full valuation period. Consequently, the intrinsic value of firms with four or fewer years of available data is calculated by applying the available data to the valuation formula to the extent possible. As in D'Mello and Shroff (2000), negative terminal values are set to zero.

A few points of clarification are necessary regarding the implementation of the model presented in Equation 2. For the purposes of this study, earnings per share excluding extraordinary items is used as the measure of *EPS*. As extraordinary items include such things as costs pertaining to natural disasters or unforeseeable events which are random, unpredictable, and unrelated to a company's line of business, including extraordinary items in the earnings per share would add random noise to estimates of overvaluation and undervaluation. Because realized outcomes are used in this study, adjustments to account for stock splits, etc. are made to the earnings per share and the book values per share in order to keep the values used comparable during the finite time horizon in Equation 2. Similar adjustments are made to the reported market values used in the calculation of the valuation errors. When implementing Equation 2, only firms with positive book values per share are utilized. However, because realized earnings per share and book values per share are used, calculated firm values per share can be negative if a firm produces sufficiently large negative abnormal earnings over the finite time horizon. Because negative calculated firm values for a given point in time include information about the relative degree of mispricing of the firm's shares in the market at that same point in time, negative calculated firm values are allowed to remain in the sample.

Following methodology similar to D'Mello and Shroff (2000), the cost of capital value, r in Equation 2, is found using a Capital Asset Pricing Model (CAPM) approach and a Fama-French three factor model approach. For the CAPM approach, daily return data from the Center for Research in

Security Prices (CRSP) and obtained through WRDS is used to calculate β from the year ending eleven days prior to the data date for the fiscal data in COMPUSTAT for each stock. A minimum of one hundred daily return observations is required for the estimated β coefficient to be considered valid. As in D'Mello and Shroff (2000), the aggregate coefficient method outlined by Dimson (1979) and modified by Fowler and Rorke (1983) is utilized when calculating the β for each firm using the daily return data. The use of daily return data with the CAPM approach enables the estimation of β, and therefore the cost of capital value, r, using company-specific returns over a time frame which is much closer to the valuation date than if monthly data were used. The expected market risk premium is calculated by taking the arithmetic average of the spread between the trailing annual value-weighted market return from CRSP and the yield for 5-year constant maturity treasuries using a rolling ten year window ending one month prior to the valuation date for each company in each year. The beginning of the first ten year window is April of 1954. The yield for the 5-year constant maturity Treasuries from the month prior to the valuation date for each company in each year is used as the riskless rate, with the maturity period consequently matching the number of years used in the valuation model described in Equation 2. Finally, the annual discount rate, r, is found using Equation 4. Subscripts for time and company have been suppressed.

$$r = r_f + (MRP_{average})\beta \tag{4}$$

Next, a firm-specific cost of equity capital is created using the Fama-French three-factor model. The Fama-French approach employed uses monthly data instead of daily data, adding another dimension of variability in the discount rate methods employed. The additional variability in methodology is desirable as assessing the robustness of the relative valuation measures to alternative specifications is one of the main focuses of this essay. Five years of monthly returns for each stock are regressed upon the three Fama-French factors to determine the sensitivity of each security to each factor. The five year period for each regression ends one month prior to the end of the valuation month. Arithmetic averages of the monthly values for each of the three factors are generated using rolling ten year windows ending one month prior to the valuation date, and those averages are used as the expected values for the three factors. The first month of the first rolling ten year window is January of 1950. Data for the Fama-French factors is from WRDS courtesy of Professor French's website. The one month Treasury bill rate from the month preceding the valuation month is used as the riskless rate to remain consistent with the calculation of the excess return on the market factor in the Fama-French data provided courtesy of Professor French's website. Monthly cost of equity figures are calculated using Equation 5. The resulting monthly expected return for each security is annualized to find the cost of equity capital according to the three-factor model. Subscripts for time and company have been suppressed in Equation 5.

$$r = r_f + (MRP_{average})\beta_1 + (SMB_{average})\beta_2 + (HML_{average})\beta_3 \quad (5)$$

Cost of equity capital figures generated using the CAPM and the Fama-French three factor model which are outside the range of 3–30% are winsorized to lie at the boundary of the range. This is the procedure followed by Dong, Hirshleifer, Richardson, and Teoh (2006) when using an analysts' forecasts valuation model.

To allay concerns about the use of cost of equity capital rates which themselves presume the validity of a particular model, two additional observable and market determined time varying rates are applied to all valuations. The first is Moody's aggregate monthly BAA bond interest rate, and the second is Moody's aggregate monthly AAA bond interest rate. Because these rates are not company specific, rates from the valuation month are used in the valuation. Both rates are obtained from FRED data provided by the St. Louis Federal Reserve Bank.

The assumption of perfect foresight for the earnings per share and book values per share while only using cost of equity capital rates contemporaneous with, or prior to, the valuation date could seem inconsistent. To address these concerns and to further explore the sensitivity of the main valuation model in Equation 7 to alternative applications of the cost of equity capital, appropriate future cost of equity values are also utilized in addition to the methodology described previously. For this implementation the abnormal earnings terms are calculated using cost of equity rates which apply at the time of the earnings. The same four approaches to the cost of equity discussed previously are employed. Using the CAPM rate as an example of the future cost of equity capital approach, a firm's abnormal earnings term for the end of the first year is found using the CAPM rate derived from the year ending eleven days before the earnings for the first year in the model. Similarly, the CAPM rate derived from the year ending eleven days before the second year of earnings is used in the abnormal earnings term for the second year. The same approach is applied to subsequent years as well under this methodology. This approach better aligns the cost of equity rates used in each abnormal earnings term with the time period of the excess earnings, and thus this approach is consistent with perfect foresight on the valuation date applying to the discount rates in addition to the earnings and book values in the model. When using the future Fama-French cost of equity rates the rate applied to each of the future abnormal earnings terms is the rate derived from the five year period ending one month prior to the appropriate year's earnings. In other words, the cost of equity used for the abnormal earnings term for year one is the Fama-French cost of equity estimated using the five year period ending in the month prior to the earnings used in that abnormal earnings term. The same convention applies to the other abnormal earnings terms in the model. For the two aggregate bond interest rate approaches each abnormal earnings term uses the aggregate bond interest rate for the month associated with the earnings. Due to the four static discount rates discussed previously and the use of the four future discount rate methods described a total of eight different implementations of the five year model presented in Equation 2 are produced.

To further explore the robustness of the excess earnings approach another version of the model presented in Equation 2 is utilized. Instead of using earnings per share before extraordinary items, this valuation model uses an approach based upon *EBITDA* with various subtractions. There are two primary differences between the *EBDA* measure of earnings presented in Equation 6 and the measure of earnings used in Equation 2. First, the measure of earnings presented in Equation 6 uses an aggregate measure of earnings instead of a measure of earnings per share. This generates a firm level estimate of intrinsic value when used in Equation 7 instead of a per share estimate of intrinsic value, sidestepping any share related issues which might arise when using per share data despite using the proper adjustments to keep per share data comparable over time. Second, the *EBDA* measure of earnings excludes depreciation and amortization. A number of firms have negative estimated intrinsic values when Equation 2 is used. By ignoring depreciation and amortization the *EBDA* measure of earnings produces estimates of intrinsic value which are less likely to be negative, providing a means to validate the calculation of negative intrinsic values derived from the per share methodology. The use of the *EBDA* measure as an alternative input when calculating intrinsic value also makes it possible to test the robustness of the relative valuation measures derived from the intrinsic value estimates to alternative specifications of earnings and book values. The *EBDA* measure of earnings is presented below.

$$EBDA = EBITDA - XINT - TXT - DVP \tag{6}$$

In the above equation $XINT$ is the total interest and related expense, TXT is the total income taxes, and DVP is the total preferred dividends. Also, the firm's book value for this model is calculated following the approach to book value used by Fama and French (1993). The resulting valuation model is presented in Equation 7, and the relevant terminal value calculation is presented in equation 8.

$$eIV_t = BV_t + \sum_{i=1}^{5} \frac{EBDA_{t+i} - (r * BV_{t+i-1})}{(1+r)^i} + \frac{TV}{r * (1+r)^5} \tag{7}$$

$$TV = \{[EBDA_4 - (r * BV_3)] + [EBDA_5 - (r * BV_4)]\}/2 \tag{8}$$

The static CAPM, Fama-French, and two Moody's bond rates described previously are also used as the discount rates with the implementation of the excess earnings model presented in Equation 7. This results in four base variants of the model displayed in Equation 7. As this implementation of the excess earnings model values all of a firm's common equity instead of the value per share, the resulting *eIV* measure is compared to the total market value of common equity instead of the price per share. As with the *EPS* based model, appropriate future discount rates are employed as well. This adds another four variants of the *eIV* measures of firm value. The same procedure for the future discount rates applied to the regular *IV* model is employed for the future discount rates used with the *eIV* model.

1.3.2 Calculation of Firm Specific Overvaluation Measures

The *IV* and *eIV* measures discussed in the prior section are used to calculate corresponding measures of firm specific overvaluation. The main measure of firm specific overvaluation is calculated using this formula:

$$VERR_t = \frac{P_t - IV_t}{P_t} \tag{9}$$

In Equation 9, P_t represents the market price per share reported for the end of the valuation month. Market prices are adjusted to account for the effects of stock splits, etc. The *VERR* measure of firm specific overvaluation therefore finds the deviation of the market price per share from the intrinsic value of the firm per share scaled by the market price per share. The market price is used in the denominator of the *VERR* measure instead of scaling by the IV_t to address the problem of negative estimated intrinsic values. For firms with positive intrinsic values, *VERR* values greater than zero theoretically represent overvaluation, and *VERR* values less than zero theoretically represent undervaluation. Firms with negative intrinsic values should be overvalued at any price, and using the market price in the denominator in the *VERR* calculation preserves the meaning of the *VERR* measure's directionality and magnitude for firms with negative intrinsic values.

The formula for finding the firm specific market valuation error using the *EBITDA* based approach is analogous to the *VERR* formula. It is presented below:

$$eVERR_t = \frac{MV_t - eIV_t}{MV_t} \quad (10)$$

For this valuation measure adjusting for stock splits is not necessary as the full market value of the firm's common equity is employed to match the firm value calculated by the eIV_t measure. In the same manner as above, positive $eVERR$ measures theoretically correspond to overvaluation in this framework, and negative $eVERR$ measures theoretically correspond to undervaluation.

The number of observations for the $VERR$ measure with valid valuation data and the time horizon involved varies slightly with the cost of equity approach employed. For the static CAPM cost of equity the final $VERR$ sample spans the 1964–2009 period and includes 134,205 firm years. The static Fama-French cost of equity approach produces a final $VERR$ sample of 117,523 firm years with valid valuation data over the 1960–2009 period. Both of the static aggregate bond interest rate approaches to the $VERR$ calculation result in 135,054 firm years spanning the 1960–2009 period. The static CAPM methodology produces $VERR$ data over a smaller number of years due to the use of the 5-year constant maturity Treasuries as the riskless rate in the CAPM equation and in the calculation of the market risk premium. As expected, the use of the future discount rate approach discussed previously has an impact upon the number of firm years for the CAPM and Fama-French methodologies used in the $VERR$ calculation. The future CAPM discount rate approach results in a $VERR$ sample size of 130,828 firm years over the 1964–2009 period, while the future Fama-French discount rate approach produces a final $VERR$ sample of 117,364 firm years over the 1960–2009 period. The number of firm years and sample period are unchanged for the two future aggregate bond interest rate approaches to the $VERR$ calculation.

The number of observations for the $eVERR$ measure with valid valuation data and the time horizon involved also varies slightly with the cost of equity approach employed. For the static CAPM cost of equity the final $eVERR$ sample spans the 1964–2009 period and includes 122,044 firm years. The static Fama-French cost of equity approach produces a final $eVERR$ sample of 106,831 firm years with valid valuation data over the 1960–2009 period. Both of the static aggregate bond interest rate approaches to the $eVERR$ calculation result in 122,364 firm years spanning the 1960–2009 period. The static CAPM methodology produces $eVERR$ data over a smaller number of years due to the use of the 5-year constant maturity Treasuries as the riskless rate in the CAPM equation and in the calculation of the market risk premium. As expected, the use of the future discount rate approach discussed previously has an impact upon the number of firm years for the CAPM and Fama-French methodologies used in the *eVERR* calculation. The future CAPM discount rate approach results in a *eVERR* sample size of 119,265 firm years over the 1964–2009 period, while the future Fama-French discount rate approach produces a final *eVERR* sample of 106,697 firm years over the 1960–2009 period. The number of firm years and sample period are unchanged for the two future aggregate bond interest rate approaches to the *eVERR* calculation.

1.4 Valuation Results and Robustness

Table 1 presents the proportion of negative *IV* or *eIV* produced by the excess earnings models when the intrinsic firm values are calculated. Results are organized by valuation model and discount rate. As discussed previously, the four discount rates consist of a CAPM discount rate, a Fama-French discount rate, and two discount rates using Moody's aggregate monthly bond interest rates. To denote the intrinsic values calculated using the appropriate future discount rates to find the present values of the future abnormal earnings the suffix *F5* is used. To explore the nature of the negative intrinsic values in more detail the intrinsic value measures are subdivided by long-term debt. Long-term debt is used to subdivide the intrinsic values for three reasons. First, long-term debt has a longer time horizon which should more closely match the longer time horizon used in the valuation model than short-term debt would. Second, long-term lenders should exert a monitoring influence upon firms in order to protect the value of their loans, and the monitoring influence should produce lower proportions of negative intrinsic values among long-term borrowers when intrinsic values are estimated using actual earnings and book value outcomes. Third, potential lenders should be more wary of making long-term loans to firms with shaky long-term prospects, indicating that the proportion of firms with negative intrinsic values should be higher among firms without long-term debt. The *FS* sample represents the full *IV* and *eIV* intrinsic value sample using the discount rate specified for the row. The *LTD* sample represents only those observations consisting of intrinsic values for firms which report some amount of long term debt in COMPUSTAT on the valuation date. Data for *NLTD* observations in Table 1 represent the proportion of intrinsic value observations for which the reported amount of long term debt in COMPUSTAT is zero. Finally, some calculated intrinsic values correspond to firms with missing values for the long term debt field in COMPUSTAT. Those observations are denoted by *MLTD*.

Naturally, a negative *IV* or *eIV* value implies an overvalued firm. For the *IV* model of the value of a share of a firm's stock the portion of the sample with negative *IV* values is less than 14% in all cases. As one might expect, the highest proportion of negative *eIV* values is slightly below the highest proportion of negative *IV* values. This no doubt results from the

Table 1
Proportion of Negative IV and eIV Values

The cost of equity approaches used in the calculation of the *IV* and *eIV* are presented in the left column, with capm5 referring to the use of the static CAPM discount rate and the five year implementation of the *IV* or *eIV* valuation model. The capmF5 refers to the use of future CAPM rates to discount the future excess earnings portion of the *IV* or *eIV* valuation model. Similar interpretations apply to the other discount methods listed in the table.

The data for each discount method is subdivided into four rows by total long-term debt (LTD). The *FS* sample includes all observations using the specified discount method, the *LTD* sample includes only valuation observations for companies which reported positive long-term debt at the time of valuation, the *NLTD* sample includes only observations for firms which reported zero long-term debt at the time of valuation, and the *MLTD* sample includes the remaining observations for companies with missing total long-term debt values in COMPUSTAT at the time of valuation. Finally, the PctNeg, calculated for both the *IV* and *eIV*, reports the percentage of negative *IV* and *eIV* observations out of the total number of observations for the specified discount method and total long-term debt sample.

		IV			eIV		
	LTD	Tobs	NegObs	PctNeg	Tobs	NegObs	PctNeg
capm5	FS	134,205	10,969	8.17	122,044	7,511	6.15
capm5	LTD	110,440	7,876	7.13	100,815	5,070	5.03
capm5	NLTD	23,536	3,068	13.04	20,996	2,424	11.55
capm5	MLTD	229	25	10.92	233	17	7.30
ff5	FS	117,523	8,300	7.06	106,831	5,758	5.39
ff5	LTD	97,490	6,015	6.17	88,894	3,949	4.44
ff5	NLTD	19,830	2,266	11.43	17,729	1,798	10.14
ff5	MLTD	203	19	9.36	208	11	5.29
baa5	FS	135,054	10,415	7.71	122,364	7,060	5.77
baa5	LTD	111,132	7,495	6.74	101,075	4,795	4.74
baa5	NLTD	23,693	2,896	12.22	21,056	2,250	10.69
baa5	MLTD	229	24	10.48	233	15	6.44
aaa5	FS	135,054	10,314	7.64	122,364	6,950	5.68
aaa5	LTD	111,132	7,421	6.68	101,075	4,717	4.67
aaa5	NLTD	23,693	2,869	12.11	21,056	2,219	10.54
aaa5	MLTD	229	24	10.48	233	14	6.01
capmF5	FS	130,828	10,162	7.77	119,265	6,841	5.74
capmF5	LTD	107,991	7,348	6.80	98,786	4,654	4.71
capmF5	NLTD	22,608	2,788	12.33	20,246	2,171	10.72
capmF5	MLTD	229	26	11.35	233	16	6.87

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		IV			eIV		
	LTD	Tobs	NegObs	PctNeg	Tobs	NegObs	PctNeg
ffF5	FS	117,364	8,275	7.05	106,697	5,613	5.26
ffF5	LTD	97,390	5,978	6.14	88,803	3,846	4.33
ffF5	NLTD	19,771	2,278	11.52	17,686	1,754	9.92
ffF5	MLTD	203	19	9.36	208	13	6.25
baaF5	FS	135,054	10,415	7.71	122,364	7,024	5.74
baaF5	LTD	111,132	7,497	6.75	101,075	4,775	4.72
baaF5	NLTD	23,693	2,896	12.22	21,056	2,235	10.61
baaF5	MLTD	229	22	9.61	233	14	6.01
aaaF5	FS	135,054	10,299	7.63	122,364	6,903	5.64
aaaF5	LTD	111,132	7,409	6.67	101,075	4,690	4.64
aaaF5	NLTD	23,693	2,866	12.10	21,056	2,199	10.44
aaaF5	MLTD	229	24	10.48	233	14	6.01

exclusion of depreciation and amortization expenses in the calculation of *eIV*, among other differences. The results from the *IV* and *eIV* models generally follow the same order in terms of the proportion of negative values across the different discount approaches. Significantly, the portion of the sample with some amount of long term debt displays a lower proportion of negative *IV* values than those observations in the *NLTD* category for each discount approach. The data in Table 1 is therefore consistent with long-term lenders exerting a monitoring influence and avoiding firms with shaky prospects since firms with long-term debt exhibit lower proportions of negative intrinsic values compared to firms without long-term debt. The fact that the observed pattern in the proportion of negative intrinsic values matches what is expected indicates that the negative intrinsic values are in fact capturing meaningful features of companies, and the data is consistent with long term debt either constraining extreme overvaluation or being less available to extremely overvalued firms. The same pattern is observed for the *eIV* model with the different discount rates.

An examination of Table 1 also reveals that the use of future discount rates has relatively little effect upon the proportion of negative *IV* or *eIV* values compared to the static discount rate of the same type. Although the effect is minimal, the use of future discount rates to find the present values of the excess earnings sometimes results in a smaller proportion of negative *IV* or *eIV* values. This means that the negative *IV* and *eIV* values are typically not the result of using static discount rates.

As negative terminal values are set to zero, an examination of the proportion of the sample affected is appropriate. The data in Table 2 shows the proportion of the sample for which negative terminal values are initially calculated before being set to zero. Consistent with what is expected, *IV*

Table 2
Proportion of Negative Terminal Values

The cost of equity approaches used in the calculation of the *IV* and *eIV* are presented in the left column, with capm5 referring to the use of the static CAPM discount rate and the five year implementation of the *IV* or *eIV* valuation model. The capmF5 refers to the use of future CAPM rates to discount the future excess earnings portion of the *IV* or *eIV* valuation model. Similar interpretations apply to the other discount methods listed in the table.

The data for each discount method is subdivided into four rows by total long-term debt (LTD). The *FS* sample includes all observations using the specified discount method, the *LTD* sample includes only valuation observations for companies which reported positive long-term debt at the time of valuation, the *NLTD* sample includes only observations for firms which reported zero long-term debt at the time of valuation, and the *MLTD* sample includes the remaining observations for companies with missing total long-term debt values in COMPUSTAT at the time of valuation. Finally, the PctNeg, calculated for the terminal values for both the *IV* and *eIV*, reports the percentage of negative terminal values subsequently set to zero out of the total number of observations for the specified discount method and total long-term debt sample.

		IV			eIV		
	LTD	Tobs	NegObs	PctNeg	Tobs	NegObs	PctNeg
capm5	FS	134,205	54,014	40.25	122,044	30,883	25.30
capm5	LTD	110,440	43,759	39.62	100,815	23,377	23.19
capm5	NLTD	23,536	10,167	43.20	20,996	7,442	35.44
capm5	MLTD	229	88	38.43	233	64	27.47
ff5	FS	117,523	54,153	46.08	106,831	34,105	31.92
ff5	LTD	97,490	45,081	46.24	88,894	27,295	30.71
ff5	NLTD	19,830	8,993	45.35	17,729	6,755	38.10
ff5	MLTD	203	79	38.92	208	55	26.44
baa5	FS	135,054	46,956	34.77	122,364	24,865	20.32
baa5	LTD	111,132	37,864	34.07	101,075	18,588	18.39
baa5	NLTD	23,693	9,023	38.08	21,056	6,232	29.60
baa5	MLTD	229	69	30.13	233	45	19.31
aaa5	FS	135,054	43,557	32.25	122,364	22,880	18.70
aaa5	LTD	111,132	34,930	31.43	101,075	16,942	16.76
aaa5	NLTD	23,693	8,562	36.14	21,056	5,894	27.99
aaa5	MLTD	229	65	28.38	233	44	18.88
capmF5	FS	130,828	50,372	38.50	119,265	27,380	22.96
capmF5	LTD	107,991	41,158	38.11	98,786	20,834	21.09
capmF5	NLTD	22,608	9,138	40.42	20,246	6,491	32.06
capmF5	MLTD	229	76	33.19	233	55	23.61

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		IV			eIV		
	LTD	Tobs	NegObs	PctNeg	Tobs	NegObs	PctNeg
ffF5	FS	117,364	53,286	45.40	106,697	32,884	30.82
ffF5	LTD	97,390	44,520	45.71	88,803	26,374	29.70
ffF5	NLTD	19,771	8,692	43.96	17,686	6,454	36.49
ffF5	MLTD	203	74	36.45	208	56	26.92
baaF5	FS	135,054	46,535	34.46	122,364	24,738	20.22
baaF5	LTD	111,132	37,580	33.82	101,075	18,555	18.36
baaF5	NLTD	23,693	8,890	37.52	21,056	6,139	29.16
baaF5	MLTD	229	65	28.38	233	44	18.88
aaaF5	FS	135,054	42,935	31.79	122,364	22,703	18.55
aaaF5	LTD	111,132	34,454	31.00	101,075	16,885	16.71
aaaF5	NLTD	23,693	8,419	35.53	21,056	5,774	27.42
aaaF5	MLTD	229	62	27.07	233	44	18.88

Table 2 – continued from the previous page

valuations have a higher proportion of negative terminal values than eIV valuations. This result makes sense due to the fact that IV valuations exclude more expenses in the earnings figure used in the terminal value calculation compared to the eIV valuations, thereby resulting in more negative terminal values. A pattern is evident with the discount rates and the proportion of negative terminal values. The use of aggregate bond discount rates results in lower proportions of negative IV and eIV valuations compared to the use of the CAPM or Fama-French discount rates. Since the expected earnings values in the terminal value calculations become higher with higher cost of equity estimates, more negative terminal values for the CAPM and Fama-French cost of equity methods are produced. Although the proportion of negative terminal values in Table 2 ranges from approximately 17% to over 46%, the results are unsurprising. As the residual income model is based upon excess earnings, the terminal values in the model may be negative even if the firm has positive earnings. If the realized earnings are less than the required return on the equity capital for the two years used in the terminal value calculation a negative terminal value results, even if the realized earnings are positive. Importantly, the terminal values are based upon the residual, or abnormal, earnings instead of total earnings, cash flows, or dividends. This distinction means that terminal values are much smaller in magnitude compared to the total estimated value than is the case for discounted cash flow or discounted dividend models which use the full cash flow or dividends to estimate the terminal values.

Abbreviated summary statistics for the $VERR$ and $eVERR$ overvaluation measures are presented in Table 3. By construction, an overvaluation measure equal to zero results when the market value matches the intrinsic

Table 3
Selected Summary Statistics for Valuation Measures

The cost of equity approaches used are presented in the left column, with capm5 referring to the use of the static CAPM discount rate and capmF5 referring to the use of future CAPM rates to discount the future excess earnings. Similar interpretations apply to the other discount methods listed in the table. The selected summary statistics which result from the use of each discount method are subdivided into four rows by total long-term debt (LTD). The *FS* sample includes all *VERR* or *eVERR* observations using the specified discount method, the *LTD* sample includes only valuation observations for companies which reported positive long-term debt at the time of valuation, the *NLTD* sample includes only observations for firms which reported zero long-term debt at the time of valuation, and the *MLTD* sample includes the remaining observations for companies with missing total long-term debt values in COMPUSTAT at the time of valuation. Finally, the P05 and P95 columns represent the 5th and 95th percentiles of the *VERR* or *eVERR* overvaluation measure for the specified discount method and total long-term debt sample.

		VERR					eVERR				
	LTD	Tobs	Mean	Median	P05	P95	Tobs	Mean	Median	P05	P95
capm5	FS	134,205	7.540	0.418	−3.233	1.098	122,044	−0.916	0.083	−5.937	1.054
capm5	LTD	110,440	6.321	0.378	−3.459	1.069	100,815	−1.076	−0.014	−6.417	1.001
capm5	NLTD	23,536	13.329	0.599	−2.059	1.206	20,996	−0.156	0.470	−3.129	1.255
capm5	MLTD	229	0.411	0.663	−1.490	1.144	233	0.128	0.557	−2.024	1.085
ff5	FS	117,523	11.953	0.465	−2.761	1.065	106,831	−0.761	0.181	−5.117	1.018
ff5	LTD	97,490	10.248	0.439	−2.891	1.039	88,894	−0.871	0.117	−5.481	0.974
ff5	NLTD	19,830	20.453	0.586	−2.048	1.180	17,729	−0.218	0.467	−3.212	1.214
ff5	MLTD	203	0.315	0.673	−1.663	1.063	208	−0.024	0.556	−2.927	1.021

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Table 3 – continued from the previous page

	LTD	VERR Tobs	VERR Mean	VERR Median	VERR P05	VERR P95	eVERR Tobs	eVERR Mean	eVERR Median	eVERR P05	eVERR P95
baa5	FS	135,054	12.078	0.297	−2.356	1.097	122,364	−0.768	−0.130	−4.549	1.041
baa5	LTD	111,132	10.948	0.254	−2.518	1.066	101,075	−0.914	−0.249	−4.872	0.986
baa5	NLTD	23,693	17.491	0.492	−1.522	1.217	21,056	−0.077	0.318	−2.468	1.263
baa5	MLTD	229	0.393	0.556	−0.850	1.134	233	0.035	0.358	−1.403	1.060
aaa5	FS	135,054	11.763	0.238	−2.887	1.096	122,364	−1.026	−0.244	−5.453	1.038
aaa5	LTD	111,132	10.501	0.190	−3.083	1.065	101,075	−1.193	−0.380	−5.865	0.982
aaa5	NLTD	23,693	17.796	0.455	−1.924	1.222	21,056	−0.236	0.261	−3.001	1.264
aaa5	MLTD	229	0.312	0.525	−1.145	1.137	233	−0.068	0.293	−1.808	1.061
capmF5	FS	130,828	11.107	0.351	−2.560	1.089	119,265	−0.782	−0.037	−4.912	1.037
capmF5	LTD	107,991	9.375	0.313	−2.723	1.061	98,786	−0.926	−0.135	−5.277	0.986
capmF5	NLTD	22,608	19.489	0.529	−1.672	1.200	20,246	−0.086	0.368	−2.679	1.242
capmF5	MLTD	229	0.375	0.582	−1.003	1.148	233	0.009	0.461	−2.162	1.062
ffF5	FS	117,364	12.572	0.416	−2.041	1.069	106,697	−0.543	0.103	−3.873	1.014
ffF5	LTD	97,390	11.473	0.391	−2.129	1.041	88,803	−0.634	0.037	−4.131	0.966
ffF5	NLTD	19,771	18.114	0.541	−1.568	1.180	17,686	−0.094	0.404	−2.451	1.215
ffF5	MLTD	203	0.336	0.614	−1.456	1.054	208	−0.070	0.500	−2.550	1.030
baaF5	FS	135,054	12.848	0.274	−2.341	1.098	122,364	−0.831	−0.167	−4.648	1.040
baaF5	LTD	111,132	11.796	0.228	−2.476	1.066	101,075	−0.975	−0.291	−5.014	0.984
baaF5	NLTD	23,693	17.905	0.480	−1.578	1.220	21,056	−0.149	0.296	−2.608	1.264
baaF5	MLTD	229	0.324	0.523	−0.915	1.137	233	−0.054	0.337	−1.756	1.060

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Table 3 – continued from the previous page

		VERR					eVERR				
	LTD	Tobs	Mean	Median	P05	P95	Tobs	Mean	Median	P05	P95
aaaF5	FS	135,054	12.807	0.207	−2.860	1.099	122,364	−1.107	−0.300	−5.608	1.037
aaaF5	LTD	111,132	11.682	0.157	−3.024	1.066	101,075	−1.271	−0.438	−6.012	0.979
aaaF5	NLTD	23,693	18.206	0.436	−2.001	1.224	21,056	−0.329	0.231	−3.251	1.266
aaaF5	MLTD	229	0.223	0.492	−1.249	1.140	233	−0.199	0.270	−2.060	1.062

value, and positive overvaluation measures are produced when the market value exceeds the intrinsic value. For all full *VERR* samples the mean value is larger than the median value, and that pattern holds for all of the *VERR* subsamples aside from the *MLTD* subsamples. For all full *eVERR* samples the mean value is smaller than the median value, and that pattern holds for all of the *eVERR* subsamples. The omission of depreciation and amortization expenses in the calculation of the *eIV* used in the *eVERR* formula tends to increase the *eIV* intrinsic values on average, accounting for the lower mean and median values for the *eVERR* samples and subsamples compared to the *VERR* samples and subsamples. Large positive *VERR* and *eVERR* values are generated for firms with negative intrinsic values, indicating that such firms are overvalued. Similarly, extremely negative *VERR* and *eVERR* values are generated for firms with intrinsic values far in excess of the market value, indicating that such firms are undervalued. The similarities in the 5^{th} and 95^{th} percentiles for each of the full *VERR* and *eVERR* samples and also for each of the *VERR* and *eVERR* subsamples indicate that the *VERR* and *eVERR* measures are generally similar in scale overall regardless of the discount method or measure of earnings applied.

Consistent with the proportion of firms with negative *IV* and *eIV* results in Table 1, the results in Table 3 show that observations in the *LTD* category appear to be tilted towards less extreme overvaluation compared to observations in the *NLTD* category. This is reflected in the lower medians and lower 5^{th} and 95^{th} percentiles for the *VERR* and *eVERR* measures of overvaluation in the *LTD* subsample compared to the *NLTD* subsample. This pattern remains regardless of the use of static or future discount rates.

Different numbers of total observations are reported in Table 3 for the different discount methods. Observations are not required to have valid data for all discount methods to be included in the dataset. For example, the full ff5 (Fama-French discount rate and five year perfect foresight valuation period) sample contains about seventeen thousand fewer observations than the capm5 (CAPM discount rate and five year perfect foresight valuation period) sample. This is due to the longer time period required preceding the valuation date to estimate the Fama-French discount rate using monthly data compared to estimating the CAPM discount rate using daily data as described in the methodology section.

The purpose of using several different implementations of the excess earnings valuation model is to determine the extent to which the model is robust to different specifications. The data suggests that the use of different discount rates and different measures of earnings produce broadly similar distributional characteristics for the *VERR* and *eVERR* overvaluation measures. The next set of tables further explores the robustness of the excess earnings model of intrinsic value to alternative specifications of discount rates and earnings measures.

To the extent that a range of possible levels of overvaluation exists, the magnitudes of overvaluation measures are relevant. However, the variety of specifications used and the fact that every possible valuation model requires assumptions means that firm specific valuation measures derived from different underlying valuation specifications may be difficult to compare. For example, underestimating the appropriate discount rate for a firm with positive excess earnings would tend to make the firm appear more undervalued than it would appear with a specification involving a higher discount rate. However, if that underestimation is consistent across firms, the *relative* valuation ordering of the firms with each valuation measure may be largely unaffected despite the error in the numerical valuation estimate. Furthermore, firms with negative estimated intrinsic values produce high values of $VERR$ and $eVERR$, which is a reflection of the fact that such firms are considered to be highly overvalued at any price given the negative estimate of the intrinsic value. To address these issues $VERR$ and $eVERR$ deciles are employed. Ali, Hwang, and Trombley (2003) employed valuation quantile ranks of a value-to-price ratio when the valuation measure was used as an explanatory variable to better handle outliers and nonlinearities. The use of deciles in the present study preserves more of the information contained in the $VERR$ and $eVERR$ measures than would be retained with the use of quantiles. One important objective of this study is to determine the robustness of the valuation model to different specifications. By using valuation deciles instead of quantiles differences which result from the various model specifications are easier to delineate than would be the case if quantiles were used. In short, the use of valuation deciles instead of quantiles makes finding differences between the model specifications more likely, which would make the valuation approach employed appear to be less robust. Consequently, the use of valuation deciles subjects the different model specifications to a harsher standard than the use of valuation quantiles would.

For each valuation measure observations with valid valuation data are assigned to deciles using two different approaches. First, for each valuation measure all observations for the entire sample period with valid valuation data are assigned to deciles. Decile one contains the most undervalued firm years during the entire sample period, and decile ten contains the most overvalued firm years during the entire sample period. Second, for each valuation measure decile assignments are made on an annual basis. For each calendar year all valuation observations for the specified valuation measure are assigned to valuation deciles, with decile one representing the most undervalued firm observations in that calendar year and decile ten representing the most overvalued firm observations in that calendar year. This process is applied to all calendar years with data available for the valuation measure. The valuation measure decile assignments generated by either the full period or annual approach may be compared across the different model specifications. Such comparisons between decile assignments make it possible to determine the level of agreement in *relative* valuation between the different valuation specifications without resorting to absolute comparisons. To perform the decile assignment comparisons this study uses the correlations between the decile assignments made using the different valuation measures. Naturally, when performing decile assignment comparisons using decile correlations full sample decile assignments are compared to other full sample decile assignments, and annual decile assignments are compared to other annual decile assignments.

The study by Frankel and Lee (1998) related a residual income model to stock returns. Their methodology used both analysts' forecasts and historical return on equity figures to generate different intrinsic value estimates. As part of the analysis performed, Frankel and Lee (1998) correlated value ranks with price ranks using Fama-French discount rates. Although the correlation of price ranks with value ranks is not entirely dissimilar to the approach used in the present study, it differs in several key respects. First, current period return on equity figures were used to project book values and earnings into the future in the Frankel and Lee (1998) study, while this study employs realized historical values. Second, Frankel and Lee (1998) correlated value ranks with price ranks while this study correlates overvaluation decile assignments with each other using different model specifications.

The first set of decile correlations is presented in Table 4. The correlations in Table 4 represent the correlations between decile assignments made for all observations over the full sample period. Panel A of Table 4 displays the correlations between the different *VERR* measures. The highest decile correlations are 0.99 and involve the use of the constant Moody's bond rates or the future Moody's bond rates to discount the abnormal earnings in the excess earnings model used in the *VERR* calculation. The lowest correlation in Panel A is 0.82 and it is the correlation between *VERR* decile assignments based upon the excess earnings model using the static Fama-French discount rate and the excess earnings model using the future Moody's AAA bond interest rates as the discount rates. The use of a static CAPM discount rate produces nearly the same *VERR* decile assignments as the use of the future CAPM discount rates in the valuation model, with the *VERR* decile correlation being 0.89. A similar comparison for the method employing the static Fama-French cost of capital and the method employing the time-varying Fama-French cost of capital results in a correlation coefficient of 0.84 for the *VERR* deciles. Overall, all of the *VERR* decile assignments made relative to the full sample period are highly correlated with each other. Concerns about the specification of the

Table 4
Correlations Between Valuation Decile Assignments Based on the Full Sample

Observations are assigned to deciles using the *VERR* and *eVERR* measures of overvaluation which result from each of the eight discount methods employed. When making the decile assignments the full sample over the entire period is used to generate the decile boundaries. Panel A presents the Spearman correlations between the decile assignments made using each of the eight *VERR* measures. Panel B presents the Spearman correlations between the decile assignments made using each of the eight *eVERR* measures. Panel C presents the Spearman correlations between the decile assignments made using each of the eight *VERR* measures and the eight *eVERR* measures.

Panel A: VERR Decile Correlations

VERR	capm5	ff5	baa5	aaa5	capmF5	ffF5	baaF5	aaaF5
capm5	1.00	0.87	0.92	0.91	0.89	0.84	0.90	0.89
ff5	0.87	1.00	0.85	0.85	0.83	0.84	0.84	0.82
baa5	0.92	0.85	1.00	0.99	0.93	0.87	0.98	0.97
aaa5	0.91	0.85	0.99	1.00	0.93	0.87	0.98	0.98
capmF5	0.89	0.83	0.93	0.93	1.00	0.89	0.92	0.92
ffF5	0.84	0.84	0.87	0.87	0.89	1.00	0.87	0.86
baaF5	0.90	0.84	0.98	0.98	0.92	0.87	1.00	0.99
aaaF5	0.89	0.82	0.97	0.98	0.92	0.86	0.99	1.00

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Table 4 – continued from the previous page

Panel B: eVERR Decile Correlations

eVERR	capm5	ff5	baa5	aaa5	capmF5	ffF5	baaF5	aaaF5
capm5	1.00	0.84	0.90	0.89	0.86	0.80	0.88	0.87
ff5	0.84	1.00	0.82	0.81	0.78	0.79	0.80	0.78
baa5	0.90	0.82	1.00	0.99	0.92	0.84	0.97	0.97
aaa5	0.89	0.81	0.99	1.00	0.91	0.84	0.97	0.97
capmF5	0.86	0.78	0.92	0.91	1.00	0.86	0.90	0.90
ffF5	0.80	0.79	0.84	0.84	0.86	1.00	0.84	0.84
baaF5	0.88	0.80	0.97	0.97	0.90	0.84	1.00	0.99
aaaF5	0.87	0.78	0.97	0.97	0.90	0.84	0.99	1.00

Panel C: Decile Correlations Between VERR and eVERR Deciles

	VERR							
eVERR	capm5	ff5	baa5	aaa5	capmF5	ffF5	baaF5	aaaF5
capm5	0.85	0.72	0.78	0.78	0.75	0.69	0.77	0.76
ff5	0.72	0.84	0.70	0.70	0.68	0.68	0.69	0.69
baa5	0.74	0.66	0.81	0.81	0.75	0.68	0.80	0.80
aaa5	0.73	0.66	0.80	0.81	0.74	0.67	0.79	0.80
capmF5	0.72	0.65	0.77	0.77	0.82	0.70	0.76	0.77
ffF5	0.67	0.66	0.71	0.71	0.73	0.81	0.71	0.72
baaF5	0.71	0.63	0.77	0.78	0.72	0.66	0.80	0.80
aaaF5	0.69	0.62	0.76	0.78	0.72	0.65	0.79	0.80

valuation model are alleviated.

Panel B of Table 4 presents the decile correlations for decile assignments based upon the different specifications of discount rates used in the *eIV* calculations which form the basis of the *eVERR* measure. As in Panel A, the highest decile assignment correlations are between the models employing the two different static Moody's discount rates and the two models employing the future discount rates based upon Moody's aggregate bond interest rates. The lowest decile correlation with deciles assigned using the full sample period is 0.78 and represents the correlation between decile assignments based upon *eVERR* measures using the static Fama-French discount rate and either the future Moody's AAA aggregate interest rates or the future CAPM approach to discount the future abnormal earnings. As expected, the static and future CAPM discount rate *eVERR* decile correlation results are similar to those reported in Panel A, with the *eVERR* decile correlation being 0.86. The *eVERR* decile assignment correlation for the static and future Fama-French discount rates is 0.79. Once again, the decile assignments are highly correlated using the *eVERR* measure and the full sample period to make the decile assignments. A comparison of the decile correlations from Panels A and B of Table 4 reveals that the *eVERR* measures presented in Panel B tend to produce decile correlations which are sometimes slightly lower than the comparable decile correlations using the *VERR* measures presented in Panel A. The slightly lower decile correlations sometimes observed between the *eVERR* decile assignments correlated in Panel B relative to the comparable decile correlations in Panel A between the *VERR* decile assignments are likely the result of the additional heterogeneity introduced by the exclusion of the depreciation and amortization in the measure of earnings used in the *eIV* formula forming the basis of the *eVERR* calculation.

The correlations between decile assignments based upon the *VERR* and *eVERR* measures are presented in Panel C of Table 4. Interestingly, when correlating the decile assignments across the *VERR* and *eVERR* measures the highest correlation observed is between the *VERR* and *eVERR* decile assignments based upon *IV* and *eIV* intrinsic value estimates utilizing the static CAPM discount rate. That decile correlation rate is 0.85. The *VERR* and *eVERR* measures using the static Fama-French, future CAPM, and future Fama-French discount rates produce decile correlations which are only slightly lower. The lowest decile correlation is from *VERR* deciles using the Fama-French discount rate and *eVERR* deciles using the future values of Moody's AAA bond interest rates as the discount rate. For decile correlations across the *VERR* and *eVERR* measures the correlations are again substantial, particularly when CAPM or Fama-French discount rates are applied.

One possible concern might be that decile assignments might be less correlated if the decile assignments are made annually. Using the full sample period to make decile assignments, as was done in Table 4, could allow the decile assignments of the models to appear highly correlated as a result of the models identifying periods of overvaluation and undervaluation across time. This would mean that the models might not be sensitive enough to differentiate between overvalued and undervalued firms at a given point in time. To address this concern, annual decile assignments are generated for each *VERR* and *eVERR* valuation measure as discussed previously, and the decile correlations are presented in Table 5.

Table 5 displays correlation patterns which are similar to those presented in Table 4. The maximum and minimum *VERR* decile assignment correlations reflected in Panel A of Table 5 generally match the valuation methods producing the maximum and minimum decile assignment correlations from Panel A of Table 4. The maximum *VERR* decile correlation is 0.99, and the minimum *VERR* decile correlation is 0.81. The minimum *VERR* decile correlation is between the static Fama-French decile assignments and the future Moody's AAA bond interest rate decile assignments or the capmF5 future discount rate decile assignments. The correlation between the decile assignments using the *VERR* measure employing the static CAPM and the decile assignments using the future CAPM is similar to the comparable decile correlation using deciles generated for the full period. Changing from assigning observations to deciles using the full sample to assigning observations to deciles on an annual basis has little effect upon the decile assignment correlation between the static and future Fama-French implementations of the *VERR* measure. The main result from Panel A is that the *VERR* decile assignments are again highly correlated if annual decile assignments are used instead of overall decile assignments.

An examination of Panel B from Table 5 reveals patterns and results consistent with the results of the decile correlations using the full period. The *eVERR* measures using the static or future implementations of Moody's BAA and AAA bond interest rates produce the highest decile correlations. The lowest decile correlation is between the *eVERR* measure using the static Fama-French discount rate and the *eVERR* measure using either the future AAA discount rate or the capmF5 future discount rate. The decile correlation between the *eVERR* measures using the static and future implementations of the CAPM is 0.89, which is slightly lower than in Panel A. The *eVERR* decile correlation for the static and future permutations of the Fama-French discount rate are slightly lower than the analogous *VERR* correlation in Panel A. Clearly, the use of annual decile assignments instead of decile assignments for the entire period has little effect upon the degree of correlation between the different *eVERR* decile assignments. A comparison of the decile correlations from Panels A and

Table 5
Correlations Between Annual Valuation Decile Assignments

Observations are assigned to deciles using the *VERR* and *eVERR* measures of overvaluation which result from each of the eight discount methods employed. When making the decile assignments the necessary decile boundaries are generated for each calendar year using all available observations for that calendar year. Panel A presents the Spearman correlations between the decile assignments made using each of the eight *VERR* measures. Panel B presents the Spearman correlations between the decile assignments made using each of the eight *eVERR* measures. Panel C presents the Spearman correlations between the decile assignments made using each of the eight *VERR* measures and the eight *eVERR* measures.

Panel A: VERR Decile Correlations

VERR	capm5	ff5	baa5	aaa5	capmF5	ffF5	baaF5	aaaF5
capm5	1.00	0.84	0.93	0.92	0.91	0.83	0.91	0.90
ff5	0.84	1.00	0.83	0.83	0.81	0.83	0.82	0.81
baa5	0.93	0.83	1.00	0.99	0.94	0.87	0.98	0.98
aaa5	0.92	0.83	0.99	1.00	0.94	0.86	0.98	0.98
capmF5	0.91	0.81	0.94	0.94	1.00	0.88	0.94	0.93
ffF5	0.83	0.83	0.87	0.86	0.88	1.00	0.86	0.86
baaF5	0.91	0.82	0.98	0.98	0.94	0.86	1.00	0.99
aaaF5	0.90	0.81	0.98	0.98	0.93	0.86	0.99	1.00

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Table 5 – continued from the previous page

Panel B: eVERR Decile Correlations

eVERR	capm5	ff5	baa5	aaa5	capmF5	ffF5	baaF5	aaaF5
capm5	1.00	0.81	0.92	0.91	0.89	0.81	0.90	0.89
ff5	0.81	1.00	0.81	0.80	0.78	0.79	0.79	0.78
baa5	0.92	0.81	1.00	0.99	0.94	0.84	0.98	0.98
aaa5	0.91	0.80	0.99	1.00	0.93	0.84	0.98	0.98
capmF5	0.89	0.78	0.94	0.93	1.00	0.85	0.93	0.93
ffF5	0.81	0.79	0.84	0.84	0.85	1.00	0.84	0.84
baaF5	0.90	0.79	0.98	0.98	0.93	0.84	1.00	0.99
aaaF5	0.89	0.78	0.98	0.98	0.93	0.84	0.99	1.00

Panel C: Decile Correlations Between VERR and eVERR Deciles

	VERR							
eVERR	capm5	ff5	baa5	aaa5	capmF5	ffF5	baaF5	aaaF5
capm5	0.81	0.65	0.75	0.75	0.73	0.64	0.74	0.74
ff5	0.66	0.80	0.66	0.66	0.64	0.64	0.65	0.65
baa5	0.73	0.62	0.78	0.79	0.74	0.65	0.78	0.78
aaa5	0.72	0.62	0.78	0.79	0.73	0.64	0.77	0.78
capmF5	0.73	0.62	0.76	0.76	0.79	0.67	0.76	0.76
ffF5	0.66	0.64	0.69	0.69	0.70	0.79	0.70	0.70
baaF5	0.71	0.61	0.77	0.78	0.73	0.64	0.78	0.79
aaaF5	0.70	0.60	0.76	0.78	0.72	0.63	0.78	0.79

B of Table 5 reveals that the *eVERR* measures tend to produce decile correlations in Panel B which are sometimes slightly lower than the comparable decile correlations in Panel A using the *VERR* measures. Overall, the effect is minor.

The correlations between annual decile assignments based upon the *VERR* and *eVERR* measures are presented in Panel C of Table 5. As in the case of the full period decile assignments, the highest decile correlation is between the *VERR* and *eVERR* measures derived from intrinsic values calculated using the static CAPM discount rate, and the correlation is 0.81. The decile correlations between the *VERR* and *eVERR* measures which both employ the static Fama-French, future CAPM, or future Fama-French discount rates are not far behind. The lowest decile correlation is 0.60, and it again results from a paring of a Fama-French based model with a model utilizing future values of Moody's AAA bond interest rates as the discount rates. Altogether, the results from the annual decile correlations confirm the results from the full period decile correlations. The annual decile assignments for the *VERR* and *eVERR* measures are highly and reliably correlated regardless of the discount methods specified.

The preceding discussion of decile correlations demonstrates the substantial agreement between the decile assignments based upon the *VERR* and *eVERR* measures with different discount rate specifications. To increase the robustness of that finding, additional decile correlations are calculated. Although the full period decile correlations and annual decile correlations produce very similar results, *VERR* and *eVERR* decile correlations might vary in strength with different market conditions. To address that concern decile correlations are calculated separately for bull and bear markets. For the full sample period, the years 1956–1957, 1962, 1966, 1969–1970, 1973–1974, 1981–1982, 1987, 2000–2002, and 2007–2009 are assigned to the bear market category. Observations in all remaining calendar years in the sample are assigned to the bull market category. Decile assignments are first made using the full sample period with all observations from both bull and bear markets. Second, decile assignments are made for each calendar year.

The first subset of the data examined is for the bull market sample. Decile breakpoints for the different valuation measures are determined using the full sample, including both bull and bear markets, over the full period. Observations are then assigned to the relevant valuation deciles. The resulting decile correlations are presented in Table 6. As before, Panel A presents *VERR* decile correlations, Panel B presents *eVERR* decile correlations, and Panel C presents decile correlations between *VERR* and *eVERR* decile assignments. The maximum decile correlation using the different versions of the *VERR* measure is 0.99, and it is the decile correlation between the *VERR* measure using the static Moody's AAA interest

Table 6
Bull Market Correlations Between Valuation Decile Assignments Based on the Full Sample

Observations from calendar bull market years are assigned to deciles using the *VERR* and *eVERR* measures of overvaluation which result from each of the eight discount methods employed. When making the decile assignments the full sample over the entire period, including both bull and bear markets, is used to generate the decile boundaries. Panel A presents the Spearman correlations between the decile assignments made using each of the eight *VERR* measures. Panel B presents the Spearman correlations between the decile assignments made using each of the eight *eVERR* measures. Panel C presents the Spearman correlations between the decile assignments made using each of the eight *VERR* measures and the eight *eVERR* measures.

Panel A: VERR Decile Correlations

VERR	capm5	ff5	baa5	aaa5	capmF5	ffF5	baaF5	aaaF5
capm5	1.00	0.87	0.92	0.91	0.89	0.84	0.89	0.88
ff5	0.87	1.00	0.85	0.85	0.82	0.83	0.84	0.82
baa5	0.92	0.85	1.00	0.99	0.93	0.87	0.98	0.97
aaa5	0.91	0.85	0.99	1.00	0.93	0.87	0.98	0.98
capmF5	0.89	0.82	0.93	0.93	1.00	0.89	0.92	0.92
ffF5	0.84	0.83	0.87	0.87	0.89	1.00	0.87	0.87
baaF5	0.89	0.84	0.98	0.98	0.92	0.87	1.00	0.99
aaaF5	0.88	0.82	0.97	0.98	0.92	0.87	0.99	1.00

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Table 6 – continued from the previous page

Panel B: eVERR Decile Correlations

eVERR	capm5	ff5	baa5	aaa5	capmF5	ffF5	baaF5	aaaF5
capm5	1.00	0.84	0.89	0.89	0.85	0.79	0.86	0.85
ff5	0.84	1.00	0.82	0.81	0.77	0.78	0.79	0.78
baa5	0.89	0.82	1.00	0.99	0.91	0.84	0.97	0.97
aaa5	0.89	0.81	0.99	1.00	0.91	0.84	0.97	0.97
capmF5	0.85	0.77	0.91	0.91	1.00	0.85	0.90	0.90
ffF5	0.79	0.78	0.84	0.84	0.85	1.00	0.84	0.84
baaF5	0.86	0.79	0.97	0.97	0.90	0.84	1.00	0.99
aaaF5	0.85	0.78	0.97	0.97	0.90	0.84	0.99	1.00

Panel C: Decile Correlations Between VERR and eVERR Deciles

	VERR							
eVERR	capm5	ff5	baa5	aaa5	capmF5	ffF5	baaF5	aaaF5
capm5	0.84	0.71	0.77	0.77	0.74	0.68	0.75	0.75
ff5	0.70	0.83	0.70	0.70	0.66	0.67	0.69	0.68
baa5	0.72	0.66	0.80	0.80	0.74	0.67	0.79	0.79
aaa5	0.71	0.65	0.79	0.80	0.73	0.66	0.78	0.79
capmF5	0.70	0.63	0.75	0.75	0.80	0.69	0.75	0.75
ffF5	0.65	0.64	0.70	0.70	0.71	0.80	0.70	0.71
baaF5	0.67	0.62	0.76	0.77	0.71	0.65	0.78	0.79
aaaF5	0.66	0.60	0.75	0.76	0.70	0.64	0.77	0.78

rate and the static Moody's BAA interest rate as the cost of capital. The use of the future values of the interest rates when discounting the abnormal earnings produces the same decile correlation for the *VERR* measure. The lowest decile correlation reported in Panel A is 0.82, and it results from deciles assigned using the static Fama-French rates in the *IV* model calculations required by the *VERR* measure being correlated with deciles assigned using either the future Moody's AAA interest rate or the future CAPM rates in the *IV* model calculations required by the *VERR* measure. The decile correlation between the static CAPM (Fama-French) and the future CAPM (Fama-French) implementations of the *VERR* measure produce a decile correlation of 0.89 (0.83). The correlations between the full period *VERR* decile assignments are therefore largely unaffected by restricting the correlation sample to bull market periods.

Panel B of Table 6 presents results which are extremely similar to the results in Panel A of Table 6. The highest decile correlations result from correlations between *eVERR* decile assignments made using either static or future values of Moody's AAA and BAA interest rates when calculating the *eIV*. The lowest correlation is between the static implementation of the Fama-French discount rate in the *eIV* formula and the capmF5 future discount rate, and it is 0.77. Decile correlations from different combinations of *eVERR* decile assignments utilizing static and future CAPM and Fama-French discount rates in the *eIV* calculation all produce decile correlations of 0.77 or better. Full period bull market *eVERR* decile assignments are all highly correlated, regardless of the discount rate used. A comparison of the decile correlations from Panels A and B of Table 6 again reveals that the *eVERR* measures in Panel B tend to produce decile correlations which are sometimes slightly lower than the comparable decile correlations in Panel A using the *VERR* measures, but the differences are small.

The final panel in Table 6 presents the decile correlations between the *VERR* and *eVERR* measures for bull market periods using the full sample to establish the decile assignments. As was observed previously, when correlating the decile assignments across the *VERR* and *eVERR* measures the highest correlation observed is between the *VERR* and *eVERR* decile assignments based upon *IV* and *eIV* intrinsic value estimates utilizing the static CAPM discount rate. In this case that decile correlation rate is 0.84. The *VERR* and *eVERR* measures using the static Fama-French, future CAPM, and future Fama-French discount rates produce decile correlations which are only slightly lower, with decile correlation values of 0.83, 0.80, and 0.80 respectively. The lowest decile correlation observed in Panel C of Table 6 is 0.60, and it is once again the correlation between the static Fama-French *VERR* implementation and the Moody's AAA bond interest rate implementation of the *eVERR* measure. Again, the decile assignments are highly positively correlated overall.

Table 7
Bull Market Correlations Between Annual Valuation Decile Assignments

Observations from calendar years considered bull market years are assigned to deciles using the *VERR* and *eVERR* measures of overvaluation which result from each of the eight discount methods employed. When making the decile assignments the necessary decile boundaries are generated for each calendar year using all available observations for that calendar year. Panel A presents the Spearman correlations between the decile assignments made using each of the eight *VERR* measures. Panel B presents the Spearman correlations between the decile assignments made using each of the eight *eVERR* measures. Panel C presents the Spearman correlations between the decile assignments made using each of the eight *VERR* measures and the eight *eVERR* measures.

Panel A: VERR Decile Correlations

VERR	capm5	ff5	baa5	aaa5	capmF5	ffF5	baaF5	aaaF5
capm5	1.00	0.83	0.92	0.92	0.90	0.83	0.90	0.89
ff5	0.83	1.00	0.83	0.83	0.81	0.83	0.82	0.81
baa5	0.92	0.83	1.00	0.99	0.94	0.87	0.98	0.98
aaa5	0.92	0.83	0.99	1.00	0.94	0.86	0.98	0.98
capmF5	0.90	0.81	0.94	0.94	1.00	0.88	0.94	0.94
ffF5	0.83	0.83	0.87	0.86	0.88	1.00	0.87	0.87
baaF5	0.90	0.82	0.98	0.98	0.94	0.87	1.00	0.99
aaaF5	0.89	0.81	0.98	0.98	0.94	0.87	0.99	1.00

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Table 7 – continued from the previous page

Panel B: eVERR Decile Correlations

eVERR	capm5	ff5	baa5	aaa5	capmF5	ffF5	baaF5	aaaF5
capm5	1.00	0.81	0.91	0.91	0.89	0.80	0.89	0.88
ff5	0.81	1.00	0.81	0.80	0.78	0.79	0.79	0.78
baa5	0.91	0.81	1.00	0.99	0.94	0.85	0.98	0.98
aaa5	0.91	0.80	0.99	1.00	0.93	0.84	0.98	0.98
capmF5	0.89	0.78	0.94	0.93	1.00	0.85	0.93	0.93
ffF5	0.80	0.79	0.85	0.84	0.85	1.00	0.85	0.84
baaF5	0.89	0.79	0.98	0.98	0.93	0.85	1.00	0.99
aaaF5	0.88	0.78	0.98	0.98	0.93	0.84	0.99	1.00

Panel C: Decile Correlations Between VERR and eVERR Deciles

	VERR							
eVERR	capm5	ff5	baa5	aaa5	capmF5	ffF5	baaF5	aaaF5
capm5	0.80	0.64	0.74	0.74	0.72	0.64	0.72	0.73
ff5	0.65	0.80	0.66	0.66	0.63	0.64	0.64	0.64
baa5	0.71	0.62	0.78	0.78	0.73	0.64	0.77	0.78
aaa5	0.71	0.61	0.77	0.78	0.72	0.63	0.76	0.77
capmF5	0.72	0.61	0.75	0.76	0.78	0.66	0.75	0.76
ffF5	0.65	0.63	0.69	0.69	0.69	0.78	0.70	0.70
baaF5	0.70	0.60	0.77	0.77	0.73	0.65	0.78	0.78
aaaF5	0.69	0.59	0.76	0.77	0.72	0.64	0.77	0.78

As a robustness check the correlations between overvaluation decile assignments during bull market periods is examined using annual decile assignments instead of using the complete sample over the full sample period to assign the observations to deciles. The resulting decile correlations are presented in Table 7. When using the annual decile assignments and examining the bull market sample the highest *VERR* decile correlation once again results from the use of the Moody's BAA and AAA bond interest rates as the discount rates. Both the static Moody's BAA and AAA *VERR* decile correlation and the future Moody's BAA and AAA *VERR* decile correlation are 0.99, as shown in Panel A. The lowest correlation observed in Panel A is 0.81, and it results from correlating the *VERR* deciles produced through the use of the static Fama-French and future Moody's AAA bond interest rates or the static Fama-French and capmF5 future discount rates in the *IV* model. The decile correlation between the static CAPM and future CAPM based *VERR* measures is slightly higher than it was when the deciles are generated using the full sample period instead of annually. The static Fama-French and the future Fama-French discount rate approaches to the *VERR* measure produce the same result regardless of whether annual or full period decile assignments are used. Using annual decile assignments instead of overall decile assignments has little effect upon the *VERR* valuation decile assignments during bull market periods.

The trend of little change continues after an examination of Panel B of Table 7. The maximum *eVERR* decile correlations during bull markets using annual deciles are essentially unchanged compared to the prior *eVERR* decile correlations previously discussed in Tables 4, 5, and 6. The minimum valuation decile correlation in Panel B of Table 7 is 0.78, which is slightly higher than it is for the bull market *eVERR* decile correlations based upon full sample decile assignments as displayed in Table 6. Correlations between *eVERR* measures employing either the static or future implementations of the CAPM or Fama-French cost of capital are all 0.78 or higher. Evidently the choice of annual decile assignments during the bull market years does little to alter the correlations between the decile assignments produced by the different permutations of the *eVERR* measure. In addition, a comparison of the decile correlations from Panels A and B of Table 7 again reveals that the *eVERR* measures in Panel B tend to produce decile correlations which are sometimes slightly lower than the comparable decile correlations in Panel A using the *VERR* measures, but the correlations are still high for both panels.

The largest decile correlation found between annual *VERR* and *eVERR* decile assignments during bull markets is 0.80, and it is the correlation between the *VERR* and *eVERR* measures generated using either the static CAPM discount rate or the static Fama-French discount rate to find the relevant *IV* and *eIV* values. The correlations presented in Panel C of

Table 7 also show that the *VERR* and *eVERR* decile assignments are only slightly below the maximum *VERR* and *eVERR* correlation when the future CAPM or future Fama-French discount rates are used for both the *VERR* and *eVERR* models. This demonstrates the robustness of the decile assignments to different earnings or discount rate specifications during bull market periods when the decile assignments are made annually.

After determining that the valuation decile correlations are largely unaffected by bull market periods it is sensible to determine if the valuation decile correlations are substantially impacted by bear market periods. To address that topic decile assignment correlations for observations during bear market periods are presented in Table 8. In Table 8 the decile correlations are based upon decile assignments made using the full sample of bear and bull market data for the full period. As usual, the highest decile correlations for the *VERR* measures are between the versions of the model using the static Moody's BAA and AAA interest rates as the discount rate or the future Moody's BAA and AAA interest rates as the discount rate. Those decile correlations are 0.99. The lowest *VERR* decile correlation presented in Panel A is 0.82, and it once again results from the decile correlation between the *VERR* measure using the static Fama-French discount rate and the *VERR* measure using the future Moody's AAA bond interest rate as the discount rate. Importantly, the static and future CAPM implementations of the *VERR* measure produce a decile correlation of 0.91. The analogous Fama-French *VERR* decile correlation is 0.86. From the results presented in Panel A of Table 8 it is clear that *VERR* decile correlations during bear market periods correspond well to the decile correlations observed during the entire time period.

The second panel of Table 8 presents the decile correlations for the *eVERR* measures. The highest decile correlation reported is again 0.99, and it is the decile correlation between the versions of the *eVERR* measure employing static Moody's BAA and AAA discount rates and also the versions of the *eVERR* measure employing the future Moody's BAA and AAA discount rates. The lowest correlation (0.79) reported in Panel B is once more the decile correlation between the *eVERR* measures employing the static Fama-French discount rate and the future Moody's AAA interest rate. The static and future variants of the CAPM *eVERR* measures produce a decile correlation of 0.89, and the static and future variants of the Fama-French *eVERR* measures produce a slightly lower decile correlation of 0.83. It is apparent that the decile correlations for the variants of the *eVERR* measure are highly correlated during bear market periods when the deciles are assigned using the full sample period. When decile correlations from Panels A and B of Table 8 are compared, it is clear that the *eVERR* measures in Panel B tend to produce decile correlations which are sometimes slightly lower than the comparable decile correlations in Panel

Table 8
Bear Market Correlations Between Valuation Decile Assignments Based on the Full Sample

Observations from calendar bear market years are assigned to deciles using the *VERR* and *eVERR* measures of overvaluation which result from each of the eight discount methods employed. When making the decile assignments the full sample over the entire period, including both bull and bear markets, is used to generate the decile boundaries. Panel A presents the Spearman correlations between the decile assignments made using each of the eight *VERR* measures. Panel B presents the Spearman correlations between the decile assignments made using each of the eight *eVERR* measures. Panel C presents the Spearman correlations between the decile assignments made using each of the eight *VERR* measures and the eight *eVERR* measures.

Panel A: VERR Decile Correlations

VERR	capm5	ff5	baa5	aaa5	capmF5	ffF5	baaF5	aaaF5
capm5	1.00	0.88	0.92	0.92	0.91	0.85	0.93	0.91
ff5	0.88	1.00	0.84	0.84	0.85	0.86	0.84	0.82
baa5	0.92	0.84	1.00	0.99	0.94	0.87	0.98	0.96
aaa5	0.92	0.84	0.99	1.00	0.93	0.87	0.98	0.98
capmF5	0.91	0.85	0.94	0.93	1.00	0.90	0.92	0.91
ffF5	0.85	0.86	0.87	0.87	0.90	1.00	0.86	0.85
baaF5	0.93	0.84	0.98	0.98	0.92	0.86	1.00	0.99
aaaF5	0.91	0.82	0.96	0.98	0.91	0.85	0.99	1.00

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Table 8 – continued from the previous page

Panel B: eVERR Decile Correlations

eVERR	capm5	ff5	baa5	aaa5	capmF5	ffF5	baaF5	aaaF5
capm5	1.00	0.85	0.91	0.91	0.89	0.83	0.92	0.90
ff5	0.85	1.00	0.81	0.82	0.81	0.83	0.81	0.79
baa5	0.91	0.81	1.00	0.99	0.93	0.85	0.97	0.96
aaa5	0.91	0.82	0.99	1.00	0.92	0.85	0.98	0.97
capmF5	0.89	0.81	0.93	0.92	1.00	0.88	0.91	0.90
ffF5	0.83	0.83	0.85	0.85	0.88	1.00	0.84	0.82
baaF5	0.92	0.81	0.97	0.98	0.91	0.84	1.00	0.99
aaaF5	0.90	0.79	0.96	0.97	0.90	0.82	0.99	1.00

Panel C: Decile Correlations Between VERR and eVERR Deciles

	VERR							
eVERR	capm5	ff5	baa5	aaa5	capmF5	ffF5	baaF5	aaaF5
capm5	0.86	0.72	0.78	0.79	0.77	0.69	0.80	0.79
ff5	0.74	0.85	0.70	0.71	0.70	0.71	0.71	0.70
baa5	0.77	0.67	0.83	0.84	0.78	0.69	0.82	0.83
aaa5	0.77	0.67	0.82	0.84	0.77	0.68	0.82	0.83
capmF5	0.78	0.69	0.81	0.81	0.85	0.74	0.79	0.79
ffF5	0.73	0.71	0.74	0.75	0.76	0.83	0.74	0.73
baaF5	0.77	0.66	0.80	0.82	0.75	0.67	0.83	0.83
aaaF5	0.75	0.64	0.79	0.81	0.74	0.65	0.82	0.83

A using the *VERR* measures, but the differences are minor.

The decile correlations between the *VERR* and *eVERR* measures for the bear market sample using full period decile assignments are presented in Panel C of Table 8. As has been the case in the prior decile correlation tables, the highest decile correlation between *VERR* and *eVERR* measures results when both the *VERR* and *eVERR* measures utilize a static CAPM discount rate. The decile correlation observed in that case is 0.86. The lowest decile correlation is again produced when a static Fama-French discount rate is used in the *VERR* calculation and a future Moody's AAA interest rate is used as the discount rate in the calculation of the *eVERR*. The resulting decile correlation is 0.64. The decile correlations between the *VERR* and *eVERR* measures using future CAPM discount rates, static Fama-French discount rates, and future Fama-French discount rates are 0.85, 0.85, and 0.83 respectively. Taken together, the decile correlation results in Panel C indicate that the decile assignments are highly correlated across valuation measures and discount rate specifications during bear market periods when the deciles are assigned using the entire bull and bear sample.

Finally, Table 9 presents the decile correlations for the bear market sample using annual decile assignments. This once again serves to address concerns that the valuation deciles assigned using the full sample might be highly correlated as a result of broad market trends more than differences in individual factors. As might be expected at this point, the highest *VERR* decile correlations are observed between the *VERR* measures using the static implementations of Moody's BAA and AAA interest rates and also the *VERR* measures using the future implementation of Moody's BAA and AAA interest rates. Both correlations are 0.99. The lowest bear market *VERR* decile correlation using annual decile assignments is the correlation between the static Fama-French *VERR* model and the future Moody's AAA based *VERR* model. That decile correlation is 0.81, which is similar to the results reported in Panel A of the prior tables. The decile correlation between the static CAPM discount rate and future CAPM discount rates variants of the *VERR* model is 0.91. The comparable decile correlation for the two Fama-French approaches is 0.83. As these results are similar to those presented previously for either the full sample or the bull market sample it is clear that the annual decile assignments during bear market periods produce approximately the same level of correlations between the *VERR* valuation deciles as the full sample or the bull market sample.

Panel B of Table 9 shows the *eVERR* decile correlations for the bear market sample using annual decile assignments. The decile correlation between the versions of the *eVERR* measure employing static Moody's BAA and AAA discount rates and also the decile correlation between the versions of the *eVERR* measure employing the future Moody's BAA and

Table 9
Bear Market Correlations Between Annual Valuation Decile Assignments

Observations from calendar years considered bear market years are assigned to deciles using the *VERR* and *eVERR* measures of overvaluation which result from each of the eight discount methods employed. When making the decile assignments the necessary decile boundaries are generated for each calendar year using all available observations for that calendar year. Panel A presents the Spearman correlations between the decile assignments made using each of the eight *VERR* measures. Panel B presents the Spearman correlations between the decile assignments made using each of the eight *eVERR* measures. Panel C presents the Spearman correlations between the decile assignments made using each of the eight *VERR* measures and the eight *eVERR* measures.

Panel A: VERR Decile Correlations

VERR	capm5	ff5	baa5	aaa5	capmF5	ffF5	baaF5	aaaF5
capm5	1.00	0.85	0.93	0.94	0.91	0.84	0.93	0.92
ff5	0.85	1.00	0.83	0.83	0.82	0.83	0.83	0.81
baa5	0.93	0.83	1.00	0.99	0.95	0.86	0.98	0.97
aaa5	0.94	0.83	0.99	1.00	0.94	0.85	0.99	0.98
capmF5	0.91	0.82	0.95	0.94	1.00	0.87	0.93	0.92
ffF5	0.84	0.83	0.86	0.85	0.87	1.00	0.84	0.83
baaF5	0.93	0.83	0.98	0.99	0.93	0.84	1.00	0.99
aaaF5	0.92	0.81	0.97	0.98	0.92	0.83	0.99	1.00

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Table 9 – continued from the previous page

Panel B: eVERR Decile Correlations

eVERR	capm5	ff5	baa5	aaa5	capmF5	ffF5	baaF5	aaaF5
capm5	1.00	0.83	0.93	0.93	0.91	0.82	0.93	0.92
ff5	0.83	1.00	0.81	0.81	0.80	0.80	0.80	0.79
baa5	0.93	0.81	1.00	0.99	0.94	0.84	0.98	0.97
aaa5	0.93	0.81	0.99	1.00	0.93	0.83	0.99	0.98
capmF5	0.91	0.80	0.94	0.93	1.00	0.85	0.93	0.92
ffF5	0.82	0.80	0.84	0.83	0.85	1.00	0.82	0.81
baaF5	0.93	0.80	0.98	0.99	0.93	0.82	1.00	0.99
aaaF5	0.92	0.79	0.97	0.98	0.92	0.81	0.99	1.00

Panel C: Decile Correlations Between VERR and eVERR Deciles

	VERR							
eVERR	capm5	ff5	baa5	aaa5	capmF5	ffF5	baaF5	aaaF5
capm5	0.82	0.67	0.77	0.78	0.75	0.65	0.77	0.77
ff5	0.69	0.82	0.67	0.68	0.66	0.66	0.67	0.67
baa5	0.76	0.64	0.80	0.81	0.76	0.65	0.80	0.80
aaa5	0.76	0.64	0.79	0.80	0.75	0.64	0.80	0.81
capmF5	0.75	0.65	0.77	0.78	0.81	0.68	0.77	0.77
ffF5	0.69	0.66	0.70	0.70	0.71	0.81	0.70	0.70
baaF5	0.75	0.63	0.79	0.80	0.74	0.64	0.80	0.81
aaaF5	0.74	0.61	0.78	0.79	0.73	0.62	0.80	0.81

AAA discount rates are 0.99. In addition, the decile correlation between the versions of the *eVERR* measure employing the static Moody's AAA and the future Moody's BAA discount rates is also 0.99. Those correlations are the highest *eVERR* decile correlations found. The lowest decile correlation is 0.79, and it is the correlation between the *eVERR* measure using the static Fama-French discount rate and the *eVERR* measure using the future AAA bond interest rate from Moody's. The decile correlations between static and future CAPM or Fama-French versions of the *eVERR* measure are all 0.80 or higher. The *eVERR* decile correlations are not affected negatively when examining bear market conditions and annual decile assignments. Furthermore, the decile correlations from Panels A and B of Table 9 illustrate that the *eVERR* measures in Panel B tend to produce decile correlations which are sometimes slightly lower than the comparable decile correlations in Panel A using the *VERR* measures. However, the differences are small.

The final panel of Table 9 presents the decile assignment correlations across *VERR* and *eVERR* measures for the bear market sample with annual decile assignment. The findings are essentially the same as they have been for Panel C in the other correlation tables. The highest decile correlation between the *VERR* and *eVERR* measures, 0.82, is produced when both measures utilize either the static CAPM or the static Fama-French discount rate. The decile correlations between the *VERR* and *eVERR* measures when both are based upon future CAPM discount rates or future Fama-French discount rates are only slightly lower. As has usually been the case for the *VERR* and *eVERR* decile correlations, the lowest decile correlation is the result of decile assignments using the static Fama-French discount rate for the *VERR* model and the future Moody's AAA interest rates for the *eVERR* model. That correlation is 0.61. Given the *VERR* and *eVERR* decile correlations in Panel C of Table 9, the use of annual decile assignments while restricting the sample to bear market periods has little effect upon the agreement across the valuation models when assigning firms to valuation deciles each year.

To broadly summarize the results of Tables 4 to 9, valuation decile assignments are robust to the use of different discount methods in the calculation of *IV* and *eIV* and they are also robust to separating the sample into bull and bear market periods. Furthermore, the valuation decile assignments display a high degree of correlation regardless of whether decile assignments are made over the full sample period or annually. Decile assignment correlations for full period decile assignments are very similar to decile assignment correlations using annual decile assignments. This high degree of decile correlation across the range of valuation implementations tested allays concerns about the robustness of using decile assignments to quantify the *relative* overvaluation of firms when the ideal discount rate,

Table 10
Decile Evolution Matrix for Annual capm5 VERR Decile Assignments

Beginning in 1964, firms are assigned to valuation deciles for the calendar year using the capm5 *VERR* measure. Decile one contains the most relatively undervalued firms during the calendar year, and decile ten contains the most relatively overvalued firms during the calendar year. Then, the subsequent valuation decile membership for each firm is determined for every calendar year over the next ten years to the extent the data is available. This process is rolled forward each year until it has been applied to every calendar year during the entire 1964–2009 period. The resulting decile evolution data is presented in event time, with the initial valuation decile assignment occurring at time T, enabling all of the overlapping ten year periods of data over the 1964–2009 period to be aligned on a uniform ten year time line.

Each panel displays data for a different time horizon, with Panel A presenting decile membership percentages for a one year horizon and Panel J presenting decile membership percentages for a ten year horizon. Initial decile assignments are listed in the first column of each panel. The percentage of firms initially in a given valuation decile at time T which are in each valuation decile at the specified time horizon for the panel may be found by reading across the row for the initial valuation decile of interest. For example, in Panel A, 47.1% of firms initially assigned to decile one are in decile one a year later, and 18.6% of firms initially assigned to decile one are in decile two a year later. Because firms drop out of the sample over time after the initial decile assignment, the proportion of firms for each initial decile assignment with missing valuation decile assignments at the specified time horizon is presented in the M column.

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Table 10 – continued from the previous page

Panel A: Percentage in Each Decile at Time T+1

Decile at T	Decile at Time T+1										
	M	1	2	3	4	5	6	7	8	9	10
1	10.16	47.08	18.63	9.25	5.61	3.45	2.31	1.56	0.98	0.54	0.42
2	10.98	19.94	25.89	18.15	10.54	5.95	3.98	2.41	1.28	0.60	0.28
3	10.57	9.47	19.20	20.15	16.41	11.11	6.24	3.61	2.06	0.89	0.29
4	9.96	5.55	11.83	17.94	18.79	15.60	10.09	5.72	3.04	1.13	0.35
5	10.39	3.61	7.35	11.97	16.30	18.12	15.48	9.50	4.88	1.90	0.51
6	10.04	2.40	4.75	7.59	11.87	16.33	19.25	15.46	8.48	3.19	0.66
7	10.09	1.74	2.74	4.54	7.35	12.11	17.81	20.87	15.53	5.83	1.39
8	9.94	1.24	1.66	2.59	3.97	6.69	11.22	19.19	26.25	14.51	2.74
9	10.54	0.62	0.77	1.02	1.59	2.44	4.49	9.28	20.20	37.80	11.27
10	16.10	0.46	0.30	0.32	0.43	0.53	0.72	1.54	3.80	15.53	60.28

Panel B: Percentage in Each Decile at Time T+2

Decile at T	Decile at Time T+2										
	M	1	2	3	4	5	6	7	8	9	10
1	16.58	32.00	15.76	10.10	7.63	5.61	4.32	3.44	2.41	1.35	0.80
2	19.63	16.24	17.76	13.72	10.51	7.64	5.72	4.21	2.56	1.42	0.59
3	19.75	10.03	14.78	14.66	12.35	9.57	7.58	5.26	3.50	1.86	0.66
4	18.98	7.33	11.52	13.61	13.37	11.89	9.63	6.72	4.14	2.08	0.75
5	19.22	5.29	8.41	11.66	12.53	12.98	11.49	8.87	5.65	2.92	0.98
6	19.65	4.32	6.63	8.63	10.64	12.55	12.83	10.95	8.18	4.27	1.35
7	19.44	3.55	4.66	6.40	8.66	11.17	12.81	13.39	11.25	6.44	2.22
8	20.20	2.96	3.52	4.35	5.74	7.96	10.90	13.85	16.04	10.75	3.73
9	21.31	1.91	2.08	2.50	3.27	4.57	6.36	9.62	15.74	21.92	10.71
10	28.73	1.02	0.87	0.77	1.01	1.28	1.93	3.13	5.72	15.01	40.53

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Table 10 – continued from the previous page

Panel C: Percentage in Each Decile at Time T+3

	Decile at Time T+3										
Decile at T	M	1	2	3	4	5	6	7	8	9	10
1	21.86	23.37	13.25	9.96	7.69	6.52	5.56	4.91	3.48	2.19	1.20
2	26.76	13.18	13.60	11.33	9.58	7.70	6.36	4.88	3.62	2.13	0.85
3	27.38	9.05	12.42	11.53	10.51	9.37	6.94	5.49	4.26	2.14	0.89
4	27.15	7.37	10.34	11.21	11.09	9.93	8.50	6.42	4.44	2.50	1.05
5	27.02	6.32	8.55	10.12	10.43	10.37	9.65	7.67	5.45	3.11	1.32
6	28.12	5.23	6.66	8.82	9.48	10.41	10.24	8.75	6.91	3.82	1.56
7	28.06	4.49	5.97	6.88	8.41	9.48	10.57	9.73	8.54	5.48	2.39
8	29.48	3.85	4.17	5.08	6.13	7.59	9.47	11.06	10.98	8.47	3.70
9	31.09	3.21	3.09	3.27	3.76	5.04	6.25	8.73	12.19	14.37	9.01
10	39.86	1.54	1.34	1.17	1.45	1.90	2.49	3.66	5.82	12.53	28.26

Panel D: Percentage in Each Decile at Time T+4

	Decile at Time T+4										
Decile at T	M	1	2	3	4	5	6	7	8	9	10
1	26.57	16.81	10.89	8.98	8.03	7.00	6.39	6.06	4.54	3.18	1.54
2	32.64	10.57	11.28	9.94	8.14	7.83	6.78	5.30	4.07	2.42	1.04
3	33.66	8.32	10.41	9.83	9.16	8.19	7.04	5.68	4.32	2.32	1.09
4	33.82	7.00	9.02	9.58	9.93	8.85	7.81	5.67	4.58	2.52	1.21
5	34.23	6.16	8.05	9.22	9.17	9.15	7.93	6.50	5.26	2.91	1.42
6	35.65	5.82	6.86	7.72	8.53	8.42	8.61	7.44	5.70	3.75	1.50
7	35.92	5.21	6.34	7.28	7.77	8.14	8.02	7.86	6.54	4.63	2.29
8	37.52	4.62	5.12	5.41	6.07	7.22	7.97	8.18	8.11	6.33	3.44
9	40.14	3.87	3.67	3.35	3.96	4.95	6.15	7.39	8.74	10.04	7.73
10	49.78	1.96	1.54	1.63	1.66	2.07	2.81	3.68	5.34	9.75	19.78

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Table 10 – continued from the previous page

Panel E: Percentage in Each Decile at Time T+5

Decile at T	Decile at Time T+5: M	1	2	3	4	5	6	7	8	9	10
1	30.83	13.40	9.60	8.04	7.66	7.19	6.65	6.41	5.24	3.50	1.48
2	37.62	8.48	9.79	8.82	7.95	7.04	6.75	5.51	4.46	2.59	0.99
3	39.33	7.03	9.34	8.94	8.20	7.57	6.94	5.12	3.99	2.39	1.15
4	40.09	6.89	7.89	8.45	8.52	8.05	7.11	5.51	3.96	2.32	1.21
5	40.38	6.02	7.34	8.36	8.19	7.99	7.05	5.97	4.53	2.80	1.35
6	42.07	5.52	6.37	7.32	7.87	7.74	7.37	6.14	4.83	3.11	1.66
7	42.73	5.18	6.51	6.59	6.71	7.23	7.08	6.45	5.38	3.82	2.33
8	44.84	5.00	5.26	5.37	5.49	6.33	6.64	6.67	6.32	5.01	3.06
9	48.10	4.06	3.54	3.55	4.11	4.52	5.45	5.93	6.84	7.43	6.48
10	58.57	2.22	1.78	1.92	1.72	2.11	2.49	3.26	4.48	7.71	13.74

Panel F: Percentage in Each Decile at Time T+6

Decile at T	Decile at Time T+6: M	1	2	3	4	5	6	7	8	9	10
1	36.52	12.20	8.39	7.63	7.12	7.05	6.09	5.77	4.86	2.90	1.47
2	42.79	7.59	9.03	8.20	7.78	6.51	5.87	5.06	3.89	2.36	0.92
3	44.28	6.39	8.08	8.08	7.53	7.22	6.42	5.09	3.63	2.15	1.13
4	45.03	6.14	7.38	8.02	7.47	7.02	7.18	4.90	3.55	2.10	1.22
5	45.55	5.77	6.75	7.38	7.49	7.30	6.86	5.31	3.73	2.68	1.19
6	47.26	4.84	6.37	6.83	7.50	6.81	6.39	5.60	4.36	2.56	1.48
7	48.16	4.79	5.60	5.72	6.26	6.80	6.45	6.11	4.74	3.36	2.01
8	50.75	4.51	4.72	5.11	5.03	5.72	5.92	5.81	5.48	4.37	2.58
9	54.78	3.70	3.35	3.44	3.61	4.17	4.72	4.99	5.80	6.04	5.39
10	64.74	1.98	1.84	1.72	1.73	2.07	2.19	2.93	4.16	6.31	10.34

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Table 10 – continued from the previous page

Panel G: Percentage in Each Decile at Time T+7

Decile at T	Decile at Time T+7										
	M	1	2	3	4	5	6	7	8	9	10
1	42.13	11.48	7.47	7.17	6.73	6.32	5.53	5.13	4.09	2.56	1.38
2	48.03	6.71	8.44	7.12	6.80	6.30	5.64	4.72	3.26	2.03	0.92
3	49.22	5.95	7.17	7.44	7.10	6.74	5.85	4.51	3.11	1.91	0.99
4	49.87	5.42	6.70	7.44	7.01	6.84	6.01	4.51	3.32	1.84	1.04
5	50.21	5.12	6.49	6.77	7.13	6.51	6.17	4.62	3.66	2.27	1.06
6	51.81	4.24	5.66	6.27	6.51	6.42	6.30	5.26	3.92	2.35	1.27
7	52.87	4.28	5.12	5.68	5.88	5.73	6.03	5.34	4.32	2.91	1.86
8	55.73	3.81	4.55	4.67	4.70	5.40	5.40	5.09	4.74	3.73	2.19
9	60.23	3.17	2.94	3.18	3.43	3.81	4.22	4.65	5.03	5.03	4.30
10	68.97	1.99	1.71	1.69	1.62	2.09	2.13	2.66	3.64	5.31	8.19

Panel H: Percentage in Each Decile at Time T+8

Decile at T	Decile at Time T+8										
	M	1	2	3	4	5	6	7	8	9	10
1	47.24	10.33	7.47	6.61	6.25	5.52	5.09	4.57	3.58	2.16	1.18
2	52.71	6.39	7.04	6.77	6.27	5.98	5.23	4.25	2.91	1.56	0.89
3	53.71	4.94	6.89	6.68	6.61	6.06	5.47	4.10	2.91	1.74	0.89
4	54.24	5.07	5.84	6.65	6.38	6.33	5.67	4.23	2.88	1.83	0.87
5	54.77	4.70	5.57	6.44	6.28	6.19	5.48	4.56	3.05	1.98	1.00
6	56.26	3.98	5.11	5.86	6.12	5.93	5.58	4.43	3.52	2.06	1.15
7	57.32	3.75	4.70	5.22	5.33	5.39	5.59	4.52	3.82	2.71	1.63
8	60.14	3.48	4.13	4.28	4.54	4.96	4.66	4.62	4.34	2.96	1.90
9	64.82	2.62	3.05	2.78	3.03	3.39	3.87	4.28	4.23	4.34	3.58
10	72.37	1.95	1.49	1.66	1.63	1.95	2.33	2.45	3.34	4.46	6.39

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Table 10 – continued from the previous page

Panel I: Percentage in Each Decile at Time T+9

Decile at T	Decile at Time T+9										
	M	1	2	3	4	5	6	7	8	9	10
1	51.79	9.48	6.81	6.12	5.44	5.26	4.79	4.15	3.27	1.76	1.12
2	56.78	5.87	6.53	6.36	5.51	5.40	4.70	3.94	2.52	1.53	0.87
3	57.90	4.73	6.15	5.79	6.20	5.90	4.81	3.52	2.59	1.62	0.79
4	58.48	4.06	5.61	6.14	6.03	5.75	5.13	3.80	2.79	1.51	0.70
5	58.94	4.30	5.31	5.77	5.97	5.57	4.78	4.17	2.74	1.66	0.80
6	60.58	3.61	4.39	5.31	5.61	5.41	5.42	3.86	2.93	1.88	1.00
7	61.44	3.44	4.25	4.86	4.81	4.82	5.09	4.34	3.41	2.18	1.36
8	63.92	3.15	3.57	4.08	4.06	4.70	4.25	4.28	3.61	2.71	1.68
9	68.97	2.27	2.55	2.71	2.92	3.12	3.49	3.74	3.72	3.49	3.02
10	75.13	1.84	1.60	1.51	1.67	1.74	2.16	2.15	3.20	3.90	5.10

Panel J: Percentage in Each Decile at Time T+10

Decile at T	Decile at Time T+10										
	M	1	2	3	4	5	6	7	8	9	10
1	56.14	8.73	5.97	5.37	5.32	4.84	4.48	3.70	2.79	1.63	1.03
2	60.71	5.45	5.71	5.81	4.93	5.13	4.39	3.42	2.41	1.30	0.74
3	61.67	4.05	5.74	5.69	5.68	5.18	4.42	3.23	2.29	1.33	0.70
4	62.03	3.98	5.10	5.72	5.57	5.06	4.48	3.67	2.39	1.37	0.63
5	62.67	3.60	5.04	5.41	5.35	5.37	4.44	3.53	2.41	1.42	0.75
6	64.25	3.26	4.12	5.05	5.03	4.97	4.76	3.60	2.62	1.52	0.82
7	65.21	3.09	3.78	4.33	4.50	4.63	4.70	3.75	2.83	2.05	1.12
8	67.74	2.85	3.28	3.72	3.99	4.05	4.00	3.70	3.07	2.23	1.35
9	72.47	1.99	2.27	2.38	2.65	2.94	3.10	3.23	3.54	2.98	2.44
10	77.76	1.75	1.41	1.46	1.49	1.59	2.09	2.10	2.93	3.32	4.10

earnings specification, or decile assignment period is unclear.

The robustness of the valuation decile assignments to different model specifications does not provide information about the persistence of the decile assignments over time. To examine this issue transition matrices are generated. In the transition matrices, annual static CAPM *VERR* decile assignments are tracked over time. The static CAPM *VERR* approach is used in order to incorporate a firm specific risk adjustment without invoking the size and book-to-market connections inherent in the Fama-French discount model. Although the decile assignments using the Fama-French approach are very similar to the decile assignments using the CAPM approach, it is possible that mispricing may account for some degree of the observed premiums associated with the size and book-to-market factors. The size and book-to-market factors in the Fama-French approach are therefore more prone to being affected by mispricing itself, whereas using the CAPM methodology to estimate the cost of equity avoids that issue. The use of the static CAPM approach based upon a company specific discount rate applicable at the valuation date instead of using different future discount rates for each abnormal earnings term is consistent with the methodologies used in prior research (see D'Mello and Shroff (2000), Dong et al. (2006), and Lee, Myers, and Swaminathan (1999)) and results in a larger sample of available data to use with the transition analyses.

Beginning in 1964, firms are assigned to valuation deciles for the calendar year using the capm5 *VERR* measure. As before, decile one contains the most relatively undervalued firms during the calendar year, and decile ten contains the most relatively overvalued firms during the calendar year. Then, the subsequent valuation decile membership for each firm is determined for every calendar year over the next ten years to the extent the data is available. This process is rolled forward each year until it has been applied to every calendar year during the entire 1964–2009 period. Table 10 presents the resulting decile evolution data in event time, with the initial valuation decile assignment occurring at time T, enabling all of the overlapping ten year periods of data over the 1964–2009 period to be aligned on a uniform ten year time line.

Each panel of Table 10 displays data for a different time horizon, with Panel A presenting decile membership percentages for a one year horizon and Panel J presenting decile membership percentages for a ten year horizon. Initial decile assignments are listed in the first column of each panel. The percentage of firms initially in a given valuation decile at time T which are in each valuation decile at the specified time horizon for the panel may be found by reading across the row for the initial valuation decile of interest. For example, in Panel A, 47.1% of firms initially assigned to decile one are in decile one a year later, and 18.6% of firms initially assigned to decile one are in decile two a year later. Because firms drop out of the sample over time after the initial decile assignment, the proportion of firms for each initial decile assignment with missing valuation decile assignments at the specified time horizon is presented in the M column.

Naturally, Table 10 shows that firms initially assigned to a valuation decile move to other valuation deciles over time on average. Interestingly, initial decile assignments are more persistent than would be expected if the measures of *relative* overvaluation are merely picking up short term fluctuations in market prices. Based upon the results in Panel A, after one year about 60% of firms in the most overvalued decile remain in the most overvalued decile. Similarly, over 47% of firms in the most undervalued decile remained in the same decile one year after the initial decile assignment. Panel E shows that by five years after the initial decile assignment the proportion of missing values relative to the initial decile assignment periods ranges from about 31% to about 59%, with overvalued firms exiting the sample in greater quantities than undervalued firms. Firms may be missing at a given time horizon as a result of the passage of time. Over time some firms go bankrupt while others are acquired, liquidated, or taken private. Some firms may simply lack the the data necessary to calculate the capm5 $VERR$ valuation measure at a particular time horizon, resulting in a missing value. Even after five years the sample of firms initially assigned to the tenth decile remains skewed towards the most overvalued valuation deciles, and the firms in the most undervalued initial valuation decile similarly remain skewed towards the undervalued valuation deciles. After ten years, data from Panel J indicates that well over half of the most undervalued firms have exited the sample. This is unsurprising due to the passage of time and the fact that the years at the end of the 1964–2009 sample period do not have ten years of future decile assignments. Of the firms which remain, Panel J shows that the proportion of firms originally assigned to the first decile which remain in the first decile is over 1.8 times as high as the proportion of firms originally assigned to the first decile which have migrated to the fifth decile (8.73/4.84). A similar comparison of the firms originally assigned to the tenth decile reveals that the proportion of firms originally assigned to the tenth decile which remain in the tenth decile is slightly less than 2.0 times as high as the proportion of firms originally assigned to the tenth decile which have migrated to the sixth decile (4.10/2.09). Clearly decile assignments are persistent over time.

The decile membership percentages for each row at each time horizon which are displayed in Table 10 are based upon all firms assigned to the initial decile of interest at time T. A transition matrix table with reported decile membership percentages based upon only the non-missing values for each initial decile assignment at each time horizon is presented in Table 11. In short, Table 10 presents the percentage of all firms initially assigned

Table 11
Decile Evolution Matrix for Annual capm5 VERR Decile Assignments: Percentages Based on Non-Missing Values

Beginning in 1964, firms are assigned to valuation deciles for the calendar year using the capm5 *VERR* measure. Decile one contains the most relatively undervalued firms during the calendar year, and decile ten contains the most relatively overvalued firms during the calendar year. Then, the subsequent valuation decile membership for each firm is determined for every calendar year over the next ten years to the extent the data is available. This process is rolled forward each year until it has been applied to every calendar year during the entire 1964–2009 period. The resulting decile evolution data is presented in event time, with the initial valuation decile assignment occurring at time *T*, enabling all of the overlapping ten year periods of data over the 1964–2009 period to be aligned on a uniform ten year time line.

Each panel displays data for a different time horizon, with Panel A presenting decile membership percentages for a one year horizon and Panel J presenting decile membership percentages for a ten year horizon. The decile membership percentages presented in the panels of this table are calculated using only those firms which have valid decile assignments at the end of the specified time horizon for each panel. Initial decile assignments are listed in the first column of each panel, and the proportion of firms with non-missing decile assignments which are in each valuation decile at the end of the specified time horizon may be found by reading across the row for the valuation decile of interest. For example, in Panel A, 52.4% of firms initially assigned to decile one which have valid decile assignments a year later are again in decile one, and 20.7% of firms initially assigned to decile one which have valid decile assignments a year later are in decile two. Because firms drop out of the sample over time after the initial decile assignment, the proportion of firms with valid decile assignments diminishes with longer time horizons. To provide context, the proportion of firms with initial decile assignments which have valid decile assignments after the specified time horizon is presented in the *NM* column for each initial decile assignment. For instance, according to Panel A, 89.8% of firms initially assigned to decile one have valid decile assignments one year later.

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Table 11 – continued from the previous page

Panel A: Percentage of Non-Missing Observations in Each Decile at Time T+1

		Decile at Time T+1									
Decile at T	NM	1	2	3	4	5	6	7	8	9	10
1	89.84	52.41	20.74	10.30	6.24	3.84	2.58	1.74	1.09	0.60	0.46
2	89.02	22.40	29.08	20.39	11.84	6.68	4.47	2.70	1.44	0.68	0.31
3	89.43	10.59	21.47	22.53	18.35	12.42	6.98	4.03	2.31	0.99	0.32
4	90.04	6.17	13.13	19.93	20.86	17.33	11.21	6.36	3.38	1.25	0.39
5	89.61	4.03	8.20	13.35	18.19	20.22	17.27	10.60	5.44	2.12	0.57
6	89.96	2.66	5.28	8.43	13.19	18.15	21.39	17.19	9.43	3.54	0.73
7	89.91	1.93	3.05	5.05	8.17	13.47	19.81	23.22	17.27	6.48	1.55
8	90.06	1.37	1.85	2.87	4.41	7.43	12.46	21.31	29.15	16.11	3.04
9	89.46	0.69	0.86	1.14	1.77	2.73	5.01	10.37	22.58	42.25	12.59
10	83.90	0.54	0.36	0.38	0.51	0.63	0.86	1.83	4.53	18.51	71.85

Panel B: Percentage of Non-Missing Observations in Each Decile at Time T+2

		Decile at Time T+2									
Decile at T	NM	1	2	3	4	5	6	7	8	9	10
1	83.42	38.36	18.89	12.11	9.15	6.72	5.18	4.12	2.89	1.62	0.95
2	80.37	20.21	22.10	17.07	13.07	9.50	7.12	5.24	3.18	1.77	0.73
3	80.25	12.50	18.42	18.26	15.39	11.93	9.44	6.56	4.36	2.31	0.82
4	81.02	9.05	14.22	16.79	16.50	14.67	11.88	8.30	5.10	2.57	0.92
5	80.78	6.55	10.41	14.44	15.51	16.07	14.23	10.98	7.00	3.61	1.21
6	80.35	5.37	8.25	10.74	13.24	15.62	15.97	13.63	10.18	5.32	1.68
7	80.56	4.40	5.79	7.94	10.75	13.86	15.91	16.63	13.96	8.00	2.76
8	79.80	3.71	4.41	5.45	7.19	9.97	13.65	17.36	20.10	13.48	4.68
9	78.69	2.43	2.64	3.17	4.16	5.81	8.09	12.22	20.00	27.86	13.62
10	71.27	1.43	1.23	1.08	1.41	1.79	2.70	4.39	8.03	21.07	56.87

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Table 11 – continued from the previous page

Panel C: Percentage of Non-Missing Observations in Each Decile at Time T+3

		Decile at Time T+3									
Decile at T	NM	1	2	3	4	5	6	7	8	9	10
1	78.14	29.91	16.96	12.75	9.84	8.34	7.12	6.28	4.46	2.81	1.53
2	73.24	18.00	18.57	15.47	13.08	10.51	8.69	6.67	4.95	2.91	1.16
3	72.62	12.46	17.10	15.88	14.48	12.91	9.56	7.56	5.87	2.94	1.23
4	72.85	10.12	14.20	15.38	15.22	13.63	11.67	8.82	6.10	3.43	1.44
5	72.98	8.65	11.72	13.86	14.29	14.21	13.22	10.50	7.47	4.26	1.81
6	71.88	7.28	9.27	12.26	13.19	14.48	14.24	12.17	9.61	5.31	2.18
7	71.94	6.24	8.29	9.56	11.69	13.18	14.69	13.52	11.87	7.62	3.32
8	70.52	5.46	5.92	7.21	8.70	10.77	13.43	15.68	15.57	12.02	5.25
9	68.91	4.66	4.49	4.75	5.46	7.31	9.07	12.66	17.69	20.85	13.07
10	60.14	2.56	2.22	1.95	2.41	3.15	4.13	6.08	9.68	20.83	46.99

Panel D: Percentage of Non-Missing Observations in Each Decile at Time T+4

		Decile at Time T+4									
Decile at T	NM	1	2	3	4	5	6	7	8	9	10
1	73.43	22.90	14.83	12.23	10.93	9.53	8.70	8.26	6.18	4.34	2.10
2	67.36	15.69	16.75	14.76	12.08	11.62	10.07	7.87	6.04	3.60	1.54
3	66.34	12.53	15.69	14.81	13.80	12.34	10.61	8.56	6.51	3.49	1.64
4	66.18	10.58	13.62	14.48	15.00	13.38	11.80	8.57	6.92	3.81	1.84
5	65.77	9.37	12.23	14.02	13.95	13.91	12.06	9.89	7.99	4.42	2.15
6	64.35	9.05	10.67	12.00	13.25	13.09	13.37	11.56	8.86	5.82	2.34
7	64.08	8.13	9.89	11.36	12.13	12.71	12.51	12.27	10.21	7.23	3.57
8	62.48	7.40	8.20	8.66	9.72	11.56	12.75	13.10	12.98	10.13	5.51
9	59.86	6.47	6.12	5.60	6.62	8.26	10.27	12.35	14.60	16.78	12.92
10	50.22	3.89	3.06	3.25	3.31	4.12	5.59	7.33	10.64	19.42	39.39

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Table 11 – continued from the previous page											
Panel E: Percentage of Non-Missing Observations in Each Decile at Time T+5											
		Decile at Time T+5									
Decile at T	NM	1	2	3	4	5	6	7	8	9	10
1	69.17	19.37	13.87	11.63	11.08	10.39	9.61	9.27	7.58	5.05	2.14
2	62.38	13.60	15.70	14.13	12.75	11.28	10.82	8.83	7.16	4.15	1.59
3	60.67	11.58	15.40	14.74	13.52	12.48	11.43	8.44	6.57	3.94	1.90
4	59.91	11.50	13.17	14.10	14.22	13.43	11.87	9.20	6.62	3.87	2.01
5	59.62	10.09	12.32	14.02	13.73	13.41	11.83	10.02	7.60	4.70	2.26
6	57.93	9.54	10.99	12.63	13.58	13.35	12.72	10.60	8.34	5.37	2.87
7	57.27	9.04	11.37	11.50	11.72	12.62	12.36	11.26	9.39	6.67	4.07
8	55.16	9.07	9.54	9.74	9.94	11.48	12.04	12.09	11.46	9.08	5.55
9	51.90	7.82	6.82	6.83	7.91	8.71	10.49	11.43	13.18	14.31	12.49
10	41.43	5.37	4.29	4.63	4.14	5.10	6.02	7.87	10.81	18.61	33.17
Panel F: Percentage of Non-Missing Observations in Each Decile at Time T+6											
		Decile at Time T+6									
Decile at T	NM	1	2	3	4	5	6	7	8	9	10
1	63.48	19.22	13.22	12.02	11.22	11.11	9.59	9.09	7.65	4.57	2.31
2	57.21	13.26	15.79	14.33	13.60	11.39	10.25	8.85	6.80	4.12	1.62
3	55.72	11.47	14.51	14.50	13.51	12.96	11.53	9.13	6.51	3.86	2.02
4	54.97	11.17	13.42	14.59	13.58	12.77	13.05	8.91	6.47	3.82	2.22
5	54.45	10.60	12.39	13.56	13.75	13.41	12.60	9.75	6.85	4.92	2.18
6	52.74	9.18	12.09	12.95	14.22	12.90	12.11	10.62	8.27	4.86	2.81
7	51.84	9.24	10.81	11.04	12.07	13.12	12.44	11.78	9.14	6.48	3.88
8	49.25	9.16	9.58	10.38	10.21	11.61	12.03	11.80	11.12	8.87	5.24
9	45.22	8.19	7.41	7.61	7.97	9.21	10.45	11.04	12.84	13.35	11.93
10	35.26	5.61	5.21	4.87	4.91	5.86	6.22	8.30	11.79	17.90	29.33

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Table 11 – continued from the previous page

Panel G: Percentage of Non-Missing Observations in Each Decile at Time T+7

		Decile at Time T+7									
Decile at T	NM	1	2	3	4	5	6	7	8	9	10
1	57.87	19.84	12.91	12.39	11.62	10.93	9.56	8.87	7.07	4.42	2.39
2	51.97	12.92	16.25	13.71	13.09	12.13	10.85	9.08	6.28	3.91	1.78
3	50.78	11.72	14.12	14.64	13.98	13.28	11.52	8.88	6.13	3.77	1.95
4	50.13	10.82	13.36	14.85	13.99	13.64	11.98	8.99	6.63	3.67	2.07
5	49.79	10.27	13.03	13.60	14.32	13.07	12.39	9.27	7.35	4.57	2.13
6	48.19	8.81	11.74	13.01	13.50	13.32	13.07	10.91	8.13	4.88	2.63
7	47.13	9.07	10.86	12.05	12.47	12.16	12.79	11.33	9.17	6.17	3.94
8	44.27	8.60	10.27	10.54	10.61	12.21	12.21	11.50	10.71	8.42	4.95
9	39.77	7.98	7.38	8.00	8.64	9.57	10.62	11.69	12.65	12.65	10.81
10	31.03	6.42	5.51	5.46	5.22	6.73	6.85	8.56	11.74	17.10	26.41

Panel H: Percentage of Non-Missing Observations in Each Decile at Time T+8

		Decile at Time T+8									
Decile at T	NM	1	2	3	4	5	6	7	8	9	10
1	52.76	19.59	14.16	12.52	11.84	10.46	9.64	8.66	6.78	4.10	2.24
2	47.29	13.52	14.89	14.33	13.25	12.64	11.06	8.98	6.15	3.29	1.88
3	46.29	10.67	14.89	14.42	14.28	13.09	11.81	8.85	6.29	3.77	1.93
4	45.76	11.09	12.77	14.54	13.94	13.84	12.39	9.25	6.29	3.99	1.91
5	45.23	10.39	12.31	14.23	13.88	13.68	12.12	10.07	6.74	4.37	2.21
6	43.74	9.11	11.68	13.40	13.99	13.55	12.77	10.13	8.05	4.71	2.62
7	42.68	8.80	11.01	12.24	12.48	12.64	13.11	10.60	8.95	6.35	3.82
8	39.86	8.73	10.36	10.73	11.39	12.45	11.68	11.59	10.88	7.42	4.77
9	35.18	7.43	8.66	7.90	8.62	9.64	11.01	12.18	12.03	12.35	10.19
10	27.63	7.05	5.37	6.02	5.91	7.05	8.43	8.86	12.07	16.12	23.12

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Table 11 – continued from the previous page											
Panel I: Percentage of Non-Missing Observations in Each Decile at Time T+9											
		Decile at Time T+9									
Decile at T	NM	1	2	3	4	5	6	7	8	9	10
1	48.21	19.66	14.14	12.70	11.28	10.91	9.94	8.61	6.77	3.66	2.33
2	43.22	13.57	15.11	14.71	12.74	12.48	10.88	9.12	5.83	3.54	2.02
3	42.10	11.24	14.62	13.75	14.73	14.02	11.42	8.37	6.14	3.84	1.88
4	41.52	9.78	13.51	14.79	14.52	13.84	12.37	9.15	6.71	3.64	1.69
5	41.06	10.48	12.93	14.05	14.53	13.56	11.64	10.15	6.68	4.03	1.94
6	39.42	9.16	11.12	13.47	14.24	13.73	13.75	9.80	7.44	4.76	2.53
7	38.56	8.93	11.03	12.62	12.46	12.50	13.20	11.24	8.85	5.66	3.52
8	36.08	8.74	9.89	11.30	11.26	13.03	11.77	11.86	10.00	7.50	4.65
9	31.03	7.32	8.21	8.74	9.41	10.06	11.26	12.05	11.98	11.24	9.72
10	24.87	7.41	6.42	6.06	6.72	6.99	8.67	8.64	12.88	15.67	20.53
Panel J: Percentage of Non-Missing Observations in Each Decile at Time T+10											
		Decile at Time T+10									
Decile at T	NM	1	2	3	4	5	6	7	8	9	10
1	43.86	19.91	13.60	12.25	12.13	11.04	10.21	8.43	6.36	3.71	2.36
2	39.29	13.87	14.53	14.80	12.54	13.05	11.17	8.71	6.15	3.32	1.88
3	38.33	10.58	14.99	14.85	14.81	13.51	11.53	8.44	5.99	3.48	1.83
4	37.97	10.48	13.42	15.05	14.68	13.33	11.80	9.66	6.30	3.61	1.67
5	37.33	9.65	13.50	14.50	14.34	14.38	11.89	9.47	6.45	3.80	2.02
6	35.75	9.12	11.54	14.12	14.06	13.91	13.31	10.06	7.33	4.25	2.29
7	34.79	8.89	10.88	12.44	12.93	13.30	13.51	10.79	8.14	5.89	3.23
8	32.26	8.85	10.17	11.53	12.38	12.57	12.41	11.48	9.52	6.91	4.18
9	27.53	7.23	8.25	8.66	9.63	10.69	11.26	11.75	12.86	10.83	8.85
10	22.24	7.89	6.34	6.54	6.71	7.15	9.40	9.43	13.15	14.93	18.46

to a valuation decile which are in each valuation decile at the time horizon of interest, while Table 11 presents the percentage of all firms initially assigned to a valuation decile and which have valid valuation data at the end of the time horizon of interest which are in each valuation decile at the end of that time horizon. Thus, with the exception of the denominator used in calculating the decile membership percentages, the steps followed to create Tables 10 and 11 are the same. Although the results in Table 11 are fundamentally the same as the results in Table 10, the presentation of the proportion of non-missing decile assignments for each time horizon in Table 11 facilitates the evaluation of the relative proportion of firms in each valuation decile at each time horizon. Consequently, it may be seen in Panel E of Table 11 that five years after the decile assignment period over 33% of firms with valid valuation decile assignments initially assigned to the tenth decile are once again in the tenth valuation decile. In contrast, for firms with valid decile assignments in both periods that figure is less than 20% for firms initially assigned to the first decile which are once again in the first decile after five years. For firms which remain in the sample after ten years, Panel J shows that about 47% of firms initially assigned to the tenth decile are still in one of the three most overvalued deciles at the end of the period. A similar proportion of firms initially assigned to the first decile which remained in the sample during the ten year time horizon are in one of the bottom three valuation deciles after the ten years. If the average valuation decile membership for firms beginning in each initial decile is calculated at each time horizon and plotted, the result is Figure 1, which is presented in the prior Introduction and Motivation section. Figure 1 is therefore constructed as the weighted average decile membership for the firms with valid valuation decile assignments at each time horizon which were initially assigned to the valuation deciles at time T.

Clearly, when firms are assigned to valuation deciles based upon the capm5 *VERR* valuation measure and tracked over time the results are remarkably persistent. From the perspective of an efficient market general mispricing could be explained as being random or a pricing error which will be arbitraged away. In the case of random mispricing, random fluctuations in market prices may produce deviations between intrinsic value and market prices. If such deviations from intrinsic value are random, firms assigned to valuation deciles at one point in time would be expected to be randomly distributed across valuation deciles in subsequent periods. This is evidently not the case, as initial decile assignments are persistent and long lasting. In the case of pricing errors generally, efficient market theory indicates that pricing errors should be arbitraged away. Investors should buy more of the undervalued equities and sell or short sell overvalued equities–leading to a correction in market prices. In that scenario valuation decile assignments ought to be short-lived as the pricing errors are eliminated through the actions of investors in the marketplace. The persistence of the initial valuation decile assignments over time which may be seen in the panels of Tables 10 and 11 is inconsistent with market efficiency. Rather, the data indicates that some firms are systematically and consistently overvalued or undervalued for protracted periods of time, raising questions about the causes of the systematic and persistent mispricing. Persistent mispricing also has ramifications for asset pricing studies, as mispricing may overlap with other common asset pricing factors.

1.5 Valuation Deciles Applied to Acquisitions

1.5.1 Introduction and Acquisition Data

The prior section demonstrated that market valuation error decile assignments based upon the application of realized earnings and book values to a residual income model are highly positively correlated with each other across specifications employing numerous different discount rates, two different earnings and book value measures, annual or full period decile assignment methods, and both bull and bear market conditions. Thus the relative valuation measures developed are highly robust. However, the consistency of the relative valuation measures with prior research findings is also important. Acquisitions provide a convenient framework for examining measures of overvaluation because overvalued firms have an incentive to use their overvalued stock to fund acquisitions instead of using cash, indicating that overvaluation should directly influence the financing choices of firms pursing acquisitions.

One study which examined overvaluation and acquisitions was performed by Dong, Hirshleifer, Richardson, and Teoh (2006) and employed a residual income valuation model based on analysts' forecasts. The existence of a published study using an approach related to the one in this essay provides a unique opportunity to simultaneously validate the measures of relative valuation in this essay through comparison to published results and to enhance the literature on the topic of acquisitions by using actual earnings and book value outcomes in the valuation process instead of analysts' projections. Therefore, to examine the validity of the relative valuation measures a study of overvaluation as it relates to acquisitions is performed. The results from an analysis of the takeover market support the validity of the relative measures of valuation developed in this essay and add confidence that the valuation decile assignments are indeed capturing overvaluation as intended.

As noted above, the role of overvaluation in the takeover market has been studied by Dong et al. (2006) using an analysts' forecast valuation model. As a means of comparing the nature of the valuation decile assignments previously discussed in this essay with published research, an examination of takeover bids and mergers is performed. Data for takeover bids is obtained from SDC Platinum for the period 1978-2009. The end date in 2009 is selected in order to ensure that the valuation measures employed have the potential to include a full five years of realized outcomes. Similar to the procedure in Dong et al. (2006), the sample of takeovers is restricted by additional requirements. First, the value of the merger or takeover is required to be at least $10 million. Second, when multiple offers were made by a specific acquirer for a particular target only the first offer is included in the sample. Third, return data in CRSP is required for at least one day during the period beginning five days before the announcement date and ending five days after the announcement date. This restriction more closely aligns the requirements applied in this essay with the requirements applied by Dong et al. (2006), facilitating the comparison of the results in this essay with the results from Dong et al. (2006) for the purpose of validating the relative measures of overvaluation in this essay.

Descriptive statistics for the acquisitions data are presented in Table 12. The sample of takeover bids consists of 4,861 offers between 1978 and 2009. The individual offer values used in the calculation of the mean offer value are adjusted for inflation, and the offer values are in millions of dollars as of the end of 2009. Overall, about 83% of takeover offers in the sample were successful, and about 29% of takeover offers involved only cash as the payment.

1.5.2 Relationship Between Overvaluation and Acquisitions

To enable an examination of the role of overvaluation in acquisitions, the sample of takeover bids is combined with the valuation decile assignments discussed previously. This reduces the number of acquisitions in the final dataset since valuation data is not available for all acquiring or target firms. The acquirer and the target are not both required to have valid valuation data for a takeover offer to be included in the univariate analysis. Consequently, the number of total observations present in the univariate data for the acquirers differs from the total number of observations present in the univariate data for the target firms. The univariate statistics presented in Table 13 follow an approach similar to the one used by Dong et al. (2006).

However, a few important differences between the univariate approach used by Dong et al. (2006) and the univariate approach used in this study should be noted. In the study by Dong et al. (2006), firms were separated into quintiles by their price-to-value (P/V) ratios. As the valuation measures presented previously in this essay utilize deciles, deciles are employed in the univariate analysis. Also, as the decile assignments are made on the basis of the *VERR* or *eVERR* measures in this study, the precise nature of

Table 12
Descriptive Statistics for Takeover Bids

The number of takeover bids per year in the sample is presented below. For each year the mean offer value is calculated using inflation adjusted deal values expressed in terms of dollar values at the end of 2009. The percentages of successful, hostile, tender offers, merger bids, all cash bids, all stock bids, and bids using a mixture of financing are presented.

Year	Tobs	Mean Offer Value	Successful (%)	Hostile (%)	Tender Offers (%)	Merger Bids (%)	All Cash (%)	All Stock (%)	Mixed (%)
1978	14	1,134.2	85.7	14.3	42.9	57.1	50.0	42.9	7.1
1979	8	779.9	50.0	12.5	50.0	50.0	87.5	12.5	0.0
1980	26	854.2	80.8	11.5	23.1	76.9	15.4	7.7	76.9
1981	91	1,435.2	71.4	14.3	22.0	78.0	4.4	0.0	95.6
1982	81	552.2	66.7	12.3	24.7	75.3	0.0	0.0	100.0
1983	107	374.2	76.6	11.2	21.5	78.5	0.9	0.0	99.1
1984	131	679.5	74.0	6.1	28.2	71.8	6.1	4.6	89.3
1985	131	825.3	71.8	9.9	28.2	71.8	49.6	20.6	29.8
1986	142	621.6	78.9	8.5	32.4	67.6	53.5	21.8	24.6
1987	132	544.9	75.0	9.1	23.5	76.5	41.7	21.2	37.1
1988	134	588.0	62.7	12.7	34.3	65.7	53.7	15.7	30.6
1989	126	624.4	71.4	6.3	21.4	78.6	34.9	32.5	32.5
1990	91	537.6	78.0	3.3	16.5	83.5	40.7	22.0	37.4
1991	79	421.8	74.7	1.3	7.6	92.4	12.7	51.9	35.4
1992	86	368.7	84.9	2.3	9.3	90.7	19.8	46.5	33.7
1993	127	487.5	81.9	2.4	11.0	89.0	27.6	41.7	30.7
1994	185	389.8	81.1	6.5	13.0	87.0	27.0	47.6	25.4
1995	215	664.4	84.2	7.4	15.3	84.7	23.7	48.8	27.4
1996	243	848.8	86.8	6.2	15.2	84.8	20.2	43.6	36.2
1997	322	975.1	89.8	4.0	16.1	83.9	16.5	48.4	35.1
1998	328	1,657.2	93.6	1.2	14.9	85.1	20.4	46.6	32.9
1999	367	2,494.0	84.5	3.5	16.3	83.7	25.9	43.9	30.2
2000	333	2,102.5	84.7	2.4	19.8	80.2	25.8	41.4	32.7
2001	230	1,135.1	85.7	1.3	17.0	83.0	24.3	37.8	37.8
2002	133	1,159.7	85.7	1.5	22.6	77.4	33.1	28.6	38.3
2003	158	1,130.0	92.4	2.5	17.1	82.9	31.0	27.8	41.1
2004	155	2,600.8	94.8	1.9	6.5	93.5	29.7	27.7	42.6
2005	150	2,696.8	89.3	1.3	8.7	91.3	37.3	22.0	40.7
2006	165	2,566.0	89.1	1.8	8.5	91.5	50.3	15.8	33.9
2007	160	1,741.1	86.9	0.0	16.9	83.1	46.9	13.8	39.4
2008	124	2,165.7	76.6	2.4	23.4	76.6	48.4	21.0	30.6
2009	87	2,750.4	82.8	1.1	31.0	69.0	31.0	25.3	43.7
Total	4,861	1,328.1	83.2	4.6	18.2	81.8	28.6	32.2	39.2

the measure of overvaluation in this study differs from the measure used by Dong et al. (2006). Perhaps the most significant difference pertains to the frequency and timeliness of the valuation measures this study uses compared to the valuation measures used by Dong et al. (2006). Since Dong et al. (2006) used an analysts' forecasts model to find firm value it was possible for them to calculate the value of the firm for the month before the announcement date. As this study is based upon a perfect foresight model using realized earnings data, firm valuations are annual. The valuation data for the acquiring firm associated with a transaction is taken from the end of the nearest fiscal year ending on or before the announcement date, and the same approach is used for the target firm associated with the transaction. Although it is possible for the valuation data used in this study to be closer to the announcement date than it was in Dong et al. (2006), in general the valuation data used in this study is expected to be markedly less fresh. This means that the measures of overvaluation in this study use market prices in the *VERR* and *eVERR* calculations from substantially before the announcement date of the acquisition in most cases, resulting in market prices which are even less likely to be contaminated by the acquisition announcement than in Dong et al. (2006) in most cases.

Importantly, the use of realized earnings data and book values in the valuation models produces an additional effect for the target firms. If an acquisition bid is successful, much of the future earnings data becomes unavailable. Since the valuation measures are calculated using whatever earnings data is available for a given firm instead of requiring that data be available for the full five years, which would produce a survivorship bias, target firms which are successfully acquired have valuation measures preceding the announcement date based upon very few future earnings figures, if any. As Equation 2 demonstrates, in the absence of future earnings data the measure of firm value becomes the book value of the firm. In effect, the firm value used to calculate the *VERR* and *eVERR* measures for many of the target firms is therefore solely the result of the target firm's book value when an acquisition bid is successful. Even in this case, the decile assignments used to sort the target firms are not purely driven by the market-to-book ratio since the decile assignments are generated using the full valuation sample over the full period. Specifically, the valuation decile assignments are full sample valuation decile assignments generated using the entire set of valuation data discussed in prior sections of this study instead of limiting decile assignments to the acquisition offer sample alone.

In all cases the decile assignments are based upon valuation measures employing the static CAPM discount rate for each firm. The static CAPM approach is used in order to incorporate a firm specific risk adjustment without invoking the size and book-to-market connections inherent in the Fama-French discount model. Although the decile assignments using the Fama-French approach are very similar to the decile assignments using the CAPM approach, it is possible that mispricing may account for some degree of the observed premiums associated with the size and book-to-market factors. The size and book-to-market factors in the Fama-French approach are therefore more prone to being affected by mispricing itself, whereas using the CAPM methodology to estimate the cost of equity avoids that issue. Additionally, Dong et al. (2006) reported results based upon a valuation implementation utilizing a CAPM discount rate, and using the static CAPM approach to estimate the cost of equity in this essay more closely approximates the primary cost of equity choice made by Dong et al. (2006), facilitating comparisons between the findings in this essay with published research.

The results in Table 13 are divided into four panels. Panel A presents characteristics of takeover offers grouped by the target's *VERR* decile assignment. As the target firms become progressively overvalued the proportion of takeover offers employing only cash as the form of payment appears to decline for the most overvalued targets, but the difference between the 10^{th} and 1^{st} deciles is not statistically significant. Increasing levels of overvaluation of the target firm appear to loosely correspond to an increased proportion of takeover offers employing only stock as the form of payment, but the difference between the 10^{th} and 1^{st} deciles is not statistically significant.

Panel B of Table 13 continues with the univariate analysis of takeover bids assigned to valuation deciles on the basis of the target's *eVERR* valuation decile assignment. In this case, the difference in the frequency of all cash payment between the 10^{th} and 1^{st} deciles is statistically significant at the 5% level. The frequency of all stock payment, however, demonstrates a statistically significant difference at the 10% level between the 10^{th} and 1^{st} valuation deciles. More overvalued target firms exhibit higher frequencies of all stock payment and lower frequencies of all cash payment.

Switching to the univariate analysis using valuation deciles for the firms making the acquisition offers, Panel C organizes the transactions into groups based upon the *VERR* decile assignment of the acquiring firm in each offer. In this panel the proportion of transactions funded entirely with cash generally declines as the acquirers become progressively more overvalued. As would be expected, the proportion of acquisition offers funded entirely with stock is higher for acquirers which are more overvalued. The difference between the frequencies reported for the 10^{th} and 1^{st} deciles is statistically significant at the 1% level for both the frequencies of all cash payment and the frequencies of all stock payment.

Moving to *eVERR* valuation decile assignments for firms making an acquisition offer produces the results in Panel D of Table 13. The results for the frequency of all cash payment are statistically significant at the 1% level, with the most overvalued acquirers less frequently making all cash offers. The frequency of all stock payment increases by 36.9% when moving from the 1^{st} decile to the 10^{th} decile, and the difference is statistically significant at the 1% level.

Similar to the approach in Dong et al. (2006), logistic regressions are performed to model the choice of full cash funding, full stock funding, tender offers, hostile takeover bids, and the success of the takeover offer for the acquisition dataset. The explanatory variables included in the logistic

Table 13
Acquisition Characteristics by Acquirer or Target Valuation Deciles

The sample of acquisition offers from 1978-2009 is merged with valuation data and the specified valuation decile assignments generated previously are used to separate the sample of acquisitions into groups in each panel. In all cases the decile assignments are based upon valuation measures employing the static CAPM discount rate for each firm. The static CAPM approach incorporates a firm specific risk adjustment while more closely approximating the cost of equity choice made by Dong et al. (2006). The mean valuation measure for the acquisition sample is presented for each decile category. The frequency of all cash, all stock, tender, hostile, and successful offers are presented for each decile category. The difference between the tenth and first deciles is presented, and p-values for two sample t-tests are at the bottom of each panel.

Decile	Tobs	Mean VERR Measure	Frequency All Cash (%)	Frequency All Stock (%)	Frequency Tender Offer (%)	Frequency Hostile (%)	Frequency Successful (%)
Panel A: Acquisitions Assigned to Deciles Using Target's capm5 VERR Valuation Decile Assignment							
1	29	−6.279	31.034	17.241	34.483	10.345	68.966
2	115	−0.800	32.174	21.739	35.652	6.957	82.609
3	179	−0.209	41.899	17.877	35.196	6.145	82.682
4	258	0.115	37.984	22.093	28.682	6.977	87.209
5	283	0.335	37.809	22.261	29.682	8.127	83.392
6	295	0.491	38.983	28.814	28.475	5.424	87.458
7	358	0.622	37.151	28.771	20.391	3.631	84.916
8	330	0.747	36.364	33.030	22.121	2.727	91.515
9	256	0.881	19.531	43.750	14.844	2.734	87.109
10	102	1.238	18.627	24.510	5.882	2.941	58.824
Difference 10-1		7.517	−12.407	7.268	−28.600	−7.404	−10.142
p-value		0.000	0.202	0.387	0.004	0.226	0.317

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Table 13 – continued from the previous page

Decile	Tobs	Mean eVERR Measure	Frequency All Cash (%)	Frequency All Stock (%)	Frequency Tender Offer (%)	Frequency Hostile (%)	Frequency Successful (%)
Panel B: Acquisitions Assigned to Deciles Using Target's capm5 eVERR Valuation Decile Assignment							
1	30	−9.131	36.667	23.333	30.000	10.000	63.333
2	34	−2.159	32.353	26.471	26.471	8.824	82.353
3	97	−0.915	36.082	13.402	37.113	7.216	77.320
4	160	−0.407	37.500	17.500	25.625	4.375	78.125
5	199	−0.044	34.673	25.126	30.653	7.035	88.945
6	285	0.205	35.439	22.105	29.474	9.123	82.456
7	349	0.405	38.682	24.069	29.226	5.158	84.527
8	441	0.590	38.776	28.798	24.036	3.855	90.249
9	424	0.771	32.311	37.264	19.575	1.887	88.679
10	166	1.107	15.663	39.759	10.241	3.012	77.711
Difference 10-1		10.238	−21.004	16.426	−19.759	−6.988	14.378
p-value		0.000	0.032	0.067	0.032	0.231	0.139

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Table 13 – continued from the previous page

Decile	Tobs	Mean VERR Measure	Frequency All Cash (%)	Frequency All Stock (%)	Frequency Tender Offer (%)	Frequency Hostile (%)	Frequency Successful (%)
Panel C: Acquisitions Assigned to Deciles Using Acquirer's capm5 VERR Valuation Decile Assignment							
1	85	−4.502	37.647	15.294	25.882	8.235	81.176
2	129	−0.924	35.659	13.178	27.132	4.651	85.271
3	143	−0.217	44.056	13.986	27.972	7.692	82.517
4	179	0.122	41.341	9.497	34.078	2.793	83.799
5	219	0.334	44.292	16.438	29.224	5.023	80.822
6	285	0.489	42.456	21.053	28.421	7.368	85.263
7	321	0.624	37.695	24.922	29.595	5.296	86.916
8	326	0.749	37.730	28.221	23.926	4.601	84.356
9	306	0.891	23.203	47.059	19.281	3.922	84.641
10	237	1.220	11.392	54.430	11.814	2.110	86.920
Difference 10-1		5.722	−26.255	39.136	−14.068	−6.126	5.743
p-value		0.000	0.000	0.000	0.008	0.054	0.233

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Table 13 – continued from the previous page

Decile	Tobs	Mean eVERR Measure	Frequency All Cash (%)	Frequency All Stock (%)	Frequency Tender Offer (%)	Frequency Hostile (%)	Frequency Successful (%)
Panel D: Acquisitions Assigned to Deciles Using Acquirer's capm5 eVERR Valuation Decile Assignment							
1	96	−8.116	27.083	20.833	15.625	6.250	84.375
2	138	−2.203	42.029	12.319	32.609	7.246	86.232
3	129	−0.977	33.333	17.054	26.357	3.101	83.721
4	196	−0.397	40.816	18.878	37.245	6.633	86.224
5	235	−0.051	41.277	18.298	31.489	9.787	81.277
6	230	0.193	42.174	18.261	28.696	4.348	83.043
7	292	0.396	39.041	27.397	25.000	6.507	84.247
8	300	0.586	31.667	29.333	23.333	3.667	84.667
9	251	0.776	23.904	43.028	15.139	3.586	80.478
10	182	1.195	13.187	57.692	12.637	0.549	89.011
Difference 10-1		9.310	−13.897	36.859	−2.988	−5.701	4.636
p-value		0.000	0.008	0.000	0.505	0.027	0.293

regressions are chosen to approximate the study by Dong et al. (2006) in order to facilitate comparisons between that study and the results in this essay. Therefore, the variables included in the logistic regressions are market-to-book ratios for the acquirer and the target, valuation decile assignments for the acquirer and the target, a dummy variable to capture the effect of diversifying acquisitions, the relative size of the acquirer to the target, the size of the target, the leverage of the acquirer, dummy variables for offer year, and dummy variables for one digit SIC industry groups. A brief discussion of the different variables will clarify the similarities and differences in the methodologies followed by Dong et al. (2006) and this study.

Most of the differences between the methodology employed by Dong et al. (2006) and the methodology this study follows revolve around the valuation date of the overvaluation measures and the way the valuation measures are included in the logistic regressions. Dong et al. (2006) converted the market-to-book and price-to-value ratios into relative values between 1 and 100 by first ranking the sample among all CRSP stocks each month. In this essay, actual market-to-book ratios are used in the logistic regressions, and they are calculated at the valuation date for each firm. The valuation date for each firm is the data date for the fiscal data in COMPUSTAT which is on or before the announcement date. Static CAPM valuation decile assignments for the acquirer and target firms are used as the valuation measures, and decile assignments are made using the full sample of 1964–2009 valuation data. As in Dong et al. (2006), the dummy variable for diversifying acquisitions is set to one if the target and acquirer share the same three-digit COMPUSTAT SIC code and zero otherwise. The relative size is calculated as the logarithm of the ratio of the market values for the acquirer and the target, with market values calculated on the valuation date corresponding to the valuation data for each firm. Target size is the logarithm of the target's market size on the valuation date. Leverage is calculated by dividing the acquirer's total liabilities by total assets on the valuation date. As in Dong et al. (2006), dummy variables are included for the offer year and dummy variables for single digit SIC industry groups are used.[1]

For the purposes of this study the most important explanatory variables are the valuation decile assignments and the most important logistic regressions are those relating to the use of cash payment or stock payment. Overvalued firms have an incentive to use their stock as a means of financing an acquisition instead of using cash. Thus, the acquirer's valuation decile is expected to be negatively related to cash payment and positively

[1]Dong et al. (2006) used dummy variables for two digit SIC industry groups, but a logistic regression using two digit SIC industry groups with the modifications to the other variables in this study failed to converge.

related to stock payment as it is in Dong et al. (2006). The relative valuation of the target firm was found by Dong et al. (2006) to be positively related to stock payment and not statistically significant at the 5% level for cash payment, and similar results are expected for this essay. The results from Dong et al. (2006) indicate that the market-to-book variables should be negatively related to cash payment and positively related to stock payment. The diversifying and relative size variables are also expected to follow the patterns in Dong et al. (2006), yielding positive relationships with all cash payment and negative relationships with all stock payment. Target size and leverage produced mixed levels of significance in the study by Dong et al. (2006), and therefore no clear expectations are established for this study.

The results are presented in Table 14. In Panel A *VERR* valuation decile assignments are used as the valuation measures for the acquirer and the target for each takeover bid. Once again, *VERR* decile assignments are generated using the full sample of valuation data over the entire period of the study discussed previously, and thus decile assignments are not limited solely to the takeover sample. The results presented in Panel A show that the levels of target and acquirer overvaluation are both negatively associated with cash being the sole payment method in the offer. On the other hand, valuation decile assignments for the target and the acquirer are both positively related to the use of only stock as the proposed method of payment in a takeover offer. This means that increasingly overvalued acquirers are more likely to use only stock and it is more likely that stock alone will be used as the proposed payment as the target firm becomes increasingly overvalued. The coefficients for the target and acquirer decile assignments are statistically significant at the 1% level. In Panel B the logistic regressions are performed again using *eVERR* valuation decile assignments. The directionality of the relationship between the valuation deciles of the target and the acquirer and the choice of only cash or only stock as payment remains the same as in Panel A. The coefficients for the valuation deciles of the acquirer and the target when modeling the use of solely cash financing and solely stock financing are all statistically significant at the 5% level, with most of them significant at the 1% level.

An evaluation of the coefficients for the variables other than the valuation measures for the cash and stock logistic regressions in Panels A and B of Table 14 produces somewhat more mixed results compared to Dong et al. (2006). Neither the target nor the acquirer's market-to-book ratio is statistically significant at the 5% level in the cash or stock logistic regressions in Panels A and B. The dummy variable for diversifying acquisitions is generally statistically insignificant, whereas it was positively related to cash payment and negatively related to stock payment in Dong et al. (2006). The directional impact of relative size upon cash or stock

Table 14
Logistic Regressions for Acquisitions

The sample of acquisition offers from 1978-2009 is merged with valuation data. Firm valuations are found using the static CAPM discount approach. Decile assignments are made using the full valuation sample. If the acquirer and target have the same three-digit SIC code in COMPUSTAT the diversifying variable is set to one, with zero assigned otherwise. Relative size is the logarithm of the ratio of the market values for the acquirer and target. Target size is the logarithm of the target's market value. Leverage is the acquirer's total liabilities scaled by total assets. Dummy variables are included for offer year and one digit SIC industry groups. The p-values are reported below each coefficient.

Panel A: VERR Decile Assignments Used as Valuation Measures (Dependent Variable = 1 if Yes, 0 Otherwise)

	Cash			Stock			Tender Offer			Hostile			Success		
Target M/B	−0.022		0.001	−0.000		−0.001	−0.000		0.000	−0.135		−0.054	0.000		0.001
	0.064		0.685	0.872		0.558	0.848		0.869	0.007		0.274	0.789		0.718
Acquirer M/B	−0.010		−0.000	0.006		0.003	−0.074		−0.054	0.004		0.004	−0.001		−0.001
	0.158		0.966	0.053		0.402	0.000		0.006	0.434		0.329	0.723		0.668
Target Decile		−0.116	−0.116		0.129	0.129		−0.172	−0.160		−0.190	−0.145		−0.076	−0.078
		0.000	0.000		0.000	0.000		0.000	0.000		0.000	0.025		0.018	0.016
Acquirer Decile		−0.120	−0.119		0.224	0.221		−0.034	−0.004		−0.064	−0.064		0.038	0.038
		0.000	0.000		0.000	0.000		0.171	0.880		0.172	0.172		0.186	0.185
Diversifying	−0.162	−0.066	−0.065	0.229	0.134	0.136	−0.073	−0.017	−0.004	−0.036	0.131	0.144	−0.162	−0.176	−0.180
	0.122	0.546	0.550	0.033	0.241	0.235	0.505	0.883	0.975	0.861	0.553	0.515	0.205	0.191	0.182
Relative Size	0.212	0.236	0.235	−0.129	−0.163	−0.164	0.082	0.087	0.107	−0.407	−0.384	−0.386	0.339	0.357	0.359
	0.000	0.000	0.000	0.000	0.000	0.000	0.006	0.005	0.001	0.000	0.000	0.000	0.000	0.000	0.000
Target Size	−0.053	−0.024	−0.024	0.006	−0.061	−0.061	0.020	0.081	0.094	0.277	0.313	0.320	0.049	0.102	0.100
	0.124	0.520	0.525	0.868	0.119	0.122	0.588	0.037	0.017	0.000	0.000	0.000	0.232	0.026	0.028
Leverage	0.743	0.462	0.463	−1.681	−1.369	−1.377	0.937	0.569	0.713	0.897	1.134	1.114	−0.334	−0.268	−0.264
	0.007	0.119	0.119	0.000	0.000	0.000	0.001	0.063	0.023	0.104	0.064	0.068	0.312	0.449	0.456
Intercept	−1.152	20.637	20.437	−0.472	−1.987	−1.980	−1.904	−1.147	−1.418	−3.769	−13.846	−13.403	0.991	0.774	0.781
	0.001	0.000	0.000	0.177	0.000	0.000	0.000	0.006	0.001	0.000	0.000	0.000	0.008	0.092	0.089
N	2,208	2,071	2,071	2,208	2,071	2,071	2,208	2,071	2,071	2,208	2,071	2,071	2,208	2,071	2,071
Pseudo-R^2	0.172	0.193	0.193	0.153	0.196	0.197	0.073	0.086	0.089	0.075	0.075	0.073	0.079	0.080	0.081

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Table 14 – continued from the previous page

Panel B: eVERR Decile Assignments Used as Valuation Measures (Dependent Variable = 1 if Yes, 0 Otherwise)

	Cash			Stock			Tender Offer			Hostile			Success		
Target M/B	−0.017		−0.002	0.002		−0.000	−0.036		−0.015	−0.205		0.007	0.002		−0.004
	0.140		0.673	0.448		0.976	0.025		0.299	0.002		0.138	0.794		0.374
Acquirer M/B	0.000		0.001	0.000		−0.000	0.001		0.001	−0.001		−0.000	0.001		0.001
	0.513		0.247	0.869		0.590	0.410		0.219	0.521		0.659	0.473		0.489
Target Decile		−0.078	−0.076		0.153	0.153		−0.098	−0.084		−0.185	−0.189		0.100	0.103
		0.008	0.011		0.000	0.000		0.001	0.008		0.001	0.001		0.005	0.004
Acquirer Decile		−0.073	−0.075		0.161	0.164		−0.055	−0.057		−0.080	−0.073		−0.041	−0.044
		0.005	0.004		0.000	0.000		0.034	0.029		0.097	0.133		0.174	0.145
Diversifying	−0.104	−0.055	−0.056	0.257	0.189	0.196	−0.117	−0.088	−0.088	0.014	0.086	0.106	−0.132	−0.138	−0.147
	0.345	0.632	0.629	0.022	0.114	0.103	0.304	0.457	0.455	0.950	0.708	0.647	0.324	0.330	0.300
Relative Size	0.231	0.260	0.263	−0.152	−0.198	−0.200	0.059	0.066	0.070	−0.434	−0.419	−0.428	0.413	0.405	0.410
	0.000	0.000	0.000	0.000	0.000	0.000	0.054	0.044	0.033	0.000	0.000	0.000	0.000	0.000	0.000
Target Size	−0.060	−0.029	−0.029	−0.005	−0.072	−0.071	0.007	0.033	0.037	0.263	0.286	0.284	0.044	0.030	0.029
	0.094	0.451	0.456	0.893	0.075	0.080	0.860	0.404	0.346	0.000	0.000	0.000	0.300	0.527	0.536
Leverage	0.713	0.495	0.468	−1.548	−1.089	−1.056	0.758	0.532	0.490	0.977	0.938	1.043	−0.475	−0.329	−0.383
	0.013	0.118	0.141	0.000	0.001	0.001	0.011	0.098	0.129	0.083	0.143	0.107	0.164	0.379	0.309
Intercept	108.120	39.613	39.104	−0.239	−1.812	−1.844	−1.793	−1.017	−1.066	−9.164	−10.773	−10.372	0.773	0.476	0.505
	0.000	0.000	0.000	0.541	0.000	0.000	0.000	0.018	0.014	0.000	0.000	0.000	0.062	0.322	0.297
N	2,049	1,885	1,885	2,049	1,885	1,885	2,049	1,885	1,885	2,049	1,885	1,885	2,049	1,885	1,885
Pseudo-R^2	0.179	0.190	0.191	0.161	0.188	0.188	0.073	0.078	0.079	0.082	0.081	0.081	0.092	0.095	0.096

payment for acquisitions in Panels A and B of Table 14 matches the results from Dong et al. (2006), but the coefficients and significance levels for the target's size do not support clear inferences–yielding somewhat weaker results for the relationship between the target's size and stock payment than documented by Dong et al. (2006). However, leverage is negatively related to stock payment and statistically significant at the 1% level across specifications in Panels A and B. The negative relationship between the acquirer's leverage and stock funding for acquisitions is more strongly supported in Table 14 than it was in the study by Dong et al. (2006).

Overall, the application of the valuation decile assignments from this study produces relative valuation results which are consistent with the findings of Dong et al. (2006) when data from the takeover market is evaluated. More overvalued acquirers are more likely to utilize only stock as the source of financing for a transaction, and more overvalued acquirers are less likely to use only cash as the source of financing. This consistency with prior research on the takeover market helps to establish the validity of the methodology employed in this study to generate the valuation measures and to assign firms to valuation deciles.

To further examine the robustness of the findings associated with the acquisition sample a meta-analysis is performed of the stock and cash logistic regressions in Table 14 using all of the different valuation decile assignments generated. A total of thirty-two different valuation decile measures are applied to the stock and cash logistic regressions. Those measures are the product of two different valuation model implementations, the *IV* and *eIV* models, with eight different cost of equity measures and both full period and annual valuation decile assignments. The thirty-two different valuation decile assignments generated are used to run thirty-two sets of the stock and cash logistic regressions analogous to the first six columns of logistic regression results presented in Table 14. For the logistic regressions which did not include the valuation deciles for the acquirer and the target only two different logistic regressions are produced in the meta-analysis. The two different logistic regressions in those cases are the result of the differences in the construction of the market-to-book ratios.

The results of the meta-analysis are presented in Table 15. Two sets of *t*-statistics are presented in the table. The *AVG t-statistic* is the simple average of the *t*-statistics produced by each underlying logistic regression. The *FM t-statistic* is the *t*-statistic for the average of each of the coefficients estimated across all of the different logistic regressions. Of particular interest is the fact that the acquirer decile is negatively related to cash being the sole payment method for acquisitions and positively related to stock being the sole payment method for acquisitions. The *AVG t-statistic* shows that those results are statistically significant at the 1% level on average across the thirty-two different sets of logistic regressions. The *FM t-statistic* shows

Table 15
Average Coefficients for Logistic Regressions for Acquisitions Using Different Valuation Decile Assignments

Logistic regressions for acquisitions are performed as in Table 14 using multiple valuation measures. A total of thirty-two different *VERR* and *eVERR* valuation decile assignments are used. The coefficients reported in the table represent the average of the coefficients resulting from the logistic regressions performed using each of the different valuation decile assignments. The *FM t-statistic* is the t-statistic for the average of the coefficients estimated across the different logistic regressions. The *AVG t-statistic* is the simple average of the *t*-statistics produced by each underlying logistic regression.

VERR and eVERR Decile Assignments Used as Valuation Measures (Dependent Variable = 1 if Yes, 0 Otherwise)						
	Cash			Stock		
Target M/B	−0.019		−0.001	0.001		−0.000
FM t-statistic			−4.496			−4.799
AVG t-statistic			−0.157			−0.260
Acquirer M/B	−0.005		0.000	0.003		0.002
FM t-statistic			0.009			3.405
AVG t-statistic			0.473			0.270
Target Decile		−0.082	−0.081		0.156	0.156
FM t-statistic		−22.413	−21.081		53.220	52.856
AVG t-statistic		−3.110	−3.023		5.169	5.135
Acquirer Decile		−0.080	−0.080		0.152	0.151
FM t-statistic		−20.271	−21.135		23.016	23.962
AVG t-statistic		−3.531	−3.509		6.182	6.124
Diversifying	−0.133	−0.056	−0.056	0.243	0.162	0.166
FM t-statistic		−12.567	−12.781		38.734	37.028
AVG t-statistic		−0.504	−0.497		1.356	1.387
Relative Size	0.221	0.235	0.237	−0.140	−0.164	−0.166
FM t-statistic		81.551	75.635		−37.343	−38.675
AVG t-statistic		7.386	7.412		−4.769	−4.802
Target Size	−0.057	−0.045	−0.045	0.000	−0.047	−0.047
FM t-statistic		−27.103	−27.203		−18.917	−19.526
AVG t-statistic		−1.176	−1.159		−1.174	−1.159
Leverage	0.728	0.533	0.524	−1.614	−1.323	−1.319
FM t-statistic		57.680	55.653		−61.194	−50.544
AVG t-statistic		1.727	1.692		−4.132	−4.109
Intercept	53.484	24.589	24.298	−0.355	−1.844	−1.850
FM t-statistic		11.418	11.446		−81.910	−95.305
AVG t-statistic		72.141	70.696		−4.123	−4.122
N	2	32	32	2	32	32

that the estimated coefficients are highly consistent across the thirty-two sets of logistic regressions, with the *t*-statistics of the average of the coefficients indicating that the coefficients generated are different from zero at the 1% level of statistical significance. The findings in Table 15 therefore show that the results of the application of the valuation deciles to acquisitions are robust to the use of the different valuation methodologies employed in this study. This outcome provides support for the robustness of the relative valuation measures derived using different discount rates, decile assignment periods, and model specifications.

1.6 Conclusion

Reliably measuring mispricing is of interest to money managers, investors, academicians, and many others. Studies employing a residual income valuation model to study some topic of interest have typically followed a robustness approach to the assumptions required by the residual income valuation model. In this approach the valuation model's assumptions are altered and the main findings for the topic of interest are examined to determine if they are affected. Although appropriate for the studies in which it is used, the approach described leaves unanswered questions about what happens to relative measures of mispricing as the assumptions utilized are altered. The present study answers some of those questions by focusing upon correlations between the relative measures of mispricing derived from the residual income model as the discount rates, decile assignment methods, and earnings and book value measures are altered.

The robustness of the relative valuation measures to alternative specifications is tested in several ways. First, two different measures of earnings and book values are used, generating the IV and eIV series of estimates of intrinsic value. Second, eight different discount rates are used in the generation of both the IV and eIV estimates of intrinsic value, and the resulting $VERR$ and $eVERR$ measures of mispricing are then converted into relative measures of mispricing by assigning firms to valuation deciles using both annual and full period decile assignments. The *lowest* decile correlation is 0.82 across discount methods with the full period $VERR$ decile assignments. The *lowest* decile correlation is 0.78 for the full period $eVERR$ decile assignments, and the *lowest* full period $VERR$ with $eVERR$ decile assignment correlation is 0.62. Similar results are obtained with annual decile assignments, annual or full period bull market decile assignments, and annual or full period bear market decile assignments.

As the results indicate, assigning firms to valuation deciles using the estimated $VERR$ and $eVERR$ produces relative measures of valuation which are not sensitive to the choice of discount rate or model specification. The first four discount rates used are static implementations of the CAPM, Fama-French three factor model, and two aggregate bond market interest rates. The second four discount rates used are alternative implementations of the first four discount rates which allow the rates to vary over time by using a contemporaneous discount rate for each abnormal earnings term. Even the application of discount rates which are not company specific have little impact upon the relative measures of valuation arising from the $VERR$ and $eVERR$ valuation decile assignments.

To test the ability of the relative valuation measures to capture the degree of overvaluation a study of acquisitions from the takeover market is performed. The results are consistent with published research, with overvalued acquirers statistically significantly less likely to pay all cash for an acquisition and statistically significantly more likely to use all stock to fund an acquisition. A meta-analysis of the acquisition data is performed using all of the different variations of the decile assignment methods, discount rates, and earnings and book value measures. Across all of the different valuation decile assignments the results demonstrate on average a statistically significant and negative relationship between the acquirer's overvaluation and all cash payment and a statistically significant and positive relationship between the acquirer's overvaluation and all stock payment.

Perhaps the most surprising finding is that annual decile assignments are highly persistent over time, contrary to what would be expected with random deviations of market prices from intrinsic values. Using the capm5 *VERR* decile assignments, fully 18% of the most overvalued firms with ten years of subsequent valuation data at the time of the initial decile assignment are in the most overvalued decile ten years later. Similarly, nearly 20% of the most undervalued firms with ten years of subsequent valuation data at the time of the intial decile assignment are in the most undervalued decile ten years later. The slow convergence of market values with intrinsic values indicates that mispricing detected by the decile assignments is not due solely to random market price fluctuations at the time of the decile assignment. To the extent that random mispricing exists at any given time it is not inconsistent with market efficiency. However, random mispricing would not be persistent, and therefore the observed persistence in mispricing argues against random price fluctuations as the causal factor. If mispricing is not random, arguments in favor of market efficiency indicate that investors should take actions which lead to the elimination of the mispricing by buying the undervalued equities and selling or shorting the overvalued equities. Consequently, the observed persistence in mispricing is hard to rectify with an efficient market, which suggests that any mispricing should be transient or random. Since the observed mispricing is systematic and long lasting, the findings in this essay open new avenues for additional research into the factors driving the observed mispricing.

Importantly, persistent mispricing calls into question common factors used in asset pricing. For example, systematic mispricing affects the market values of firms, and that may influence the impact of size effects measured using market values. As overvaluation and undervaluation affect market values, systematic and long lasting overvaluation and undervaluation are likely related to factors derived from market-to-book ratios as well. Thus, the persistence in mispricing this study documents lays the foundation for future research into asset pricing models to study the extent to which common asset pricing factors are driven by the underlying mispricing.

In summary, the relative valuation measures derived from decile assignments using scaled valuation errors between market values and intrinsic values estimated via the excess earnings model with realized earnings and book values are remarkably robust to alternative specifications. This study contributes to the literature by systematically and explicitly examining the impact of several model specification choices upon estimates of *relative* overvaluation using the residual income model. The evidence shows that the valuation deciles produce results in agreement with prior published research on acquisitions using other estimates of overvaluation. Furthermore, the observed mispricing is systematic and persistent over very long time horizons. With these robust measures of relative mispricing it is possible to study the determinants of mispricing and to re-examine asset pricing topics such as the size and book-to-market effects, opening important areas of future research.

2 Determinants of Mispricing

2.1 Introduction and Motivation

The first essay examines the robustness of several measures of mispricing based upon an abnormal earnings valuation model and demonstrates the robustness of the valuation measures to different discount rates and model specifications. The mispricing observed in the first essay is found to be remarkably persistent. In one approach examined by the first essay, firms are annually assigned to valuation deciles. For firms with at least ten years of valuation data, 33.4% of the firms assigned to the most overvalued valuation decile at the beginning of a ten year period are in the top two most overvalued deciles ten years later. Additionally, 33.5% of firms with at least ten years of valuation data which begin the ten year period assigned to the most undervalued decile are in the two most undervalued deciles ten years later. If mispricing is random, as would be expected in a fully efficient market, firms in one valuation decile at the valuation date would be expected to be randomly distributed across the valuation deciles at a later date. That is not what is observed in the data. Rather, the most overvalued firms remain stubbornly overvalued while the most undervalued firms remain stubbornly undervalued–even after ten years. This is a theoretical puzzle, as the persistence of the mispricing indicates that it is systematic in nature. What are the determinants of this mispricing?

Mispricing may be related to rational factors. Under this view, the mispricing measured in the first part of this study may have arisen due to the rational actions of managers and investors given the incentives and information available to them. For example, managerial compensation based upon short term results produces an incentive for the manager to increase the performance of the firm now at the expense of the firm later, and this could induce inflated stock prices now. Empirical evidence provided by Badertscher (2011) indicates that firms engage in earnings management to prolong periods of overvaluation for significant periods of time, and that the forms of earnings management employed get progressively destructive as time elapses. Managers therefore pursue courses of action which tend to prolong periods of overvaluation while ultimately proving destructive for the firm. This finding is unsurprising when viewed through the lens of Jensen's (2005) agency theory of overvalued equity–what manager would last long at his job if he publicly announced that his firm's stock needed to decline in value to match his firm's prospects? Rather, a manager who finds himself at the helm of an overvalued firm is likely to make decisions which appear to support his firm's current level of valuation, even if the scheme eventually unravels.

Another possible source of mispricing arises from ambiguity. Specifically, firms with harder to value assets or ambiguous prospects are more prone to mispricing in a rational framework for the simple reason that it is more difficult for managers and investors to arrive at an accurate estimate of firm value. To the extent that mispricing arising from intangible factors is related to the difficulty in estimating the value of the intangible factors, an efficient market may well misprice such factors on average, leading to larger pricing errors for firms more exposed to intangible factors. However, in such a scenario an efficient market would not be expected to systematically overvalue or undervalue such factors on average.

Unfortunately, the very nature of intangible factors makes them difficult to observe, let alone properly value. To surmount this challenge, three proxies for intangible factors are used in this study: advertising, research and development (R&D), and intangible assets on the balance sheet. Advertising increases brand awareness and makes consumers and investors more aware of a firm's products and services. The precise amount of value added by advertising is less clear, as competitive factors, market trends, and demographic shifts can all affect the utility of advertising expenditures, creating the potential for mispricing. Scaled intangible assets from the balance sheet are also used as a proxy for the intangible components of firm value. Since intangible assets on the balance sheet are largely composed of the amount paid for acquisitions in excess of the target firm's assets, the intangible assets represent some form of intangible value the acquiring firm believes to exist. As many firms which have engaged in acquisitions can attest, that estimate of value can be very difficult to assess–and very wrong. R&D expenditures provide the third proxy for intangible factors leading to mispricing. A major reason why R&D spending is generally expensed instead of capitalized is the difficulty in assessing its value. Spending money on R&D may result in profitable future products or services, but it may also result in no special advantage in the marketplace if the competition develops similarly attractive products or services.

Mispricing may be due to the effect of irrational actions or behavioral biases of managers or investors. In this framework, investor or managerial overconfidence may be related to the mispricing measured in the first essay. Measures of investor sentiment are expected to demonstrate a relationship to mispricing from this perspective, and it is possible that investor sentiment also affects how investors and managers interpret other factors. As an example, investor sentiment may affect the degree to which intangibles such as R&D are incorrectly valued, leading to larger mispricing than would be expected only from the difficult valuation associated with the R&D expenditures. In this sense sentiment may have a more direct impact upon mispricing by inducing overconfidence in managers and investors generally, and it may also lead to overconfidence in the assessment of what would otherwise be considered to be rational causes of mispricing as discussed above. Additionally, behavioral biases or other traits such as limited attention by investors may cause investors to focus too much on some firm characteristics while not focusing enough on others, leading to systematic mispricing of certain firm characteristics. As an example, Hirshleifer, Lim, and Teoh (2011) developed a theoretical model in which investors focusing their limited attention upon earnings as a whole would likely undervalue cash flows. This drives the inclusion of cash flow, accruals, and net property, plant, and equipment (net fixed assets) in the analyses in this essay.

If behavioral biases are involved, investors may not merely misprice intangible factors on average but they may also systematically overvalue some intangible factors and undervalue others. Although rational interpretations of the effect of intangible factors upon mispricing indicate that intangible factors may well produce increased mispricing, systematically directional mispricing of tangible or intangible factors is more consistent with behavioral biases and market inefficiency. For example, investors may not merely misprice R&D spending–overconfidence or other behavioral biases may cause them to systematically overvalue it. In fact, the overvaluation of scaled R&D expenditures is the most consistent and robust finding in this essay. Such strongly directional mispricing of any tangible or intangible factor is difficult to rectify with an efficient market.

The different possible determinants of mispricing produce varied, but important, implications. If characteristics of managerial compensation are found to be determinants of mispricing, alternative compensation practices may be preferable. This affects corporate policy decisions. Mispricing related to intangibles suggests that there may be a cost associated with the intangibles beyond what is normally considered by managers, and if the mispricing of an intangible factor is consistently directional instead of random, it is difficult to reconcile such a pattern with an efficient market. Such an outcome has implications for asset pricing models and portfolio choices of investors. Sentiment related factors found to be associated with mispricing imply that irrational investment behavior may lead to overvaluation or undervaluation of stocks, and those outcomes may affect the real choices of rational managers. Irrational managers may also find themselves caught up in sentiment driven decision making, producing suboptimal decisions. Furthermore, mispricing driven by sentiment suggests that it may be preferable for rational investors to alter their portfolio allocations in various ways as investor sentiment fluctuates.

The most important results in this study pertain to cash flow, sentiment, the interaction between investor sentiment and net fixed assets, R&D spending, and risk control variables. On average, investors tend to undervalue scaled cash flow, which is consistent with the theoretical model detailed by Hirshleifer et al. (2011). Limited attention investors do a poor job valuing cash flows, and therefore they undervalue firms with high cash flow. When relative overvaluation is assessed across a period of years, investor sentiment is positively related to overvaluation with three different measures of sentiment. This finding supports the effect of sentiment upon the assessments of firm value made by investors–positive sentiment makes investors have a more rosy view of the prospects of firms, leading to overvaluation. The effect of sentiment also extends to how investors value net fixed assets, with investors susceptible to undervaluing net fixed assets when sentiment is positive and overvaluing net fixed assets when sentiment is negative. One of the most robust findings in this essay using is that investors systematically overvalue R&D spending. The fact that investors consistently overvalue R&D spending instead of randomly mispricing it indicates that there are market inefficiencies in the valuation of R&D expenditures. In short, investors are much too optimistic about the spending firms do on R&D. This has implications for market efficiency and possibly for profitable investment strategies. Finally, several risk control variables consistently exhibit a positive relationship with overvaluation. This means that undervalued equities cannot be explained as having higher risk using several common risk proxies. Such results are inconsistent with an efficient market.

The remaining sections of this study are organized in the following manner. Section 2.2 reviews the relevant literature pertaining to the effects of mispricing, while Section 2.3 reviews the literature about factors related to mispricing. Hypotheses are developed in Section 2.4. The methodology used in the preparation of the components of the determinants analyses is discussed in Section 2.5. Section 2.6 presents the aggregate results of the analyses and the robustness of the results, and Section 2.7 concludes the study.

2.2 Literature Review of the Effects of Mispricing

The primary focus of this essay is upon the determinants of mispricing. As mispricing may influence firm behavior, a discussion of the effects of mispricing will help to motivate the analyses performed in this essay. Importantly, managerial choices may exacerbate or alleviate the effects of mispricing. Because the excess earnings approach to firm value is applied in this study using realized earnings and book values, managerial actions which affect the subsequent performance of a firm will influence the measure of mispricing used in this study.

Jensen (2005) explored the agency costs associated with substantially overvalued equity and discussed mechanisms by which a combination of various factors can produce toxic results for a substantially overvalued firm. The nature of managerial compensation is one related factor. As managerial compensation is often linked to certain financial market outcomes, managers have an incentive to engage in behavior achieving the desired outcomes in the financial markets–but the means employed may ultimately prove to be destructive. For example, managers may engage in earnings management in order to hit earnings targets and to earn bonuses.

Significantly, Jensen (2005) notes that the nature of overvaluation is such that it is not generally possible for an overvalued firm to achieve results which would justify the price being paid for the firm's stock. In an attempt to escape from the debacle, overvalued firms are likely to set about pursuing acquisitions, risky projects, earnings management, etc. in an attempt to justify the level of valuation. These actions may jeopardize the value of the underlying business, resulting in an eventual dissipation of more than just the original overvaluation but also the value of the underlying business as the firm's actions damage the firm's viability in the long run. If other firms in the industry are similarly overvalued, the situation may be worse. Each firm in the industry may well be judged relative to the other firms in the industry. The result is that each firm thinks that something can be done to justify the overvaluation, leading to competitive pressure to achieve impossible results. The problem is perhaps most clearly expressed by Jensen (2005) when he noted the impossibility of an executive arguing to a board of directors that the firm's stock price needed to go down.

Managerial responses to overvalued equity have been associated with the accruals anomaly, as in Kothari, Loutskina, and Nikolaev (2009). Kothari et al. (2009) find that managerial attempts to sustain the overvaluation of their firm results in accruals management, and firms engaging in accruals management tend to also be investing in acquisitions, capital expenditures, and R&D. As accruals management cannot forever increase the reported earnings of a firm, the effort to manage accruals in order to support the overvaluation produces negative abnormal returns in the future. Investor and possibly managerial optimism pertaining to the prospects of the firm or the withholding of adverse information about the prospects of the firm was suggested by Kothari et al. (2009) as possible causes of the overvaluation.

As managers seek to justify excessive market valuations they are under pressure to demonstrate results satisfying the expectations of the market. A study by Badertscher (2011) examined the types of earnings management utilized by overvalued firms and found that overvalued firms transition from one form of earnings management to another over time. Specifically, Badertscher (2011) examined the number of consecutive years a firm was in the most overvalued quintile and found that accruals management increased substantially during the first two years while real transactions management remained comparatively minor. For firms in the most overvalued quintile for three to five consecutive years, real transactions management increased in magnitude while accruals management declined. For firms in the most overvalued quintile for five consecutive years the amount of real transactions management dominated the amount of accruals management. The total earnings management increased the longer a firm resided in the most overvalued quintile. In the case of firms engaging in non-GAAP accruals management, firms in Badertscher's (2011) study exhibited larger real transactions management in the year before they resorted to the non-GAAP accruals management, with a large proportion of firms engaging in the non-GAAP accruals management being overvalued at the time of the non-GAAP accruals management and in the year following. Taken together, these patterns suggest that firms engage in earnings management to prolong periods of overvaluation for significant periods of time, and that the forms of earnings management employed get increasingly destructive as time passes.

Mispricing also warps a firm's investment practices. Polk and Sapienza (2009) examined the extent to which firms cater to market mispricing by altering their investment practices. In their study discretionary accruals serve as the proxy for mispricing. The concept underlying this study is the notion that if investors sufficiently overvalue a firm's investments then a firm may cater to market preferences by making investments which are actually not worth the cost, leading to a positive market response which may outweigh the losses ultimately associated with the poor investment. Polk and Sapienza's (2009) model suggests that longer periods of overvaluation and shorter investor time frames increase the incentive for firms to engage in poor investments, with longer periods of undervaluation and shorter investor time frames decreasing the incentive for firms to engage in positive investments. Put simply, overvalued firms make investments that should be avoided and undervalued firms decline investments that should be undertaken. Although it would be tempting to connect this result purely to the ability of overvalued firms to raise funds through the sale of overvalued equity, Polk and Sapienza (2009) found that this effect is not solely driven by the impact of stock issuance upon investment. Rather, the measure of overvaluation used by Polk and Sapienza (2009) remained positively related to investment after controlling for equity issuance. Interestingly, firms with higher R&D intensity were found to have investment levels which responded more to overvaluation. These findings again suggest that overvalued firms may engage in behavior which destroys firm value later, and firms with harder to value prospects may be more prone to catering to the market with their investment choices.

Given the above discussion of the effects of mispricing it is important to note the ways in which those effects could relate to the overvaluation measures used in this study. Returning to the point made by Jensen (2005), substantial levels of overvaluation experienced by a firm imply that the overvalued firm cannot produce results commensurate with market expectations. In that case, using realized results in the calculation of the valuation measures in this study should indeed show overvalued firms to be overvalued as their subsequent earnings fail to live up to the market's expectations. As managerial actions to manage earnings may temporarily increase reported earnings subsequent to the time when a firm is overvalued, the valuation measures employed may underestimate the full level of overvaluation during the early years when a firm is overvalued. Eventually the effects of the accruals management, real transactions management, and poor investment choices due to catering will come home to roost. Realized earnings over the five year time horizon employed in the valuation models in this study will eventually include the period of time when poor prior managerial choices have begun to adversely affect earnings in subsequent periods. Thus, the research reviewed above leads to the conclusion that the valuation models employed in this study should successfully classify overvalued stocks either due to the excessive nature of the overvaluation making it impossible for a firm to produce results supporting the market's valuation or due to the destructive choices managers make in response to their firm's market value. Put differently, a substantially overvalued firm would not be expected to be able to generate high enough abnormal earnings to counterbalance the excessive nature of the overvaluation. The shortfall in abnormal earnings should therefore correspond to lower intrinsic value estimates using the methodologies discussed in the first essay, resulting in such firms appearing overvalued using the *relative* valuation measures employed in this essay. Alternately, if a firm's managers make destructive choices due to the overvalued nature of the company's equity the effect of the destructive choices upon the future abnormal earnings should ensure that the company's equity will appear *relatively* overvalued when the excess earnings valuation models are applied.

2.3 Literature Review of Factors Related to Mispricing

A natural extension of measuring mispricing is to identify the determinants of mispricing. Figure 1 shows that the most overvalued firms remain overvalued for a prolonged period of time on average. The transition matrices presented in Tables 10 and 11 add more detail to that finding. The persistence of the mispricing for the most relatively overvalued and the most relatively undervalued firms indicates that the mispricing is not due to random market mispricing at each point in time, suggesting that there are underlying factors driving the mispricing. However, the determinants of mispricing are not clearly understood in the literature, although a substantial amount of research has been performed in areas relating directly or indirectly to the topic. As mentioned previously, there are explanations for mispricing which focus upon rational behavior and explanations for mispricing which focus upon irrational behavior. In some cases the explanations proposed blur the line between the two philosophical approaches to explaining mispricing. For the sake of convenience, the literature review has been broken up into sections according to general topic areas. The broad topic areas include rational bubbles, managerial incentives, firm characteristics, investor sentiment, and risk and information uncertainty.

2.3.1 Rational Bubbles

An irrational bubble, such as a market-wide mania, is perhaps easier to imagine than a rational bubble. The notion that investors may behave irrationally, and that such irrational behavior may affect equity prices, is certainly not new. Investor sentiment and psychological factors could contribute to irrational bubbles, and investor sentiment and psychological factors are discussed in greater detail later. A rational bubble could result in mispricing despite everyone behaving rationally. For example, if a bubble provides sufficiently high gains relative to the probability of a collapse in each period it is possible for investors to rationally decide to continue investing (Blanchard and Watson (1982)). The evidence and conditions for rational bubbles are discussed in the following review of the relevant literature.

A number of studies have examined the concept of rational bubbles theoretically and empirically. In the theoretical framework explored by Diba and Grossman (1987), rational stock bubbles can only begin on the first trading date of a stock. An expansion of the model which was presented in Diba and Grossman (1988b) led to the conclusion that rational bubbles in stock prices could only begin on the first day of trading and they would not occur again if the bubble burst at some point in the future. Importantly, Diba and Grossman (1988b) noted that rational bubbles imply a focus upon one or more irrelevant factors or a focus upon relevant factors in an inappropriate way. Although the model's implications are limited, the connection between irrelevant factors or inappropriate interpretation of relevant factors and the existence of rational stock bubbles has implications for the determinants of mispricing. Relevant factors which are difficult for market participants to assess could perhaps lead to flawed interpretations of the otherwise relevant factors. An empirical analysis of data for the Standard and Poor's Composite Stock Price Index was presented in Diba and Grossman (1988a), and the authors concluded that the results did not support the existence of explosive rational bubbles, although some of the test results were mixed.

Blanchard and Watson (1982) suggested that one possible explanation for a rational bubble involves progressively larger deviations from fundamental value with the possibility of the bubble collapsing in each period. If the increased gains due to the bubble are sufficiently high to outweigh the risk of the bubble's collapse, investing in the stock may still be rational. Under that framework Blanchard and Watson (1982) were able to show that the rational bubble did not violate a typical no arbitrage condition. Instead, Blanchard and Watson (1982) compared rational bubbles to Ponzi schemes, which implies that having investors with shorter time horizons coupled with the presence of new investors makes the existence of rational bubbles possible. If an asset's fundamentals are difficult to assess, Blanchard and Watson (1982) suggested that the asset will be more prone to experience bubbles as market participants rely upon prior price movements as an assessment tool instead of actually assessing fundamentals. This implies that stock prices in firms with more opaque prospects may be more subject to the formation of rational bubbles, leading to misvaluation. By the same logic, the authors noted that the difficulty in assessing fundamentals which may lead to a bubble also makes it difficult to determine if a bubble has indeed formed.

A pair of empirical papers published in 2005 further examined the existence of rational bubbles in stock prices. Data for the Standard and Poor's 500 index was analyzed by Koustas and Serletis (2005), and the authors found sufficient evidence of fractional integration between stock prices and dividends to reject the null hypothesis of the existence of rational bubbles. The use of a fractional integration approach allows the relationship between stock prices and dividends to maintain a long-run equilibrium while sustaining mean-reverting deviations in the short run. Cuñado, Gil-Alana, and de Gracia (2005) applied a fractional integration approach to the NASDAQ stock index during the period commonly considered the technology bubble and reported mixed results. Their tests failed to reject the null hypothesis of rational bubbles when monthly data were used. However, Cuñado et al. (2005) showed that using daily or weekly data resulted in a rejection of the null hypothesis of rational bubbles. The authors suggested that the difference in results may have been driven by a short sample period or by data aggregation in the case of monthly data obscuring market adjustments over shorter time horizons.

In a theoretical paper studying the effect of short sale constraints upon rational bubbles, Kocherlakota (2008) demonstrated that rational bubbles could exist with exogenously or endogenously determined short sale constraints. In the case of exogenously determined short sale constraints, Kocherlakota (2008) demonstrated that certain alterations to the short sale constraints in an economy could produce a rational bubble for an asset with infinite life. For endogenously determined short sale constraints Kocherlakota (2008) showed that bubbles in assets and bubbles in short sale constraints were interrelated.

A near-rational bubble framework presented in Lansing (2010) produced results consistent with stock market data observed in the United States. In Lansing's (2010) near-rational framework, the price-dividend ratio no longer has the positive drift typically associated with rational bubbles. Also, investors in the near-rational model use prior information to make a combined forecast including both the fundamental and bubble components of prices instead of projecting each component separately. Simulation results for Lansing's (2010) model were largely consistent with statistical properties of observed price-dividend ratios in the United States, suggesting that near-rational bubbles may exist.

2.3.2 Managerial Incentives

Managers make decisions on a regular basis which have significant implications for firm value, and they make those decisions while faced with compensation based incentives. Managerial incentives thereby affect the decisions made by the managers. Managerial decision making could relate to investments in R&D, acquisitions, expansions of property, plant, and equipment, or any number of other things. Some managerial decisions may relate to earnings management or other destructive practices. Investors must attempt to assess the decisions made by managers in order to properly value the equity of firms. If managers invest more in R&D, for example, the intangible nature of R&D may lead to more mispricing by investors struggling to properly assign value to the expenditures. Managers may also manipulate earnings in order to maximize their compensation due to higher equity prices in the short term, leading to more equity mispricing as a result of choices made by managers. Because of the role managerial compensation plays in incentivizing managers to make decisions which ultimately affect the ability of investors to accurately value firms, a review of the relevant literature is included below.

Some forms of managerial compensation may spur responses to investor speculation which involve earnings management. In the case studied by Bolton, Scheinkman, and Xiong (2005), managers may have incentives to focus upon the short term for the sake of current investors at the expense of future investors. Bolton et al. (2005) note that overconfident investors may not fully study all aspects of a firm's position, and their overconfidence in their own opinion of a firm's position can create speculative differences in opinion which drive trading and overvaluation. In the model put forth by Bolton et al. (2005), market value is the result of fundamental value and a speculative option. The authors note that the value of the speculative option component increases with expected future differences of opinion between investors. In the presence of short sale constraints, if a sufficiently large proportion of investors fail to thoroughly study a firm's position and yet they are overconfident in their assessment of the firm's value, manipulation of the firm's earnings may cause the overconfident prospective investors to overvalue the company. The overvaluation by the overconfident prospective investors may be more than enough to offset the rational investors' declining assessment of the firm's value due to the earnings manipulation. The examples presented by Bolton et al. (2005) show that this can lead to incentives for a manager to engage in some level of earnings manipulation in order to maximize the value of the firm to current shareholders, and that earnings manipulation would also be expected to maximize the value of the manager's compensation. The result is that managers may rationally pursue a policy which increases the current stock price and thereby their own compensation and which accomplishes these outcomes by generating overvaluation through the exploitation of the nature of overconfident investors.

The specific effects of option compensation upon managerial actions can depend upon several factors. A theoretical paper by Carpenter (2000) showed that managerial responses to option compensation may lead to more risk taking or less risk taking depending upon the scenario. According to Carpenter's (2000) framework, far out of the money options generally incentivize risk taking on the part of managers while increasing the number of options held by managers can induce the managers to reduce risk under certain circumstances. Empirical evidence presented by Coles, Daniel, and Naveen (2006) linked vega, the sensitivity of a CEO's wealth to the stock's volatility, to the firm's investment decisions, corporate focus, and leverage. If a firm's CEO has a higher vega the authors of the study found that the firm tends to invest more in R&D and less in fixed assets, the firm tends to be more focused, and the firm employs more leverage. In contrast, Coles et al. (2006) found that the results for delta, the sensitivity of the CEO's wealth to the stock price, indicated that a higher delta was associated with less investment in R&D, more investment in fixed assets, and less leverage. Taken together, Carpenter's (2000) analysis and Coles et al.'s (2006) findings indicate that corporate decisions made by managers are affected by the incentives created by the managers' compensation packages. For example, managers with far out of the money options in their compensation packages tend to take more risks, and managers with high vega invest more in R&D while managers with high delta invest less in R&D. Therefore, managers' choices about investments in R&D, fixed assets, and other areas can be affected by factors such as delta and vega.

Changes in the investment decisions of managers can result in firms with investments which are harder or easier for investors to value. Firms with harder to value investments may be subject to higher levels of mispricing relative to subsequently realized results. Consequently, factors such as delta and vega which affect managerial decisions about investments may be related to mispricing.

Some forms of compensation for managers, particularly for CFOs, have been shown by Kim, Li, and Zhang (2011) to be related to the risk of a stock price crash. The risk of a stock price crash increases as the dollar value of a CFO's option incentives becomes more sensitive to the company's stock price. Kim et al. (2011) found that the increased stock price crash risk applied specifically to companies in non-competitive industries, which the authors identified using the Herfindahl-Hirschman Index. Of particular interest is the fact that CEO option incentives were more weakly related to crash risk than CFO option incentives, and both CEO and CFO stock incentives had no effect upon crash risk (Kim et al. (2011)). The mechanism proposed by Kim et al. (2011) through which the crash risk may be increased centers around managers, and CFOs in particular, withholding negative information to maintain higher stock prices.

Firms with dual-class share structures provide evidence that managers with disproportionate voting rights relative to cash flow rights engage in activities which reduce firm value (Masulis, Wang, and Xie (2009)). Masulis et al. (2009) found that managers with disproportionate voting rights received excess pay, were more likely to make value destroying acquisitions, and made capital investments which were less beneficial to regular shareholders. This data suggests that giving managers voting rights in excess of cash flow rights may result in poorer results and poorer shareholders than would otherwise be the case. As value destroying activities would affect the subsequent earnings of a firm, it is again possible that the nature of managerial investment in the firm may affect the extent to which the firm appears overvalued based upon realized results.

2.3.3 Firm Characteristics

The characteristics a firm has can affect the ability of investors to accurately determine the value of the firm. Mispricing may result from the difficulty investors encounter in attempting to value different firm characteristics, it might arise from behavioral biases which cause investors to value firm characteristics incorrectly, or it might arise from investors basing their evaluations upon incorrect data. The relevant literature relating firm characteristics to mispricing is discussed below.

By their very nature intangible assets are harder to value than tangible assets. The inherently challenging process of accurately assessing the value of intangible investments in areas such as advertising and R&D indicates that intangible assets are likely to be related to the mispricing of equities compared to actual earnings and book value outcomes. Put differently, the difficulty associated with determining the impact of intangible assets upon future earnings and book values indicates that investors are likely to generate less accurate estimates of firm value when significant quantities of intangible assets are involved. For example, investments in R&D may or may not produce more valuable products or services in the future–leading to unclear financial outcomes for firms making larger investments in R&D. Less accurate estimates of firm value should result in more mispricing of equities for firms with more intangible assets. Investments in tangible assets may also be related to mispricing. On the one hand, it should be easier for investors to assess how the prospects of a firm relate to the firm's tangible assets. On the other hand, although the firm's prospects associated with its tangible assets should be easier for investors to value compared to the firm's intangible assets, there is still no guarantee that investors will estimate the value of tangible assets correctly. The relevant literature relating intangible assets and other firm characteristics to mispricing is reviewed below.

Advertising and R&D expenditures are commonly considered to produce intangible assets. Advertising expenditures are expected to build brand recognition and image, which ideally produces better long term sales and customer relationships, while R&D expenditures are expected to result in new products and services which may be sold to a company's customers in the future or which may be used to improve a company's operations. The intangible nature of the benefits of these expenditures makes them difficult to value accurately. By relating scaled changes in advertising and R&D expenditures to the cumulative abnormal return of a stock Bublitz and Ettredge (1989) showed that investors treat advertising expenditures as expenses rather than investments in nearly all cases, with nondurable goods companies being a possible exception. Evidence for the long term view of R&D expenditures was mixed, although R&D expenditures appeared to be viewed as long term in one testing specification using all firms or durable goods firms (Bublitz and Ettredge (1989)). Also, Bublitz and Ettredge (1989) found that R&D expenditures were viewed as longer term than advertising expenditures. Although these results indicate that investors incorporate advertising and R&D expenditures when evaluating stocks, it is not certain if they do an accurate job of doing so.

Nejadmalayeri, Mathur, and Singh (2013) examined the impact of advertising upon corporate bond liquidity and credit spreads and focused upon the visibility effect of advertising and the sensitivity of a firm's sales to advertising. Increased visibility from advertising was found to decrease credit spreads slightly while increasing bond liquidity somewhat, suggesting that increased visibility may add some value for bondholders (Nejadmalayeri et al. (2013)). Complicating the analysis was the finding that the impact of visibility and the sensitivity of sales to advertising (sales-advertising sensitivity) upon credit spreads and bond liquidity varied depending upon the relative visibility and sales-advertising sensitivity characteristics of the firm. For example, higher sales-advertising sensitivity was related to a bigger increase in the credit spread for low visibility firms than for high visibility firms (Nejadmalayeri et al. (2013)). Taken together, these results suggest that the impact of advertising upon firm value depends significantly upon a firm's industry and the sensitivity of its sales to its advertising efforts.

Competition in R&D was evaluated in a theoretical context by Dasgupta and Stiglitz (1980). Under the assumption of certainty of discovery employed by Dasgupta and Stiglitz (1980) competition in R&D could induce excessive investment in R&D by one firm seeking to prevent other firms from making similar investments. As noted by the authors, this suggests that competition in R&D may well be present even though only one firm is investing in R&D. Assuming uncertainty of discovery led Dasgupta and Stiglitz (1980) to conclude that a low elasticity of demand could result in excessive investment in R&D. The possibility of firms engaging in excessive R&D investment to prevent other firms from entering implies that the payoff of R&D expenditures may be unclear. If moderate R&D expenditures result in new products or services not offered by other companies then it is possible that a firm engaging in that investment may reap abnormal profits. On the other hand, if a firm engages in excessive R&D investment to prevent competitors from pursuing similar research, then the abnormal profits earned later may be less valuable than the expenditures made to secure them.

Announcements of increases in R&D expenditures have been evaluated relative to the impact upon stock prices. The results presented by Chan, Martin, and Kensinger (1990) indicate that an announcement of increased R&D spending is accompanied by an increase in the stock price. This positive effect on the stock price was noted across stocks reporting earnings increases and stocks reporting earnings decreases (Chan et al. (1990)). This does not suggest that the market views all increases in R&D spending equally. Chan et al. (1990) found that firms in high-tech industries in their sample generally experienced a positive stock price change after announcing the increase while firms in low-tech industries in their sample more frequently experienced negative stock price changes following the announcement. One finding in the study by Chan et al. (1990) was that outspending the industry on R&D produced a positive effect for high-tech firms. As might be expected, announcements of increases in R&D spending are viewed as value relevant information by market participants. However, the study by Chan et al. (1990) does not address the extent to which the response of market participants correctly values the announced change in R&D expenditures.

In a broader exploration of various firm announcements, Woolridge and Snow (1990) analyzed a sample of firms announcing joint ventures, R&D investments, capital expenditures, and diversification activities and found that cumulative abnormal returns for the announcement periods were positive on average for each category and generally statistically significant. In aggregate, Woolridge and Snow (1990) found that the cumulative abnormal returns for joint venture and R&D announcements appeared to be somewhat larger than the cumulative abnormal returns for diversification or capital expenditure announcements. Whether or not the positive cumulative abnormal returns observed were in fact justified by the changes in the prospects of the firms subsequent to the announcements was not addressed. This leaves open the possibility that market participants may incorrectly account for such announcements due to difficulties assessing the value of the changes in the prospects of the firm or for other reasons.

The ideal competitive response by one firm to another firm's increase in R&D spending is influenced by industry structure and the extent to which changes in R&D spending are viewed favorably. Specifically, Sundaram, John, and John (1996) found that although the average net announcement effect for increases in R&D spending was essentially zero for the announcing firms the effect for subsamples defined using the nature of the competition yielded different results. When competitors match strategies the announcement effect was found to be negative, but when competitors accommodate strategies the announcement effect was found to be positive (Sundaram et al. (1996)). Furthermore, Sundaram et al. (1996) found that the preferred response for the competitors depended upon how the market responded to the firm's announcement. These findings suggest that the valuation of R&D expenditures may be challenging for market participants to assess as industry structure and competitive responses influence the value of investments in R&D.

With a sample of firms from the United Kingdom and an implementation of a residual income model Green, Stark, and Thomas (1996) studied the valuation of R&D expenditures and their results suggested that market participants view R&D spending as capital expenditures. In the framework used by Green et al. (1996) the residual income utilized was contemporaneous to the market value used in the model specification. In addition, the measure of earnings used in the residual income calculation excluded R&D and extraordinary items, and only one year of earnings was used. With that specification and under certain assumptions the authors employed, scaled R&D expenses were sometimes found to be positively related to the value of the firm for the years studied (Green et al. (1996)). Because

Green et al. (1996) used the scaled difference between market value and book value as the dependent variable in their model, their results suggest that market values include the effect of R&D–but their results do not necessarily indicate that the market properly values the R&D expenditures. Instead, it is possible that the positive relationship which they observed in some cases between R&D and the scaled market value in excess of book value might be the result of mispricing.

Under GAAP R&D expenditures are expensed in the year in which they are incurred. Because R&D expenditures may add long-term value to the organization, some studies have suggested that R&D expenditures should instead be capitalized. Lev and Sougiannis (1996) formed estimated values of the R&D capital of publicly traded companies and adjusted earnings for the expensing of R&D and found that net annual investment in R&D and the amount of R&D capital were related to stock prices. The estimated R&D capital generated by Lev and Sougiannis (1996) was also found to be positively related to subsequent returns when the R&D capital was scaled by the market price. The authors interpreted this finding to be indicative of the mispricing of R&D capital, and the relationship was stronger for firms with larger concentrations of estimated R&D capital. These findings again support the notion that the market views R&D expenditures as relevant to the value of a firm, but the results also suggest that R&D expenditures may be related to misvaluation.

The difficulties associated with the valuation of R&D expenditures as it applies to software development are illustrative of some of the difficulties investors may face normally when evaluating R&D investments. Interestingly, Aboody and Lev (1998) found that analysts' forecast errors increased with higher levels of software capitalization–despite the fact that the authors also found evidence that changes in capitalized software development costs were more strongly related to returns than fully expensed development costs. This finding suggested that the market viewed the capitalized costs as value relevant. For software firms the relative benefits of capitalization compared to expensing of software development costs depend upon how fast intangible investments are growing relative to the size of the firm's ROE (Aboody and Lev (1998)). Of particular interest for this study is the finding that the market's reaction to the software development costs of expensing firms was delayed by two to three years, as evidenced by a positive relationship between software development expenses and stock returns over that time horizon (Aboody and Lev (1998)). This suggests that market participants may respond slowly to the unclear valuation information inherent in software development costs in particular and possibly R&D spending in general.

A study of asset revaluations for Australian firms found that the revaluation of intangible assets was positively related to share prices but that the results for property, plant, and equipment depended upon the industry involved (Barth and Clinch (1998)). For nonfinancial firms Barth and Clinch (1998) found that revaluations of property, plant, and equipment were positively related to the stock price. Barth and Clinch (1998) noted that even untimely revaluations appeared to be viewed as relevant by the market. In their study, a two period implementation of an abnormal earnings model based upon analysts' forecasts for two years and assuming that the firm's projected abnormal earnings for the second period continued on in perpetuity was used. With that estimate of firm value in hand, Barth and Clinch (1998) found that revaluation of intangibles was positively associated with the estimated value of nonfinancial firms while revaluation of property, plant, and equipment was negatively associated with the estimated value of nonfinancial firms. The difference in the sign of the association between the revaluations of property, plant, and equipment and the market price or the estimated value of the firm is of particular interest. Specifically, it is possible that the market incorrectly incorporates the revaluation information associated with property, plant, and equipment, and therefore there may be a relationship between reported values of property, plant, and equipment and firm misvaluation.

In order to study the effect of the capitalization of intangible assets upon stock prices Ely and Waymire (1999) examined data from the pre-SEC era. Using their sample of firms, Ely and Waymire (1999) found that capitalized intangibles were not statistically significantly related to stock prices, but more capitalized intangibles made earnings less strongly related to stock prices. The authors also found evidence that rights-based intangibles, such as patents, and other capitalized intangibles being amortized or revalued at lower levels was positively associated with stock prices (Ely and Waymire (1999)). However, the net effect of those capitalized intangibles on prices remained unclear due to Ely and Waymire's (1999) finding that the interaction between earnings and intangibles continued to produce a negative relationship with stock prices. As the sample firms in the study were under a very different regulatory regime, it is uncertain the extent to which the results remain applicable today. Nevertheless, the results are suggestive. It is possible that market participants still view certain types of intangibles, such as patents, as being value relevant. The extent to which the market accurately or inaccurately prices intangibles would likely impact the mispricing suggested by the results of the valuation model used in this study compared to market prices.

An examination of R&D intensity and subsequent stock returns performed by Chan, Lakonishok, and Sougiannis (2001) found evidence of a positive association between R&D and subsequent stock returns for stocks with large values of R&D relative to market value. Importantly, Chan et al. (2001) found that this effect appeared to be driven by the relatively poor prior returns of the stocks in the category, although the pattern remained after adjusting for size and the book-to-market ratio. The authors postulated that this result may be driven by growth investors no longer seeing such firms as attractive investments while value investors are avoiding those types of firms altogether (Chan et al. (2001)). Interestingly, a similar pattern was found for high levels of advertising relative to market value in which firms with high levels of advertising relative to market value exhibited higher subsequent returns over a three year period and had poorer prior returns. It is particularly important to note that Chan et al. (2001) found that R&D measured relative to sales produced a much less persuasive relationship between R&D intensity and subsequent returns. Overall, these results imply that market mispricing of the R&D expenditures may be what drives the association between higher levels of R&D spending relative to market value and subsequent returns.

The challenges associated with the valuation of intangible assets typically relate to the fact that predicting the extent to which intangible assets may affect the prospects of a firm may be particularly difficult. A theoretical paper which assumed that intangible investments randomly become capital found that such an approach could explain the volatility puzzle (Danthine and Jin (2007)). The random accumulation of capital from intangible investments induces more valuation volatility than earnings volatility (Danthine and Jin (2007)). Higher market volatility unaccompanied by high earnings volatility would be expected to produce larger measured misvaluation due to the use of a residual income valuation model. Intangible investments may be related to the mispricing measures discussed previously.

Various aspects of behavioral finance relate to how investors perceive or evaluate information. Some of the topics in behavioral finance which may impact how investors evaluate firm characteristics are overconfidence, biased self-attribution, and limited attention. For example, some of the areas mentioned serve to influence the extent to which ambiguous information, such as the value relevance of a firm's R&D expenditures, may be related to mispricing. Furthermore, some areas may influence how investors incorporate firm characteristics such as cash flows when assessing the values of firms.

Investor overconfidence has been studied as an explanation for phenomena such as overreactions in the stock market. Daniel, Hirshleifer, and Subrahmanyam (1998) defined overconfidence relative to an investor's assessment of his privately generated information, such as when an investor puts too much faith in the accuracy of his analysis of a firm's financial statements or other information. This overconfidence then leads market prices to overreact (Daniel et al. (1998)). Biased self-attribution is when an investor interprets subsequent information which agrees with his assessment in a way which increases his confidence but he is slow to decrease his confidence when subsequent information arrives which disagrees with his assessment. Daniel et al. (1998) found that momentum in the short-term and reversals in the long-term could result from biased self-attribution.

The impact of overconfidence and biased self-attribution is likely to be larger when investors evaluate more ambiguous information (Daniel and Titman (1999)). Using the book-to-market ratio as a proxy for growth options and therefore ambiguity, stocks with lower book-to-market ratios exhibited more momentum effects (Daniel and Titman (1999)). This finding suggests that firms with larger proportions of intangible assets may be more subject to the overreaction resulting from overconfidence and biased self-attribution. Daniel and Titman (1999) specifically noted that the subjectivity involved in valuing intangible assets should make companies with more intangible assets subject to more misvaluation.

Daniel, Hirshleifer, and Subrahmanyam (2001) developed a theoretical model of asset pricing which incorporated investor mispricing due to overconfidence. Their model suggested that fundamental-to-price ratios have predictive power for returns because the ratios can capture both risk and misvaluation (Daniel et al. (2001)). Of particular note is the conclusion by Daniel et al. (2001) that in their framework fundamental-to-price ratios should have higher predictive power for firms with more ambiguous values. Daniel et al. (2001) also pointed out that making industry relative adjustments to measures of mispricing could obscure a portion of any mispricing originating at the industry level. Consequently, industries with more concentrated intangible investments may be harder to value, resulting in more misvaluation driven by overconfidence which might not be readily detected if the measure of misvaluation is assessed relative to the industry itself.

A theoretical model focusing on limited investor attention was developed by Hirshleifer, Lim, and Teoh (2011). According to this model, the limited attention of investors can cause them to inadequately incorporate information about earnings when attention is low or to inadequately incorporate information about accruals or cash flows when they focus their limited attention on earnings as a whole (Hirshleifer et al. (2011)). Of particular significance is the notion discussed by Hirshleifer et al. (2011) that market prices will be generated by the weighted average of the views of both attentive and inattentive investors, implying that arbitrage may be insufficient to correct mispricing as the price the attentive investors believe to be appropriate would appear mispriced to the inattentive investors. Furthermore, Hirshleifer et al. (2011) noted that investors who focus their limited attention upon earnings exclusively would likely undervalue firms with high cash flow or low accruals and overvalue firms with low cash flow or high accruals because the investors would be ignoring the additional data relevant to future earnings contained in cash flows and accruals. Since this result suggests that investors with limited attention may not incorporate all relevant sources of information when forming expectations of future earnings, the limited attention of investors could be a source of valuation error detected by the overvaluation measures used in the present study as the limited attention investors' earnings expectations would then deviate more from realized earnings results in the future.

Taboga (2011) studied aggregate market valuation using euro zone stock market data and earnings-to-price ratios and found that cyclical fluctuations in earnings could affect the extent to which stocks appeared overvalued. If adjustments accounting for cyclical fluctuations were made to earnings, Taboga (2011) found that an estimate of the likelihood that the market was overvalued in terms of the earnings-to-price ratio could be created. Interestingly, Taboga's (2011) model was able to present features consistent with lower adjusted earnings-to-price ratios preceding the crash in 2008 to 2009. The findings derived from this approach suggest the possibility that investors may not properly value earnings resulting from cyclical fluctuations in the economy at large. Put another way, investors may project a cyclical fluctuation in earnings into the future, resulting in periods with gaps between perceived valuations and valuations derived from earnings adjusted for the cyclical fluctuations.

2.3.4 Investor Sentiment

Investor sentiment may drive some component of mispricing. If investors experience a period of optimism they may be more prone to seeing the world through rose-colored glasses, leading them to overvalue the prospects of firms. Conversely, investors experiencing a period of pessimism may have a more gloomy outlook which biases their assessments of firm value in a downward direction, producing the undervaluation of firms relative to future outcomes. Although sentiment may affect the stock market broadly, it may also affect firms with different characteristics in different ways. The remainder of this section briefly reviews the relevant investor sentiment literature.

Measures of sentiment have been found to be related to mispricing and long-run returns. Using a set of pricing errors for the Dow Jones Industrial Average provided by Bakshi and Chen (2005) as a measure of intrinsic value, Brown and Cliff (2005) found a positive relationship between overvaluation and sentiment as measured using data from Investors Intelligence. High levels of investor sentiment were also shown to precede lower returns over a multi-year time horizon for the market as a whole (Brown and Cliff (2005)). In a footnote discussing their use of pricing errors from Bakshi and Chen (2005), Brown and Cliff (2005) noted that the approach of Lee, Myers, and Swaminathan (1999) produced an intrinsic value measure which responded to sentiment. As the intrinsic value measure used by Lee et al. (1999) was based upon analysts' forecasts, that finding is perhaps unsurprising as analysts could be influenced by investor sentiment in the market. Brown and Cliff (2005) found that sentiment was negatively related to returns for the market as a whole, for large firms, and for low book-to-market firms over time horizons from one to three years in length despite controlling for various other factors commonly employed in asset pricing. Negative sentiment was not found to be as strongly or consistently significant in long-horizon return regressions, pricing error regressions, or the cointegration analyses performed, leading Brown and Cliff (2005) to conclude that sentiment may have an asymmetric impact. Overall, these findings support the use of realized results instead of analyst forecasts when exploring the impact of investor sentiment and the findings also support the long-term effects of sentiment upon returns.

One of the inherent challenges in studying the effect of investor sentiment is determining an appropriate measure of investor sentiment. As a means of measuring investor sentiment, Baker and Wurgler (2006) constructed an index of investor sentiment from the following factors: a measure of the average closed-end fund discount, a detrended NYSE share turnover measure, the number of initial public offerings, the first-day returns on initial public offerings, the share of equity issues relative to total equity and long-term debt issues, and a measure of the dividend premium. Baker and Wurgler (2006) found that lagged sentiment was negatively related to the returns of smaller, younger, distressed, more volatile, and unprofitable firms when long-short portfolios were constructed using those characteristics. Similar results were observed when long-short portfolios were constructed for firms which did not pay dividends or which were experiencing very high sales growth compared to moderate sales growth, or very low sales growth compared to moderate sales growth (Baker and Wurgler (2006)). These results were interpreted to be consistent with the actions of speculators in an environment with more limited arbitrage opportunities, with the results for sales growth extremes suggesting that firms with harder to value prospects were more subject to the impact of investor sentiment. These findings suggest that sentiment may play a role in the overvaluation of certain types of stocks, which suggests that sentiment may be associated with the overvaluation measures discussed previously.

The differential impact of sentiment upon stocks with varying levels of exposure to arbitrage efforts was explored by Baker and Wurgler (2007). The key notion in this study was that relative valuations for different types of stocks can be affected differently by sentiment. Baker and Wurgler (2007) suggested that harder to value stocks would have values which are most positively influenced by high investor sentiment and most negatively influenced by low investor sentiment. That conclusion is consistent with other literature reviewed so far. Interestingly, Baker and Wurgler (2007) also suggested that it is possible that firms with more stable and easily valued prospects might actually be undervalued in periods of high sentiment and overvalued in periods of low sentiment–with the latter case arising as investors experiencing low sentiment seek safety. When the performance of portfolios formed on the basis of volatility was examined during months following high or low investor sentiment, some evidence consistent with the differential effects of sentiment emerged, although this approach assumed that volatility is a proxy for the degree to which stocks might be difficult to value and harder to arbitrage (Baker and Wurgler (2007)). Thus, periods of high sentiment may not uniformly induce overvaluation, but rather such periods might induce overvaluation in some stocks and possibly even undervaluation in others.

An examination of the actions of managers can illuminate the degree to which managers believe they are engaging in timing the market when they make certain decisions. To perform such an analysis, Jenter (2005) examined the personal portfolio decisions of managers and found that managers behave in a manner which suggests that the managers are responding to what they perceive to be mispricing. Specifically, managers of firms with low book-to-market (B/M) ratios engage in substantial net selling compared to managers of firms with high B/M ratios after controlling for various other factors, and managers of firms with high B/M ratios engage in more buying compared to the managers of the low B/M firms (Jenter (2005)). Importantly, a positive correlation between equity issuance and insider equity sales was found. Overall, these results tend to suggest that managers attempt to time the market with their own portfolios, and that managers of firms issuing equity may well perceive their firms as being overvalued. To the extent firms with low B/M ratios may be more prone to have made larger intangible investments, the literature reviewed previously regarding sentiment and the manner in which investors value intangible investments suggests that managers of low B/M firms may be correctly assessing that their firms are overvalued when they issue equity while simultaneously reducing their personal holdings.

Hirshleifer and Jiang (2010) generated a measure of mispricing based upon characteristics of overconfidence and style investing by creating a long-short portfolio using firms issuing or repurchasing debt or equity. The rationale behind this choice was that firms repurchasing debt or equity were expected to be undervalued by this approach, and firms issuing debt or equity were expected to be overvalued by this approach, and thus the factor constructed was titled UMO (Hirshleifer and Jiang (2010)). As this methodology is related to initial public offerings, it is connected indirectly to the sentiment index constructed by Baker and Wurgler (2006). Hirshleifer and Jiang (2010) showed that their proxy for mispricing, UMO, was statistically significantly related to monthly excess returns for portfolios analyzed using a Fama-MacBeth approach with the standard three factor model and also with momentum, leverage, or investment factors separately added to the three factor model. The consistently positive association of the UMO factor with returns was viewed as evidence of financing decisions being informative about mispricing more broadly due to sentiment in favor of certain investment styles or overconfidence (Hirshleifer and Jiang (2010)). Thus, the results obtained are suggestive that mispricing may result from overconfidence or shifting investor preferences for certain characteristics, and financing choices may be the result of managerial responses to the mispricing. Under this view, financing choices are less likely to be a determinant of mispricing than to be determined by mispricing.

In a study of the impact of sentiment upon more diversified firms, Iyer and Nejadmalayeri (2014) suggested that investors may seek out diversified firms when investor sentiment is more pessimistic. Iyer and Nejadmalayeri (2014) proposed that this is the result of constrained investors seeking safety in the face of pessimistic sentiment. In findings consistent with that view, Iyer and Nejadmalayeri (2014) reported that the discount experienced by diversified firms is lower during pessimistic periods. This finding is broadly consistent with the notion that sentiment may produce opposite valuation effects upon different types of firms as noted in Baker and Wurgler (2007). This implies that firm-level characteristics related to diversification may influence the extent and direction of the impact of sentiment upon overvaluation.

One challenge in constructing a measure of investor sentiment from market data is the possibility for alternative explanations of the fluctuations in the factors which are being used as indicators of investor sentiment. For example, initial public offerings may cluster at points in time with higher market prices as managers use prior equity issues to gauge the proper time to sell stock. Such a pattern would argue against initial public offerings being used as a part of the measure of investor sentiment developed by Baker and Wurgler (2006) and discussed above. Examinations of the decisions managers make with their own portfolios can illuminate whether or not managers believe their company's stock to be overvalued when they issue it, which relates to the extent to which equity issuance can be viewed as an indicator of overvaluation.

It was noted previously that the number of initial public offerings was used as a part of the sentiment measure developed by Baker and Wurgler (2006). However, Schultz (2003) argued that the number of initial public offerings could occur in patterns which *ex-post* appear to be indicative of market timing behavior but which are actually consistent with an efficient market, which the author termed pseudo market timing. The crux of Schultz's (2003) approach is that managers may use the market prices themselves as indicators of when equity should be issued. Thus, Schultz (2003) proposed that as prices rise and prior initial public offerings perform well more managers decide to issue equity. If that assumption is true and if initial public offering returns are positively correlated across issuing firms then pseudo market timing results (Schultz (2003)). Importantly, this model suggests that initial public offerings will appear to cluster when market prices are high. To the extent that this causes concerns about using initial public offerings as components of a sentiment index the concerns may be alleviated by resorting to more direct measures of sentiment, which has been done in studies such as Brown and Cliff (2005) and Iyer and Nejadmalayeri (2014).

2.3.5 Risk and Information Uncertainty

Estimated mispricing may also be the result of risk or information uncertainty. If uncertainty about a firm's prospects is high, the stock may appear to be more mispriced relative to realized outcomes. Higher levels of information uncertainty may increase the range of firm values estimated by investors, potentially leading to more measured mispricing. Investors facing information uncertainty may also rely excessively upon private interpretations of the uncertainty, facilitating larger pricing errors. Risk may also relate to measures of mispricing. If estimates of intrinsic value do not properly account for risk, measures of mispricing may be driven by heterogeneity in risk across firms. Firms which appear to be undervalued may be more risky, and firms which appear to be overvalued may be less risky. The topics of risk and uncertainty as they relate to mispricing are discussed in the following paragraphs.

The interconnections between overconfidence, information uncertainty, and stock returns were examined by Jiang, Lee, and Zhang (2005). Jiang et al. (2005) used several proxies for information uncertainty, including firm age, return volatility, trading volume, and equity duration. The motivation behind Jiang et al.'s (2005) study was the idea that overconfidence should play a bigger role in the valuation of stocks for which information uncertainty is higher because investors will overconfidently rely upon their private interpretations of the uncertain scenario. Interestingly, Jiang et al. (2005) found that stocks with low prior returns exhibit a stronger negative association with the degree of information uncertainty while stocks with high information uncertainty experience larger price and earnings momentum effects over the next month. An examination of portfolio returns indicated that the momentum effect for the high information uncertainty firms diminishes substantially after the next quarter (Jiang et al. (2005)). The results of this study suggest that firms with poor recent returns and high information uncertainty are likely to continue to underperform over the next month. Although the time horizon of Jiang et al.'s (2005) study is clearly much shorter than the time horizon employed by the overvaluation models in the present study, the results suggest that investor overconfidence in an environment of information uncertainty can contribute to mispricing.

When current stock prices more accurately reflect future earnings less mispricing will be observed using measures of mispricing based upon actual future earnings and book values. Jiambalvo, Rajgopal, and Venkatachalam (2002) studied the effect of institutional ownership upon the connection between the stock price and future earnings, and in their study they used several variables to control for aspects of the information environment. Size was used by Jiambalvo et al. (2002) as a proxy for the information environment. Larger firms are generally expected to have better information availability and more earnings consistency, supporting the use of size as a proxy for the information environment. In addition, because firms with more leverage have bigger incentives to manage earnings to meet debt covenant restrictions, Jiambalvo et al. (2002) included leverage in order to control for the lower earnings predictability which can result from earnings management. Because both size and leverage may serve as proxy variables for the information uncertainty which affects the ability of investors to accurately assess and incorporate future earnings prospects into a firm's stock price, it is likely that size and leverage are related to mispricing measured using actual future earnings and book values. Jiambalvo et al. (2002) also included measures of earnings scaled by assets and the standard deviation of return on assets (earnings scaled by assets) as control variables in a number of their analyses. More earnings volatility would be expected to diminish the extent to which stock prices accurately reflect future earnings. Naturally, this suggests that the information uncertainty or risk produced by more volatile earnings may explain mispricing measured relative to realized outcomes. As earnings become more volatile investors have a harder time properly assessing the future prospects of firms, producing more mispricing when intrinsic values estimated using realized future earnings and book values are compared to market prices.

One very important issue in assessing estimations of overvaluation is whether the estimated overvaluation is in fact due to risk instead of mispricing. Ali, Hwang, and Trombley (2003) performed an analysis using a residual income valuation approach based upon analysts' forecasts and found a strong positive relationship between stock returns around quarterly earnings announcements and value-to-price quintile ranks from a prior period. The use of value-to-price quintile ranks by Ali et al. (2003) as an independent variable in one model instead of using raw value-to-price values is not unlike the use of valuation decile assignments in the present study, although the present study uses valuation decile assignments as the dependent variable. Ali et al. (2003) also regressed their raw value-to-price measure upon various risk factors to determine the extent to which risk could account for the estimated value to price discrepancy, and the factors assessed included the following: beta, involatility, the debt-to-equity ratio, size, the number of analysts, analysts' forecast dispersion, the standard deviation of past return on assets, the implied industry cost of capital, the book-to-price ratio, the long-term growth projection from I/B/E/S, Altman's Z-Score, and estimated expected return. The results reported by Ali et al. (2003) were mixed regarding whether risk factors could explain the value to price measure used. To further explore the issue, Ali et al. (2003) regressed cumulative three year size adjusted returns on the value-to-price measure and the risk factors already mentioned, and the value-to-price measure remained positively related to the long-term returns despite the risk factors included in the regression. This finding suggested that risk measures cannot explain the predictive power of the value-to-price ratio. In other regression analyses, Ali et al. (2003) reported that the relationship of their value-to-price measure with future returns was driven by the component of the estimated firm value arising from the projected future residual incomes.

There are a few important ways in which the present study varies from the study performed by Ali et al. (2003). First, the present study utilizes realized incomes instead of analysts' forecasts. This distinction has particular importance due to the possibility that valuation models based upon analysts' forecasts may be affected by investor sentiment, as mentioned by Brown and Cliff (2005). Second, the study by Ali et al. (2003) focused upon examining risk based explanations for the observed value-to-price ratios, while this study includes additional independent variables which may drive overvaluation. Specifically, this study examines the effect that factors relating to managerial incentives, firm characteristics, investor sentiment, and risk and information uncertainty have upon overvaluation.

2.4 Hypothesis Development

The review of literature in the previous section suggests that certain factors may be determinants of overvaluation. It is important to note that in the context of this study undervaluation and overvaluation refer to opposite ends of the same unified valuation spectrum. Therefore, the most overvalued firms are considered to be the least undervalued, and vice versa. This section formalizes the hypotheses which have been identified regarding the possible determinants of overvaluation. In some cases the literature is unclear or divided about the likely directional effect of a proposed determinant of overvaluation. Some proposed determinants may be related to misvaluation generally, allowing for those proposed determinants to be associated with both overvalued and undervalued stocks. For the sake of convenience, the hypotheses developed below will be presented in approximately the same order as the topics discussed in the previous section which reviewed the factors related to mispricing.

2.4.1 CEO Compensation Characteristics

Managerial compensation characteristics may be a determinant of overvaluation as different compensation structures may create incentives for managers to engage in different investment behaviors and possibly earnings management. Coles et al. (2006) found that a CEO with a high sensitivity of the CEO's wealth to the volatility of the stock (vega) invested more in R&D and less in fixed assets. Because the intangible nature of R&D expenditures would reasonably be expected to make firm valuation more difficult, executive compensation may be related to misvaluation by affecting the choices of managers. This hypothesized connection between the vega of managers and overvaluation is a second order effect as the impact upon overvaluation is derived from the choices of managers. One specific area of managerial choice is to pursue or avoid expenditures on R&D. Thus, the vega of managers is expected to produce an effect on overvaluation through the choices made by managers, with the R&D channel serving as one possible mechanism through which vega may affect overvaluation. The first null and alternative hypotheses are the following:

$\mathbf{H1_0}$: *Ceteribus paribus, the sensitivity of the CEO's wealth to the volatility of the stock is unrelated to overvaluation.*
$\mathbf{H1_A}$: *Ceteribus paribus, the sensitivity of the CEO's wealth to the volatility of the stock is related to overvaluation.*

The second null and alternative hypotheses relating managerial compensation to the overvaluation measures employed in this study may be derived from Coles et al. (2006). In that study, a CEO with a high sensitivity of the CEO's wealth to the stock price (delta) invested less in R&D and more in fixed assets. As this combination of investment choices would be expected to result in less ambiguous prospects for a firm, such investment choices would be expected to result in less mispricing generally. Due to the reduced investments in R&D, to which investors may overreact, managerial delta is expected to be related to overvaluation. As with managerial vega, the effect of managers' delta upon overvaluation is expected to flow through the effects of the choices made by managers, including through the R&D channel. This means that delta is expected to be a second order issue. The second null and alternative hypotheses are the following:

$\mathbf{H2_0}$: *Ceteribus paribus, the sensitivity of the CEO's wealth to the stock price is unrelated to overvaluation.*
$\mathbf{H2_A}$: *Ceteribus paribus, the sensitivity of the CEO's wealth to the stock*

price is related to overvaluation.

2.4.2 Firm Characteristics

Although managerial incentives have been discussed as potentially influencing expenditures upon intangible assets such as R&D, thereby exacerbating mispricing, the direct impact of intangible assets upon mispricing may also be explored. The literature reviewed previously supports the idea that intangible assets may be related to mispricing. Evidence presented by Woolridge and Snow (1990), Chan et al. (1990), Sundaram et al. (1996), Green et al. (1996), and Lev and Sougiannis (1996) indicates that market participants view R&D spending to be value relevant. A study by Ali et al. (2003) found that visibility from advertising was associated with decreased credit spreads, suggesting a lower assessment of risk for bondholders. Interestingly, Aboody and Lev (1998) found that analysts' forecast errors increased with more R&D capitalization, which highlights the difficulty in properly assessing the degree of value relevance of R&D. Stock price increases were shown by Chan et al. (1990) to accompany announced increases in R&D expenditures. Given the realized earnings valuation models used in this study, elevated stock prices resulting from the announced increases in R&D would still be compared to an estimated firm value with largely the same realized earnings data as the prior estimation period, likely resulting in a positive relationship between R&D expenditures and the overvaluation measures used in this study. A similar result is expected for advertising expenditures. The resulting hypotheses are stated below:

$\mathbf{H3_0}$: *Ceteribus paribus, advertising expenditures are unrelated to overvaluation.*
$\mathbf{H3_A}$: *Ceteribus paribus, advertising expenditures are positively related to overvaluation.*

$\mathbf{H4_0}$: *Ceteribus paribus, R&D expenditures are unrelated to overvaluation.*
$\mathbf{H4_A}$: *Ceteribus paribus, R&D expenditures are positively related to overvaluation.*

Barth and Clinch (1998) examined asset revaluations for Australian firms and found that revaluations of property, plant, and equipment for nonfinancial firms were positively related to the stock price. This finding is particularly notable due to their additional finding that the revaluation of property, plant, and equipment was negatively associated with the estimated value of nonfinancial firms. This divergence in the response of the estimated value and the corresponding market response indicates that property, plant, and equipment may also be related to overvaluation. On one hand, the results presented by Barth and Clinch (1998) imply that the asset revaluations they examined led to more overvaluation as the stock price responded positively while the estimated value responded negatively. On the other hand, one of the themes throughout the literature review presented previously regarding intangible assets is that intangible assets may be subject to more misvaluation due to the more ambiguous nature of the prospects associated with the intangible assets in comparison to tangible assets such as fixed assets. This line of thought suggests that investments in property, plant, and equipment should lead to more accurate valuations generally as the prospective returns are more certain. In other words, investors respond to new information about fixed assets on the balance sheet in a way which results in overvaluation, yet the more tangible nature of fixed assets should make fixed assets easier for investors to value than intangible assets. The curious overvaluation of equity which results from the revaluation of property, plant, and equipment calls into question the ability of investors to accurately value property, plant, and equipment generally, suggesting that investments in property, plant, and equipment may be related to overvaluation. To explore this issue further, the following null and alternative hypotheses are formed:

$\mathbf{H5_0}$: *Ceteribus paribus, investments in property, plant, and equipment are unrelated to overvaluation.*
$\mathbf{H5_A}$: *Ceteribus paribus, investments in property, plant, and equipment are related to overvaluation.*

As mentioned in the literature review, Daniel and Titman (1999) noted that the subjectivity associated with intangible assets should result in more misvaluation. This suggested effect was linked to overconfidence and biased self-attribution on the part of investors. Daniel et al. (2001) presented a theoretical model which ultimately suggested that fundamental-to-price ratios should have more predictive power for firms with more ambiguous values, implying that higher concentrations of intangible assets may be related to larger amounts of mispricing. A study by Jiang et al. (2005) considered the impact of overconfidence and the magnitude of information uncertainty and found that stocks with high information uncertainty experienced stronger price and earnings momentum effects over a short time horizon, and stocks with low prior returns experienced a stronger negative relationship with the information uncertainty. Taken together, these studies imply that higher levels of intangible assets should be related to higher levels of misvaluation. The following null and alternative hypotheses result from that assessment:

$\mathbf{H6_0}$: *Ceteribus paribus, intangible assets are unrelated to overvaluation.*
$\mathbf{H6_A}$: *Ceteribus paribus, intangible assets are related to overvaluation.*

In a paper considering the effects of limited investor attention Hirshleifer et al. (2011) proposed that firms with high cash flow or low accruals might be undervalued by investors while firms with low cash flow or high accruals might be overvalued by investors. Therefore a negative relationship may exist between cash flow and overvaluation and a positive relationship may exist between accruals and overvaluation. The hypotheses which result are as follows:

$H7_0$: *Ceteribus paribus, cash flow is unrelated to overvaluation.*
$H7_A$: *Ceteribus paribus, cash flow is negatively related to overvaluation.*

$H8_0$: *Ceteribus paribus, accruals are unrelated to overvaluation.*
$H8_A$: *Ceteribus paribus, accruals are positively related to overvaluation.*

2.4.3 Investor Sentiment Variables

Prior research indicates that investor sentiment may be related to overvaluation. Brown and Cliff (2005) found that investor sentiment was positively related to overvaluation as measured using pricing errors for the Dow Jones Industrial Average which were obtained by Bakshi and Chen (2005). Interestingly, Brown and Cliff (2005) found evidence which suggested that negative and positive investor sentiment might influence overvaluation in an asymmetric manner. Baker and Wurgler (2006) constructed a sentiment index using various factors and found that lagged sentiment was negatively related to the returns of smaller, younger, distressed, more volatile, and unprofitable firms, and similar findings were reported for firms which did not pay dividends or firms with very high or very low sales growth. Baker and Wurgler (2006) concluded that these findings were consistent with the effects of limited arbitrage opportunities. Subsequently, Baker and Wurgler (2007) suggested that firms with harder to value prospects would be more subject to the effects of investor sentiment. This implies that sentiment may interact with intangible assets or other firm characteristics to supercharge misvaluation arising from the ambiguity associated with the value of the intangible assets or other firm characteristics. According to Baker and Wurgler (2007), firms with more stable prospects may become undervalued during periods with positive investor sentiment as investors seek other options and may become overvalued during periods of negative investor sentiment as investors seek safety. If the proportion of property, plant, and equipment is related to the stability of a firm's prospects, investor sentiment may affect the impact of property, plant, and equipment upon overvaluation by making firms with significant proportions of net fixed assets undervalued during periods of optimistic investor sentiment. Overall, these findings imply that investor sentiment may directly influence overvaluation and also affect how other data is perceived by investors, thereby changing the impact of R&D expenditures and other firm characteristics upon overvaluation as investor sentiment fluctuates. The hypotheses about the relationship between investor sentiment and overvaluation are below:

$\mathbf{H9_0}$: *Ceteribus paribus, investor sentiment is unrelated to overvaluation.*
$\mathbf{H9_A}$: *Ceteribus paribus, investor sentiment is positively related to overvaluation.*

$\mathbf{H10_0}$: *Ceteribus paribus, the interaction between investor sentiment and advertising expenditures is unrelated to overvaluation.*
$\mathbf{H10_A}$: *Ceteribus paribus, the interaction between investor sentiment and advertising expenditures is positively related to overvaluation.*

$\mathbf{H11_0}$: *Ceteribus paribus, the interaction between investor sentiment and R&D expenditures is unrelated to overvaluation.*
$\mathbf{H11_A}$: *Ceteribus paribus, the interaction between investor sentiment and R&D expenditures is positively related to overvaluation.*

$\mathbf{H12_0}$: *Ceteribus paribus, the interaction between investor sentiment and property, plant, and equipment is unrelated to overvaluation.*
$\mathbf{H12_A}$: *Ceteribus paribus, the interaction between investor sentiment and property, plant, and equipment is negatively related to overvaluation.*

$\mathbf{H13_0}$: *Ceteribus paribus, the interaction between investor sentiment and intangible assets is unrelated to overvaluation.*
$\mathbf{H13_A}$: *Ceteribus paribus, the interaction between investor sentiment and intangible assets is positively related to overvaluation.*

$\mathbf{H14_0}$: *Ceteribus paribus, the interaction between investor sentiment and cash flow is unrelated to overvaluation.*
$\mathbf{H14_A}$: *Ceteribus paribus, the interaction between investor sentiment and cash flow is negatively related to overvaluation.*

$\mathbf{H15_0}$: *Ceteribus paribus, the interaction between investor sentiment and accruals is unrelated to overvaluation.*
$\mathbf{H15_A}$: *Ceteribus paribus, the interaction between investor sentiment and accruals is positively related to overvaluation.*

2.4.4 Risk and Information Uncertainty Control Variables

As discussed in the Literature Review of Factors section, risk and information uncertainty may explain some portion of mispricing, leading to relationships between risk and information uncertainty and the relative measures of overvaluation used in this study. Jiambalvo et al. (2002) used several variables to control for the information environment while performing a study of the impact of institutional ownership upon the extent to which market prices reflect future earnings. Some of the variables included by Jiambalvo et al. (2002) in various analyses were firm size, leverage, the standard deviation of return on assets, and a measure of scaled earnings. Firm size was found to be positively related to the extent to which market prices reflect future earnings, meaning that market prices tend to more accurately reflect future earnings for larger firms. This suggests that mispricing should be larger for smaller firms, although the direction of the mispricing is unclear. The resulting hypotheses are as follows:

$H16_0$: *Ceteribus paribus, firm size is unrelated to overvaluation.*
$H16_A$: *Ceteribus paribus, firm size is related to overvaluation.*

In addition, Jiambalvo et al. (2002) showed that leverage and the standard deviation of return on assets were often negatively related to the extent to which market prices reflect future earnings. These findings indicate that leverage and the standard deviation of return on assets should be related to mispricing. If leverage and the standard deviation of return on assets capture some dimension of risk which is not captured by other variables or incorporated in the measures of mispricing, then it is possible that leverage and the standard deviation of return on assets may be negatively related to overvaluation. This would mean that more risky firms appear to be undervalued using the relative valuation measures employed by this study when in fact such firms are more risky. If the information uncertainty effect of leverage and the standard deviation of return on assets is dominant, firms with more leverage and more volatile return on assets will experience more mispricing, although the direction of the mispricing is not as clear under this approach. Interestingly, a measure of earnings scaled by assets was generally negatively related to subsequent returns in the study by Jiambalvo et al. (2002). If earnings are persistent, a negative relationship between a measure of return on assets and subsequent returns suggests that return on assets may be negatively related to overvaluation as market prices decline while earnings persist. The hypotheses which result are as follows:

$H17_0$: *Ceteribus paribus, leverage is unrelated to overvaluation.*
$H17_A$: *Ceteribus paribus, leverage is negatively related to overvaluation.*

$H18_0$: *Ceteribus paribus, the standard deviation of return on assets is unrelated to overvaluation.*
$H18_A$: *Ceteribus paribus, the standard deviation of return on assets is negatively related to overvaluation.*

$H19_0$: *Ceteribus paribus, return on assets is unrelated to overvaluation.*
$H19_A$: *Ceteribus paribus, return on assets is negatively related to overvaluation.*

If investors face higher levels of information uncertainty when they evaluate a firm, it should be difficult for them to form an accurate assessment of the firm's prospects. It is reasonable to conclude that the increased difficulty in accurately assessing a firm's prospects will produce increased mispricing. Jiang et al. (2005) used firm age, the standard deviation of returns, and average stock turnover as proxies for information uncertainty.

Importantly, Jiang et al. (2005) found that firms with high information uncertainty earned lower future returns, and the authors suggested that this was consistent with overconfidence on the part of investors evaluating firms with high information uncertainty. This suggests that information uncertainty has an asymmetric effect on mispricing by making firms with high information uncertainty more overvalued, leading to poorer future returns. If information uncertainty affects returns through a risk channel instead, firms with high information uncertainty should yield higher subsequent returns to compensate for the higher risk. The risk interpretation indicates that firms with higher information uncertainty should appear to be undervalued relative to subsequent outcomes if the estimates of intrinsic value do not fully account for all sources of risk relating to information uncertainty. Therefore, an investor overconfidence interpretation and a risk interpretation of the relationship between information uncertainty upon overvaluation produce different predictions, making the relationship an empirical issue. The hypotheses are as follows:

$\mathbf{H20_0}$: *Ceteribus paribus, firm age is unrelated to overvaluation.*
$\mathbf{H20_A}$: *Ceteribus paribus, firm age is related to overvaluation.*

$\mathbf{H21_0}$: *Ceteribus paribus, the standard deviation of returns is unrelated to overvaluation.*
$\mathbf{H21_A}$: *Ceteribus paribus, the standard deviation of returns is related to overvaluation.*

$\mathbf{H22_0}$: *Ceteribus paribus, stock turnover is unrelated to overvaluation.*
$\mathbf{H22_A}$: *Ceteribus paribus, stock turnover is related to overvaluation.*

It is possible that firms which appear to be undervalued according to the relative measures of overvaluation used in this study are actually more risky firms. Similarly, firms which appear to be overvalued relative to future earnings and book values may actually be less risky. In a study evaluating the residual income model's ability to predict future stock returns, Ali et al. (2003) used several proxies for firm risk. Some of the risk proxies included by Ali et al. (2003) have already been discussed in some form, such as firm size, scaled measures of debt, and the standard deviation of return on assets. However, two additional proxies for firm risk used by Ali et al. (2003) are Altman's Z-Score and beta. Results reported by Ali et al. (2003) showed that firms with higher values of Altman's Z-Score and beta appeared to be more undervalued using their measures of valuation. Those results are consistent with interpreting the appearance of overvaluation and undervaluation as being related to differences in risk. In other words, firms which appear undervalued are somewhat more risky and firms which appear overvalued are somewhat less risky. Therefore, in light of those results the hypotheses for Altman's Z-Score and beta are as follows:

$\mathbf{H23_0}$: *Ceteribus paribus, Altman's Z-Score is unrelated to overvaluation.*
$\mathbf{H23_A}$: *Ceteribus paribus, Altmans's Z-Score is negatively related to overvaluation.*

$\mathbf{H24_0}$: *Ceteribus paribus, beta is unrelated to overvaluation.*
$\mathbf{H24_A}$: *Ceteribus paribus, beta is negatively related to overvaluation.*

From the discussion in this section it should be clear that theoretical reasons exist for why various factors might be related to the measures of overvaluation used in this study. The next section of this study develops the methodology and models needed to test the hypotheses which have been articulated. The overvaluation measures derived previously are used in conjunction with the characteristics discussed in this section to more fully explore the determinants of overvaluation.

2.5 Methodology

In the first essay the scaled deviation of market value from intrinsic value is used to assign firms to valuation deciles, creating relative measures of valuation. In order to better capture the true value of firms, the intrinsic value estimates use actual future earnings and book value data. Importantly, the results in the first essay demonstrate that the firms which are the most overvalued initially remain overvalued on average over time, and the firms which are the most undervalued initially remain undervalued on average over several years. This persistence in overvaluation and undervaluation indicates that the overvaluation and undervaluation relative to subsequent earnings and book value data are not primarily driven by random market mispricing at the time the mispricing is measured. If the mispricing being measured is merely the result of random market pricing errors at each point in time, the most overvalued firms would be randomly distributed across the valuation deciles in subsequent periods instead of remaining overvalued over time, and similar logic would apply to the most undervalued firms. Therefore, as the mispricing measured is not solely driven by random market pricing errors, studying the determinants of mispricing is warranted.

In the course of studying the determinants of mispricing, this essay employs the valuation decile assignments developed in the first essay as the measure of mispricing. Since undervaluation and overvaluation refer to opposite ends of the same unified valuation spectrum, the most overvalued firms are considered to be the least undervalued, and vice versa. For the sake of convenience, the valuation decile assignments are often simply referred to as measures of overvaluation. The most relatively undervalued firms are assigned to the first decile, and the most relatively overvalued firms are assigned to the tenth decile.

Valuation deciles are used for a few reasons. First, the scaled deviation of market value from intrinsic value is subject to outliers, and the *VERR* and *eVERR* data also exhibit substantial skewness, as may be seen in the means and percentile data in Table 3. Assigning firms to valuation deciles using the scaled deviation of market value from intrinsic value solves the problem of outliers and skewed *VERR* and *eVERR* data. In a regression of size adjusted announcement returns on independent variables, Ali et al. (2003) used value-to-price quintile ranks as an independent variable to better handle outliers and nonlinearities in the relationship. Thus, using valuation deciles in the present study to solve the problem of outliers and skewed data is similar to the approach used by Ali et al. (2003). However, using valuation deciles allows for more variation in the data than is allowed with the value-to-price quintile ranks used by Ali et al. (2003). Second, employing valuation deciles makes determinant analyses based upon different *VERR* or *eVERR* measures more directly comparable as all valuation decile assignments share the same scale. Third, the use of valuation deciles facilitates the study of determinants of mispricing in a relative sense. In other words, using valuation decile assignments makes it possible to determine the extent to which the determinants of mispricing make some firms more overvalued or more undervalued relative to other firms.

The preceding Literature Review of Factors and Hypothesis Development sections discuss factors and control variables which are relevant to the study of the determinants of mispricing. The independent variables identified in the Hypothesis Development section fit into four groups: CEO compensation characteristics, firm characteristics, investor sentiment variables, and control variables. Because valuation decile assignments are used as the measure of overvaluation, ordered logistic regressions of valuation decile assignments on the determinants of mispricing are performed. Therefore, the general form of the analyses is the following:

$$\begin{aligned} Decile = f(&\text{CEO compensation characteristics, firm characteristics,} \\ &\text{investor sentiment variables, and control variables}) \end{aligned} \tag{11}$$

Studying the determinants of mispricing using ordered logistic regressions of the general form presented in Equation 11 requires that valuation data be matched with the determinants identified in the Hypothesis Development section and with the control variables. This section details the construction of the combined valuation and determinants sample, including the methodology used for the valuation measures, CEO compensation characteristics, sentiment data, company characteristics, and control variables. Focusing on audited financial results in order to generate the highest quality estimate of intrinsic value using actual financial outcomes produces valuation data which is available annually for firms in the sample. The main sample period is from 1964–2009 due to the availability of the valuation data, but data for some of the determinants is not available during that full period. CEO compensation data is available from 1992–2010, extending beyond the valuation sample period but substantially limiting the early sample period. The Investors Intelligence measure of investor sentiment is available from 1963–2014, fully covering the valuation sample period. The measure of sentiment described in Baker and Wurgler (2007) begins in 1965 and spans the remainder of the valuation sample period. The American Association of Individual Investors sentiment data begins in 1987 and continues through the valuation sample period. The availability of cash flow and accruals data depends upon the calculation method used, with one method producing at least some data covering the full valuation sample period and the other method beginning in 1987 and continuing throughout the remainder of the valuation sample period. The specific details of the preparation of the data are presented in the sections below.

2.5.1 Valuation Measures

As discussed above, this essay uses the valuation decile assignments developed in the first essay as the measures of relative overvaluation used in the analyses of the determinants of mispricing. Valuation decile assignments are therefore used as the dependent variable in the general model presented in Equation 11. The main valuation measure employed in this essay is the set of full period decile assignments derived from the *VERR* measure calculated with intrinsic values estimated using the static CAPM discount rate for each firm. The static CAPM approach is used in order to incorporate a firm specific risk adjustment without invoking the size and book-to-market connections inherent in the Fama-French discount model. Although the decile assignments using the Fama-French approach are very similar to the decile assignments using the CAPM approach, it is possible that mispricing may account for some degree of the observed premiums associated with the size and book-to-market factors. The size and book-to-market factors in the Fama-French approach are therefore more prone to being affected by mispricing itself, whereas using the CAPM methodology to estimate the cost of equity avoids that issue.

In order to produce the full period valuation decile assignments all the static CAPM *VERR* figures across the 1964–2009 period are grouped together and then separated into valuation deciles. The first valuation decile contains the most relatively undervalued firm observations and the tenth valuation decile contains the most relatively overvalued firm observations. Using the full set of observations over the 1964–2009 period when assigning firms to valuation deciles makes the resulting decile assignments relative measures of valuation for the full time period since each firm observation is compared to the decile boundaries derived from the full sample when the decile assignments are made. Thus, firms at each point in time are assigned to valuation deciles using decile thresholds derived from all observations over the full 1964–2009 period.

Assigning firms to full period valuation deciles using the CAPM based *VERR* measure and the full 1964–2009 time period could cause the decile assignments to be driven by broad market mispricing in some time periods. This could affect the determinants which appear to be statistically significantly related to mispricing. Specifically, analyses of determinants using full period decile assignments may indicate that determinants which capture broad market conditions are driving mispricing, possibly obscuring the effect of other determinants driving mispricing over shorter time periods. To examine the robustness of the main results using the full period decile assignments, *VERR* decile assignments made annually are also used in a series of analyses. With this approach the static CAPM discount rate is again employed in the calculation of the intrinsic value used in the *VERR* formula, but firms are assigned to valuation deciles annually. As *VERR* estimations are performed at the end of the month in which each fiscal year ends, all *VERR* calculations from within a calendar year are grouped together and separated into valuation deciles. Decile one contains the most relatively undervalued equities, and decile ten contains the most relatively overvalued equities. Using annual decile assignments shifts the focus from mispricing which may be driven by broad market factors towards mispricing which may be caused by other factors. For example, if investor sentiment affects mispricing, using full period decile assignments as the dependent variable in the analyses would be expected to more fully capture that impact because sentiment is more variable over broad time horizons and market conditions. Using annual decile assignments in the determinants analyses allows for less heterogeneity in investor sentiment values since all *VERR* measures within a given year will have one of twelve different dates because each company's annual *VERR* measure is estimated at the end of the month in which the company's fiscal year ends. Consequently, although the main valuation measure employed in this study is the set of full period *VERR* decile assignments using the static CAPM discount rate approach, annual *VERR* decile assignments are also used for robustness, and the corresponding results are presented in the Appendix. The sample of static CAPM *VERR* observations converted into full period and annual decile assignments consists of 134,205 observations.

In the Appendix, two additional valuation decile assignment variables are used in the determinants analyses as the dependent variable. The *eVERR* measures developed in the first essay are based upon alternate specifications for earnings and book values compared to the earnings and book values specifications used in the estimation of the *VERR* measures. Therefore, two of the sets of valuation decile assignments generated from the *eVERR* measures are used to study the determinants of mispricing in order to more fully examine the robustness of the results obtained to the use of alternate specifications of earnings and book values in the estimation of intrinsic value. Both *eVERR* decile assignment variables employ the static CAPM discount rate for each firm when performing the calculations to generate the *eVERR* figures. The first *eVERR* measure corresponds to the full period decile assignments using the *VERR* measure to assign firms to deciles. For this set of *eVERR* decile assignments all observations over the full 1964–2009 period are grouped together and then assigned to valuation deciles, with the first decile containing the most relatively undervalued equities and the tenth decile containing the most relatively overvalued equities. The second *eVERR* measure corresponds to the annual decile assignments made using the *VERR* measure to assign firms to deciles. For this dependent variable all *eVERR* measures within a calendar year are assigned to valuation deciles. The discussion in the preceding paragraph regarding the implications of assigning firm observations to *VERR* based valuation deciles over the full period or annually apply to the two *eVERR* based valuation decile assignments as well. The sample of static CAPM *eVERR* observations converted into full period and annual decile assignments consists of 122,044 observations.

2.5.2 CEO Compensation Characteristics

The characteristics of managerial compensation are identified in the Literature Review of Factors and in the Hypothesis Development sections as likely being related to overvaluation. In particular, the sensitivity of the executive's wealth to the volatility of the stock (vega), and the sensitivity of the executive's wealth to the stock price (delta), are hypothesized to be related to mispricing. Vega and delta data are obtained from Professor Naveen's website, with the data covering the period 1992–2010 and including delta and vega for various executives. The vega and delta measures provided by Professor Naveen were calculated using Execucomp data following methodologies developed by Core and Guay (2002) and Coles et al. (2006).

The delta and vega obtained from Professor Naveen's website are matched with data from Execucomp to separate out the data for CEOs specifically. In some cases delta and vega are included for multiple CEOs for a given year. When that occurs, the average of the deltas and vegas is used. Because delta and vega are hypothesized to affect overvaluation by influencing the decisions of managers in areas such as R&D, using the average of the deltas and vegas for multiple CEOs during a year better reflects the incentives which may have affected managerial decisions during that period. The final set of delta and vega data consists of 29,427 observations, and both delta and vega are rescaled to be in terms of millions of dollars of change in the executive's wealth relative to the change in the stock price or the volatility of the stock. The rescaling is performed to facilitate the interpretation of the resulting coefficients in the analyses without affecting the inferences.

2.5.3 Firm Characteristics

As detailed in the Hypothesis Development section, various firm characteristics have been hypothesized to be related to overvaluation. To test these hypotheses, various variables are constructed. Research and development expenditures (COMPUSTAT variable XRD) are scaled by the average total assets during the fiscal year to obtain the measure of R&D used in most of the analyses. The average total assets is computed as the average of the total assets at the end of the fiscal year and the total assets at the end of the prior fiscal year. The average total assets during the year is used to better match the periodic nature of R&D expenditures given that total assets figures taken from balance sheets are point estimates. An average total assets figure therefore better matches the level of assets associated with the R&D expenditures during the fiscal year. Missing values of R&D expenditures are treated as zeros. The same procedure is followed when using the advertising expenditures (COMPUSTAT variable XAD) to compute the advertising measure used in the analyses. For robustness, R&D expenditures are also scaled by sales in some analyses to provide an alternative measure of R&D intensity.

Scaled values of net property, plant, and equipment and intangible assets are also calculated. The corresponding COMPUSTAT variables for net property, plant, and equipment and intangible assets are $PPENT$ and $INTAN$, respectively. Because the net property, plant, and equipment and intangible assets figures are obtained for the end of the fiscal year, the total assets figure for the end of the fiscal year is used when scaling the variables. This approach to scaling matches the point estimates of intangible assets and net property, plant, and equipment with the corresponding point estimate of total assets.

Two different measures of cash flow and accruals are utilized. The first set of measures is calculated using the approach documented by Sloan (1996). Following that method, cash flow and accruals are calculated as follows:

$$ACC_{Sloan} = (\triangle ACT - \triangle CHE) - (\triangle LCT - \triangle DLC - \triangle TXP) - DP \quad (12)$$

$$CF_{Sloan} = OIADP - ACC_{Sloan} \quad (13)$$

The abbreviations in the equations above refer to the COMPUSTAT variable names, where ACT is total current assets, CHE is cash and cash equivalents, LCT is total current liabilities, DLC is total debt in current liabilities, TXP is income taxes payable, DP is depreciation and amortization expense, and $OIADP$ is operating income after depreciation. The data required to calculate the cash flow and accruals measures following Sloan (1996) is available sporadically for firms prior to mid-1970, and very consistently thereafter. The second set of measures is calculated using the approach documented by Collins, Gong, and Hribar (2003). Following that method, cash flow and accruals are calculated as follows:

$$CF_{Collins} = OANCF - XIDOC \tag{14}$$

$$ACC_{Collins} = IBC - CF_{Collins} \tag{15}$$

In the above equations the COMPUSTAT variables are provided. $OANCF$ is the net cash flow from operating activities and $XIDOC$ is the cash flow from extraordinary items and discontinued operations. IBC is the income before extraordinary items. The data required to calculate the cash flow and accruals measures following Collins et al. (2003) is available sporadically for firms beginning in 1987 and continuing through mid-1988, and consistently thereafter. The accruals and cash flow measures calculated following both Sloan (1996) and Collins et al. (2003) are scaled by average total assets before being used in the analyses. The average total assets during the year is used to better match the periodic nature of cash flow and accruals given that total assets figures taken from balance sheets are point estimates. An average total assets figure therefore better matches the level of assets associated with the cash flow and accruals during the fiscal year.

2.5.4 Sentiment Variables

Three sources of sentiment data are used for this study. The first source of sentiment data is from Investors Intelligence. The Investors Intelligence data spanned the period from January of 1963 through the beginning of March of 2014, beyond the end of the valuation sample period. For the period from January of 1963 through November of 1963, data is available once per month. For the period from December of 1963 through May of 1969, data is available on a bi-weekly basis. The data is available on a weekly basis for the remainder of the data available. Sentiment data from Investors Intelligence ending within a calendar month is averaged to produce a monthly sentiment measure. The specific measure of sentiment used to construct the monthly average is the difference between the percentage bullish and the percentage bearish. As a result of the data availability, for most of the sample period the monthly average is constructed from the weekly difference. The use of a monthly average allows time for investor sentiment to be reflected in market prices by incorporating sentiment data over a period of weeks. Also, using a monthly average makes it possible to more closely align the estimation periods across all three measures of investor sentiment.

The second source of sentiment data is the monthly orthogonalized sentiment measure described in Baker and Wurgler (2007). The data is obtained from Professor Wurgler's webpage. The orthogonalized sentiment measure is available from July of 1965 until December of 2010, beyond the end of the valuation sample period.

The third and final source of sentiment data is obtained from the American Association of Individual Investors (AAII). AAII conducts a weekly sentiment survey of its members, with data beginning in July of 1987 and extending beyond the end of the valuation sample period. The sentiment data is downloaded from the AAII website. Data for one week in 1996 is missing. The difference between the percentage bullish and the percentage bearish is used as the measure of sentiment, and a monthly sentiment measure is constructed as the average of all of the weekly sentiment figures dated during each calendar month. As noted above, the use of a monthly average allows time for investor sentiment to be reflected in market prices by incorporating sentiment data over a period of weeks. Also, using a monthly average makes it possible to more closely align the estimation periods across all three measures of investor sentiment, as the Baker-Wurgler measure of sentiment is available monthly.

2.5.5 Control Variables

Several measures to control for risk are constructed and used in the analyses. In a study of the relationship between institutional ownership and the relationship between stock prices and future earnings Jiambalvo, Rajgopal, and Venkatachalam (2002) included firm size and leverage in their analyses. For this study, size is defined to be the natural logarithm of total assets and leverage is defined to be total liabilities scaled by total assets. Jiambalvo et al. (2002) also included a measure of the standard deviation of return on assets. In the present study return on assets is calculated using the average total assets described above, and the standard deviation is calculated using the five fiscal years ending on the valuation date, with a minimum of three return on asset figures required. Return on assets is also included as a control variable in the analyses.

When Jiang et al. (2005) studied the connection between information uncertainty and expected returns, several variables to account for information uncertainty were included. Firm age, the standard deviation of returns, and stock turnover were employed by Jiang et al. (2005) as measures of information uncertainty. Investors faced with information uncertainty may have a more difficult time accurately assessing the value of firms, leading to a connection between information uncertainty and mispricing. To control for the effects of information uncertainty, firm age, the standard deviation of returns, and stock turnover are included as control variables in the analyses. Using the approach taken by Jiang et al. (2005), firm age is defined in the present study to be the total number of months the stock appeared in CRSP prior to and including the valuation month. The standard deviation of returns is calculated using the standard deviation of the natural log of daily returns during the two month window ending eleven days before the valuation date, which is the last day of the valuation month. The turnover for the stock is calculated to be the average of the percentage turnover for each day during the six month period ending eleven days before the valuation date. The estimation methodologies for the standard deviation of returns and turnover are similar to the methodologies used by Jiang et al. (2005), and the estimation period ends eleven days before the valuation date to match the methodology used in the estimation of the CAPM discount rate used in the valuation measures.

Two additional control variables are used in the analyses. Altman's Z-Score is calculated as a variable to control for the uncertainty associated with default risk, and it is computed following the formulation presented in Altman (2000) of the original model introduced by Altman (1968). The CAPM beta derived for the first essay of this study is also included as a variable to control for risk.

2.5.6 Model Specifications

Three different general specifications are used for the ordered logistic regressions, and two different models are used for each general specification. The first general specification is the baseline specification for the independent variables which is used to generate the primary results reported in this study. Within the baseline specification for the independent variables there are two models which are used to perform the ordered logistic regressions. The first model includes scaled advertising (AD), scaled R&D (R&D/A), scaled net fixed assets (PPENT), scaled intangible assets (INTAN), scaled cash flow (CF), scaled accruals (ACC), investor sentiment (Sent), several interaction terms between firm characteristics and investor sentiment (AD*Sent, R&D*Sent, PPENT*Sent, INTAN*Sent, CF*Sent, and ACC*Sent), Altman's Z-Score (AltZ1), firm age (Age), firm size (Size), the standard deviation of returns (StdRet), stock turnover (Turnover), the standard deviation of return on assets (StdROA), the stock's β (Beta), return on assets (ROA), and leverage (Leverage). The first baseline specification model omits delta and vega because the limited availability of the delta and vega data significantly reduces the sample period. The model is presented below in Equation 16:

$$\begin{aligned}Decile_{i,t} = f(&\boldsymbol{\alpha} + \gamma_3 AD_{i,t} + \gamma_4 R\&D/A_{i,t} + \gamma_5 PPENT_{i,t}\\ &+ \gamma_6 INTAN_{i,t} + \gamma_7 CF_{i,t} + \gamma_8 ACC_{i,t} + \gamma_9 Sent_{i,t}\\ &+ \gamma_{10}(AD_{i,t} * Sent_{i,t}) + \gamma_{11}(R\&D_{i,t} * Sent_{i,t})\\ &+ \gamma_{12}(PPENT_{i,t} * Sent_{i,t}) + \gamma_{13}(INTAN_{i,t} * Sent_{i,t})\\ &+ \gamma_{14}(CF_{i,t} * Sent_{i,t}) + \gamma_{15}(ACC_{i,t} * Sent_{i,t})\\ &+ \gamma_{16} AltZ1_{i,t} + \gamma_{17} Age_{i,t} + \gamma_{18} Size_{i,t}\\ &+ \gamma_{19} StdRet_{i,t} + \gamma_{20} Turnover_{i,t} + \gamma_{21} StdROA_{i,t}\\ &+ \gamma_{22} Beta_{i,t} + \gamma_{23} ROA_{i,t} + \gamma_{24} Leverage_{i,t} + \varepsilon_{i,t})\end{aligned} \tag{16}$$

The second model adds delta (Delta) and vega (Vega) to the model presented in Equation 16. The model which results is presented below in Equation 17:

$$\begin{aligned}Decile_{i,t} = f(&\boldsymbol{\alpha} + \gamma_1 Vega_{i,t} + \gamma_2 Delta_{i,t} + \gamma_3 AD_{i,t}\\ &+ \gamma_4 R\&D/A_{i,t} + \gamma_5 PPENT_{i,t} + \gamma_6 INTAN_{i,t} + \gamma_7 CF_{i,t}\\ &+ \gamma_8 ACC_{i,t} + \gamma_9 Sent_{i,t} + \gamma_{10}(AD_{i,t} * Sent_{i,t})\\ &+ \gamma_{11}(R\&D/A_{i,t} * Sent_{i,t}) + \gamma_{12}(PPENT_{i,t} * Sent_{i,t})\\ &+ \gamma_{13}(INTAN_{i,t} * Sent_{i,t}) + \gamma_{14}(CF_{i,t} * Sent_{i,t})\\ &+ \gamma_{15}(ACC_{i,t} * Sent_{i,t}) + \gamma_{16} AltZ1_{i,t}\\ &+ \gamma_{17} Age_{i,t} + \gamma_{18} Size_{i,t} + \gamma_{19} StdRet_{i,t}\\ &+ \gamma_{20} Turnover_{i,t} + \gamma_{21} StdROA_{i,t} + \gamma_{22} Beta_{i,t}\\ &+ \gamma_{23} ROA_{i,t} + \gamma_{24} Leverage_{i,t} + \varepsilon_{i,t})\end{aligned} \tag{17}$$

The second general specification adds single digit SIC industry fixed effects to the baseline specification models. Industry fixed effects are included in this specification because it is possible that industry effects may drive some of the overvaluation which is observed.[2] Aside from the addition of the single digit SIC industry fixed effects, the same combinations of variables are used for the two industry fixed effects specification models as are employed for the two baseline specification models. In the model equations for the industry fixed effects specification, Equations 18 and 19, the industry fixed effects are represented by the addition of the vector of industry dummy variables to the baseline models in Equations 16 and 17.

[2]An ordered logistic regression with firm level fixed effects has been attempted, but the model failed to converge.

The models used in the industry fixed effects specification are as follows:

$$
\begin{aligned}
Decile_{i,t} = f(&\boldsymbol{\alpha} + \gamma_3 AD_{i,t} + \gamma_4 R\&D/A_{i,t} + \gamma_5 PPENT_{i,t} \\
&+ \gamma_6 INTAN_{i,t} + \gamma_7 CF_{i,t} + \gamma_8 ACC_{i,t} + \gamma_9 Sent_{i,t} \\
&+ \gamma_{10}(AD_{i,t} * Sent_{i,t}) + \gamma_{11}(R\&D/A_{i,t} * Sent_{i,t}) \\
&+ \gamma_{12}(PPENT_{i,t} * Sent_{i,t}) + \gamma_{13}(INTAN_{i,t} * Sent_{i,t}) \\
&+ \gamma_{14}(CF_{i,t} * Sent_{i,t}) + \gamma_{15}(ACC_{i,t} * Sent_{i,t}) \\
&+ \gamma_{16} AltZ1_{i,t} + \gamma_{17} Age_{i,t} + \gamma_{18} Size_{i,t} \\
&+ \gamma_{19} StdRet_{i,t} + \gamma_{20} Turnover_{i,t} + \gamma_{21} StdROA_{i,t} \\
&+ \gamma_{22} Beta_{i,t} + \gamma_{23} ROA_{i,t} + \gamma_{24} Leverage_{i,t} \\
&+ \boldsymbol{\theta IndDUM} + \varepsilon_{i,t})
\end{aligned} \tag{18}
$$

$$
\begin{aligned}
Decile_{i,t} = f(&\boldsymbol{\alpha} + \gamma_1 Vega_{i,t} + \gamma_2 Delta_{i,t} + \gamma_3 AD_{i,t} \\
&+ \gamma_4 R\&D/A_{i,t} + \gamma_5 PPENT_{i,t} + \gamma_6 INTAN_{i,t} + \gamma_7 CF_{i,t} \\
&+ \gamma_8 ACC_{i,t} + \gamma_9 Sent_{i,t} + \gamma_{10}(AD_{i,t} * Sent_{i,t}) \\
&+ \gamma_{11}(R\&D/A_{i,t} * Sent_{i,t}) + \gamma_{12}(PPENT_{i,t} * Sent_{i,t}) \\
&+ \gamma_{13}(INTAN_{i,t} * Sent_{i,t}) + \gamma_{14}(CF_{i,t} * Sent_{i,t}) \\
&+ \gamma_{15}(ACC_{i,t} * Sent_{i,t}) + \gamma_{16} AltZ1_{i,t} \\
&+ \gamma_{17} Age_{i,t} + \gamma_{18} Size_{i,t} + \gamma_{19} StdRet_{i,t} \\
&+ \gamma_{20} Turnover_{i,t} + \gamma_{21} StdROA_{i,t} + \gamma_{22} Beta_{i,t} \\
&+ \gamma_{23} ROA_{i,t} + \gamma_{24} Leverage_{i,t} + \boldsymbol{\theta IndDUM} + \varepsilon_{i,t})
\end{aligned} \tag{19}
$$

The third general specification incorporates several adjustments to address potential endogeneity concerns, producing the endogeneity specification models. Specifically, three issues arise which are related to the baseline specification approach described so far. First, it is possible that vega and delta could be affected by managers seeking particular compensation packages when their firms are overvalued. Second, one possible concern with the scaled intangible assets in the ordered logistic regressions is that overvalued firms may engage in more acquisitions, thereby potentially creating an endogeneity problem for the scaled intangible assets. To address both potential endogeneity problems lagged values of vega, delta, and scaled intangible assets are used as the independent variables in the endogeneity specification models. Third, scaling R&D by assets may be cause for concern due to the fact that higher R&D spending reduces earnings, thereby reducing assets in the long run and affecting both the earnings and book value components of the residual income model. To address that concern R&D spending is scaled by sales for the endogeneity specification models. Aside from the adjustments made to delta, vega, scaled intangible assets, and scaled R&D spending, the same combinations of independent variables are used for the two endogeneity specification models as are employed for the baseline specification models. The resulting endogeneity specification models are presented below, with the endogeneity specification models in Equations 20 and 21 corresponding to the baseline specification models in Equations 16 and 17 after the endogeneity adjustments described:

$$\begin{aligned} Decile_{i,t} = f(&\boldsymbol{\alpha} + \gamma_3 AD_{i,t} + \gamma_4 R\&D/S_{i,t} + \gamma_5 PPENT_{i,t} \\ &+ \gamma_6 INTAN_{i,t-1} + \gamma_7 CF_{i,t} + \gamma_8 ACC_{i,t} + \gamma_9 Sent_{i,t} \\ &+ \gamma_{10}(AD_{i,t} * Sent_{i,t}) + \gamma_{11}(R\&D/S_{i,t} * Sent_{i,t}) \\ &+ \gamma_{12}(PPENT_{i,t} * Sent_{i,t}) + \gamma_{13}(INTAN_{i,t-1} * Sent_{i,t}) \\ &+ \gamma_{14}(CF_{i,t} * Sent_{i,t}) + \gamma_{15}(ACC_{i,t} * Sent_{i,t}) \\ &+ \gamma_{16} AltZ1_{i,t} + \gamma_{17} Age_{i,t} + \gamma_{18} Size_{i,t} \\ &+ \gamma_{19} StdRet_{i,t} + \gamma_{20} Turnover_{i,t} + \gamma_{21} StdROA_{i,t} \\ &+ \gamma_{22} Beta_{i,t} + \gamma_{23} ROA_{i,t} + \gamma_{24} Leverage_{i,t} + \varepsilon_{i,t}) \end{aligned} \tag{20}$$

$$\begin{aligned} Decile_{i,t} = f(&\boldsymbol{\alpha} + \gamma_1 Vega_{i,t-1} + \gamma_2 Delta_{i,t-1} + \gamma_3 AD_{i,t} \\ &+ \gamma_4 R\&D/S_{i,t} + \gamma_5 PPENT_{i,t} + \gamma_6 INTAN_{i,t-1} + \gamma_7 CF_{i,t} \\ &+ \gamma_8 ACC_{i,t} + \gamma_9 Sent_{i,t} + \gamma_{10}(AD_{i,t} * Sent_{i,t}) \\ &+ \gamma_{11}(R\&D/S_{i,t} * Sent_{i,t}) + \gamma_{12}(PPENT_{i,t} * Sent_{i,t}) \\ &+ \gamma_{13}(INTAN_{i,t-1} * Sent_{i,t}) + \gamma_{14}(CF_{i,t} * Sent_{i,t}) \\ &+ \gamma_{15}(ACC_{i,t} * Sent_{i,t}) + \gamma_{16} AltZ1_{i,t} \\ &+ \gamma_{17} Age_{i,t} + \gamma_{18} Size_{i,t} + \gamma_{19} StdRet_{i,t} \\ &+ \gamma_{20} Turnover_{i,t} + \gamma_{21} StdROA_{i,t} + \gamma_{22} Beta_{i,t} \\ &+ \gamma_{23} ROA_{i,t} + \gamma_{24} Leverage_{i,t} + \varepsilon_{i,t}) \end{aligned} \tag{21}$$

The baseline, industry fixed effects, and endogeneity specifications are used to generate ordered logistic regression analyses of the determinants of mispricing. In order to generate the ordered logistic regression analyses of the determinants of mispricing the valuation deciles, CEO compensation characteristics, firm characteristics, sentiment variables, and control variables discussed previously are used to implement the models depicted in Equations 16 through 21. Although the main focus in this study is upon the baseline specification encompassing the models in Equations 16 and 17, the alternative models in Equations 18 through 21 make it possible to illuminate the robustness of the findings to adjustments applied to the independent variables and models used in the analyses. In the following section the methodology discussed in this section is applied to the preparation of the independent and dependent variables and the subsequent results from the ordered logistic regression analyses are summarized and discussed.

2.6 Results

The first essay documents the existence of mispricing relative to intrinsic values calculated using future realized earnings and book values. Importantly, the mispricing documented is persistent, with the most overvalued firms remaining overvalued on average for several years and the most undervalued firms remaining undervalued on average for several years. Persistent mispricing is inconsistent with the observed mispricing being driven solely by random market pricing errors. If market pricing errors are completely random the most overvalued and undervalued firms at one point in time should be evenly distributed across the mispricing spectrum in subsequent periods. That is not what is observed, as Figure 1 and Tables 10 and 11 clearly show. Thus, the observed mispricing of equity securities is not fully driven by random market pricing errors, indicating that some other factors are the determinants of mispricing.

A review of prior literature supports a series of hypotheses about potential determinants of the observed mispricing. Naturally, mispricing equity securities must result in the equity securities being either undervalued or overvalued. Since undervaluation and overvaluation refer to opposite ends of the same unified valuation spectrum, the most overvalued firms are considered to be the least undervalued, and vice versa. For the sake of convenience, overvaluation is used in this section to refer to mispricing as the results are discussed because the term overvaluation helpfully indicates the directionality of the mispricing. Thus, determinants which decrease overvaluation may be viewed as increasing undervaluation, and vice versa.

The discussion of the results presented in this section is subdivided into subsections according to the specifications discussed in the Methodology section. The main results are from the baseline specification and are discussed first. Ordered logistic regressions following the models displayed in Equations 16 and 17 are performed using the full period static CAPM *VERR* decile assignments as the dependent variable. Equation 16 and Equation 17 are both estimated with each of the six combinations of the two measures of cash flow and accruals with the three measures of investor sentiment. The detailed results of those ordered logistic regressions are presented in Tables 19 through 24 in the Appendix. In this section, Table 16 summarizes those detailed results. The average coefficients and average t-statistics for the ordered logistic regressions following Equation 16 with the full period static CAPM *VERR* valuation decile assignments used as the dependent variable are presented in Table 16, with results reported separately for each of the three measures of investor sentiment. The same procedure is followed for the ordered logistic regressions employing the model in Equation 17 with the full period static CAPM *VERR* valuation decile assignments used as the dependent variable, and the summarized results are also presented in Table 16.

The robustness of the primary baseline specification results is explored by considering the additional details from the single digit SIC industry fixed effects specification and the endogeneity specification. Ordered logistic regressions are performed for the single digit SIC industry fixed effects specification using the full period static CAPM *VERR* decile assignments as the dependent variable in the models given in Equations 18 and 19. Ordered logistic regressions are performed for each of the six combinations of the two measures of cash flow and accruals with the three measures of investor sentiment. The detailed results are presented in Tables 44 through 49 in the Appendix. Ordered logistic regressions are performed for the endogeneity specification using the full period static CAPM *VERR* decile assignments as the dependent variable in the models given in Equations 20 and 21. Ordered logistic regressions are performed for each of the six combinations of the two measures of cash flow and accruals with the three measures of investor sentiment. The detailed results are presented in Tables 69 through 74 in the Appendix. In this section, Table 17 summarizes those detailed results. The average coefficients and average t-statistics for the ordered logistic regressions following Equation 20 are presented in Table 17, with results reported separately for each of the three measures of investor sentiment. The same procedure is followed for the ordered logistic regressions employing the model in Equation 19, and the summarized results are also presented in Table 17.

There are several findings for the determinants of mispricing which are robust to the use of the different specifications. Investors systematically overvalue scaled R&D spending, undervalue scaled cash flow, and are prone to overvaluing equities when sentiment is high. In addition, investors undervalue scaled property, plant, and equipment (net fixed assets) when sentiment is high, as indicated by the negative coefficients for the interaction term between sentiment and net fixed assets across the results evaluated for the three specifications. Finally, risk cannot account for the observed mispricing. Financial distress, leverage, β, and the standard deviation of return on assets are all positively related to overvaluation, meaning that the overvalued firms are actually more risky on average than the undervalued firms. Older and larger firms also tend to be undervalued, further challenging any possible risk explanation for the apparent mispricing.

Valuation measures and determinants data are constructed and combined to create the final dataset by following the approach detailed in the Methodology section. The dependent variable of interest is the set of valuation decile assignments generated from the *VERR* measure estimated using the static CAPM discount rate and with the decile thresholds established across the full 1964–2009 sample period. Thus, the results presented

Exhibit 1
Definitions of the Independent Variables Used in the Primary Ordered Logistic Regressions

The independent variables used in the ordered logistic regressions are defined below. The dependent variables used in the ordered logistic regressions are available for the 1964–2009 period. A more detailed period of availability through the end of 2009 is indicated in parentheses when necessary.

Panel A: CEO Compensation Characteristics Variables		
Vega	=	the average of the change in wealth (in millions) for a 0.01 change in the firm's volatility of returns for all CEOs during the fiscal year (1992–2009)
Delta	=	the average of the change in wealth (in millions) for a 1% change in the firm's stock price for all CEOs during the fiscal year (1992–2009)
Panel B: Firm Characteristics Variables		
AD	=	advertising expense scaled by average assets for the fiscal year
R&D/A	=	R&D expense scaled by average assets for the fiscal year
R&D/S	=	R&D expense scaled by sales for the fiscal year
PPENT	=	total net property, plant, and equipment scaled by assets
INTAN	=	total intangible assets scaled by assets
CF	=	cash flow scaled by average assets for the fiscal year, with cash flow calculated following Sloan (1996) (1964–2009) or Collins et al. (2003) (1987–2009)
ACC	=	accruals scaled by average assets for the fiscal year, with accruals calculated following Sloan (1996) (1964–2009) or Collins et al. (2003) (1987–2009)
Panel C: Investor Sentiment Variables		
Sent	=	investor sentiment for the month, with sentiment measured as either the monthly average of the difference between the bullish and bearish sentiment reported by Investors Intelligence, the monthly Baker-Wurgler sentiment index (July 1965–2009), or the monthly average of the weekly difference between the bullish and bearish sentiment reported by AAII (July 1987–2009)
AD*Sent	=	the interaction between investor sentiment for the month and advertising scaled by average assets for the fiscal year
R&D/A*Sent	=	the interaction between investor sentiment for the month and R&D scaled by average assets for the fiscal year

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Exhibit 1 – continued from the previous page		
R&D/S*Sent	=	the interaction between investor sentiment for the month and R&D scaled by sales for the fiscal year
PPENT*Sent	=	the interaction between investor sentiment for the month and total net property, plant, and equipment scaled by assets for the fiscal year
INTAN*Sent	=	the interaction between investor sentiment for the month and intangible assets scaled by assets for the fiscal year
CF*Sent	=	the interaction between investor sentiment for the month and cash flow scaled by average assets for the fiscal year
ACC*Sent	=	the interaction between investor sentiment for the month and accruals scaled by average assets for the fiscal year
Panel D: Risk and Information Uncertainty Control Variables		
AltZ1	=	the Z1 version of Altman's Z-Score
Age	=	the total number of months the stock appeared in CRSP prior to and including the valuation month
Size	=	the natural logarithm of total assets
StdRet	=	the standard deviation of the natural log of daily returns during the two month window ending eleven days before the end of the valuation month
Turnover	=	the average of the percentage turnover for each day during the six month period ending eleven days before the end of the valuation month
StdROA	=	the standard deviation of return on assets using the five fiscal years ending at the end of the valuation month
Beta	=	the CAPM β estimated following Dimson (1979) as modified by Fowler and Rorke (1983) using daily return data from the year ending eleven days before the end of the valuation month
ROA	=	net income scaled by average assets
Leverage	=	total liabilities scaled by assets

in this section all use the full period static CAPM *VERR* valuation decile assignments as the dependent variable.

Results presented in the Appendix are separated by specification and dependent variable. The set of full period static CAPM *VERR* valuation decile assignments is the first dependent variable used for each specification's results in the Appendix because it is the primary dependent variable used in this study. The second dependent variable used for each specification's results in the Appendix is produced by assigning firms to valuation deciles using annual decile thresholds with the static CAPM derived *VERR* measure for each year in the 1964–2009 period. The third and fourth dependent variables used for each specification's results in the

Appendix mirror the approaches used for the first and second dependent variables while using the *eVERR* valuation measures instead of the *VERR* valuation measures. The results for the analyses employing the second, third, and fourth dependent variables are provided in the Appendix for the sake of completeness. However, the first dependent variable, the valuation decile assignments obtained using the static CAPM discount approach to calculate the *VERR* measure and the full sample decile thresholds to assign firms to valuation deciles, is the focus of the analysis in this section.

As discussed in the Methodology section, two measures of cash flow and accruals and three measures of investor sentiment are used as independent variables across the ordered logistic regressions. Cash flow and accruals are calculated following Sloan (1996) and also Collins et al. (2003). The data required to calculate the cash flow and accruals measures following Sloan (1996) is available sporadically for firms prior to mid-1970, and very consistently thereafter, while the data required to calculate the cash flow and accruals measures following Collins et al. (2003) is available sporadically for firms beginning in 1987 and continuing through mid-1988, and consistently thereafter. The three measures of investor sentiment are derived from sentiment data from Investors Intelligence, sentiment data from Baker and Wurgler (2007), and sentiment data from AAII. The Investors Intelligence data is available for the full 1964–2009 period corresponding to the capm5 *VERR* and *eVERR* valuation decile assignments, while the sentiment data from Baker and Wurgler (2007) begins in the middle of 1965 and the sentiment data from AAII begins in the middle of 1987.

Exhibit 1 defines the independent variables used in the ordered logistic regressions which provide the results analyzed in this section. As not all independent variables are available for the full time period, Exhibit 1 also includes information about the time period for which each independent variable is available prior to the end of 2009 if the independent variable is not available for the full 1964–2009 period. Panel A displays the CEO compensation characteristics variables, Panel B displays the firm characteristics variables, Panel C displays the investor sentiment variables, and Panel D displays the risk and information uncertainty control variables.

The precise time periods and samples for the data used in the ordered logistic regressions are the result of the intersection of the data availability for the explanatory variables and the dependent variables. Thus, because the Collins et al. (2003) measures of cash flow and accruals and the AAII measure of investor sentiment are only available beginning in 1987, ordered logistic regressions using those independent variables are based upon somewhat more limited datasets. Similarly, delta and vega data are only available beginning in 1992, which again significantly reduces the dataset utilized for the ordered logistic regressions including delta and vega. For the *VERR* and *eVERR* measures used as the dependent variable with the

Sloan (1996) measures of cash flow and accruals in the baseline and industry fixed effects specifications there are a bit less than 82,000 observations in the dataset, with about 56,000 observations remaining in the dataset when the AAII measure of sentiment is used and about 16,000 observations remaining when delta and vega are used as independent variables. For the *VERR* and *eVERR* measures used as the dependent variable with the Collins et al. (2003) measures of cash flow and accruals in the baseline and industry fixed effects specifications there are approximately 55,000 observations in the dataset, with about 16,000 observations remaining when delta and vega are used as independent variables. The number of observations is slightly lower for the robustness specification due to the use of lagged variables. The detailed specification tables in the Appendix provide the number of observations used for each individual ordered logistic regression performed.

To facilitate the evaluation of the results discussed in this section, Exhibit 2 summarizes the hypotheses presented in the Hypothesis Development section. The hypotheses in Exhibit 2 are organized in a manner consistent with the presentation in the Hypothesis Development section, with Panel A presenting the hypotheses pertaining to CEO compensation variables, Panel B presenting the hypotheses pertaining to firm characteristics variables, Panel C presenting the hypotheses pertaining to investor sentiment variables, and Panel D presenting the hypotheses pertaining to the risk and information uncertainty control variables. As the results are discussed in this section the hypotheses listed in Exhibit 2 are referenced by number for convenience and brevity.

The results and analysis for this study are presented in the sections below. First, the baseline specification results for the ordered logistic regressions using the full period static CAPM *VERR* valuation deciles as the dependent variable are discussed. Second, the robustness of the main findings is evaluated using the results obtained from employing the industry fixed effects specification and the endogeneity specification with the full period static CAPM *VERR* valuation deciles as the dependent variable.

2.6.1 Baseline Specification Results

Table 16 summarizes the baseline specification results of interest. The two baseline specification models are estimated using either the Sloan (1996) or Collins et al. (2003) measures of cash flow and accruals and each of the three measures of investor sentiment. This produces six different ordered logistic regressions for each of the two models presented in Equations 16 and 17 with the static CAPM *VERR* decile assignments used as the dependent variable. The six corresponding tables in the Appendix which present the individual ordered logistic regression results are Tables 19 through 24. For

Exhibit 2
Hypotheses Regarding the Expected Determinants of Overvaluation

Panel A: Hypotheses for CEO Compensation Characteristics	
$\mathbf{H1_0}$:	Ceteribus paribus, the sensitivity of the CEO's wealth to the volatility of the stock is unrelated to overvaluation.
$\mathbf{H1_A}$:	Ceteribus paribus, the sensitivity of the CEO's wealth to the volatility of the stock is related to overvaluation.
$\mathbf{H2_0}$:	Ceteribus paribus, the sensitivity of the CEO's wealth to the stock price is unrelated to overvaluation.
$\mathbf{H2_A}$:	Ceteribus paribus, the sensitivity of the CEO's wealth to the stock price is related to overvaluation.
Panel B: Hypotheses for Firm Characteristics	
$\mathbf{H3_0}$:	Ceteribus paribus, advertising expenditures are unrelated to overvaluation.
$\mathbf{H3_A}$:	Ceteribus paribus, advertising expenditures are positively related to overvaluation.
$\mathbf{H4_0}$:	Ceteribus paribus, R&D expenditures are unrelated to overvaluation.
$\mathbf{H4_A}$:	Ceteribus paribus, R&D expenditures are positively related to overvaluation.
$\mathbf{H5_0}$:	Ceteribus paribus, investments in property, plant, and equipment are unrelated to overvaluation.
$\mathbf{H5_A}$:	Ceteribus paribus, investments in property, plant, and equipment are related to overvaluation.
$\mathbf{H6_0}$:	Ceteribus paribus, intangible assets are unrelated to overvaluation.
$\mathbf{H6_A}$:	Ceteribus paribus, intangible assets are related to overvaluation.
$\mathbf{H7_0}$:	Ceteribus paribus, cash flow is unrelated to overvaluation.
$\mathbf{H7_A}$:	Ceteribus paribus, cash flow is negatively related to overvaluation.
$\mathbf{H8_0}$:	Ceteribus paribus, accruals are unrelated to overvaluation.
$\mathbf{H8_A}$:	Ceteribus paribus, accruals are positively related to overvaluation.
Panel C: Hypotheses for Investor Sentiment Variables	
$\mathbf{H9_0}$:	Ceteribus paribus, investor sentiment is unrelated to overvaluation.
$\mathbf{H9_A}$:	Ceteribus paribus, investor sentiment is positively related to overvaluation.
$\mathbf{H10_0}$:	Ceteribus paribus, the interaction between investor sentiment and advertising expenditures is unrelated to overvaluation.
$\mathbf{H10_A}$:	Ceteribus paribus, the interaction between investor sentiment and advertising expenditures is positively related to overvaluation.
$\mathbf{H11_0}$:	Ceteribus paribus, the interaction between investor sentiment and R&D expenditures is unrelated to overvaluation.
$\mathbf{H11_A}$:	Ceteribus paribus, the interaction between investor sentiment and R&D expenditures is positively related to overvaluation.
$\mathbf{H12_0}$:	Ceteribus paribus, the interaction between investor sentiment and property, plant, and equipment is unrelated to overvaluation.
$\mathbf{H12_A}$:	Ceteribus paribus, the interaction between investor sentiment and property, plant, and equipment is negatively related to overvaluation.

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Exhibit 2 – continued from the previous page	
H13$_0$:	Ceteribus paribus, the interaction between investor sentiment and intangible assets is unrelated to overvaluation.
H13$_A$:	Ceteribus paribus, the interaction between investor sentiment and intangible assets is positively related to overvaluation.
H14$_0$:	Ceteribus paribus, the interaction between investor sentiment and cash flow is unrelated to overvaluation.
H14$_A$:	Ceteribus paribus, the interaction between investor sentiment and cash flow is negatively related to overvaluation.
H15$_0$:	Ceteribus paribus, the interaction between investor sentiment and accruals is unrelated to overvaluation.
H15$_A$:	Ceteribus paribus, the interaction between investor sentiment and accruals is positively related to overvaluation.
Panel D: Hypotheses for Risk and Information Uncertainty Control Variables	
H16$_0$:	Ceteribus paribus, firm size is unrelated to overvaluation.
H16$_A$:	Ceteribus paribus, firm size is related to overvaluation.
H17$_0$:	Ceteribus paribus, leverage is unrelated to overvaluation.
H17$_A$:	Ceteribus paribus, leverage is negatively related to overvaluation.
H18$_0$:	Ceteribus paribus, the standard deviation of return on assets is unrelated to overvaluation.
H18$_A$:	Ceteribus paribus, the standard deviation of return on assets is negatively related to overvaluation.
H19$_0$:	Ceteribus paribus, return on assets is unrelated to overvaluation.
H19$_A$:	Ceteribus paribus, return on assets is negatively related to overvaluation.
H20$_0$:	Ceteribus paribus, firm age is unrelated to overvaluation.
H20$_A$:	Ceteribus paribus, firm age is related to overvaluation.
H21$_0$:	Ceteribus paribus, the standard deviation of returns is unrelated to overvaluation.
H21$_A$:	Ceteribus paribus, the standard deviation of returns is related to overvaluation.
H22$_0$:	Ceteribus paribus, stock turnover is unrelated to overvaluation.
H22$_A$:	Ceteribus paribus, stock turnover is related to overvaluation.
H23$_0$:	Ceteribus paribus, Altman's Z-Score is unrelated to overvaluation.
H23$_A$:	Ceteribus paribus, Altmans's Z-Score is negatively related to overvaluation.
H24$_0$:	Ceteribus paribus, beta is unrelated to overvaluation.
H24$_A$:	Ceteribus paribus, beta is negatively related to overvaluation.

each measure of investor sentiment there are therefore two ordered logistic regressions following Equation 16: one using the Sloan (1996) measures of cash flow and accruals and one using the Collins et al. (2003) measures of cash flow and accruals. The same is true for the ordered logistic regressions following Equation 17. Each column in Table 16 presents the average coefficients and average t-statistics across the two ordered logistic regressions produced by employing the two different measures of cash flow and accruals in the model specified near the bottom of the table with the specified measure of investor sentiment. Columns 1 and 2 of Table 16 summarize the coefficients and t-statistics for the baseline specification results of interest using the Investors Intelligence measure of investor sentiment, columns 3 and 4 summarize the results using the Baker-Wurgler measure of investor sentiment, and columns 5 and 6 summarize the results using the AAII measure of investor sentiment. The tables in the Appendix which contain the individual ordered logistic regression results which are averaged together to produce each column of Table 16 are listed at the bottom of each column.

An examination of columns 2, 4, and 6 in Table 16 reveals that both vega and delta are generally positively related to overvaluation on average. The coefficient for vega, which is a measure of the sensitivity of the CEO's wealth to changes in the firm's volatility of returns, is positive and statistically significant on average at the 10% level when the Investors Intelligence measure of sentiment is used, and positive and statistically significant on average at the 5% level or better when the Baker-Wurgler or AAII measure of investor sentiment is used (H1). The coefficient for delta, which is a measure of the sensitivity of the CEO's wealth to changes in the firm's stock price, is positive and statistically significant on average at the 5% level across results for all three measures of investor sentiment (H2). The positive and statistically significant coefficients for vega and delta on average in the baseline specification results support rejection of the null hypotheses of no relationship between vega and delta and overvaluation (H1 and H2). These results indicate that CEO compensation incentives, as represented by vega and delta, have an impact upon the overvaluation of the firm. As discussed in the Literature Review and Hypothesis Development sections, delta and vega likely affect overvaluation by altering the choices made by managers, and some choices made by managers, such as investments in R&D, alter the ability of investors to accurately value firms. Interestingly, based upon the substantially larger coefficients for vega compared to delta despite the similar magnitudes for both variables, vega has a larger impact upon overvaluation than delta. This indicates that option based compensation, which drives vega, is more prone to producing overvaluation than stock based compensation.

Because advertising expenditures create an intangible asset which may be difficult to value while simultaneously raising the profile of the firms spending the money on advertising, scaled advertising expenditures are expected to be positively related to overvaluation because investors overestimate the value of the advertising expenditures. The average coefficients and average t-statistics in Table 16 are inconsistent with that interpretation overall. In the models omitting delta and vega, which have larger sample sizes due to the limited availability of delta and vega, the coef-

Table 16
Average Coefficients and t-Statistics for Ordered Logistic Regressions of capm5 VERR Full Period Decile Assignments on Determinants for the Baseline Specification

Average coefficients and average t-statistics are presented in this table for ordered logistic regressions using the full period capm5 *VERR* decile assignments from 1964–2009 as the dependent variable and employing the baseline specification models. Some independent variables are not available for the full period. Scaled cash flow and accruals data are calculated in accordance with Sloan (1996) and Collins et al. (2003). Each column reports the average coefficients and average t-statistics across the two ordered logistic regressions performed using the specified measure of sentiment and the two different measures of scaled cash flow and accruals in the appropriate baseline specification model. The average t-statistics are reported below each average coefficient.

	Inv. Intelligence		Baker-Wurgler		AAII	
	1	2	3	4	5	6
$Vega_t$		0.114		0.230		0.135
		1.724		3.473		2.037
$Delta_t$		0.003		0.003		0.004
		2.084		2.255		2.333
AD_t	0.614	−0.438	0.770	0.576	0.867	−0.448
	3.234	−0.844	5.566	1.734	4.596	−1.070
AD_t*$Sent_t$	0.002	0.041	−0.905	−1.102	−0.005	0.066
	0.425	1.963	−4.861	−1.963	−0.468	3.052
$R\&D/A_t$	6.023	6.600	6.084	6.333	5.756	6.166
	39.319	16.109	52.875	22.141	40.061	17.029
$R\&D/A_t$*$Sent_t$	−0.002	0.012	−0.479	2.221	−0.006	0.043
	−0.273	0.730	−3.171	4.256	−0.895	2.440
$PPENT_t$	0.684	0.837	0.458	0.587	0.669	0.817
	13.815	6.509	12.087	6.754	13.412	7.287
$PPENT_t$*$Sent_t$	−0.014	−0.015	−0.204	−0.445	−0.021	−0.023
	−6.644	−3.067	−3.415	−3.009	−8.539	−4.406
$INTAN_t$	0.722	−0.334	1.156	0.149	0.667	0.168
	9.680	−2.139	22.542	1.482	10.144	1.382
$INTAN_t$*$Sent_t$	0.014	0.015	−0.515	0.184	0.003	−0.000
	5.029	2.537	−6.708	1.010	0.906	−0.057
CF_t	−2.812	−1.914	−2.910	−1.722	−2.650	−2.003
	−29.711	−4.435	−34.959	−4.876	−26.618	−5.069
CF_t*$Sent_t$	−0.001	0.009	0.973	0.935	0.005	0.011
	−0.488	0.978	12.224	3.577	1.490	1.208
ACC_t	−1.273	0.414	−1.359	0.289	−0.808	0.406
	−11.812	0.706	−14.559	0.450	−6.961	0.812
ACC_t*$Sent_t$	−0.001	−0.016	0.595	0.089	−0.006	−0.027
	−0.190	−1.708	6.843	−0.066	−1.566	−2.579
$Sent_t$	0.008	0.009	0.421	0.536	0.014	0.017
	8.075	3.488	19.563	6.652	11.648	5.951

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Table 16 – continued from the previous page						
	Inv. Intelligence		Baker-Wurgler		AAII	
	1	2	3	4	5	6
$AltZ1_t$	0.058	0.076	0.057	0.072	0.051	0.072
	40.449	21.989	39.791	20.771	35.381	20.814
Age_t	−0.001	−0.001	−0.001	−0.001	−0.001	−0.001
	−18.478	−13.574	−19.785	−13.471	−21.348	−13.155
$Size_t$	−0.135	−0.174	−0.136	−0.191	−0.158	−0.173
	−27.295	−12.677	−27.380	−13.919	−29.709	−12.634
$StdRet_t$	−0.004	−0.010	−0.005	−0.016	−0.006	−0.012
	−22.230	−16.087	−25.309	−25.515	−29.742	−19.006
$Turnover_t$	0.004	−0.001	0.004	−0.000	0.002	−0.000
	30.184	−4.090	30.021	−1.571	20.234	−1.077
$StdROA_t$	0.001	0.021	0.001	0.024	0.000	0.020
	4.943	9.975	5.202	11.619	4.327	9.732
$Beta_t$	0.586	1.005	0.623	1.121	0.702	1.018
	62.831	42.902	66.452	46.713	69.864	43.481
ROA_t	−0.054	0.643	−0.103	0.186	−0.106	0.782
	−1.045	1.676	−1.834	0.711	−1.466	2.236
$Leverage_t$	1.043	1.326	0.989	1.181	1.141	1.201
	25.385	13.501	24.086	12.020	25.855	12.215
Model	Eq. 16	Eq. 17	Eq. 16	Eq. 17	Eq. 16	Eq. 17
Tables	19, 22		20, 23		21, 24	

ficients for scaled advertising are positive and statistically significant on average at the 1% level (H3). However, if delta and vega are included in the ordered logistic regressions, as in columns 2, 4, and 6, scaled advertising is not statistically significantly related to overvaluation in two cases (columns 2 and 6) and only positive and statistically significantly related to overvaluation in one case at the 10% level (column 4). Thus, although the analyses employing the larger dataset suggest that advertising is positively related to overvaluation, the results in the smaller sample including delta and vega are inconclusive. Therefore, although the results for the larger sample omitting delta and vega are suggestive, the overall findings fail to reject the null hypothesis of no relationship between scaled advertising and overvaluation (H3).

Across the average results in Table 16 for all three measures of sentiment and for both of the applicable models (Equations 16 and 17) the coefficients for the relationship between scaled R&D and overvaluation are uniformly positive and statistically significant on average at the 1% level, with several of the average t-statistics an order of magnitude larger than the threshold value for significance at the 1% level. This provides strong evidence in favor of investors systematically overvaluing the investments in R&D made by firms (H4). Consequently, the positive and statistically significant coefficients for scaled R&D expenditures support rejection of the null hypothesis of no relationship between scaled R&D and overvaluation (H4). This finding is inconsistent with market efficiency and the ambiguity surrounding the investments in R&D, but it is consistent with investors generating optimistically biased assessments of the value of R&D spending. If ambiguity surrounding investments in R&D produced mispricing in general, a strongly directional effect on mispricing would not be expected. The positive and highly statistically significant relationship between scaled R&D spending and overvaluation is consequently inconsistent with mere ambiguity surrounding the prospects of R&D expenditures. Rather, it appears that investors are unrealistically optimistic about the impact that R&D spending will have upon a firm's prospects. It is also possible that investor overconfidence plays a role in the overvaluation of scaled R&D spending as investors more heavily rely upon their own unrealistically optimistic expectations.

The average results for scaled property, plant, and equipment (net fixed assets) indicate that investors overvalue net fixed assets (H5). Across all six columns in Table 16 the average coefficients for scaled net fixed assets are positive and statistically significant on average at the 1% level, supporting rejection of the null hypothesis of no relationship between scaled net fixed assets and overvaluation (H5). The overvaluation of net fixed assets is consistent with the finding by Barth and Clinch (1998) that stock prices were positively related to revaluations of property, plant, and equipment despite the fact that the revaluations of property, plant, and equipment were negatively related to the estimated value of the firms. The results in this study are therefore broadly consistent with the findings by Barth and Clinch (1998) and inconsistent with the notion that investors should do a better job of evaluating the prospects of firms' investments in net fixed assets due to the more tangible nature of the assets.

Although the ambiguous nature of intangible assets makes it easy to conclude that investors are more likely to misprice stocks with larger amounts of scaled intangible assets, the results from the baseline ordered logistic regressions using the full period static CAPM *VERR* decile assignments as the dependent variable are inconsistent in some respects. On one hand, for all three measures of investor sentiment the average coefficients and average t-statistics for the models excluding delta and vega (columns 1, 3, and 5) indicate that scaled intangible assets are positively and statistically significantly related to overvaluation at the 1% level on average. On the other hand, the average coefficients and average t-statistics for the models including delta and vega (columns 2, 4, and 6) are inconsistent with a positive and statistically significant relationship between scaled intangible assets and overvaluation. In fact, the average coefficient and average t-statistic for column 2, which is the model employing the Investors Intelligence measure of sentiment while including delta and vega, indicates that scaled intangible assets are negatively and statistically significantly related to overvaluation. Columns 4 and 6 produce statistically insignificant results for the relationship between scaled intangible assets and overvaluation. Consequently, though there is some evidence for a positive relationship between scaled intangible assets and overvaluation in the larger sample excluding delta and vega, the inconsistent results overall indicate that there is insufficient evidence to reject the null hypothesis of no relationship between scaled intangible assets and overvaluation (H6).

Hirshleifer et al. (2011) proposed that firms with high cash flow will be undervalued by investors with limited attention. The results summarized in Table 16 are consistent with that conclusion. For all six columns of average results the coefficients for scaled cash flow are negative and statistically significant at the 1% level on average, leading to a rejection of the null hypothesis of no relationship between scaled cash flow and overvaluation (H7). Consistent with prior research and expectations, investors undervalue scaled cash flow when evaluating firms (H7). Considering the fact that cash flow data is released in publicly available financial statements, the negative relationship between scaled cash flow and overvaluation is inconsistent with market efficiency. Instead, the undervaluation of scaled cash flow is consistent with the limited attention of investors discussed by Hirshleifer et al. (2011) or other behavioral or evaluative biases. It is also possible that investors undervalue scaled cash flow when market conditions are poor, as firms with high levels of scaled cash flow in poor market conditions may be healthier than pessimistic investors are capable of believing in the midst of a market rout. This could explain the negative relationship between scaled cash flow and overvaluation as measured by full period valuation deciles, and it could also indicate that investment opportunities may exist for investors to exploit large declines in broad market prices by buying firms with large values of scaled cash flow.

The study by Hirshleifer et al. (2011) also proposed that firms with high levels of accruals will be overvalued by investors with limited attention. The results summarized in Table 16 are generally inconsistent with that conclusion. Across all three measures of investor sentiment, the average coefficients and average t-statistics for the models excluding delta and vega (columns 1, 3, and 5) indicate that accruals are negatively and statistically significantly related to overvaluation at the 1% level on average. This relationship is exactly opposite of the relationship proposed by Hirshleifer et al. (2011) in which the limited attention of investors leads to the overvaluation of accruals. The results for the relationship between scaled accruals and overvaluation for the remaining three columns (columns 2, 4, and 6) are statistically insignificant on average. The analyses based upon the larger sample excluding delta and vega support a negative and statistically significant relationship between scaled accruals and overvaluation while the analyses based upon a smaller sample size including all of the independent variables produce inconclusive results. The lack of consistency yields an absence of adequate evidence to reject the null hypothesis of no relationship between scaled accruals and overvaluation (H8), although the existing evidence which contradicts Hirshleifer et al. (2011) in the larger sample makes this a potentially fruitful area of further research to resolve the contradictory results.

The summarized results for the baseline specification ordered logistic regressions using the full period static CAPM *VERR* valuation deciles as the dependent variable consistently show that investor sentiment is positively related to overvaluation. For all three measures of investor sentiment used in Table 16 there is a positive and statistically significant relationship between investor sentiment and overvaluation on average at the 1% level (H9). Consistent with the prior research of Brown and Cliff (2005) and Baker and Wurgler (2006), the positive and statistically significant coefficients on average for investor sentiment support rejection of the null hypothesis of no relationship between investor sentiment and overvaluation (H9). As investors experience more positive sentiment about the market they overvalue equities, and when investor sentiment is negative about the market investors undervalue equities.

Investors may also be prone to misvaluing firm characteristics as a result of investor sentiment. Several interaction terms between investor sentiment and firm characteristics address that possibility in the ordered logistic regressions. Scaled values of advertising, R&D, net fixed assets (PPENT), intangible assets, cash flow, and accruals are each interacted with the measure of sentiment applicable to each column in Table 16. Only the interaction between investor sentiment and scaled net fixed assets produces average coefficients and average t-statistics which are consistent across the three measures of sentiment encompassing the six columns of average results. On average, the interaction between scaled net fixed assets and investor sentiment is negative and statistically significant at the 1% level (H12). This indicates that as investor sentiment becomes more positive investors systematically undervalue firms with larger proportions of net fixed assets. Interestingly, this also means that investors systematically overvalue firms with larger proportions of net fixed assets as investor sentiment becomes more negative. This finding is consistent with the conjecture by Baker and Wurgler (2007) that firms with more stable and easily valued prospects might be overvalued when sentiment is low as investors seek safety and undervalued when sentiment is high. The positive and statistically significant coefficients for the interaction between scaled net fixed assets and investor sentiment across the columns in Table 16 supports the rejection of the null hypothesis of no relationship between overvaluation and the interaction of scaled net fixed assets with investor sentiment (H12). The remaining interaction terms between investor sentiment and scaled values of advertising, R&D, intangible assets, cash flow, or accruals all produce average coefficients and average t-statistics which are inconsistent in sign, inconsistent in statistical significance, or both. The results therefore fail to reject the corresponding null hypotheses of no relationship between those specified interaction terms and overvaluation (H10, H11, H13, H14, and H15).

The remaining results displayed in Table 16 pertain to the control variables included in the ordered logistic regressions to account for risk and information uncertainty explanations of mispricing. Firms which appear undervalued using the full period static CAPM *VERR* decile assignments as the valuation measure may actually be more risky, and firms which appear overvalued may be less risky. If that is the case, market efficiency indicates that the firms which appear undervalued and overvalued may actually be properly valued relative to their risks. The results in Table 16 argue strongly against that interpretation. Firm size and firm age are negatively and statistically significantly related to overvaluation at the 1% level on average (H16 and H20). Thus, the baseline specification results support the rejection of the null hypotheses of no relationship between either firm size or firm age and overvaluation (H16 and H20). Leverage, the standard deviation of return on assets, Altman's Z-Score, and β are all positively and statistically significantly related to overvaluation at the 1% level on average–despite being expected to have negative relationships with overvaluation if firms which appear undervalued are in fact more risky (H17, H18, H23, and H24). The positive and statistically significant coefficients for leverage, the standard deviation of return on assets, Altman's Z-Score, and β all support rejection of the corresponding null hypotheses of no relationship between the listed risk proxies and overvaluation (H17, H18, H23, and H24).

However, the positive relationships between overvaluation and leverage, the standard deviation of return on assets, Altman's Z-Score, and β are inconsistent with prior research by Ali et al. (2003). Importantly, the study by Ali et al. (2003) based estimates of firm value upon an implementation of a residual income model utilizing analysts' forecasts. As the present study uses actual, or realized, earnings and book value outcomes in the calculation of the intrinsic value of firms, the differences between the results in this study and the results in the study by Ali et al. (2003) indicate that analysts have an optimistic bias when forming forecasts for more risky firms. Such a possibility is unsurprising given that Brown and Cliff (2005) noted in a footnote that they found that the residual income measure of intrinsic value used by Lee et al. (1999), which employed analysts' forecasts, responded to sentiment. Thus, prior research indicates that analysts' forecasts are subject to bias. In short, the present study finds that undervalued equities tend to be the equities of older and larger firms with less leverage, a lower standard deviation of return on assets, a lower risk of financial distress, and less systematic risk. Clearly, firm risk does not explain the observed mispricing of equities relative to realized outcomes in a manner consistent with market efficiency.

Return on assets and turnover do not support robust inferences regarding their relationship with overvaluation. The results for return on assets are inconsistent and generally statistically insignificant across columns 1 through 6 of Table 16, failing to provide sufficient evidence to justify rejecting the null hypothesis of no relationship between return on assets and overvaluation (H19). Equities with high turnover appear to be overvalued on average in the larger sample excluding delta and vega (columns 1, 3, and 5), with average t-statistics far beyond the threshold for statistical significance at the 1% level. However, the relationship between turnover and overvaluation is either negative or statistically insignificant on average in the smaller sample including delta and vega (columns 2, 4, and 6). Consequently, insufficient evidence exists to robustly reject the null hypothesis of no relationship between turnover and overvaluation (H22).

At first blush, the results in Table 16 for the standard deviation of returns and β appear contradictory. On the one hand, the relationship between β and overvaluation is positive and statistically significant on average at the 1% level across columns 1 through 6, suggesting that more risky equities tend to be overvalued. On the other hand, the relationship between the standard deviation of returns and overvaluation is negative and statistically significant on average at the 1% level across columns 1 through 6, leading to a rejection of the null hypothesis of no relationship between the standard deviation of returns and overvaluation (H21). However, the negative and statistically significant coefficients on average for the standard deviation of returns seems to imply that more risky equities tend to be undervalued. The apparent contradiction between the results for β, a measure of systematic risk, and the results for the volatility of returns, which is closely related to β, can be resolved by considering the nature of the valuation measure used in the ordered logistic regressions. The full period static CAPM *VERR* valuation deciles are used as the dependent variables in the ordered logistic regressions summarized in Table 16. Thus, some portion of the undervaluation and overvaluation detected by the full period static CAPM *VERR* measure is due to broad market fluctuations over time since this valuation measure allows for broad market overvaluation and undervaluation at different points in time. In the midst of a market rout and general panic return volatility will increase across the market as prices fall. The falling prices across the market will eventually make equities undervalued broadly, producing a negative relationship between the standard deviation of returns and overvaluation. The results for leverage, the standard deviation of return on assets, Altman's Z-Score, and β all suggest that more risky equities tend to be overvalued; the negative relationship between the standard deviation of returns and overvaluation indicates that equities are more undervaled when broad market volatility increases in the midst of a downturn in the market.

In summary, the baseline specification ordered logistic regression results employing the full period static CAPM *VERR* valuation deciles as the dependent variable in the models represented by Equations 16 and 17 indicate that several independent variables are statistically significantly related to overvaluation on average. Both delta and vega are positively related to overvaluation on average (H1 and H2), although the coefficients for vega are over an order of magnitude larger than the coefficients for delta. Scaled values of R&D and net fixed assets are positively related to overvaluation on average (H4 and H5), indicating that investors systematically overvalue R&D spending and the proportion of net fixed assets. However, investors systematically undervalue scaled cash flow (H7), which is consistent with the limited investor attention discussed by Hirshleifer et al. (2011). Investor sentiment is positively related to overvaluation (H9), but investors are prone to undervaluing net fixed assets when they are experiencing higher levels of sentiment (H12). Importantly, the observed mispricing cannot be explained by risk variables from a market efficiency standpoint. Undervalued equities are associated with lower leverage (H17), lower default risk (H23), lower β (H24), and a lower standard deviation of return on assets (H18). Furthermore, undervalued equities tend to be older and larger (H16 and H20). These risk related relationships are inconsistent with the undervalued equities being more risky and the overvalued securities being less risky.

2.6.2 Robustness

Two additional specifications are examined to evaluate the robustness of the baseline specification results. The first robustness specification builds on the baseline specification models in Equations 16 and 17 and adds single digit SIC industry fixed effects. The addition of single digit SIC industry fixed effects controls for industry specific factors which may be driving the results reported for the baseline specification models. The industry fixed effects specification models are presented in Equations 18 and 19. The second robustness specification makes a series of adjustments to the baseline specification models in order to address concerns about the potential endogeneity of several of the independent variables used in the ordered logistic regressions. The endogeneity specification models are presented in Equations 20 and 21. The single digit SIC industry fixed effects specification results are summarized first, followed by the presentation of the results for the endogeneity specification. As with the baseline specification results discussed above, both the single digit SIC industry fixed effects and endogeneity results discussed are derived from ordered logistic regressions using the full period static CAPM *VERR* valuation decile assignments as the dependent variable.

Single Digit SIC Industry Fixed Effects Specification

Panel A of Table 43 in the Appendix presents results for the single digit SIC fixed effects specification analyses corresponding to the baseline specification analyses summarized in Table 16. In nearly all cases the addition of the industry fixed effects did little to affect the inferences drawn using the baseline specification results summarized in Table 16. The only important areas of divergence between the inferences drawn from the baseline specification results in Table 16 and the matching analyses performed using the single digit SIC industry fixed effects specification are the inferences for delta and vega. When the industry fixed effects are included, vega drops to only being statistically significant on average when the Baker-Wurgler measure of sentiment is employed in the ordered logistic regressions (H1). Similarly, delta is statistically insignificant on average when industry fixed effects are included in the ordered logistic regressions using the full period static CAPM *VERR* valuation decile assignments as the dependent variable (H2). The results of the single digit SIC industry fixed effects specification therefore provide insufficient evidence to warrant the rejection of the null hypotheses of no relationship between delta or vega and overvaluation (H1 and H2). The loss of statistical significance for delta and vega when industry fixed effects are included is likely due to overvalued industries embracing compensation practices involving higher delta and vega for CEOs. This also suggests that equity overvaluation may precede the executive compensation choices made by firms which yield higher delta and vega for CEOs. Consequently, endogeneity may be an issue for delta and vega. Adjustments to address that concern are made in the endogeneity specification results which are discussed below. The statistically significant and consistent inferences which may be drawn for the other independent variables in the single digit SIC industry fixed effects specification are qualitatively similar to the inferences discussed for the baseline specification results in Table 16.

Endogeneity Specification

The endogeneity specification makes several adjustments to the baseline specification in order to address potential endogeneity concerns. First, a firm's overvaluation may precede the creation of compensation packages which increase delta and vega for CEOs. Second, overvalued firms may engage in more acquisitions, thereby potentially creating an endogeneity problem for the scaled intangible assets. To address both potential endogeneity problems lagged values of vega, delta, and scaled intangible assets are used as the independent variables in the endogeneity specification mod-

Table 17
Average Coefficients and t-Statistics for Ordered Logistic Regressions of capm5 VERR Full Period Decile Assignments on Determinants with Endogeneity Adjustments

Average coefficients and average t-statistics are presented in this table for ordered logistic regressions using the full period capm5 *VERR* decile assignments from 1964–2009 as the dependent variable and employing the endogeneity specification models. Some independent variables are not available for the full period. Scaled cash flow and accruals data are calculated in accordance with Sloan (1996) and Collins et al. (2003). Each column reports the average coefficients and average t-statistics across the two ordered logistic regressions performed using the specified measure of sentiment and the two different measures of scaled cash flow and accruals in the appropriate endogeneity specification model. The average t-statistics are reported below each average coefficient.

	Inv. Intelligence		Baker-Wurgler		AAII	
	1	2	3	4	5	6
$Vega_{t-1}$		0.000		0.000		0.000
		0.581		2.380		1.066
$Delta_{t-1}$		0.000		0.000		0.000
		2.546		2.241		2.620
AD_t	0.299	−0.718	0.338	0.288	0.448	−0.249
	1.501	−1.335	2.455	0.792	2.360	−0.553
AD_t*$Sent_t$	−0.005	0.048	−0.965	−0.597	−0.008	0.044
	−0.363	2.173	−5.041	−0.893	−0.833	1.891
$R\&D/S_t$	0.029	1.851	0.015	2.119	0.011	2.923
	5.083	9.856	5.214	14.580	5.264	13.875
$R\&D/S_t$*$Sent_t$	−0.001	0.013	−0.008	−0.777	0.000	−0.046
	−3.797	1.765	−3.821	−3.053	2.859	−6.146
$PPENT_t$	0.095	0.165	−0.146	0.068	0.018	0.396
	1.987	1.259	−3.902	0.768	0.366	3.454
$PPENT_t$*$Sent_t$	−0.014	−0.010	−0.136	−0.773	−0.019	−0.032
	−7.209	−2.043	−2.043	−5.200	−8.334	−6.048
$INTAN_{t-1}$	−0.193	−1.261	0.356	−0.519	−0.142	−0.494
	−2.295	−7.567	7.110	−4.875	−2.147	−3.796
$INTAN_{t-1}$*$Sent_t$	0.020	0.024	−0.420	−0.252	0.004	−0.004
	7.044	3.894	−5.246	−1.306	1.394	−0.695
CF_t	−3.350	−0.955	−3.614	−0.912	−3.378	−1.077
	−34.365	−1.844	−41.732	−2.349	−32.717	−2.334
CF_t*$Sent_t$	−0.010	−0.003	1.002	0.298	0.003	−0.002
	−3.679	−0.253	13.503	0.997	0.782	−0.106
ACC_t	−1.959	0.225	−2.106	0.500	−1.640	0.758
	−17.557	0.349	−21.622	0.917	−13.715	1.502
ACC_t*$Sent_t$	−0.003	0.002	0.791	−0.207	−0.005	−0.035
	−0.796	−0.315	8.978	−0.850	−1.304	−3.108
$Sent_t$	0.009	0.009	0.384	0.873	0.013	0.025
	10.395	3.226	20.061	11.021	13.867	9.155

continued on the next page

Table 17 – continued from the previous page						
	Inv. Intelligence		Baker-Wurgler		AAII	
	1	2	3	4	5	6
$AltZ1_t$	0.059	0.071	0.058	0.068	0.051	0.068
	40.359	18.911	39.591	17.786	34.697	17.935
Age_t	−0.001	−0.001	−0.001	−0.001	−0.001	−0.001
	−21.506	−12.848	−22.851	−12.769	−24.439	−12.295
$Size_t$	−0.110	−0.156	−0.110	−0.172	−0.140	−0.157
	−21.881	−10.825	−21.806	−11.906	−26.003	−10.883
$StdRet_t$	−0.005	−0.011	−0.005	−0.016	−0.006	−0.012
	−22.181	−15.996	−25.765	−25.363	−30.340	−19.035
$Turnover_t$	0.004	−0.001	0.004	−0.000	0.003	−0.000
	33.916	−3.394	33.748	−1.312	23.284	−0.762
$StdROA_t$	0.005	0.028	0.005	0.031	0.001	0.027
	9.656	11.978	10.392	13.134	4.644	11.568
$Beta_t$	0.607	0.974	0.643	1.113	0.728	1.001
	64.619	38.768	68.183	43.054	71.865	39.879
ROA_t	−0.286	0.774	−0.341	0.300	−0.299	0.914
	−4.939	1.897	−5.790	1.061	−3.593	2.508
$Leverage_t$	0.731	1.262	0.662	1.129	0.849	1.165
	17.807	12.072	16.147	10.781	19.263	11.099
Model	Eq. 20	Eq. 21	Eq. 20	Eq. 21	Eq. 20	Eq. 21
Tables	69, 72		70, 73		71, 74	

els. Third, scaling R&D by assets may be cause for concern because higher R&D spending reduces earnings, thereby reducing assets in the long run and affecting both the earnings and book value components of the residual income model. To address that concern R&D spending is scaled by sales for the endogeneity specification models. Aside from the adjustments made to delta, vega, scaled intangible assets, and scaled R&D spending, the same combinations of independent variables are used for the two endogeneity specification models as are employed for the baseline specification models. The resulting endogeneity specification models are presented in Equations 20 and 21. Table 17 parallels Table 16 but uses the endogeneity specification models instead of the baseline specification models. The endogeneity specification results are based upon the ordered logistic regressions performed using the full period static CAPM *VERR* valuation decile assignments as the dependent variable.

Although the majority of the results summarized in Table 17 are qualitatively similar to the results in Table 16, there are a few important differences. Using the lagged value of vega results in a lack of statistical significance on average for the relationship between vega and overvaluation for the models employing either the Investors Intelligence or the AAII measure of investor sentiment. Furthermore, even when vega is positive and statistically significantly related to overvaluation using the Baker-Wurgler measure of sentiment the coefficient is well over an order of magnitude smaller than it is for the baseline specification results summarized in Table 16. This finding weakens support for the statistical significance of any relationship between vega and overvaluation, leading to an overall failure to reject the null hypothesis of no relationship between vega and overvaluation (H1).

The most curious changes in inferences which are produced by switching from the baseline specification to the endogeneity specification relate to scaled net fixed assets and scaled intangible assets. The coefficients for scaled net fixed assets (PPENT) are inconsistent in sign or statistically insignificant across the endogeneity specification findings presented in columns 1 through 6 in Table 17 (H5). With the baseline specification results summarized in columns 1 through 6 of Table 16 the coefficients are consistently positive and statistically significant on average. Using the endogeneity specification consequently yields results which provide insufficient evidence to justify rejecting the null hypothesis of no relationship between scaled net fixed assets and overvaluation, weakening the baseline specification evidence previously discussed (H5).

Interestingly, utilizing lagged values of scaled intangible assets yields stronger results for scaled intangible assets than using the baseline specification approach. Under the baseline specification approach, scaled intangible assets yields inconsistent and contradictory coefficients and significance levels for the relationship between scaled intangible assets and overvaluation. The use of lagged values of scaled intangible assets in the endogeneity specification yields average coefficents and average t-statistics which support a negative and statistically significant relationship between lagged values of scaled intangible assets and overvaluation for all columns aside from column 3 of Table 17 (H6). It is possible that the generally negative relationship between lagged values of scaled intangible assets and overvaluation is produced by overvalued firms engaging in acquisitions and then declining in overvaluation over the course of the following year as the overvaluation fades or as the acquisitions are perceived by investors to destroy value. Given the persistence of overvaluation documented in the first essay, the latter explanation seems more likely. Due to the lack of consistency in results across the baseline, single digit SIC fixed effects, and endogeneity specifications, there is insufficient evidence to robustly reject the null hypothesis of no relationship between scaled intangible assets and overvaluation (H6).

Aside from the important differences just discussed, the inferences which may be drawn from the results for the endogeneity specification are very similar to the inferences which may be drawn from the results for the baseline specification. Investors overvalue scaled R&D, undervalue scaled cash flow, overvalue equities in general when sentiment is high, and undervalue scaled net fixed assets when sentiment is high. In addition, overvalued firms are younger (H20), smaller (H16), and more financially distressed (H23) while having more leverage (H17), a higher standard deviation of return on assets (H18), and higher systematic risk (H24).

2.6.3 Summary of Results

Across the three specifications evaluated there are several findings which are consistent. Investors systematically overvalue scaled R&D spending (H4) while systematically undervaluing scaled cash flow (H7). High investor sentiment leads to more overvaluation in general (H9), but investors experiencing high sentiment tend to undervalue scaled net fixed assets (H12). According to traditional views of market efficiency, equities which appear undervalued may be more risky while equities which appear overvalued may be less risky. The results analyzed from the three specifications are not compatible with that view. Overvalued equities have higher default risk (H23), higher leverage (H17), higher systematic risk as represented by β (H24), and a higher standard deviation of return on assets (H18). Overvalued equities are also typically younger (H20) and smaller (H16).

2.7 Conclusion

Understanding the determinants of mispricing has significant implications for money managers, investors, executives, and academicians. Money managers and investors are naturally interested in mispriced equities as attempts to short overvalued equities and buy undervalued equities are obvious hallmarks of actively managed investment approaches. Severe levels of overvaluation may affect the choices made by executives and produce the deleterious effects identified by Jensen (2005) in the agency theory of overvalued equity. For academicians, persistent mispricing and statistically significant determinants of mispricing are generally indicative of inefficiencies in the market and suggestive of entanglements between overvaluation and common asset pricing factors such as firm size and the market-to-book ratio. This essay presents a thorough analysis of several possible determinants of overvaluation, and a number of significant findings are identified.

It is possible that mispricing generally may result from difficulty assessing intangibles. To study that possibility, three proxies for intangibles are used: advertising expenditures, R&D expenditures, and intangible assets listed on the balance sheet. On one hand, the results for advertising and intangible assets from the balance sheet are mixed. On the other hand, the most consistently statistically significant firm characteristic examined as a determinant of overvaluation in the analyses performed is scaled R&D expenditures. Scaled R&D expenditures are found to be positively and statistically significantly related to overvaluation in every ordered logistic regression summarized and analyzed in the Results section, and also in every ordered logistic regression in the Appendix which includes scaled R&D. This is strong evidence that investors overvalue scaled R&D expenditures. The positive relationship between scaled R&D expenditures and overvaluation is maintained regardless of the use of two different measures of cash flow and accruals, three different measures of investor sentiment, and the implementation of the baseline, single digit SIC industry fixed effects, and endogeneity specifications. Furthermore, a positive relationship between scaled R&D and overvaluation is observed regardless of whether the R&D expenditures are scaled by average total assets or sales. If investors merely have a difficult time evaluating scaled R&D expenditures overall, no net directional relationship between overvaluation and scaled R&D would be expected to appear as both undervaluation and overvaluation would result. The consistently positive relationship between scaled R&D expenditures and overvaluation indicates that investors view scaled R&D with excessive optimism, producing the observed overvaluation of scaled R&D. This suggests that there may be potential investment strategies which are possible due to the observed mispricing of scaled R&D.

On top of mispricing scaled R&D expenditures, investors are prone to overvaluing firms when sentiment is high. The results presented in the Results section of this essay show that investor sentiment is positively and statistically significantly associated with overvaluation when firms are assigned to valuation deciles across the 1964–2009 period using the static CAPM *VERR* valuation measure. The evidence supports a positive relationship between investor sentiment and overvaluation for all three measures of investor sentiment used with the full period decile assignment analyses. In addition, the results based upon the full period static CAPM *VERR* decile assignments show that investors undervalue net property, plant, and equipment when sentiment is positive, and they overvalue net property, plant, and equipment when sentiment is negative. Waves of sentiment may therefore create inefficiencies in the pricing of some equities more than others.

Scaled cash flow is found to be negatively related to overvaluation on average across the analyses employing the full period static CAPM *VERR* valuation deciles as the dependent variable. The negative relationship between scaled cash flow and overvaluation is generally consistent with the finding by Sloan (1996) that investors underestimate the persistence of earnings indicated by cash flow, and it is also consistent with the contention by Hirshleifer et al. (2011) that investors with limited attention will undervalue firms with high cash flow. Consequently, the approach to assessing the determinants of mispricing used in this essay adds to the literature on cash flow's relationship to positive stock returns.

One possible explanation for the observed mispricing is that the equities which appear undervalued are more risky and the equities which appear overvalued are less risky. The results strongly undercut that explanation. Proxies for risk including Altman's Z-Score, leverage, β, and the standard deviation of return on assets are all positively related to overvaluation. Furthermore, firm age and size are negatively related to overvaluation.

These results all suggest that the equities which are overvalued are actually *more* risky on average than the equities which are undervalued.

This study robustly analyzes numerous determinants of mispricing. Investors overvalue scaled R&D spending and are prone to overvaluing equities when sentiment is high. Firms with higher scaled values of cash flow tend towards being undervalued relative to subsequent realized earnings and book value outcomes, and investors undervalue scaled net property, plant, and equipment when sentiment is positive and overvalue scaled net property, plant, and equipment when sentiment is negative. Importantly, several conventional risk proxies are positively related to overvaluation– indicating that undervalued firms are less risky and overvalued firms are more risky on average. The combined effects of investor sentiment, the undervaluation of scaled cash flow, the mispricing of scaled net fixed assets driven by investor sentiment, the overvaluation of scaled R&D spending, and the positive relationship between standard risk proxies and overvaluation indicate that inefficiencies in market prices exist. These findings add to the literature on market efficiency and equity mispricing when overvaluation is viewed from the perspective of realized earnings and book value outcomes. The results also suggest that asset pricing factors related to market value and book-to-market are likely influenced by investor sentiment and the overvaluation and undervaluation of various firm characteristics, opening fruitful areas of future research.

3 Appendix

This Appendix provides a more extensive set of results for the ordered logistic regressions performed to study the determinants of mispricing than are discussed in the Results section of the second essay. As discussed in the Methodology section of the second essay, three specifications are used for the ordered logistic regressions: a baseline specification, an industry fixed effects specification, and an endogeneity specification. Within each specification, analyses are performed using four different dependent variables available for the 1964–2009 period: capm5 *VERR* full period decile assignments, capm5 *VERR* annual decile assignments, capm5 *eVERR* full period decile assignments, and capm5 *eVERR* annual decile assignments. For each specification and each dependent variable analyses are performed using both the Sloan (1996) and Collins et al. (2003) measures of cash flow and accruals with each of the three measures of investor sentiment. The three measures of investor sentiment are obtained from Investors Intelligence data, the Baker-Wurgler monthly sentiment index, and AAII data. The procedures followed with the sentiment data are discussed in the Methodology section of the second essay. The combination of four different dependent variables, two different measures of cash flow and accruals, and three different measures of investor sentiment combine to produce twenty-four separate tables for each specification.

The ordered logistic regression results in this Appendix are organized by specification. The baseline specification results are presented in the first subsection. The second subsection contains the industry fixed effects specification results, and the third subsection contains the endogeneity specification results. At the beginning of the subsection for each specification a summary table is presented which summarizes the results obtained using the specification's models from the Methodology section of the second essay with each of the four dependent variables.

Exhibit 3 defines the independent variables used in the ordered logistic regressions presented in this Appendix. As not all independent variables are available for the full time period, Exhibit 3 also includes information about the time period for which each independent variable is available prior to the end of 2009 if the independent variable is not available for the full 1964–2009 period. Panel A displays the CEO compensation characteristics variables, Panel B displays the firm characteristics variables, Panel C displays the investor sentiment variables, and Panel D displays the risk and

Exhibit 3
Definitions of the Independent Variables Used in the Ordered Logistic Regressions Presented in the Appendix

The independent variables used in the ordered logistic regressions detailed in the Appendix are defined below. The dependent variables used in the ordered logistic regressions are available for the 1964–2009 period. A more detailed period of availability through the end of 2009 is indicated in parentheses when necessary.

Panel A: CEO Compensation Characteristics Variables		
Vega	=	the average of the change in wealth (in millions) for a 0.01 change in the firm's volatility of returns for all CEOs during the fiscal year (1992–2009)
Delta	=	the average of the change in wealth (in millions) for a 1% change in the firm's stock price for all CEOs during the fiscal year (1992–2009)
Panel B: Firm Characteristics Variables		
AD	=	advertising expense scaled by average assets for the fiscal year
R&D/A	=	R&D expense scaled by average assets for the fiscal year
R&D/S	=	R&D expense scaled by sales for the fiscal year
PPENT	=	total net property, plant, and equipment scaled by assets
INTAN	=	total intangible assets scaled by assets
CF	=	cash flow scaled by average assets for the fiscal year, with cash flow calculated following Sloan (1996) (1964–2009) or Collins et al. (2003) (1987–2009)
ACC	=	accruals scaled by average assets for the fiscal year, with accruals calculated following Sloan (1996) (1964–2009) or Collins et al. (2003) (1987–2009)
Panel C: Investor Sentiment Variables		
Sent	=	investor sentiment for the month, with sentiment measured using either the Investors Intelligence, Baker-Wurgler, or AAII data detailed below
IIbullbear	=	the monthly average of the difference between the bullish and bearish sentiment reported by Investors Intelligence
BWsent	=	the monthly Baker-Wurgler sentiment index (July 1965–2009)
AAIIbullbear	=	the monthly average of the weekly difference between the bullish and bearish sentiment reported by AAII (July 1987–2009)
AD*Sent	=	the interaction between investor sentiment for the month and advertising scaled by average assets for the fiscal year

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Exhibit 3 – continued from the previous page		
R&D/A*Sent	=	the interaction between investor sentiment for the month and R&D scaled by average assets for the fiscal year
R&D/S*Sent	=	the interaction between investor sentiment for the month and R&D scaled by sales for the fiscal year
PPENT*Sent	=	the interaction between investor sentiment for the month and total net property, plant, and equipment scaled by assets for the fiscal year
INTAN*Sent	=	the interaction between investor sentiment for the month and intangible assets scaled by assets for the fiscal year
CF*Sent	=	the interaction between investor sentiment for the month and cash flow scaled by average assets for the fiscal year
ACC*Sent	=	the interaction between investor sentiment for the month and accruals scaled by average assets for the fiscal year
Panel D: Risk and Information Uncertainty Control Variables		
AltZ1	=	the Z1 version of Altman's Z-Score
Age	=	the total number of months the stock appeared in CRSP prior to and including the valuation month
Size	=	the natural logarithm of total assets
StdRet	=	the standard deviation of the natural log of daily returns during the two month window ending eleven days before the end of the valuation month
Turnover	=	the average of the percentage turnover for each day during the six month period ending eleven days before the end of the valuation month
StdROA	=	the standard deviation of return on assets using the five fiscal years ending at the end of the valuation month
Beta	=	the CAPM β estimated following Dimson (1979) as modified by Fowler and Rorke (1983) using daily return data from the year ending eleven days before the end of the valuation month
ROA	=	net income scaled by average assets
Leverage	=	total liabilities scaled by assets

information uncertainty control variables.

This Appendix also presents additional ordered logistic regression results for models within each specification which are not discussed in the Results section of the second essay. The models within the baseline specification are presented in the introduction to the first subsection, the models within the industry fixed effects specification are presented in the introduction to the second subsection, and the models within the endogeneity specification are presented in the introduction to the third subsection. All of the twenty-four tables for each specification in this Appendix include equation numbers at the bottom of each column which specify the model used to generate the ordered logistic regression results presented in that column.

3.1 Detailed Determinants Tables: Baseline Specification

A series of ordered logistic regressions of capm5 *VERR* and *eVERR* valuation decile assignments on different combinations of independent variables following the baseline specification is performed in Tables 19 through 42. Decile assignments based upon the *VERR* and *eVERR* measures are made using the full 1964–2009 period and also using each calendar year. The combination of full period and annual decile assignments for the capm5 *VERR* and *eVERR* valuation deciles results in four different dependent variables for the ordered logistic regressions. The results from using the full 1964–2009 period capm5 *VERR* decile assignments as the dependent variable are presented in Tables 19 through 24. The results from using the annual *VERR* decile assignments as the dependent variable are presented in Tables 25 through 30. Switching to the use of the full 1964–2009 period capm5 *eVERR* decile assignments as the dependent variable in the ordered logistic regressions produces Tables 31 through 36, and the utilization of annual capm5 *eVERR* decile assignments as the dependent variable in the ordered logistic regressions generates Tables 37 through 42.

Table 18 summarizes the results of the baseline specification ordered logistic regression models detailed in Equations 16 and 17 for all four dependent variables. Panel A presents results using the full period capm5 *VERR* decile assignments as the dependent variable, Panel B presents results using the annual capm5 *VERR* decile assignments as the dependent variable, Panel C presents results using the full period capm5 *eVERR* decile assignments as the dependent variable, and Panel D presents the results using the annual capm5 *eVERR* decile assignments as the dependent variable. Each column of each panel in Table 18 reports the average coefficients and average *t*-statistics across the two ordered logistic regressions performed using the specified measure of sentiment and the two different measures of scaled cash flow and accruals in the appropriate baseline specification model with the dependent variable listed for the panel. The equation detailing the model used for each column is reported near the bottom of each column. As each column in Table 18 presents average coefficients and average *t*-statistics across results produced using both measures of cash flow and accruals, the tables reporting the individual results which are averaged to produce each column are listed at the bottom of each column in Table 18. The results displayed in Panel A of Table 18 are the same as the results

Table 18
Average Coefficients and t-Statistics for Ordered Logistic Regressions of capm5 VERR and eVERR Decile Assignments on Determinants for the Baseline Specification

Average coefficients and average t-statistics are presented in this table for ordered logistic regressions using the baseline specification models. Some independent variables are not available for the full period. Scaled cash flow and accruals data are calculated in accordance with Sloan (1996) and Collins et al. (2003). Each column reports the average coefficients and average t-statistics across the two ordered logistic regressions performed using the specified measure of sentiment and the two different measures of scaled cash flow and accruals in the appropriate baseline specification model. The average t-statistics are reported below each average coefficient.

Panel A displays the average results for the ordered logistic regressions using the full period capm5 *VERR* decile assignments from 1964–2009 as the dependent variable. Panel B displays the average results for the ordered logistic regressions using the annual capm5 *VERR* decile assignments from 1964–2009 as the dependent variable. Panel C displays the average results for the ordered logistic regressions using the full period capm5 *eVERR* decile assignments from 1964–2009 as the dependent variable. Panel D displays the average results for the ordered logistic regressions using the annual capm5 *eVERR* decile assignments from 1964–2009 as the dependent variable.

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Table 18 – continued from the previous page						
Panel A: Dependent Variable = Full Period *VERR* Decile						
	Inv. Intelligence		Baker-Wurgler		AAII	
	1	2	3	4	5	6
$Vega_t$		0.114		0.230		0.135
		1.724		3.473		2.037
$Delta_t$		0.003		0.003		0.004
		2.084		2.255		2.333
AD_t	0.614	−0.438	0.770	0.576	0.867	−0.448
	3.234	−0.844	5.566	1.734	4.596	−1.070
AD_t*$Sent_t$	0.002	0.041	−0.905	−1.102	−0.005	0.066
	0.425	1.963	−4.861	−1.963	−0.468	3.052
R&D/A_t	6.023	6.600	6.084	6.333	5.756	6.166
	39.319	16.109	52.875	22.141	40.061	17.029
R&D/A_t*$Sent_t$	−0.002	0.012	−0.479	2.221	−0.006	0.043
	−0.273	0.730	−3.171	4.256	−0.895	2.440
$PPENT_t$	0.684	0.837	0.458	0.587	0.669	0.817
	13.815	6.509	12.087	6.754	13.412	7.287
$PPENT_t$*$Sent_t$	−0.014	−0.015	−0.204	−0.445	−0.021	−0.023
	−6.644	−3.067	−3.415	−3.009	−8.539	−4.406
$INTAN_t$	0.722	−0.334	1.156	0.149	0.667	0.168
	9.680	−2.139	22.542	1.482	10.144	1.382
$INTAN_t$*$Sent_t$	0.014	0.015	−0.515	0.184	0.003	−0.000
	5.029	2.537	−6.708	1.010	0.906	−0.057
CF_t	−2.812	−1.914	−2.910	−1.722	−2.650	−2.003
	−29.711	−4.435	−34.959	−4.876	−26.618	−5.069
CF_t*$Sent_t$	−0.001	0.009	0.973	0.935	0.005	0.011
	−0.488	0.978	12.224	3.577	1.490	1.208
ACC_t	−1.273	0.414	−1.359	0.289	−0.808	0.406
	−11.812	0.706	−14.559	0.450	−6.961	0.812
ACC_t*$Sent_t$	−0.001	−0.016	0.595	0.089	−0.006	−0.027
	−0.190	−1.708	6.843	−0.066	−1.566	−2.579
$Sent_t$	0.008	0.009	0.421	0.536	0.014	0.017
	8.075	3.488	19.563	6.652	11.648	5.951
$AltZ1_t$	0.058	0.076	0.057	0.072	0.051	0.072
	40.449	21.989	39.791	20.771	35.381	20.814
Age_t	−0.001	−0.001	−0.001	−0.001	−0.001	−0.001
	−18.478	−13.574	−19.785	−13.471	−21.348	−13.155
$Size_t$	−0.135	−0.174	−0.136	−0.191	−0.158	−0.173
	−27.295	−12.677	−27.380	−13.919	−29.709	−12.634
$StdRet_t$	−0.004	−0.010	−0.005	−0.016	−0.006	−0.012
	−22.230	−16.087	−25.309	−25.515	−29.742	−19.006
$Turnover_t$	0.004	−0.001	0.004	−0.000	0.002	−0.000
	30.184	−4.090	30.021	−1.571	20.234	−1.077
$StdROA_t$	0.001	0.021	0.001	0.024	0.000	0.020
	4.943	9.975	5.202	11.619	4.327	9.732
$Beta_t$	0.586	1.005	0.623	1.121	0.702	1.018
	62.831	42.902	66.452	46.713	69.864	43.481
ROA_t	−0.054	0.643	−0.103	0.186	−0.106	0.782
	−1.045	1.676	−1.834	0.711	−1.466	2.236
$Leverage_t$	1.043	1.326	0.989	1.181	1.141	1.201
	25.385	13.501	24.086	12.020	25.855	12.215
Model	Eq. 16	Eq. 17	Eq. 16	Eq. 17	Eq. 16	Eq. 17
Tables	19, 22		20, 23		21, 24	

continued on the next page

Table 18 – continued from the previous page						
Panel B: Dependent Variable = Annual *VERR* Decile						
	Inv. Intelligence		Baker-Wurgler		AAII	
	1	2	3	4	5	6
$Vega_t$		0.199		0.206		0.162
		3.006		3.136		2.455
$Delta_t$		0.003		0.003		0.003
		2.214		2.287		2.346
AD_t	0.909	−0.428	1.002	0.333	1.033	−0.644
	4.944	−0.828	7.337	1.008	5.487	−1.539
AD_t*$Sent_t$	−0.001	0.031	−0.979	−0.364	−0.011	0.062
	0.197	1.499	−5.688	−0.651	−1.158	2.889
R&D/A_t	5.505	5.890	5.563	6.279	5.686	6.115
	37.092	14.528	50.209	22.295	40.315	17.064
R&D/A_t*$Sent_t$	0.001	0.025	−0.374	0.459	−0.014	0.023
	0.174	1.551	−2.181	0.933	−2.017	1.347
$PPENT_t$	0.572	0.455	0.382	0.302	0.508	0.418
	11.759	3.551	10.284	3.503	10.232	3.748
$PPENT_t$*$Sent_t$	−0.013	−0.010	−0.186	−0.225	−0.017	−0.011
	−6.300	−2.026	−3.368	−1.534	−7.093	−2.193
$INTAN_t$	0.914	0.536	0.730	0.271	0.733	0.212
	11.971	3.450	14.115	2.716	11.176	1.749
$INTAN_t$*$Sent_t$	−0.011	−0.014	−0.147	−0.020	−0.000	0.005
	−3.754	−2.480	−1.451	−0.108	−0.149	0.805
CF_t	−1.831	−0.643	−2.013	−0.616	−2.338	−0.680
	−18.015	−1.997	−22.391	−2.378	−23.326	−2.198
CF_t*$Sent_t$	−0.004	−0.004	0.636	0.792	0.005	0.008
	−1.424	−0.320	7.262	3.145	1.307	0.860
ACC_t	−0.242	0.955	−0.560	0.311	−0.899	0.565
	−2.080	1.590	−5.602	0.231	−7.726	0.959
ACC_t*$Sent_t$	−0.015	−0.043	0.243	0.414	−0.005	−0.018
	−3.879	−3.943	2.606	1.112	−1.143	−1.698
$Sent_t$	0.005	0.000	0.047	0.287	0.007	0.008
	4.923	0.081	1.588	3.624	6.131	2.807
$AltZ1_t$	0.032	0.040	0.032	0.037	0.030	0.037
	27.438	13.625	27.661	12.846	25.585	12.742
Age_t	−0.001	−0.001	−0.001	−0.001	−0.001	−0.001
	−20.941	−10.810	−21.048	−10.376	−19.734	−10.219
$Size_t$	−0.123	−0.155	−0.123	−0.164	−0.121	−0.155
	−25.635	−11.380	−25.446	−12.029	−22.821	−11.373
$StdRet_t$	−0.003	−0.003	−0.003	−0.004	−0.004	−0.001
	−16.243	−4.043	−16.587	−6.356	−17.475	−2.408
$Turnover_t$	0.002	0.001	0.002	0.001	0.002	0.001
	21.508	3.177	21.730	3.743	21.589	3.935
$StdROA_t$	0.000	0.016	0.001	0.015	0.000	0.014
	4.387	7.781	4.386	7.770	4.320	7.002
$Beta_t$	0.678	0.935	0.681	0.982	0.683	0.930
	73.513	40.553	73.556	41.947	68.658	40.422
ROA_t	−0.363	−0.112	−0.368	−0.400	−0.172	−0.114
	−4.826	0.031	−4.903	−0.648	−2.157	0.042
$Leverage_t$	0.682	0.578	0.674	0.529	0.726	0.538
	17.124	6.027	16.931	5.519	16.834	5.606
Model	Eq. 16	Eq. 17	Eq. 16	Eq. 17	Eq. 16	Eq. 17
Tables	25, 28		26, 29		27, 30	

continued on the next page

Table 18 – continued from the previous page						
Panel C: Dependent Variable = Full Period *eVERR* Decile						
	Inv. Intelligence		Baker-Wurgler		AAII	
	1	2	3	4	5	6
$Vega_t$		0.355		0.498		0.386
		5.483		7.700		5.961
$Delta_t$		0.009		0.008		0.008
		3.692		3.505		3.615
AD_t	0.506	−0.454	0.718	0.432	0.568	−0.829
	2.699	−0.873	5.254	1.294	3.005	−1.968
AD_t*$Sent_t$	0.005	0.037	−0.926	−1.381	0.009	0.089
	0.852	1.743	−5.014	−2.457	0.894	4.148
$R\&D/A_t$	5.400	7.323	5.983	7.489	5.571	7.143
	35.859	17.595	51.508	25.770	38.688	19.442
$R\&D/A_t$*$Sent_t$	0.033	0.037	−0.234	2.297	0.017	0.055
	5.282	2.260	−1.812	4.339	2.296	3.085
$PPENT_t$	−0.558	−0.483	−0.799	−0.770	−0.620	−0.582
	−11.400	−3.726	−21.055	−8.823	−12.400	−5.175
$PPENT_t$*$Sent_t$	−0.012	−0.016	−0.151	−0.419	−0.017	−0.019
	−5.801	−3.158	−2.743	−2.845	−6.736	−3.738
$INTAN_t$	−0.279	−1.072	0.084	−0.792	−0.390	−0.724
	−3.509	−6.833	1.888	−7.874	−5.967	−5.928
$INTAN_t$*$Sent_t$	0.011	0.004	−0.456	0.009	0.008	−0.005
	4.075	0.765	−6.058	0.052	2.668	−0.832
CF_t	−3.347	−1.940	−3.446	−1.521	−3.158	−1.687
	−34.864	−4.409	−40.752	−4.323	−32.578	−4.053
CF_t*$Sent_t$	0.001	0.018	1.074	0.983	0.003	−0.002
	0.179	1.935	13.245	3.727	0.864	−0.150
ACC_t	−1.169	1.190	−1.246	1.220	−0.700	1.619
	−10.858	2.342	−13.407	2.735	−6.104	3.621
ACC_t*$Sent_t$	0.001	−0.011	0.677	0.178	−0.010	−0.054
	0.413	−1.202	7.723	0.157	−2.478	−4.672
$Sent_t$	0.008	0.011	0.425	0.627	0.013	0.018
	7.738	3.856	19.796	7.784	11.151	6.555
$AltZ1_t$	0.079	0.104	0.078	0.101	0.070	0.100
	47.152	26.541	46.701	25.674	41.552	25.570
Age_t	−0.000	−0.001	−0.001	−0.001	−0.001	−0.001
	−8.528	−10.429	−9.844	−10.268	−10.498	−9.964
$Size_t$	−0.135	−0.126	−0.137	−0.144	−0.155	−0.124
	−27.439	−9.262	−27.743	−10.579	−29.024	−9.146
$StdRet_t$	−0.005	−0.013	−0.006	−0.019	−0.006	−0.014
	−25.867	−19.915	−30.047	−29.588	−31.123	−22.500
$Turnover_t$	0.003	−0.002	0.002	−0.002	0.002	−0.001
	22.196	−10.393	22.110	−7.915	14.450	−6.970
$StdROA_t$	0.001	0.026	0.001	0.030	0.000	0.025
	5.141	12.130	5.438	14.180	4.678	11.925
$Beta_t$	0.641	1.120	0.686	1.259	0.743	1.135
	68.212	47.121	72.528	51.414	73.200	47.698
ROA_t	−0.074	0.975	−0.121	0.492	−0.075	1.124
	−1.278	2.885	−2.068	1.965	−1.233	3.451
$Leverage_t$	0.298	0.588	0.230	0.460	0.347	0.464
	7.253	5.965	5.567	4.652	7.818	4.697
Model	Eq. 16	Eq. 17	Eq. 16	Eq. 17	Eq. 16	Eq. 17
Tables	31, 34		32, 35		33, 36	

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Table 18 – continued from the previous page

Panel D: Dependent Variable = Annual *eVERR* Decile						
	Inv. Intelligence		Baker-Wurgler		AAII	
	1	2	3	4	5	6
$Vega_t$		0.514		0.502		0.454
		8.148		7.997		7.223
$Delta_t$		0.003		0.003		0.003
		2.132		2.220		2.232
AD_t	0.913	0.336	1.050	0.704	0.899	−0.463
	4.999	0.646	7.716	2.130	4.760	−1.100
AD_t*$Sent_t$	0.002	0.011	−1.070	−0.468	−0.003	0.079
	0.446	0.508	−6.174	−0.837	−0.262	3.704
$R\&D/A_t$	4.887	6.978	5.367	7.643	5.406	7.266
	33.251	16.911	48.062	26.828	38.285	20.014
$R\&D/A_t$*$Sent_t$	0.026	0.033	−0.497	0.115	0.006	0.034
	4.193	2.016	−2.903	0.230	0.819	1.992
$PPENT_t$	−0.865	−1.069	−1.029	−1.292	−0.948	−1.297
	−17.653	−8.292	−27.230	−14.839	−18.993	−11.549
$PPENT_t$*$Sent_t$	−0.011	−0.013	−0.065	−0.065	−0.008	−0.001
	−5.409	−2.636	−1.384	−0.448	−3.110	−0.247
$INTAN_t$	−0.011	−0.318	−0.353	−0.761	−0.400	−0.827
	−0.183	−2.045	−6.915	−7.620	−6.135	−6.808
$INTAN_t$*$Sent_t$	−0.017	−0.021	0.061	0.041	0.007	0.005
	−5.898	−3.662	1.133	0.233	2.338	0.812
CF_t	−2.383	−0.820	−2.537	−0.299	−2.788	−0.182
	−23.456	−2.185	−28.151	−1.213	−28.605	−0.526
CF_t*$Sent_t$	−0.001	0.011	0.716	0.597	0.001	−0.013
	−0.284	1.282	8.252	2.337	0.192	−1.426
ACC_t	−0.198	1.645	−0.500	1.257	−0.746	1.852
	−1.702	3.162	−5.006	2.755	−6.485	4.053
ACC_t*$Sent_t$	−0.013	−0.042	0.346	0.090	−0.012	−0.054
	−3.292	−3.699	3.797	0.037	−2.684	−4.664
$Sent_t$	0.002	−0.004	0.002	0.326	0.002	0.004
	2.570	−1.356	−0.242	4.123	1.705	1.406
$AltZ1_t$	0.047	0.062	0.048	0.059	0.047	0.060
	34.694	19.116	35.175	18.235	33.273	18.290
Age_t	−0.000	−0.001	−0.000	−0.001	−0.000	−0.001
	−8.567	−6.984	−8.488	−6.272	−7.450	−6.351
$Size_t$	−0.124	−0.100	−0.125	−0.107	−0.124	−0.097
	−25.828	−7.357	−25.899	−7.885	−23.404	−7.194
$StdRet_t$	−0.004	−0.005	−0.004	−0.005	−0.004	−0.003
	−18.543	−8.204	−18.524	−9.091	−18.262	−4.972
$Turnover_t$	0.002	−0.000	0.002	−0.000	0.002	−0.000
	16.362	−1.217	16.477	−1.030	17.422	−1.026
$StdROA_t$	0.001	0.020	0.001	0.019	0.000	0.018
	4.655	9.924	4.628	9.647	4.652	8.829
$Beta_t$	0.699	1.021	0.704	1.071	0.705	1.001
	75.327	43.869	75.498	45.290	70.466	43.181
ROA_t	−0.284	0.491	−0.292	0.132	−0.105	0.469
	−3.824	1.942	−3.944	1.095	−1.566	1.860
$Leverage_t$	−0.149	−0.255	−0.147	−0.304	−0.069	−0.283
	−3.651	−2.650	−3.590	−3.162	−1.594	−2.931
Model	Eq. 16	Eq. 17	Eq. 16	Eq. 17	Eq. 16	Eq. 17
Tables	37, 40		38, 41		39, 42	

in Table 16, while Panels B through D summarize the additional analyses corresponding to the application of the other three dependent variables to the models in Equations 16 and 17.

Tables 19 through 42 contain the results for all of the individual ordered logistic regressions performed using the baseline specification. The four different dependent variables, two different measures of cash flow and accruals, and three different measures of investor sentiment produce the twenty-four baseline specification tables. Each table includes the coefficients and t-statistics for six models within the baseline specification which employ the specified dependent variable, measures of cash flow and accruals, and measure of investor sentiment. Information about the definition and availability of the independent variables used in the baseline specification models is presented in Exhibit 3. The time period spanned by the data used to generate each column of Tables 19 through 42 is therefore dictated by the intersection of the time periods for which the variables used in each column are available. The baseline specification models estimated are the following:

$$\begin{aligned} Decile_{i,t} = f(&\boldsymbol{\alpha} + \gamma_3 AD_{i,t} + \gamma_4 R\&D/A_{i,t} + \gamma_5 PPENT_{i,t} \\ &+ \gamma_6 INTAN_{i,t} + \gamma_7 CF_{i,t} + \gamma_8 ACC_{i,t} + \gamma_{16} AltZ1_{i,t} \\ &+ \gamma_{17} Age_{i,t} + \gamma_{18} Size_{i,t} + \gamma_{19} StdRet_{i,t} + \gamma_{20} Turnover_{i,t} \\ &+ \gamma_{21} StdROA_{i,t} + \gamma_{22} Beta_{i,t} + \gamma_{23} ROA_{i,t} \\ &+ \gamma_{24} Leverage_{i,t} + \varepsilon_{i,t}) \end{aligned} \tag{22}$$

$$\begin{aligned} Decile_{i,t} = f(&\boldsymbol{\alpha} + \gamma_1 Vega_{i,t} + \gamma_2 Delta_{i,t} + \gamma_3 AD_{i,t} \\ &+ \gamma_5 PPENT_{i,t} + \gamma_6 INTAN_{i,t} + \gamma_7 CF_{i,t} + \gamma_8 ACC_{i,t} \\ &+ \gamma_{16} AltZ1_{i,t} + \gamma_{17} Age_{i,t} + \gamma_{18} Size_{i,t} + \gamma_{19} StdRet_{i,t} \\ &+ \gamma_{20} Turnover_{i,t} + \gamma_{21} StdROA_{i,t} + \gamma_{22} Beta_{i,t} \\ &+ \gamma_{23} ROA_{i,t} + \gamma_{24} Leverage_{i,t} + \varepsilon_{i,t}) \end{aligned} \tag{23}$$

$$\begin{aligned} Decile_{i,t} = f(&\boldsymbol{\alpha} + \gamma_1 Vega_{i,t} + \gamma_2 Delta_{i,t} + \gamma_3 AD_{i,t} \\ &+ \gamma_4 R\&D/A_{i,t} + \gamma_5 PPENT_{i,t} + \gamma_6 INTAN_{i,t} + \gamma_7 CF_{i,t} \\ &+ \gamma_8 ACC_{i,t} + \gamma_{16} AltZ1_{i,t} + \gamma_{17} Age_{i,t} + \gamma_{18} Size_{i,t} \\ &+ \gamma_{19} StdRet_{i,t} + \gamma_{20} Turnover_{i,t} + \gamma_{21} StdROA_{i,t} \\ &+ \gamma_{22} Beta_{i,t} + \gamma_{23} ROA_{i,t} + \gamma_{24} Leverage_{i,t} + \varepsilon_{i,t}) \end{aligned} \tag{24}$$

$$
\begin{aligned}
Decile_{i,t} = f(&\boldsymbol{\alpha} + \gamma_3 AD_{i,t} + \gamma_4 R\&D/A_{i,t} + \gamma_5 PPENT_{i,t} \\
&+ \gamma_6 INTAN_{i,t} + \gamma_7 CF_{i,t} + \gamma_8 ACC_{i,t} + \gamma_9 Sent_{i,t} \\
&+ \gamma_{16} AltZ1_{i,t} + \gamma_{17} Age_{i,t} + \gamma_{18} Size_{i,t} + \gamma_{19} StdRet_{i,t} \\
&+ \gamma_{20} Turnover_{i,t} + \gamma_{21} StdROA_{i,t} + \gamma_{22} Beta_{i,t} \\
&+ \gamma_{23} ROA_{i,t} + \gamma_{24} Leverage_{i,t} + \varepsilon_{i,t})
\end{aligned} \tag{25}
$$

$$
\begin{aligned}
Decile_{i,t} = f(&\boldsymbol{\alpha} + \gamma_3 AD_{i,t} + \gamma_4 R\&D/A_{i,t} + \gamma_5 PPENT_{i,t} \\
&+ \gamma_6 INTAN_{i,t} + \gamma_7 CF_{i,t} + \gamma_8 ACC_{i,t} + \gamma_9 Sent_{i,t} \\
&+ \gamma_{10}(AD_{i,t} * Sent_{i,t}) + \gamma_{11}(R\&D_{i,t} * Sent_{i,t}) \\
&+ \gamma_{12}(PPENT_{i,t} * Sent_{i,t}) + \gamma_{13}(INTAN_{i,t} * Sent_{i,t}) \\
&+ \gamma_{14}(CF_{i,t} * Sent_{i,t}) + \gamma_{15}(ACC_{i,t} * Sent_{i,t}) \\
&+ \gamma_{16} AltZ1_{i,t} + \gamma_{17} Age_{i,t} + \gamma_{18} Size_{i,t} \\
&+ \gamma_{19} StdRet_{i,t} + \gamma_{20} Turnover_{i,t} + \gamma_{21} StdROA_{i,t} \\
&+ \gamma_{22} Beta_{i,t} + \gamma_{23} ROA_{i,t} + \gamma_{24} Leverage_{i,t} + \varepsilon_{i,t})
\end{aligned} \tag{26}
$$

$$
\begin{aligned}
Decile_{i,t} = f(&\boldsymbol{\alpha} + \gamma_1 Vega_{i,t} + \gamma_2 Delta_{i,t} + \gamma_3 AD_{i,t} \\
&+ \gamma_4 R\&D/A_{i,t} + \gamma_5 PPENT_{i,t} + \gamma_6 INTAN_{i,t} + \gamma_7 CF_{i,t} \\
&+ \gamma_8 ACC_{i,t} + \gamma_9 Sent_{i,t} + \gamma_{10}(AD_{i,t} * Sent_{i,t}) \\
&+ \gamma_{11}(R\&D/A_{i,t} * Sent_{i,t}) + \gamma_{12}(PPENT_{i,t} * Sent_{i,t}) \\
&+ \gamma_{13}(INTAN_{i,t} * Sent_{i,t}) + \gamma_{14}(CF_{i,t} * Sent_{i,t}) \\
&+ \gamma_{15}(ACC_{i,t} * Sent_{i,t}) + \gamma_{16} AltZ1_{i,t} \\
&+ \gamma_{17} Age_{i,t} + \gamma_{18} Size_{i,t} + \gamma_{19} StdRet_{i,t} \\
&+ \gamma_{20} Turnover_{i,t} + \gamma_{21} StdROA_{i,t} + \gamma_{22} Beta_{i,t} \\
&+ \gamma_{23} ROA_{i,t} + \gamma_{24} Leverage_{i,t} + \varepsilon_{i,t})
\end{aligned} \tag{27}
$$

In Tables 19 through 42 the baseline specification models in Equations 22 through 27 correspond to the columns in the tables. Equation 22 is used to estimate the coefficients and t-statistics presented in column A of Tables 19 through 42. Equation 23 is used to estimate the coefficients and t-statistics presented in column B, Equation 24 is used to estimate the coefficients and t-statistics presented in column C, and Equation 25 is used to estimate the coefficients and t-statistics presented in column D. Equations 26 and 27, which are the same as the baseline specification models in Equations 16 and 17 in the Methodology section of the second essay, are used to estimate the coefficients and t-statistics presented in columns E and F respectively.

3.1.1 Full Period VERR Decile Assignments Used with the Baseline Specification

For Tables 19 through 24 capm5 *VERR* valuation measures are used to assign firm years to valuation deciles across the 1964–2009 period. The first three tables, Tables 19 through 21, use scaled values of the Sloan (1996) measures of cash flow and accruals as part of the baseline specification. The data required to calculate the cash flow and accruals measures following Sloan (1996) is available sporadically for firms prior to mid-1970, and very consistently thereafter. Table 19 employs the Investors Intelligence measure of sentiment, which is available for the full 1964–2009 period. Table 20 employs the sentiment data from Baker and Wurgler (2007), which is available beginning in the middle of 1965. Table 21 employs the AAII measure of sentiment, which is first available in the middle of 1987. The more limited availability of the AAII measure accounts for the smaller number of observations involved in the analyses presented in Table 21.

The second three tables, Tables 22 through 24, use scaled values of the Collins et al. (2003) measures of cash flow and accruals as part of the baseline specification. The data required to calculate the cash flow and accruals measures following Collins et al. (2003) is available sporadically for firms beginning in 1987 and continuing through mid-1988, and consistently thereafter. Table 22 employs the Investors Intelligence measure of sentiment, which is available for the full 1964–2009 period. Table 23 employs the sentiment data from Baker and Wurgler (2007), which is available beginning in the middle of 1965. Table 24 employs the AAII measure of sentiment, which is first available in the middle of 1987. The more limited availability of the Collins et al. (2003) measures of cash flow and accruals accounts for the smaller number of observations involved in the analyses presented in Tables 22 through Tables 24.

Table 19
Determinants of Full Sample capm5 VERR Decile Assignments Using Investors Intelligence Sentiment and Sloan Accruals and Cash Flow

The ordered logistic regressions use the full period capm5 *VERR* decile assignments from 1964–2009 as the dependent variable. Some independent variables are not available for the full period. CEO compensation characteristics, vega and delta, are obtained from Professor Naveen's website and are rescaled to be in millions. Scaled cash flow and accruals data are calculated in accordance with Sloan (1996). Sentiment is calculated as the monthly average of the weekly difference between the bullish and bearish sentiment reported by Investors Intelligence. Advertising (AD), R&D, cash flow (CF), and accruals (ACC) are scaled by average total assets; intangible assets (INTAN) and property, plant, and equipment (PPENT) are scaled by end of the year assets. A version of Altman's Z, firm age, firm size, the standard deviation of returns, stock turnover, return on assets, the standard deviation of return on assets, beta, and total liabilities scaled by assets are included as control variables. The t-statistics are reported below each coefficient.

	A	B	C	D	E	F
$Vega_t$		0.274	0.167			0.092
		4.128	2.503			1.378
$Delta_t$		0.003	0.003			0.003
		2.172	1.915			1.936
AD_t	0.563	−0.148	0.431	0.571	0.384	−0.515
	4.508	−0.450	1.311	4.574	2.361	−0.967
$AD_t{*}Sent_t$					0.013	0.047
					1.877	2.199
$R\&D/A_t$	6.312		6.495	6.326	6.292	6.341
	56.744		23.001	56.872	42.496	15.440
$R\&D/A_t{*}Sent_t$					0.001	0.022
					0.161	1.369
$PPENT_t$	0.457	−0.044	0.462	0.462	0.642	0.726
	13.181	−0.536	5.410	13.320	14.366	5.577
$PPENT_t{*}Sent_t$					−0.011	−0.012
					−6.318	−2.443
$INTAN_t$	1.499	−0.286	0.085	1.467	1.071	−0.367
	30.134	−2.915	0.858	29.409	14.698	−2.335
$INTAN_t{*}Sent_t$					0.018	0.016
					6.686	2.808
$CFsloan_t$	−2.800	−1.718	−1.445	−2.764	−2.694	−1.413
	−40.104	−7.688	−6.398	−39.565	−33.226	−5.028
$CFsloan_t{*}Sent_t$					−0.003	0.015
					−1.187	1.779
$ACCsloan_t$	−1.833	−0.568	−0.063	−1.778	−1.902	0.111
	−20.787	−1.926	−0.213	−20.122	−18.060	0.266
$ACCsloan_t{*}Sent_t$					0.010	0.011
					2.749	0.714
$IIbullbear_t$				0.003	0.005	0.008
				8.090	6.396	2.876

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Table 19 – continued from the previous page

	A	B	C	D	E	F
$AltZ1_t$	0.065	0.082	0.078	0.065	0.065	0.076
	45.118	22.926	21.957	44.985	44.952	21.535
Age_t	−0.001	−0.001	−0.001	−0.001	−0.001	−0.001
	−15.144	−13.857	−13.830	−14.901	−14.884	−13.520
$Size_t$	−0.109	−0.174	−0.174	−0.110	−0.111	−0.173
	−24.456	−12.686	−12.669	−24.610	−24.813	−12.565
$StdRet_t$	−0.004	−0.013	−0.013	−0.003	−0.003	−0.010
	−19.112	−21.738	−20.998	−17.652	−17.004	−16.184
$Turnover_t$	0.005	−0.000	−0.001	0.005	0.005	−0.001
	42.387	−0.253	−3.049	41.640	41.492	−4.341
$StdROA_t$	0.001	0.032	0.023	0.001	0.001	0.020
	5.894	15.091	11.008	5.830	5.782	9.756
$Beta_t$	0.484	1.022	1.020	0.483	0.482	1.006
	56.964	43.832	43.566	56.827	56.658	42.808
ROA_t	−0.129	0.120	0.504	−0.130	−0.142	0.372
	−2.335	0.569	2.386	−2.346	−2.552	1.756
$Leverage_t$	0.960	1.093	1.366	0.967	0.979	1.380
	25.236	11.121	13.792	25.416	25.719	13.934
N	81,300	15,629	15,629	81,300	81,300	15,629
Pseudo-R^2	0.268	0.263	0.286	0.268	0.270	0.293
Model	Eq. 22	Eq. 23	Eq. 24	Eq. 25	Eq. 26	Eq. 27

Table 20
Determinants of Full Sample capm5 VERR Decile Assignments Using Baker-Wurgler Sentiment and Sloan Accruals and Cash Flow

The ordered logistic regressions use the full period capm5 *VERR* decile assignments from 1964–2009 as the dependent variable. Some independent variables are not available for the full period. CEO compensation characteristics, vega and delta, are obtained from Professor Naveen's website and are rescaled to be in millions. Scaled cash flow and accruals data are calculated in accordance with Sloan (1996). Monthly orthogonalized sentiment values introduced by Baker and Wurgler (2007) are used. Advertising (AD), R&D, cash flow (CF), and accruals (ACC) are scaled by average total assets; intangible assets (INTAN) and property, plant, and equipment (PPENT) are scaled by end of the year assets. A version of Altman's Z, firm age, firm size, the standard deviation of returns, stock turnover, return on assets, the standard deviation of return on assets, beta, and total liabilities scaled by assets are included as control variables. The *t*-statistics are reported below each coefficient.

	A	B	C	D	E	F
$Vega_t$		0.274	0.167			0.213
		4.128	2.503			3.180
$Delta_t$		0.003	0.003			0.003
		2.172	1.915			2.116
AD_t	0.563	−0.148	0.431	0.653	0.754	0.660
	4.508	−0.450	1.311	5.219	6.022	1.965
AD_t*Sent_t					−0.979	−1.141
					−6.587	−2.027
$R\&D/A_t$	6.312		6.495	6.444	6.499	6.215
	56.744		23.001	57.966	57.861	21.740
$R\&D/A_t*Sent_t$					−1.231	2.430
					−7.696	4.637
$PPENT_t$	0.457	−0.044	0.462	0.442	0.453	0.533
	13.181	−0.536	5.410	12.744	13.022	6.105
$PPENT_t*Sent_t$					−0.108	−0.370
					−2.691	−2.491
$INTAN_t$	1.499	−0.286	0.085	1.543	1.596	0.157
	30.134	−2.915	0.858	30.968	31.878	1.559
$INTAN_t*Sent_t$					−0.760	0.221
					−10.503	1.208
$CFsloan_t$	−2.800	−1.718	−1.445	−2.623	−2.730	−1.501
	−40.104	−7.688	−6.398	−37.461	−38.446	−6.532
$CFsloan_t*Sent_t$					0.804	0.786
					12.950	3.215
$ACCsloan_t$	−1.833	−0.568	−0.063	−1.612	−1.745	−0.032
	−20.787	−1.926	−0.213	−18.214	−19.443	−0.104
$ACCsloan_t*Sent_t$					0.905	0.679
					10.742	1.809
$BWsent_t$				0.567	0.609	0.536
				74.212	32.029	6.546

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Table 20 – continued from the previous page						
	A	B	C	D	E	F
$AltZ1_t$	0.065	0.082	0.078	0.063	0.063	0.073
	45.118	22.926	21.957	43.751	44.091	20.543
Age_t	−0.001	−0.001	−0.001	−0.001	−0.001	−0.001
	−15.144	−13.857	−13.830	−16.741	−17.180	−13.364
$Size_t$	−0.109	−0.174	−0.174	−0.114	−0.113	−0.189
	−24.456	−12.686	−12.669	−25.527	−25.300	−13.734
$StdRet_t$	−0.004	−0.013	−0.013	−0.004	−0.004	−0.016
	−19.112	−21.738	−20.998	−19.483	−19.184	−25.317
$Turnover_t$	0.005	−0.000	−0.001	0.005	0.005	−0.000
	42.387	−0.253	−3.049	40.226	39.860	−1.815
$StdROA_t$	0.001	0.032	0.023	0.001	0.002	0.024
	5.894	15.091	11.008	6.113	6.138	11.320
$Beta_t$	0.484	1.022	1.020	0.535	0.540	1.122
	56.964	43.832	43.566	62.390	62.843	46.603
ROA_t	−0.129	0.120	0.504	−0.187	−0.222	0.263
	−2.335	0.569	2.386	−3.335	−3.893	1.232
$Leverage_t$	0.960	1.093	1.366	0.931	0.928	1.242
	25.236	11.121	13.792	24.453	24.358	12.533
N	81,300	15,629	15,629	81,262	81,262	15,629
Pseudo-R^2	0.268	0.263	0.286	0.316	0.319	0.312
Model	Eq. 22	Eq. 23	Eq. 24	Eq. 25	Eq. 26	Eq. 27

Table 21
Determinants of Full Sample capm5 VERR Decile Assignments Using AAII Sentiment and Sloan Accruals and Cash Flow

The ordered logistic regressions use the full period capm5 *VERR* decile assignments from 1964–2009 as the dependent variable. Some independent variables are not available for the full period. CEO compensation characteristics, vega and delta, are obtained from Professor Naveen's website and are rescaled to be in millions. Scaled cash flow and accruals data are calculated in accordance with Sloan (1996). Sentiment is calculated as the monthly average of the weekly difference between the bullish and bearish sentiment reported by AAII. Advertising (AD), R&D, cash flow (CF), and accruals (ACC) are scaled by average total assets; intangible assets (INTAN) and property, plant, and equipment (PPENT) are scaled by end of the year assets. A version of Altman's Z, firm age, firm size, the standard deviation of returns, stock turnover, return on assets, the standard deviation of return on assets, beta, and total liabilities scaled by assets are included as control variables. The *t*-statistics are reported below each coefficient.

	A	B	C	D	E	F
$Vega_t$		0.274	0.167			0.115
		4.128	2.503			1.717
$Delta_t$		0.003	0.003			0.003
		2.172	1.915			2.221
AD_t	0.563	−0.148	0.431	0.892	0.964	−0.452
	4.508	−0.450	1.311	5.916	5.127	−1.061
AD_t*$Sent_t$					−0.006	0.069
					−0.575	3.206
R&D/A_t	6.312		6.495	5.603	5.648	5.913
	56.744		23.001	47.938	39.372	16.288
R&D/A_t*$Sent_t$					−0.002	0.054
					−0.320	3.108
$PPENT_t$	0.457	−0.044	0.462	0.405	0.636	0.755
	13.181	−0.536	5.410	9.865	12.798	6.682
$PPENT_t$*$Sent_t$					−0.020	−0.022
					−8.271	−4.115
$INTAN_t$	1.499	−0.286	0.085	0.718	0.672	0.163
	30.134	−2.915	0.858	13.320	10.232	1.326
$INTAN_t$*$Sent_t$					0.004	0.001
					1.162	0.148
$CFsloan_t$	−2.800	−1.718	−1.445	−2.279	−2.324	−1.613
	−40.104	−7.688	−6.398	−26.965	−25.296	−6.236
$CFsloan_t$*$Sent_t$					0.005	0.018
					1.460	2.081
$ACCsloan_t$	−1.833	−0.568	−0.063	−0.921	−0.912	0.270
	−20.787	−1.926	−0.213	−8.443	−7.421	0.747
$ACCsloan_t$*$Sent_t$					0.000	−0.010
					0.031	−0.696
$AAIIbullbear_t$				0.009	0.013	0.016
				17.900	11.436	5.525

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Table 21 – continued from the previous page						
	A	B	C	D	E	F
$AltZ1_t$	0.065	0.082	0.078	0.052	0.052	0.073
	45.118	22.926	21.957	35.724	35.540	20.475
Age_t	−0.001	−0.001	−0.001	−0.001	−0.001	−0.001
	−15.144	−13.857	−13.830	−21.403	−21.361	−13.055
$Size_t$	−0.109	−0.174	−0.174	−0.157	−0.157	−0.172
	−24.456	−12.686	−12.669	−29.704	−29.655	−12.493
$StdRet_t$	−0.004	−0.013	−0.013	−0.006	−0.006	−0.012
	−19.112	−21.738	−20.998	−29.561	−29.568	−18.921
$Turnover_t$	0.005	−0.000	−0.001	0.002	0.002	−0.000
	42.387	−0.253	−3.049	20.141	20.101	−1.251
$StdROA_t$	0.001	0.032	0.023	0.000	0.000	0.020
	5.894	15.091	11.008	4.332	4.370	9.510
$Beta_t$	0.484	1.022	1.020	0.707	0.704	1.018
	56.964	43.832	43.566	70.409	70.103	43.333
ROA_t	−0.129	0.120	0.504	−0.235	−0.238	0.585
	−2.335	0.569	2.386	−3.298	−3.310	2.764
$Leverage_t$	0.960	1.093	1.366	1.219	1.221	1.256
	25.236	11.121	13.792	27.600	27.627	12.663
N	81,300	15,629	15,629	55,986	55,986	15,629
Pseudo-R^2	0.268	0.263	0.286	0.300	0.301	0.301
Model	Eq. 22	Eq. 23	Eq. 24	Eq. 25	Eq. 26	Eq. 27

Table 22
Determinants of Full Sample capm5 VERR Decile Assignments Using Investors Intelligence Sentiment and Collins Accruals and Cash Flow

The ordered logistic regressions use the full period capm5 *VERR* decile assignments from 1964–2009 as the dependent variable. Some independent variables are not available for the full period. CEO compensation characteristics, vega and delta, are obtained from Professor Naveen's website and are rescaled to be in millions. Scaled cash flow and accruals data are calculated in accordance with Collins et al. (2003). Sentiment is calculated as the monthly average of the weekly difference between the bullish and bearish sentiment reported by Investors Intelligence. Advertising (AD), R&D, cash flow (CF), and accruals (ACC) are scaled by average total assets; intangible assets (INTAN) and property, plant, and equipment (PPENT) are scaled by end of the year assets. A version of Altman's Z, firm age, firm size, the standard deviation of returns, stock turnover, return on assets, the standard deviation of return on assets, beta, and total liabilities scaled by assets are included as control variables. The t-statistics are reported below each coefficient.

	A	B	C	D	E	F
$Vega_t$		0.318	0.211			0.136
		4.882	3.229			2.070
$Delta_t$		0.004	0.003			0.003
		2.430	2.212			2.232
AD_t	0.669	−0.323	0.295	0.700	0.843	−0.362
	4.406	−1.011	0.923	4.606	4.107	−0.722
AD_t*$Sent_t$					−0.010	0.035
					−1.027	1.728
$R\&D/A_t$	5.698		6.654	5.696	5.754	6.859
	48.552		23.628	48.524	36.141	16.777
$R\&D/A_t$*$Sent_t$					−0.005	0.001
					−0.708	0.092
$PPENT_t$	0.447	0.039	0.571	0.477	0.726	0.948
	10.819	0.480	6.730	11.524	13.265	7.440
$PPENT_t$*$Sent_t$					−0.016	−0.018
					−6.969	−3.691
$INTAN_t$	0.704	−0.334	0.066	0.610	0.374	−0.301
	13.080	−3.458	0.668	11.269	4.662	−1.942
$INTAN_t$*$Sent_t$					0.010	0.013
					3.373	2.266
$CFcollins_t$	−2.974	−3.190	−2.484	−2.929	−2.931	−2.414
	−30.548	−5.353	−4.151	−30.122	−26.196	−3.843
$CFcollins_t$*$Sent_t$					0.001	0.002
					0.211	0.176
$ACCcollins_t$	−0.899	−1.087	−0.114	−0.834	−0.645	0.717
	−9.067	−1.810	−0.190	−8.417	−5.564	1.145
$ACCcollins_t$*$Sent_t$					−0.012	−0.042
					−3.128	−4.130
$IIbullbear_t$				0.008	0.011	0.011
				16.185	9.755	4.099

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Table 22 – continued from the previous page						
	A	B	C	D	E	F
$AltZ1_t$	0.051	0.080	0.077	0.051	0.051	0.076
	35.918	23.394	22.657	35.921	35.946	22.442
Age_t	−0.001	−0.001	−0.001	−0.001	−0.001	−0.001
	−22.372	−14.017	−14.029	−22.174	−22.072	−13.627
$Size_t$	−0.153	−0.178	−0.178	−0.160	−0.160	−0.174
	−28.576	−13.091	−13.092	−29.935	−29.777	−12.788
$StdRet_t$	−0.006	−0.013	−0.013	−0.006	−0.006	−0.010
	−30.020	−22.378	−21.699	−28.302	−27.455	−15.990
$Turnover_t$	0.002	0.000	−0.001	0.002	0.002	−0.001
	20.476	0.127	−2.564	18.806	18.875	−3.838
$StdROA_t$	0.000	0.033	0.024	0.000	0.000	0.021
	4.213	15.547	11.525	4.149	4.103	10.193
$Beta_t$	0.693	1.026	1.022	0.693	0.691	1.003
	69.241	44.261	43.943	69.206	69.004	42.995
ROA_t	0.027	1.061	0.883	0.031	0.033	0.914
	0.377	1.856	1.542	0.433	0.462	1.596
$Leverage_t$	1.052	0.944	1.239	1.093	1.107	1.272
	23.872	9.820	12.750	24.769	25.050	13.069
N	55,108	15,880	15,880	55,108	55,108	15,880
Pseudo-R^2	0.299	0.266	0.290	0.303	0.304	0.298
Model	Eq. 22	Eq. 23	Eq. 24	Eq. 25	Eq. 26	Eq. 27

Table 23
Determinants of Full Sample capm5 VERR Decile Assignments Using Baker-Wurgler Sentiment and Collins Accruals and Cash Flow

The ordered logistic regressions use the full period capm5 *VERR* decile assignments from 1964–2009 as the dependent variable. Some independent variables are not available for the full period. CEO compensation characteristics, vega and delta, are obtained from Professor Naveen's website and are rescaled to be in millions. Scaled cash flow and accruals data are calculated in accordance with Collins et al. (2003). Monthly orthogonalized sentiment values introduced by Baker and Wurgler (2007) are used. Advertising (AD), R&D, cash flow (CF), and accruals (ACC) are scaled by average total assets; intangible assets (INTAN) and property, plant, and equipment (PPENT) are scaled by end of the year assets. A version of Altman's Z, firm age, firm size, the standard deviation of returns, stock turnover, return on assets, the standard deviation of return on assets, beta, and total liabilities scaled by assets are included as control variables. The *t*-statistics are reported below each coefficient.

	A	B	C	D	E	F
$Vega_t$		0.318	0.211			0.247
		4.882	3.229			3.767
$Delta_t$		0.004	0.003			0.004
		2.430	2.212			2.395
AD_t	0.669	−0.323	0.295	0.695	0.785	0.491
	4.406	−1.011	0.923	4.574	5.109	1.504
AD_t*$Sent_t$					−0.832	−1.062
					−3.134	−1.898
$R\&D/A_t$	5.698		6.654	5.713	5.669	6.452
	48.552		23.628	48.655	47.889	22.542
$R\&D/A_t$*$Sent_t$					0.274	2.013
					1.354	3.875
$PPENT_t$	0.447	0.039	0.571	0.451	0.463	0.641
	10.819	0.480	6.730	10.923	11.151	7.403
$PPENT_t$*$Sent_t$					−0.301	−0.520
					−4.139	−3.528
$INTAN_t$	0.704	−0.334	0.066	0.695	0.717	0.140
	13.080	−3.458	0.668	12.898	13.206	1.406
$INTAN_t$*$Sent_t$					−0.270	0.148
					−2.913	0.812
$CFcollins_t$	−2.974	−3.190	−2.484	−2.956	−3.090	−1.943
	−30.548	−5.353	−4.151	−30.339	−31.473	−3.221
$CFcollins_t$*$Sent_t$					1.143	1.085
					11.497	3.938
$ACCcollins_t$	−0.899	−1.087	−0.114	−0.886	−0.973	0.611
	−9.067	−1.810	−0.190	−8.915	−9.674	1.004
$ACCcollins_t$*$Sent_t$					0.286	−0.500
					2.945	−1.940
$BWsent_t$				0.180	0.232	0.535
				12.979	7.096	6.757

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Table 23 – continued from the previous page						
	A	B	C	D	E	F
AltZ1_t	0.051	0.080	0.077	0.051	0.051	0.071
	35.918	23.394	22.657	35.491	35.491	20.999
Age_t	−0.001	−0.001	−0.001	−0.001	−0.001	−0.001
	−22.372	−14.017	−14.029	−22.236	−22.391	−13.579
Size_t	−0.153	−0.178	−0.178	−0.159	−0.158	−0.193
	−28.576	−13.091	−13.092	−29.587	−29.459	−14.103
StdRet_t	−0.006	−0.013	−0.013	−0.007	−0.007	−0.016
	−30.020	−22.378	−21.699	−31.433	−31.435	−25.714
Turnover_t	0.002	0.000	−0.001	0.002	0.002	−0.000
	20.476	0.127	−2.564	20.349	20.183	−1.327
StdROA_t	0.000	0.033	0.024	0.000	0.000	0.025
	4.213	15.547	11.525	4.247	4.267	11.918
Beta_t	0.693	1.026	1.022	0.703	0.706	1.120
	69.241	44.261	43.943	69.980	70.062	46.824
ROA_t	0.027	1.061	0.883	0.019	0.016	0.109
	0.377	1.856	1.542	0.260	0.225	0.190
Leverage_t	1.052	0.944	1.239	1.060	1.050	1.120
	23.872	9.820	12.750	24.039	23.814	11.507
N	55,108	15,880	15,880	55,108	55,108	15,880
Pseudo-R^2	0.299	0.266	0.290	0.301	0.303	0.316
Model	Eq. 22	Eq. 23	Eq. 24	Eq. 25	Eq. 26	Eq. 27

Table 24
Determinants of Full Sample capm5 VERR Decile Assignments Using AAII Sentiment and Collins Accruals and Cash Flow

The ordered logistic regressions use the full period capm5 *VERR* decile assignments from 1964–2009 as the dependent variable. Some independent variables are not available for the full period. CEO compensation characteristics, vega and delta, are obtained from Professor Naveen's website and are rescaled to be in millions. Scaled cash flow and accruals are were calculated in accordance with Collins et al. (2003). Sentiment is calculated as the monthly average of the weekly difference between the bullish and bearish sentiment reported by AAII. Advertising (AD), R&D, cash flow (CF), and accruals (ACC) are scaled by average total assets; intangible assets (INTAN) and property, plant, and equipment (PPENT) are scaled by end of the year assets. A version of Altman's Z, firm age, firm size, the standard deviation of returns, stock turnover, return on assets, the standard deviation of return on assets, beta, and total liabilities scaled by assets are included as control variables. The *t*-statistics are reported below each coefficient.

	A	B	C	D	E	F
$Vega_t$		0.318	0.211			0.154
		4.882	3.229			2.357
$Delta_t$		0.004	0.003			0.004
		2.430	2.212			2.445
AD_t	0.669	−0.323	0.295	0.726	0.770	−0.443
	4.406	−1.011	0.923	4.776	4.065	−1.079
AD_t*Sent_t					−0.004	0.062
					−0.361	2.899
$R\&D/A_t$	5.698		6.654	5.710	5.863	6.418
	48.552		23.628	48.669	40.750	17.771
$R\&D/A_t*Sent_t$					−0.010	0.031
					−1.469	1.772
$PPENT_t$	0.447	0.039	0.571	0.454	0.702	0.879
	10.819	0.480	6.730	10.980	14.026	7.891
$PPENT_t*Sent_t$					−0.022	−0.024
					−8.807	−4.697
$INTAN_t$	0.704	−0.334	0.066	0.686	0.661	0.174
	13.080	−3.458	0.668	12.726	10.057	1.438
$INTAN_t*Sent_t$					0.002	−0.002
					0.651	−0.262
$CFcollins_t$	−2.974	−3.190	−2.484	−2.920	−2.976	−2.393
	−30.548	−5.353	−4.151	−30.023	−27.940	−3.902
$CFcollins_t*Sent_t$					0.006	0.003
					1.519	0.334
$ACCcollins_t$	−0.899	−1.087	−0.114	−0.849	−0.705	0.541
	−9.067	−1.810	−0.190	−8.563	−6.502	0.877
$ACCcollins_t*Sent_t$					−0.013	−0.045
					−3.162	−4.462
$AAIIbullbear_t$				0.009	0.014	0.018
				18.246	11.860	6.376

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Table 24 – continued from the previous page						
	A	B	C	D	E	F
$AltZ1_t$	0.051	0.080	0.077	0.050	0.050	0.072
	35.918	23.394	22.657	35.348	35.223	21.152
Age_t	−0.001	−0.001	−0.001	−0.001	−0.001	−0.001
	−22.372	−14.017	−14.029	−21.395	−21.335	−13.255
$Size_t$	−0.153	−0.178	−0.178	−0.160	−0.160	−0.174
	−28.576	−13.091	−13.092	−29.856	−29.764	−12.775
$StdRet_t$	−0.006	−0.013	−0.013	−0.006	−0.006	−0.012
	−30.020	−22.378	−21.699	−29.995	−29.915	−19.092
$Turnover_t$	0.002	0.000	−0.001	0.002	0.002	−0.000
	20.476	0.127	−2.564	20.411	20.367	−0.903
$StdROA_t$	0.000	0.033	0.024	0.000	0.000	0.021
	4.213	15.547	11.525	4.250	4.285	9.953
$Beta_t$	0.693	1.026	1.022	0.703	0.700	1.018
	69.241	44.261	43.943	69.971	69.625	43.629
ROA_t	0.027	1.061	0.883	0.023	0.027	0.979
	0.377	1.856	1.542	0.328	0.379	1.709
$Leverage_t$	1.052	0.944	1.239	1.057	1.062	1.146
	23.872	9.820	12.750	23.984	24.083	11.767
N	55,108	15,880	15,880	55,104	55,104	15,880
Pseudo-R^2	0.299	0.266	0.290	0.303	0.305	0.305
Model	Eq. 22	Eq. 23	Eq. 24	Eq. 25	Eq. 26	Eq. 27

3.1.2 Annual VERR Decile Assignments Used with the Baseline Specification

For Tables 25 through 30 capm5 *VERR* valuation measures are used to assign firm years to valuation deciles for each calendar year during the 1964–2009 period. The first three tables, Tables 25 through 27, use scaled values of the Sloan (1996) measures of cash flow and accruals as part of the baseline specification. The data required to calculate the cash flow and accruals measures following Sloan (1996) is available sporadically for firms prior to mid-1970, and very consistently thereafter. Table 25 employs the Investors Intelligence measure of sentiment, which is available for the full 1964–2009 period. Table 26 employs the sentiment data from Baker and Wurgler (2007), which is available beginning in the middle of 1965. Table 27 employs the AAII measure of sentiment, which is first available in the middle of 1987. The more limited availability of the AAII measure accounts for the smaller number of observations involved in the analyses presented in Table 27.

The second three tables, Tables 28 through 30, use scaled values of the Collins et al. (2003) measures of cash flow and accruals as part of the baseline specification. The data required to calculate the cash flow and accruals measures following Collins et al. (2003) is available sporadically for firms beginning in 1987 and continuing through mid-1988, and consistently thereafter. Table 28 employs the Investors Intelligence measure of sentiment, which is available for the full 1964–2009 period. Table 29 employs the sentiment data from Baker and Wurgler (2007), which is available beginning in the middle of 1965. Table 30 employs the AAII measure of sentiment, which is first available in the middle of 1987. The more limited availability of the Collins et al. (2003) measures of cash flow and accruals accounts for the smaller number of observations involved in the analyses presented in Tables 28 through Tables 30.

Table 25
Determinants of Annual capm5 VERR Decile Assignments Using Investors Intelligence Sentiment and Sloan Accruals and Cash Flow

The ordered logistic regressions use the annual capm5 *VERR* decile assignments from 1964–2009 as the dependent variable. Some independent variables are not available for the full period. CEO compensation characteristics, vega and delta, are obtained from Professor Naveen's website and are rescaled to be in millions. Scaled cash flow and accruals data are calculated in accordance with Sloan (1996). Sentiment is calculated as the monthly average of the weekly difference between the bullish and bearish sentiment reported by Investors Intelligence. Advertising (AD), R&D, cash flow (CF), and accruals (ACC) are scaled by average total assets; intangible assets (INTAN) and property, plant, and equipment (PPENT) are scaled by end of the year assets. A version of Altman's Z, firm age, firm size, the standard deviation of returns, stock turnover, return on assets, the standard deviation of return on assets, beta, and total liabilities scaled by assets are included as control variables. The *t*-statistics are reported below each coefficient.

	A	B	C	D	E	F
$Vega_t$		0.281	0.178			0.188
		4.239	2.685			2.809
$Delta_t$		0.004	0.003			0.003
		2.451	2.158			2.144
AD_t	0.989	−0.356	0.220	0.990	0.798	−0.460
	7.930	−1.090	0.673	7.936	4.909	−0.865
AD_t*Sent_t					0.013	0.033
					1.868	1.550
$R\&D/A_t$	5.514		6.310	5.515	5.474	5.636
	52.352		22.741	52.358	38.531	13.857
$R\&D/A_t*Sent_t$					0.002	0.036
					0.312	2.226
$PPENT_t$	0.414	−0.258	0.244	0.414	0.609	0.390
	12.029	−3.166	2.877	12.043	13.688	3.001
$PPENT_t*Sent_t$					−0.012	−0.008
					−6.760	−1.546
$INTAN_t$	0.723	−0.140	0.237	0.721	0.887	0.534
	14.681	−1.435	2.390	14.590	12.195	3.410
$INTAN_t*Sent_t$					−0.009	−0.013
					−3.380	−2.282
$CFsloan_t$	−1.240	−1.131	−0.843	−1.237	−1.181	−0.967
	−15.826	−5.144	−3.805	−15.765	−13.439	−3.483
$CFsloan_t*Sent_t$					−0.003	0.005
					−1.248	0.603
$ACCsloan_t$	0.019	−0.696	−0.217	0.024	0.249	0.148
	0.198	−2.381	−0.739	0.247	2.197	0.358
$ACCsloan_t*Sent_t$					−0.014	−0.021
					−3.626	−1.391
$IIbullbear_t$				0.000	0.004	−0.001
				0.658	5.241	−0.315

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Table 25 – continued from the previous page						
	A	B	C	D	E	F
$AltZ1_t$	0.034	0.044	0.041	0.034	0.033	0.041
	29.524	14.575	13.761	29.512	29.452	13.706
Age_t	−0.001	−0.001	−0.001	−0.001	−0.001	−0.001
	−22.010	−10.849	−10.683	−21.975	−21.903	−10.820
$Size_t$	−0.126	−0.157	−0.157	−0.126	−0.126	−0.156
	−28.487	−11.480	−11.444	−28.494	−28.634	−11.368
$StdRet_t$	−0.003	−0.003	−0.002	−0.003	−0.003	−0.003
	−15.831	−4.493	−3.770	−15.546	−15.443	−4.420
$Turnover_t$	0.002	0.001	0.001	0.002	0.002	0.001
	21.748	5.562	2.984	21.640	21.548	3.176
$StdROA_t$	0.001	0.024	0.015	0.001	0.001	0.015
	4.503	11.655	7.696	4.502	4.520	7.608
$Beta_t$	0.676	0.934	0.931	0.676	0.675	0.937
	78.723	40.717	40.465	78.692	78.469	40.464
ROA_t	−0.721	−0.148	0.148	−0.722	−0.720	0.151
	−9.581	−0.704	0.704	−9.587	−9.560	0.719
$Leverage_t$	0.702	0.381	0.649	0.703	0.707	0.633
	18.901	3.979	6.730	18.914	19.016	6.564
N	81,300	15,629	15,629	81,300	81,300	15,629
Pseudo-R^2	0.237	0.246	0.270	0.237	0.237	0.271
Model	Eq. 22	Eq. 23	Eq. 24	Eq. 25	Eq. 26	Eq. 27

Table 26
Determinants of Annual capm5 VERR Decile Assignments Using Baker-Wurgler Sentiment and Sloan Accruals and Cash Flow

The ordered logistic regressions use the annual capm5 *VERR* decile assignments from 1964–2009 as the dependent variable. Some independent variables are not available for the full period. CEO compensation characteristics, vega and delta, are obtained from Professor Naveen's website and are rescaled to be in millions. Scaled cash flow and accruals data are calculated in accordance with Sloan (1996). Monthly orthogonalized sentiment values introduced by Baker and Wurgler (2007) are used. Advertising (AD), R&D, cash flow (CF), and accruals (ACC) are scaled by average total assets; intangible assets (INTAN) and property, plant, and equipment (PPENT) are scaled by end of the year assets. A version of Altman's Z, firm age, firm size, the standard deviation of returns, stock turnover, return on assets, the standard deviation of return on assets, beta, and total liabilities scaled by assets are included as control variables. The *t*-statistics are reported below each coefficient.

	A	B	C	D	E	F
$Vega_t$		0.281	0.178			0.194
		4.239	2.685			2.922
$Delta_t$		0.004	0.003			0.003
		2.451	2.158			2.229
AD_t	0.989	−0.356	0.220	0.986	1.096	0.349
	7.930	−1.090	0.673	7.911	8.753	1.044
AD_t*$Sent_t$					−1.353	−0.384
					−9.088	−0.685
$R\&D/A_t$	5.514		6.310	5.520	5.558	6.199
	52.352		22.741	52.382	52.112	22.011
$R\&D/A_t$*$Sent_t$					−0.366	0.644
					−2.366	1.304
$PPENT_t$	0.414	−0.258	0.244	0.415	0.431	0.277
	12.029	−3.166	2.877	12.060	12.496	3.189
$PPENT_t$*$Sent_t$					−0.138	−0.182
					−3.492	−1.236
$INTAN_t$	0.723	−0.140	0.237	0.725	0.718	0.287
	14.681	−1.435	2.390	14.704	14.498	2.867
$INTAN_t$*$Sent_t$					0.095	0.004
					1.330	0.022
$CFsloan_t$	−1.240	−1.131	−0.843	−1.257	−1.287	−0.972
	−15.826	−5.144	−3.805	−16.018	−16.377	−4.322
$CFsloan_t$*$Sent_t$					0.216	0.828
					3.593	3.464
$ACCsloan_t$	0.019	−0.696	−0.217	0.003	−0.008	−0.345
	0.198	−2.381	−0.739	0.028	−0.079	−1.135
$ACCsloan_t$*$Sent_t$					0.050	0.848
					0.600	2.307
$BWsent_t$				−0.034	0.012	0.263
				−4.590	0.631	3.267

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Table 26 – continued from the previous page						
	A	B	C	D	E	F
$AltZ1_t$	0.034	0.044	0.041	0.034	0.034	0.039
	29.524	14.575	13.761	29.631	29.701	12.992
Age_t	−0.001	−0.001	−0.001	−0.001	−0.001	−0.001
	−22.010	−10.849	−10.683	−21.946	−21.949	−10.332
$Size_t$	−0.126	−0.157	−0.157	−0.126	−0.126	−0.163
	−28.487	−11.480	−11.444	−28.422	−28.517	−11.910
$StdRet_t$	−0.003	−0.003	−0.002	−0.003	−0.003	−0.004
	−15.831	−4.493	−3.770	−15.795	−15.922	−6.358
$Turnover_t$	0.002	0.001	0.001	0.002	0.002	0.001
	21.748	5.562	2.984	21.961	21.983	3.691
$StdROA_t$	0.001	0.024	0.015	0.001	0.001	0.015
	4.503	11.655	7.696	4.496	4.505	7.587
$Beta_t$	0.676	0.934	0.931	0.674	0.675	0.982
	78.723	40.717	40.465	78.256	78.212	41.814
ROA_t	−0.721	−0.148	0.148	−0.715	−0.725	0.034
	−9.581	−0.704	0.704	−9.499	−9.644	0.159
$Leverage_t$	0.702	0.381	0.649	0.704	0.706	0.583
	18.901	3.979	6.730	18.939	18.983	6.040
N	81,300	15,629	15,629	81,262	81,262	15,629
Pseudo-R^2	0.237	0.246	0.270	0.237	0.238	0.278
Model	Eq. 22	Eq. 23	Eq. 24	Eq. 25	Eq. 26	Eq. 27

Table 27
Determinants of Annual capm5 VERR Decile Assignments Using AAII Sentiment and Sloan Accruals and Cash Flow

The ordered logistic regressions use the annual capm5 *VERR* decile assignments from 1964–2009 as the dependent variable. Some independent variables are not available for the full period. CEO compensation characteristics, vega and delta, are obtained from Professor Naveen's website and are rescaled to be in millions. Scaled cash flow and accruals data are calculated in accordance with Sloan (1996). Sentiment is calculated as the monthly average of the weekly difference between the bullish and bearish sentiment reported by AAII. Advertising (AD), R&D, cash flow (CF), and accruals (ACC) are scaled by average total assets; intangible assets (INTAN) and property, plant, and equipment (PPENT) are scaled by end of the year assets. A version of Altman's Z, firm age, firm size, the standard deviation of returns, stock turnover, return on assets, the standard deviation of return on assets, beta, and total liabilities scaled by assets are included as control variables. The *t*-statistics are reported below each coefficient.

	A	B	C	D	E	F
$Vega_t$		0.281	0.178			0.149
		4.239	2.685			2.243
$Delta_t$		0.004	0.003			0.003
		2.451	2.158			2.295
AD_t	0.989	−0.356	0.220	0.957	1.095	−0.697
	7.930	−1.090	0.673	6.377	5.836	−1.637
AD_t*Sent_t					−0.011	0.065
					−1.183	3.014
$R\&D/A_t$	5.514		6.310	5.441	5.604	5.950
	52.352		22.741	47.977	39.768	16.553
$R\&D/A_t*Sent_t$					−0.012	0.030
					−1.775	1.795
$PPENT_t$	0.414	−0.258	0.244	0.288	0.487	0.389
	12.029	−3.166	2.877	7.059	9.840	3.453
$PPENT_t*Sent_t$					−0.017	−0.010
					−6.968	−1.988
$INTAN_t$	0.723	−0.140	0.237	0.751	0.755	0.220
	14.681	−1.435	2.390	14.005	11.514	1.804
$INTAN_t*Sent_t$					−0.000	0.005
					−0.118	0.911
$CFsloan_t$	−1.240	−1.131	−0.843	−2.005	−2.040	−0.948
	−15.826	−5.144	−3.805	−22.732	−21.537	−3.721
$CFsloan_t*Sent_t$					0.003	0.014
					1.064	1.581
$ACCsloan_t$	0.019	−0.696	−0.217	−0.933	−0.872	0.069
	0.198	−2.381	−0.739	−8.253	−6.918	0.192
$ACCsloan_t*Sent_t$					−0.005	−0.008
					−0.949	−0.560
$AAIIbullbear_t$				0.002	0.007	0.007
				4.602	6.077	2.448

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Table 27 – continued from the previous page						
	A	B	C	D	E	F
$AltZ1_t$	0.034	0.044	0.041	0.031	0.031	0.038
	29.524	14.575	13.761	26.075	25.964	12.828
Age_t	−0.001	−0.001	−0.001	−0.001	−0.001	−0.001
	−22.010	−10.849	−10.683	−19.822	−19.785	−10.164
$Size_t$	−0.126	−0.157	−0.157	−0.120	−0.120	−0.155
	−28.487	−11.480	−11.444	−22.852	−22.862	−11.289
$StdRet_t$	−0.003	−0.003	−0.002	−0.004	−0.004	−0.001
	−15.831	−4.493	−3.770	−17.635	−17.676	−2.471
$Turnover_t$	0.002	0.001	0.001	0.002	0.002	0.001
	21.748	5.562	2.984	21.638	21.600	3.920
$StdROA_t$	0.001	0.024	0.015	0.000	0.000	0.014
	4.503	11.655	7.696	4.353	4.374	6.857
$Beta_t$	0.676	0.934	0.931	0.686	0.684	0.929
	78.723	40.717	40.465	68.979	68.742	40.283
ROA_t	−0.721	−0.148	0.148	−0.336	−0.337	0.160
	−9.581	−0.704	0.704	−4.211	−4.230	0.762
$Leverage_t$	0.702	0.381	0.649	0.794	0.798	0.587
	18.901	3.979	6.730	18.418	18.487	6.078
N	81,300	15,629	15,629	55,986	55,986	15,629
Pseudo-R^2	0.237	0.246	0.270	0.288	0.289	0.276
Model	Eq. 22	Eq. 23	Eq. 24	Eq. 25	Eq. 26	Eq. 27

Table 28
Determinants of Annual capm5 VERR Decile Assignments Using Investors Intelligence Sentiment and Collins Accruals and Cash Flow

The ordered logistic regressions use the annual capm5 *VERR* decile assignments from 1964–2009 as the dependent variable. Some independent variables are not available for the full period. CEO compensation characteristics, vega and delta, are obtained from Professor Naveen's website and are rescaled to be in millions. Scaled cash flow and accruals data are calculated in accordance with Collins et al. (2003). Sentiment is calculated as the monthly average of the weekly difference between the bullish and bearish sentiment reported by Investors Intelligence. Advertising (AD), R&D, cash flow (CF), and accruals (ACC) are scaled by average total assets; intangible assets (INTAN) and property, plant, and equipment (PPENT) are scaled by end of the year assets. A version of Altman's Z, firm age, firm size, the standard deviation of returns, stock turnover, return on assets, the standard deviation of return on assets, beta, and total liabilities scaled by assets are included as control variables. The *t*-statistics are reported below each coefficient.

	A	B	C	D	E	F
$Vega_t$		0.306	0.206			0.210
		4.716	3.163			3.203
$Delta_t$		0.004	0.003			0.003
		2.553	2.300			2.284
AD_t	0.826	−0.392	0.224	0.826	1.021	−0.396
	5.460	−1.233	0.701	5.460	4.980	−0.791
AD_t*$Sent_t$					−0.014	0.029
					−1.473	1.448
$R\&D/A_t$	5.560		6.417	5.560	5.535	6.144
	48.910		23.222	48.904	35.653	15.198
$R\&D/A_t$*$Sent_t$					0.000	0.014
					0.036	0.875
$PPENT_t$	0.320	−0.228	0.291	0.320	0.535	0.520
	7.792	−2.823	3.453	7.790	9.829	4.100
$PPENT_t$*$Sent_t$					−0.014	−0.012
					−5.840	−2.506
$INTAN_t$	0.708	−0.198	0.202	0.707	0.940	0.538
	13.215	−2.056	2.063	13.141	11.748	3.491
$INTAN_t$*$Sent_t$					−0.013	−0.015
					−4.127	−2.678
$CFcollins_t$	−2.582	−1.140	−0.492	−2.582	−2.480	−0.320
	−27.039	−1.925	−0.826	−27.025	−22.590	−0.511
$CFcollins_t$*$Sent_t$					−0.006	−0.012
					−1.600	−1.242
$ACCcollins_t$	−0.994	−0.200	0.639	−0.993	−0.733	1.762
	−10.065	−0.333	1.065	−10.057	−6.357	2.822
$ACCcollins_t$*$Sent_t$					−0.016	−0.066
					−4.132	−6.495
$IIbullbear_t$				0.000	0.005	0.001
				0.073	4.605	0.478

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Table 28 – continued from the previous page						
	A	B	C	D	E	F
$AltZ1_t$	0.030	0.041	0.039	0.030	0.030	0.039
	25.470	14.187	13.595	25.469	25.423	13.543
Age_t	−0.001	−0.001	−0.001	−0.001	−0.001	−0.001
	−20.030	−10.914	−10.788	−20.024	−19.978	−10.800
$Size_t$	−0.120	−0.159	−0.159	−0.120	−0.121	−0.155
	−22.597	−11.728	−11.706	−22.531	−22.635	−11.392
$StdRet_t$	−0.004	−0.003	−0.002	−0.004	−0.004	−0.002
	−17.372	−4.571	−3.906	−17.252	−17.043	−3.666
$Turnover_t$	0.002	0.001	0.001	0.002	0.002	0.001
	21.633	5.545	3.108	21.529	21.467	3.177
$StdROA_t$	0.000	0.024	0.016	0.000	0.000	0.016
	4.251	11.951	7.996	4.250	4.253	7.954
$Beta_t$	0.682	0.936	0.932	0.682	0.681	0.934
	68.720	41.093	40.798	68.715	68.556	40.643
ROA_t	−0.008	−0.257	−0.430	−0.008	−0.007	−0.375
	−0.111	−0.450	−0.753	−0.111	−0.092	−0.657
$Leverage_t$	0.651	0.254	0.540	0.651	0.658	0.522
	15.099	2.702	5.686	15.085	15.232	5.489
N	55,108	15,880	15,880	55,108	55,108	15,880
Pseudo-R^2	0.290	0.247	0.271	0.290	0.291	0.274
Model	Eq. 22	Eq. 23	Eq. 24	Eq. 25	Eq. 26	Eq. 27

Table 29
Determinants of Annual capm5 VERR Decile Assignments Using Baker-Wurgler Sentiment and Collins Accruals and Cash Flow

The ordered logistic regressions use the annual capm5 *VERR* decile assignments from 1964–2009 as the dependent variable. Some independent variables are not available for the full period. CEO compensation characteristics, vega and delta, are obtained from Professor Naveen's website and are rescaled to be in millions. Scaled cash flow and accruals data are calculated in accordance with Collins et al. (2003). Monthly orthogonalized sentiment values introduced by Baker and Wurgler (2007) are used. Advertising (AD), R&D, cash flow (CF), and accruals (ACC) are scaled by average total assets; intangible assets (INTAN) and property, plant, and equipment (PPENT) are scaled by end of the year assets. A version of Altman's Z, firm age, firm size, the standard deviation of returns, stock turnover, return on assets, the standard deviation of return on assets, beta, and total liabilities scaled by assets are included as control variables. The *t*-statistics are reported below each coefficient.

	A	B	C	D	E	F
$Vega_t$		0.306	0.206			0.219
		4.716	3.163			3.350
$Delta_t$		0.004	0.003			0.003
		2.553	2.300			2.345
AD_t	0.826	−0.392	0.224	0.825	0.907	0.316
	5.460	−1.233	0.701	5.452	5.921	0.972
AD_t*Sent_t					−0.605	−0.344
					−2.287	−0.618
$R\&D/A_t$	5.560		6.417	5.560	5.567	6.358
	48.910		23.222	48.908	48.307	22.580
$R\&D/A_t*Sent_t$					−0.383	0.274
					−1.996	0.562
$PPENT_t$	0.320	−0.228	0.291	0.320	0.333	0.328
	7.792	−2.823	3.453	7.787	8.072	3.818
$PPENT_t*Sent_t$					−0.234	−0.267
					−3.243	−1.831
$INTAN_t$	0.708	−0.198	0.202	0.708	0.742	0.254
	13.215	−2.056	2.063	13.222	13.733	2.566
$INTAN_t*Sent_t$					−0.390	−0.043
					−4.233	−0.238
$CFcollins_t$	−2.582	−1.140	−0.492	−2.583	−2.739	−0.260
	−27.039	−1.925	−0.826	−27.045	−28.404	−0.433
$CFcollins_t*Sent_t$					1.056	0.756
					10.931	2.826
$ACCcollins_t$	−0.994	−0.200	0.639	−0.994	−1.113	0.967
	−10.065	−0.333	1.065	−10.070	−11.124	1.597
$ACCcollins_t*Sent_t$					0.437	−0.019
					4.612	−0.084
$BWsent_t$				−0.008	0.082	0.310
				−0.614	2.544	3.980

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Table 29 – continued from the previous page						
	A	B	C	D	E	F
$AltZ1_t$	0.030	0.041	0.039	0.030	0.030	0.036
	25.470	14.187	13.595	25.471	25.622	12.699
Age_t	−0.001	−0.001	−0.001	−0.001	−0.001	−0.001
	−20.030	−10.914	−10.788	−20.037	−20.148	−10.419
$Size_t$	−0.120	−0.159	−0.159	−0.120	−0.119	−0.165
	−22.597	−11.728	−11.706	−22.464	−22.375	−12.149
$StdRet_t$	−0.004	−0.003	−0.002	−0.004	−0.004	−0.004
	−17.372	−4.571	−3.906	−17.201	−17.251	−6.354
$Turnover_t$	0.002	0.001	0.001	0.002	0.002	0.001
	21.633	5.545	3.108	21.639	21.477	3.796
$StdROA_t$	0.000	0.024	0.016	0.000	0.000	0.016
	4.251	11.951	7.996	4.250	4.267	7.952
$Beta_t$	0.682	0.936	0.932	0.682	0.687	0.981
	68.720	41.093	40.798	68.584	68.900	42.080
ROA_t	−0.008	−0.257	−0.430	−0.008	−0.012	−0.834
	−0.111	−0.450	−0.753	−0.106	−0.162	−1.456
$Leverage_t$	0.651	0.254	0.540	0.650	0.642	0.475
	15.099	2.702	5.686	15.091	14.878	4.997
N	55,108	15,880	15,880	55,108	55,108	15,880
Pseudo-R^2	0.290	0.247	0.271	0.290	0.292	0.279
Model	Eq. 22	Eq. 23	Eq. 24	Eq. 25	Eq. 26	Eq. 27

Table 30
Determinants of Annual capm5 VERR Decile Assignments Using AAII Sentiment and Collins Accruals and Cash Flow

The ordered logistic regressions use the annual capm5 *VERR* decile assignments from 1964–2009 as the dependent variable. Some independent variables are not available for the full period. CEO compensation characteristics, vega and delta, are obtained from Professor Naveen's website and are rescaled to be in millions. Scaled cash flow and accruals data are calculated in accordance with Collins et al. (2003). Sentiment is calculated as the monthly average of the weekly difference between the bullish and bearish sentiment reported by AAII. Advertising (AD), R&D, cash flow (CF), and accruals (ACC) are scaled by average total assets; intangible assets (INTAN) and property, plant, and equipment (PPENT) are scaled by end of the year assets. A version of Altman's Z, firm age, firm size, the standard deviation of returns, stock turnover, return on assets, the standard deviation of return on assets, beta, and total liabilities scaled by assets are included as control variables. The t-statistics are reported below each coefficient.

	A	B	C	D	E	F
Vega_t		0.306	0.206			0.174
		4.716	3.163			2.667
Delta_t		0.004	0.003			0.004
		2.553	2.300			2.396
AD_t	0.826	−0.392	0.224	0.838	0.972	−0.591
	5.460	−1.233	0.701	5.537	5.138	−1.441
$\text{AD}_t\text{*Sent}_t$					−0.011	0.058
					−1.133	2.765
$\text{R\&D/A}_t$	5.560		6.417	5.558	5.767	6.280
	48.910		23.222	48.902	40.861	17.576
$\text{R\&D/A}_t\text{*Sent}_t$					−0.016	0.015
					−2.258	0.899
PPENT_t	0.320	−0.228	0.291	0.321	0.529	0.448
	7.792	−2.823	3.453	7.831	10.625	4.042
$\text{PPENT}_t\text{*Sent}_t$					−0.018	−0.012
					−7.218	−2.398
INTAN_t	0.708	−0.198	0.202	0.704	0.710	0.204
	13.215	−2.056	2.063	13.137	10.837	1.693
$\text{INTAN}_t\text{*Sent}_t$					−0.001	0.004
					−0.179	0.699
CFcollins_t	−2.582	−1.140	−0.492	−2.569	−2.635	−0.412
	−27.039	−1.925	−0.826	−26.900	−25.115	−0.675
$\text{CFcollins}_t\text{*Sent}_t$					0.006	0.001
					1.550	0.138
ACCcollins_t	−0.994	−0.200	0.639	−0.982	−0.925	1.062
	−10.065	−0.333	1.065	−9.955	−8.534	1.726
$\text{ACCcollins}_t\text{*Sent}_t$					−0.005	−0.028
					−1.337	−2.836
AAIIbullbear_t				0.002	0.007	0.009
				4.455	6.186	3.166

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Table 30 – continued from the previous page						
	A	B	C	D	E	F
$AltZ1_t$	0.030	0.041	0.039	0.029	0.029	0.036
	25.470	14.187	13.595	25.300	25.205	12.657
Age_t	−0.001	−0.001	−0.001	−0.001	−0.001	−0.001
	−20.030	−10.914	−10.788	−19.728	−19.684	−10.273
$Size_t$	−0.120	−0.159	−0.159	−0.121	−0.121	−0.155
	−22.597	−11.728	−11.706	−22.833	−22.781	−11.457
$StdRet_t$	−0.004	−0.003	−0.002	−0.004	−0.004	−0.001
	−17.372	−4.571	−3.906	−17.289	−17.274	−2.344
$Turnover_t$	0.002	0.001	0.001	0.002	0.002	0.001
	21.633	5.545	3.108	21.616	21.578	3.951
$StdROA_t$	0.000	0.024	0.016	0.000	0.000	0.014
	4.251	11.951	7.996	4.248	4.266	7.148
$Beta_t$	0.682	0.936	0.932	0.684	0.682	0.930
	68.720	41.093	40.798	68.819	68.573	40.561
ROA_t	−0.008	−0.257	−0.430	−0.009	−0.006	−0.387
	−0.111	−0.450	−0.753	−0.122	−0.084	−0.677
$Leverage_t$	0.651	0.254	0.540	0.651	0.655	0.489
	15.099	2.702	5.686	15.111	15.182	5.134
N	55,108	15,880	15,880	55,104	55,104	15,880
Pseudo-R^2	0.290	0.247	0.271	0.290	0.291	0.277
Model	Eq. 22	Eq. 23	Eq. 24	Eq. 25	Eq. 26	Eq. 27

3.1.3 Full Period eVERR Decile Assignments Used with the Baseline Specification

For Tables 31 through 36 capm5 *eVERR* valuation measures are used to assign firm years to valuation deciles across the 1964–2009 period. The first three tables, Tables 31 through 33, use scaled values of the Sloan (1996) measures of cash flow and accruals as part of the baseline specification. The data required to calculate the cash flow and accruals measures following Sloan (1996) is available sporadically for firms prior to mid-1970, and very consistently thereafter. Table 31 employs the Investors Intelligence measure of sentiment, which is available for the full 1964–2009 period. Table 32 employs the sentiment data from Baker and Wurgler (2007), which is available beginning in the middle of 1965. Table 33 employs the AAII measure of sentiment, which is first available in the middle of 1987. The more limited availability of the AAII measure accounts for the smaller number of observations involved in the analyses presented in Table 33.

The second three tables, Tables 34 through 36, use scaled values of the Collins et al. (2003) measures of cash flow and accruals as part of the baseline specification. The data required to calculate the cash flow and accruals measures following Collins et al. (2003) is available sporadically for firms beginning in 1987 and continuing through mid-1988, and consistently thereafter. Table 34 employs the Investors Intelligence measure of sentiment, which is available for the full 1964–2009 period. Table 35 employs the sentiment data from Baker and Wurgler (2007), which is available beginning in the middle of 1965. Table 36 employs the AAII measure of sentiment, which is first available in the middle of 1987. The more limited availability of the Collins et al. (2003) measures of cash flow and accruals accounts for the smaller number of observations involved in the analyses presented in Tables 34 through Tables 36.

Table 31
Determinants of Full Sample capm5 eVERR Decile Assignments Using Investors Intelligence Sentiment and Sloan Accruals and Cash Flow

The ordered logistic regressions use the full period capm5 *eVERR* decile assignments from 1964–2009 as the dependent variable. Some independent variables are not available for the full period. CEO compensation characteristics, vega and delta, are obtained from Professor Naveen's website and are rescaled to be in millions. Scaled cash flow and accruals data are calculated in accordance with Sloan (1996). Sentiment is calculated as the monthly average of the weekly difference between the bullish and bearish sentiment reported by Investors Intelligence. Advertising (AD), R&D, cash flow (CF), and accruals (ACC) are scaled by average total assets; intangible assets (INTAN) and property, plant, and equipment (PPENT) are scaled by end of the year assets. A version of Altman's Z, firm age, firm size, the standard deviation of returns, stock turnover, return on assets, the standard deviation of return on assets, beta, and total liabilities scaled by assets are included as control variables. The *t*-statistics are reported below each coefficient.

	A	B	C	D	E	F
$Vega_t$		0.527	0.412			0.327
		8.040	6.334			5.021
$Delta_t$		0.007	0.008			0.008
		3.402	3.380			3.493
AD_t	0.598	−0.392	0.295	0.612	0.380	−0.407
	4.776	−1.190	0.894	4.883	2.329	−0.757
AD_t*Sent_t					0.016	0.038
					2.345	1.759
$R\&D/A_t$	6.074		7.624	6.093	5.514	7.070
	54.366		26.591	54.538	38.127	16.954
$R\&D/A_t*Sent_t$					0.035	0.048
					5.785	2.906
$PPENT_t$	−0.768	−1.420	−0.857	−0.763	−0.606	−0.591
	−22.054	−17.180	−10.017	−21.923	−13.523	−4.528
$PPENT_t*Sent_t$					−0.010	−0.013
					−5.464	−2.543
$INTAN_t$	0.374	−1.272	−0.873	0.329	−0.038	−1.136
	7.604	−12.918	−8.740	6.664	−0.527	−7.193
$INTAN_t*Sent_t$					0.016	0.006
					6.130	1.126
$CFsloan_t$	−3.336	−1.716	−1.344	−3.287	−3.197	−1.381
	−46.694	−7.611	−5.870	−46.003	−38.920	−4.839
$CFsloan_t*Sent_t$					−0.004	0.024
					−1.350	2.706
$ACCsloan_t$	−1.858	0.114	0.830	−1.785	−1.911	1.128
	−20.874	0.385	2.769	−20.015	−18.050	2.687
$ACCsloan_t*Sent_t$					0.012	0.009
					3.020	0.622
$IIbullbear_t$				0.004	0.005	0.009
				10.435	5.842	3.182

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Table 31 – continued from the previous page						
	A	B	C	D	E	F
$AltZ1_t$	0.089	0.110	0.105	0.088	0.088	0.102
	52.854	27.138	26.270	52.612	52.491	25.710
Age_t	−0.000	−0.001	−0.001	−0.000	−0.000	−0.001
	−5.728	−10.548	−10.515	−5.417	−5.370	−10.206
$Size_t$	−0.114	−0.124	−0.127	−0.115	−0.116	−0.125
	−25.600	−9.101	−9.315	−25.843	−25.978	−9.122
$StdRet_t$	−0.005	−0.016	−0.015	−0.005	−0.004	−0.013
	−25.935	−25.666	−24.806	−24.089	−23.162	−19.717
$Turnover_t$	0.004	−0.001	−0.002	0.004	0.004	−0.002
	32.804	−6.158	−9.405	31.905	31.662	−10.789
$StdROA_t$	0.002	0.039	0.028	0.002	0.001	0.025
	5.983	17.822	13.326	5.899	5.846	11.918
$Beta_t$	0.555	1.134	1.134	0.554	0.552	1.121
	64.638	47.945	47.732	64.498	64.263	47.002
ROA_t	−0.108	0.639	0.985	−0.107	−0.118	0.795
	−1.952	3.049	4.658	−1.940	−2.132	3.750
$Leverage_t$	0.289	0.333	0.637	0.296	0.306	0.626
	7.521	3.367	6.403	7.708	7.960	6.297
N	81,443	15,728	15,728	81,443	81,443	15,728
Pseudo-R^2	0.311	0.351	0.377	0.312	0.314	0.384
Model	Eq. 22	Eq. 23	Eq. 24	Eq. 25	Eq. 26	Eq. 27

Table 32
Determinants of Full Sample capm5 eVERR Decile Assignments Using Baker-Wurgler Sentiment and Sloan Accruals and Cash Flow

The ordered logistic regressions use the full period capm5 *eVERR* decile assignments from 1964–2009 as the dependent variable. Some independent variables are not available for the full period. CEO compensation characteristics, vega and delta, are obtained from Professor Naveen's website and are rescaled to be in millions. Scaled cash flow and accruals data are calculated in accordance with Sloan (1996). Monthly orthogonalized sentiment values introduced by Baker and Wurgler (2007) are used. Advertising (AD), R&D, cash flow (CF), and accruals (ACC) are scaled by average total assets; intangible assets (INTAN) and property, plant, and equipment (PPENT) are scaled by end of the year assets. A version of Altman's Z, firm age, firm size, the standard deviation of returns, stock turnover, return on assets, the standard deviation of return on assets, beta, and total liabilities scaled by assets are included as control variables. The t-statistics are reported below each coefficient.

	A	B	C	D	E	F
$Vega_t$		0.527	0.412			0.476
		8.040	6.334			7.302
$Delta_t$		0.007	0.008			0.007
		3.402	3.380			3.359
AD_t	0.598	−0.392	0.295	0.709	0.803	0.555
	4.776	−1.190	0.894	5.646	6.396	1.645
AD_t*Sent_t					−1.027	−1.430
					−6.910	−2.535
$R\&D/A_t$	6.074		7.624	6.172	6.207	7.380
	54.366		26.591	55.377	55.157	25.422
$R\&D/A_t*Sent_t$					−1.007	2.510
					−6.229	4.718
$PPENT_t$	−0.768	−1.420	−0.857	−0.849	−0.841	−0.821
	−22.054	−17.180	−10.017	−24.343	−24.025	−9.377
$PPENT_t*Sent_t$					−0.118	−0.353
					−2.954	−2.383
$INTAN_t$	0.374	−1.272	−0.873	0.363	0.409	−0.805
	7.604	−12.918	−8.740	7.371	8.268	−7.958
$INTAN_t*Sent_t$					−0.669	0.046
					−9.431	0.253
$CFsloan_t$	−3.336	−1.716	−1.344	−3.139	−3.257	−1.363
	−46.694	−7.611	−5.870	−43.925	−45.235	−5.862
$CFsloan_t*Sent_t$					0.839	0.816
					13.446	3.290
$ACCsloan_t$	−1.858	0.114	0.830	−1.601	−1.739	0.921
	−20.874	0.385	2.769	−17.948	−19.339	2.969
$ACCsloan_t*Sent_t$					0.925	0.728
					10.949	1.916
$BWsent_t$				0.584	0.616	0.629
				76.396	32.423	7.669

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Table 32 – continued from the previous page						
	A	B	C	D	E	F
$AltZ1_t$	0.089	0.110	0.105	0.086	0.087	0.100
	52.854	27.138	26.270	51.430	51.756	25.093
Age_t	−0.000	−0.001	−0.001	−0.000	−0.000	−0.001
	−5.728	−10.548	−10.515	−7.203	−7.641	−10.008
$Size_t$	−0.114	−0.124	−0.127	−0.121	−0.121	−0.142
	−25.600	−9.101	−9.315	−27.097	−26.950	−10.387
$StdRet_t$	−0.005	−0.016	−0.015	−0.005	−0.005	−0.018
	−25.935	−25.666	−24.806	−26.930	−26.726	−29.269
$Turnover_t$	0.004	−0.001	−0.002	0.003	0.003	−0.002
	32.804	−6.158	−9.405	30.235	29.859	−8.266
$StdROA_t$	0.002	0.039	0.028	0.002	0.002	0.030
	5.983	17.822	13.326	6.211	6.280	13.913
$Beta_t$	0.555	1.134	1.134	0.617	0.621	1.259
	64.638	47.945	47.732	71.019	71.412	51.257
ROA_t	−0.108	0.639	0.985	−0.162	−0.190	0.750
	−1.952	3.049	4.658	−2.916	−3.411	3.521
$Leverage_t$	0.289	0.333	0.637	0.226	0.224	0.511
	7.521	3.367	6.403	5.889	5.816	5.127
N	81,443	15,728	15,728	81,406	81,406	15,728
Pseudo-R^2	0.311	0.351	0.377	0.360	0.363	0.404
Model	Eq. 22	Eq. 23	Eq. 24	Eq. 25	Eq. 26	Eq. 27

Table 33
Determinants of Full Sample capm5 eVERR Decile Assignments Using AAII Sentiment and Sloan Accruals and Cash Flow

The ordered logistic regressions use the full period capm5 *eVERR* decile assignments from 1964–2009 as the dependent variable. Some independent variables are not available for the full period. CEO compensation characteristics, vega and delta, are obtained from Professor Naveen's website and are rescaled to be in millions. Scaled cash flow and accruals data are calculated in accordance with Sloan (1996). Sentiment is calculated as the monthly average of the weekly difference between the bullish and bearish sentiment reported by AAII. Advertising (AD), R&D, cash flow (CF), and accruals (ACC) are scaled by average total assets; intangible assets (INTAN) and property, plant, and equipment (PPENT) are scaled by end of the year assets. A version of Altman's Z, firm age, firm size, the standard deviation of returns, stock turnover, return on assets, the standard deviation of return on assets, beta, and total liabilities scaled by assets are included as control variables. The *t*-statistics are reported below each coefficient.

	A	B	C	D	E	F
$Vega_t$		0.527	0.412			0.360
		8.040	6.334			5.534
$Delta_t$		0.007	0.008			0.008
		3.402	3.380			3.453
AD_t	0.598	−0.392	0.295	0.760	0.681	−0.790
	4.776	−1.190	0.894	5.034	3.614	−1.840
AD_t*Sent_t					0.007	0.092
					0.760	4.238
$R\&D/A_t$	6.074		7.624	5.630	5.398	6.918
	54.366		26.591	47.560	37.615	18.770
$R\&D/A_t*Sent_t$					0.022	0.066
					2.993	3.732
$PPENT_t$	−0.768	−1.420	−0.857	−0.854	−0.673	−0.632
	−22.054	−17.180	−10.017	−20.720	−13.505	−5.574
$PPENT_t*Sent_t$					−0.016	−0.019
					−6.535	−3.572
$INTAN_t$	0.374	−1.272	−0.873	−0.294	−0.410	−0.754
	7.604	−12.918	−8.740	−5.503	−6.276	−6.139
$INTAN_t*Sent_t$					0.009	−0.003
					3.036	−0.567
$CFsloan_t$	−3.336	−1.716	−1.344	−2.874	−2.888	−1.197
	−46.694	−7.611	−5.870	−36.571	−33.444	−4.556
$CFsloan_t*Sent_t$					0.002	0.002
					0.739	0.265
$ACCsloan_t$	−1.858	0.114	0.830	−1.077	−1.035	1.800
	−20.874	0.385	2.769	−10.530	−8.846	4.914
$ACCsloan_t*Sent_t$					−0.002	−0.048
					−0.431	−3.383
$AAIIbullbear_t$				0.011	0.013	0.018
				23.037	11.024	6.346

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Table 33 – continued from the previous page						
	A	B	C	D	E	F
AltZ1_t	0.089	0.110	0.105	0.073	0.072	0.099
	52.854	27.138	26.270	42.262	42.040	24.885
Age_t	−0.000	−0.001	−0.001	−0.001	−0.001	−0.001
	−5.728	−10.548	−10.515	−10.306	−10.269	−9.739
Size_t	−0.114	−0.124	−0.127	−0.155	−0.154	−0.122
	−25.600	−9.101	−9.315	−29.286	−29.123	−8.961
StdRet_t	−0.005	−0.016	−0.015	−0.006	−0.006	−0.014
	−25.935	−25.666	−24.806	−31.133	−31.005	−22.264
Turnover_t	0.004	−0.001	−0.002	0.002	0.002	−0.002
	32.804	−6.158	−9.405	14.206	14.175	−7.254
StdROA_t	0.002	0.039	0.028	0.000	0.000	0.025
	5.983	17.822	13.326	4.652	4.707	11.683
Beta_t	0.555	1.134	1.134	0.749	0.745	1.134
	64.638	47.945	47.732	73.923	73.483	47.510
ROA_t	−0.108	0.639	0.985	−0.115	−0.113	1.003
	−1.952	3.049	4.658	−1.992	−1.965	4.726
Leverage_t	0.289	0.333	0.637	0.455	0.454	0.505
	7.521	3.367	6.403	10.268	10.229	5.062
N	81,443	15,728	15,728	56,259	56,259	15,728
Pseudo-R^2	0.311	0.351	0.377	0.359	0.360	0.394
Model	Eq. 22	Eq. 23	Eq. 24	Eq. 25	Eq. 26	Eq. 27

Table 34
Determinants of Full Sample capm5 eVERR Decile Assignments Using Investors Intelligence Sentiment and Collins Accruals and Cash Flow

The ordered logistic regressions use the full period capm5 *eVERR* decile assignments from 1964–2009 as the dependent variable. Some independent variables are not available for the full period. CEO compensation characteristics, vega and delta, are obtained from Professor Naveen's website and are rescaled to be in millions. Scaled cash flow and accruals data are calculated in accordance with Collins et al. (2003). Sentiment is calculated as the monthly average of the weekly difference between the bullish and bearish sentiment reported by Investors Intelligence. Advertising (AD), R&D, cash flow (CF), and accruals (ACC) are scaled by average total assets; intangible assets (INTAN) and property, plant, and equipment (PPENT) are scaled by end of the year assets. A version of Altman's Z, firm age, firm size, the standard deviation of returns, stock turnover, return on assets, the standard deviation of return on assets, beta, and total liabilities scaled by assets are included as control variables. The t-statistics are reported below each coefficient.

	A	B	C	D	E	F
$Vega_t$		0.583	0.465			0.382
		8.950	7.245			5.945
$Delta_t$		0.008	0.009			0.009
		3.734	3.784			3.891
AD_t	0.492	−0.661	0.079	0.529	0.633	−0.501
	3.238	−2.063	0.247	3.477	3.069	−0.989
AD_t*$Sent_t$					−0.006	0.035
					−0.642	1.727
$R\&D/A_t$	5.819		7.776	5.821	5.286	7.577
	48.743		27.174	48.746	33.590	18.236
$R\&D/A_t$*$Sent_t$					0.032	0.027
					4.779	1.614
$PPENT_t$	−0.760	−1.329	−0.749	−0.731	−0.510	−0.374
	−18.285	−16.205	−8.791	−17.599	−9.277	−2.924
$PPENT_t$*$Sent_t$					−0.014	−0.019
					−6.138	−3.773
$INTAN_t$	−0.247	−1.282	−0.850	−0.371	−0.519	−1.007
	−4.620	−13.195	−8.604	−6.907	−6.491	−6.473
$INTAN_t$*$Sent_t$					0.006	0.002
					2.020	0.404
$CFcollins_t$	−3.479	−3.097	−2.393	−3.424	−3.497	−2.500
	−35.080	−5.209	−4.008	−34.596	−30.809	−3.979
$CFcollins_t$*$Sent_t$					0.006	0.012
					1.707	1.163
$ACCcollins_t$	−0.639	−0.354	0.643	−0.563	−0.426	1.251
	−6.438	−0.590	1.071	−5.689	−3.666	1.997
$ACCcollins_t$*$Sent_t$					−0.009	−0.031
					−2.195	−3.027
$IIbullbear_t$				0.009	0.011	0.012
				19.724	9.634	4.530

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Table 34 – continued from the previous page						
	A	B	C	D	E	F
$AltZ1_t$	0.070	0.108	0.106	0.070	0.070	0.106
	41.930	28.093	27.604	41.881	41.814	27.372
Age_t	−0.001	−0.001	−0.001	−0.001	−0.001	−0.001
	−12.060	−10.971	−11.001	−11.768	−11.686	−10.652
$Size_t$	−0.146	−0.129	−0.132	−0.156	−0.155	−0.127
	−27.440	−9.529	−9.768	−29.170	−28.900	−9.403
$StdRet_t$	−0.007	−0.016	−0.016	−0.006	−0.006	−0.013
	−31.510	−26.655	−25.808	−29.493	−28.572	−20.113
$Turnover_t$	0.002	−0.001	−0.002	0.001	0.001	−0.002
	14.695	−5.532	−8.688	12.746	12.731	−9.997
$StdROA_t$	0.000	0.040	0.029	0.000	0.000	0.026
	4.528	18.273	13.779	4.465	4.437	12.342
$Beta_t$	0.731	1.139	1.138	0.731	0.729	1.119
	72.353	48.439	48.160	72.374	72.162	47.240
ROA_t	−0.036	1.287	1.149	−0.031	−0.030	1.154
	−0.505	2.256	2.013	−0.426	−0.425	2.020
$Leverage_t$	0.239	0.185	0.527	0.282	0.290	0.550
	5.403	1.919	5.408	6.369	6.547	5.632
N	55,360	15,971	15,971	55,360	55,360	15,971
Pseudo-R^2	0.357	0.354	0.382	0.361	0.363	0.389
Model	Eq. 22	Eq. 23	Eq. 24	Eq. 25	Eq. 26	Eq. 27

Table 35
Determinants of Full Sample capm5 eVERR Decile Assignments Using Baker-Wurgler Sentiment and Collins Accruals and Cash Flow

The ordered logistic regressions use the full period capm5 $eVERR$ decile assignments from 1964–2009 as the dependent variable. Some independent variables are not available for the full period. CEO compensation characteristics, vega and delta, are obtained from Professor Naveen's website and are rescaled to be in millions. Scaled cash flow and accruals data are calculated in accordance with Collins et al. (2003). Monthly orthogonalized sentiment values introduced by Baker and Wurgler (2007) are used. Advertising (AD), R&D, cash flow (CF), and accruals (ACC) are scaled by average total assets; intangible assets (INTAN) and property, plant, and equipment (PPENT) are scaled by end of the year assets. A version of Altman's Z, firm age, firm size, the standard deviation of returns, stock turnover, return on assets, the standard deviation of return on assets, beta, and total liabilities scaled by assets are included as control variables. The t-statistics are reported below each coefficient.

	A	B	C	D	E	F
$Vega_t$		0.583	0.465			0.520
		8.950	7.245			8.098
$Delta_t$		0.008	0.009			0.008
		3.734	3.784			3.652
AD_t	0.492	−0.661	0.079	0.527	0.633	0.309
	3.238	−2.063	0.247	3.463	4.112	0.943
AD_t*Sent_t					−0.825	−1.333
					−3.118	−2.380
$R\&D/A_t$	5.819		7.776	5.843	5.759	7.597
	48.743		27.174	48.915	47.860	26.119
$R\&D/A_t*Sent_t$					0.539	2.084
					2.605	3.959
$PPENT_t$	−0.760	−1.329	−0.749	−0.758	−0.756	−0.719
	−18.285	−16.205	−8.791	−18.251	−18.085	−8.269
$PPENT_t*Sent_t$					−0.183	−0.484
					−2.532	−3.307
$INTAN_t$	−0.247	−1.282	−0.850	−0.263	−0.242	−0.779
	−4.620	−13.195	−8.604	−4.923	−4.492	−7.789
$INTAN_t*Sent_t$					−0.244	−0.027
					−2.684	−0.150
$CFcollins_t$	−3.479	−3.097	−2.393	−3.454	−3.634	−1.678
	−35.080	−5.209	−4.008	−34.786	−36.269	−2.784
$CFcollins_t*Sent_t$					1.309	1.151
					13.044	4.163
$ACCcollins_t$	−0.639	−0.354	0.643	−0.617	−0.754	1.520
	−6.438	−0.590	1.071	−6.210	−7.474	2.500
$ACCcollins_t*Sent_t$					0.430	−0.372
					4.497	−1.603
$BWsent_t$				0.228	0.235	0.626
				16.494	7.169	7.900

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Table 35 – continued from the previous page						
	A	B	C	D	E	F
$AltZ1_t$	0.070	0.108	0.106	0.069	0.070	0.101
	41.930	28.093	27.604	41.503	41.645	26.254
Age_t	−0.001	−0.001	−0.001	−0.001	−0.001	−0.001
	−12.060	−10.971	−11.001	−11.872	−12.047	−10.529
$Size_t$	−0.146	−0.129	−0.132	−0.154	−0.153	−0.146
	−27.440	−9.529	−9.768	−28.741	−28.537	−10.771
$StdRet_t$	−0.007	−0.016	−0.016	−0.007	−0.007	−0.019
	−31.510	−26.655	−25.808	−33.373	−33.368	−29.907
$Turnover_t$	0.002	−0.001	−0.002	0.002	0.002	−0.002
	14.695	−5.532	−8.688	14.563	14.362	−7.564
$StdROA_t$	0.000	0.040	0.029	0.000	0.001	0.031
	4.528	18.273	13.779	4.572	4.595	14.447
$Beta_t$	0.731	1.139	1.138	0.745	0.750	1.259
	72.353	48.439	48.160	73.416	73.644	51.572
ROA_t	−0.036	1.287	1.149	−0.049	−0.052	0.235
	−0.505	2.256	2.013	−0.684	−0.725	0.409
$Leverage_t$	0.239	0.185	0.527	0.248	0.236	0.408
	5.403	1.919	5.408	5.609	5.318	4.178
N	55,360	15,971	15,971	55,360	55,360	15,971
Pseudo-R^2	0.357	0.354	0.382	0.360	0.362	0.408
Model	Eq. 22	Eq. 23	Eq. 24	Eq. 25	Eq. 26	Eq. 27

Table 36
Determinants of Full Sample capm5 eVERR Decile Assignments Using AAII Sentiment and Collins Accruals and Cash Flow

The ordered logistic regressions use the full period capm5 *eVERR* decile assignments from 1964–2009 as the dependent variable. Some independent variables are not available for the full period. CEO compensation characteristics, vega and delta, are obtained from Professor Naveen's website and are rescaled to be in millions. Scaled cash flow and accruals data are calculated in accordance with Collins et al. (2003). Sentiment is calculated as the monthly average of the weekly difference between the bullish and bearish sentiment reported by AAII. Advertising (AD), R&D, cash flow (CF), and accruals (ACC) are scaled by average total assets; intangible assets (INTAN) and property, plant, and equipment (PPENT) are scaled by end of the year assets. A version of Altman's Z, firm age, firm size, the standard deviation of returns, stock turnover, return on assets, the standard deviation of return on assets, beta, and total liabilities scaled by assets are included as control variables. The *t*-statistics are reported below each coefficient.

	A	B	C	D	E	F
$Vega_t$		0.583	0.465			0.411
		8.950	7.245			6.387
$Delta_t$		0.008	0.009			0.009
		3.734	3.784			3.777
AD_t	0.492	−0.661	0.079	0.570	0.455	−0.868
	3.238	−2.063	0.247	3.743	2.395	−2.095
AD_t*$Sent_t$					0.010	0.087
					1.027	4.057
$R\&D/A_t$	5.819		7.776	5.846	5.744	7.367
	48.743		27.174	48.969	39.762	20.115
$R\&D/A_t$*$Sent_t$					0.012	0.044
					1.600	2.438
$PPENT_t$	−0.760	−1.329	−0.749	−0.761	−0.568	−0.533
	−18.285	−16.205	−8.791	−18.329	−11.295	−4.775
$PPENT_t$*$Sent_t$					−0.017	−0.020
					−6.937	−3.905
$INTAN_t$	−0.247	−1.282	−0.850	−0.284	−0.370	−0.694
	−4.620	−13.195	−8.604	−5.308	−5.657	−5.718
$INTAN_t$*$Sent_t$					0.007	−0.006
					2.299	−1.097
$CFcollins_t$	−3.479	−3.097	−2.393	−3.407	−3.428	−2.178
	−35.080	−5.209	−4.008	−34.425	−31.712	−3.550
$CFcollins_t$*$Sent_t$					0.004	−0.006
					0.990	−0.565
$ACCcollins_t$	−0.639	−0.354	0.643	−0.575	−0.364	1.437
	−6.438	−0.590	1.071	−5.800	−3.361	2.328
$ACCcollins_t$*$Sent_t$					−0.018	−0.061
					−4.525	−5.961
$AAIIbullbear_t$				0.011	0.013	0.019
				23.503	11.278	6.764

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Table 36 – continued from the previous page						
	A	B	C	D	E	F
$AltZ1_t$	0.070	0.108	0.106	0.068	0.068	0.101
	41.930	28.093	27.604	41.206	41.065	26.255
Age_t	−0.001	−0.001	−0.001	−0.001	−0.001	−0.001
	−12.060	−10.971	−11.001	−10.786	−10.727	−10.189
$Size_t$	−0.146	−0.129	−0.132	−0.156	−0.155	−0.126
	−27.440	−9.529	−9.768	−29.120	−28.926	−9.330
$StdRet_t$	−0.007	−0.016	−0.016	−0.007	−0.007	−0.014
	−31.510	−26.655	−25.808	−31.502	−31.240	−22.735
$Turnover_t$	0.002	−0.001	−0.002	0.002	0.002	−0.001
	14.695	−5.532	−8.688	14.762	14.724	−6.686
$StdROA_t$	0.000	0.040	0.029	0.000	0.000	0.026
	4.528	18.273	13.779	4.599	4.649	12.167
$Beta_t$	0.731	1.139	1.138	0.744	0.740	1.136
	72.353	48.439	48.160	73.390	72.918	47.887
ROA_t	−0.036	1.287	1.149	−0.039	−0.036	1.244
	−0.505	2.256	2.013	−0.550	−0.500	2.177
$Leverage_t$	0.239	0.185	0.527	0.237	0.239	0.424
	5.403	1.919	5.408	5.363	5.407	4.332
N	55,360	15,971	15,971	55,356	55,356	15,971
Pseudo-R^2	0.357	0.354	0.382	0.363	0.365	0.399
Model	Eq. 22	Eq. 23	Eq. 24	Eq. 25	Eq. 26	Eq. 27

3.1.4 Annual eVERR Decile Assignments Used with the Baseline Specification

For Tables 37 through 42 capm5 *eVERR* valuation measures are used to assign firm years to valuation deciles for each calendar year during the 1964–2009 period. The first three tables, Tables 37 through 39, use scaled values of the Sloan (1996) measures of cash flow and accruals as part of the baseline specification. The data required to calculate the cash flow and accruals measures following Sloan (1996) is available sporadically for firms prior to mid-1970, and very consistently thereafter. Table 37 employs the Investors Intelligence measure of sentiment, which is available for the full 1964–2009 period. Table 38 employs the sentiment data from Baker and Wurgler (2007), which is available beginning in the middle of 1965. Table 39 employs the AAII measure of sentiment, which is first available in the middle of 1987. The more limited availability of the AAII measure accounts for the smaller number of observations involved in the analyses presented in Table 39.

The second three tables, Tables 40 through 42, use scaled values of the Collins et al. (2003) measures of cash flow and accruals as part of the baseline specification. The data required to calculate the cash flow and accruals measures following Collins et al. (2003) is available sporadically for firms beginning in 1987 and continuing through mid-1988, and consistently thereafter. Table 40 employs the Investors Intelligence measure of sentiment, which is available for the full 1964–2009 period. Table 41 employs the sentiment data from Baker and Wurgler (2007), which is available beginning in the middle of 1965. Table 42 employs the AAII measure of sentiment, which is first available in the middle of 1987. The more limited availability of the Collins et al. (2003) measures of cash flow and accruals accounts for the smaller number of observations involved in the analyses presented in Tables 40 through Tables 42.

Table 37
Determinants of Annual capm5 eVERR Decile Assignments Using Investors Intelligence Sentiment and Sloan Accruals and Cash Flow

The ordered logistic regressions use the annual capm5 *eVERR* decile assignments from 1964–2009 as the dependent variable. Some independent variables are not available for the full period. CEO compensation characteristics, vega and delta, are obtained from Professor Naveen's website and are rescaled to be in millions. Scaled cash flow and accruals data are calculated in accordance with Sloan (1996). Sentiment is calculated as the monthly average of the weekly difference between the bullish and bearish sentiment reported by Investors Intelligence. Advertising (AD), R&D, cash flow (CF), and accruals (ACC) are scaled by average total assets; intangible assets (INTAN) and property, plant, and equipment (PPENT) are scaled by end of the year assets. A version of Altman's Z, firm age, firm size, the standard deviation of returns, stock turnover, return on assets, the standard deviation of return on assets, beta, and total liabilities scaled by assets are included as control variables. The *t*-statistics are reported below each coefficient.

	A	B	C	D	E	F
$Vega_t$		0.577	0.466			0.501
		9.020	7.366			7.877
$Delta_t$		0.004	0.003			0.003
		2.305	2.079			2.066
AD_t	1.099	−0.174	0.580	1.096	0.889	0.352
	8.790	−0.531	1.767	8.767	5.451	0.657
AD_t*$Sent_t$					0.014	0.010
					2.052	0.464
$R\&D/A_t$	5.095		7.658	5.093	4.685	6.730
	48.477		27.280	48.453	33.543	16.261
$R\&D/A_t$*$Sent_t$					0.024	0.044
					4.172	2.738
$PPENT_t$	−1.074	−1.885	−1.314	−1.076	−0.899	−1.128
	−31.026	−22.800	−15.364	−31.064	−20.146	−8.653
$PPENT_t$*$Sent_t$					−0.011	−0.011
					−6.130	−2.166
$INTAN_t$	−0.385	−1.245	−0.820	−0.377	−0.065	−0.356
	−7.879	−12.743	−8.266	−7.684	−0.901	−2.271
$INTAN_t$*$Sent_t$					−0.016	−0.020
					−6.027	−3.404
$CFsloan_t$	−1.765	−0.739	−0.452	−1.775	−1.756	−0.888
	−22.409	−3.368	−2.026	−22.497	−19.866	−3.165
$CFsloan_t$*$Sent_t$					−0.001	0.016
					−0.259	1.853
$ACCsloan_t$	−0.061	0.263	0.857	−0.077	0.121	1.300
	−0.621	0.899	2.904	−0.781	1.070	3.126
$ACCsloan_t$*$Sent_t$					−0.012	−0.030
					−3.127	−2.030
$IIbullbear_t$				−0.001	0.003	−0.005
				−2.103	3.196	−1.707

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Table 37 – continued from the previous page						
	A	B	C	D	E	F
$AltZ1_t$	0.049	0.065	0.061	0.049	0.049	0.062
	36.640	19.593	18.583	36.667	36.488	18.647
Age_t	−0.000	−0.001	−0.001	−0.000	−0.000	−0.001
	−9.094	−6.499	−6.446	−9.161	−9.113	−6.738
$Size_t$	−0.127	−0.097	−0.100	−0.127	−0.127	−0.101
	−28.721	−7.165	−7.379	−28.675	−28.769	−7.412
$StdRet_t$	−0.003	−0.004	−0.004	−0.004	−0.004	−0.005
	−18.727	−7.242	−6.237	−18.852	−18.838	−8.234
$Turnover_t$	0.002	0.000	−0.000	0.002	0.002	−0.000
	15.309	1.274	−2.021	15.421	15.280	−1.395
$StdROA_t$	0.001	0.028	0.019	0.001	0.001	0.019
	4.636	13.926	9.439	4.629	4.706	9.722
$Beta_t$	0.692	1.006	1.005	0.693	0.692	1.022
	80.179	43.538	43.332	80.211	80.051	43.754
ROA_t	−0.543	0.280	0.684	−0.542	−0.538	0.717
	−7.300	1.350	3.277	−7.278	−7.220	3.421
$Leverage_t$	−0.124	−0.523	−0.202	−0.126	−0.127	−0.222
	−3.302	−5.432	−2.082	−3.348	−3.372	−2.291
N	81,443	15,728	15,728	81,443	81,443	15,728
Pseudo-R^2	0.289	0.330	0.359	0.289	0.290	0.362
Model	Eq. 22	Eq. 23	Eq. 24	Eq. 25	Eq. 26	Eq. 27

Table 38
Determinants of Annual capm5 eVERR Decile Assignments Using Baker-Wurgler Sentiment and Sloan Accruals and Cash Flow

The ordered logistic regressions use the annual capm5 $eVERR$ decile assignments from 1964–2009 as the dependent variable. Some independent variables are not available for the full period. CEO compensation characteristics, vega and delta, are obtained from Professor Naveen's website and are rescaled to be in millions. Scaled cash flow and accruals data are calculated in accordance with Sloan (1996). Monthly orthogonalized sentiment values introduced by Baker and Wurgler (2007) are used. Advertising (AD), R&D, cash flow (CF), and accruals (ACC) are scaled by average total assets; intangible assets (INTAN) and property, plant, and equipment (PPENT) are scaled by end of the year assets. A version of Altman's Z, firm age, firm size, the standard deviation of returns, stock turnover, return on assets, the standard deviation of return on assets, beta, and total liabilities scaled by assets are included as control variables. The t-statistics are reported below each coefficient.

	A	B	C	D	E	F
$Vega_t$		0.577	0.466			0.491
		9.020	7.366			7.747
$Delta_t$		0.004	0.003			0.003
		2.305	2.079			2.156
AD_t	1.099	−0.174	0.580	1.098	1.221	0.707
	8.790	−0.531	1.767	8.781	9.706	2.106
AD_t*$Sent_t$					−1.470	−0.451
					−9.807	−0.803
R&D/A_t	5.095		7.658	5.105	5.169	7.578
	48.477		27.280	48.533	48.453	26.587
R&D/A_t*$Sent_t$					−0.525	0.299
					−3.384	0.602
$PPENT_t$	−1.074	−1.885	−1.314	−1.072	−1.059	−1.313
	−31.026	−22.800	−15.364	−30.950	−30.490	−15.015
$PPENT_t$*$Sent_t$					−0.084	−0.022
					−2.132	−0.150
$INTAN_t$	−0.385	−1.245	−0.820	−0.383	−0.407	−0.779
	−7.879	−12.743	−8.266	−7.825	−8.277	−7.758
$INTAN_t$*$Sent_t$					0.293	0.079
					4.176	0.444
$CFsloan_t$	−1.765	−0.739	−0.452	−1.792	−1.834	−0.519
	−22.409	−3.368	−2.026	−22.721	−23.205	−2.294
$CFsloan_t$*$Sent_t$					0.268	0.558
					4.462	2.313
$ACCsloan_t$	−0.061	0.263	0.857	−0.088	−0.112	0.833
	−0.621	0.899	2.904	−0.903	−1.135	2.729
$ACCsloan_t$*$Sent_t$					0.123	0.430
					1.479	1.166
$BWsent_t$				−0.046	−0.028	0.313
				−6.231	−1.495	3.886

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Table 38 – continued from the previous page						
	A	B	C	D	E	F
$AltZ1_t$	0.049	0.065	0.061	0.050	0.050	0.059
	36.640	19.593	18.583	36.804	36.963	17.817
Age_t	−0.000	−0.001	−0.001	−0.000	−0.000	−0.001
	−9.094	−6.499	−6.446	−8.989	−8.953	−5.986
$Size_t$	−0.127	−0.097	−0.100	−0.126	−0.127	−0.107
	−28.721	−7.165	−7.379	−28.632	−28.837	−7.852
$StdRet_t$	−0.003	−0.004	−0.004	−0.003	−0.003	−0.005
	−18.727	−7.242	−6.237	−18.633	−18.893	−8.941
$Turnover_t$	0.002	0.000	−0.000	0.002	0.002	−0.000
	15.309	1.274	−2.021	15.621	15.692	−1.228
$StdROA_t$	0.001	0.028	0.019	0.001	0.001	0.019
	4.636	13.926	9.439	4.621	4.633	9.467
$Beta_t$	0.692	1.006	1.005	0.689	0.692	1.072
	80.179	43.538	43.332	79.614	79.784	45.174
ROA_t	−0.543	0.280	0.684	−0.533	−0.546	0.572
	−7.300	1.350	3.277	−7.160	−7.354	2.726
$Leverage_t$	−0.124	−0.523	−0.202	−0.122	−0.120	−0.276
	−3.302	−5.432	−2.082	−3.238	−3.185	−2.844
N	81,443	15,728	15,728	81,406	81,406	15,728
Pseudo-R^2	0.289	0.330	0.359	0.290	0.291	0.368
Model	Eq. 22	Eq. 23	Eq. 24	Eq. 25	Eq. 26	Eq. 27

Table 39
Determinants of Annual capm5 eVERR Decile Assignments Using AAII Sentiment and Sloan Accruals and Cash Flow

The ordered logistic regressions use the annual capm5 *eVERR* decile assignments from 1964–2009 as the dependent variable. Some independent variables are not available for the full period. CEO compensation characteristics, vega and delta, are obtained from Professor Naveen's website and are rescaled to be in millions. Scaled cash flow and accruals data are calculated in accordance with Sloan (1996). Sentiment is calculated as the monthly average of the weekly difference between the bullish and bearish sentiment reported by AAII. Advertising (AD), R&D, cash flow (CF), and accruals (ACC) are scaled by average total assets; intangible assets (INTAN) and property, plant, and equipment (PPENT) are scaled by end of the year assets. A version of Altman's Z, firm age, firm size, the standard deviation of returns, stock turnover, return on assets, the standard deviation of return on assets, beta, and total liabilities scaled by assets are included as control variables. The *t*-statistics are reported below each coefficient.

	A	B	C	D	E	F
$Vega_t$		0.577	0.466			0.439
		9.020	7.366			6.934
$Delta_t$		0.004	0.003			0.003
		2.305	2.079			2.177
AD_t	1.099	−0.174	0.580	0.941	0.985	−0.547
	8.790	−0.531	1.767	6.265	5.240	−1.281
AD_t*Sent_t					−0.004	0.083
					−0.370	3.860
$R\&D/A_t$	5.095		7.658	5.370	5.283	7.148
	48.477		27.280	46.960	37.483	19.610
$R\&D/A_t*Sent_t$					0.008	0.041
					1.154	2.413
$PPENT_t$	−1.074	−1.885	−1.314	−1.071	−0.984	−1.312
	−31.026	−22.800	−15.364	−26.044	−19.793	−11.595
$PPENT_t*Sent_t$					−0.008	−0.001
					−3.074	−0.192
$INTAN_t$	−0.385	−1.245	−0.820	−0.307	−0.397	−0.855
	−7.879	−12.743	−8.266	−5.767	−6.087	−7.002
$INTAN_t*Sent_t$					0.007	0.006
					2.388	1.008
$CFsloan_t$	−1.765	−0.739	−0.452	−2.550	−2.539	−0.202
	−22.409	−3.368	−2.026	−31.184	−28.605	−0.787
$CFsloan_t*Sent_t$					−0.000	−0.011
					−0.096	−1.214
$ACCsloan_t$	−0.061	0.263	0.857	−1.050	−0.919	1.811
	−0.621	0.899	2.904	−9.906	−7.661	5.021
$ACCsloan_t*Sent_t$					−0.011	−0.055
					−2.156	−3.970
$AAIIbullbear_t$				0.002	0.002	0.004
				3.697	1.884	1.371

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Table 39 – continued from the previous page

	A	B	C	D	E	F
$AltZ1_t$	0.049	0.065	0.061	0.049	0.049	0.059
	36.640	19.593	18.583	33.897	33.756	17.785
Age_t	−0.000	−0.001	−0.001	−0.000	−0.000	−0.001
	−9.094	−6.499	−6.446	−7.260	−7.206	−6.078
$Size_t$	−0.127	−0.097	−0.100	−0.125	−0.125	−0.097
	−28.721	−7.165	−7.379	−23.786	−23.695	−7.177
$StdRet_t$	−0.003	−0.004	−0.004	−0.004	−0.004	−0.003
	−18.727	−7.242	−6.237	−18.753	−18.652	−4.877
$Turnover_t$	0.002	0.000	−0.000	0.002	0.002	−0.000
	15.309	1.274	−2.021	17.394	17.405	−1.171
$StdROA_t$	0.001	0.028	0.019	0.000	0.000	0.017
	4.636	13.926	9.439	4.656	4.694	8.615
$Beta_t$	0.692	1.006	1.005	0.708	0.705	1.001
	80.179	43.538	43.332	70.845	70.534	43.044
ROA_t	−0.543	0.280	0.684	−0.185	−0.182	0.685
	−7.300	1.350	3.277	−2.760	−2.730	3.275
$Leverage_t$	−0.124	−0.523	−0.202	0.027	0.027	−0.260
	−3.302	−5.432	−2.082	0.629	0.620	−2.674
N	81,443	15,728	15,728	56,259	56,259	15,728
Pseudo-R^2	0.289	0.330	0.359	0.349	0.349	0.363
Model	Eq. 22	Eq. 23	Eq. 24	Eq. 25	Eq. 26	Eq. 27

Table 40
Determinants of Annual capm5 eVERR Decile Assignments Using Investors Intelligence Sentiment and Collins Accruals and Cash Flow

The ordered logistic regressions use the annual capm5 *eVERR* decile assignments from 1964–2009 as the dependent variable. Some independent variables are not available for the full period. CEO compensation characteristics, vega and delta, are obtained from Professor Naveen's website and are rescaled to be in millions. Scaled cash flow and accruals data are calculated in accordance with Collins et al. (2003). Sentiment is calculated as the monthly average of the weekly difference between the bullish and bearish sentiment reported by Investors Intelligence. Advertising (AD), R&D, cash flow (CF), and accruals (ACC) are scaled by average total assets; intangible assets (INTAN) and property, plant, and equipment (PPENT) are scaled by end of the year assets. A version of Altman's Z, firm age, firm size, the standard deviation of returns, stock turnover, return on assets, the standard deviation of return on assets, beta, and total liabilities scaled by assets are included as control variables. The *t*-statistics are reported below each coefficient.

	A	B	C	D	E	F
$Vega_t$		0.602	0.496			0.527
		9.548	7.972			8.419
$Delta_t$		0.004	0.003			0.003
		2.420	2.225			2.198
AD_t	0.782	−0.228	0.580	0.777	0.937	0.319
	5.160	−0.716	1.813	5.125	4.548	0.634
AD_t*$Sent_t$					−0.011	0.011
					−1.159	0.553
$R\&D/A_t$	5.552		7.713	5.556	5.088	7.225
	48.288		27.601	48.312	32.959	17.560
$R\&D/A_t$*$Sent_t$					0.028	0.021
					4.214	1.295
$PPENT_t$	−1.001	−1.855	−1.274	−1.006	−0.831	−1.011
	−24.187	−22.623	−15.012	−24.286	−15.160	−7.930
$PPENT_t$*$Sent_t$					−0.011	−0.015
					−4.687	−3.106
$INTAN_t$	−0.314	−1.239	−0.790	−0.298	0.043	−0.280
	−5.900	−12.838	−8.050	−5.568	0.534	−1.819
$INTAN_t$*$Sent_t$					−0.018	−0.022
					−5.769	−3.920
$CFcollins_t$	−3.039	−1.221	−0.506	−3.048	−3.009	−0.752
	−31.402	−2.068	−0.853	−31.467	−27.045	−1.205
$CFcollins_t$*$Sent_t$					−0.001	0.007
					−0.308	0.711
$ACCcollins_t$	−0.731	0.167	1.138	−0.742	−0.517	1.989
	−7.431	0.280	1.901	−7.531	−4.475	3.197
$ACCcollins_t$*$Sent_t$					−0.013	−0.053
					−3.457	−5.368
$IIbullbear_t$				−0.001	0.002	−0.003
				−2.843	1.943	−1.005

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Table 40 – continued from the previous page						
	A	B	C	D	E	F
$AltZ1_t$	0.046	0.065	0.063	0.046	0.046	0.063
	33.042	20.255	19.566	33.071	32.900	19.585
Age_t	−0.000	−0.001	−0.001	−0.000	−0.000	−0.001
	−7.976	−6.986	−7.012	−8.043	−8.022	−7.231
$Size_t$	−0.122	−0.098	−0.101	−0.121	−0.122	−0.099
	−23.108	−7.277	−7.479	−22.815	−22.886	−7.303
$StdRet_t$	−0.004	−0.005	−0.004	−0.004	−0.004	−0.005
	−18.158	−7.727	−6.777	−18.375	−18.248	−8.175
$Turnover_t$	0.002	0.000	−0.000	0.002	0.002	−0.000
	17.422	1.533	−1.598	17.595	17.443	−1.040
$StdROA_t$	0.000	0.029	0.019	0.000	0.000	0.020
	4.574	14.228	9.760	4.595	4.603	10.125
$Beta_t$	0.705	1.007	1.005	0.706	0.705	1.020
	70.662	43.871	43.623	70.707	70.604	43.984
ROA_t	−0.031	0.394	0.235	−0.031	−0.031	0.264
	−0.425	0.692	0.413	−0.438	−0.427	0.464
$Leverage_t$	−0.165	−0.602	−0.261	−0.171	−0.171	−0.288
	−3.796	−6.351	−2.731	−3.925	−3.931	−3.009
N	55,360	15,971	15,971	55,360	55,360	15,971
Pseudo-R^2	0.352	0.332	0.361	0.352	0.353	0.365
Model	Eq. 22	Eq. 23	Eq. 24	Eq. 25	Eq. 26	Eq. 27

Table 41
Determinants of Annual capm5 eVERR Decile Assignments Using Baker-Wurgler Sentiment and Collins Accruals and Cash Flow

The ordered logistic regressions use the annual capm5 *eVERR* decile assignments from 1964–2009 as the dependent variable. Some independent variables are not available for the full period. CEO compensation characteristics, vega and delta, are obtained from Professor Naveen's website and are rescaled to be in millions. Scaled cash flow and accruals data are calculated in accordance with Collins et al. (2003). Monthly orthogonalized sentiment values introduced by Baker and Wurgler (2007) are used. Advertising (AD), R&D, cash flow (CF), and accruals (ACC) are scaled by average total assets; intangible assets (INTAN) and property, plant, and equipment (PPENT) are scaled by end of the year assets. A version of Altman's Z, firm age, firm size, the standard deviation of returns, stock turnover, return on assets, the standard deviation of return on assets, beta, and total liabilities scaled by assets are included as control variables. The t-statistics are reported below each coefficient.

	A	B	C	D	E	F
$Vega_t$		0.602	0.496			0.514
		9.548	7.972			8.247
$Delta_t$		0.004	0.003			0.004
		2.420	2.225			2.284
AD_t	0.782	−0.228	0.580	0.784	0.879	0.702
	5.160	−0.716	1.813	5.172	5.727	2.154
AD_t*$Sent_t$					−0.670	−0.486
					−2.541	−0.872
$R\&D/A_t$	5.552		7.713	5.552	5.566	7.709
	48.288		27.601	48.288	47.672	27.069
$R\&D/A_t$*$Sent_t$					−0.470	−0.070
					−2.422	−0.142
$PPENT_t$	−1.001	−1.855	−1.274	−1.001	−0.999	−1.271
	−24.187	−22.623	−15.012	−24.182	−23.971	−14.663
$PPENT_t$*$Sent_t$					−0.046	−0.108
					−0.636	−0.746
$INTAN_t$	−0.314	−1.239	−0.790	−0.315	−0.298	−0.743
	−5.900	−12.838	−8.050	−5.913	−5.553	−7.481
$INTAN_t$*$Sent_t$					−0.172	0.004
					−1.910	0.022
$CFcollins_t$	−3.039	−1.221	−0.506	−3.038	−3.241	−0.079
	−31.402	−2.068	−0.853	−31.378	−33.098	−0.132
$CFcollins_t$*$Sent_t$					1.163	0.637
					12.042	2.361
$ACCcollins_t$	−0.731	0.167	1.138	−0.731	−0.888	1.680
	−7.431	0.280	1.901	−7.422	−8.876	2.781
$ACCcollins_t$*$Sent_t$					0.569	−0.250
					6.114	−1.092
$BWsent_t$				0.012	0.033	0.339
				0.871	1.011	4.360

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Table 41 – continued from the previous page						
	A	B	C	D	E	F
$AltZ1_t$	0.046	0.065	0.063	0.046	0.047	0.060
	33.042	20.255	19.566	32.986	33.386	18.653
Age_t	−0.000	−0.001	−0.001	−0.000	−0.000	−0.001
	−7.976	−6.986	−7.012	−7.958	−8.024	−6.557
$Size_t$	−0.122	−0.098	−0.101	−0.123	−0.122	−0.107
	−23.108	−7.277	−7.479	−23.093	−22.960	−7.918
$StdRet_t$	−0.004	−0.005	−0.004	−0.004	−0.004	−0.006
	−18.158	−7.727	−6.777	−18.169	−18.155	−9.241
$Turnover_t$	0.002	0.000	−0.000	0.002	0.002	−0.000
	17.422	1.533	−1.598	17.416	17.262	−0.833
$StdROA_t$	0.000	0.029	0.019	0.000	0.000	0.020
	4.574	14.228	9.760	4.576	4.623	9.828
$Beta_t$	0.705	1.007	1.005	0.706	0.715	1.070
	70.662	43.871	43.623	70.607	71.212	45.406
ROA_t	−0.031	0.394	0.235	−0.031	−0.038	−0.307
	−0.425	0.692	0.413	−0.434	−0.533	−0.537
$Leverage_t$	−0.165	−0.602	−0.261	−0.165	−0.174	−0.333
	−3.796	−6.351	−2.731	−3.789	−3.996	−3.480
N	55,360	15,971	15,971	55,360	55,360	15,971
Pseudo-R^2	0.352	0.332	0.361	0.352	0.354	0.370
Model	Eq. 22	Eq. 23	Eq. 24	Eq. 25	Eq. 26	Eq. 27

Table 42
Determinants of Annual capm5 eVERR Decile Assignments Using AAII Sentiment and Collins Accruals and Cash Flow

The ordered logistic regressions use the annual capm5 *eVERR* decile assignments from 1964–2009 as the dependent variable. Some independent variables are not available for the full period. CEO compensation characteristics, vega and delta, are obtained from Professor Naveen's website and are rescaled to be in millions. Scaled cash flow and accruals data are calculated in accordance with Collins et al. (2003). Sentiment is calculated as the monthly average of the weekly difference between the bullish and bearish sentiment reported by AAII. Advertising (AD), R&D, cash flow (CF), and accruals (ACC) are scaled by average total assets; intangible assets (INTAN) and property, plant, and equipment (PPENT) are scaled by end of the year assets. A version of Altman's Z, firm age, firm size, the standard deviation of returns, stock turnover, return on assets, the standard deviation of return on assets, beta, and total liabilities scaled by assets are included as control variables. The *t*-statistics are reported below each coefficient.

	A	B	C	D	E	F
$Vega_t$		0.602	0.496			0.469
		9.548	7.972			7.512
$Delta_t$		0.004	0.003			0.004
		2.420	2.225			2.286
AD_t	0.782	−0.228	0.580	0.792	0.812	−0.378
	5.160	−0.716	1.813	5.223	4.281	−0.920
AD_t*$Sent_t$					−0.001	0.075
					−0.154	3.547
R&D/A_t	5.552		7.713	5.551	5.529	7.383
	48.288		27.601	48.289	39.088	20.419
R&D/A_t*$Sent_t$					0.003	0.027
					0.484	1.570
$PPENT_t$	−1.001	−1.855	−1.274	−1.000	−0.912	−1.281
	−24.187	−22.623	−15.012	−24.169	−18.193	−11.502
$PPENT_t$*$Sent_t$					−0.008	−0.002
					−3.147	−0.303
$INTAN_t$	−0.314	−1.239	−0.790	−0.318	−0.404	−0.798
	−5.900	−12.838	−8.050	−5.975	−6.184	−6.614
$INTAN_t$*$Sent_t$					0.007	0.004
					2.287	0.617
$CFcollins_t$	−3.039	−1.221	−0.506	−3.028	−3.037	−0.162
	−31.402	−2.068	−0.853	−31.286	−28.604	−0.266
$CFcollins_t$*$Sent_t$					0.002	−0.016
					0.479	−1.638
$ACCcollins_t$	−0.731	0.167	1.138	−0.722	−0.573	1.893
	−7.431	0.280	1.901	−7.339	−5.308	3.085
$ACCcollins_t$*$Sent_t$					−0.013	−0.052
					−3.212	−5.359
$AAIIbullbear_t$				0.002	0.002	0.004
				3.266	1.526	1.442

continued on the next page

Table 42 – continued from the previous page						
	A	B	C	D	E	F
$AltZ1_t$	0.046	0.065	0.063	0.046	0.046	0.061
	33.042	20.255	19.566	32.883	32.790	18.795
Age_t	−0.000	−0.001	−0.001	−0.000	−0.000	−0.001
	−7.976	−6.986	−7.012	−7.764	−7.694	−6.624
$Size_t$	−0.122	−0.098	−0.101	−0.124	−0.123	−0.097
	−23.108	−7.277	−7.479	−23.259	−23.112	−7.211
$StdRet_t$	−0.004	−0.005	−0.004	−0.004	−0.004	−0.003
	−18.158	−7.727	−6.777	−18.087	−17.872	−5.067
$Turnover_t$	0.002	0.000	−0.000	0.002	0.002	−0.000
	17.422	1.533	−1.598	17.434	17.439	−0.881
$StdROA_t$	0.000	0.029	0.019	0.000	0.000	0.018
	4.574	14.228	9.760	4.572	4.611	9.042
$Beta_t$	0.705	1.007	1.005	0.707	0.704	1.001
	70.662	43.871	43.623	70.704	70.399	43.317
ROA_t	−0.031	0.394	0.235	−0.031	−0.029	0.253
	−0.425	0.692	0.413	−0.432	−0.403	0.444
$Leverage_t$	−0.165	−0.602	−0.261	−0.167	−0.166	−0.306
	−3.796	−6.351	−2.731	−3.841	−3.808	−3.188
N	55,360	15,971	15,971	55,356	55,356	15,971
Pseudo-R^2	0.352	0.332	0.361	0.352	0.353	0.366
Model	Eq. 22	Eq. 23	Eq. 24	Eq. 25	Eq. 26	Eq. 27

3.2 Detailed Determinants Tables: Single Digit SIC Industry Fixed Effects Specification

A series of ordered logistic regressions of capm5 *VERR* and *eVERR* valuation decile assignments on different combinations of independent variables following the single digit SIC industry fixed effects specification is performed in Tables 44 through 67. Decile assignments based upon the *VERR* and *eVERR* measures are made using the full 1964–2009 period and also using each calendar year. The combination of full period and annual decile assignments for the capm5 *VERR* and *eVERR* valuation deciles results in four different dependent variables for the ordered logistic regressions. The results from using the full 1964–2009 period capm5 *VERR* decile assignments as the dependent variable are presented in Tables 44 through 49. The results from using the annual *VERR* decile assignments as the dependent variable are presented in Tables 50 through 55. Switching to the use of the full 1964–2009 period capm5 *eVERR* decile assignments as the dependent variable in the ordered logistic regressions produces Tables 56 through 61, and the utilization of annual capm5 *eVERR* decile assignments as the dependent variable in the ordered logistic regressions generates Tables 62 through 67.

Table 43 summarizes the results of the industry fixed effects specification ordered logistic regression models detailed in Equations 18 and 19 for all four dependent variables. Panel A presents results using the full period capm5 *VERR* decile assignments as the dependent variable, Panel B presents results using the annual capm5 *VERR* decile assignments as the dependent variable, Panel C presents results using the full period capm5 *eVERR* decile assignments as the dependent variable, and Panel D presents the results using the annual capm5 *eVERR* decile assignments as the dependent variable. Each column of each panel in Table 43 reports the average coefficients and average *t*-statistics across the two ordered logistic regressions performed using the specified measure of sentiment and the two different measures of scaled cash flow and accruals in the appropriate industry fixed effects specification model with the dependent variable listed for the panel. The equation detailing the model used for each column is reported near the bottom of each column. As each column in Table 43 presents average coefficients and average *t*-statistics across results produced using both measures of cash flow and accruals, the tables reporting the individual results which are averaged to produce each column are listed at the bottom of each column in Table 43.

Tables 44 through 67 contain the results for all of the individual ordered logistic regressions performed using the industry fixed effects specification. The four different dependent variables, two different measures of cash flow and accruals, and three different measures of investor sentiment produce

Table 43
Average Coefficients and t-Statistics for Ordered Logistic Regressions of capm5 VERR and eVERR Decile Assignments on Determinants with Industry Fixed Effects

Average coefficients and average t-statistics are presented in this table for ordered logistic regressions using the industry fixed effects specification models. Some independent variables are not available for the full period. Scaled cash flow and accruals data are calculated in accordance with Sloan (1996) and Collins et al. (2003). Each column reports the average coefficients and average t-statistics across the two ordered logistic regressions performed using the specified measure of sentiment and the two different measures of scaled cash flow and accruals in the appropriate industry fixed effects specification model. The average t-statistics are reported below each average coefficient.

Panel A displays the average results for the ordered logistic regressions using the full period capm5 *VERR* decile assignments from 1964–2009 as the dependent variable. Panel B displays the average results for the ordered logistic regressions using the annual capm5 *VERR* decile assignments from 1964–2009 as the dependent variable. Panel C displays the average results for the ordered logistic regressions using the full period capm5 *eVERR* decile assignments from 1964–2009 as the dependent variable. Panel D displays the average results for the ordered logistic regressions using the annual capm5 *eVERR* decile assignments from 1964–2009 as the dependent variable.

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Table 43 – continued from the previous page						
Panel A: Dependent Variable = Full Period *VERR* Decile						
	Inv. Intelligence		Baker-Wurgler		AAII	
	1	2	3	4	5	6
$Vega_t$		0.089		0.204		0.107
		1.350		3.071		1.610
$Delta_t$		0.003		0.003		0.003
		1.679		1.831		1.943
AD_t	0.729	−0.351	0.923	0.783	0.979	−0.305
	3.837	−0.670	6.533	2.317	5.113	−0.721
AD_t*Sent_t	0.004	0.047	−0.883	−1.034	−0.002	0.070
	0.716	2.253	−4.748	−1.841	−0.201	3.256
$R\&D/A_t$	6.252	6.549	6.254	6.434	5.864	6.276
	39.729	15.614	52.297	21.419	39.592	16.796
$R\&D/A_t*Sent_t$	−0.005	0.015	−0.477	2.110	−0.010	0.041
	−0.754	0.947	−3.116	4.029	−1.357	2.342
$PPENT_t$	0.460	0.684	0.229	0.426	0.436	0.680
	8.838	5.098	5.576	4.439	8.215	5.732
$PPENT_t*Sent_t$	−0.014	−0.014	−0.194	−0.447	−0.021	−0.024
	−6.555	−2.882	−3.249	−3.019	−8.476	−4.529
$INTAN_t$	0.557	−0.529	0.971	−0.056	0.487	−0.028
	7.434	−3.344	18.599	−0.546	7.312	−0.223
$INTAN_t*Sent_t$	0.014	0.015	−0.496	0.190	0.003	0.000
	4.832	2.592	−6.462	1.040	1.029	0.083
CF_t	−2.736	−1.939	−2.835	−1.711	−2.591	−2.040
	−28.361	−4.414	−32.237	−4.740	−25.378	−5.081
CF_t*Sent_t	−0.002	0.009	0.983	0.947	0.005	0.013
	−0.715	1.043	12.339	3.624	1.453	1.443
ACC_t	−1.088	0.611	−1.157	0.548	−0.649	0.610
	−9.947	1.130	−11.792	1.141	−5.525	1.309
ACC_t*Sent_t	−0.001	−0.014	0.621	0.090	−0.005	−0.026
	−0.118	−1.614	7.116	−0.113	−1.252	−2.421
$Sent_t$	0.008	0.009	0.419	0.547	0.014	0.016
	8.037	3.218	19.422	6.789	11.668	5.859
$AltZ1_t$	0.058	0.077	0.057	0.073	0.051	0.073
	40.263	22.013	39.585	20.741	35.274	20.841
Age_t	−0.001	−0.001	−0.001	−0.001	−0.001	−0.001
	−14.936	−11.773	−16.204	−11.440	−18.538	−11.231
$Size_t$	−0.139	−0.172	−0.140	−0.190	−0.162	−0.172
	−27.758	−12.523	−27.939	−13.800	−30.132	−12.486
$StdRet_t$	−0.005	−0.011	−0.005	−0.016	−0.006	−0.012
	−23.426	−16.655	−26.473	−26.095	−30.424	−19.588
$Turnover_t$	0.003	−0.001	0.003	−0.000	0.002	−0.000
	29.696	−3.762	29.569	−1.302	20.377	−0.857
$StdROA_t$	0.001	0.019	0.001	0.022	0.000	0.018
	4.887	9.048	5.128	10.594	4.445	8.842
$Beta_t$	0.592	1.012	0.629	1.133	0.709	1.025
	63.238	42.834	66.853	46.736	70.216	43.405
ROA_t	−0.088	0.529	−0.151	0.046	−0.143	0.664
	−1.520	1.265	−2.167	0.239	−1.789	1.817
$Leverage_t$	1.062	1.294	1.009	1.141	1.172	1.169
	25.592	13.068	24.334	11.520	26.327	11.786
Model	Eq. 18	Eq. 19	Eq. 18	Eq. 19	Eq. 18	Eq. 19
Tables	44, 47		45, 48		46, 49	

continued on the next page

Table 43 – continued from the previous page						
Panel B: Dependent Variable = Annual *VERR* Decile						
	Inv. Intelligence		Baker-Wurgler		AAII	
	1	2	3	4	5	6
$Vega_t$		0.182		0.189		0.142
		2.744		2.860		2.155
$Delta_t$		0.003		0.003		0.003
		1.841		1.898		1.980
AD_t	1.030	−0.344	1.166	0.511	1.147	−0.504
	5.565	−0.661	8.354	1.521	6.001	−1.191
AD_t*$Sent_t$	0.003	0.037	−0.967	−0.307	−0.009	0.065
	0.552	1.749	−5.643	−0.549	−0.920	3.027
$R\&D/A_t$	5.636	5.905	5.640	6.389	5.811	6.238
	37.032	14.236	49.124	21.649	39.985	16.886
$R\&D/A_t$*$Sent_t$	−0.002	0.029	−0.382	0.339	−0.017	0.021
	−0.295	1.790	−2.192	0.687	−2.476	1.258
$PPENT_t$	0.333	0.312	0.146	0.170	0.268	0.301
	6.564	2.333	3.709	1.786	5.069	2.547
$PPENT_t$*$Sent_t$	−0.013	−0.009	−0.177	−0.226	−0.017	−0.012
	−6.336	−1.880	−3.226	−1.542	−7.069	−2.298
$INTAN_t$	0.757	0.351	0.559	0.072	0.548	0.020
	9.827	2.232	10.604	0.699	8.247	0.161
$INTAN_t$*$Sent_t$	−0.011	−0.014	−0.130	−0.009	−0.000	0.005
	−3.910	−2.486	−1.234	−0.051	−0.010	0.903
CF_t	−1.742	−0.662	−1.932	−0.611	−2.264	−0.713
	−16.951	−1.971	−21.266	−2.274	−22.409	−2.209
CF_t*$Sent_t$	−0.005	−0.003	0.643	0.799	0.004	0.009
	−1.600	−0.281	7.369	3.170	1.276	1.060
ACC_t	−0.063	1.128	−0.380	0.530	−0.739	0.748
	−0.519	1.968	−3.783	0.831	−6.384	1.415
ACC_t*$Sent_t$	−0.015	−0.042	0.264	0.403	−0.004	−0.017
	−3.835	−3.844	2.844	1.058	−0.824	−1.582
$Sent_t$	0.005	−0.000	0.045	0.297	0.007	0.008
	4.896	−0.171	1.475	3.755	6.119	2.737
$AltZ1_t$	0.031	0.040	0.032	0.037	0.030	0.037
	26.997	13.562	27.220	12.735	25.160	12.676
Age_t	−0.001	−0.001	−0.001	−0.001	−0.001	−0.001
	−18.212	−8.959	−18.272	−8.470	−16.805	−8.386
$Size_t$	−0.127	−0.153	−0.126	−0.162	−0.124	−0.152
	−26.080	−11.138	−25.940	−11.798	−23.295	−11.139
$StdRet_t$	−0.003	−0.003	−0.003	−0.004	−0.004	−0.002
	−17.190	−4.654	−17.487	−6.921	−18.191	−2.945
$Turnover_t$	0.002	0.001	0.002	0.001	0.002	0.001
	21.507	3.461	21.709	4.031	21.802	4.187
$StdROA_t$	0.000	0.014	0.000	0.014	0.000	0.012
	4.477	7.018	4.493	6.960	4.384	6.276
$Beta_t$	0.684	0.945	0.687	0.994	0.690	0.939
	73.849	40.613	73.896	42.066	69.064	40.452
ROA_t	−0.413	−0.206	−0.418	−0.506	−0.210	−0.205
	−5.449	−0.311	−5.536	−1.014	−2.608	−0.292
$Leverage_t$	0.708	0.531	0.700	0.477	0.748	0.492
	17.634	5.496	17.458	4.941	17.204	5.085
Model	Eq. 18	Eq. 19	Eq. 18	Eq. 19	Eq. 18	Eq. 19
Tables	50, 53		51, 54		52, 55	

continued on the next page

Table 43 – continued from the previous page						
Panel C: Dependent Variable = Full Period *eVERR* Decile						
	Inv. Intelligence		Baker-Wurgler		AAII	
	1	2	3	4	5	6
$Vega_t$		0.348		0.465		0.349
		5.377		7.185		5.378
$Delta_t$		0.007		0.007		0.008
		3.183		3.107		3.281
AD_t	0.527	−0.458	0.795	0.576	0.583	−0.803
	2.815	−0.874	5.694	1.696	3.041	−1.886
AD_t*$Sent_t$	0.002	0.042	−0.886	−1.329	0.012	0.097
	0.514	2.005	−4.809	−2.362	1.228	4.498
$R\&D/A_t$	3.014	5.029	6.228	7.887	5.745	7.551
	23.559	15.439	51.366	25.723	38.540	19.850
$R\&D/A_t$*$Sent_t$	0.015	0.031	−0.240	2.208	0.013	0.054
	−0.604	2.149	−1.800	4.136	1.814	3.035
$PPENT_t$	−1.008	−0.686	−1.086	−0.861	−0.894	−0.657
	−19.341	−5.167	−26.265	−8.941	−16.759	−5.522
$PPENT_t$*$Sent_t$	−0.014	−0.015	−0.141	−0.427	−0.016	−0.020
	−6.632	−2.997	−2.610	−2.901	−6.551	−3.748
$INTAN_t$	−0.676	−1.430	−0.126	−1.029	−0.588	−0.951
	−8.575	−9.089	−2.128	−9.936	−8.855	−7.627
$INTAN_t$*$Sent_t$	0.010	0.005	−0.429	0.032	0.009	−0.004
	3.543	0.863	−5.705	0.179	2.798	−0.640
CF_t	−3.537	−1.594	−3.365	−1.592	−3.097	−1.799
	−36.033	−3.827	−39.130	−4.411	−31.577	−4.237
CF_t*$Sent_t$	−0.008	0.015	1.087	1.047	0.003	0.000
	−2.396	1.667	13.405	3.963	0.797	0.040
ACC_t	−1.331	1.387	−1.061	1.473	−0.567	1.818
	−12.163	2.745	−11.251	3.399	−4.895	4.101
ACC_t*$Sent_t$	−0.001	−0.006	0.699	0.165	−0.009	−0.053
	−0.401	−0.792	7.962	0.073	−2.245	−4.572
$Sent_t$	0.010	0.010	0.423	0.632	0.013	0.018
	10.534	3.778	19.659	7.823	11.101	6.413
$AltZ1_t$	0.080	0.104	0.078	0.101	0.070	0.101
	46.750	26.169	46.178	25.606	41.202	25.545
Age_t	−0.000	−0.001	−0.000	−0.001	−0.000	−0.001
	−6.832	−7.669	−6.302	−7.187	−7.887	−6.956
$Size_t$	−0.137	−0.123	−0.143	−0.139	−0.160	−0.119
	−27.441	−9.029	−28.817	−10.147	−29.844	−8.705
$StdRet_t$	−0.005	−0.013	−0.006	−0.019	−0.007	−0.014
	−27.023	−20.496	−31.050	−30.247	−31.615	−23.111
$Turnover_t$	0.003	−0.002	0.003	−0.002	0.002	−0.001
	23.887	−9.773	22.134	−7.730	14.999	−6.832
$StdROA_t$	0.001	0.026	0.001	0.028	0.000	0.024
	4.938	12.161	5.478	13.392	4.795	11.229
$Beta_t$	0.667	1.142	0.699	1.281	0.756	1.152
	70.337	47.455	73.519	51.727	74.118	47.926
ROA_t	−0.090	0.977	−0.143	0.408	−0.087	1.073
	−1.545	2.744	−2.362	1.654	−1.408	3.222
$Leverage_t$	0.203	0.551	0.242	0.391	0.365	0.404
	5.072	5.518	5.791	3.925	8.168	4.046
Model	Eq. 18	Eq. 19	Eq. 18	Eq. 19	Eq. 18	Eq. 19
Tables	56, 59		57, 60		58, 61	

continued on the next page

Table 43 – continued from the previous page						
Panel D: Dependent Variable = Annual *eVERR* Decile						
	Inv. Intelligence		Baker-Wurgler		AAII	
	1	2	3	4	5	6
$Vega_t$		0.483		0.472		0.420
		7.643		7.489		6.670
$Delta_t$		0.003		0.003		0.003
		1.674		1.753		1.785
AD_t	0.935	0.292	1.121	0.779	0.898	−0.473
	5.083	0.558	8.061	2.312	4.690	−1.111
AD_t*$Sent_t$	0.005	0.018	−1.044	−0.418	0.001	0.085
	0.857	0.843	−6.054	−0.747	0.086	3.998
R&D/A_t	5.098	7.242	5.522	8.044	5.588	7.709
	33.681	17.124	47.476	26.821	38.229	20.531
R&D/A_t*$Sent_t$	0.022	0.039	−0.527	−0.027	0.002	0.031
	3.609	2.401	−3.019	−0.058	0.271	1.812
$PPENT_t$	−1.169	−1.133	−1.326	−1.332	−1.237	−1.329
	−22.614	−8.417	−32.172	−13.865	−23.229	−11.187
$PPENT_t$*$Sent_t$	−0.011	−0.012	−0.054	−0.067	−0.007	−0.001
	−5.320	−2.369	−1.249	−0.463	−2.872	−0.175
$INTAN_t$	−0.188	−0.526	−0.542	−0.995	−0.603	−1.056
	−2.469	−3.340	−10.361	−9.673	−9.116	−8.516
$INTAN_t$*$Sent_t$	−0.017	−0.021	0.083	0.067	0.008	0.006
	−6.008	−3.720	1.416	0.377	2.513	1.007
CF_t	−2.269	−0.888	−2.434	−0.362	−2.706	−0.271
	−22.110	−2.284	−26.730	−1.320	−26.939	−0.692
CF_t*$Sent_t$	−0.002	0.011	0.722	0.663	0.001	−0.012
	−0.522	1.214	8.339	2.594	0.135	−1.289
ACC_t	−0.014	1.811	−0.319	1.478	−0.601	2.052
	−0.102	3.521	−3.178	3.340	−5.119	4.538
ACC_t*$Sent_t$	−0.013	−0.040	0.364	0.103	−0.011	−0.054
	−3.318	−3.573	3.994	0.045	−2.465	−4.632
$Sent_t$	0.002	−0.005	0.000	0.329	0.002	0.004
	2.520	−1.669	−0.334	4.160	1.598	1.272
$AltZ1_t$	0.047	0.062	0.048	0.059	0.047	0.060
	34.074	18.950	34.546	18.018	32.738	18.105
Age_t	−0.000	−0.000	−0.000	−0.000	−0.000	−0.000
	−5.959	−3.947	−5.840	−3.232	−4.807	−3.345
$Size_t$	−0.130	−0.092	−0.131	−0.099	−0.130	−0.089
	−26.789	−6.733	−26.902	−7.262	−24.281	−6.576
$StdRet_t$	−0.004	−0.006	−0.004	−0.006	−0.004	−0.003
	−19.288	−8.857	−19.235	−9.653	−18.694	−5.482
$Turnover_t$	0.002	−0.000	0.002	−0.000	0.002	−0.000
	16.775	−0.948	16.885	−0.726	18.054	−0.749
$StdROA_t$	0.000	0.019	0.000	0.018	0.000	0.017
	4.764	9.401	4.780	9.087	4.703	8.332
$Beta_t$	0.712	1.042	0.717	1.096	0.719	1.022
	76.343	44.320	76.532	45.787	71.512	43.613
ROA_t	−0.330	0.444	−0.339	0.067	−0.131	0.425
	−4.421	1.741	−4.554	0.857	−1.760	1.670
$Leverage_t$	−0.133	−0.340	−0.130	−0.396	−0.061	−0.368
	−3.229	−3.504	−3.147	−4.081	−1.383	−3.785
Model	Eq. 18	Eq. 19	Eq. 18	Eq. 19	Eq. 18	Eq. 19
Tables	62, 65		63, 66		64, 67	

the twenty-four industry fixed effects specification tables. Each table includes the coefficients and t-statistics for six models within the industry fixed effects specification which employ the specified dependent variable, measures of cash flow and accruals, and measure of investor sentiment. Information about the definition and availability of the independent variables used in the industry fixed effects specification models is presented in Exhibit 3 at the beginning of the Appendix. The time period spanned by the data used to generate each column of Tables 44 through 67 is therefore dictated by the intersection of the time periods for which the variables used in each column are available. The industry fixed effects are represented by the vector of industry dummy variables included in each industry fixed effects specification model. The industry fixed effects specification models estimated are the following:

$$\begin{aligned} Decile_{i,t} = f(&\boldsymbol{\alpha} + \gamma_3 AD_{i,t} + \gamma_4 R\&D/A_{i,t} + \gamma_5 PPENT_{i,t} \\ &+ \gamma_6 INTAN_{i,t} + \gamma_7 CF_{i,t} + \gamma_8 ACC_{i,t} + \gamma_{16} AltZ1_{i,t} \\ &+ \gamma_{17} Age_{i,t} + \gamma_{18} Size_{i,t} + \gamma_{19} StdRet_{i,t} + \gamma_{20} Turnover_{i,t} \\ &+ \gamma_{21} StdROA_{i,t} + \gamma_{22} Beta_{i,t} + \gamma_{23} ROA_{i,t} \\ &+ \gamma_{24} Leverage_{i,t} + \boldsymbol{\theta IndDUM} + \varepsilon_{i,t}) \end{aligned} \tag{28}$$

$$\begin{aligned} Decile_{i,t} = f(&\boldsymbol{\alpha} + \gamma_1 Vega_{i,t} + \gamma_2 Delta_{i,t} + \gamma_3 AD_{i,t} \\ &+ \gamma_5 PPENT_{i,t} + \gamma_6 INTAN_{i,t} + \gamma_7 CF_{i,t} + \gamma_8 ACC_{i,t} \\ &+ \gamma_{16} AltZ1_{i,t} + \gamma_{17} Age_{i,t} + \gamma_{18} Size_{i,t} + \gamma_{19} StdRet_{i,t} \\ &+ \gamma_{20} Turnover_{i,t} + \gamma_{21} StdROA_{i,t} + \gamma_{22} Beta_{i,t} \\ &+ \gamma_{23} ROA_{i,t} + \gamma_{24} Leverage_{i,t} + \boldsymbol{\theta IndDUM} + \varepsilon_{i,t}) \end{aligned} \tag{29}$$

$$\begin{aligned} Decile_{i,t} = f(&\boldsymbol{\alpha} + \gamma_1 Vega_{i,t} + \gamma_2 Delta_{i,t} + \gamma_3 AD_{i,t} \\ &+ \gamma_4 R\&D/A_{i,t} + \gamma_5 PPENT_{i,t} + \gamma_6 INTAN_{i,t} + \gamma_7 CF_{i,t} \\ &+ \gamma_8 ACC_{i,t} + \gamma_{16} AltZ1_{i,t} + \gamma_{17} Age_{i,t} + \gamma_{18} Size_{i,t} \\ &+ \gamma_{19} StdRet_{i,t} + \gamma_{20} Turnover_{i,t} + \gamma_{21} StdROA_{i,t} \\ &+ \gamma_{22} Beta_{i,t} + \gamma_{23} ROA_{i,t} + \gamma_{24} Leverage_{i,t} \\ &+ \boldsymbol{\theta IndDUM} + \varepsilon_{i,t}) \end{aligned} \tag{30}$$

$$\begin{aligned}
Decile_{i,t} = f(&\boldsymbol{\alpha} + \gamma_3 AD_{i,t} + \gamma_4 R\&D/A_{i,t} + \gamma_5 PPENT_{i,t} \\
&+ \gamma_6 INTAN_{i,t} + \gamma_7 CF_{i,t} + \gamma_8 ACC_{i,t} + \gamma_9 Sent_{i,t} \\
&+ \gamma_{16} AltZ1_{i,t} + \gamma_{17} Age_{i,t} + \gamma_{18} Size_{i,t} + \gamma_{19} StdRet_{i,t} \\
&+ \gamma_{20} Turnover_{i,t} + \gamma_{21} StdROA_{i,t} + \gamma_{22} Beta_{i,t} \\
&+ \gamma_{23} ROA_{i,t} + \gamma_{24} Leverage_{i,t} + \boldsymbol{\theta IndDUM} + \varepsilon_{i,t})
\end{aligned} \quad (31)$$

$$\begin{aligned}
Decile_{i,t} = f(&\boldsymbol{\alpha} + \gamma_3 AD_{i,t} + \gamma_4 R\&D/A_{i,t} + \gamma_5 PPENT_{i,t} \\
&+ \gamma_6 INTAN_{i,t} + \gamma_7 CF_{i,t} + \gamma_8 ACC_{i,t} + \gamma_9 Sent_{i,t} \\
&+ \gamma_{10}(AD_{i,t} * Sent_{i,t}) + \gamma_{11}(R\&D_{i,t} * Sent_{i,t}) \\
&+ \gamma_{12}(PPENT_{i,t} * Sent_{i,t}) + \gamma_{13}(INTAN_{i,t} * Sent_{i,t}) \\
&+ \gamma_{14}(CF_{i,t} * Sent_{i,t}) + \gamma_{15}(ACC_{i,t} * Sent_{i,t}) \\
&+ \gamma_{16} AltZ1_{i,t} + \gamma_{17} Age_{i,t} + \gamma_{18} Size_{i,t} \\
&+ \gamma_{19} StdRet_{i,t} + \gamma_{20} Turnover_{i,t} + \gamma_{21} StdROA_{i,t} \\
&+ \gamma_{22} Beta_{i,t} + \gamma_{23} ROA_{i,t} + \gamma_{24} Leverage_{i,t} \\
&+ \boldsymbol{\theta IndDUM} + \varepsilon_{i,t})
\end{aligned} \quad (32)$$

$$\begin{aligned}
Decile_{i,t} = f(&\boldsymbol{\alpha} + \gamma_1 Vega_{i,t} + \gamma_2 Delta_{i,t} + \gamma_3 AD_{i,t} \\
&+ \gamma_4 R\&D/A_{i,t} + \gamma_5 PPENT_{i,t} + \gamma_6 INTAN_{i,t} + \gamma_7 CF_{i,t} \\
&+ \gamma_8 ACC_{i,t} + \gamma_9 Sent_{i,t} + \gamma_{10}(AD_{i,t} * Sent_{i,t}) \\
&+ \gamma_{11}(R\&D/A_{i,t} * Sent_{i,t}) + \gamma_{12}(PPENT_{i,t} * Sent_{i,t}) \\
&+ \gamma_{13}(INTAN_{i,t} * Sent_{i,t}) + \gamma_{14}(CF_{i,t} * Sent_{i,t}) \\
&+ \gamma_{15}(ACC_{i,t} * Sent_{i,t}) + \gamma_{16} AltZ1_{i,t} \\
&+ \gamma_{17} Age_{i,t} + \gamma_{18} Size_{i,t} + \gamma_{19} StdRet_{i,t} \\
&+ \gamma_{20} Turnover_{i,t} + \gamma_{21} StdROA_{i,t} + \gamma_{22} Beta_{i,t} \\
&+ \gamma_{23} ROA_{i,t} + \gamma_{24} Leverage_{i,t} + \boldsymbol{\theta IndDUM} + \varepsilon_{i,t})
\end{aligned} \quad (33)$$

In Tables 44 through 67 the industry fixed effects specification models in Equations 28 through 33 correspond to the columns in the tables. Equation 28 is used to estimate the coefficients and t-statistics presented in column A of Tables 44 through 67. Equation 29 is used for column B, Equation 30 is used for column C, and Equation 31 is used for column D. Equations 32 and 33, which are the same as the industry fixed effects specification models in Equations 18 and 19 in the Methodology section of the second essay, are used to estimate the coefficients and t-statistics presented in columns E and F respectively.

3.2.1 Full Period VERR Decile Assignments Used with the Single Digit SIC Industry Fixed Effects Specification

For Tables 44 through 49 capm5 *VERR* valuation measures are used to assign firm years to valuation deciles across the 1964–2009 period. The first three tables, Tables 44 through 46, use scaled values of the Sloan (1996) measures of cash flow and accruals as part of the single digit SIC industry fixed effects specification. The data required to calculate the cash flow and accruals measures following Sloan (1996) is available sporadically for firms prior to mid-1970, and very consistently thereafter. Table 44 employs the Investors Intelligence measure of sentiment, which is available for the full 1964–2009 period. Table 45 employs the sentiment data from Baker and Wurgler (2007), which is available beginning in the middle of 1965. Table 46 employs the AAII measure of sentiment, which is first available in the middle of 1987. The more limited availability of the AAII measure accounts for the smaller number of observations involved in the analyses presented in Table 46.

The second three tables, Tables 47 through 49, use scaled values of the Collins et al. (2003) measures of cash flow and accruals as part of the single digit SIC industry fixed effects specification. The data required to calculate the cash flow and accruals measures following Collins et al. (2003) is available sporadically for firms beginning in 1987 and continuing through mid-1988, and consistently thereafter. Table 47 employs the Investors Intelligence measure of sentiment, which is available for the full 1964–2009 period. Table 48 employs the sentiment data from Baker and Wurgler (2007), which is available beginning in the middle of 1965. Table 49 employs the AAII measure of sentiment, which is first available in the middle of 1987. The more limited availability of the Collins et al. (2003) measures of cash flow and accruals accounts for the smaller number of observations involved in the analyses presented in Tables 47 through Tables 49.

Table 44
Determinants of Full Sample capm5 VERR Decile Assignments Using Investors Intelligence Sentiment, Sloan Accruals and Cash Flow, and Single Digit SIC Industry Fixed Effects

The ordered logistic regressions use the full period capm5 *VERR* decile assignments from 1964–2009 as the dependent variable. Some independent variables are not available for the full period. CEO compensation characteristics, vega and delta, are obtained from Professor Naveen's website and are rescaled to be in millions. Scaled cash flow and accruals data are calculated in accordance with Sloan (1996). Sentiment is calculated as the monthly average of the weekly difference between the bullish and bearish sentiment reported by Investors Intelligence. Advertising (AD), R&D, cash flow (CF), and accruals (ACC) are scaled by average total assets; intangible assets (INTAN) and property, plant, and equipment (PPENT) are scaled by end of the year assets. Single digit SIC codes are used to implement the industry fixed effects. A version of Altman's Z, firm age, firm size, the standard deviation of returns, stock turnover, return on assets, the standard deviation of return on assets, beta, and total liabilities scaled by assets are included as control variables. The *t*-statistics are reported below each coefficient.

	A	B	C	D	E	F
$Vega_t$		0.249	0.139			0.066
		3.737	2.088			0.988
$Delta_t$		0.003	0.002			0.002
		1.647	1.519			1.543
AD_t	0.711	0.279	0.641	0.721	0.518	−0.435
	5.567	0.834	1.915	5.649	3.146	−0.812
AD_t*Sent_t					0.014	0.054
					2.028	2.488
$R\&D/A_t$	6.628		6.577	6.639	6.643	6.304
	57.285		22.138	57.379	43.647	14.992
$R\&D/A_t*Sent_t$					−0.002	0.026
					−0.249	1.577
$PPENT_t$	0.251	−0.050	0.315	0.255	0.431	0.569
	6.684	−0.538	3.327	6.816	9.193	4.184
$PPENT_t*Sent_t$					−0.011	−0.011
					−6.147	−2.250
$INTAN_t$	1.313	−0.505	−0.100	1.282	0.904	−0.562
	25.859	−5.019	−0.979	25.177	12.281	−3.529
$INTAN_t*Sent_t$					0.017	0.016
					6.362	2.856
$CFsloan_t$	−2.659	−1.652	−1.377	−2.624	−2.541	−1.360
	−37.428	−7.370	−6.065	−36.825	−30.586	−4.824
$CFsloan_t*Sent_t$					−0.004	0.016
					−1.390	1.822
$ACCsloan_t$	−1.561	−0.201	0.252	−1.508	−1.638	0.386
	−17.437	−0.675	0.841	−16.773	−15.262	0.926
$ACCsloan_t*Sent_t$					0.011	0.012
					2.945	0.814
$IIbullbear_t$				0.003	0.005	0.007
				7.859	6.429	2.633

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Table 44 – continued from the previous page						
	A	B	C	D	E	F
$AltZ1_t$	0.065	0.083	0.078	0.064	0.065	0.076
	44.657	22.933	21.888	44.534	44.502	21.461
Age_t	−0.001	−0.001	−0.001	−0.001	−0.001	−0.001
	−10.838	−13.055	−11.932	−10.636	−10.633	−11.741
$Size_t$	−0.113	−0.169	−0.173	−0.113	−0.114	−0.171
	−25.040	−12.250	−12.549	−25.175	−25.377	−12.422
$StdRet_t$	−0.004	−0.013	−0.013	−0.004	−0.003	−0.011
	−20.639	−22.099	−21.517	−19.196	−18.576	−16.706
$Turnover_t$	0.005	0.000	−0.001	0.005	0.005	−0.001
	41.086	0.206	−2.864	40.375	40.261	−4.070
$StdROA_t$	0.001	0.029	0.021	0.001	0.001	0.018
	5.732	13.637	10.055	5.649	5.572	8.851
$Beta_t$	0.489	1.023	1.027	0.488	0.487	1.014
	57.431	43.467	43.493	57.287	57.133	42.749
ROA_t	−0.187	−0.046	0.360	−0.189	−0.208	0.232
	−3.257	−0.218	1.695	−3.277	−3.483	1.089
$Leverage_t$	0.961	1.099	1.332	0.968	0.979	1.344
	25.050	11.074	13.347	25.235	25.508	13.458
N	81,293	15,629	15,629	81,293	81,293	15,629
Pseudo-R^2	0.275	0.269	0.290	0.276	0.277	0.297
Model	Eq. 28	Eq. 29	Eq. 30	Eq. 31	Eq. 32	Eq. 33

Table 45
Determinants of Full Sample capm5 VERR Decile Assignments Using Baker-Wurgler Sentiment, Sloan Accruals and Cash Flow, and Single Digit SIC Industry Fixed Effects

The ordered logistic regressions use the full period capm5 *VERR* decile assignments from 1964–2009 as the dependent variable. Some independent variables are not available for the full period. CEO compensation characteristics, vega and delta, are obtained from Professor Naveen's website and are rescaled to be in millions. Scaled cash flow and accruals data are calculated in accordance with Sloan (1996). Monthly orthogonalized sentiment values introduced by Baker and Wurgler (2007) are used. Advertising (AD), R&D, cash flow (CF), and accruals (ACC) are scaled by average total assets; intangible assets (INTAN) and property, plant, and equipment (PPENT) are scaled by end of the year assets. Single digit SIC codes are used to implement the industry fixed effects. A version of Altman's Z, firm age, firm size, the standard deviation of returns, stock turnover, return on assets, the standard deviation of return on assets, beta, and total liabilities scaled by assets are included as control variables. The *t*-statistics are reported below each coefficient.

	A	B	C	D	E	F
$Vega_t$		0.249	0.139			0.186
		3.737	2.088			2.770
$Delta_t$		0.003	0.002			0.003
		1.647	1.519			1.700
AD_t	0.711	0.279	0.641	0.797	0.906	0.870
	5.567	0.834	1.915	6.234	7.074	2.543
AD_t*$Sent_t$					−0.963	−1.076
					−6.475	−1.910
R&D/A_t	6.628		6.577	6.746	6.784	6.321
	57.285		22.138	58.325	58.102	21.054
R&D/A_t*$Sent_t$					−1.201	2.320
					−7.447	4.410
$PPENT_t$	0.251	−0.050	0.315	0.223	0.235	0.370
	6.684	−0.538	3.327	5.929	6.250	3.835
$PPENT_t$*$Sent_t$					−0.104	−0.373
					−2.601	−2.503
$INTAN_t$	1.313	−0.505	−0.100	1.354	1.405	−0.049
	25.859	−5.019	−0.979	26.608	27.473	−0.475
$INTAN_t$*$Sent_t$					−0.732	0.228
					−10.116	1.248
$CFsloan_t$	−2.659	−1.652	−1.377	−2.466	−2.565	−1.426
	−37.428	−7.370	−6.065	−33.318	−32.925	−6.178
$CFsloan_t$*$Sent_t$					0.816	0.790
					13.132	3.232
$ACCsloan_t$	−1.561	−0.201	0.252	−1.327	−1.449	0.306
	−17.437	−0.675	0.841	−14.321	−14.980	0.987
$ACCsloan_t$*$Sent_t$					0.926	0.678
					10.970	1.805
$BWsent_t$				0.566	0.603	0.549
				73.998	31.684	6.692

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Table 45 – continued from the previous page						
	A	B	C	D	E	F
$AltZ1_t$	0.065	0.083	0.078	0.062	0.063	0.073
	44.657	22.933	21.888	43.232	43.599	20.408
Age_t	−0.001	−0.001	−0.001	−0.001	−0.001	−0.001
	−10.838	−13.055	−11.932	−12.601	−13.096	−11.373
$Size_t$	−0.113	−0.169	−0.173	−0.118	−0.117	−0.188
	−25.040	−12.250	−12.549	−26.195	−25.936	−13.623
$StdRet_t$	−0.004	−0.013	−0.013	−0.004	−0.004	−0.016
	−20.639	−22.099	−21.517	−20.960	−20.679	−25.861
$Turnover_t$	0.005	0.000	−0.001	0.005	0.005	−0.000
	41.086	0.206	−2.864	39.084	38.766	−1.593
$StdROA_t$	0.001	0.029	0.021	0.001	0.001	0.021
	5.732	13.637	10.055	5.869	5.873	10.302
$Beta_t$	0.489	1.023	1.027	0.541	0.545	1.134
	57.431	43.467	43.493	62.858	63.263	46.642
ROA_t	−0.187	−0.046	0.360	−0.265	−0.316	0.109
	−3.257	−0.218	1.695	−4.185	−4.532	0.510
$Leverage_t$	0.961	1.099	1.332	0.933	0.931	1.198
	25.050	11.074	13.347	24.296	24.208	11.991
N	81,293	15,629	15,629	81,255	81,255	15,629
Pseudo-R^2	0.275	0.269	0.290	0.322	0.326	0.317
Model	Eq. 28	Eq. 29	Eq. 30	Eq. 31	Eq. 32	Eq. 33

Table 46
Determinants of Full Sample capm5 VERR Decile Assignments Using AAII Sentiment, Sloan Accruals and Cash Flow, and Single Digit SIC Industry Fixed Effects

The ordered logistic regressions use the full period capm5 *VERR* decile assignments from 1964–2009 as the dependent variable. Some independent variables are not available for the full period. CEO compensation characteristics, vega and delta, are obtained from Professor Naveen's website and are rescaled to be in millions. Scaled cash flow and accruals data are calculated in accordance with Sloan (1996). Sentiment is calculated as the monthly average of the weekly difference between the bullish and bearish sentiment reported by AAII. Advertising (AD), R&D, cash flow (CF), and accruals (ACC) are scaled by average total assets; intangible assets (INTAN) and property, plant, and equipment (PPENT) are scaled by end of the year assets. Single digit SIC codes are used to implement the industry fixed effects. A version of Altman's Z, firm age, firm size, the standard deviation of returns, stock turnover, return on assets, the standard deviation of return on assets, beta, and total liabilities scaled by assets are included as control variables. The t-statistics are reported below each coefficient.

	A	B	C	D	E	F
$Vega_t$		0.249	0.139			0.085
		3.737	2.088			1.276
$Delta_t$		0.003	0.002			0.003
		1.647	1.519			1.839
AD_t	0.711	0.279	0.641	1.017	1.063	−0.297
	5.567	0.834	1.915	6.607	5.570	−0.688
AD_t*$Sent_t$					−0.003	0.073
					−0.317	3.374
R&D/A_t	6.628		6.577	5.689	5.771	6.031
	57.285		22.138	46.704	39.001	16.096
R&D/A_t*$Sent_t$					−0.006	0.052
					−0.770	2.993
$PPENT_t$	0.251	−0.050	0.315	0.184	0.414	0.617
	6.684	−0.538	3.327	4.107	7.831	5.155
$PPENT_t$*$Sent_t$					−0.020	−0.022
					−8.202	−4.264
$INTAN_t$	1.313	−0.505	−0.100	0.544	0.493	−0.034
	25.859	−5.019	−0.979	9.890	7.394	−0.271
$INTAN_t$*$Sent_t$					0.004	0.002
					1.273	0.269
$CFsloan_t$	−2.659	−1.652	−1.377	−2.150	−2.195	−1.582
	−37.428	−7.370	−6.065	−24.006	−22.789	−6.095
$CFsloan_t$*$Sent_t$					0.005	0.021
					1.430	2.329
$ACCsloan_t$	−1.561	−0.201	0.252	−0.678	−0.681	0.568
	−17.437	−0.675	0.841	−5.941	−5.361	1.561
$ACCsloan_t$*$Sent_t$					0.001	−0.009
					0.261	−0.662
$AAIIbullbear_t$				0.008	0.013	0.015
				17.812	11.453	5.433

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Table 46 – continued from the previous page						
	A	B	C	D	E	F
$AltZ1_t$	0.065	0.083	0.078	0.052	0.052	0.073
	44.657	22.933	21.888	35.406	35.244	20.407
Age_t	−0.001	−0.001	−0.001	−0.001	−0.001	−0.001
	−10.838	−13.055	−11.932	−18.666	−18.614	−11.154
$Size_t$	−0.113	−0.169	−0.173	−0.161	−0.161	−0.170
	−25.040	−12.250	−12.549	−30.166	−30.111	−12.349
$StdRet_t$	−0.004	−0.013	−0.013	−0.006	−0.006	−0.012
	−20.639	−22.099	−21.517	−30.151	−30.153	−19.465
$Turnover_t$	0.005	0.000	−0.001	0.002	0.002	−0.000
	41.086	0.206	−2.864	20.215	20.192	−1.076
$StdROA_t$	0.001	0.029	0.021	0.000	0.000	0.018
	5.732	13.637	10.055	4.445	4.491	8.634
$Beta_t$	0.489	1.023	1.027	0.713	0.711	1.025
	57.431	43.467	43.493	70.746	70.456	43.266
ROA_t	−0.187	−0.046	0.360	−0.307	−0.311	0.445
	−3.257	−0.218	1.695	−3.899	−3.935	2.094
$Leverage_t$	0.961	1.099	1.332	1.242	1.243	1.220
	25.050	11.074	13.347	27.882	27.905	12.196
N	81,293	15,629	15,629	55,984	55,984	15,629
Pseudo-R^2	0.275	0.269	0.290	0.306	0.307	0.305
Model	Eq. 28	Eq. 29	Eq. 30	Eq. 31	Eq. 32	Eq. 33

Table 47
Determinants of Full Sample capm5 VERR Decile Assignments Using Investors Intelligence Sentiment, Collins Accruals and Cash Flow, and Single Digit SIC Industry Fixed Effects

The ordered logistic regressions use the full period capm5 *VERR* decile assignments from 1964–2009 as the dependent variable. Some independent variables are not available for the full period. CEO compensation characteristics, vega and delta, are obtained from Professor Naveen's website and are rescaled to be in millions. Scaled cash flow and accruals data are calculated in accordance with Collins et al. (2003). Sentiment is calculated as the monthly average of the weekly difference between the bullish and bearish sentiment reported by Investors Intelligence. Advertising (AD), R&D, cash flow (CF), and accruals (ACC) are scaled by average total assets; intangible assets (INTAN) and property, plant, and equipment (PPENT) are scaled by end of the year assets. Single digit SIC codes are used to implement the industry fixed effects. A version of Altman's Z, firm age, firm size, the standard deviation of returns, stock turnover, return on assets, the standard deviation of return on assets, beta, and total liabilities scaled by assets are included as control variables. The *t*-statistics are reported below each coefficient.

	A	B	C	D	E	F
$Vega_t$		0.295	0.185			0.113
		4.509	2.831			1.712
$Delta_t$		0.003	0.003			0.003
		1.877	1.790			1.815
AD_t	0.821	0.084	0.501	0.857	0.940	−0.267
	5.290	0.257	1.536	5.524	4.529	−0.529
AD_t*Sent_t					−0.006	0.041
					−0.595	2.019
$R\&D/A_t$	5.758		6.718	5.737	5.860	6.794
	47.142		22.676	46.975	35.812	16.235
$R\&D/A_t*Sent_t$					−0.009	0.005
					−1.259	0.317
$PPENT_t$	0.207	0.036	0.426	0.240	0.489	0.800
	4.582	0.397	4.545	5.293	8.484	6.012
$PPENT_t*Sent_t$					−0.016	−0.017
					−6.964	−3.514
$INTAN_t$	0.531	−0.553	−0.120	0.441	0.209	−0.495
	9.665	−5.562	−1.185	7.998	2.588	−3.160
$INTAN_t*Sent_t$					0.010	0.013
					3.302	2.328
$CFcollins_t$	−2.986	−3.344	−2.565	−2.944	−2.931	−2.519
	−30.617	−5.606	−4.281	−30.206	−26.137	−4.004
$CFcollins_t*Sent_t$					−0.000	0.003
					−0.040	0.264
$ACCcollins_t$	−0.789	−0.976	0.032	−0.730	−0.537	0.836
	−7.966	−1.626	0.054	−7.378	−4.633	1.334
$ACCcollins_t*Sent_t$					−0.013	−0.041
					−3.180	−4.041
$IIbullbear_t$				0.007	0.011	0.010
				15.563	9.645	3.802

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Table 47 – continued from the previous page						
	A	B	C	D	E	F
$AltZ1_t$	0.052	0.082	0.078	0.052	0.052	0.078
	36.009	23.635	22.791	35.993	36.024	22.565
Age_t	−0.001	−0.001	−0.001	−0.001	−0.001	−0.001
	−19.329	−13.197	−12.056	−19.340	−19.239	−11.805
$Size_t$	−0.157	−0.172	−0.177	−0.164	−0.163	−0.173
	−29.024	−12.608	−12.963	−30.276	−30.140	−12.624
$StdRet_t$	−0.006	−0.014	−0.013	−0.006	−0.006	−0.011
	−30.817	−22.846	−22.305	−29.112	−28.276	−16.604
$Turnover_t$	0.002	0.000	−0.000	0.002	0.002	−0.001
	20.642	0.705	−2.270	19.061	19.131	−3.455
$StdROA_t$	0.000	0.030	0.022	0.000	0.000	0.019
	4.319	14.055	10.517	4.258	4.202	9.245
$Beta_t$	0.699	1.025	1.029	0.699	0.698	1.011
	69.561	43.846	43.839	69.528	69.342	42.920
ROA_t	0.026	0.997	0.790	0.030	0.032	0.826
	0.359	1.742	1.380	0.414	0.443	1.441
$Leverage_t$	1.090	0.962	1.215	1.130	1.144	1.244
	24.525	9.892	12.392	25.404	25.675	12.678
N	55,105	15,880	15,880	55,105	55,105	15,880
Pseudo-R^2	0.306	0.273	0.295	0.310	0.311	0.302
Model	Eq. 28	Eq. 29	Eq. 30	Eq. 31	Eq. 32	Eq. 33

Table 48
Determinants of Full Sample capm5 VERR Decile Assignments Using Baker-Wurgler Sentiment, Collins Accruals and Cash Flow, and Single Digit SIC Industry Fixed Effects

The ordered logistic regressions use the full period capm5 *VERR* decile assignments from 1964–2009 as the dependent variable. Some independent variables are not available for the full period. CEO compensation characteristics, vega and delta, are obtained from Professor Naveen's website and are rescaled to be in millions. Scaled cash flow and accruals data are calculated in accordance with Collins et al. (2003). Monthly orthogonalized sentiment values introduced by Baker and Wurgler (2007) are used. Advertising (AD), R&D, cash flow (CF), and accruals (ACC) are scaled by average total assets; intangible assets (INTAN) and property, plant, and equipment (PPENT) are scaled by end of the year assets. Single digit SIC codes are used to implement the industry fixed effects. A version of Altman's Z, firm age, firm size, the standard deviation of returns, stock turnover, return on assets, the standard deviation of return on assets, beta, and total liabilities scaled by assets are included as control variables. The *t*-statistics are reported below each coefficient.

	A	B	C	D	E	F
$Vega_t$		0.295	0.185			0.222
		4.509	2.831			3.372
$Delta_t$		0.003	0.003			0.003
		1.877	1.790			1.961
AD_t	0.821	0.084	0.501	0.852	0.941	0.696
	5.290	0.257	1.536	5.487	5.991	2.091
AD_t*$Sent_t$					−0.803	−0.992
					−3.022	−1.772
$R\&D/A_t$	5.758		6.718	5.773	5.725	6.548
	47.142		22.676	47.241	46.492	21.784
$R\&D/A_t$*$Sent_t$					0.247	1.900
					1.215	3.648
$PPENT_t$	0.207	0.036	0.426	0.208	0.223	0.481
	4.582	0.397	4.545	4.585	4.901	5.042
$PPENT_t$*$Sent_t$					−0.283	−0.521
					−3.897	−3.535
$INTAN_t$	0.531	−0.553	−0.120	0.518	0.538	−0.063
	9.665	−5.562	−1.185	9.432	9.724	−0.617
$INTAN_t$*$Sent_t$					−0.260	0.152
					−2.809	0.832
$CFcollins_t$	−2.986	−3.344	−2.565	−2.966	−3.105	−1.995
	−30.617	−5.606	−4.281	−30.388	−31.549	−3.302
$CFcollins_t$*$Sent_t$					1.149	1.104
					11.547	4.017
$ACCcollins_t$	−0.789	−0.976	0.032	−0.774	−0.864	0.789
	−7.966	−1.626	0.054	−7.799	−8.603	1.296
$ACCcollins_t$*$Sent_t$					0.315	−0.499
					3.261	−2.031
$BWsent_t$				0.186	0.235	0.546
				13.404	7.160	6.885

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Table 48 – continued from the previous page

	A	B	C	D	E	F
$AltZ1_t$	0.052	0.082	0.078	0.051	0.051	0.073
	36.009	23.635	22.791	35.556	35.571	21.074
Age_t	−0.001	−0.001	−0.001	−0.001	−0.001	−0.001
	−19.329	−13.197	−12.056	−19.194	−19.312	−11.506
$Size_t$	−0.157	−0.172	−0.177	−0.163	−0.162	−0.192
	−29.024	−12.608	−12.963	−30.071	−29.942	−13.976
$StdRet_t$	−0.006	−0.014	−0.013	−0.007	−0.007	−0.016
	−30.817	−22.846	−22.305	−32.266	−32.267	−26.328
$Turnover_t$	0.002	0.000	−0.000	0.002	0.002	−0.000
	20.642	0.705	−2.270	20.524	20.371	−1.012
$StdROA_t$	0.000	0.030	0.022	0.000	0.000	0.023
	4.319	14.055	10.517	4.359	4.382	10.886
$Beta_t$	0.699	1.025	1.029	0.710	0.713	1.132
	69.561	43.846	43.839	70.340	70.443	46.831
ROA_t	0.026	0.997	0.790	0.017	0.014	−0.018
	0.359	1.742	1.380	0.238	0.197	−0.031
$Leverage_t$	1.090	0.962	1.215	1.098	1.087	1.084
	24.525	9.892	12.392	24.698	24.460	11.050
N	55,105	15,880	15,880	55,105	55,105	15,880
Pseudo-R^2	0.306	0.273	0.295	0.309	0.310	0.321
Model	Eq. 28	Eq. 29	Eq. 30	Eq. 31	Eq. 32	Eq. 33

Table 49
Determinants of Full Sample capm5 VERR Decile Assignments Using AAII Sentiment, Collins Accruals and Cash Flow, and Single Digit SIC Industry Fixed Effects

The ordered logistic regressions use the full period capm5 *VERR* decile assignments from 1964–2009 as the dependent variable. Some independent variables are not available for the full period. CEO compensation characteristics, vega and delta, are obtained from Professor Naveen's website and are rescaled to be in millions. Scaled cash flow and accruals data were calculated in accordance with Collins et al. (2003). Sentiment is calculated as the monthly average of the weekly difference between the bullish and bearish sentiment reported by AAII. Advertising (AD), R&D, cash flow (CF), and accruals (ACC) are scaled by average total assets; intangible assets (INTAN) and property, plant, and equipment (PPENT) are scaled by end of the year assets. Single digit SIC codes are used to implement the industry fixed effects. A version of Altman's Z, firm age, firm size, the standard deviation of returns, stock turnover, return on assets, the standard deviation of return on assets, beta, and total liabilities scaled by assets are included as control variables. The *t*-statistics are reported below each coefficient.

	A	B	C	D	E	F
$Vega_t$		0.295	0.185			0.128
		4.509	2.831			1.944
$Delta_t$		0.003	0.003			0.003
		1.877	1.790			2.046
AD_t	0.821	0.084	0.501	0.881	0.896	−0.313
	5.290	0.257	1.536	5.676	4.657	−0.754
AD_t*$Sent_t$					−0.001	0.067
					−0.085	3.137
R&D/A_t	5.758		6.718	5.764	5.957	6.520
	47.142		22.676	47.207	40.184	17.497
R&D/A_t*$Sent_t$					−0.014	0.030
					−1.945	1.692
$PPENT_t$	0.207	0.036	0.426	0.211	0.458	0.743
	4.582	0.397	4.545	4.667	8.599	6.310
$PPENT_t$*$Sent_t$					−0.021	−0.025
					−8.750	−4.794
$INTAN_t$	0.531	−0.553	−0.120	0.513	0.482	−0.021
	9.665	−5.562	−1.185	9.334	7.231	−0.174
$INTAN_t$*$Sent_t$					0.002	−0.001
					0.785	−0.103
$CFcollins_t$	−2.986	−3.344	−2.565	−2.931	−2.987	−2.497
	−30.617	−5.606	−4.281	−30.079	−27.967	−4.066
$CFcollins_t$*$Sent_t$					0.005	0.006
					1.476	0.558
$ACCcollins_t$	−0.789	−0.976	0.032	−0.742	−0.617	0.653
	−7.966	−1.626	0.054	−7.491	−5.689	1.057
$ACCcollins_t$*$Sent_t$					−0.011	−0.042
					−2.765	−4.180
$AAIIbullbear_t$				0.009	0.014	0.017
				18.067	11.884	6.285

continued on the next page

Table 49 – continued from the previous page						
	A	B	C	D	E	F
$AltZ1_t$	0.052	0.082	0.078	0.051	0.051	0.073
	36.009	23.635	22.791	35.416	35.304	21.275
Age_t	−0.001	−0.001	−0.001	−0.001	−0.001	−0.001
	−19.329	−13.197	−12.056	−18.531	−18.463	−11.307
$Size_t$	−0.157	−0.172	−0.177	−0.164	−0.163	−0.173
	−29.024	−12.608	−12.963	−30.244	−30.153	−12.624
$StdRet_t$	−0.006	−0.014	−0.013	−0.006	−0.006	−0.012
	−30.817	−22.846	−22.305	−30.777	−30.694	−19.711
$Turnover_t$	0.002	0.000	−0.000	0.002	0.002	−0.000
	20.642	0.705	−2.270	20.585	20.562	−0.639
$StdROA_t$	0.000	0.030	0.022	0.000	0.000	0.019
	4.319	14.055	10.517	4.359	4.399	9.050
$Beta_t$	0.699	1.025	1.029	0.709	0.706	1.026
	69.561	43.846	43.839	70.300	69.976	43.544
ROA_t	0.026	0.997	0.790	0.022	0.026	0.883
	0.359	1.742	1.380	0.311	0.357	1.540
$Leverage_t$	1.090	0.962	1.215	1.096	1.100	1.118
	24.525	9.892	12.392	24.670	24.749	11.377
N	55,105	15,880	15,880	55,101	55,101	15,880
Pseudo-R^2	0.306	0.273	0.295	0.311	0.312	0.310
Model	Eq. 28	Eq. 29	Eq. 30	Eq. 31	Eq. 32	Eq. 33

3.2.2 Annual VERR Decile Assignments Used with the Single Digit SIC Industry Fixed Effects Specification

For Tables 50 through 55 capm5 *VERR* valuation measures are used to assign firm years to valuation deciles for each calendar year during the 1964–2009 period. The first three tables, Tables 50 through 52, use scaled values of the Sloan (1996) measures of cash flow and accruals as part of the single digit SIC industry fixed effects specification. The data required to calculate the cash flow and accruals measures following Sloan (1996) is available sporadically for firms prior to mid-1970, and very consistently thereafter. Table 50 employs the Investors Intelligence measure of sentiment, which is available for the full 1964–2009 period. Table 51 employs the sentiment data from Baker and Wurgler (2007), which is available beginning in the middle of 1965. Table 52 employs the AAII measure of sentiment, which is first available in the middle of 1987. The more limited availability of the AAII measure accounts for the smaller number of observations involved in the analyses presented in Table 52.

The second three tables, Tables 53 through 55, use scaled values of the Collins et al. (2003) measures of cash flow and accruals as part of the single digit SIC industry fixed effects specification. The data required to calculate the cash flow and accruals measures following Collins et al. (2003) is available sporadically for firms beginning in 1987 and continuing through mid-1988, and consistently thereafter. Table 53 employs the Investors Intelligence measure of sentiment, which is available for the full 1964–2009 period. Table 54 employs the sentiment data from Baker and Wurgler (2007), which is available beginning in the middle of 1965. Table 55 employs the AAII measure of sentiment, which is first available in the middle of 1987. The more limited availability of the Collins et al. (2003) measures of cash flow and accruals accounts for the smaller number of observations involved in the analyses presented in Tables 53 through Tables 55.

Table 50
Determinants of Annual capm5 VERR Decile Assignments Using Investors Intelligence Sentiment, Sloan Accruals and Cash Flow, and Single Digit SIC Industry Fixed Effects

The ordered logistic regressions use the annual capm5 *VERR* decile assignments from 1964–2009 as the dependent variable. Some independent variables are not available for the full period. CEO compensation characteristics, vega and delta, are obtained from Professor Naveen's website and are rescaled to be in millions. Scaled cash flow and accruals data are calculated in accordance with Sloan (1996). Sentiment is calculated as the monthly average of the weekly difference between the bullish and bearish sentiment reported by Investors Intelligence. Advertising (AD), R&D, cash flow (CF), and accruals (ACC) are scaled by average total assets; intangible assets (INTAN) and property, plant, and equipment (PPENT) are scaled by end of the year assets. Single digit SIC codes are used to implement the industry fixed effects. A version of Altman's Z, firm age, firm size, the standard deviation of returns, stock turnover, return on assets, the standard deviation of return on assets, beta, and total liabilities scaled by assets are included as control variables. The *t*-statistics are reported below each coefficient.

	A	B	C	D	E	F
$Vega_t$		0.264	0.160			0.169
		3.975	2.396			2.532
$Delta_t$		0.003	0.003			0.003
		1.965	1.795			1.778
AD_t	1.158	0.049	0.397	1.159	0.944	−0.388
	9.086	0.146	1.189	9.091	5.741	−0.725
AD_t*$Sent_t$					0.015	0.039
					2.126	1.807
$R\&D/A_t$	5.611		6.416	5.612	5.608	5.671
	51.493		22.014	51.497	38.556	13.628
$R\&D/A_t$*$Sent_t$					−0.000	0.039
					−0.083	2.456
$PPENT_t$	0.186	−0.244	0.120	0.187	0.380	0.246
	5.002	−2.644	1.271	5.014	8.144	1.811
$PPENT_t$*$Sent_t$					−0.012	−0.007
					−6.760	−1.403
$INTAN_t$	0.567	−0.358	0.052	0.565	0.744	0.351
	11.260	−3.581	0.508	11.194	10.129	2.215
$INTAN_t$*$Sent_t$					−0.010	−0.013
					−3.616	−2.296
$CFsloan_t$	−1.080	−1.075	−0.782	−1.078	−1.019	−0.916
	−13.656	−4.874	−3.513	−13.608	−11.509	−3.290
$CFsloan_t$*$Sent_t$					−0.003	0.005
					−1.370	0.632
$ACCsloan_t$	0.279	−0.362	0.065	0.283	0.498	0.399
	2.829	−1.229	0.219	2.859	4.368	0.965
$ACCsloan_t$*$Sent_t$					−0.013	−0.019
					−3.487	−1.294
$IIbullbear_t$				0.000	0.004	−0.002
				0.510	5.340	−0.541

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Table 50 – continued from the previous page						
	A	B	C	D	E	F
$AltZ1_t$	0.033	0.044	0.041	0.033	0.033	0.041
	28.940	14.463	13.606	28.931	28.879	13.568
Age_t	−0.001	−0.001	−0.001	−0.001	−0.001	−0.001
	−19.514	−10.076	−8.859	−19.491	−19.437	−8.977
$Size_t$	−0.129	−0.151	−0.154	−0.129	−0.130	−0.153
	−29.002	−10.971	−11.219	−29.006	−29.130	−11.135
$StdRet_t$	−0.003	−0.003	−0.003	−0.003	−0.003	−0.003
	−16.786	−4.792	−4.260	−16.513	−16.444	−4.986
$Turnover_t$	0.002	0.001	0.001	0.002	0.002	0.001
	21.406	6.045	3.186	21.313	21.224	3.394
$StdROA_t$	0.001	0.021	0.014	0.001	0.001	0.014
	4.635	10.374	6.937	4.633	4.637	6.852
$Beta_t$	0.681	0.937	0.940	0.681	0.679	0.947
	78.976	40.465	40.506	78.948	78.729	40.532
ROA_t	−0.820	−0.284	0.030	−0.820	−0.818	0.033
	−10.831	−1.351	0.141	−10.835	−10.796	0.156
$Leverage_t$	0.727	0.371	0.603	0.728	0.732	0.586
	19.437	3.834	6.205	19.447	19.553	6.029
N	81,293	15,629	15,629	81,293	81,293	15,629
Pseudo-R^2	0.242	0.252	0.274	0.242	0.243	0.276
Model	Eq. 28	Eq. 29	Eq. 30	Eq. 31	Eq. 32	Eq. 33

Table 51
Determinants of Annual capm5 VERR Decile Assignments Using Baker-Wurgler Sentiment, Sloan Accruals and Cash Flow, and Single Digit SIC Industry Fixed Effects

The ordered logistic regressions use the annual capm5 *VERR* decile assignments from 1964–2009 as the dependent variable. Some independent variables are not available for the full period. CEO compensation characteristics, vega and delta, are obtained from Professor Naveen's website and are rescaled to be in millions. Scaled cash flow and accruals data are calculated in accordance with Sloan (1996). Monthly orthogonalized sentiment values introduced by Baker and Wurgler (2007) are used. Advertising (AD), R&D, cash flow (CF), and accruals (ACC) are scaled by average total assets; intangible assets (INTAN) and property, plant, and equipment (PPENT) are scaled by end of the year assets. Single digit SIC codes are used to implement the industry fixed effects. A version of Altman's Z, firm age, firm size, the standard deviation of returns, stock turnover, return on assets, the standard deviation of return on assets, beta, and total liabilities scaled by assets are included as control variables. The t-statistics are reported below each coefficient.

	A	B	C	D	E	F
$Vega_t$		0.264	0.160			0.176
		3.975	2.396			2.637
$Delta_t$		0.003	0.003			0.003
		1.965	1.795			1.847
AD_t	1.158	0.049	0.397	1.156	1.270	0.521
	9.086	0.146	1.189	9.068	9.916	1.528
AD_t*$Sent_t$					−1.358	−0.328
					−9.107	−0.584
$R\&D/A_t$	5.611		6.416	5.618	5.649	6.324
	51.493		22.014	51.527	51.223	21.423
$R\&D/A_t$*$Sent_t$					−0.336	0.535
					−2.164	1.081
$PPENT_t$	0.186	−0.244	0.120	0.188	0.205	0.145
	5.002	−2.644	1.271	5.051	5.485	1.507
$PPENT_t$*$Sent_t$					−0.135	−0.183
					−3.420	−1.241
$INTAN_t$	0.567	−0.358	0.052	0.568	0.560	0.089
	11.260	−3.581	0.508	11.283	11.064	0.866
$INTAN_t$*$Sent_t$					0.117	0.017
					1.632	0.095
$CFsloan_t$	−1.080	−1.075	−0.782	−1.097	−1.130	−0.910
	−13.656	−4.874	−3.513	−13.854	−14.245	−4.027
$CFsloan_t$*$Sent_t$					0.230	0.834
					3.827	3.487
$ACCsloan_t$	0.279	−0.362	0.065	0.262	0.248	−0.053
	2.829	−1.229	0.219	2.659	2.509	−0.174
$ACCsloan_t$*$Sent_t$					0.072	0.852
					0.864	2.318
$BWsent_t$				−0.035	0.007	0.274
				−4.742	0.358	3.400

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Table 51 – continued from the previous page						
	A	B	C	D	E	F
$AltZ1_t$	0.033	0.044	0.041	0.033	0.034	0.038
	28.940	14.463	13.606	29.057	29.135	12.803
Age_t	−0.001	−0.001	−0.001	−0.001	−0.001	−0.001
	−19.514	−10.076	−8.859	−19.437	−19.452	−8.442
$Size_t$	−0.129	−0.151	−0.154	−0.129	−0.129	−0.161
	−29.002	−10.971	−11.219	−28.929	−29.022	−11.686
$StdRet_t$	−0.003	−0.003	−0.003	−0.003	−0.003	−0.004
	−16.786	−4.792	−4.260	−16.760	−16.901	−6.898
$Turnover_t$	0.002	0.001	0.001	0.002	0.002	0.001
	21.406	6.045	3.186	21.617	21.651	3.922
$StdROA_t$	0.001	0.021	0.014	0.001	0.001	0.013
	4.635	10.374	6.937	4.635	4.654	6.783
$Beta_t$	0.681	0.937	0.940	0.678	0.679	0.995
	78.976	40.465	40.506	78.499	78.456	41.951
ROA_t	−0.820	−0.284	0.030	−0.814	−0.824	−0.088
	−10.831	−1.351	0.141	−10.749	−10.896	−0.417
$Leverage_t$	0.727	0.371	0.603	0.729	0.732	0.530
	19.437	3.834	6.205	19.482	19.537	5.452
N	81,293	15,629	15,629	81,255	81,255	15,629
Pseudo-R^2	0.242	0.252	0.274	0.242	0.243	0.282
Model	Eq. 28	Eq. 29	Eq. 30	Eq. 31	Eq. 32	Eq. 33

Table 52
Determinants of Annual capm5 VERR Decile Assignments Using AAII Sentiment, Sloan Accruals and Cash Flow, and Single Digit SIC Industry Fixed Effects

The ordered logistic regressions use the annual capm5 *VERR* decile assignments from 1964–2009 as the dependent variable. Some independent variables are not available for the full period. CEO compensation characteristics, vega and delta, are obtained from Professor Naveen's website and are rescaled to be in millions. Scaled cash flow and accruals data are calculated in accordance with Sloan (1996). Sentiment is calculated as the monthly average of the weekly difference between the bullish and bearish sentiment reported by AAII. Advertising (AD), R&D, cash flow (CF), and accruals (ACC) are scaled by average total assets; intangible assets (INTAN) and property, plant, and equipment (PPENT) are scaled by end of the year assets. Single digit SIC codes are used to implement the industry fixed effects. A version of Altman's Z, firm age, firm size, the standard deviation of returns, stock turnover, return on assets, the standard deviation of return on assets, beta, and total liabilities scaled by assets are included as control variables. The *t*-statistics are reported below each coefficient.

	A	B	C	D	E	F
$Vega_t$		0.264	0.160			0.129
		3.975	2.396			1.929
$Delta_t$		0.003	0.003			0.003
		1.965	1.795			1.934
AD_t	1.158	0.049	0.397	1.080	1.193	−0.560
	9.086	0.146	1.189	7.045	6.263	−1.301
AD_t*$Sent_t$					−0.009	0.067
					−0.950	3.137
$R\&D/A_t$	5.611		6.416	5.548	5.751	6.092
	51.493		22.014	46.983	39.571	16.435
$R\&D/A_t$*$Sent_t$					−0.016	0.029
					−2.229	1.690
$PPENT_t$	0.186	−0.244	0.120	0.061	0.257	0.271
	5.002	−2.644	1.271	1.355	4.884	2.274
$PPENT_t$*$Sent_t$					−0.017	−0.011
					−6.925	−2.112
$INTAN_t$	0.567	−0.358	0.052	0.574	0.571	0.030
	11.260	−3.581	0.508	10.498	8.603	0.240
$INTAN_t$*$Sent_t$					0.000	0.006
					0.012	0.995
$CFsloan_t$	−1.080	−1.075	−0.782	−1.865	−1.899	−0.914
	−13.656	−4.874	−3.513	−20.883	−19.826	−3.580
$CFsloan_t$*$Sent_t$					0.003	0.016
					1.030	1.784
$ACCsloan_t$	0.279	−0.362	0.065	−0.688	−0.642	0.347
	2.829	−1.229	0.219	−6.025	−5.048	0.963
$ACCsloan_t$*$Sent_t$					−0.003	−0.008
					−0.687	−0.561
$AAIIbullbear_t$				0.002	0.007	0.007
				4.383	6.062	2.379

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Table 52 – continued from the previous page

	A	B	C	D	E	F
$AltZ1_t$	0.033	0.044	0.041	0.031	0.031	0.038
	28.940	14.463	13.606	25.515	25.424	12.688
Age_t	−0.001	−0.001	−0.001	−0.001	−0.001	−0.001
	−19.514	−10.076	−8.859	−16.919	−16.874	−8.334
$Size_t$	−0.129	−0.151	−0.154	−0.124	−0.124	−0.152
	−29.002	−10.971	−11.219	−23.373	−23.378	−11.060
$StdRet_t$	−0.003	−0.003	−0.003	−0.004	−0.004	−0.002
	−16.786	−4.792	−4.260	−18.277	−18.312	−2.972
$Turnover_t$	0.002	0.001	0.001	0.002	0.002	0.001
	21.406	6.045	3.186	21.760	21.737	4.116
$StdROA_t$	0.001	0.021	0.014	0.000	0.000	0.012
	4.635	10.374	6.937	4.417	4.442	6.138
$Beta_t$	0.681	0.937	0.940	0.692	0.691	0.939
	78.976	40.465	40.506	69.374	69.149	40.324
ROA_t	−0.820	−0.284	0.030	−0.410	−0.414	0.045
	−10.831	−1.351	0.141	−5.087	−5.123	0.211
$Leverage_t$	0.727	0.371	0.603	0.809	0.813	0.540
	19.437	3.834	6.205	18.644	18.715	5.549
N	81,293	15,629	15,629	55,984	55,984	15,629
Pseudo-R^2	0.242	0.252	0.274	0.295	0.295	0.280
Model	Eq. 28	Eq. 29	Eq. 30	Eq. 31	Eq. 32	Eq. 33

Table 53
Determinants of Annual capm5 VERR Decile Assignments Using Investors Intelligence Sentiment, Collins Accruals and Cash Flow, and Single Digit SIC Industry Fixed Effects

The ordered logistic regressions use the annual capm5 *VERR* decile assignments from 1964–2009 as the dependent variable. Some independent variables are not available for the full period. CEO compensation characteristics, vega and delta, are obtained from Professor Naveen's website and are rescaled to be in millions. Scaled cash flow and accruals data are calculated in accordance with Collins et al. (2003). Sentiment is calculated as the monthly average of the weekly difference between the bullish and bearish sentiment reported by Investors Intelligence. Advertising (AD), R&D, cash flow (CF), and accruals (ACC) are scaled by average total assets; intangible assets (INTAN) and property, plant, and equipment (PPENT) are scaled by end of the year assets. Single digit SIC codes are used to implement the industry fixed effects. A version of Altman's Z, firm age, firm size, the standard deviation of returns, stock turnover, return on assets, the standard deviation of return on assets, beta, and total liabilities scaled by assets are included as control variables. The t-statistics are reported below each coefficient.

	A	B	C	D	E	F
$Vega_t$		0.291	0.189			0.194
		4.471	2.894			2.955
$Delta_t$		0.003	0.003			0.003
		2.049	1.920			1.903
AD_t	0.982	0.012	0.410	0.981	1.116	−0.300
	6.356	0.037	1.261	6.347	5.389	−0.596
AD_t*$Sent_t$					−0.010	0.034
					−1.022	1.692
$R\&D/A_t$	5.626		6.486	5.627	5.664	6.138
	47.605		22.354	47.606	35.509	14.844
$R\&D/A_t$*$Sent_t$					−0.003	0.018
					−0.507	1.124
$PPENT_t$	0.071	−0.213	0.166	0.069	0.286	0.378
	1.567	−2.337	1.780	1.532	4.984	2.856
$PPENT_t$*$Sent_t$					−0.014	−0.012
					−5.911	−2.356
$INTAN_t$	0.528	−0.418	0.013	0.532	0.770	0.351
	9.663	−4.227	0.132	9.688	9.526	2.249
$INTAN_t$*$Sent_t$					−0.013	−0.015
					−4.204	−2.675
$CFcollins_t$	−2.575	−1.294	−0.569	−2.577	−2.464	−0.408
	−26.911	−2.182	−0.954	−26.918	−22.393	−0.652
$CFcollins_t$*$Sent_t$					−0.006	−0.012
					−1.829	−1.195
$ACCcollins_t$	−0.886	−0.114	0.753	−0.889	−0.624	1.857
	−8.981	−0.191	1.253	−9.002	−5.406	2.972
$ACCcollins_t$*$Sent_t$					−0.016	−0.065
					−4.182	−6.393
$IIbullbear_t$				−0.000	0.005	0.001
				−0.721	4.453	0.199

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Table 53 – continued from the previous page						
	A	B	C	D	E	F
$AltZ1_t$	0.030	0.041	0.039	0.030	0.030	0.039
	25.139	14.258	13.594	25.143	25.114	13.557
Age_t	−0.001	−0.001	−0.001	−0.001	−0.001	−0.001
	−17.023	−10.153	−8.934	−17.029	−16.988	−8.941
$Size_t$	−0.123	−0.152	−0.156	−0.123	−0.124	−0.152
	−23.057	−11.180	−11.467	−22.934	−23.030	−11.141
$StdRet_t$	−0.004	−0.003	−0.003	−0.004	−0.004	−0.003
	−18.163	−4.941	−4.466	−18.128	−17.936	−4.321
$Turnover_t$	0.002	0.001	0.001	0.002	0.002	0.001
	21.901	6.150	3.435	21.872	21.790	3.527
$StdROA_t$	0.000	0.021	0.014	0.000	0.000	0.014
	4.310	10.609	7.213	4.315	4.316	7.183
$Beta_t$	0.689	0.938	0.941	0.689	0.688	0.944
	69.121	40.799	40.808	69.127	68.970	40.694
ROA_t	−0.008	−0.282	−0.496	−0.009	−0.007	−0.445
	−0.116	−0.494	−0.867	−0.119	−0.101	−0.778
$Leverage_t$	0.678	0.248	0.495	0.676	0.684	0.476
	15.608	2.612	5.176	15.551	15.714	4.964
N	55,105	15,880	15,880	55,105	55,105	15,880
Pseudo-R^2	0.298	0.254	0.276	0.298	0.298	0.278
Model	Eq. 28	Eq. 29	Eq. 30	Eq. 31	Eq. 32	Eq. 33

Table 54
Determinants of Annual capm5 VERR Decile Assignments Using Baker-Wurgler Sentiment, Collins Accruals and Cash Flow, and Single Digit SIC Industry Fixed Effects

The ordered logistic regressions use the annual capm5 *VERR* decile assignments from 1964–2009 as the dependent variable. Some independent variables are not available for the full period. CEO compensation characteristics, vega and delta, are obtained from Professor Naveen's website and are rescaled to be in millions. Scaled cash flow and accruals data are calculated in accordance with Collins et al. (2003). Monthly orthogonalized sentiment values introduced by Baker and Wurgler (2007) are used. Advertising (AD), R&D, cash flow (CF), and accruals (ACC) are scaled by average total assets; intangible assets (INTAN) and property, plant, and equipment (PPENT) are scaled by end of the year assets. Single digit SIC codes are used to implement the industry fixed effects. A version of Altman's Z, firm age, firm size, the standard deviation of returns, stock turnover, return on assets, the standard deviation of return on assets, beta, and total liabilities scaled by assets are included as control variables. The t-statistics are reported below each coefficient.

	A	B	C	D	E	F
$Vega_t$		0.291	0.189			0.202
		4.471	2.894			3.082
$Delta_t$		0.003	0.003			0.003
		2.049	1.920			1.949
AD_t	0.982	0.012	0.410	0.982	1.062	0.501
	6.356	0.037	1.261	6.352	6.791	1.514
AD_t*$Sent_t$					−0.577	−0.287
					−2.178	−0.514
$R\&D/A_t$	5.626		6.486	5.626	5.632	6.455
	47.605		22.354	47.605	47.024	21.875
$R\&D/A_t$*$Sent_t$					−0.429	0.143
					−2.220	0.292
$PPENT_t$	0.071	−0.213	0.166	0.071	0.087	0.196
	1.567	−2.337	1.780	1.567	1.932	2.064
$PPENT_t$*$Sent_t$					−0.219	−0.269
					−3.032	−1.843
$INTAN_t$	0.528	−0.418	0.013	0.528	0.558	0.054
	9.663	−4.227	0.132	9.666	10.144	0.532
$INTAN_t$*$Sent_t$					−0.378	−0.036
					−4.101	−0.197
$CFcollins_t$	−2.575	−1.294	−0.569	−2.576	−2.734	−0.313
	−26.911	−2.182	−0.954	−26.912	−28.287	−0.521
$CFcollins_t$*$Sent_t$					1.055	0.764
					10.911	2.853
$ACCcollins_t$	−0.886	−0.114	0.753	−0.886	−1.008	1.113
	−8.981	−0.191	1.253	−8.983	−10.074	1.836
$ACCcollins_t$*$Sent_t$					0.456	−0.047
					4.824	−0.202
$BWsent_t$				−0.004	0.084	0.321
				−0.274	2.591	4.111

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Table 54 – continued from the previous page						
	A	B	C	D	E	F
$\mathrm{AltZ1_t}$	0.030	0.041	0.039	0.030	0.030	0.036
	25.139	14.258	13.594	25.128	25.306	12.667
$\mathrm{Age_t}$	−0.001	−0.001	−0.001	−0.001	−0.001	−0.001
	−17.023	−10.153	−8.934	−17.025	−17.091	−8.497
$\mathrm{Size_t}$	−0.123	−0.152	−0.156	−0.123	−0.123	−0.162
	−23.057	−11.180	−11.467	−22.951	−22.858	−11.910
$\mathrm{StdRet_t}$	−0.004	−0.003	−0.003	−0.004	−0.004	−0.004
	−18.163	−4.941	−4.466	−18.031	−18.072	−6.944
$\mathrm{Turnover_t}$	0.002	0.001	0.001	0.002	0.002	0.001
	21.901	6.150	3.435	21.904	21.767	4.141
$\mathrm{StdROA_t}$	0.000	0.021	0.014	0.000	0.000	0.014
	4.310	10.609	7.213	4.309	4.331	7.136
$\mathrm{Beta_t}$	0.689	0.938	0.941	0.689	0.695	0.994
	69.121	40.799	40.808	69.002	69.336	42.180
$\mathrm{ROA_t}$	−0.008	−0.282	−0.496	−0.008	−0.013	−0.924
	−0.116	−0.494	−0.867	−0.113	−0.175	−1.611
$\mathrm{Leverage_t}$	0.678	0.248	0.495	0.678	0.669	0.424
	15.608	2.612	5.176	15.603	15.379	4.430
N	55,105	15,880	15,880	55,105	55,105	15,880
Pseudo-R^2	0.298	0.254	0.276	0.298	0.300	0.284
Model	Eq. 28	Eq. 29	Eq. 30	Eq. 31	Eq. 32	Eq. 33

Table 55
Determinants of Annual capm5 VERR Decile Assignments Using AAII Sentiment, Collins Accruals and Cash Flow, and Single Digit SIC Industry Fixed Effects

The ordered logistic regressions use the annual capm5 *VERR* decile assignments from 1964–2009 as the dependent variable. Some independent variables are not available for the full period. CEO compensation characteristics, vega and delta, are obtained from Professor Naveen's website and are rescaled to be in millions. Scaled cash flow and accruals data are calculated in accordance with Collins et al. (2003). Sentiment is calculated as the monthly average of the weekly difference between the bullish and bearish sentiment reported by AAII. Advertising (AD), R&D, cash flow (CF), and accruals (ACC) are scaled by average total assets; intangible assets (INTAN) and property, plant, and equipment (PPENT) are scaled by end of the year assets. Single digit SIC codes are used to implement the industry fixed effects. A version of Altman's Z, firm age, firm size, the standard deviation of returns, stock turnover, return on assets, the standard deviation of return on assets, beta, and total liabilities scaled by assets are included as control variables. The *t*-statistics are reported below each coefficient.

	A	B	C	D	E	F
$Vega_t$		0.291	0.189			0.156
		4.471	2.894			2.381
$Delta_t$		0.003	0.003			0.003
		2.049	1.920			2.026
AD_t	0.982	0.012	0.410	0.994	1.101	−0.448
	6.356	0.037	1.261	6.427	5.738	−1.082
AD_t*$Sent_t$					−0.009	0.062
					−0.889	2.916
$R\&D/A_t$	5.626		6.486	5.623	5.872	6.385
	47.605		22.354	47.587	40.399	17.338
$R\&D/A_t$*$Sent_t$					−0.019	0.014
					−2.723	0.825
$PPENT_t$	0.071	−0.213	0.166	0.072	0.279	0.330
	1.567	−2.337	1.780	1.596	5.254	2.820
$PPENT_t$*$Sent_t$					−0.018	−0.013
					−7.213	−2.485
$INTAN_t$	0.528	−0.418	0.013	0.525	0.524	0.010
	9.663	−4.227	0.132	9.604	7.890	0.082
$INTAN_t$*$Sent_t$					−0.000	0.005
					−0.033	0.811
$CFcollins_t$	−2.575	−1.294	−0.569	−2.562	−2.630	−0.512
	−26.911	−2.182	−0.954	−26.776	−24.992	−0.838
$CFcollins_t$*$Sent_t$					0.006	0.003
					1.523	0.337
$ACCcollins_t$	−0.886	−0.114	0.753	−0.876	−0.836	1.150
	−8.981	−0.191	1.253	−8.886	−7.720	1.867
$ACCcollins_t$*$Sent_t$					−0.004	−0.026
					−0.960	−2.603
$AAIIbullbear_t$				0.002	0.007	0.008
				4.142	6.176	3.094

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Table 55 – continued from the previous page						
	A	B	C	D	E	F
AltZ1_t	0.030	0.041	0.039	0.029	0.029	0.037
	25.139	14.258	13.594	24.972	24.896	12.665
Age_t	−0.001	−0.001	−0.001	−0.001	−0.001	−0.001
	−17.023	−10.153	−8.934	−16.791	−16.736	−8.438
Size_t	−0.123	−0.152	−0.156	−0.125	−0.125	−0.153
	−23.057	−11.180	−11.467	−23.268	−23.213	−11.219
StdRet_t	−0.004	−0.003	−0.003	−0.004	−0.004	−0.002
	−18.163	−4.941	−4.466	−18.081	−18.070	−2.918
Turnover_t	0.002	0.001	0.001	0.002	0.002	0.001
	21.901	6.150	3.435	21.886	21.867	4.258
StdROA_t	0.000	0.021	0.014	0.000	0.000	0.013
	4.310	10.609	7.213	4.305	4.326	6.414
Beta_t	0.689	0.938	0.941	0.691	0.689	0.939
	69.121	40.799	40.808	69.209	68.980	40.580
ROA_t	−0.008	−0.282	−0.496	−0.009	−0.007	−0.455
	−0.116	−0.494	−0.867	−0.124	−0.093	−0.795
Leverage_t	0.678	0.248	0.495	0.678	0.682	0.443
	15.608	2.612	5.176	15.626	15.694	4.621
N	55,105	15,880	15,880	55,101	55,101	15,880
Pseudo-R^2	0.298	0.254	0.276	0.298	0.299	0.282
Model	Eq. 28	Eq. 29	Eq. 30	Eq. 31	Eq. 32	Eq. 33

3.2.3 Full Period eVERR Decile Assignments Used with the Single Digit SIC Industry Fixed Effects Specification

For Tables 56 through 61 capm5 *eVERR* valuation measures are used to assign firm years to valuation deciles across the 1964–2009 period. The first three tables, Tables 56 through 58, use scaled values of the Sloan (1996) measures of cash flow and accruals as part of the single digit SIC industry fixed effects specification. The data required to calculate the cash flow and accruals measures following Sloan (1996) is available sporadically for firms prior to mid-1970, and very consistently thereafter. Table 56 employs the Investors Intelligence measure of sentiment, which is available for the full 1964–2009 period. Table 57 employs the sentiment data from Baker and Wurgler (2007), which is available beginning in the middle of 1965. Table 58 employs the AAII measure of sentiment, which is first available in the middle of 1987. The more limited availability of the AAII measure accounts for the smaller number of observations involved in the analyses presented in Table 58.

The second three tables, Tables 59 through 61, use scaled values of the Collins et al. (2003) measures of cash flow and accruals as part of the single digit SIC industry fixed effects specification. The data required to calculate the cash flow and accruals measures following Collins et al. (2003) is available sporadically for firms beginning in 1987 and continuing through mid-1988, and consistently thereafter. Table 59 employs the Investors Intelligence measure of sentiment, which is available for the full 1964–2009 period. Table 60 employs the sentiment data from Baker and Wurgler (2007), which is available beginning in the middle of 1965. Table 61 employs the AAII measure of sentiment, which is first available in the middle of 1987. The more limited availability of the Collins et al. (2003) measures of cash flow and accruals accounts for the smaller number of observations involved in the analyses presented in Tables 59 through Tables 61.

Table 56
Determinants of Full Sample capm5 eVERR Decile Assignments Using Investors Intelligence Sentiment, Sloan Accruals and Cash Flow, and Single Digit SIC Industry Fixed Effects

The ordered logistic regressions use the full period capm5 *eVERR* decile assignments from 1964–2009 as the dependent variable. Some independent variables are not available for the full period. CEO compensation characteristics, vega and delta, are obtained from Professor Naveen's website and are rescaled to be in millions. Scaled cash flow and accruals data are calculated in accordance with Sloan (1996). Sentiment is calculated as the monthly average of the weekly difference between the bullish and bearish sentiment reported by Investors Intelligence. Advertising (AD), R&D, cash flow (CF), and accruals (ACC) are scaled by average total assets; intangible assets (INTAN) and property, plant, and equipment (PPENT) are scaled by end of the year assets. Single digit SIC codes are used to implement the industry fixed effects. A version of Altman's Z, firm age, firm size, the standard deviation of returns, stock turnover, return on assets, the standard deviation of return on assets, beta, and total liabilities scaled by assets are included as control variables. The *t*-statistics are reported below each coefficient.

	A	B	C	D	E	F
$Vega_t$		0.500	0.377			0.296
		7.680	5.784			4.535
$Delta_t$		0.006	0.007			0.007
		2.827	3.005			3.120
AD_t	0.691	0.023	0.435	0.707	0.457	−0.403
	5.398	0.068	1.292	5.520	2.766	−0.745
AD_t*Sent_t					0.017	0.045
					2.532	2.070
$R\&D/A_t$	6.458		7.980	6.473	5.927	7.231
	55.350		26.331	55.478	39.741	16.909
$R\&D/A_t*Sent_t$					0.032	0.055
					5.311	3.323
$PPENT_t$	−1.048	−1.352	−0.936	−1.043	−0.890	−0.684
	−27.764	−14.494	−9.870	−27.623	−18.893	−5.020
$PPENT_t*Sent_t$					−0.009	−0.012
					−5.271	−2.291
$INTAN_t$	0.166	−1.534	−1.089	0.121	−0.227	−1.352
	3.300	−15.154	−10.585	2.409	−3.093	−8.443
$INTAN_t*Sent_t$					0.016	0.006
					5.811	1.081
$CFsloan_t$	−3.192	−1.715	−1.331	−3.145	−3.042	−1.380
	−44.523	−7.579	−5.782	−43.839	−36.890	−4.819
$CFsloan_t*Sent_t$					−0.004	0.024
					−1.661	2.700
$ACCsloan_t$	−1.599	0.484	1.142	−1.528	−1.663	1.380
	−17.879	1.620	3.776	−17.048	−15.637	3.272
$ACCsloan_t*Sent_t$					0.012	0.012
					3.156	0.782
$IIbullbear_t$				0.004	0.005	0.008
				10.249	5.907	2.892

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Table 56 – continued from the previous page						
	A	B	C	D	E	F
$AltZ1_t$	0.088	0.111	0.105	0.087	0.087	0.102
	52.031	27.168	26.183	51.807	51.698	25.614
Age_t	−0.000	−0.001	−0.001	−0.000	−0.000	−0.001
	−1.465	−8.873	−7.581	−1.196	−1.180	−7.398
$Size_t$	−0.120	−0.115	−0.122	−0.121	−0.122	−0.119
	−26.759	−8.424	−8.894	−26.981	−27.103	−8.682
$StdRet_t$	−0.005	−0.016	−0.016	−0.005	−0.005	−0.013
	−27.358	−26.089	−25.383	−25.519	−24.625	−20.329
$Turnover_t$	0.004	−0.001	−0.002	0.004	0.004	−0.002
	32.061	−5.617	−9.320	31.202	30.991	−10.610
$StdROA_t$	0.001	0.036	0.027	0.001	0.001	0.024
	5.950	16.583	12.572	5.857	5.787	11.192
$Beta_t$	0.566	1.142	1.151	0.565	0.563	1.139
	65.669	47.810	47.964	65.525	65.298	47.263
ROA_t	−0.137	0.502	0.890	−0.136	−0.148	0.706
	−2.468	2.387	4.188	−2.464	−2.669	3.311
$Leverage_t$	0.288	0.311	0.577	0.296	0.306	0.563
	7.433	3.117	5.750	7.637	7.882	5.609
N	81,436	15,728	15,728	81,436	81,436	15,728
Pseudo-R^2	0.320	0.358	0.384	0.321	0.322	0.391
Model	Eq. 28	Eq. 29	Eq. 30	Eq. 31	Eq. 32	Eq. 33

Table 57
Determinants of Full Sample capm5 eVERR Decile Assignments Using Baker-Wurgler Sentiment, Sloan Accruals and Cash Flow, and Single Digit SIC Industry Fixed Effects

The ordered logistic regressions use the full period capm5 *eVERR* decile assignments from 1964–2009 as the dependent variable. Some independent variables are not available for the full period. CEO compensation characteristics, vega and delta, are obtained from Professor Naveen's website and are rescaled to be in millions. Scaled cash flow and accruals data are calculated in accordance with Sloan (1996). Monthly orthogonalized sentiment values introduced by Baker and Wurgler (2007) are used. Advertising (AD), R&D, cash flow (CF), and accruals (ACC) are scaled by average total assets; intangible assets (INTAN) and property, plant, and equipment (PPENT) are scaled by end of the year assets. Single digit SIC codes are used to implement the industry fixed effects. A version of Altman's Z, firm age, firm size, the standard deviation of returns, stock turnover, return on assets, the standard deviation of return on assets, beta, and total liabilities scaled by assets are included as control variables. The *t*-statistics are reported below each coefficient.

	A	B	C	D	E	F
$Vega_t$		0.500	0.377			0.442
		7.680	5.784			6.771
$Delta_t$		0.006	0.007			0.006
		2.827	3.005			2.960
AD_t	0.691	0.023	0.435	0.789	0.889	0.700
	5.398	0.068	1.292	6.154	6.924	2.036
AD_t*Sent_t					−0.993	−1.379
					−6.679	−2.444
$R\&D/A_t$	6.458		7.980	6.546	6.567	7.768
	55.350		26.331	56.225	55.913	25.364
$R\&D/A_t*Sent_t$					−0.983	2.437
					−6.016	4.544
$PPENT_t$	−1.048	−1.352	−0.936	−1.145	−1.135	−0.911
	−27.764	−14.494	−9.870	−30.254	−29.919	−9.406
$PPENT_t*Sent_t$					−0.119	−0.360
					−2.974	−2.430
$INTAN_t$	0.166	−1.534	−1.089	0.152	0.196	−1.045
	3.300	−15.154	−10.585	3.014	3.871	−10.029
$INTAN_t*Sent_t$					−0.636	0.071
					−8.973	0.392
$CFsloan_t$	−3.192	−1.715	−1.331	−2.990	−3.102	−1.353
	−44.523	−7.579	−5.782	−41.524	−42.169	−5.789
$CFsloan_t*Sent_t$					0.852	0.878
					13.654	3.536
$ACCsloan_t$	−1.599	0.484	1.142	−1.341	−1.472	1.264
	−17.879	1.620	3.776	−14.907	−16.063	4.036
$ACCsloan_t*Sent_t$					0.948	0.753
					11.198	1.975
$BWsent_t$				0.585	0.613	0.634
				76.365	32.197	7.712

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Table 57 – continued from the previous page						
	A	B	C	D	E	F
$AltZ1_t$	0.088	0.111	0.105	0.084	0.085	0.100
	52.031	27.168	26.183	50.515	50.876	24.938
Age_t	−0.000	−0.001	−0.001	−0.000	−0.000	−0.001
	−1.465	−8.873	−7.581	−3.119	−3.610	−6.970
$Size_t$	−0.120	−0.115	−0.122	−0.128	−0.127	−0.137
	−26.759	−8.424	−8.894	−28.384	−28.223	−9.956
$StdRet_t$	−0.005	−0.016	−0.016	−0.005	−0.005	−0.019
	−27.358	−26.089	−25.383	−28.264	−28.091	−29.910
$Turnover_t$	0.004	−0.001	−0.002	0.003	0.003	−0.002
	32.061	−5.617	−9.320	29.674	29.346	−8.128
$StdROA_t$	0.001	0.036	0.027	0.001	0.001	0.028
	5.950	16.583	12.572	6.184	6.243	13.127
$Beta_t$	0.566	1.142	1.151	0.629	0.633	1.281
	65.669	47.810	47.964	72.103	72.468	51.596
ROA_t	−0.137	0.502	0.890	−0.195	−0.234	0.644
	−2.468	2.387	4.188	−3.464	−4.011	3.010
$Leverage_t$	0.288	0.311	0.577	0.226	0.224	0.438
	7.433	3.117	5.750	5.824	5.786	4.358
N	81,436	15,728	15,728	81,399	81,399	15,728
Pseudo-R^2	0.320	0.358	0.384	0.368	0.371	0.412
Model	Eq. 28	Eq. 29	Eq. 30	Eq. 31	Eq. 32	Eq. 33

Table 58
Determinants of Full Sample capm5 eVERR Decile Assignments Using AAII Sentiment, Sloan Accruals and Cash Flow, and Single Digit SIC Industry Fixed Effects

The ordered logistic regressions use the full period capm5 *eVERR* decile assignments from 1964–2009 as the dependent variable. Some independent variables are not available for the full period. CEO compensation characteristics, vega and delta, are obtained from Professor Naveen's website and are rescaled to be in millions. Scaled cash flow and accruals data are calculated in accordance with Sloan (1996). Sentiment is calculated as the monthly average of the weekly difference between the bullish and bearish sentiment reported by AAII. Advertising (AD), R&D, cash flow (CF), and accruals (ACC) are scaled by average total assets; intangible assets (INTAN) and property, plant, and equipment (PPENT) are scaled by end of the year assets. Single digit SIC codes are used to implement the industry fixed effects. A version of Altman's Z, firm age, firm size, the standard deviation of returns, stock turnover, return on assets, the standard deviation of return on assets, beta, and total liabilities scaled by assets are included as control variables. The *t*-statistics are reported below each coefficient.

	A	B	C	D	E	F
$Vega_t$		0.500	0.377			0.322
		7.680	5.784			4.928
$Delta_t$		0.006	0.007			0.007
		2.827	3.005			3.109
AD_t	0.691	0.023	0.435	0.798	0.683	−0.752
	5.398	0.068	1.292	5.176	3.571	−1.733
AD_t*$Sent_t$					0.011	0.099
					1.084	4.544
R&D/A_t	6.458		7.980	5.775	5.581	7.331
	55.350		26.331	46.611	37.558	19.206
R&D/A_t*$Sent_t$					0.019	0.065
					2.510	3.648
$PPENT_t$	−1.048	−1.352	−0.936	−1.112	−0.934	−0.703
	−27.764	−14.494	−9.870	−24.614	−17.596	−5.863
$PPENT_t$*$Sent_t$					−0.016	−0.019
					−6.346	−3.637
$INTAN_t$	0.166	−1.534	−1.089	−0.483	−0.603	−0.982
	3.300	−15.154	−10.585	−8.852	−9.096	−7.827
$INTAN_t$*$Sent_t$					0.010	−0.002
					3.139	−0.401
$CFsloan_t$	−3.192	−1.715	−1.331	−2.766	−2.778	−1.211
	−44.523	−7.579	−5.782	−34.515	−31.650	−4.591
$CFsloan_t$*$Sent_t$					0.002	0.004
					0.656	0.444
$ACCsloan_t$	−1.599	0.484	1.142	−0.887	−0.857	2.124
	−17.879	1.620	3.776	−8.539	−7.236	5.759
$ACCsloan_t$*$Sent_t$					−0.001	−0.049
					−0.237	−3.478
$AAIIbullbear_t$				0.011	0.013	0.018
				23.019	11.004	6.223

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Table 58 – continued from the previous page						
	A	B	C	D	E	F
$AltZ1_t$	0.088	0.111	0.105	0.072	0.072	0.100
	52.031	27.168	26.183	41.702	41.499	24.782
Age_t	−0.000	−0.001	−0.001	−0.000	−0.000	−0.001
	−1.465	−8.873	−7.581	−7.886	−7.850	−6.759
$Size_t$	−0.120	−0.115	−0.122	−0.161	−0.160	−0.117
	−26.759	−8.424	−8.894	−30.144	−29.977	−8.514
$StdRet_t$	−0.005	−0.016	−0.016	−0.007	−0.006	−0.014
	−27.358	−26.089	−25.383	−31.514	−31.389	−22.845
$Turnover_t$	0.004	−0.001	−0.002	0.002	0.002	−0.002
	32.061	−5.617	−9.320	14.718	14.704	−7.165
$StdROA_t$	0.001	0.036	0.027	0.000	0.000	0.023
	5.950	16.583	12.572	4.776	4.836	10.996
$Beta_t$	0.566	1.142	1.151	0.763	0.759	1.151
	65.669	47.810	47.964	74.859	74.429	47.752
ROA_t	−0.137	0.502	0.890	−0.141	−0.139	0.916
	−2.468	2.387	4.188	−2.352	−2.330	4.295
$Leverage_t$	0.288	0.311	0.577	0.467	0.466	0.440
	7.433	3.117	5.750	10.460	10.424	4.374
N	81,436	15,728	15,728	56,257	56,257	15,728
Pseudo-R^2	0.320	0.358	0.384	0.366	0.367	0.401
Model	Eq. 28	Eq. 29	Eq. 30	Eq. 31	Eq. 32	Eq. 33

Table 59
Determinants of Full Sample capm5 eVERR Decile Assignments Using Investors Intelligence Sentiment, Collins Accruals and Cash Flow, and Single Digit SIC Industry Fixed Effects

The ordered logistic regressions use the full period capm5 *eVERR* decile assignments from 1964–2009 as the dependent variable. Some independent variables are not available for the full period. CEO compensation characteristics, vega and delta, are obtained from Professor Naveen's website and are rescaled to be in millions. Scaled cash flow and accruals data are calculated in accordance with Collins et al. (2003). Sentiment is calculated as the monthly average of the weekly difference between the bullish and bearish sentiment reported by Investors Intelligence. Advertising (AD), R&D, cash flow (CF), and accruals (ACC) are scaled by average total assets; intangible assets (INTAN) and property, plant, and equipment (PPENT) are scaled by end of the year assets. Single digit SIC codes are used to implement the industry fixed effects. A version of Altman's Z, firm age, firm size, the standard deviation of returns, stock turnover, return on assets, the standard deviation of return on assets, beta, and total liabilities scaled by assets are included as control variables. The *t*-statistics are reported below each coefficient.

	A	B	C	D	E	F
$Vega_t$		0.558	0.469			0.400
		8.637	7.325			6.219
$Delta_t$		0.007	0.007			0.007
		3.133	3.157			3.246
AD_t	0.326	−0.247	0.170	0.377	0.597	−0.513
	2.098	−0.753	0.517	2.422	2.864	−1.003
AD_t*$Sent_t$					−0.014	0.040
					−1.505	1.940
$R\&D/A_t$	0.037		2.919	0.037	0.101	2.827
	7.032		18.893	6.975	7.377	13.969
$R\&D/A_t$*$Sent_t$					−0.002	0.008
					−6.518	0.975
$PPENT_t$	−1.439	−1.268	−1.045	−1.405	−1.126	−0.687
	−31.925	−13.757	−11.185	−31.156	−19.790	−5.314
$PPENT_t$*$Sent_t$					−0.018	−0.018
					−7.993	−3.703
$INTAN_t$	−0.898	−1.543	−1.319	−1.018	−1.125	−1.507
	−16.654	−15.445	−13.075	−18.796	−14.057	−9.735
$INTAN_t$*$Sent_t$					0.004	0.004
					1.275	0.645
$CFcollins_t$	−4.319	−3.394	−1.785	−4.262	−4.032	−1.807
	−43.062	−5.700	−2.958	−42.755	−35.176	−2.835
$CFcollins_t$*$Sent_t$					−0.011	0.007
					−3.132	0.634
$ACCcollins_t$	−1.328	−0.333	0.932	−1.257	−1.000	1.394
	−13.198	−0.555	1.542	−12.585	−8.690	2.217
$ACCcollins_t$*$Sent_t$					−0.015	−0.025
					−3.959	−2.365
$IIbullbear_t$				0.009	0.014	0.012
				19.512	15.160	4.664

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Table 59 – continued from the previous page						
	A	B	C	D	E	F
$AltZ1_t$	0.072	0.111	0.106	0.072	0.072	0.105
	41.915	28.351	26.935	41.796	41.802	26.723
Age_t	−0.001	−0.001	−0.001	−0.001	−0.001	−0.001
	−12.670	−9.265	−8.149	−12.646	−12.483	−7.940
$Size_t$	−0.142	−0.120	−0.132	−0.151	−0.151	−0.128
	−26.131	−8.805	−9.700	−27.751	−27.779	−9.377
$StdRet_t$	−0.007	−0.016	−0.016	−0.006	−0.006	−0.013
	−32.215	−27.168	−26.028	−30.146	−29.420	−20.663
$Turnover_t$	0.002	−0.001	−0.002	0.002	0.002	−0.002
	18.562	−4.867	−7.869	16.621	16.784	−8.935
$StdROA_t$	0.001	0.037	0.031	0.001	0.001	0.028
	4.003	17.009	14.259	4.073	4.088	13.130
$Beta_t$	0.773	1.145	1.163	0.773	0.770	1.145
	75.694	48.239	48.549	75.707	75.377	47.647
ROA_t	−0.045	1.310	1.237	−0.034	−0.031	1.248
	−0.614	2.296	2.161	−0.467	−0.421	2.178
$Leverage_t$	0.032	0.174	0.520	0.075	0.101	0.539
	0.713	1.785	5.239	1.691	2.262	5.428
N	54,893	15,971	15,964	54,893	54,893	15,964
Pseudo-R^2	0.331	0.363	0.383	0.336	0.338	0.389
Model	Eq. 28	Eq. 29	Eq. 30	Eq. 31	Eq. 32	Eq. 33

Table 60
Determinants of Full Sample capm5 eVERR Decile Assignments Using Baker-Wurgler Sentiment, Collins Accruals and Cash Flow, and Single Digit SIC Industry Fixed Effects

The ordered logistic regressions use the full period capm5 *eVERR* decile assignments from 1964–2009 as the dependent variable. Some independent variables are not available for the full period. CEO compensation characteristics, vega and delta, are obtained from Professor Naveen's website and are rescaled to be in millions. Scaled cash flow and accruals data are calculated in accordance with Collins et al. (2003). Monthly orthogonalized sentiment values introduced by Baker and Wurgler (2007) are used. Advertising (AD), R&D, cash flow (CF), and accruals (ACC) are scaled by average total assets; intangible assets (INTAN) and property, plant, and equipment (PPENT) are scaled by end of the year assets. Single digit SIC codes are used to implement the industry fixed effects. A version of Altman's Z, firm age, firm size, the standard deviation of returns, stock turnover, return on assets, the standard deviation of return on assets, beta, and total liabilities scaled by assets are included as control variables. The *t*-statistics are reported below each coefficient.

	A	B	C	D	E	F
$Vega_t$		0.558	0.432			0.489
		8.637	6.721			7.599
$Delta_t$		0.007	0.008			0.007
		3.133	3.414			3.255
AD_t	0.556	−0.247	0.225	0.596	0.702	0.453
	3.585	−0.753	0.687	3.840	4.465	1.356
AD_t*Sent_t					−0.779	−1.278
					−2.939	−2.281
$R\&D/A_t$	5.953		8.142	5.978	5.890	8.006
	47.679		26.910	47.847	46.819	26.082
$R\&D/A_t*Sent_t$					0.504	1.979
					2.417	3.728
$PPENT_t$	−1.038	−1.268	−0.831	−1.042	−1.036	−0.811
	−22.782	−13.757	−8.846	−22.862	−22.611	−8.476
$PPENT_t*Sent_t$					−0.162	−0.494
					−2.247	−3.371
$INTAN_t$	−0.444	−1.543	−1.065	−0.464	−0.447	−1.014
	−8.131	−15.445	−10.461	−8.499	−8.126	−9.844
$INTAN_t*Sent_t$					−0.221	−0.006
					−2.437	−0.034
$CFcollins_t$	−3.470	−3.394	−2.577	−3.443	−3.628	−1.832
	−34.899	−5.700	−4.305	−34.584	−36.092	−3.032
$CFcollins_t*Sent_t$					1.322	1.215
					13.157	4.391
$ACCcollins_t$	−0.534	−0.333	0.757	−0.511	−0.650	1.682
	−5.375	−0.555	1.257	−5.137	−6.438	2.763
$ACCcollins_t*Sent_t$					0.451	−0.424
					4.726	−1.830
$BWsent_t$				0.234	0.233	0.629
				16.899	7.120	7.934

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Table 60 – continued from the previous page						
	A	B	C	D	E	F
$AltZ1_t$	0.070	0.111	0.108	0.070	0.070	0.102
	41.770	28.351	27.691	41.310	41.481	26.274
Age_t	−0.001	−0.001	−0.001	−0.001	−0.001	−0.001
	−9.042	−9.265	−7.971	−8.859	−8.993	−7.404
$Size_t$	−0.152	−0.120	−0.127	−0.160	−0.159	−0.141
	−28.296	−8.805	−9.354	−29.623	−29.411	−10.337
$StdRet_t$	−0.007	−0.016	−0.016	−0.007	−0.007	−0.019
	−32.125	−27.168	−26.443	−34.010	−34.009	−30.585
$Turnover_t$	0.002	−0.001	−0.002	0.002	0.002	−0.002
	15.232	−4.867	−8.494	15.102	14.921	−7.333
$StdROA_t$	0.000	0.037	0.028	0.000	0.000	0.029
	4.630	17.009	12.973	4.678	4.714	13.658
$Beta_t$	0.744	1.145	1.154	0.759	0.764	1.280
	73.211	48.239	48.350	74.320	74.570	51.858
ROA_t	−0.035	1.310	1.129	−0.048	−0.051	0.171
	−0.483	2.296	1.974	−0.664	−0.713	0.298
$Leverage_t$	0.263	0.174	0.476	0.272	0.259	0.344
	5.889	1.785	4.841	6.093	5.796	3.492
N	55,357	15,971	15,971	55,357	55,357	15,971
Pseudo-R^2	0.365	0.363	0.389	0.368	0.370	0.416
Model	Eq. 28	Eq. 29	Eq. 30	Eq. 31	Eq. 32	Eq. 33

Table 61
Determinants of Full Sample capm5 eVERR Decile Assignments Using AAII Sentiment, Collins Accruals and Cash Flow, and Single Digit SIC Industry Fixed Effects

The ordered logistic regressions use the full period capm5 *eVERR* decile assignments from 1964–2009 as the dependent variable. Some independent variables are not available for the full period. CEO compensation characteristics, vega and delta, are obtained from Professor Naveen's website and are rescaled to be in millions. Scaled cash flow and accruals data are calculated in accordance with Collins et al. (2003). Sentiment is calculated as the monthly average of the weekly difference between the bullish and bearish sentiment reported by AAII. Advertising (AD), R&D, cash flow (CF), and accruals (ACC) are scaled by average total assets; intangible assets (INTAN) and property, plant, and equipment (PPENT) are scaled by end of the year assets. Single digit SIC codes are used to implement the industry fixed effects. A version of Altman's Z, firm age, firm size, the standard deviation of returns, stock turnover, return on assets, the standard deviation of return on assets, beta, and total liabilities scaled by assets are included as control variables. The *t*-statistics are reported below each coefficient.

	A	B	C	D	E	F
$Vega_t$		0.558	0.432			0.375
		8.637	6.721			5.828
$Delta_t$		0.007	0.008			0.008
		3.133	3.414			3.453
AD_t	0.556	−0.247	0.225	0.640	0.484	−0.854
	3.585	−0.753	0.687	4.118	2.510	−2.039
$AD_t{*}Sent_t$					0.013	0.095
					1.371	4.451
$R\&D/A_t$	5.953		8.142	5.972	5.910	7.771
	47.679		26.910	47.832	39.523	20.494
$R\&D/A_t{*}Sent_t$					0.008	0.044
					1.117	2.422
$PPENT_t$	−1.038	−1.268	−0.831	−1.043	−0.853	−0.611
	−22.782	−13.757	−8.846	−22.887	−15.921	−5.180
$PPENT_t{*}Sent_t$					−0.017	−0.020
					−6.755	−3.860
$INTAN_t$	−0.444	−1.543	−1.065	−0.480	−0.572	−0.920
	−8.131	−15.445	−10.461	−8.779	−8.614	−7.427
$INTAN_t{*}Sent_t$					0.008	−0.005
					2.457	−0.878
$CFcollins_t$	−3.470	−3.394	−2.577	−3.397	−3.417	−2.388
	−34.899	−5.700	−4.305	−34.231	−31.504	−3.882
$CFcollins_t{*}Sent_t$					0.004	−0.004
					0.938	−0.363
$ACCcollins_t$	−0.534	−0.333	0.757	−0.474	−0.277	1.512
	−5.375	−0.555	1.257	−4.783	−2.555	2.443
$ACCcollins_t{*}Sent_t$					−0.017	−0.058
					−4.252	−5.666
$AAIIbullbear_t$				0.011	0.013	0.018
				23.361	11.198	6.603

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Table 61 – continued from the previous page						
	A	B	C	D	E	F
AltZ1_t	0.070	0.111	0.108	0.069	0.069	0.103
	41.770	28.351	27.691	41.026	40.904	26.308
Age_t	−0.001	−0.001	−0.001	−0.000	−0.000	−0.001
	−9.042	−9.265	−7.971	−7.980	−7.923	−7.154
Size_t	−0.152	−0.120	−0.127	−0.161	−0.161	−0.121
	−28.296	−8.805	−9.354	−29.903	−29.710	−8.896
StdRet_t	−0.007	−0.016	−0.016	−0.007	−0.007	−0.014
	−32.125	−27.168	−26.443	−32.103	−31.842	−23.377
Turnover_t	0.002	−0.001	−0.002	0.002	0.002	−0.001
	15.232	−4.867	−8.494	15.310	15.294	−6.498
StdROA_t	0.000	0.037	0.028	0.000	0.000	0.024
	4.630	17.009	12.973	4.697	4.754	11.461
Beta_t	0.744	1.145	1.154	0.757	0.753	1.153
	73.211	48.239	48.350	74.259	73.807	48.100
ROA_t	−0.035	1.310	1.129	−0.038	−0.035	1.229
	−0.483	2.296	1.974	−0.530	−0.485	2.148
Leverage_t	0.263	0.174	0.476	0.262	0.264	0.367
	5.889	1.785	4.841	5.875	5.912	3.719
N	55,357	15,971	15,971	55,353	55,353	15,971
Pseudo-R^2	0.365	0.363	0.389	0.371	0.372	0.406
Model	Eq. 28	Eq. 29	Eq. 30	Eq. 31	Eq. 32	Eq. 33

3.2.4 Annual eVERR Decile Assignments Used with the Single Digit SIC Industry Fixed Effects Specification

For Tables 62 through 67 capm5 *eVERR* valuation measures are used to assign firm years to valuation deciles for each calendar year during the 1964–2009 period. The first three tables, Tables 62 through 64, use scaled values of the Sloan (1996) measures of cash flow and accruals as part of the single digit SIC industry fixed effects specification. The data required to calculate the cash flow and accruals measures following Sloan (1996) is available sporadically for firms prior to mid-1970, and very consistently thereafter. Table 62 employs the Investors Intelligence measure of sentiment, which is available for the full 1964–2009 period. Table 63 employs the sentiment data from Baker and Wurgler (2007), which is available beginning in the middle of 1965. Table 64 employs the AAII measure of sentiment, which is first available in the middle of 1987. The more limited availability of the AAII measure accounts for the smaller number of observations involved in the analyses presented in Table 64.

The second three tables, Tables 65 through 67, use scaled values of the Collins et al. (2003) measures of cash flow and accruals as part of the single digit SIC industry fixed effects specification. The data required to calculate the cash flow and accruals measures following Collins et al. (2003) is available sporadically for firms beginning in 1987 and continuing through mid-1988, and consistently thereafter. Table 65 employs the Investors Intelligence measure of sentiment, which is available for the full 1964–2009 period. Table 66 employs the sentiment data from Baker and Wurgler (2007), which is available beginning in the middle of 1965. Table 67 employs the AAII measure of sentiment, which is first available in the middle of 1987. The more limited availability of the Collins et al. (2003) measures of cash flow and accruals accounts for the smaller number of observations involved in the analyses presented in Tables 65 through Tables 67.

Table 62
Determinants of Annual capm5 eVERR Decile Assignments Using Investors Intelligence Sentiment, Sloan Accruals and Cash Flow, and Single Digit SIC Industry Fixed Effects

The ordered logistic regressions use the annual capm5 *eVERR* decile assignments from 1964–2009 as the dependent variable. Some independent variables are not available for the full period. CEO compensation characteristics, vega and delta, are obtained from Professor Naveen's website and are rescaled to be in millions. Scaled cash flow and accruals data are calculated in accordance with Sloan (1996). Sentiment is calculated as the monthly average of the weekly difference between the bullish and bearish sentiment reported by Investors Intelligence. Advertising (AD), R&D, cash flow (CF), and accruals (ACC) are scaled by average total assets; intangible assets (INTAN) and property, plant, and equipment (PPENT) are scaled by end of the year assets. Single digit SIC codes are used to implement the industry fixed effects. A version of Altman's Z, firm age, firm size, the standard deviation of returns, stock turnover, return on assets, the standard deviation of return on assets, beta, and total liabilities scaled by assets are included as control variables. The *t*-statistics are reported below each coefficient.

	A	B	C	D	E	F
$Vega_t$		0.551	0.433			0.469
		8.658	6.835			7.355
$Delta_t$		0.003	0.003			0.002
		1.734	1.631			1.610
AD_t	1.180	0.205	0.650	1.176	0.943	0.304
	9.230	0.615	1.944	9.202	5.712	0.564
AD_t*Sent_t					0.016	0.017
					2.356	0.787
$R\&D/A_t$	5.283		8.032	5.281	4.923	7.000
	48.330		27.125	48.316	34.255	16.499
$R\&D/A_t*Sent_t$					0.021	0.050
					3.604	3.108
$PPENT_t$	−1.378	−1.761	−1.341	−1.380	−1.206	−1.188
	−36.622	−18.893	−14.154	−36.660	−25.670	−8.733
$PPENT_t*Sent_t$					−0.011	−0.010
					−6.056	−1.912
$INTAN_t$	−0.554	−1.504	−1.037	−0.545	−0.221	−0.562
	−11.068	−14.974	−10.149	−10.867	−3.023	−3.540
$INTAN_t*Sent_t$					−0.017	−0.020
					−6.240	−3.473
$CFsloan_t$	−1.579	−0.758	−0.450	−1.589	−1.563	−0.885
	−19.871	−3.438	−2.006	−19.964	−17.566	−3.144
$CFsloan_t*Sent_t$					−0.001	0.016
					−0.490	1.803
$ACCsloan_t$	0.206	0.605	1.142	0.190	0.385	1.554
	2.087	2.052	3.835	1.922	3.371	3.723
$ACCsloan_t*Sent_t$					−0.012	−0.029
					−3.099	−1.931
$IIbullbear_t$				−0.001	0.003	−0.006
				−2.150	3.333	−2.004

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Table 62 – continued from the previous page

	A	B	C	D	E	F
$AltZ1_t$	0.048	0.065	0.061	0.048	0.048	0.061
	35.756	19.391	18.316	35.784	35.629	18.404
Age_t	−0.000	−0.000	−0.000	−0.000	−0.000	−0.000
	−6.735	−4.766	−3.486	−6.795	−6.755	−3.720
$Size_t$	−0.133	−0.086	−0.092	−0.133	−0.133	−0.093
	−29.840	−6.345	−6.765	−29.799	−29.875	−6.783
$StdRet_t$	−0.004	−0.004	−0.004	−0.004	−0.004	−0.006
	−19.564	−7.560	−6.732	−19.687	−19.716	−8.851
$Turnover_t$	0.002	0.000	−0.000	0.002	0.002	−0.000
	15.434	1.874	−1.815	15.548	15.404	−1.186
$StdROA_t$	0.001	0.026	0.018	0.001	0.001	0.018
	4.848	12.897	8.931	4.851	4.879	9.210
$Beta_t$	0.704	1.018	1.025	0.705	0.704	1.044
	81.186	43.610	43.768	81.218	81.057	44.220
ROA_t	−0.639	0.179	0.612	−0.637	−0.632	0.644
	−8.536	0.861	2.914	−8.516	−8.445	3.055
$Leverage_t$	−0.105	−0.575	−0.287	−0.107	−0.108	−0.309
	−2.777	−5.915	−2.939	−2.829	−2.849	−3.157
N	81,436	15,728	15,728	81,436	81,436	15,728
Pseudo-R^2	0.297	0.338	0.367	0.297	0.298	0.370
Model	Eq. 28	Eq. 29	Eq. 30	Eq. 31	Eq. 32	Eq. 33

Table 63
Determinants of Annual capm5 eVERR Decile Assignments Using Baker-Wurgler Sentiment, Sloan Accruals and Cash Flow, and Single Digit SIC Industry Fixed Effects

The ordered logistic regressions use the annual capm5 *eVERR* decile assignments from 1964–2009 as the dependent variable. Some independent variables are not available for the full period. CEO compensation characteristics, vega and delta, are obtained from Professor Naveen's website and are rescaled to be in millions. Scaled cash flow and accruals data are calculated in accordance with Sloan (1996). Monthly orthogonalized sentiment values introduced by Baker and Wurgler (2007) are used. Advertising (AD), R&D, cash flow (CF), and accruals (ACC) are scaled by average total assets; intangible assets (INTAN) and property, plant, and equipment (PPENT) are scaled by end of the year assets. Single digit SIC codes are used to implement the industry fixed effects. A version of Altman's Z, firm age, firm size, the standard deviation of returns, stock turnover, return on assets, the standard deviation of return on assets, beta, and total liabilities scaled by assets are included as control variables. The t-statistics are reported below each coefficient.

	A	B	C	D	E	F
$Vega_t$		0.551	0.433			0.459
		8.658	6.835			7.226
$Delta_t$		0.003	0.003			0.003
		1.734	1.631			1.691
AD_t	1.180	0.205	0.650	1.179	1.303	0.779
	9.230	0.615	1.944	9.221	10.130	2.278
AD_t*$Sent_t$					−1.458	−0.406
					−9.722	−0.722
$R\&D/A_t$	5.283		8.032	5.295	5.353	7.978
	48.330		27.125	48.399	48.279	26.590
$R\&D/A_t$*$Sent_t$					−0.507	0.177
					−3.242	0.354
$PPENT_t$	−1.378	−1.761	−1.341	−1.375	−1.361	−1.350
	−36.622	−18.893	−14.154	−36.526	−36.084	−13.968
$PPENT_t$*$Sent_t$					−0.087	−0.022
					−2.198	−0.153
$INTAN_t$	−0.554	−1.504	−1.037	−0.551	−0.578	−1.012
	−11.068	−14.974	−10.149	−11.010	−11.489	−9.792
$INTAN_t$*$Sent_t$					0.317	0.108
					4.511	0.607
$CFsloan_t$	−1.579	−0.758	−0.450	−1.606	−1.649	−0.525
	−19.871	−3.438	−2.006	−20.184	−20.689	−2.307
$CFsloan_t$*$Sent_t$					0.278	0.627
					4.615	2.600
$ACCsloan_t$	0.206	0.605	1.142	0.179	0.155	1.126
	2.087	2.052	3.835	1.811	1.561	3.654
$ACCsloan_t$*$Sent_t$					0.134	0.486
					1.609	1.314
$BWsent_t$				−0.046	−0.030	0.315
				−6.302	−1.634	3.913

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Table 63 – continued from the previous page						
	A	B	C	D	E	F
$AltZ1_t$	0.048	0.065	0.061	0.049	0.049	0.058
	35.756	19.391	18.316	35.927	36.093	17.527
Age_t	−0.000	−0.000	−0.000	−0.000	−0.000	−0.000
	−6.735	−4.766	−3.486	−6.611	−6.567	−2.969
$Size_t$	−0.133	−0.086	−0.092	−0.132	−0.133	−0.099
	−29.840	−6.345	−6.765	−29.742	−29.954	−7.233
$StdRet_t$	−0.004	−0.004	−0.004	−0.004	−0.004	−0.006
	−19.564	−7.560	−6.732	−19.487	−19.765	−9.492
$Turnover_t$	0.002	0.000	−0.000	0.002	0.002	−0.000
	15.434	1.874	−1.815	15.731	15.815	−0.978
$StdROA_t$	0.001	0.026	0.018	0.001	0.001	0.018
	4.848	12.897	8.931	4.847	4.878	8.908
$Beta_t$	0.704	1.018	1.025	0.701	0.704	1.097
	81.186	43.610	43.768	80.611	80.781	45.693
ROA_t	−0.639	0.179	0.612	−0.628	−0.642	0.494
	−8.536	0.861	2.914	−8.399	−8.598	2.345
$Leverage_t$	−0.105	−0.575	−0.287	−0.103	−0.100	−0.369
	−2.777	−5.915	−2.939	−2.709	−2.644	−3.775
N	81,436	15,728	15,728	81,399	81,399	15,728
Pseudo-R^2	0.297	0.338	0.367	0.297	0.299	0.376
Model	Eq. 28	Eq. 29	Eq. 30	Eq. 31	Eq. 32	Eq. 33

Table 64
Determinants of Annual capm5 eVERR Decile Assignments Using AAII Sentiment, Sloan Accruals and Cash Flow, and Single Digit SIC Industry Fixed Effects

The ordered logistic regressions use the annual capm5 *eVERR* decile assignments from 1964–2009 as the dependent variable. Some independent variables are not available for the full period. CEO compensation characteristics, vega and delta, are obtained from Professor Naveen's website and are rescaled to be in millions. Scaled cash flow and accruals data are calculated in accordance with Sloan (1996). Sentiment is calculated as the monthly average of the weekly difference between the bullish and bearish sentiment reported by AAII. Advertising (AD), R&D, cash flow (CF), and accruals (ACC) are scaled by average total assets; intangible assets (INTAN) and property, plant, and equipment (PPENT) are scaled by end of the year assets. Single digit SIC codes are used to implement the industry fixed effects. A version of Altman's Z, firm age, firm size, the standard deviation of returns, stock turnover, return on assets, the standard deviation of return on assets, beta, and total liabilities scaled by assets are included as control variables. The *t*-statistics are reported below each coefficient.

	A	B	C	D	E	F
$Vega_t$		0.551	0.433			0.404
		8.658	6.835			6.361
$Delta_t$		0.003	0.003			0.003
		1.734	1.631			1.731
AD_t	1.180	0.205	0.650	0.963	0.967	−0.558
	9.230	0.615	1.944	6.281	5.069	−1.291
AD_t*Sent_t					−0.000	0.089
					−0.030	4.137
$R\&D/A_t$	5.283		8.032	5.518	5.479	7.603
	48.330		27.125	46.159	37.543	20.158
$R\&D/A_t*Sent_t$					0.004	0.038
					0.602	2.200
$PPENT_t$	−1.378	−1.761	−1.341	−1.342	−1.262	−1.339
	−36.622	−18.893	−14.154	−29.737	−23.778	−11.176
$PPENT_t*Sent_t$					−0.007	−0.001
					−2.829	−0.173
$INTAN_t$	−0.554	−1.504	−1.037	−0.498	−0.594	−1.082
	−11.068	−14.974	−10.149	−9.170	−8.982	−8.681
$INTAN_t*Sent_t$					0.008	0.007
					2.547	1.181
$CFsloan_t$	−1.579	−0.758	−0.450	−2.412	−2.400	−0.220
	−19.871	−3.438	−2.006	−27.680	−25.606	−0.855
$CFsloan_t*Sent_t$					−0.001	−0.009
					−0.167	−1.080
$ACCsloan_t$	0.206	0.605	1.142	−0.834	−0.714	2.125
	2.087	2.052	3.835	−7.492	−5.724	5.854
$ACCsloan_t*Sent_t$					−0.010	−0.058
					−1.977	−4.131
$AAIIbullbear_t$				0.002	0.002	0.004
				3.593	1.800	1.249

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Table 64 – continued from the previous page						
	A	B	C	D	E	F
$AltZ1_t$	0.048	0.065	0.061	0.048	0.048	0.059
	35.756	19.391	18.316	33.168	33.064	17.535
Age_t	−0.000	−0.000	−0.000	−0.000	−0.000	−0.000
	−6.735	−4.766	−3.486	−4.770	−4.710	−3.081
$Size_t$	−0.133	−0.086	−0.092	−0.131	−0.131	−0.089
	−29.840	−6.345	−6.765	−24.699	−24.608	−6.554
$StdRet_t$	−0.004	−0.004	−0.004	−0.004	−0.004	−0.003
	−19.564	−7.560	−6.732	−19.100	−19.001	−5.369
$Turnover_t$	0.002	0.000	−0.000	0.002	0.002	−0.000
	15.434	1.874	−1.815	17.963	17.989	−0.946
$StdROA_t$	0.001	0.026	0.018	0.000	0.000	0.016
	4.848	12.897	8.931	4.714	4.756	8.127
$Beta_t$	0.704	1.018	1.025	0.722	0.719	1.022
	81.186	43.610	43.768	71.881	71.586	43.489
ROA_t	−0.639	0.179	0.612	−0.239	−0.236	0.616
	−8.536	0.861	2.914	−3.178	−3.150	2.930
$Leverage_t$	−0.105	−0.575	−0.287	0.031	0.030	−0.347
	−2.777	−5.915	−2.939	0.697	0.695	−3.539
N	81,436	15,728	15,728	56,257	56,257	15,728
Pseudo-R^2	0.297	0.338	0.367	0.357	0.357	0.371
Model	Eq. 28	Eq. 29	Eq. 30	Eq. 31	Eq. 32	Eq. 33

Table 65
Determinants of Annual capm5 eVERR Decile Assignments Using Investors Intelligence Sentiment, Collins Accruals and Cash Flow, and Single Digit SIC Industry Fixed Effects

The ordered logistic regressions use the annual capm5 *eVERR* decile assignments from 1964–2009 as the dependent variable. Some independent variables are not available for the full period. CEO compensation characteristics, vega and delta, are obtained from Professor Naveen's website and are rescaled to be in millions. Scaled cash flow and accruals data are calculated in accordance with Collins et al. (2003). Sentiment is calculated as the monthly average of the weekly difference between the bullish and bearish sentiment reported by Investors Intelligence. Advertising (AD), R&D, cash flow (CF), and accruals (ACC) are scaled by average total assets; intangible assets (INTAN) and property, plant, and equipment (PPENT) are scaled by end of the year assets. Single digit SIC codes are used to implement the industry fixed effects. A version of Altman's Z, firm age, firm size, the standard deviation of returns, stock turnover, return on assets, the standard deviation of return on assets, beta, and total liabilities scaled by assets are included as control variables. The *t*-statistics are reported below each coefficient.

	A	B	C	D	E	F
$Vega_t$		0.580	0.465			0.497
		9.236	7.465			7.932
$Delta_t$		0.003	0.003			0.003
		1.836	1.770			1.738
AD_t	0.842	0.136	0.658	0.834	0.927	0.279
	5.443	0.418	2.018	5.392	4.454	0.551
AD_t*$Sent_t$					−0.006	0.018
					−0.642	0.899
$R\&D/A_t$	5.673		8.080	5.682	5.274	7.484
	47.245		27.408	47.297	33.106	17.749
$R\&D/A_t$*$Sent_t$					0.024	0.027
					3.613	1.693
$PPENT_t$	−1.296	−1.740	−1.307	−1.304	−1.131	−1.078
	−28.516	−18.897	−13.947	−28.648	−19.558	−8.101
$PPENT_t$*$Sent_t$					−0.011	−0.014
					−4.584	−2.827
$INTAN_t$	−0.516	−1.500	−1.010	−0.496	−0.154	−0.491
	−9.497	−15.116	−9.987	−9.093	−1.915	−3.140
$INTAN_t$*$Sent_t$					−0.018	−0.022
					−5.776	−3.967
$CFcollins_t$	−3.013	−1.481	−0.647	−3.025	−2.975	−0.890
	−31.055	−2.507	−1.088	−31.146	−26.653	−1.424
$CFcollins_t$*$Sent_t$					−0.002	0.006
					−0.555	0.625
$ACCcollins_t$	−0.633	0.206	1.255	−0.646	−0.413	2.068
	−6.426	0.345	2.094	−6.550	−3.575	3.319
$ACCcollins_t$*$Sent_t$					−0.014	−0.052
					−3.536	−5.215
$IIbullbear_t$				−0.002	0.002	−0.004
				−3.534	1.708	−1.334

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Table 65 – continued from the previous page						
	A	B	C	D	E	F
$AltZ1_t$	0.046	0.066	0.063	0.046	0.046	0.064
	32.627	20.226	19.440	32.669	32.519	19.495
Age_t	−0.000	−0.001	−0.000	−0.000	−0.000	−0.000
	−5.143	−5.264	−4.005	−5.182	−5.163	−4.174
$Size_t$	−0.128	−0.087	−0.093	−0.127	−0.127	−0.090
	−23.968	−6.411	−6.864	−23.643	−23.703	−6.684
$StdRet_t$	−0.004	−0.005	−0.004	−0.004	−0.004	−0.006
	−18.668	−8.091	−7.311	−18.969	−18.861	−8.864
$Turnover_t$	0.002	0.000	−0.000	0.002	0.002	−0.000
	18.081	2.256	−1.275	18.314	18.147	−0.709
$StdROA_t$	0.000	0.027	0.018	0.000	0.000	0.019
	4.610	13.169	9.221	4.648	4.649	9.592
$Beta_t$	0.719	1.017	1.025	0.720	0.719	1.041
	71.690	43.892	44.025	71.739	71.629	44.421
ROA_t	−0.028	0.426	0.213	−0.029	−0.029	0.244
	−0.387	0.749	0.374	−0.403	−0.398	0.427
$Leverage_t$	−0.151	−0.651	−0.344	−0.158	−0.158	−0.372
	−3.458	−6.807	−3.567	−3.615	−3.609	−3.851
N	55,357	15,971	15,971	55,357	55,357	15,971
Pseudo-R^2	0.361	0.340	0.369	0.361	0.362	0.373
Model	Eq. 28	Eq. 29	Eq. 30	Eq. 31	Eq. 32	Eq. 33

Table 66
Determinants of Annual capm5 eVERR Decile Assignments Using Baker-Wurgler Sentiment, Collins Accruals and Cash Flow, and Single Digit SIC Industry Fixed Effects

The ordered logistic regressions use the annual capm5 *eVERR* decile assignments from 1964–2009 as the dependent variable. Some independent variables are not available for the full period. CEO compensation characteristics, vega and delta, are obtained from Professor Naveen's website and are rescaled to be in millions. Scaled cash flow and accruals data are calculated in accordance with Collins et al. (2003). Monthly orthogonalized sentiment values introduced by Baker and Wurgler (2007) are used. Advertising (AD), R&D, cash flow (CF), and accruals (ACC) are scaled by average total assets; intangible assets (INTAN) and property, plant, and equipment (PPENT) are scaled by end of the year assets. Single digit SIC codes are used to implement the industry fixed effects. A version of Altman's Z, firm age, firm size, the standard deviation of returns, stock turnover, return on assets, the standard deviation of return on assets, beta, and total liabilities scaled by assets are included as control variables. The t-statistics are reported below each coefficient.

	A	B	C	D	E	F
$Vega_t$		0.580	0.465			0.484
		9.236	7.465			7.751
$Delta_t$		0.003	0.003			0.003
		1.836	1.770			1.815
AD_t	0.842	0.136	0.658	0.845	0.938	0.779
	5.443	0.418	2.018	5.462	5.991	2.346
AD_t*$Sent_t$					−0.630	−0.431
					−2.386	−0.772
$R\&D/A_t$	5.673		8.080	5.673	5.691	8.109
	47.245		27.408	47.244	46.673	27.052
$R\&D/A_t$*$Sent_t$					−0.548	−0.232
					−2.797	−0.470
$PPENT_t$	−1.296	−1.740	−1.307	−1.296	−1.292	−1.313
	−28.516	−18.897	−13.947	−28.518	−28.259	−13.761
$PPENT_t$*$Sent_t$					−0.021	−0.112
					−0.300	−0.773
$INTAN_t$	−0.516	−1.500	−1.010	−0.517	−0.506	−0.977
	−9.497	−15.116	−9.987	−9.518	−9.232	−9.553
$INTAN_t$*$Sent_t$					−0.151	0.026
					−1.678	0.148
$CFcollins_t$	−3.013	−1.481	−0.647	−3.012	−3.219	−0.199
	−31.055	−2.507	−1.088	−31.028	−32.771	−0.333
$CFcollins_t$*$Sent_t$					1.167	0.699
					12.062	2.588
$ACCcollins_t$	−0.633	0.206	1.255	−0.633	−0.793	1.831
	−6.426	0.345	2.094	−6.420	−7.916	3.026
$ACCcollins_t$*$Sent_t$					0.593	−0.280
					6.379	−1.225
$BWsent_t$				0.016	0.031	0.343
				1.197	0.966	4.407

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Table 66 – continued from the previous page						
	A	B	C	D	E	F
$AltZ1_t$	0.046	0.066	0.063	0.046	0.046	0.060
	32.627	20.226	19.440	32.560	32.999	18.509
Age_t	−0.000	−0.001	−0.000	−0.000	−0.000	−0.000
	−5.143	−5.264	−4.005	−5.121	−5.112	−3.495
$Size_t$	−0.128	−0.087	−0.093	−0.129	−0.128	−0.099
	−23.968	−6.411	−6.864	−23.982	−23.851	−7.292
$StdRet_t$	−0.004	−0.005	−0.004	−0.004	−0.004	−0.006
	−18.668	−8.091	−7.311	−18.715	−18.705	−9.813
$Turnover_t$	0.002	0.000	−0.000	0.002	0.002	−0.000
	18.081	2.256	−1.275	18.076	17.955	−0.473
$StdROA_t$	0.000	0.027	0.018	0.000	0.000	0.018
	4.610	13.169	9.221	4.621	4.682	9.265
$Beta_t$	0.719	1.017	1.025	0.720	0.730	1.094
	71.690	43.892	44.025	71.643	72.282	45.881
ROA_t	−0.028	0.426	0.213	−0.029	−0.037	−0.361
	−0.387	0.749	0.374	−0.400	−0.510	−0.631
$Leverage_t$	−0.151	−0.651	−0.344	−0.151	−0.160	−0.423
	−3.458	−6.807	−3.567	−3.441	−3.650	−4.387
N	55,357	15,971	15,971	55,357	55,357	15,971
Pseudo-R^2	0.361	0.340	0.369	0.361	0.363	0.379
Model	Eq. 28	Eq. 29	Eq. 30	Eq. 31	Eq. 32	Eq. 33

Table 67
Determinants of Annual capm5 eVERR Decile Assignments Using AAII Sentiment, Collins Accruals and Cash Flow, and Single Digit SIC Industry Fixed Effects

The ordered logistic regressions use the annual capm5 $eVERR$ decile assignments from 1964–2009 as the dependent variable. Some independent variables are not available for the full period. CEO compensation characteristics, vega and delta, are obtained from Professor Naveen's website and are rescaled to be in millions. Scaled cash flow and accruals data are calculated in accordance with Collins et al. (2003). Sentiment is calculated as the monthly average of the weekly difference between the bullish and bearish sentiment reported by AAII. Advertising (AD), R&D, cash flow (CF), and accruals (ACC) are scaled by average total assets; intangible assets (INTAN) and property, plant, and equipment (PPENT) are scaled by end of the year assets. Single digit SIC codes are used to implement the industry fixed effects. A version of Altman's Z, firm age, firm size, the standard deviation of returns, stock turnover, return on assets, the standard deviation of return on assets, beta, and total liabilities scaled by assets are included as control variables. The t-statistics are reported below each coefficient.

	A	B	C	D	E	F
$Vega_t$		0.580	0.465			0.436
		9.236	7.465			6.979
$Delta_t$		0.003	0.003			0.003
		1.836	1.770			1.840
AD_t	0.842	0.136	0.658	0.852	0.829	−0.388
	5.443	0.418	2.018	5.508	4.311	−0.931
AD_t*$Sent_t$					0.002	0.082
					0.203	3.860
$R\&D/A_t$	5.673		8.080	5.671	5.696	7.814
	47.245		27.408	47.234	38.916	20.905
$R\&D/A_t$*$Sent_t$					−0.000	0.025
					−0.060	1.424
$PPENT_t$	−1.296	−1.740	−1.307	−1.296	−1.213	−1.319
	−28.516	−18.897	−13.947	−28.502	−22.681	−11.197
$PPENT_t$*$Sent_t$					−0.007	−0.001
					−2.915	−0.176
$INTAN_t$	−0.516	−1.500	−1.010	−0.519	−0.612	−1.029
	−9.497	−15.116	−9.987	−9.560	−9.250	−8.352
$INTAN_t$*$Sent_t$					0.008	0.005
					2.478	0.832
$CFcollins_t$	−3.013	−1.481	−0.647	−3.003	−3.012	−0.323
	−31.055	−2.507	−1.088	−30.944	−28.271	−0.528
$CFcollins_t$*$Sent_t$					0.002	−0.015
					0.436	−1.499
$ACCcollins_t$	−0.633	0.206	1.255	−0.625	−0.488	1.979
	−6.426	0.345	2.094	−6.347	−4.514	3.222
$ACCcollins_t$*$Sent_t$					−0.012	−0.050
					−2.953	−5.133
$AAIIbullbear_t$				0.001	0.002	0.004
				3.048	1.397	1.296

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Table 67 – continued from the previous page						
	A	B	C	D	E	F
$AltZ1_t$	0.046	0.066	0.063	0.045	0.045	0.061
	32.627	20.226	19.440	32.472	32.412	18.676
Age_t	−0.000	−0.001	−0.000	−0.000	−0.000	−0.000
	−5.143	−5.264	−4.005	−4.979	−4.903	−3.609
$Size_t$	−0.128	−0.087	−0.093	−0.129	−0.129	−0.089
	−23.968	−6.411	−6.864	−24.098	−23.954	−6.598
$StdRet_t$	−0.004	−0.005	−0.004	−0.004	−0.004	−0.003
	−18.668	−8.091	−7.311	−18.598	−18.387	−5.594
$Turnover_t$	0.002	0.000	−0.000	0.002	0.002	−0.000
	18.081	2.256	−1.275	18.093	18.119	−0.553
$StdROA_t$	0.000	0.027	0.018	0.000	0.000	0.017
	4.610	13.169	9.221	4.606	4.650	8.536
$Beta_t$	0.719	1.017	1.025	0.721	0.719	1.022
	71.690	43.892	44.025	71.720	71.438	43.737
ROA_t	−0.028	0.426	0.213	−0.028	−0.027	0.234
	−0.387	0.749	0.374	−0.393	−0.371	0.411
$Leverage_t$	−0.151	−0.651	−0.344	−0.153	−0.152	−0.390
	−3.458	−6.807	−3.567	−3.495	−3.460	−4.030
N	55,357	15,971	15,971	55,353	55,353	15,971
Pseudo-R^2	0.361	0.340	0.369	0.361	0.361	0.374
Model	Eq. 28	Eq. 29	Eq. 30	Eq. 31	Eq. 32	Eq. 33

3.3 Detailed Determinants Tables: Endogeneity Specification

A series of ordered logistic regressions of capm5 *VERR* and *eVERR* valuation decile assignments on different combinations of independent variables following the endogeneity specification is performed in Tables 69 through 92. Decile assignments based upon the *VERR* and *eVERR* measures are made using the full 1964–2009 period and also using each calendar year. The combination of full period and annual decile assignments for the capm5 *VERR* and *eVERR* valuation deciles results in four different dependent variables for the ordered logistic regressions. The results from using the full 1964–2009 period capm5 *VERR* decile assignments as the dependent variable are presented in Tables 69 through 74. The results from using the annual *VERR* decile assignments as the dependent variable are presented in Tables 75 through 80. Switching to the use of the full 1964–2009 period capm5 *eVERR* decile assignments as the dependent variable in the ordered logistic regressions produces Tables 81 through 86, and the utilization of annual capm5 *eVERR* decile assignments as the dependent variable in the ordered logistic regressions generates Tables 87 through 92.

Table 68 summarizes the results of the endogeneity specification ordered logistic regression models detailed in Equations 20 and 21 for all four dependent variables. Panel A presents results using the full period capm5 *VERR* decile assignments as the dependent variable, Panel B presents results using the annual capm5 *VERR* decile assignments as the dependent variable, Panel C presents results using the full period capm5 *eVERR* decile assignments as the dependent variable, and Panel D presents the results using the annual capm5 *eVERR* decile assignments as the dependent variable. Each column of each panel in Table 68 reports the average coefficients and average t-statistics across the two ordered logistic regressions performed using the specified measure of sentiment and the two different measures of scaled cash flow and accruals in the appropriate endogeneity specification model with the dependent variable listed for the panel. The equation detailing the model used for each column is reported near the bottom of each column. As each column in Table 68 presents average coefficients and average t-statistics across results produced using both measures of cash flow and accruals, the tables reporting the individual results which are averaged to produce each column are listed at the bottom of each column in Table 68.

Tables 69 through 92 contain the results for all of the individual ordered logistic regressions performed using the endogeneity specification. The four different dependent variables, two different measures of cash flow and accruals, and three different measures of investor sentiment produce the twenty-four endogeneity specification tables. Each table includes the

Table 68
Average Coefficients and t-Statistics for Ordered Logistic Regressions of capm5 VERR and eVERR Decile Assignments on Determinants with Endogeneity Adjustments

Average coefficients and average t-statistics are presented in this table for ordered logistic regressions using the endogeneity specification models. Some independent variables are not available for the full period. Scaled cash flow and accruals data are calculated in accordance with Sloan (1996) and Collins et al. (2003). Each column reports the average coefficients and average t-statistics across the two ordered logistic regressions performed using the specified measure of sentiment and the two different measures of scaled cash flow and accruals in the appropriate endogeneity specification model. The average t-statistics are reported below each average coefficient.

Panel A displays the average results for the ordered logistic regressions using the full period capm5 *VERR* decile assignments from 1964–2009 as the dependent variable. Panel B displays the average results for the ordered logistic regressions using the annual capm5 *VERR* decile assignments from 1964–2009 as the dependent variable. Panel C displays the average results for the ordered logistic regressions using the full period capm5 *eVERR* decile assignments from 1964–2009 as the dependent variable. Panel D displays the average results for the ordered logistic regressions using the annual capm5 *eVERR* decile assignments from 1964–2009 as the dependent variable.

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Table 68 – continued from the previous page						
Panel A: Dependent Variable = Full Period *VERR* Decile						
	Inv. Intelligence		Baker-Wurgler		AAII	
	1	2	3	4	5	6
$Vega_{t-1}$		0.000		0.000		0.000
		0.581		2.380		1.066
$Delta_{t-1}$		0.000		0.000		0.000
		2.546		2.241		2.620
AD_t	0.299	−0.718	0.338	0.288	0.448	−0.249
	1.501	−1.335	2.455	0.792	2.360	−0.553
AD_t*$Sent_t$	−0.005	0.048	−0.965	−0.597	−0.008	0.044
	−0.363	2.173	−5.041	−0.893	−0.833	1.891
$R\&D/S_t$	0.029	1.851	0.015	2.119	0.011	2.923
	5.083	9.856	5.214	14.580	5.264	13.875
$R\&D/S_t$*$Sent_t$	−0.001	0.013	−0.008	−0.777	0.000	−0.046
	−3.797	1.765	−3.821	−3.053	2.859	−6.146
$PPENT_t$	0.095	0.165	−0.146	0.068	0.018	0.396
	1.987	1.259	−3.902	0.768	0.366	3.454
$PPENT_t$*$Sent_t$	−0.014	−0.010	−0.136	−0.773	−0.019	−0.032
	−7.209	−2.043	−2.043	−5.200	−8.334	−6.048
$INTAN_{t-1}$	−0.193	−1.261	0.356	−0.519	−0.142	−0.494
	−2.295	−7.567	7.110	−4.875	−2.147	−3.796
$INTAN_{t-1}$*$Sent_t$	0.020	0.024	−0.420	−0.252	0.004	−0.004
	7.044	3.894	−5.246	−1.306	1.394	−0.695
CF_t	−3.350	−0.955	−3.614	−0.912	−3.378	−1.077
	−34.365	−1.844	−41.732	−2.349	−32.717	−2.334
CF_t*$Sent_t$	−0.010	−0.003	1.002	0.298	0.003	−0.002
	−3.679	−0.253	13.503	0.997	0.782	−0.106
ACC_t	−1.959	0.225	−2.106	0.500	−1.640	0.758
	−17.557	0.349	−21.622	0.917	−13.715	1.502
ACC_t*$Sent_t$	−0.003	0.002	0.791	−0.207	−0.005	−0.035
	−0.796	−0.315	8.978	−0.850	−1.304	−3.108
$Sent_t$	0.009	0.009	0.384	0.873	0.013	0.025
	10.395	3.226	20.061	11.021	13.867	9.155
$AltZ1_t$	0.059	0.071	0.058	0.068	0.051	0.068
	40.359	18.911	39.591	17.786	34.697	17.935
Age_t	−0.001	−0.001	−0.001	−0.001	−0.001	−0.001
	−21.506	−12.848	−22.851	−12.769	−24.439	−12.295
$Size_t$	−0.110	−0.156	−0.110	−0.172	−0.140	−0.157
	−21.881	−10.825	−21.806	−11.906	−26.003	−10.883
$StdRet_t$	−0.005	−0.011	−0.005	−0.016	−0.006	−0.012
	−22.181	−15.996	−25.765	−25.363	−30.340	−19.035
$Turnover_t$	0.004	−0.001	0.004	−0.000	0.003	−0.000
	33.916	−3.394	33.748	−1.312	23.284	−0.762
$StdROA_t$	0.005	0.028	0.005	0.031	0.001	0.027
	9.656	11.978	10.392	13.134	4.644	11.568
$Beta_t$	0.607	0.974	0.643	1.113	0.728	1.001
	64.619	38.768	68.183	43.054	71.865	39.879
ROA_t	−0.286	0.774	−0.341	0.300	−0.299	0.914
	−4.939	1.897	−5.790	1.061	−3.593	2.508
$Leverage_t$	0.731	1.262	0.662	1.129	0.849	1.165
	17.807	12.072	16.147	10.781	19.263	11.099
Model	Eq. 20	Eq. 21	Eq. 20	Eq. 21	Eq. 20	Eq. 21
Tables	69, 72		70, 73		71, 74	

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Table 68 – continued from the previous page						
Panel B: Dependent Variable = Annual *VERR* Decile						
	Inv. Intelligence		Baker-Wurgler		AAII	
	1	2	3	4	5	6
$Vega_{t\text{-}1}$		0.000		0.000		0.000
		0.520		0.847		0.026
$Delta_{t\text{-}1}$		0.000		0.000		0.000
		2.831		2.667		2.874
AD_t	0.600	−0.879	0.607	−0.070	0.600	−0.415
	3.241	−1.641	4.504	−0.193	3.166	−0.925
AD_t*$Sent_t$	−0.006	0.040	−0.947	0.174	−0.013	0.033
	−0.388	1.860	−5.474	0.262	−1.319	1.429
$R\&D/S_t$	0.006	1.799	0.008	1.745	0.006	2.772
	5.204	9.725	4.752	13.764	4.417	14.073
$R\&D/S_t$*$Sent_t$	0.000	−0.009	−0.003	−0.878	0.000	−0.052
	3.297	−1.245	−2.015	−7.600	2.148	−8.732
$PPENT_t$	0.052	−0.103	−0.160	−0.239	−0.103	0.030
	1.268	−0.782	−4.134	−2.699	−2.162	0.267
$PPENT_t$*$Sent_t$	−0.014	−0.010	−0.101	−0.387	−0.015	−0.021
	−6.914	−2.046	−2.029	−2.736	−6.381	−4.116
$INTAN_{t\text{-}1}$	0.174	−0.208	0.071	−0.292	0.051	−0.283
	2.292	−1.260	1.400	−2.758	0.765	−2.187
$INTAN_{t\text{-}1}$*$Sent_t$	−0.006	−0.007	−0.071	−0.207	0.000	−0.000
	−2.103	−1.214	−0.539	−1.105	0.044	−0.063
CF_t	−2.502	0.320	−2.809	0.059	−3.153	0.142
	−24.503	0.391	−30.597	−0.352	−30.987	0.129
CF_t*$Sent_t$	−0.011	−0.023	0.662	0.297	0.002	−0.006
	−3.894	−2.107	8.035	1.081	0.599	−0.594
ACC_t	−0.979	1.049	−1.365	0.368	−1.769	0.770
	−8.311	1.696	−13.254	0.398	−14.908	1.377
ACC_t*$Sent_t$	−0.017	−0.045	0.437	0.325	−0.004	−0.025
	−4.554	−3.842	4.746	0.749	−0.963	−2.256
$Sent_t$	0.005	0.004	0.009	0.487	0.006	0.017
	6.412	1.309	0.179	6.935	6.599	6.348
$AltZ1_t$	0.038	0.037	0.038	0.034	0.036	0.034
	30.172	11.397	30.425	10.520	27.879	10.498
Age_t	−0.001	−0.001	−0.001	−0.001	−0.001	−0.001
	−23.562	−10.449	−23.723	−10.028	−22.366	−9.732
$Size_t$	−0.105	−0.135	−0.103	−0.142	−0.106	−0.135
	−21.538	−9.398	−21.230	−9.902	−19.846	−9.458
$StdRet_t$	−0.003	−0.002	−0.003	−0.004	−0.004	−0.001
	−16.096	−3.200	−16.843	−5.898	−18.235	−1.838
$Turnover_t$	0.003	0.001	0.003	0.001	0.003	0.001
	24.601	3.697	24.844	4.409	24.076	4.495
$StdROA_t$	0.002	0.023	0.002	0.022	0.001	0.020
	6.000	9.972	6.253	9.793	4.832	8.835
$Beta_t$	0.701	0.899	0.705	0.962	0.709	0.903
	75.531	36.345	75.617	38.244	70.660	36.630
ROA_t	−0.587	0.093	−0.600	−0.212	−0.369	0.133
	−7.546	0.566	−7.740	−0.067	−4.469	0.691
$Leverage_t$	0.461	0.511	0.445	0.446	0.525	0.492
	11.555	5.010	11.178	4.369	12.106	4.807
Model	Eq. 20	Eq. 21	Eq. 20	Eq. 21	Eq. 20	Eq. 21
Tables	75, 78		76, 79		77, 80	

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Table 68 – continued from the previous page

Panel C: Dependent Variable = Full Period *eVERR* Decile						
	Inv. Intelligence		Baker-Wurgler		AAII	
	1	2	3	4	5	6
$Vega_{t-1}$		0.000		0.000		0.000
		3.984		6.304		4.785
$Delta_{t-1}$		0.000		0.000		0.000
		4.832		4.051		4.648
AD_t	0.225	−0.889	0.321	0.129	0.157	−0.783
	1.160	−1.623	2.413	0.349	0.824	−1.723
AD_t*$Sent_t$	−0.002	0.054	−0.992	0.009	0.007	0.083
	0.028	2.445	−5.232	0.013	0.724	3.605
$R\&D/S_t$	0.108	3.431	0.043	3.673	0.032	3.430
	7.273	13.815	7.586	21.316	6.449	15.227
$R\&D/S_t$*$Sent_t$	−0.002	0.014	−0.009	2.536	0.001	0.017
	−5.888	1.443	−1.495	7.504	3.626	1.623
$PPENT_t$	−1.037	−0.948	−1.319	−1.140	−1.167	−0.893
	−21.593	−7.063	−35.519	−12.644	−24.218	−7.684
$PPENT_t$*$Sent_t$	−0.015	−0.011	−0.091	−0.205	−0.017	−0.024
	−7.298	−2.210	−1.557	−1.373	−7.197	−4.450
$INTAN_{t-1}$	−1.019	−1.774	−0.554	−1.266	−0.994	−1.240
	−13.107	−10.557	−10.354	−11.825	−15.055	−9.479
$INTAN_{t-1}$*$Sent_t$	0.017	0.015	−0.314	0.374	0.008	−0.003
	5.852	2.382	−4.063	1.954	2.448	−0.420
CF_t	−3.613	−0.504	−3.967	−0.331	−3.769	−0.554
	−35.914	−0.759	−44.474	−0.768	−35.956	−0.967
CF_t*$Sent_t$	−0.015	0.006	1.098	0.972	−0.001	0.007
	−5.060	0.609	14.297	3.310	−0.179	0.666
ACC_t	−1.639	1.399	−1.854	1.695	−1.437	2.083
	−14.605	2.572	−18.868	3.683	−11.850	4.310
ACC_t*$Sent_t$	−0.007	0.007	0.872	0.487	−0.012	−0.043
	−1.743	0.202	9.953	1.045	−2.788	−3.494
$Sent_t$	0.011	0.010	0.395	0.466	0.014	0.020
	12.585	3.581	20.538	5.748	14.646	7.025
$AltZ1_t$	0.080	0.099	0.079	0.095	0.071	0.095
	47.221	23.452	46.622	22.356	41.186	22.320
Age_t	−0.001	−0.001	−0.001	−0.001	−0.001	−0.001
	−10.920	−9.596	−12.312	−9.575	−12.890	−9.061
$Size_t$	−0.118	−0.131	−0.117	−0.148	−0.143	−0.130
	−23.465	−9.039	−23.404	−10.176	−26.560	−8.982
$StdRet_t$	−0.005	−0.013	−0.006	−0.019	−0.007	−0.014
	−26.137	−19.204	−30.579	−28.493	−31.634	−21.866
$Turnover_t$	0.003	−0.002	0.003	−0.002	0.002	−0.002
	25.690	−10.549	25.478	−8.620	17.359	−7.354
$StdROA_t$	0.005	0.034	0.006	0.037	0.002	0.033
	10.036	13.931	11.128	15.399	5.128	13.594
$Beta_t$	0.665	1.092	0.710	1.241	0.773	1.114
	70.266	42.814	74.600	47.118	75.502	43.642
ROA_t	−0.341	1.137	−0.423	0.696	−0.268	1.251
	−5.591	3.284	−6.833	2.554	−3.352	3.752
$Leverage_t$	0.024	0.705	−0.063	0.594	0.088	0.567
	0.570	6.701	−1.567	5.636	1.981	5.367
Model	Eq. 20	Eq. 21	Eq. 20	Eq. 21	Eq. 20	Eq. 21
Tables	81, 84		82, 85		83, 86	

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Table 68 – continued from the previous page						
Panel D: Dependent Variable = Annual *eVERR* Decile						
	Inv. Intelligence		Baker-Wurgler		AAII	
	1	2	3	4	5	6
$Vega_{t-1}$		0.000		0.000		0.000
		5.108		5.313		4.378
$Delta_{t-1}$		0.000		0.000		0.000
		2.979		2.822		3.025
AD_t	0.657	−0.289	0.705	0.218	0.501	−0.370
	3.601	−0.532	5.245	0.605	2.635	−0.816
AD_t*$Sent_t$	−0.004	0.033	−1.060	0.896	−0.004	0.062
	−0.257	1.503	−6.056	1.341	−0.380	2.703
$R\&D/S_t$	0.035	3.748	0.027	3.402	0.018	3.951
	5.589	14.576	6.910	21.383	6.893	17.698
$R\&D/S_t$*$Sent_t$	−0.001	−0.017	−0.011	1.398	0.001	−0.030
	−2.466	−1.795	−2.638	4.593	5.042	−3.261
$PPENT_t$	−1.290	−1.427	−1.486	−1.689	−1.452	−1.476
	−26.870	−10.638	−40.158	−18.757	−30.144	−12.739
$PPENT_t$*$Sent_t$	−0.012	−0.013	0.022	0.218	−0.007	−0.014
	−6.360	−2.445	0.022	1.467	−2.965	−2.612
$INTAN_{t-1}$	−0.563	−0.837	−0.828	−1.056	−0.867	−1.062
	−7.351	−5.047	−15.932	−9.942	−13.174	−8.179
$INTAN_{t-1}$*$Sent_t$	−0.013	−0.010	0.184	0.420	0.005	0.002
	−4.371	−1.621	2.540	2.214	1.757	0.368
CF_t	−2.780	0.651	−3.127	0.784	−3.395	0.923
	−26.810	1.471	−33.628	2.025	−32.924	2.417
CF_t*$Sent_t$	−0.014	−0.009	0.722	0.540	−0.003	−0.015
	−4.692	−0.788	8.851	1.894	−1.009	−1.428
ACC_t	−0.705	2.179	−1.137	1.524	−1.428	2.314
	−5.945	3.965	−10.997	3.354	−11.923	4.778
ACC_t*$Sent_t$	−0.020	−0.049	0.512	0.452	−0.013	−0.058
	−5.300	−3.969	5.786	1.067	−2.958	−4.715
$Sent_t$	0.004	−0.001	−0.041	0.140	0.003	0.011
	5.459	−0.486	−2.146	1.754	2.928	3.975
$AltZ1_t$	0.049	0.064	0.049	0.058	0.048	0.060
	34.847	17.334	35.162	15.919	33.045	16.439
Age_t	−0.001	−0.001	−0.001	−0.001	−0.001	−0.001
	−10.609	−6.470	−10.595	−5.804	−9.488	−5.782
$Size_t$	−0.113	−0.099	−0.113	−0.105	−0.116	−0.096
	−23.228	−6.902	−23.162	−7.290	−21.789	−6.681
$StdRet_t$	−0.004	−0.004	−0.004	−0.005	−0.004	−0.002
	−18.906	−6.636	−19.149	−7.764	−19.250	−3.723
$Turnover_t$	0.002	−0.000	0.002	−0.000	0.002	−0.000
	19.717	−0.885	19.688	−0.476	20.312	−0.328
$StdROA_t$	0.002	0.026	0.002	0.025	0.001	0.023
	6.205	11.410	6.423	10.898	5.053	10.258
$Beta_t$	0.727	0.981	0.732	1.035	0.737	0.968
	77.749	39.311	78.000	40.712	72.939	38.944
ROA_t	−0.521	0.732	−0.541	0.414	−0.333	0.712
	−6.789	2.545	−7.050	1.777	−4.093	2.435
$Leverage_t$	−0.408	−0.083	−0.416	−0.165	−0.319	−0.130
	−10.074	−0.807	−10.259	−1.602	−7.324	−1.253
Model	Eq. 20	Eq. 21	Eq. 20	Eq. 21	Eq. 20	Eq. 21
Tables	87, 90		88, 91		89, 92	

coefficients and t-statistics for six models within the endogeneity specification which employ the specified dependent variable, measures of cash flow and accruals, and measure of investor sentiment. Information about the definition and availability of the independent variables used in the endogeneity specification models is presented in Exhibit 3 at the beginning of the Appendix. The time period spanned by the data used to generate each column of Tables 69 through 92 is therefore dictated by the intersection of the time periods for which the variables used in each column are available. The endogeneity specification models estimated are the following:

$$\begin{aligned} Decile_{i,t} = f(&\boldsymbol{\alpha} + \gamma_3 AD_{i,t} + \gamma_4 R\&D/S_{i,t} + \gamma_5 PPENT_{i,t} \\ &+ \gamma_6 INTAN_{i,t-1} + \gamma_7 CF_{i,t} + \gamma_8 ACC_{i,t} + \gamma_{16} AltZ1_{i,t} \\ &+ \gamma_{17} Age_{i,t} + \gamma_{18} Size_{i,t} + \gamma_{19} StdRet_{i,t} + \gamma_{20} Turnover_{i,t} \\ &+ \gamma_{21} StdROA_{i,t} + \gamma_{22} Beta_{i,t} + \gamma_{23} ROA_{i,t} \\ &+ \gamma_{24} Leverage_{i,t} + \varepsilon_{i,t}) \end{aligned} \tag{34}$$

$$\begin{aligned} Decile_{i,t} = f(&\boldsymbol{\alpha} + \gamma_1 Vega_{i,t-1} + \gamma_2 Delta_{i,t-1} + \gamma_3 AD_{i,t} \\ &+ \gamma_5 PPENT_{i,t} + \gamma_6 INTAN_{i,t-1} + \gamma_7 CF_{i,t} + \gamma_8 ACC_{i,t} \\ &+ \gamma_{16} AltZ1_{i,t} + \gamma_{17} Age_{i,t} + \gamma_{18} Size_{i,t} + \gamma_{19} StdRet_{i,t} \\ &+ \gamma_{20} Turnover_{i,t} + \gamma_{21} StdROA_{i,t} + \gamma_{22} Beta_{i,t} \\ &+ \gamma_{23} ROA_{i,t} + \gamma_{24} Leverage_{i,t} + \varepsilon_{i,t}) \end{aligned} \tag{35}$$

$$\begin{aligned} Decile_{i,t} = f(&\boldsymbol{\alpha} + \gamma_1 Vega_{i,t-1} + \gamma_2 Delta_{i,t-1} + \gamma_3 AD_{i,t} \\ &+ \gamma_4 R\&D/S_{i,t} + \gamma_5 PPENT_{i,t} + \gamma_6 INTAN_{i,t-1} + \gamma_7 CF_{i,t} \\ &+ \gamma_8 ACC_{i,t} + \gamma_{16} AltZ1_{i,t} + \gamma_{17} Age_{i,t} + \gamma_{18} Size_{i,t} \\ &+ \gamma_{19} StdRet_{i,t} + \gamma_{20} Turnover_{i,t} + \gamma_{21} StdROA_{i,t} \\ &+ \gamma_{22} Beta_{i,t} + \gamma_{23} ROA_{i,t} + \gamma_{24} Leverage_{i,t} + \varepsilon_{i,t}) \end{aligned} \tag{36}$$

$$\begin{aligned} Decile_{i,t} = f(&\boldsymbol{\alpha} + \gamma_3 AD_{i,t} + \gamma_4 R\&D/S_{i,t} + \gamma_5 PPENT_{i,t} \\ &+ \gamma_6 INTAN_{i,t-1} + \gamma_7 CF_{i,t} + \gamma_8 ACC_{i,t} + \gamma_9 Sent_{i,t} \\ &+ \gamma_{16} AltZ1_{i,t} + \gamma_{17} Age_{i,t} + \gamma_{18} Size_{i,t} + \gamma_{19} StdRet_{i,t} \\ &+ \gamma_{20} Turnover_{i,t} + \gamma_{21} StdROA_{i,t} + \gamma_{22} Beta_{i,t} \\ &+ \gamma_{23} ROA_{i,t} + \gamma_{24} Leverage_{i,t} + \varepsilon_{i,t}) \end{aligned} \tag{37}$$

$$
\begin{aligned}
Decile_{i,t} = f(\boldsymbol{\alpha} &+ \gamma_3 AD_{i,t} + \gamma_4 R\&D/S_{i,t} + \gamma_5 PPENT_{i,t} \\
&+ \gamma_6 INTAN_{i,t-1} + \gamma_7 CF_{i,t} + \gamma_8 ACC_{i,t} + \gamma_9 Sent_{i,t} \\
&+ \gamma_{10}(AD_{i,t} * Sent_{i,t}) + \gamma_{11}(R\&D/S_{i,t} * Sent_{i,t}) \\
&+ \gamma_{12}(PPENT_{i,t} * Sent_{i,t}) + \gamma_{13}(INTAN_{i,t-1} * Sent_{i,t}) \\
&+ \gamma_{14}(CF_{i,t} * Sent_{i,t}) + \gamma_{15}(ACC_{i,t} * Sent_{i,t}) \\
&+ \gamma_{16} AltZ1_{i,t} + \gamma_{17} Age_{i,t} + \gamma_{18} Size_{i,t} \\
&+ \gamma_{19} StdRet_{i,t} + \gamma_{20} Turnover_{i,t} + \gamma_{21} StdROA_{i,t} \\
&+ \gamma_{22} Beta_{i,t} + \gamma_{23} ROA_{i,t} + \gamma_{24} Leverage_{i,t} + \varepsilon_{i,t})
\end{aligned} \tag{38}
$$

$$
\begin{aligned}
Decile_{i,t} = f(\boldsymbol{\alpha} &+ \gamma_1 Vega_{i,t-1} + \gamma_2 Delta_{i,t-1} + \gamma_3 AD_{i,t} \\
&+ \gamma_4 R\&D/S_{i,t} + \gamma_5 PPENT_{i,t} + \gamma_6 INTAN_{i,t-1} + \gamma_7 CF_{i,t} \\
&+ \gamma_8 ACC_{i,t} + \gamma_9 Sent_{i,t} + \gamma_{10}(AD_{i,t} * Sent_{i,t}) \\
&+ \gamma_{11}(R\&D/S_{i,t} * Sent_{i,t}) + \gamma_{12}(PPENT_{i,t} * Sent_{i,t}) \\
&+ \gamma_{13}(INTAN_{i,t-1} * Sent_{i,t}) + \gamma_{14}(CF_{i,t} * Sent_{i,t}) \\
&+ \gamma_{15}(ACC_{i,t} * Sent_{i,t}) + \gamma_{16} AltZ1_{i,t} \\
&+ \gamma_{17} Age_{i,t} + \gamma_{18} Size_{i,t} + \gamma_{19} StdRet_{i,t} \\
&+ \gamma_{20} Turnover_{i,t} + \gamma_{21} StdROA_{i,t} + \gamma_{22} Beta_{i,t} \\
&+ \gamma_{23} ROA_{i,t} + \gamma_{24} Leverage_{i,t} + \varepsilon_{i,t})
\end{aligned} \tag{39}
$$

In Tables 69 through 92 the endogeneity specification models in Equations 34 through 39 correspond to the columns in the tables. Equation 34 is used to estimate the coefficients and t-statistics presented in column A of Tables 69 through 92. Equation 35 is used to estimate the coefficients and t-statistics presented in column B, Equation 36 is used to estimate the coefficients and t-statistics presented in column C, and Equation 37 is used to estimate the coefficients and t-statistics presented in column D. Equations 38 and 39, which are the same as the endogeneity specification models in Equations 20 and 21 in the Methodology section of the second essay, are used to estimate the coefficients and t-statistics presented in columns E and F respectively.

3.3.1 Full Period VERR Decile Assignments Used with the Endogeneity Specification

For Tables 69 through 74 capm5 *VERR* valuation measures are used to assign firm years to valuation deciles across the 1964–2009 period. The first three tables, Tables 69 through 71, use scaled values of the Sloan (1996) measures of cash flow and accruals as part of the robustness specification. The data required to calculate the cash flow and accruals measures following Sloan (1996) is available sporadically for firms prior to mid-1970, and very consistently thereafter. Table 69 employs the Investors Intelligence measure of sentiment, which is available for the full 1964–2009 period. Table 70 employs the sentiment data from Baker and Wurgler (2007), which is available beginning in the middle of 1965. Table 71 employs the AAII measure of sentiment, which is first available in the middle of 1987. The more limited availability of the AAII measure accounts for the smaller number of observations involved in the analyses presented in Table 71.

The second three tables, Tables 72 through 74, use scaled values of the Collins et al. (2003) measures of cash flow and accruals as part of the robustness specification. The data required to calculate the cash flow and accruals measures following Collins et al. (2003) is available sporadically for firms beginning in 1987 and continuing through mid-1988, and consistently thereafter. Table 72 employs the Investors Intelligence measure of sentiment, which is available for the full 1964–2009 period. Table 73 employs the sentiment data from Baker and Wurgler (2007), which is available beginning in the middle of 1965. Table 74 employs the AAII measure of sentiment, which is first available in the middle of 1987. The more limited availability of the Collins et al. (2003) measures of cash flow and accruals accounts for the smaller number of observations involved in the analyses presented in Tables 72 through Tables 74.

Table 69
Determinants of Full Sample capm5 VERR Decile Assignments Using Investors Intelligence Sentiment and Sloan Accruals and Cash Flow: R&D/S, and Lagged INTAN, Delta, and Vega

The ordered logistic regressions use the full period capm5 *VERR* decile assignments from 1964–2009 as the dependent variable. Some independent variables are not available for the full period. CEO compensation characteristics, vega and delta, are obtained from Professor Naveen's website and are rescaled to be in millions. Scaled cash flow and accruals data are calculated in accordance with Sloan (1996). Sentiment is calculated as the monthly average of the weekly difference between the bullish and bearish sentiment reported by Investors Intelligence. Advertising (AD), cash flow (CF), and accruals (ACC) are scaled by average total assets; intangible assets (INTAN) and property, plant, and equipment (PPENT) are scaled by end of the year assets; R&D is scaled by sales. Lagged INTAN scaled by assets, lagged delta, and lagged vega are used. A version of Altman's Z, firm age, firm size, the standard deviation of returns, stock turnover, return on assets, the standard deviation of return on assets, beta, and total liabilities scaled by assets are included as control variables. The t-statistics are reported below each coefficient.

	A	B	C	D	E	F
$Vega_{t-1}$		0.000	0.000			0.000
		2.015	1.155			0.158
$Delta_{t-1}$		0.000	0.000			0.000
		2.456	2.384			2.409
AD_t	0.196	−0.060	0.216	0.203	0.083	−0.804
	1.556	−0.170	0.610	1.610	0.509	−1.452
AD_t*$Sent_t$					0.009	0.054
					1.327	2.389
$R\&D/S_t$	0.012		2.010	0.012	0.028	1.783
	4.727		14.123	4.753	4.891	9.570
$R\&D/S_t$*$Sent_t$					−0.001	0.018
					−3.487	2.426
$PPENT_t$	−0.106	−0.299	−0.095	−0.102	0.090	0.063
	−3.142	−3.485	−1.091	−3.036	2.079	0.472
$PPENT_t$*$Sent_t$					−0.012	−0.007
					−6.851	−1.462
$INTAN_{t-1}$	0.724	−0.835	−0.661	0.693	0.177	−1.341
	14.381	−7.935	−6.227	13.736	2.405	−8.020
$INTAN_{t-1}$*$Sent_t$					0.024	0.027
					8.863	4.375
$CFsloan_t$	−3.276	−1.533	−0.729	−3.247	−3.028	−0.497
	−45.022	−6.449	−2.964	−44.604	−36.454	−1.562
$CFsloan_t$*$Sent_t$					−0.011	0.009
					−4.489	0.868
$ACCsloan_t$	−2.365	−0.446	0.228	−2.319	−2.364	0.016
	−25.968	−1.419	0.715	−25.414	−22.114	0.035
$ACCsloan_t$*$Sent_t$					0.006	0.032
					1.730	1.980
$IIbullbear_t$				0.003	0.006	0.007
				7.592	8.215	2.542

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Table 69 – continued from the previous page						
	A	B	C	D	E	F
$AltZ1_t$	0.068	0.080	0.072	0.067	0.067	0.070
	45.776	20.728	18.687	45.645	45.618	18.098
Age_t	−0.001	−0.001	−0.001	−0.001	−0.001	−0.001
	−18.321	−13.657	−13.296	−18.097	−17.998	−12.835
$Size_t$	−0.076	−0.146	−0.156	−0.077	−0.078	−0.154
	−16.923	−10.158	−10.778	−17.075	−17.466	−10.628
$StdRet_t$	−0.004	−0.014	−0.014	−0.003	−0.003	−0.011
	−19.131	−22.397	−21.489	−17.733	−16.754	−15.961
$Turnover_t$	0.006	−0.000	−0.001	0.006	0.006	−0.001
	46.770	−0.945	−2.589	46.066	45.987	−3.520
$StdROA_t$	0.008	0.036	0.030	0.008	0.008	0.028
	15.429	15.202	12.894	15.255	14.972	11.742
$Beta_t$	0.502	0.978	0.996	0.501	0.499	0.976
	58.771	39.213	39.662	58.666	58.436	38.701
ROA_t	−0.601	0.175	0.602	−0.598	−0.603	0.432
	−10.251	0.788	2.674	−10.209	−10.287	1.914
$Leverage_t$	0.622	1.100	1.292	0.628	0.649	1.291
	16.458	10.557	12.275	16.615	17.166	12.263
N	80,626	13,958	13,951	80,626	80,626	13,951
Pseudo-R^2	0.230	0.252	0.267	0.230	0.232	0.275
Model	Eq. 34	Eq. 35	Eq. 36	Eq. 37	Eq. 38	Eq. 39

Table 70
Determinants of Full Sample capm5 VERR Decile Assignments Using Baker-Wurgler Sentiment and Sloan Accruals and Cash Flow: R&D/S, and Lagged INTAN, Delta, and Vega

The ordered logistic regressions use the full period capm5 *VERR* decile assignments from 1964–2009 as the dependent variable. Some independent variables are not available for the full period. CEO compensation characteristics, vega and delta, are obtained from Professor Naveen's website and are rescaled to be in millions. Scaled cash flow and accruals data are calculated in accordance with Sloan (1996). Monthly orthogonalized sentiment values introduced by Baker and Wurgler (2007) are used. Advertising (AD), cash flow (CF), and accruals (ACC) are scaled by average total assets; intangible assets (INTAN) and property, plant, and equipment (PPENT) are scaled by end of the year assets; R&D is scaled by sales. Lagged INTAN scaled by assets, lagged delta, and lagged vega are used. A version of Altman's Z, firm age, firm size, the standard deviation of returns, stock turnover, return on assets, the standard deviation of return on assets, beta, and total liabilities scaled by assets are included as control variables. The *t*-statistics are reported below each coefficient.

	A	B	C	D	E	F
$Vega_{t-1}$		0.000	0.000			0.000
		2.015	1.155			2.040
$Delta_{t-1}$		0.000	0.000			0.000
		2.456	2.384			2.136
AD_t	0.196	−0.060	0.216	0.274	0.380	0.343
	1.556	−0.170	0.610	2.173	3.004	0.931
AD_t*Sent_t					−0.967	−0.589
					−6.475	−0.876
$R\&D/S_t$	0.012		2.010	0.014	0.017	2.094
	4.727		14.123	5.102	5.692	14.505
$R\&D/S_t*Sent_t$					−0.009	−0.694
					−5.325	−2.704
$PPENT_t$	−0.106	−0.299	−0.095	−0.121	−0.116	0.018
	−3.142	−3.485	−1.091	−3.603	−3.436	0.203
$PPENT_t*Sent_t$					−0.016	−0.698
					−0.398	−4.678
$INTAN_{t-1}$	0.724	−0.835	−0.661	0.787	0.817	−0.519
	14.381	−7.935	−6.227	15.611	16.168	−4.831
$INTAN_{t-1}*Sent_t$					−0.568	−0.200
					−7.602	−1.043
$CFsloan_t$	−3.276	−1.533	−0.729	−3.110	−3.222	−0.753
	−45.022	−6.449	−2.964	−42.627	−44.021	−3.002
$CFsloan_t*Sent_t$					0.969	0.118
					16.068	0.430
$ACCsloan_t$	−2.365	−0.446	0.228	−2.153	−2.298	0.178
	−25.968	−1.419	0.715	−23.558	−25.022	0.537
$ACCsloan_t*Sent_t$					1.082	0.392
					12.894	0.956
$BWsent_t$				0.564	0.519	0.893
				73.959	31.055	11.066

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Table 70 – continued from the previous page						
	A	B	C	D	E	F
AltZ1_t	0.068	0.080	0.072	0.065	0.065	0.067
	45.776	20.728	18.687	44.271	44.480	17.355
Age_t	−0.001	−0.001	−0.001	−0.001	−0.001	−0.001
	−18.321	−13.657	−13.296	−19.988	−20.313	−12.735
Size_t	−0.076	−0.146	−0.156	−0.080	−0.080	−0.169
	−16.923	−10.158	−10.778	−17.894	−17.817	−11.647
StdRet_t	−0.004	−0.014	−0.014	−0.004	−0.004	−0.016
	−19.131	−22.397	−21.489	−19.510	−19.563	−25.264
Turnover_t	0.006	−0.000	−0.001	0.005	0.005	−0.000
	46.770	−0.945	−2.589	44.726	44.340	−1.381
StdROA_t	0.008	0.036	0.030	0.008	0.009	0.031
	15.429	15.202	12.894	15.590	15.938	12.954
Beta_t	0.502	0.978	0.996	0.554	0.556	1.113
	58.771	39.213	39.662	64.282	64.428	42.936
ROA_t	−0.601	0.175	0.602	−0.657	−0.675	0.408
	−10.251	0.788	2.674	−11.133	−11.491	1.800
Leverage_t	0.622	1.100	1.292	0.579	0.581	1.168
	16.458	10.557	12.275	15.305	15.374	11.077
N	80,626	13,958	13,951	80,588	80,588	13,951
Pseudo-R^2	0.230	0.252	0.267	0.280	0.283	0.293
Model	Eq. 34	Eq. 35	Eq. 36	Eq. 37	Eq. 38	Eq. 39

Table 71
Determinants of Full Sample capm5 VERR Decile Assignments Using AAII Sentiment and Sloan Accruals and Cash Flow: R&D/S, and Lagged INTAN, Delta, and Vega

The ordered logistic regressions use the full period capm5 *VERR* decile assignments from 1964–2009 as the dependent variable. Some independent variables are not available for the full period. CEO compensation characteristics, vega and delta, are obtained from Professor Naveen's website and are rescaled to be in millions. Scaled cash flow and accruals data are calculated in accordance with Sloan (1996). Sentiment is calculated as the monthly average of the weekly difference between the bullish and bearish sentiment reported by AAII. Advertising (AD), cash flow (CF), and accruals (ACC) are scaled by average total assets; intangible assets (INTAN) and property, plant, and equipment (PPENT) are scaled by end of the year assets; R&D is scaled by sales. Lagged INTAN scaled by assets, lagged delta, and lagged vega are used. A version of Altman's Z, firm age, firm size, the standard deviation of returns, stock turnover, return on assets, the standard deviation of return on assets, beta, and total liabilities scaled by assets are included as control variables. The *t*-statistics are reported below each coefficient.

	A	B	C	D	E	F
$Vega_{t-1}$		0.000	0.000			0.000
		2.015	1.155			0.710
$Delta_{t-1}$		0.000	0.000			0.000
		2.456	2.384			2.499
AD_t	0.196	−0.060	0.216	0.450	0.574	−0.278
	1.556	−0.170	0.610	2.954	3.030	−0.608
AD_t*$Sent_t$					−0.010	0.049
					−1.012	2.102
$R\&D/S_t$	0.012		2.010	0.013	0.011	2.809
	4.727		14.123	4.942	5.421	13.371
$R\&D/S_t$*$Sent_t$					0.000	−0.041
					2.928	−5.188
$PPENT_t$	−0.106	−0.299	−0.095	−0.219	0.002	0.328
	−3.142	−3.485	−1.091	−5.523	0.047	2.839
$PPENT_t$*$Sent_t$					−0.019	−0.030
					−8.390	−5.649
$INTAN_{t-1}$	0.724	−0.835	−0.661	−0.049	−0.104	−0.532
	14.381	−7.935	−6.227	−0.896	−1.564	−4.066
$INTAN_{t-1}$*$Sent_t$					0.005	−0.002
					1.489	−0.353
$CFsloan_t$	−3.276	−1.533	−0.729	−2.869	−2.882	−0.667
	−45.022	−6.449	−2.964	−31.599	−29.803	−2.350
$CFsloan_t$*$Sent_t$					0.003	0.006
					0.827	0.595
$ACCsloan_t$	−2.365	−0.446	0.228	−1.627	−1.611	0.656
	−25.968	−1.419	0.715	−14.147	−12.672	1.668
$ACCsloan_t$*$Sent_t$					−0.000	−0.012
					−0.035	−0.780
$AAIIbullbear_t$				0.009	0.013	0.025
				18.271	14.055	8.812

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Table 71 – continued from the previous page						
	A	B	C	D	E	F
$AltZ1_t$	0.068	0.080	0.072	0.053	0.053	0.067
	45.776	20.728	18.687	35.530	35.284	17.303
Age_t	−0.001	−0.001	−0.001	−0.001	−0.001	−0.001
	−18.321	−13.657	−13.296	−24.654	−24.572	−12.266
$Size_t$	−0.076	−0.146	−0.156	−0.138	−0.138	−0.154
	−16.923	−10.158	−10.778	−25.826	−25.824	−10.638
$StdRet_t$	−0.004	−0.014	−0.014	−0.006	−0.006	−0.012
	−19.131	−22.397	−21.489	−30.370	−30.330	−19.018
$Turnover_t$	0.006	−0.000	−0.001	0.003	0.003	−0.000
	46.770	−0.945	−2.589	23.262	23.231	−0.751
$StdROA_t$	0.008	0.036	0.030	0.001	0.001	0.027
	15.429	15.202	12.894	4.909	4.841	11.397
$Beta_t$	0.502	0.978	0.996	0.733	0.731	1.001
	58.771	39.213	39.662	72.454	72.178	39.747
ROA_t	−0.601	0.175	0.602	−0.624	−0.624	0.702
	−10.251	0.788	2.674	−7.525	−7.526	3.119
$Leverage_t$	0.622	1.100	1.292	0.948	0.950	1.193
	16.458	10.557	12.275	21.468	21.501	11.285
N	80,626	13,958	13,951	55,144	55,144	13,951
Pseudo-R^2	0.230	0.252	0.267	0.263	0.265	0.283
Model	Eq. 34	Eq. 35	Eq. 36	Eq. 37	Eq. 38	Eq. 39

Table 72
Determinants of Full Sample capm5 VERR Decile Assignments Using Investors Intelligence Sentiment and Collins Accruals and Cash Flow: R&D/S, and Lagged INTAN, Delta, and Vega

The ordered logistic regressions use the full period capm5 *VERR* decile assignments from 1964–2009 as the dependent variable. Some independent variables are not available for the full period. CEO compensation characteristics, vega and delta, are obtained from Professor Naveen's website and are rescaled to be in millions. Scaled cash flow and accruals data are calculated in accordance with Collins et al. (2003). Sentiment is calculated as the monthly average of the weekly difference between the bullish and bearish sentiment reported by Investors Intelligence. Advertising (AD), cash flow (CF), and accruals (ACC) are scaled by average total assets; intangible assets (INTAN) and property, plant, and equipment (PPENT) are scaled by end of the year assets; R&D is scaled by sales. Lagged INTAN scaled by assets, lagged delta, and lagged vega are used. A version of Altman's Z, firm age, firm size, the standard deviation of returns, stock turnover, return on assets, the standard deviation of return on assets, beta, and total liabilities scaled by assets are included as control variables. The t-statistics are reported below each coefficient.

	A	B	C	D	E	F
$Vega_{t-1}$		0.000	0.000			0.000
		2.861	1.962			1.004
$Delta_{t-1}$		0.000	0.000			0.000
		2.769	2.685			2.683
AD_t	0.177	−0.237	0.098	0.211	0.515	−0.633
	1.154	−0.691	0.285	1.373	2.493	−1.217
AD_t*$Sent_t$					−0.019	0.041
					−2.052	1.957
$R\&D/S_t$	0.011		2.007	0.011	0.030	1.919
	4.541		14.082	4.534	5.274	10.142
$R\&D/S_t$*$Sent_t$					−0.001	0.008
					−4.107	1.105
$PPENT_t$	−0.193	−0.199	0.002	−0.161	0.100	0.267
	−4.819	−2.335	0.024	−4.029	1.894	2.046
$PPENT_t$*$Sent_t$					−0.017	−0.013
					−7.566	−2.625
$INTAN_{t-1}$	−0.119	−0.868	−0.668	−0.218	−0.563	−1.181
	−2.197	−8.408	−6.388	−4.019	−6.995	−7.114
$INTAN_{t-1}$*$Sent_t$					0.016	0.021
					5.224	3.413
$CFcollins_t$	−3.908	−2.953	−1.735	−3.867	−3.673	−1.413
	−38.789	−4.782	−2.778	−38.559	−32.275	−2.127
$CFcollins_t$*$Sent_t$					−0.010	−0.015
					−2.868	−1.375
$ACCcollins_t$	−1.833	−0.871	0.028	−1.767	−1.554	0.434
	−17.583	−1.398	0.045	−17.043	−13.000	0.664
$ACCcollins_t$*$Sent_t$					−0.013	−0.029
					−3.322	−2.609
$IIbullbear_t$				0.008	0.012	0.010
				17.138	12.574	3.909

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Table 72 – continued from the previous page						
	A	B	C	D	E	F
$AltZ1_t$	0.051	0.079	0.073	0.051	0.051	0.073
	34.987	21.486	19.911	34.998	35.101	19.724
Age_t	−0.001	−0.001	−0.001	−0.001	−0.001	−0.001
	−25.399	−13.775	−13.367	−25.199	−25.015	−12.861
$Size_t$	−0.134	−0.152	−0.162	−0.142	−0.142	−0.158
	−24.881	−10.632	−11.318	−26.383	−26.297	−11.022
$StdRet_t$	−0.006	−0.014	−0.014	−0.006	−0.006	−0.011
	−30.540	−22.969	−22.061	−28.698	−27.608	−16.031
$Turnover_t$	0.003	−0.000	−0.001	0.003	0.003	−0.001
	23.474	−0.785	−2.393	21.646	21.844	−3.269
$StdROA_t$	0.001	0.037	0.032	0.001	0.001	0.029
	4.743	15.570	13.349	4.422	4.340	12.214
$Beta_t$	0.717	0.983	0.997	0.717	0.714	0.972
	71.079	39.633	39.962	71.073	70.802	38.835
ROA_t	0.010	1.021	0.986	0.026	0.031	1.116
	0.137	1.724	1.662	0.342	0.409	1.880
$Leverage_t$	0.742	0.969	1.212	0.786	0.812	1.233
	16.904	9.497	11.694	17.882	18.448	11.881
N	54,246	14,181	14,174	54,246	54,246	14,174
Pseudo-R^2	0.261	0.256	0.270	0.265	0.267	0.278
Model	Eq. 34	Eq. 35	Eq. 36	Eq. 37	Eq. 38	Eq. 39

Table 73
Determinants of Full Sample capm5 VERR Decile Assignments Using Baker-Wurgler Sentiment and Collins Accruals and Cash Flow: R&D/S, and Lagged INTAN, Delta, and Vega

The ordered logistic regressions use the full period capm5 *VERR* decile assignments from 1964–2009 as the dependent variable. Some independent variables are not available for the full period. CEO compensation characteristics, vega and delta, are obtained from Professor Naveen's website and are rescaled to be in millions. Scaled cash flow and accruals data are calculated in accordance with Collins et al. (2003). Monthly orthogonalized sentiment values introduced by Baker and Wurgler (2007) are used. Advertising (AD), cash flow (CF), and accruals (ACC) are scaled by average total assets; intangible assets (INTAN) and property, plant, and equipment (PPENT) are scaled by end of the year assets; R&D is scaled by sales. Lagged INTAN scaled by assets, lagged delta, and lagged vega are used. A version of Altman's Z, firm age, firm size, the standard deviation of returns, stock turnover, return on assets, the standard deviation of return on assets, beta, and total liabilities scaled by assets are included as control variables. The *t*-statistics are reported below each coefficient.

	A	B	C	D	E	F
$Vega_{t\text{-}1}$		0.000	0.000			0.000
		2.861	1.962			2.720
$Delta_{t\text{-}1}$		0.000	0.000			0.000
		2.769	2.685			2.346
AD_t	0.177	−0.237	0.098	0.204	0.296	0.232
	1.154	−0.691	0.285	1.329	1.905	0.653
AD_t*$Sent_t$					−0.962	−0.606
					−3.608	−0.911
$R\&D/S_t$	0.011		2.007	0.012	0.014	2.143
	4.541		14.082	4.553	4.737	14.656
$R\&D/S_t$*$Sent_t$					−0.007	−0.861
					−2.317	−3.402
$PPENT_t$	−0.193	−0.199	0.002	−0.188	−0.175	0.118
	−4.819	−2.335	0.024	−4.710	−4.368	1.333
$PPENT_t$*$Sent_t$					−0.256	−0.847
					−3.688	−5.722
$INTAN_{t\text{-}1}$	−0.119	−0.868	−0.668	−0.121	−0.106	−0.520
	−2.197	−8.408	−6.388	−2.248	−1.948	−4.918
$INTAN_{t\text{-}1}$*$Sent_t$					−0.272	−0.304
					−2.890	−1.568
$CFcollins_t$	−3.908	−2.953	−1.735	−3.889	−4.005	−1.070
	−38.789	−4.782	−2.778	−38.593	−39.444	−1.696
$CFcollins_t$*$Sent_t$					1.034	0.477
					10.938	1.564
$ACCcollins_t$	−1.833	−0.871	0.028	−1.822	−1.914	0.822
	−17.583	−1.398	0.045	−17.465	−18.222	1.296
$ACCcollins_t$*$Sent_t$					0.500	−0.806
					5.061	−2.657
$BWsent_t$				0.173	0.248	0.854
				12.377	9.066	10.976

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Table 73 – continued from the previous page						
	A	B	C	D	E	F
$AltZ1_t$	0.051	0.079	0.073	0.050	0.051	0.068
	34.987	21.486	19.911	34.548	34.702	18.216
Age_t	−0.001	−0.001	−0.001	−0.001	−0.001	−0.001
	−25.399	−13.775	−13.367	−25.275	−25.388	−12.804
$Size_t$	−0.134	−0.152	−0.162	−0.140	−0.139	−0.175
	−24.881	−10.632	−11.318	−25.862	−25.795	−12.166
$StdRet_t$	−0.006	−0.014	−0.014	−0.007	−0.007	−0.016
	−30.540	−22.969	−22.061	−31.875	−31.967	−25.461
$Turnover_t$	0.003	−0.000	−0.001	0.003	0.003	−0.000
	23.474	−0.785	−2.393	23.377	23.157	−1.242
$StdROA_t$	0.001	0.037	0.032	0.001	0.001	0.032
	4.743	15.570	13.349	4.782	4.845	13.315
$Beta_t$	0.717	0.983	0.997	0.727	0.730	1.112
	71.079	39.633	39.962	71.772	71.938	43.173
ROA_t	0.010	1.021	0.986	0.000	−0.007	0.191
	0.137	1.724	1.662	0.006	−0.090	0.321
$Leverage_t$	0.742	0.969	1.212	0.747	0.743	1.089
	16.904	9.497	11.694	17.019	16.921	10.485
N	54,246	14,181	14,174	54,246	54,246	14,174
Pseudo-R^2	0.261	0.256	0.270	0.263	0.265	0.296
Model	Eq. 34	Eq. 35	Eq. 36	Eq. 37	Eq. 38	Eq. 39

Table 74
Determinants of Full Sample capm5 VERR Decile Assignments Using AAII Sentiment and Collins Accruals and Cash Flow: R&D/S, and Lagged INTAN, Delta, and Vega

The ordered logistic regressions use the full period capm5 *VERR* decile assignments from 1964–2009 as the dependent variable. Some independent variables are not available for the full period. CEO compensation characteristics, vega and delta, are obtained from Professor Naveen's website and are rescaled to be in millions. Scaled cash flow and accruals data are calculated in accordance with Collins et al. (2003). Sentiment is calculated as the monthly average of the weekly difference between the bullish and bearish sentiment reported by AAII. Advertising (AD), cash flow (CF), and accruals (ACC) are scaled by average total assets; intangible assets (INTAN) and property, plant, and equipment (PPENT) are scaled by end of the year assets; R&D is scaled by sales. Lagged INTAN scaled by assets, lagged delta, and lagged vega are used. A version of Altman's Z, firm age, firm size, the standard deviation of returns, stock turnover, return on assets, the standard deviation of return on assets, beta, and total liabilities scaled by assets are included as control variables. The *t*-statistics are reported below each coefficient.

	A	B	C	D	E	F
$Vega_{t-1}$		0.000	0.000			0.000
		2.861	1.962			1.421
$Delta_{t-1}$		0.000	0.000			0.000
		2.769	2.685			2.741
AD_t	0.177	−0.237	0.098	0.240	0.322	−0.219
	1.154	−0.691	0.285	1.565	1.690	−0.499
AD_t*$Sent_t$					−0.006	0.038
					−0.654	1.680
$R\&D/S_t$	0.011		2.007	0.012	0.011	3.037
	4.541		14.082	4.626	5.107	14.379
$R\&D/S_t$*$Sent_t$					0.000	−0.052
					2.790	−7.105
$PPENT_t$	−0.193	−0.199	0.002	−0.186	0.033	0.464
	−4.819	−2.335	0.024	−4.656	0.685	4.069
$PPENT_t$*$Sent_t$					−0.019	−0.034
					−8.279	−6.447
$INTAN_{t-1}$	−0.119	−0.868	−0.668	−0.134	−0.180	−0.456
	−2.197	−8.408	−6.388	−2.483	−2.731	−3.525
$INTAN_{t-1}$*$Sent_t$					0.004	−0.006
					1.300	−1.037
$CFcollins_t$	−3.908	−2.953	−1.735	−3.864	−3.874	−1.487
	−38.789	−4.782	−2.778	−38.525	−35.631	−2.318
$CFcollins_t$*$Sent_t$					0.003	−0.009
					0.737	−0.806
$ACCcollins_t$	−1.833	−0.871	0.028	−1.788	−1.669	0.861
	−17.583	−1.398	0.045	−17.231	−14.757	1.336
$ACCcollins_t$*$Sent_t$					−0.010	−0.059
					−2.573	−5.437
$AAIIbullbear_t$				0.009	0.013	0.025
				18.820	13.678	9.498

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Table 74 – continued from the previous page						
	A	B	C	D	E	F
$AltZ1_t$	0.051	0.079	0.073	0.050	0.049	0.069
	34.987	21.486	19.911	34.334	34.111	18.566
Age_t	−0.001	−0.001	−0.001	−0.001	−0.001	−0.001
	−25.399	−13.775	−13.367	−24.392	−24.306	−12.324
$Size_t$	−0.134	−0.152	−0.162	−0.142	−0.141	−0.159
	−24.881	−10.632	−11.318	−26.258	−26.181	−11.128
$StdRet_t$	−0.006	−0.014	−0.014	−0.006	−0.006	−0.012
	−30.540	−22.969	−22.061	−30.506	−30.350	−19.052
$Turnover_t$	0.003	−0.000	−0.001	0.003	0.003	−0.000
	23.474	−0.785	−2.393	23.407	23.338	−0.773
$StdROA_t$	0.001	0.037	0.032	0.001	0.001	0.028
	4.743	15.570	13.349	4.519	4.447	11.740
$Beta_t$	0.717	0.983	0.997	0.727	0.724	1.001
	71.079	39.633	39.962	71.862	71.552	40.010
ROA_t	0.010	1.021	0.986	0.020	0.026	1.126
	0.137	1.724	1.662	0.267	0.340	1.897
$Leverage_t$	0.742	0.969	1.212	0.744	0.747	1.137
	16.904	9.497	11.694	16.961	17.024	10.914
N	54,246	14,181	14,174	54,242	54,242	14,174
Pseudo-R^2	0.261	0.256	0.270	0.265	0.267	0.287
Model	Eq. 34	Eq. 35	Eq. 36	Eq. 37	Eq. 38	Eq. 39

3.3.2 Annual VERR Decile Assignments Used with the Endogeneity Specification

For Tables 75 through 80 capm5 *VERR* valuation measures are used to assign firm years to valuation deciles for each calendar year during the 1964–2009 period. The first three tables, Tables 75 through 77, use scaled values of the Sloan (1996) measures of cash flow and accruals as part of the robustness specification. The data required to calculate the cash flow and accruals measures following Sloan (1996) is available sporadically for firms prior to mid-1970, and very consistently thereafter. Table 75 employs the Investors Intelligence measure of sentiment, which is available for the full 1964–2009 period. Table 76 employs the sentiment data from Baker and Wurgler (2007), which is available beginning in the middle of 1965. Table 77 employs the AAII measure of sentiment, which is first available in the middle of 1987. The more limited availability of the AAII measure accounts for the smaller number of observations involved in the analyses presented in Table 77.

The second three tables, Tables 78 through 80, use scaled values of the Collins et al. (2003) measures of cash flow and accruals as part of the robustness specification. The data required to calculate the cash flow and accruals measures following Collins et al. (2003) is available sporadically for firms beginning in 1987 and continuing through mid-1988, and consistently thereafter. Table 78 employs the Investors Intelligence measure of sentiment, which is available for the full 1964–2009 period. Table 79 employs the sentiment data from Baker and Wurgler (2007), which is available beginning in the middle of 1965. Table 80 employs the AAII measure of sentiment, which is first available in the middle of 1987. The more limited availability of the Collins et al. (2003) measures of cash flow and accruals accounts for the smaller number of observations involved in the analyses presented in Tables 78 through Tables 80.

Table 75
Determinants of Annual capm5 VERR Decile Assignments Using Investors Intelligence Sentiment and Sloan Accruals and Cash Flow: R&D/S, and Lagged INTAN, Delta, and Vega

The ordered logistic regressions use the annual capm5 *VERR* decile assignments from 1964–2009 as the dependent variable. Some independent variables are not available for the full period. CEO compensation characteristics, vega and delta, are obtained from Professor Naveen's website and are rescaled to be in millions. Scaled cash flow and accruals data are calculated in accordance with Sloan (1996). Sentiment is calculated as the monthly average of the weekly difference between the bullish and bearish sentiment reported by Investors Intelligence. Advertising (AD), cash flow (CF), and accruals (ACC) are scaled by average total assets; intangible assets (INTAN) and property, plant, and equipment (PPENT) are scaled by end of the year assets; R&D is scaled by sales. Lagged INTAN scaled by assets, lagged delta, and lagged vega are used. A version of Altman's Z, firm age, firm size, the standard deviation of returns, stock turnover, return on assets, the standard deviation of return on assets, beta, and total liabilities scaled by assets are included as control variables. The *t*-statistics are reported below each coefficient.

	A	B	C	D	E	F
$Vega_{t-1}$		0.000	0.000			0.000
		0.954	0.202			0.243
$Delta_{t-1}$		0.000	0.000			0.000
		2.901	2.804			2.782
AD_t	0.683	−0.319	−0.087	0.684	0.525	−0.954
	5.434	−0.904	−0.247	5.437	3.209	−1.729
AD_t*$Sent_t$					0.011	0.043
					1.583	1.931
$R\&D/S_t$	0.008		1.607	0.008	0.007	1.678
	5.056		12.888	5.057	5.524	9.191
$R\&D/S_t$*$Sent_t$					0.000	−0.004
					3.701	−0.496
$PPENT_t$	−0.069	−0.487	−0.322	−0.069	0.138	−0.173
	−2.074	−5.702	−3.713	−2.066	3.200	−1.309
$PPENT_t$*$Sent_t$					−0.013	−0.008
					−7.362	−1.490
$INTAN_{t-1}$	0.134	−0.526	−0.373	0.132	0.210	−0.280
	2.672	−5.029	−3.537	2.639	2.854	−1.688
$INTAN_{t-1}$*$Sent_t$					−0.005	−0.004
					−1.655	−0.652
$CFsloan_t$	−1.798	−1.049	−0.272	−1.797	−1.634	−0.112
	−22.660	−4.488	−1.125	−22.605	−18.549	−0.355
$CFsloan_t$*$Sent_t$					−0.009	−0.009
					−3.760	−0.894
$ACCsloan_t$	−0.584	−0.678	−0.052	−0.581	−0.302	0.255
	−5.933	−2.176	−0.164	−5.892	−2.671	0.562
$ACCsloan_t$*$Sent_t$					−0.016	−0.016
					−4.467	−0.996
$IIbullbear_t$				0.000	0.005	0.002
				0.335	6.617	0.799

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Table 75 – continued from the previous page						
	A	B	C	D	E	F
$AltZ1_t$	0.040	0.043	0.037	0.040	0.040	0.038
	32.793	13.082	11.343	32.784	32.697	11.374
Age_t	−0.001	−0.001	−0.001	−0.001	−0.001	−0.001
	−24.804	−10.859	−10.487	−24.779	−24.660	−10.523
$Size_t$	−0.102	−0.127	−0.134	−0.102	−0.103	−0.133
	−23.034	−8.824	−9.290	−23.035	−23.281	−9.238
$StdRet_t$	−0.003	−0.003	−0.002	−0.003	−0.003	−0.002
	−15.532	−4.318	−3.492	−15.296	−14.878	−3.524
$Turnover_t$	0.003	0.001	0.001	0.003	0.003	0.001
	25.636	5.090	3.822	25.542	25.379	3.904
$StdROA_t$	0.003	0.027	0.022	0.003	0.003	0.022
	7.523	11.795	9.866	7.511	7.308	9.813
$Beta_t$	0.700	0.882	0.898	0.700	0.698	0.899
	80.975	35.941	36.415	80.955	80.682	36.221
ROA_t	−1.168	−0.025	0.287	−1.169	−1.157	0.294
	−15.051	−0.111	1.287	−15.055	−14.860	1.316
$Leverage_t$	0.467	0.386	0.550	0.467	0.478	0.551
	12.581	3.787	5.366	12.586	12.865	5.375
N	80,626	13,958	13,951	80,626	80,626	13,951
Pseudo-R^2	0.206	0.234	0.247	0.206	0.207	0.248
Model	Eq. 34	Eq. 35	Eq. 36	Eq. 37	Eq. 38	Eq. 39

Table 76
Determinants of Annual capm5 VERR Decile Assignments Using Baker-Wurgler Sentiment and Sloan Accruals and Cash Flow: R&D/S, and Lagged INTAN, Delta, and Vega

The ordered logistic regressions use the annual capm5 *VERR* decile assignments from 1964–2009 as the dependent variable. Some independent variables are not available for the full period. CEO compensation characteristics, vega and delta, are obtained from Professor Naveen's website and are rescaled to be in millions. Scaled cash flow and accruals data are calculated in accordance with Sloan (1996). Monthly orthogonalized sentiment values introduced by Baker and Wurgler (2007) are used. Advertising (AD), cash flow (CF), and accruals (ACC) are scaled by average total assets; intangible assets (INTAN) and property, plant, and equipment (PPENT) are scaled by end of the year assets; R&D is scaled by sales. Lagged INTAN scaled by assets, lagged delta, and lagged vega are used. A version of Altman's Z, firm age, firm size, the standard deviation of returns, stock turnover, return on assets, the standard deviation of return on assets, beta, and total liabilities scaled by assets are included as control variables. The t-statistics are reported below each coefficient.

	A	B	C	D	E	F
$Vega_{t-1}$		0.000	0.000			0.000
		0.954	0.202			0.608
$Delta_{t-1}$		0.000	0.000			0.000
		2.901	2.804			2.621
AD_t	0.683	−0.319	−0.087	0.681	0.795	−0.096
	5.434	−0.904	−0.247	5.417	6.294	−0.263
AD_t*$Sent_t$					−1.310	0.182
					−8.751	0.272
R&D/S_t	0.008		1.607	0.008	0.009	1.713
	5.056		12.888	5.044	4.992	13.583
R&D/S_t*$Sent_t$					−0.005	−0.851
					−3.512	−6.970
$PPENT_t$	−0.069	−0.487	−0.322	−0.069	−0.056	−0.257
	−2.074	−5.702	−3.713	−2.065	−1.674	−2.896
$PPENT_t$*$Sent_t$					−0.099	−0.363
					−2.586	−2.544
$INTAN_{t-1}$	0.134	−0.526	−0.373	0.132	0.124	−0.276
	2.672	−5.029	−3.537	2.635	2.462	−2.586
$INTAN_{t-1}$*$Sent_t$					0.153	−0.201
					2.069	−1.077
$CFsloan_t$	−1.798	−1.049	−0.272	−1.815	−1.848	−0.360
	−22.660	−4.488	−1.125	−22.845	−23.198	−1.465
$CFsloan_t$*$Sent_t$					0.256	0.315
					4.432	1.199
$ACCsloan_t$	−0.584	−0.678	−0.052	−0.601	−0.620	−0.251
	−5.933	−2.176	−0.164	−6.101	−6.271	−0.767
$ACCsloan_t$*$Sent_t$					0.131	0.729
					1.591	1.825
$BWsent_t$				−0.032	−0.013	0.486
				−4.339	−0.814	6.830

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Table 76 – continued from the previous page						
	A	B	C	D	E	F
AltZ1_t	0.040	0.043	0.037	0.041	0.041	0.035
	32.793	13.082	11.343	32.903	32.965	10.636
Age_t	−0.001	−0.001	−0.001	−0.001	−0.001	−0.001
	−24.804	−10.859	−10.487	−24.749	−24.747	−10.073
Size_t	−0.102	−0.127	−0.134	−0.102	−0.102	−0.139
	−23.034	−8.824	−9.290	−22.944	−23.045	−9.664
StdRet_t	−0.003	−0.003	−0.002	−0.003	−0.003	−0.004
	−15.532	−4.318	−3.492	−15.516	−15.715	−5.992
Turnover_t	0.003	0.001	0.001	0.003	0.003	0.001
	25.636	5.090	3.822	25.813	25.830	4.592
StdROA_t	0.003	0.027	0.022	0.003	0.003	0.022
	7.523	11.795	9.866	7.587	7.679	9.715
Beta_t	0.700	0.882	0.898	0.697	0.698	0.962
	80.975	35.941	36.415	80.497	80.451	38.103
ROA_t	−1.168	−0.025	0.287	−1.162	−1.170	0.209
	−15.051	−0.111	1.287	−14.971	−15.080	0.933
Leverage_t	0.467	0.386	0.550	0.469	0.470	0.483
	12.581	3.787	5.366	12.623	12.645	4.709
N	80,626	13,958	13,951	80,588	80,588	13,951
Pseudo-R^2	0.206	0.234	0.247	0.206	0.207	0.257
Model	Eq. 34	Eq. 35	Eq. 36	Eq. 37	Eq. 38	Eq. 39

Table 77
Determinants of Annual capm5 VERR Decile Assignments Using AAII Sentiment and Sloan Accruals and Cash Flow: R&D/S, and Lagged INTAN, Delta, and Vega

The ordered logistic regressions use the annual capm5 *VERR* decile assignments from 1964–2009 as the dependent variable. Some independent variables are not available for the full period. CEO compensation characteristics, vega and delta, are obtained from Professor Naveen's website and are rescaled to be in millions. Scaled cash flow and accruals data are calculated in accordance with Sloan (1996). Sentiment is calculated as the monthly average of the weekly difference between the bullish and bearish sentiment reported by AAII. Advertising (AD), cash flow (CF), and accruals (ACC) are scaled by average total assets; intangible assets (INTAN) and property, plant, and equipment (PPENT) are scaled by end of the year assets; R&D is scaled by sales. Lagged INTAN scaled by assets, lagged delta, and lagged vega are used. A version of Altman's Z, firm age, firm size, the standard deviation of returns, stock turnover, return on assets, the standard deviation of return on assets, beta, and total liabilities scaled by assets are included as control variables. The *t*-statistics are reported below each coefficient.

	A	B	C	D	E	F
$Vega_{t-1}$		0.000	0.000			−0.000
		0.954	0.202			−0.212
$Delta_{t-1}$		0.000	0.000			0.000
		2.901	2.804			2.821
AD_t	0.683	−0.319	−0.087	0.526	0.692	−0.504
	5.434	−0.904	−0.247	3.459	3.664	−1.103
AD_t*$Sent_t$					−0.014	0.037
					−1.405	1.614
$R\&D/S_t$	0.008		1.607	0.007	0.006	2.696
	5.056		12.888	4.714	4.424	13.725
$R\&D/S_t$*$Sent_t$					0.000	−0.049
					2.110	−8.212
$PPENT_t$	−0.069	−0.487	−0.322	−0.286	−0.110	−0.004
	−2.074	−5.702	−3.713	−7.230	−2.319	−0.034
$PPENT_t$*$Sent_t$					−0.015	−0.020
					−6.515	−3.797
$INTAN_{t-1}$	0.134	−0.526	−0.373	0.100	0.107	−0.300
	2.672	−5.029	−3.537	1.838	1.617	−2.306
$INTAN_{t-1}$*$Sent_t$					−0.000	0.001
					−0.103	0.191
$CFsloan_t$	−1.798	−1.049	−0.272	−2.675	−2.686	−0.094
	−22.660	−4.488	−1.125	−29.858	−28.142	−0.336
$CFsloan_t$*$Sent_t$					0.002	−0.000
					0.558	−0.048
$ACCsloan_t$	−0.584	−0.678	−0.052	−1.692	−1.627	0.351
	−5.933	−2.176	−0.164	−14.820	−12.881	0.902
$ACCsloan_t$*$Sent_t$					−0.005	−0.011
					−1.032	−0.704
$AAIIbullbear_t$				0.002	0.006	0.016
				5.056	6.750	6.096

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Table 77 – continued from the previous page						
	A	B	C	D	E	F
$AltZ1_t$	0.040	0.043	0.037	0.037	0.037	0.035
	32.793	13.082	11.343	28.769	28.552	10.511
Age_t	−0.001	−0.001	−0.001	−0.001	−0.001	−0.001
	−24.804	−10.859	−10.487	−22.600	−22.550	−9.764
$Size_t$	−0.102	−0.127	−0.134	−0.105	−0.105	−0.133
	−23.034	−8.824	−9.290	−19.738	−19.764	−9.236
$StdRet_t$	−0.003	−0.003	−0.002	−0.004	−0.004	−0.001
	−15.532	−4.318	−3.492	−18.597	−18.599	−1.958
$Turnover_t$	0.003	0.001	0.001	0.003	0.003	0.001
	25.636	5.090	3.822	24.284	24.189	4.716
$StdROA_t$	0.003	0.027	0.022	0.001	0.001	0.020
	7.523	11.795	9.866	5.046	5.006	8.741
$Beta_t$	0.700	0.882	0.898	0.713	0.711	0.904
	80.975	35.941	36.415	71.054	70.811	36.524
ROA_t	−1.168	−0.025	0.287	−0.725	−0.721	0.333
	−15.051	−0.111	1.287	−8.768	−8.714	1.497
$Leverage_t$	0.467	0.386	0.550	0.619	0.622	0.523
	12.581	3.787	5.366	14.262	14.315	5.080
N	80,626	13,958	13,951	55,144	55,144	13,951
Pseudo-R^2	0.206	0.234	0.247	0.252	0.253	0.256
Model	Eq. 34	Eq. 35	Eq. 36	Eq. 37	Eq. 38	Eq. 39

Table 78
Determinants of Annual capm5 VERR Decile Assignments Using Investors Intelligence Sentiment and Collins Accruals and Cash Flow: R&D/S, and Lagged INTAN, Delta, and Vega

The ordered logistic regressions use the annual capm5 *VERR* decile assignments from 1964–2009 as the dependent variable. Some independent variables are not available for the full period. CEO compensation characteristics, vega and delta, are obtained from Professor Naveen's website and are rescaled to be in millions. Scaled cash flow and accruals data are calculated in accordance with Collins et al. (2003). Sentiment is calculated as the monthly average of the weekly difference between the bullish and bearish sentiment reported by Investors Intelligence. Advertising (AD), cash flow (CF), and accruals (ACC) are scaled by average total assets; intangible assets (INTAN) and property, plant, and equipment (PPENT) are scaled by end of the year assets; R&D is scaled by sales. Lagged INTAN scaled by assets, lagged delta, and lagged vega are used. A version of Altman's Z, firm age, firm size, the standard deviation of returns, stock turnover, return on assets, the standard deviation of return on assets, beta, and total liabilities scaled by assets are included as control variables. The *t*-statistics are reported below each coefficient.

	A	B	C	D	E	F
$Vega_{t-1}$		0.000	0.000			0.000
		1.561	0.740			0.797
$Delta_{t-1}$		0.000	0.000			0.000
		3.031	2.927			2.880
AD_t	0.343	−0.333	−0.037	0.346	0.675	−0.804
	2.244	−0.975	−0.109	2.258	3.272	−1.552
AD_t*$Sent_t$					−0.022	0.038
					−2.358	1.789
$R\&D/S_t$	0.007		1.635	0.007	0.006	1.920
	4.666		13.116	4.667	4.884	10.259
$R\&D/S_t$*$Sent_t$					0.000	−0.014
					2.893	−1.994
$PPENT_t$	−0.267	−0.446	−0.291	−0.265	−0.035	−0.033
	−6.711	−5.255	−3.369	−6.653	−0.663	−0.256
$PPENT_t$*$Sent_t$					−0.014	−0.013
					−6.466	−2.602
$INTAN_{t-1}$	0.002	−0.582	−0.404	−0.004	0.139	−0.137
	0.028	−5.670	−3.889	−0.077	1.730	−0.833
$INTAN_{t-1}$*$Sent_t$					−0.008	−0.011
					−2.550	−1.777
$CFcollins_t$	−3.620	−1.057	0.088	−3.617	−3.370	0.751
	−36.816	−1.722	0.142	−36.783	−30.458	1.136
$CFcollins_t$*$Sent_t$					−0.013	−0.037
					−4.028	−3.320
$ACCcollins_t$	−1.967	−0.144	0.583	−1.962	−1.656	1.844
	−19.035	−0.231	0.934	−18.991	−13.951	2.830
$ACCcollins_t$*$Sent_t$					−0.018	−0.074
					−4.641	−6.688
$IIbullbear_t$				0.001	0.006	0.005
				1.074	6.207	1.819

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Table 78 – continued from the previous page						
	A	B	C	D	E	F
$AltZ1_t$	0.035	0.040	0.035	0.035	0.035	0.036
	27.654	12.669	11.287	27.650	27.648	11.419
Age_t	−0.001	−0.001	−0.001	−0.001	−0.001	−0.001
	−22.592	−10.858	−10.434	−22.564	−22.464	−10.374
$Size_t$	−0.105	−0.131	−0.139	−0.106	−0.106	−0.136
	−19.657	−9.219	−9.763	−19.675	−19.795	−9.557
$StdRet_t$	−0.004	−0.003	−0.002	−0.004	−0.004	−0.002
	−18.033	−4.337	−3.518	−17.785	−17.315	−2.877
$Turnover_t$	0.003	0.001	0.001	0.003	0.003	0.001
	24.087	4.798	3.542	23.870	23.823	3.490
$StdROA_t$	0.001	0.027	0.023	0.001	0.001	0.023
	4.760	12.004	10.068	4.737	4.692	10.130
$Beta_t$	0.707	0.885	0.899	0.707	0.705	0.899
	70.623	36.306	36.688	70.609	70.381	36.469
ROA_t	−0.022	−0.136	−0.174	−0.021	−0.018	−0.109
	−0.290	−0.230	−0.294	−0.279	−0.232	−0.184
$Leverage_t$	0.425	0.258	0.473	0.428	0.443	0.471
	9.847	2.583	4.674	9.893	10.245	4.646
N	54,246	14,181	14,174	54,246	54,246	14,174
Pseudo-R^2	0.253	0.234	0.248	0.253	0.254	0.250
Model	Eq. 34	Eq. 35	Eq. 36	Eq. 37	Eq. 38	Eq. 39

Table 79
Determinants of Annual capm5 VERR Decile Assignments Using Baker-Wurgler Sentiment and Collins Accruals and Cash Flow: R&D/S, and Lagged INTAN, Delta, and Vega

The ordered logistic regressions use the annual capm5 *VERR* decile assignments from 1964–2009 as the dependent variable. Some independent variables are not available for the full period. CEO compensation characteristics, vega and delta, are obtained from Professor Naveen's website and are rescaled to be in millions. Scaled cash flow and accruals data are calculated in accordance with Collins et al. (2003). Monthly orthogonalized sentiment values introduced by Baker and Wurgler (2007) are used. Advertising (AD), cash flow (CF), and accruals (ACC) are scaled by average total assets; intangible assets (INTAN) and property, plant, and equipment (PPENT) are scaled by end of the year assets; R&D is scaled by sales. Lagged INTAN scaled by assets, lagged delta, and lagged vega are used. A version of Altman's Z, firm age, firm size, the standard deviation of returns, stock turnover, return on assets, the standard deviation of return on assets, beta, and total liabilities scaled by assets are included as control variables. The t-statistics are reported below each coefficient.

	A	B	C	D	E	F
$Vega_{t-1}$		0.000	0.000			0.000
		1.561	0.740			1.085
$Delta_{t-1}$		0.000	0.000			0.000
		3.031	2.927			2.713
AD_t	0.343	−0.333	−0.037	0.342	0.420	−0.043
	2.244	−0.975	−0.109	2.233	2.714	−0.123
AD_t*$Sent_t$					−0.584	0.167
					−2.198	0.252
$R\&D/S_t$	0.007		1.635	0.007	0.007	1.778
	4.666		13.116	4.665	4.512	13.946
$R\&D/S_t$*$Sent_t$					−0.002	−0.905
					−0.518	−8.229
$PPENT_t$	−0.267	−0.446	−0.291	−0.268	−0.264	−0.220
	−6.711	−5.255	−3.369	−6.721	−6.594	−2.501
$PPENT_t$*$Sent_t$					−0.102	−0.411
					−1.472	−2.928
$INTAN_{t-1}$	0.002	−0.582	−0.404	0.002	0.018	−0.308
	0.028	−5.670	−3.889	0.028	0.338	−2.929
$INTAN_{t-1}$*$Sent_t$					−0.295	−0.213
					−3.147	−1.134
$CFcollins_t$	−3.620	−1.057	0.088	−3.621	−3.769	0.477
	−36.816	−1.722	0.142	−36.827	−37.996	0.760
$CFcollins_t$*$Sent_t$					1.068	0.279
					11.637	0.962
$ACCcollins_t$	−1.967	−0.144	0.583	−1.967	−2.110	0.986
	−19.035	−0.231	0.934	−19.042	−20.238	1.563
$ACCcollins_t$*$Sent_t$					0.744	−0.080
					7.901	−0.328
$BWsent_t$				−0.012	0.032	0.487
				−0.884	1.171	7.040

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Table 79 – continued from the previous page						
	A	B	C	D	E	F
$AltZ1_t$	0.035	0.040	0.035	0.035	0.035	0.033
	27.654	12.669	11.287	27.662	27.886	10.403
Age_t	−0.001	−0.001	−0.001	−0.001	−0.001	−0.001
	−22.592	−10.858	−10.434	−22.604	−22.700	−9.983
$Size_t$	−0.105	−0.131	−0.139	−0.105	−0.104	−0.145
	−19.657	−9.219	−9.763	−19.510	−19.416	−10.140
$StdRet_t$	−0.004	−0.003	−0.002	−0.004	−0.004	−0.004
	−18.033	−4.337	−3.518	−17.827	−17.970	−5.803
$Turnover_t$	0.003	0.001	0.001	0.003	0.003	0.001
	24.087	4.798	3.542	24.094	23.858	4.227
$StdROA_t$	0.001	0.027	0.023	0.001	0.001	0.022
	4.760	12.004	10.068	4.758	4.827	9.870
$Beta_t$	0.707	0.885	0.899	0.706	0.712	0.963
	70.623	36.306	36.688	70.456	70.782	38.386
ROA_t	−0.022	−0.136	−0.174	−0.021	−0.030	−0.633
	−0.290	−0.230	−0.294	−0.281	−0.400	−1.067
$Leverage_t$	0.425	0.258	0.473	0.425	0.420	0.408
	9.847	2.583	4.674	9.841	9.710	4.029
N	54,246	14,181	14,174	54,246	54,246	14,174
Pseudo-R^2	0.253	0.234	0.248	0.253	0.255	0.257
Model	Eq. 34	Eq. 35	Eq. 36	Eq. 37	Eq. 38	Eq. 39

Table 80
Determinants of Annual capm5 VERR Decile Assignments Using AAII Sentiment and Collins Accruals and Cash Flow: R&D/S, and Lagged INTAN, Delta, and Vega

The ordered logistic regressions use the annual capm5 *VERR* decile assignments from 1964–2009 as the dependent variable. Some independent variables are not available for the full period. CEO compensation characteristics, vega and delta, are obtained from Professor Naveen's website and are rescaled to be in millions. Scaled cash flow and accruals data are calculated in accordance with Collins et al. (2003). Sentiment is calculated as the monthly average of the weekly difference between the bullish and bearish sentiment reported by AAII. Advertising (AD), cash flow (CF), and accruals (ACC) are scaled by average total assets; intangible assets (INTAN) and property, plant, and equipment (PPENT) are scaled by end of the year assets; R&D is scaled by sales. Lagged INTAN scaled by assets, lagged delta, and lagged vega are used. A version of Altman's Z, firm age, firm size, the standard deviation of returns, stock turnover, return on assets, the standard deviation of return on assets, beta, and total liabilities scaled by assets are included as control variables. The *t*-statistics are reported below each coefficient.

	A	B	C	D	E	F
$Vega_{t-1}$		0.000	0.000			0.000
		1.561	0.740			0.265
$Delta_{t-1}$		0.000	0.000			0.000
		3.031	2.927			2.927
AD_t	0.343	−0.333	−0.037	0.359	0.507	−0.327
	2.244	−0.975	−0.109	2.344	2.667	−0.746
AD_t*$Sent_t$					−0.012	0.028
					−1.233	1.244
$R\&D/S_t$	0.007		1.635	0.007	0.006	2.848
	4.666		13.116	4.682	4.410	14.421
$R\&D/S_t$*$Sent_t$					0.000	−0.054
					2.185	−9.251
$PPENT_t$	−0.267	−0.446	−0.291	−0.265	−0.096	0.064
	−6.711	−5.255	−3.369	−6.647	−2.005	0.567
$PPENT_t$*$Sent_t$					−0.014	−0.023
					−6.247	−4.435
$INTAN_{t-1}$	0.002	−0.582	−0.404	−0.001	−0.006	−0.266
	0.028	−5.670	−3.889	−0.022	−0.086	−2.068
$INTAN_{t-1}$*$Sent_t$					0.001	−0.002
					0.191	−0.318
$CFcollins_t$	−3.620	−1.057	0.088	−3.605	−3.619	0.379
	−36.816	−1.722	0.142	−36.711	−33.833	0.593
$CFcollins_t$*$Sent_t$					0.002	−0.012
					0.640	−1.139
$ACCcollins_t$	−1.967	−0.144	0.583	−1.954	−1.912	1.189
	−19.035	−0.231	0.934	−18.933	−16.936	1.852
$ACCcollins_t$*$Sent_t$					−0.004	−0.040
					−0.893	−3.807
$AAIIbullbear_t$				0.002	0.006	0.017
				5.146	6.448	6.600

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Table 80 – continued from the previous page						
	A	B	C	D	E	F
$AltZ1_t$	0.035	0.040	0.035	0.034	0.034	0.033
	27.654	12.669	11.287	27.424	27.206	10.485
Age_t	−0.001	−0.001	−0.001	−0.001	−0.001	−0.001
	−22.592	−10.858	−10.434	−22.236	−22.181	−9.700
$Size_t$	−0.105	−0.131	−0.139	−0.107	−0.107	−0.138
	−19.657	−9.219	−9.763	−19.961	−19.928	−9.680
$StdRet_t$	−0.004	−0.003	−0.002	−0.004	−0.004	−0.001
	−18.033	−4.337	−3.518	−17.938	−17.872	−1.719
$Turnover_t$	0.003	0.001	0.001	0.003	0.003	0.001
	24.087	4.798	3.542	24.068	23.963	4.275
$StdROA_t$	0.001	0.027	0.023	0.001	0.001	0.020
	4.760	12.004	10.068	4.702	4.658	8.929
$Beta_t$	0.707	0.885	0.899	0.709	0.707	0.903
	70.623	36.306	36.688	70.750	70.508	36.736
ROA_t	−0.022	−0.136	−0.174	−0.020	−0.017	−0.068
	−0.290	−0.230	−0.294	−0.268	−0.224	−0.115
$Leverage_t$	0.425	0.258	0.473	0.425	0.428	0.461
	9.847	2.583	4.674	9.847	9.898	4.535
N	54,246	14,181	14,174	54,242	54,242	14,174
Pseudo-R^2	0.253	0.234	0.248	0.253	0.254	0.257
Model	Eq. 34	Eq. 35	Eq. 36	Eq. 37	Eq. 38	Eq. 39

3.3.3 Full Period eVERR Decile Assignments Used with the Endogeneity Specification

For Tables 81 through 86 capm5 *eVERR* valuation measures are used to assign firm years to valuation deciles across the 1964–2009 period. The first three tables, Tables 81 through 83, use scaled values of the Sloan (1996) measures of cash flow and accruals as part of the robustness specification. The data required to calculate the cash flow and accruals measures following Sloan (1996) is available sporadically for firms prior to mid-1970, and very consistently thereafter. Table 81 employs the Investors Intelligence measure of sentiment, which is available for the full 1964–2009 period. Table 82 employs the sentiment data from Baker and Wurgler (2007), which is available beginning in the middle of 1965. Table 83 employs the AAII measure of sentiment, which is first available in the middle of 1987. The more limited availability of the AAII measure accounts for the smaller number of observations involved in the analyses presented in Table 83.

The second three tables, Tables 84 through 86, use scaled values of the Collins et al. (2003) measures of cash flow and accruals as part of the robustness specification. The data required to calculate the cash flow and accruals measures following Collins et al. (2003) is available sporadically for firms beginning in 1987 and continuing through mid-1988, and consistently thereafter. Table 84 employs the Investors Intelligence measure of sentiment, which is available for the full 1964–2009 period. Table 85 employs the sentiment data from Baker and Wurgler (2007), which is available beginning in the middle of 1965. Table 86 employs the AAII measure of sentiment, which is first available in the middle of 1987. The more limited availability of the Collins et al. (2003) measures of cash flow and accruals accounts for the smaller number of observations involved in the analyses presented in Tables 84 through Tables 86.

Table 81
Determinants of Full Sample capm5 eVERR Decile Assignments Using Investors Intelligence Sentiment and Sloan Accruals and Cash Flow: R&D/S, and Lagged INTAN, Delta, and Vega

The ordered logistic regressions use the full period capm5 *eVERR* decile assignments from 1964–2009 as the dependent variable. Some independent variables are not available for the full period. CEO compensation characteristics, vega and delta, are obtained from Professor Naveen's website and are rescaled to be in millions. Scaled cash flow and accruals data are calculated in accordance with Sloan (1996). Sentiment is calculated as the monthly average of the weekly difference between the bullish and bearish sentiment reported by Investors Intelligence Advertising (AD), cash flow (CF), and accruals (ACC) are scaled by average total assets; intangible assets (INTAN) and property, plant, and equipment (PPENT) are scaled by end of the year assets; R&D is scaled by sales. Lagged INTAN scaled by assets, lagged delta, and lagged vega are used. A version of Altman's Z, firm age, firm size, the standard deviation of returns, stock turnover, return on assets, the standard deviation of return on assets, beta, and total liabilities scaled by assets are included as control variables. The t-statistics are reported below each coefficient.

	A	B	C	D	E	F
$Vega_{t-1}$		0.000	0.000			0.000
		5.858	4.624			3.432
$Delta_{t-1}$		0.000	0.000			0.000
		4.181	4.472			4.624
AD_t	0.277	−0.380	0.102	0.288	0.119	−0.875
	2.190	−1.072	0.285	2.279	0.727	−1.548
AD_t*Sent_t					0.013	0.055
					1.808	2.422
$R\&D/S_t$	0.042		3.601	0.043	0.107	3.339
	7.738		20.616	7.726	7.017	13.754
$R\&D/S_t*Sent_t$					−0.002	0.020
					−5.203	2.178
$PPENT_t$	−1.244	−1.561	−1.216	−1.241	−1.046	−1.054
	−36.618	−18.053	−13.737	−36.531	−23.928	−7.814
$PPENT_t*Sent_t$					−0.012	−0.009
					−6.974	−1.642
$INTAN_{t-1}$	−0.240	−1.643	−1.380	−0.283	−0.763	−1.897
	−4.796	−15.561	−12.946	−5.644	−10.387	−11.253
$INTAN_{t-1}*Sent_t$					0.022	0.018
					8.077	2.955
$CFsloan_t$	−3.688	−1.422	−0.187	−3.645	−3.313	−0.000
	−49.312	−5.925	−0.745	−48.729	−38.681	−0.001
$CFsloan_t*Sent_t$					−0.017	0.014
					−6.499	1.404
$ACCsloan_t$	−2.302	0.285	1.454	−2.237	−2.174	1.366
	−24.926	0.901	4.508	−24.186	−20.078	2.959
$ACCsloan_t*Sent_t$					0.001	0.030
					0.378	1.800
$IIbullbear_t$				0.003	0.008	0.008
				9.779	10.229	2.962

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Table 81 – continued from the previous page						
	A	B	C	D	E	F
$AltZ1_t$	0.091	0.109	0.099	0.091	0.091	0.095
	53.472	25.165	22.815	53.221	53.283	22.160
Age_t	−0.000	−0.001	−0.001	−0.000	−0.000	−0.001
	−8.322	−10.407	−9.889	−8.030	−7.869	−9.405
$Size_t$	−0.088	−0.113	−0.131	−0.089	−0.091	−0.127
	−19.605	−7.816	−9.057	−19.855	−20.256	−8.777
$StdRet_t$	−0.005	−0.016	−0.016	−0.005	−0.004	−0.013
	−26.199	−25.796	−24.477	−24.421	−23.328	−18.850
$Turnover_t$	0.004	−0.001	−0.002	0.004	0.004	−0.002
	36.716	−6.815	−9.854	35.872	35.806	−10.776
$StdROA_t$	0.009	0.045	0.036	0.008	0.008	0.033
	15.827	18.501	14.927	15.551	15.123	13.644
$Beta_t$	0.577	1.085	1.113	0.576	0.574	1.094
	66.798	43.020	43.674	66.698	66.376	42.755
ROA_t	−0.565	0.646	1.208	−0.565	−0.576	0.999
	−9.580	2.914	5.362	−9.597	−9.813	4.417
$Leverage_t$	−0.008	0.406	0.730	−0.002	0.019	0.707
	−0.213	3.876	6.882	−0.060	0.490	6.661
N	80,752	14,066	14,061	80,752	80,752	14,061
Pseudo-R^2	0.281	0.342	0.370	0.282	0.284	0.377
Model	Eq. 34	Eq. 35	Eq. 36	Eq. 37	Eq. 38	Eq. 39

Table 82
Determinants of Full Sample capm5 eVERR Decile Assignments Using Baker-Wurgler Sentiment and Sloan Accruals and Cash Flow: R&D/S, and Lagged INTAN, Delta, and Vega

The ordered logistic regressions use the full period capm5 *eVERR* decile assignments from 1964–2009 as the dependent variable. Some independent variables are not available for the full period. CEO compensation characteristics, vega and delta, are obtained from Professor Naveen's website and are rescaled to be in millions. Scaled cash flow and accruals data are calculated in accordance with Sloan (1996). Monthly orthogonalized sentiment values introduced by Baker and Wurgler (2007) are used. Advertising (AD), cash flow (CF), and accruals (ACC) are scaled by average total assets; intangible assets (INTAN) and property, plant, and equipment (PPENT) are scaled by end of the year assets; R&D is scaled by sales. Lagged INTAN scaled by assets, lagged delta, and lagged vega are used. A version of Altman's Z, firm age, firm size, the standard deviation of returns, stock turnover, return on assets, the standard deviation of return on assets, beta, and total liabilities scaled by assets are included as control variables. The t-statistics are reported below each coefficient.

	A	B	C	D	E	F
$Vega_{t-1}$		0.000	0.000			0.000
		5.858	4.624			5.857
$Delta_{t-1}$		0.000	0.000			0.000
		4.181	4.472			3.874
AD_t	0.277	−0.380	0.102	0.380	0.475	0.205
	2.190	−1.072	0.285	3.004	3.747	0.551
AD_t*$Sent_t$					−1.016	−0.055
					−6.805	−0.082
$R\&D/S_t$	0.042		3.601	0.049	0.047	3.686
	7.738		20.616	8.218	8.093	21.404
$R\&D/S_t$*$Sent_t$					−0.021	2.702
					−3.239	7.951
$PPENT_t$	−1.244	−1.561	−1.216	−1.324	−1.319	−1.190
	−36.618	−18.053	−13.737	−38.844	−38.598	−13.158
$PPENT_t$*$Sent_t$					−0.043	−0.139
					−1.094	−0.926
$INTAN_{t-1}$	−0.240	−1.643	−1.380	−0.226	−0.203	−1.293
	−4.796	−15.561	−12.946	−4.510	−4.040	−11.987
$INTAN_{t-1}$*$Sent_t$					−0.473	0.397
					−6.457	2.085
$CFsloan_t$	−3.688	−1.422	−0.187	−3.467	−3.584	−0.208
	−49.312	−5.925	−0.745	−46.182	−47.667	−0.817
$CFsloan_t$*$Sent_t$					0.981	0.862
					16.055	3.071
$ACCsloan_t$	−2.302	0.285	1.454	−2.018	−2.155	1.440
	−24.926	0.901	4.508	−21.774	−23.176	4.299
$ACCsloan_t$*$Sent_t$					1.070	1.131
					12.662	2.726
$BWsent_t$				0.585	0.543	0.462
				76.448	32.161	5.585

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Table 82 – continued from the previous page						
	A	B	C	D	E	F
$AltZ1_t$	0.091	0.109	0.099	0.088	0.089	0.093
	53.472	25.165	22.815	51.829	52.160	21.381
Age_t	−0.000	−0.001	−0.001	−0.001	−0.001	−0.001
	−8.322	−10.407	−9.889	−9.903	−10.229	−9.390
$Size_t$	−0.088	−0.113	−0.131	−0.094	−0.094	−0.144
	−19.605	−7.816	−9.057	−20.960	−20.936	−9.918
$StdRet_t$	−0.005	−0.016	−0.016	−0.005	−0.005	−0.019
	−26.199	−25.796	−24.477	−27.020	−27.209	−28.227
$Turnover_t$	0.004	−0.001	−0.002	0.004	0.004	−0.002
	36.716	−6.815	−9.854	34.204	33.860	−8.779
$StdROA_t$	0.009	0.045	0.036	0.009	0.009	0.036
	15.827	18.501	14.927	15.899	16.392	15.074
$Beta_t$	0.577	1.085	1.113	0.640	0.642	1.243
	66.798	43.020	43.674	73.265	73.444	47.016
ROA_t	−0.565	0.646	1.208	−0.648	−0.679	1.021
	−9.580	2.914	5.362	−10.946	−11.517	4.483
$Leverage_t$	−0.008	0.406	0.730	−0.084	−0.083	0.612
	−0.213	3.876	6.882	−2.200	−2.173	5.753
N	80,752	14,066	14,061	80,715	80,715	14,061
Pseudo-R^2	0.281	0.342	0.370	0.332	0.335	0.398
Model	Eq. 34	Eq. 35	Eq. 36	Eq. 37	Eq. 38	Eq. 39

Table 83
Determinants of Full Sample capm5 eVERR Decile Assignments Using AAII Sentiment and Sloan Accruals and Cash Flow: R&D/S, and Lagged INTAN, Delta, and Vega

The ordered logistic regressions use the full period capm5 *eVERR* decile assignments from 1964–2009 as the dependent variable. Some independent variables are not available for the full period. CEO compensation characteristics, vega and delta, are obtained from Professor Naveen's website and are rescaled to be in millions. Scaled cash flow and accruals data are calculated in accordance with Sloan (1996). Sentiment is calculated as the monthly average of the weekly difference between the bullish and bearish sentiment reported by AAII. Advertising (AD), cash flow (CF), and accruals (ACC) are scaled by average total assets; intangible assets (INTAN) and property, plant, and equipment (PPENT) are scaled by end of the year assets; R&D is scaled by sales. Lagged INTAN scaled by assets, lagged delta, and lagged vega are used. A version of Altman's Z, firm age, firm size, the standard deviation of returns, stock turnover, return on assets, the standard deviation of return on assets, beta, and total liabilities scaled by assets are included as control variables. The *t*-statistics are reported below each coefficient.

	A	B	C	D	E	F
$Vega_{t-1}$		0.000	0.000			0.000
		5.858	4.624			4.307
$Delta_{t-1}$		0.000	0.000			0.000
		4.181	4.472			4.469
AD_t	0.277	−0.380	0.102	0.353	0.300	−0.773
	2.190	−1.072	0.285	2.311	1.578	−1.667
AD_t*Sent_t					0.005	0.086
					0.528	3.677
$R\&D/S_t$	0.042		3.601	0.041	0.032	3.316
	7.738		20.616	7.571	6.834	14.792
$R\&D/S_t*Sent_t$					0.001	0.026
					3.841	2.456
$PPENT_t$	−1.244	−1.561	−1.216	−1.389	−1.196	−0.956
	−36.618	−18.053	−13.737	−34.690	−24.922	−8.188
$PPENT_t*Sent_t$					−0.017	−0.022
					−7.339	−4.093
$INTAN_{t-1}$	−0.240	−1.643	−1.380	−0.876	−0.977	−1.313
	−4.796	−15.561	−12.946	−16.155	−14.771	−9.991
$INTAN_{t-1}*Sent_t$					0.008	0.000
					2.672	0.024
$CFsloan_t$	−3.688	−1.422	−0.187	−3.443	−3.405	−0.110
	−49.312	−5.925	−0.745	−37.547	−34.901	−0.381
$CFsloan_t*Sent_t$					−0.001	0.012
					−0.378	1.176
$ACCsloan_t$	−2.302	0.285	1.454	−1.791	−1.714	2.251
	−24.926	0.901	4.508	−15.612	−13.477	5.658
$ACCsloan_t*Sent_t$					−0.005	−0.029
					−0.980	−1.926
$AAIIbullbear_t$				0.011	0.015	0.019
				23.223	15.066	6.640

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Table 83 – continued from the previous page						
	A	B	C	D	E	F
$AltZ1_t$	0.091	0.109	0.099	0.074	0.074	0.092
	53.472	25.165	22.815	42.373	42.210	21.234
Age_t	−0.000	−0.001	−0.001	−0.001	−0.001	−0.001
	−8.322	−10.407	−9.889	−12.870	−12.747	−8.891
$Size_t$	−0.088	−0.113	−0.131	−0.142	−0.142	−0.126
	−19.605	−7.816	−9.057	−26.596	−26.600	−8.691
$StdRet_t$	−0.005	−0.016	−0.016	−0.007	−0.007	−0.014
	−26.199	−25.796	−24.477	−31.729	−31.568	−21.692
$Turnover_t$	0.004	−0.001	−0.002	0.002	0.002	−0.002
	36.716	−6.815	−9.854	17.159	17.209	−7.453
$StdROA_t$	0.009	0.045	0.036	0.002	0.002	0.032
	15.827	18.501	14.927	5.277	5.184	13.365
$Beta_t$	0.577	1.085	1.113	0.779	0.776	1.115
	66.798	43.020	43.674	76.162	75.840	43.546
ROA_t	−0.565	0.646	1.208	−0.426	−0.425	1.200
	−9.580	2.914	5.362	−5.278	−5.250	5.307
$Leverage_t$	−0.008	0.406	0.730	0.223	0.224	0.568
	−0.213	3.876	6.882	4.999	5.031	5.339
N	80,752	14,066	14,061	55,398	55,398	14,061
Pseudo-R^2	0.281	0.342	0.370	0.329	0.330	0.387
Model	Eq. 34	Eq. 35	Eq. 36	Eq. 37	Eq. 38	Eq. 39

Table 84
Determinants of Full Sample capm5 eVERR Decile Assignments Using Investors Intelligence Sentiment and Collins Accruals and Cash Flow: R&D/S, and Lagged INTAN, Delta, and Vega

The ordered logistic regressions use the full period capm5 *eVERR* decile assignments from 1964–2009 as the dependent variable. Some independent variables are not available for the full period. CEO compensation characteristics, vega and delta, are obtained from Professor Naveen's website and are rescaled to be in millions. Scaled cash flow and accruals data are calculated in accordance with Collins et al. (2003). Sentiment is calculated as the monthly average of the weekly difference between the bullish and bearish sentiment reported by Investors Intelligence. Advertising (AD), cash flow (CF), and accruals (ACC) are scaled by average total assets; intangible assets (INTAN) and property, plant, and equipment (PPENT) are scaled by end of the year assets; R&D is scaled by sales. Lagged INTAN scaled by assets, lagged delta, and lagged vega are used. A version of Altman's Z, firm age, firm size, the standard deviation of returns, stock turnover, return on assets, the standard deviation of return on assets, beta, and total liabilities scaled by assets are included as control variables. The *t*-statistics are reported below each coefficient.

	A	B	C	D	E	F
$Vega_{t-1}$		0.000	0.000			0.000
		6.843	5.615			4.536
$Delta_{t-1}$		0.000	0.000			0.000
		4.619	4.948			5.041
AD_t	0.028	−0.629	−0.034	0.067	0.331	−0.903
	0.180	−1.825	−0.098	0.436	1.594	−1.698
AD_t*$Sent_t$					−0.017	0.053
					−1.752	2.469
$R\&D/S_t$	0.041		3.570	0.041	0.110	3.523
	7.308		20.511	7.284	7.528	13.877
$R\&D/S_t$*$Sent_t$					−0.003	0.007
					−6.574	0.707
$PPENT_t$	−1.321	−1.451	−1.111	−1.292	−1.027	−0.841
	−32.680	−16.876	−12.596	−31.954	−19.257	−6.313
$PPENT_t$*$Sent_t$					−0.017	−0.014
					−7.622	−2.779
$INTAN_{t-1}$	−0.900	−1.634	−1.326	−1.026	−1.275	−1.650
	−16.716	−15.764	−12.629	−18.970	−15.826	−9.861
$INTAN_{t-1}$*$Sent_t$					0.011	0.011
					3.628	1.808
$CFcollins_t$	−4.209	−2.845	−1.129	−4.168	−3.913	−1.009
	−40.343	−4.621	−1.810	−40.265	−33.147	−1.516
$CFcollins_t$*$Sent_t$					−0.012	−0.002
					−3.621	−0.187
$ACCcollins_t$	−1.420	−0.151	1.204	−1.359	−1.104	1.431
	−13.455	−0.243	1.921	−12.986	−9.133	2.185
$ACCcollins_t$*$Sent_t$					−0.015	−0.016
					−3.865	−1.396
$IIbullbear_t$				0.010	0.014	0.011
				20.368	14.941	4.200

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Table 84 – continued from the previous page						
	A	B	C	D	E	F
$AltZ1_t$	0.070	0.109	0.104	0.069	0.070	0.103
	41.212	26.361	24.939	41.130	41.159	24.744
Age_t	−0.001	−0.001	−0.001	−0.001	−0.001	−0.001
	−14.453	−10.814	−10.247	−14.148	−13.971	−9.787
$Size_t$	−0.133	−0.120	−0.139	−0.144	−0.144	−0.134
	−24.786	−8.334	−9.682	−26.687	−26.673	−9.300
$StdRet_t$	−0.007	−0.017	−0.016	−0.006	−0.006	−0.013
	−32.095	−26.728	−25.309	−29.972	−28.946	−19.558
$Turnover_t$	0.002	−0.001	−0.002	0.002	0.002	−0.002
	17.412	−6.508	−9.492	15.334	15.573	−10.323
$StdROA_t$	0.002	0.046	0.037	0.002	0.002	0.034
	5.661	18.894	15.421	5.071	4.950	14.218
$Beta_t$	0.758	1.090	1.112	0.759	0.756	1.089
	74.377	43.446	43.909	74.463	74.157	42.872
ROA_t	−0.139	1.259	1.218	−0.113	−0.105	1.275
	−1.798	2.133	2.058	−1.471	−1.368	2.152
$Leverage_t$	−0.043	0.277	0.693	0.001	0.029	0.704
	−0.971	2.706	6.648	0.025	0.651	6.740
N	54,486	14,282	14,277	54,486	54,486	14,277
Pseudo-R^2	0.324	0.346	0.372	0.329	0.331	0.379
Model	Eq. 34	Eq. 35	Eq. 36	Eq. 37	Eq. 38	Eq. 39

Table 85
Determinants of Full Sample capm5 eVERR Decile Assignments Using Baker-Wurgler Sentiment and Collins Accruals and Cash Flow: R&D/S, and Lagged INTAN, Delta, and Vega

The ordered logistic regressions use the full period capm5 *eVERR* decile assignments from 1964–2009 as the dependent variable. Some independent variables are not available for the full period. CEO compensation characteristics, vega and delta, are obtained from Professor Naveen's website and are rescaled to be in millions. Scaled cash flow and accruals data are calculated in accordance with Collins et al. (2003). Monthly orthogonalized sentiment values introduced by Baker and Wurgler (2007) are used. Advertising (AD), cash flow (CF), and accruals (ACC) are scaled by average total assets; intangible assets (INTAN) and property, plant, and equipment (PPENT) are scaled by end of the year assets; R&D is scaled by sales. Lagged INTAN scaled by assets, lagged delta, and lagged vega are used. A version of Altman's Z, firm age, firm size, the standard deviation of returns, stock turnover, return on assets, the standard deviation of return on assets, beta, and total liabilities scaled by assets are included as control variables. The *t*-statistics are reported below each coefficient.

	A	B	C	D	E	F
$Vega_{t-1}$		0.000	0.000			0.000
		6.843	5.615			6.752
$Delta_{t-1}$		0.000	0.000			0.000
		4.619	4.948			4.228
AD_t	0.028	−0.629	−0.034	0.063	0.168	0.053
	0.180	−1.825	−0.098	0.407	1.078	0.148
AD_t*$Sent_t$					−0.969	0.072
					−3.658	0.108
$R\&D/S_t$	0.041		3.570	0.042	0.039	3.661
	7.308		20.511	7.452	7.080	21.229
$R\&D/S_t$*$Sent_t$					0.003	2.370
					0.248	7.057
$PPENT_t$	−1.321	−1.451	−1.111	−1.321	−1.318	−1.090
	−32.680	−16.876	−12.596	−32.663	−32.440	−12.130
$PPENT_t$*$Sent_t$					−0.140	−0.271
					−2.021	−1.820
$INTAN_{t-1}$	−0.900	−1.634	−1.326	−0.908	−0.904	−1.239
	−16.716	−15.764	−12.629	−16.862	−16.669	−11.664
$INTAN_{t-1}$*$Sent_t$					−0.154	0.351
					−1.670	1.823
$CFcollins_t$	−4.209	−2.845	−1.129	−4.184	−4.350	−0.454
	−40.343	−4.621	−1.810	−40.080	−41.280	−0.719
$CFcollins_t$*$Sent_t$					1.216	1.082
					12.538	3.548
$ACCcollins_t$	−1.420	−0.151	1.204	−1.405	−1.553	1.949
	−13.455	−0.243	1.921	−13.294	−14.560	3.068
$ACCcollins_t$*$Sent_t$					0.673	−0.158
					7.245	−0.637
$BWsent_t$				0.219	0.247	0.470
				15.744	8.916	5.912

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Table 85 – continued from the previous page						
	A	B	C	D	E	F
$AltZ1_t$	0.070	0.109	0.104	0.069	0.070	0.097
	41.212	26.361	24.939	40.770	41.084	23.332
Age_t	−0.001	−0.001	−0.001	−0.001	−0.001	−0.001
	−14.453	−10.814	−10.247	−14.299	−14.394	−9.760
$Size_t$	−0.133	−0.120	−0.139	−0.141	−0.140	−0.151
	−24.786	−8.334	−9.682	−26.017	−25.872	−10.434
$StdRet_t$	−0.007	−0.017	−0.016	−0.007	−0.007	−0.019
	−32.095	−26.728	−25.309	−33.807	−33.949	−28.759
$Turnover_t$	0.002	−0.001	−0.002	0.002	0.002	−0.002
	17.412	−6.508	−9.492	17.301	17.096	−8.462
$StdROA_t$	0.002	0.046	0.037	0.002	0.002	0.038
	5.661	18.894	15.421	5.690	5.864	15.723
$Beta_t$	0.758	1.090	1.112	0.772	0.778	1.240
	74.377	43.446	43.909	75.382	75.757	47.219
ROA_t	−0.139	1.259	1.218	−0.152	−0.167	0.372
	−1.798	2.133	2.058	−1.957	−2.149	0.625
$Leverage_t$	−0.043	0.277	0.693	−0.037	−0.043	0.577
	−0.971	2.706	6.648	−0.829	−0.962	5.519
N	54,486	14,282	14,277	54,486	54,486	14,277
Pseudo-R^2	0.324	0.346	0.372	0.327	0.329	0.400
Model	Eq. 34	Eq. 35	Eq. 36	Eq. 37	Eq. 38	Eq. 39

Table 86
Determinants of Full Sample capm5 eVERR Decile Assignments Using AAII Sentiment and Collins Accruals and Cash Flow: R&D/S, and Lagged INTAN, Delta, and Vega

The ordered logistic regressions use the full period capm5 *eVERR* decile assignments from 1964–2009 as the dependent variable. Some independent variables are not available for the full period. CEO compensation characteristics, vega and delta, are obtained from Professor Naveen's website and are rescaled to be in millions. Scaled cash flow and accruals data are calculated in accordance with Collins et al. (2003). Sentiment is calculated as the monthly average of the weekly difference between the bullish and bearish sentiment reported by AAII. Advertising (AD), cash flow (CF), and accruals (ACC) are scaled by average total assets; intangible assets (INTAN) and property, plant, and equipment (PPENT) are scaled by end of the year assets; R&D is scaled by sales. Lagged INTAN scaled by assets, lagged delta, and lagged vega are used. A version of Altman's Z, firm age, firm size, the standard deviation of returns, stock turnover, return on assets, the standard deviation of return on assets, beta, and total liabilities scaled by assets are included as control variables. The *t*-statistics are reported below each coefficient.

	A	B	C	D	E	F
$Vega_{t-1}$		0.000	0.000			0.000
		6.843	5.615			5.263
$Delta_{t-1}$		0.000	0.000			0.000
		4.619	4.948			4.827
AD_t	0.028	−0.629	−0.034	0.114	0.013	−0.793
	0.180	−1.825	−0.098	0.738	0.070	−1.779
AD_t*Sent_t					0.009	0.081
					0.920	3.533
$R\&D/S_t$	0.041		3.570	0.041	0.032	3.544
	7.308		20.511	7.409	6.065	15.661
$R\&D/S_t*Sent_t$					0.001	0.008
					3.412	0.790
$PPENT_t$	−1.321	−1.451	−1.111	−1.324	−1.138	−0.829
	−32.680	−16.876	−12.596	−32.754	−23.513	−7.180
$PPENT_t*Sent_t$					−0.016	−0.026
					−7.054	−4.807
$INTAN_{t-1}$	−0.900	−1.634	−1.326	−0.931	−1.011	−1.166
	−16.716	−15.764	−12.629	−17.276	−15.340	−8.966
$INTAN_{t-1}*Sent_t$					0.007	−0.005
					2.224	−0.863
$CFcollins_t$	−4.209	−2.845	−1.129	−4.161	−4.134	−0.997
	−40.343	−4.621	−1.810	−40.241	−37.010	−1.553
$CFcollins_t*Sent_t$					0.000	0.002
					0.020	0.156
$ACCcollins_t$	−1.420	−0.151	1.204	−1.378	−1.161	1.915
	−13.455	−0.243	1.921	−13.178	−10.223	2.963
$ACCcollins_t*Sent_t$					−0.018	−0.056
					−4.597	−5.062
$AAIIbullbear_t$				0.011	0.014	0.021
				23.858	14.225	7.409

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Table 86 – continued from the previous page						
	A	B	C	D	E	F
$AltZ1_t$	0.070	0.109	0.104	0.068	0.067	0.098
	41.212	26.361	24.939	40.353	40.162	23.407
Age_t	−0.001	−0.001	−0.001	−0.001	−0.001	−0.001
	−14.453	−10.814	−10.247	−13.156	−13.034	−9.232
$Size_t$	−0.133	−0.120	−0.139	−0.144	−0.143	−0.134
	−24.786	−8.334	−9.682	−26.601	−26.520	−9.274
$StdRet_t$	−0.007	−0.017	−0.016	−0.007	−0.007	−0.014
	−32.095	−26.728	−25.309	−32.035	−31.699	−22.041
$Turnover_t$	0.002	−0.001	−0.002	0.002	0.002	−0.002
	17.412	−6.508	−9.492	17.497	17.509	−7.255
$StdROA_t$	0.002	0.046	0.037	0.002	0.002	0.033
	5.661	18.894	15.421	5.124	5.072	13.822
$Beta_t$	0.758	1.090	1.112	0.773	0.769	1.113
	74.377	43.446	43.909	75.505	75.163	43.738
ROA_t	−0.139	1.259	1.218	−0.119	−0.111	1.303
	−1.798	2.133	2.058	−1.551	−1.453	2.197
$Leverage_t$	−0.043	0.277	0.693	−0.050	−0.047	0.565
	−0.971	2.706	6.648	−1.128	−1.070	5.395
N	54,486	14,282	14,277	54,482	54,482	14,277
Pseudo-R^2	0.324	0.346	0.372	0.331	0.332	0.390
Model	Eq. 34	Eq. 35	Eq. 36	Eq. 37	Eq. 38	Eq. 39

3.3.4 Annual eVERR Decile Assignments Used with the Endogeneity Specification

For Tables 87 through 92 capm5 *eVERR* valuation measures are used to assign firm years to valuation deciles for each calendar year during the 1964–2009 period. The first three tables, Tables 87 through 89, use scaled values of the Sloan (1996) measures of cash flow and accruals as part of the robustness specification. The data required to calculate the cash flow and accruals measures following Sloan (1996) is available sporadically for firms prior to mid-1970, and very consistently thereafter. Table 87 employs the Investors Intelligence measure of sentiment, which is available for the full 1964–2009 period. Table 88 employs the sentiment data from Baker and Wurgler (2007), which is available beginning in the middle of 1965. Table 89 employs the AAII measure of sentiment, which is first available in the middle of 1987. The more limited availability of the AAII measure accounts for the smaller number of observations involved in the analyses presented in Table 89.

The second three tables, Tables 90 through 92, use scaled values of the Collins et al. (2003) measures of cash flow and accruals as part of the robustness specification. The data required to calculate the cash flow and accruals measures following Collins et al. (2003) is available sporadically for firms beginning in 1987 and continuing through mid-1988, and consistently thereafter. Table 90 employs the Investors Intelligence measure of sentiment, which is available for the full 1964–2009 period. Table 91 employs the sentiment data from Baker and Wurgler (2007), which is available beginning in the middle of 1965. Table 92 employs the AAII measure of sentiment, which is first available in the middle of 1987. The more limited availability of the Collins et al. (2003) measures of cash flow and accruals accounts for the smaller number of observations involved in the analyses presented in Tables 90 through Tables 92.

Table 87
Determinants of Annual capm5 eVERR Decile Assignments Using Investors Intelligence Sentiment and Sloan Accruals and Cash Flow: R&D/S, and Lagged INTAN, Delta, and Vega

The ordered logistic regressions used the annual capm5 *eVERR* decile assignments from 1964–2009 as the dependent variable. Some independent variables are not available for the full period. CEO compensation characteristics, vega and delta, are obtained from Professor Naveen's website and are rescaled to be in millions. Scaled cash flow and accruals data were calculated in accordance with Sloan (1996). Sentiment was calculated as the monthly average of the weekly difference between the bullish and bearish sentiment reported by Investors Intelligence. Advertising (AD), cash flow (CF), and accruals (ACC) are scaled by average total assets; intangible assets (INTAN) and property, plant, and equipment (PPENT) are scaled by end of the year assets; R&D is scaled by sales. Lagged INTAN scaled by assets, lagged delta, and lagged vega are used. A version of Altman's Z, firm age, firm size, the standard deviation of returns, stock turnover, return on assets, the standard deviation of return on assets, beta, and total liabilities scaled by assets were included as control variables. The *t*-statistics are reported below each coefficient.

	A	B	C	D	E	F
$Vega_{t-1}$		0.000	0.000			0.000
		5.703	4.294			4.697
$Delta_{t-1}$		0.000	0.000			0.000
		2.917	2.948			2.913
AD_t	0.851	−0.180	0.281	0.848	0.681	−0.367
	6.752	−0.511	0.793	6.726	4.148	−0.659
AD_t*$Sent_t$					0.011	0.034
					1.651	1.512
$R\&D/S_t$	0.026		3.458	0.026	0.038	3.627
	7.158		21.330	7.152	5.855	14.334
$R\&D/S_t$*$Sent_t$					−0.001	−0.010
					−2.423	−1.063
$PPENT_t$	−1.467	−2.010	−1.680	−1.469	−1.271	−1.495
	−43.384	−23.207	−18.985	−43.422	−29.172	−11.065
$PPENT_t$*$Sent_t$					−0.012	−0.010
					−7.064	−1.926
$INTAN_{t-1}$	−0.789	−1.406	−1.129	−0.779	−0.553	−0.952
	−15.832	−13.430	−10.675	−15.589	−7.542	−5.725
$INTAN_{t-1}$*$Sent_t$					−0.012	−0.006
					−4.415	−1.030
$CFsloan_t$	−2.154	−0.547	0.698	−2.167	−1.986	0.603
	−26.984	−2.341	2.850	−27.086	−22.274	1.885
$CFsloan_t$*$Sent_t$					−0.011	−0.003
					−4.518	−0.329
$ACCsloan_t$	−0.518	0.302	1.423	−0.537	−0.213	1.915
	−5.261	0.970	4.476	−5.437	−1.875	4.176
$ACCsloan_t$*$Sent_t$					−0.020	−0.034
					−5.415	−2.042
$IIbullbear_t$				−0.001	0.004	−0.002
				−2.454	6.040	−0.689

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Table 87 – continued from the previous page						
	A	B	C	D	E	F
$AltZ1_t$	0.051	0.070	0.060	0.051	0.051	0.062
	37.051	18.941	16.265	37.086	37.092	16.515
Age_t	−0.001	−0.001	−0.001	−0.001	−0.001	−0.001
	−11.315	−6.683	−6.101	−11.392	−11.271	−6.318
$Size_t$	−0.111	−0.080	−0.097	−0.111	−0.112	−0.098
	−24.990	−5.607	−6.707	−24.933	−25.156	−6.782
$StdRet_t$	−0.003	−0.004	−0.003	−0.004	−0.004	−0.004
	−18.755	−6.638	−5.171	−18.935	−18.800	−6.547
$Turnover_t$	0.002	0.000	−0.000	0.002	0.002	−0.000
	18.976	1.515	−1.280	19.099	19.076	−0.880
$StdROA_t$	0.003	0.032	0.024	0.003	0.003	0.025
	7.400	14.234	10.791	7.457	7.307	11.140
$Beta_t$	0.721	0.942	0.970	0.722	0.720	0.982
	82.974	38.247	38.984	83.010	82.742	39.205
ROA_t	−0.955	0.281	0.875	−0.953	−0.937	0.938
	−12.442	1.285	3.934	−12.405	−12.207	4.199
$Leverage_t$	−0.389	−0.415	−0.092	−0.391	−0.383	−0.082
	−10.375	−4.053	−0.891	−10.421	−10.204	−0.789
N	80,752	14,066	14,061	80,752	80,752	14,061
Pseudo-R^2	0.263	0.318	0.349	0.263	0.264	0.350
Model	Eq. 34	Eq. 35	Eq. 36	Eq. 37	Eq. 38	Eq. 39

Table 88
Determinants of Annual capm5 eVERR Decile Assignments Using Baker-Wurgler Sentiment and Sloan Accruals and Cash Flow: R&D/S, and Lagged INTAN, Delta, and Vega

The ordered logistic regressions used the annual capm5 *eVERR* decile assignments from 1964–2009 as the dependent variable. Some independent variables are not available for the full period. CEO compensation characteristics, vega and delta, are obtained from Professor Naveen's website and are rescaled to be in millions. Scaled cash flow and accruals data were calculated in accordance with Sloan (1996). Monthly orthogonalized sentiment values introduced by Baker and Wurgler (2007) were used. Advertising (AD), cash flow (CF), and accruals (ACC) are scaled by average total assets; intangible assets (INTAN) and property, plant, and equipment (PPENT) are scaled by end of the year assets; R&D is scaled by sales. Lagged INTAN scaled by assets, lagged delta, and lagged vega are used. A version of Altman's Z, firm age, firm size, the standard deviation of returns, stock turnover, return on assets, the standard deviation of return on assets, beta, and total liabilities scaled by assets were included as control variables. The *t*-statistics are reported below each coefficient.

	A	B	C	D	E	F
$Vega_{t-1}$		0.000	0.000			0.000
		5.703	4.294			4.955
$Delta_{t-1}$		0.000	0.000			0.000
		2.917	2.948			2.752
AD_t	0.851	−0.180	0.281	0.851	0.975	0.159
	6.752	−0.511	0.793	6.751	7.686	0.430
AD_t*$Sent_t$					−1.434	0.920
					−9.513	1.371
R&D/S_t	0.026		3.458	0.026	0.030	3.421
	7.158		21.330	7.110	7.526	21.500
R&D/S_t*$Sent_t$					−0.015	1.539
					−3.517	5.016
$PPENT_t$	−1.467	−2.010	−1.680	−1.466	−1.455	−1.710
	−43.384	−23.207	−18.985	−43.338	−42.921	−18.917
$PPENT_t$*$Sent_t$					−0.052	0.263
					−1.342	1.761
$INTAN_{t-1}$	−0.789	−1.406	−1.129	−0.790	−0.813	−1.087
	−15.832	−13.430	−10.675	−15.847	−16.256	−10.166
$INTAN_{t-1}$*$Sent_t$					0.374	0.439
					5.146	2.328
$CFsloan_t$	−2.154	−0.547	0.698	−2.182	−2.220	0.639
	−26.984	−2.341	2.850	−27.291	−27.676	2.568
$CFsloan_t$*$Sent_t$					0.309	0.588
					5.326	2.137
$ACCsloan_t$	−0.518	0.302	1.423	−0.546	−0.568	1.294
	−5.261	0.970	4.476	−5.539	−5.738	3.926
$ACCsloan_t$*$Sent_t$					0.179	0.951
					2.164	2.329
$BWsent_t$				−0.042	−0.054	0.121
				−5.793	−3.293	1.480

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Table 88 – continued from the previous page						
	A	B	C	D	E	F
$AltZ1_t$	0.051	0.070	0.060	0.052	0.052	0.057
	37.051	18.941	16.265	37.213	37.322	15.160
Age_t	−0.001	−0.001	−0.001	−0.001	−0.001	−0.001
	−11.315	−6.683	−6.101	−11.220	−11.155	−5.637
$Size_t$	−0.111	−0.080	−0.097	−0.110	−0.112	−0.103
	−24.990	−5.607	−6.707	−24.885	−25.116	−7.116
$StdRet_t$	−0.003	−0.004	−0.003	−0.003	−0.004	−0.005
	−18.755	−6.638	−5.171	−18.698	−19.025	−7.656
$Turnover_t$	0.002	0.000	−0.000	0.002	0.002	−0.000
	18.976	1.515	−1.280	19.253	19.329	−0.484
$StdROA_t$	0.003	0.032	0.024	0.003	0.003	0.024
	7.400	14.234	10.791	7.458	7.596	10.672
$Beta_t$	0.721	0.942	0.970	0.718	0.721	1.038
	82.974	38.247	38.984	82.412	82.569	40.655
ROA_t	−0.955	0.281	0.875	−0.945	−0.958	0.775
	−12.442	1.285	3.934	−12.318	−12.482	3.465
$Leverage_t$	−0.389	−0.415	−0.092	−0.387	−0.386	−0.171
	−10.375	−4.053	−0.891	−10.314	−10.285	−1.647
N	80,752	14,066	14,061	80,715	80,715	14,061
Pseudo-R^2	0.263	0.318	0.349	0.263	0.265	0.359
Model	Eq. 34	Eq. 35	Eq. 36	Eq. 37	Eq. 38	Eq. 39

Table 89
Determinants of Annual capm5 eVERR Decile Assignments Using AAII Sentiment and Sloan Accruals and Cash Flow: R&D/S, and Lagged INTAN, Delta, and Vega

The ordered logistic regressions used the annual capm5 *eVERR* decile assignments from 1964–2009 as the dependent variable. Some independent variables are not available for the full period. CEO compensation characteristics, vega and delta, are obtained from Professor Naveen's website and are rescaled to be in millions. Scaled cash flow and accruals data were calculated in accordance with Sloan (1996). Sentiment was calculated as the monthly average of the weekly difference between the bullish and bearish sentiment reported by AAII. Advertising (AD), cash flow (CF), and accruals (ACC) are scaled by average total assets; intangible assets (INTAN) and property, plant, and equipment (PPENT) are scaled by end of the year assets; R&D is scaled by sales. Lagged INTAN scaled by assets, lagged delta, and lagged vega are used. A version of Altman's Z, firm age, firm size, the standard deviation of returns, stock turnover, return on assets, the standard deviation of return on assets, beta, and total liabilities scaled by assets were included as control variables. The *t*-statistics are reported below each coefficient.

	A	B	C	D	E	F
$Vega_{t-1}$		0.000	0.000			0.000
		5.703	4.294			4.005
$Delta_{t-1}$		0.000	0.000			0.000
		2.917	2.948			2.960
AD_t	0.851	−0.180	0.281	0.553	0.615	−0.507
	6.752	−0.511	0.793	3.634	3.245	−1.104
AD_t*Sent_t					−0.005	0.067
					−0.528	2.884
$R\&D/S_t$	0.026		3.458	0.021	0.018	3.910
	7.158		21.330	6.274	6.911	17.502
$R\&D/S_t*Sent_t$					0.001	−0.025
					4.955	−2.771
$PPENT_t$	−1.467	−2.010	−1.680	−1.558	−1.473	−1.510
	−43.384	−23.207	−18.985	−38.954	−30.705	−12.945
$PPENT_t*Sent_t$					−0.007	−0.012
					−3.147	−2.328
$INTAN_{t-1}$	−0.789	−1.406	−1.129	−0.773	−0.834	−1.136
	−15.832	−13.430	−10.675	−14.341	−12.657	−8.704
$INTAN_{t-1}*Sent_t$					0.005	0.005
					1.724	0.793
$CFsloan_t$	−2.154	−0.547	0.698	−3.071	−3.009	0.988
	−26.984	−2.341	2.850	−33.871	−31.199	3.489
$CFsloan_t*Sent_t$					−0.004	−0.014
					−1.219	−1.391
$ACCsloan_t$	−0.518	0.302	1.423	−1.663	−1.509	2.366
	−5.261	0.970	4.476	−14.524	−11.905	6.026
$ACCsloan_t*Sent_t$					−0.012	−0.053
					−2.474	−3.543
$AAIIbullbear_t$				0.002	0.003	0.011
				4.217	3.388	3.936

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Table 89 – continued from the previous page						
	A	B	C	D	E	F
$AltZ1_t$	0.051	0.070	0.060	0.050	0.050	0.058
	37.051	18.941	16.265	34.087	33.896	15.640
Age_t	−0.001	−0.001	−0.001	−0.001	−0.001	−0.001
	−11.315	−6.683	−6.101	−9.476	−9.363	−5.611
$Size_t$	−0.111	−0.080	−0.097	−0.116	−0.117	−0.094
	−24.990	−5.607	−6.707	−21.930	−21.984	−6.504
$StdRet_t$	−0.003	−0.004	−0.003	−0.004	−0.004	−0.002
	−18.755	−6.638	−5.171	−19.820	−19.695	−3.684
$Turnover_t$	0.002	0.000	−0.000	0.002	0.002	−0.000
	18.976	1.515	−1.280	20.363	20.372	−0.273
$StdROA_t$	0.003	0.032	0.024	0.002	0.002	0.023
	7.400	14.234	10.791	5.131	5.088	10.062
$Beta_t$	0.721	0.942	0.970	0.740	0.738	0.970
	82.974	38.247	38.984	73.293	73.078	38.903
ROA_t	−0.955	0.281	0.875	−0.575	−0.566	0.878
	−12.442	1.285	3.934	−6.995	−6.876	3.945
$Leverage_t$	−0.389	−0.415	−0.092	−0.203	−0.200	−0.142
	−10.375	−4.053	−0.891	−4.632	−4.566	−1.366
N	80,752	14,066	14,061	55,398	55,398	14,061
Pseudo-R^2	0.263	0.318	0.349	0.316	0.316	0.354
Model	Eq. 34	Eq. 35	Eq. 36	Eq. 37	Eq. 38	Eq. 39

Table 90
Determinants of Annual capm5 eVERR Decile Assignments Using Investors Intelligence Sentiment and Collins Accruals and Cash Flow: R&D/S, and Lagged INTAN, Delta, and Vega

The ordered logistic regressions used the annual capm5 *eVERR* decile assignments from 1964–2009 as the dependent variable. Some independent variables are not available for the full period. CEO compensation characteristics, vega and delta, are obtained from Professor Naveen's website and are rescaled to be in millions. Scaled cash flow and accruals data were calculated in accordance with Collins et al. (2003). Sentiment was calculated as the monthly average of the weekly difference between the bullish and bearish sentiment reported by Investors Intelligence. Advertising (AD), cash flow (CF), and accruals (ACC) are scaled by average total assets; intangible assets (INTAN) and property, plant, and equipment (PPENT) are scaled by end of the year assets; R&D is scaled by sales. Lagged INTAN scaled by assets, lagged delta, and lagged vega are used. A version of Altman's Z, firm age, firm size, the standard deviation of returns, stock turnover, return on assets, the standard deviation of return on assets, beta, and total liabilities scaled by assets were included as control variables. The *t*-statistics are reported below each coefficient.

	A	B	C	D	E	F
$Vega_{t-1}$		0.000	0.000			0.000
		6.517	5.080			5.520
$Delta_{t-1}$		0.000	0.000			0.000
		3.080	3.107			3.044
AD_t	0.342	−0.198	0.373	0.337	0.633	−0.212
	2.230	−0.580	1.086	2.202	3.053	−0.405
AD_t*Sent_t					−0.020	0.032
					−2.165	1.494
$R\&D/S_t$	0.022		3.391	0.022	0.033	3.870
	6.195		21.094	6.200	5.323	14.818
$R\&D/S_t*Sent_t$					−0.001	−0.025
					−2.509	−2.528
$PPENT_t$	−1.507	−1.957	−1.643	−1.511	−1.308	−1.360
	−37.344	−22.736	−18.667	−37.403	−24.568	−10.211
$PPENT_t*Sent_t$					−0.013	−0.015
					−5.655	−2.964
$INTAN_{t-1}$	−0.835	−1.380	−1.067	−0.824	−0.574	−0.722
	−15.593	−13.407	−10.233	−15.317	−7.160	−4.370
$INTAN_{t-1}*Sent_t$					−0.013	−0.013
					−4.327	−2.213
$CFcollins_t$	−3.856	−1.278	0.543	−3.862	−3.574	0.698
	−38.267	−2.090	0.875	−38.280	−31.345	1.058
$CFcollins_t*Sent_t$					−0.016	−0.014
					−4.866	−1.246
$ACCcollins_t$	−1.527	0.030	1.357	−1.534	−1.198	2.443
	−14.725	0.049	2.177	−14.774	−10.016	3.754
$ACCcollins_t*Sent_t$					−0.020	−0.065
					−5.184	−5.896
$IIbullbear_t$				−0.001	0.005	−0.001
				−2.088	4.878	−0.283

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Table 90 – continued from the previous page						
	A	B	C	D	E	F
$AltZ1_t$	0.046	0.070	0.064	0.046	0.046	0.065
	32.582	19.714	17.892	32.604	32.601	18.152
Age_t	−0.001	−0.001	−0.001	−0.001	−0.001	−0.001
	−10.012	−7.065	−6.453	−10.061	−9.947	−6.622
$Size_t$	−0.114	−0.084	−0.101	−0.114	−0.115	−0.101
	−21.380	−5.934	−7.091	−21.129	−21.300	−7.023
$StdRet_t$	−0.004	−0.004	−0.003	−0.004	−0.004	−0.004
	−19.159	−7.094	−5.614	−19.275	−19.012	−6.725
$Turnover_t$	0.002	0.000	−0.000	0.002	0.002	−0.000
	20.250	1.500	−1.206	20.343	20.357	−0.891
$StdROA_t$	0.002	0.033	0.025	0.002	0.002	0.027
	5.118	14.505	11.191	5.162	5.103	11.679
$Beta_t$	0.735	0.943	0.964	0.735	0.733	0.980
	72.933	38.520	39.061	72.960	72.755	39.417
ROA_t	−0.107	0.596	0.516	−0.109	−0.105	0.526
	−1.401	1.014	0.875	−1.430	−1.371	0.891
$Leverage_t$	−0.440	−0.484	−0.083	−0.444	−0.433	−0.085
	−10.118	−4.809	−0.808	−10.207	−9.944	−0.825
N	54,486	14,282	14,277	54,486	54,486	14,277
Pseudo-R^2	0.317	0.319	0.349	0.317	0.318	0.352
Model	Eq. 34	Eq. 35	Eq. 36	Eq. 37	Eq. 38	Eq. 39

Table 91
Determinants of Annual capm5 eVERR Decile Assignments Using Baker-Wurgler Sentiment and Collins Accruals and Cash Flow: R&D/S, and Lagged INTAN, Delta, and Vega

The ordered logistic regressions used the annual capm5 *eVERR* decile assignments from 1964–2009 as the dependent variable. Some independent variables are not available for the full period. CEO compensation characteristics, vega and delta, are obtained from Professor Naveen's website and are rescaled to be in millions. Scaled cash flow and accruals data were calculated in accordance with Collins et al. (2003). Monthly orthogonalized sentiment values introduced by Baker and Wurgler (2007) were used. Advertising (AD), cash flow (CF), and accruals (ACC) are scaled by average total assets; intangible assets (INTAN) and property, plant, and equipment (PPENT) are scaled by end of the year assets; R&D is scaled by sales. Lagged INTAN scaled by assets, lagged delta, and lagged vega are used. A version of Altman's Z, firm age, firm size, the standard deviation of returns, stock turnover, return on assets, the standard deviation of return on assets, beta, and total liabilities scaled by assets were included as control variables. The *t*-statistics are reported below each coefficient.

	A	B	C	D	E	F
$Vega_{t-1}$		0.000	0.000			0.000
		6.517	5.080			5.671
$Delta_{t-1}$		0.000	0.000			0.000
		3.080	3.107			2.893
AD_t	0.342	−0.198	0.373	0.343	0.435	0.277
	2.230	−0.580	1.086	2.240	2.804	0.780
AD_t*$Sent_t$					−0.685	0.871
					−2.600	1.312
$R\&D/S_t$	0.022		3.391	0.022	0.023	3.382
	6.195		21.094	6.197	6.294	21.267
$R\&D/S_t$*$Sent_t$					−0.007	1.258
					−1.759	4.170
$PPENT_t$	−1.507	−1.957	−1.643	−1.507	−1.517	−1.669
	−37.344	−22.736	−18.667	−37.337	−37.395	−18.597
$PPENT_t$*$Sent_t$					0.095	0.173
					1.386	1.173
$INTAN_{t-1}$	−0.835	−1.380	−1.067	−0.836	−0.842	−1.024
	−15.593	−13.407	−10.233	−15.595	−15.608	−9.717
$INTAN_{t-1}$*$Sent_t$					−0.006	0.400
					−0.065	2.099
$CFcollins_t$	−3.856	−1.278	0.543	−3.855	−4.035	0.929
	−38.267	−2.090	0.875	−38.247	−39.579	1.483
$CFcollins_t$*$Sent_t$					1.135	0.493
					12.375	1.651
$ACCcollins_t$	−1.527	0.030	1.357	−1.527	−1.706	1.755
	−14.725	0.049	2.177	−14.720	−16.256	2.782
$ACCcollins_t$*$Sent_t$					0.846	−0.048
					9.408	−0.195
$BWsent_t$				0.009	−0.027	0.159
				0.641	−0.999	2.027

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Table 91 – continued from the previous page						
	A	B	C	D	E	F
$AltZ1_t$	0.046	0.070	0.064	0.046	0.047	0.060
	32.582	19.714	17.892	32.531	33.002	16.678
Age_t	−0.001	−0.001	−0.001	−0.001	−0.001	−0.001
	−10.012	−7.065	−6.453	−9.999	−10.034	−5.971
$Size_t$	−0.114	−0.084	−0.101	−0.115	−0.114	−0.107
	−21.380	−5.934	−7.091	−21.351	−21.208	−7.464
$StdRet_t$	−0.004	−0.004	−0.003	−0.004	−0.004	−0.005
	−19.159	−7.094	−5.614	−19.137	−19.272	−7.872
$Turnover_t$	0.002	0.000	−0.000	0.002	0.002	−0.000
	20.250	1.500	−1.206	20.246	20.048	−0.469
$StdROA_t$	0.002	0.033	0.025	0.002	0.002	0.025
	5.118	14.505	11.191	5.120	5.250	11.124
$Beta_t$	0.735	0.943	0.964	0.735	0.744	1.033
	72.933	38.520	39.061	72.849	73.432	40.770
ROA_t	−0.107	0.596	0.516	−0.107	−0.124	0.053
	−1.401	1.014	0.875	−1.407	−1.619	0.089
$Leverage_t$	−0.440	−0.484	−0.083	−0.440	−0.445	−0.160
	−10.118	−4.809	−0.808	−10.114	−10.232	−1.557
N	54,486	14,282	14,277	54,486	54,486	14,277
Pseudo-R^2	0.317	0.319	0.349	0.317	0.320	0.359
Model	Eq. 34	Eq. 35	Eq. 36	Eq. 37	Eq. 38	Eq. 39

Table 92
Determinants of Annual capm5 eVERR Decile Assignments Using AAII Sentiment and Collins Accruals and Cash Flow: R&D/S, and Lagged INTAN, Delta, and Vega

The ordered logistic regressions used the annual capm5 *eVERR* decile assignments from 1964–2009 as the dependent variable. Some independent variables are not available for the full period. CEO compensation characteristics, vega and delta, are obtained from Professor Naveen's website and are rescaled to be in millions. Scaled cash flow and accruals data were calculated in accordance with Collins et al. (2003). Sentiment was calculated as the monthly average of the weekly difference between the bullish and bearish sentiment reported by AAII. Advertising (AD), cash flow (CF), and accruals (ACC) are scaled by average total assets; intangible assets (INTAN) and property, plant, and equipment (PPENT) are scaled by end of the year assets; R&D is scaled by sales. Lagged INTAN scaled by assets, lagged delta, and lagged vega are used. A version of Altman's Z, firm age, firm size, the standard deviation of returns, stock turnover, return on assets, the standard deviation of return on assets, beta, and total liabilities scaled by assets were included as control variables. The *t*-statistics are reported below each coefficient.

	A	B	C	D	E	F
$Vega_{t-1}$		0.000	0.000			0.000
		6.517	5.080			4.752
$Delta_{t-1}$		0.000	0.000			0.000
		3.080	3.107			3.091
AD_t	0.342	−0.198	0.373	0.356	0.386	−0.233
	2.230	−0.580	1.086	2.320	2.025	−0.528
AD_t*Sent_t					−0.002	0.057
					−0.233	2.521
$R\&D/S_t$	0.022		3.391	0.022	0.018	3.991
	6.195		21.094	6.217	6.874	17.894
$R\&D/S_t*Sent_t$					0.001	−0.034
					5.128	−3.751
$PPENT_t$	−1.507	−1.957	−1.643	−1.505	−1.431	−1.443
	−37.344	−22.736	−18.667	−37.304	−29.583	−12.533
$PPENT_t*Sent_t$					−0.006	−0.015
					−2.783	−2.896
$INTAN_{t-1}$	−0.835	−1.380	−1.067	−0.838	−0.900	−0.988
	−15.593	−13.407	−10.233	−15.635	−13.691	−7.653
$INTAN_{t-1}*Sent_t$					0.006	−0.000
					1.790	−0.057
$CFcollins_t$	−3.856	−1.278	0.543	−3.845	−3.781	0.858
	−38.267	−2.090	0.875	−38.209	−34.650	1.345
$CFcollins_t*Sent_t$					−0.003	−0.016
					−0.798	−1.466
$ACCcollins_t$	−1.527	0.030	1.357	−1.518	−1.348	2.261
	−14.725	0.049	2.177	−14.658	−11.941	3.529
$ACCcollins_t*Sent_t$					−0.014	−0.063
					−3.442	−5.887
$AAIIbullbear_t$				0.002	0.002	0.011
				4.065	2.468	4.014

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Table 92 – continued from the previous page						
	A	B	C	D	E	F
$AltZ1_t$	0.046	0.070	0.064	0.046	0.046	0.062
	32.582	19.714	17.892	32.376	32.195	17.239
Age_t	−0.001	−0.001	−0.001	−0.001	−0.001	−0.001
	−10.012	−7.065	−6.453	−9.737	−9.613	−5.954
$Size_t$	−0.114	−0.084	−0.101	−0.116	−0.116	−0.098
	−21.380	−5.934	−7.091	−21.604	−21.594	−6.857
$StdRet_t$	−0.004	−0.004	−0.003	−0.004	−0.004	−0.002
	−19.159	−7.094	−5.614	−19.069	−18.804	−3.762
$Turnover_t$	0.002	0.000	−0.000	0.002	0.002	−0.000
	20.250	1.500	−1.206	20.269	20.252	−0.382
$StdROA_t$	0.002	0.033	0.025	0.001	0.001	0.024
	5.118	14.505	11.191	5.052	5.018	10.453
$Beta_t$	0.735	0.943	0.964	0.737	0.735	0.966
	72.933	38.520	39.061	73.004	72.799	38.985
ROA_t	−0.107	0.596	0.516	−0.105	−0.100	0.547
	−1.401	1.014	0.875	−1.372	−1.310	0.925
$Leverage_t$	−0.440	−0.484	−0.083	−0.443	−0.439	−0.117
	−10.118	−4.809	−0.808	−10.180	−10.082	−1.141
N	54,486	14,282	14,277	54,482	54,482	14,277
Pseudo-R^2	0.317	0.319	0.349	0.318	0.318	0.354
Model	Eq. 34	Eq. 35	Eq. 36	Eq. 37	Eq. 38	Eq. 39

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