

AN EMPIRICAL TEST OF THE EFFECT OF ASSET
AGGREGATION ON VALUATION
ACCURACY

By

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CHAPTER I

INTRODUCTION

Over the past two decades the world has experienced a significant increase in the general price level. In the United States, the Urban-Consumer Price Index increased from 87.9 in January of 1960 to 204.7 in January of 1979 (Statement of Financial Accounting Standards No. 33, p. 126). This economic phenomenon has precipitated an ongoing debate concerning possible inadequacies of financial reports and taxation laws based on historical costs.

Certain proposed solutions have centered around various methods of asset revaluation. Statement of Financial Accounting Standards No. 33 has mandated that firms meeting certain size criteria must disclose general price level adjusted and current cost financial information beginning in 1980. With respect to current cost disclosures, at least two implementation questions are suggested.

1. What valuation estimation scheme (direct appraisal, market quotation, price indices) should be used?
2. What level of asset aggregation should be used?

Two American Accounting Association committees (1964 and 1966) have proposed that direct methods of valuation estimation (appraisal, market quotation) are theoretically

preferred; but adjustment by price indices has been recommended as a surrogate. The report of the United Kingdom Inflation Accounting Committee (Sandilands, 1975, p. 240) recommended that index numbers be used as the principal method of revaluing plant, machinery, stocks, and work in progress. A study by Arnold and Huefner (1977) tested the correlation between actual inventory material replacement cost prices and prices estimated from price indices. They concluded that, due to a relatively high correlation (approximately .5) between the estimates and actual prices, the use of indices to estimate replacement costs of inventory materials could be justified.

Electric utilities in the United States have used price indices for many years in revaluing their rate base for regulatory rate-making purposes. A survey by Arthur Andersen & Co. (1977, p. 13), regarding compliance with Accounting Series Release No. 190, has shown that in 1976, 36% of surveyed companies relied primarily on indexing to calculate replacement cost for productive capacity. A similar study by Arthur Young & Co. (1977, p. 10) disclosed that 31% of surveyed companies made extensive use of indexing in calculating replacement cost disclosures mandated by ASR No. 190. Based on the experience of ASR No. 190, it seems that indexing will be a likely method of compliance with Statement of Financial Accounting Standards No. 33.

The second implementation question to be addressed

concerns the level of asset aggregation. How detailed must asset revaluations be to achieve a suitable level of accuracy? Restated, the question is, given that price indices will probably be used for many asset revaluations, how many price indices should be used? On a pragmatic level, this question has been debated often between certain supporters of general price level restatements (one index) and supporters of specific price level restatements (many indices).

Multi-index proponents assert, "[general price indices] may be too broad to be meaningful for approximating the current cost of specific assets of a particular company" (Arthur Andersen & Co., 1979, p. 21). Revsine and Weygandt (1974) have argued that

Uniform reliance on general price indices as an inflation adjustment mechanism can lead to adjustments that do not conform to the specific purchasing power change experienced by individual firms [and thus] using general price level indexes to adjust individual firm's financial statements may give rise to misleading inferences (p. 76).

Alternatively, proponents of single index asset restatements suggest using many indices may not significantly improve revaluation accuracy. Boersema (1974, p. 29) has suggested that when changes in specific prices are highly correlated with changes in the general price level, "[one may consider] the publication of general price level adjusted costs as surrogates for current values."² Boersema's position is based in part on the results of a

study by Dockweiler wherein replacement cost balance sheet data were found to be very similar to general price level adjusted balance sheet data (cited in B cersema, 1974, p. 29).

Pragmatically, multi-index proponents concede that

[When] general price levels tend to move in tandem with an entity's own unique purchasing power, general price level adjustments would be useful, not because general price level adjustments are relevant per se, but rather because the general price level adjustments would tend to give the same results as do the theoretically correct specific adjustments (Revsine and Weygandt, 1974, p. 77).

Part of this debate centers on concern as to whether restatement accuracy is significantly improved by disaggregation. If accuracy can be improved by disaggregation, the research concern is that of selecting a suitable set of disaggregated indices. However, there is limited evidence in the accounting literature that no one particular set of disaggregated indices can obtain a minimum valuation error for all individual companies (Sunder, 1978).

Objectives of the Study

Sunder (1978) has shown by counter example that increasing the number of price indices used does not necessarily improve valuation accuracy. That is, in certain cases a revaluation of "p" assets performed using "m" indices may be more accurate than a similar revaluation performed using "n" indices ($m < n < p$). A critical question to

be addressed is, "how likely is such a result?"

An analogy may be useful in emphasizing the importance of the previous question. Consider, for example, the physical act of tossing a coin. Generally, we think that there are two possible outcomes; either heads or tails. Actually there is a third possible result. The coin may land on its edge. Pragmatically though, because this third outcome is highly unlikely, we tend to ignore it as a possible result. Likewise, the primary concern herein is to determine the likelihood that an "n" index system would be more accurate than a "m" index system.

More specifically, the primary objective of this study is to offer some empirical evidence as to whether or not "n" index valuation is consistently more accurate than "m" ($m < n$) index valuation. A second objective is to assess the extent to which "n" index valuation is significantly more accurate than "m" index valuation. Both objectives are addressed at the industry and firm level.

Contributions

The study makes at least three contributions to the literature. First, the study indicates the extent to which accuracy is improved by increasing the number of indices used in revaluations. Secondly, the results provide an indication as to whether or not conclusions can be generalized across firms within an industry and/or across industries within an economy. Finally, the study provides

some empirical evidence as to how often the use of more indices results in a materially more accurate result.

Organization of Study

Chapter II presents a review of prior works that have addressed research questions related to those stated in the study objectives.

Chapter III details the study methodology and discusses its related limitations. Also, hypotheses are presented and their significance discussed.

In Chapter IV the study results are presented and analyzed and the implications of the results are discussed.

Chapter V presents a summary of the study and its conclusions. Additionally, suggestions for further research are presented.

NOTES

¹A different categorization of cost estimation methods may be found in Brinkman (1977). He discusses four methods; direct pricing, unit pricing, functional pricing, and indexing.

²Hohl (1977, p. 47) has noted that a strong correlation between two price indices does not imply that one index is a good substitute for the other. The necessary and sufficient conditions for perfect substitutability of two price indices is that their natural logarithms must be perfectly correlated and that the regression slope parameter, derived from a regression of one index's natural logarithms on the other index's natural logarithms, must be equal to one.

CHAPTER II

LITERATURE REVIEW

This chapter reviews the works of four authors whose previous studies addressed research questions similar to those stated in Chapter I. This review begins with a brief discussion of Tritschler (1969), Peasnell and Skerratt (1977), and Honl (1977). The review concludes with a more exhaustive review of Sunder (1978). Sunder's study is reviewed in greater detail because the methodology of the current study (discussed in Chapter III) was based mostly on Sunder's work.

Tritschler (1969) was the first known researcher to address empirically the problem of asset aggregation and the use of price indices. Tritschler used the price movements for machinery and equipment from the Wholesale Price Index (WPI) to study two research questions.

1. How can price indices be constructed so as to minimize sampling error?
2. How can asset revaluation error be minimized?

The study noted that sampling error could be controlled by increasing sample size. A second conclusion was that asset revaluation error could be controlled by a judicious grouping of assets so as to reduce price change dispersion

within asset groupings. Based on his results, Tritschler questioned whether disaggregation of asset groupings appreciably improves revaluation accuracy. This result was due in part, to significant price dispersion within WPI asset sub-groups.

In 1975, the report of the United Kingdom Inflation Accounting Committee was published. Recommendations of that report included a call for current cost accounting and an advocacy that indexing with nineteen price indices be used as the principal method of revaluing plant, machinery, stocks, and work in progress. The nineteen indices were for various industry areas. They are listed below.

Road transport	Bricks
Mining, quarrying	Construction
Agriculture	Electricity
Food, drink, tobacco	Post office
Oil, chemicals	Petroleum
Metal manufacture	Retailing
Engineering	Other wholesaling
Vehicles	Insurance
Textiles	Other services
Paper	

The stated purpose of another study (Pleasnell and Skerratt, 1977) was to present empirical evidence concerning the commonality among the set of nineteen official government price indices of capital expenditure on plant and machinery. That is, they attempted to answer the question, "what information is provided by the nineteen detailed indices as compared with a single index constructed to include all nineteen industries?" The technique used to answer the research question was principal components analysis.

If the first principal component accounted for a high proportion of the variation in the nineteen indices, the implication would be that the movement of the nineteen price indices could be well approximated by a single price index. If the first principal component accounted for a low proportion of the variation in the nineteen indices, the implication would be that several price indices were needed to achieve a certain level of valuation accuracy.

Based on twenty-seven years of price change data for the nineteen industry specific price indices, Peasnell and Skerratt found that the first principal component accounted for 98.3% of the overall price variation in the group of nineteen indices. (This high percentage of price variation accounted for by a single component was due to price movements common to all nineteen indices - general inflation.) Peasnell and Skerratt interpreted this to mean that the entire nineteen separate price indices were not needed to achieve valuations that were within unspecified accounting materiality limits. Instead, they concluded that a much smaller number of price indices could achieve any reasonable level of accuracy desired for accounting revaluations.

A simulation study by Hchl (1977) attempted to determine whether general price level adjustments approximate current replacement costs in financial statements. Using a sample of sixty-two price indices from the Bureau of Labor Statistics Wholesale Price Series

covering a ten year period, Hohl attempted to measure the extent to which a general price index surrogates individual price indices, homogenous groups of price indices, and heterogenous groups of price indices. The groups of price indices were of varying sizes from one to ten; and within each group all individual price indices were given equal weight.

Hohl concluded that individual price indices were, on average, not well surrogated by a general price index. A second conclusion was that, in groups of four or more, both heterogenous as well as homogenous groups were well surrogated by a general price index. Further, as group size increased, the general price index surrogation of the group movement improved.

Until 1978, no researcher had developed an analytical structure capable of comparing asset revaluation error resulting from the use of various numbers of price indices. That year however, Sunder (1978) reported the results of his development of such an analytical structure.

Sunder began by assigning the following structure to asset revaluations:

Let V_0 = beginning of period valuation of total assets, and

V_1 = end of period valuation of total assets.

Then $V_1 = V_0 (1 + R^*)$

where R^* = actual percentage change in valuation of total assets from the beginning to the end of

the period (assuming the quantity of total assets remains unchanged).

Having developed a structure for revaluation, two alternative measures of revaluation error were introduced and defined as follows:²

Bias = Expected value $(R - R^*)$, and

MSE = Expected value $(R - R^*) (R - R^*)$,

where R = estimated percentage of change in valuation of total assets computed by a particular configuration of price indices.³

Sunder next formulated an expression to compute R for each possible configuration of price indices. For example, assume we have " n " assets in an economy of " m " firms and associated with these assets are the following vectors.

\bar{w} = $\begin{bmatrix} w_1 \\ \vdots \\ w_n \end{bmatrix}$ a vector of value weights of asset " i " for specific firm " j ", where " i " = 1, 2, ..., n , and " j " = 1, 2, ..., m ,

\bar{w}_j = $\begin{bmatrix} w_1 \\ \vdots \\ w_n \end{bmatrix}$ a vector of value weights of asset " i " in the economy where " i " = 1, 2, ..., n , and

\bar{r} = $\begin{bmatrix} r_1 \\ \vdots \\ r_n \end{bmatrix}$ a vector of percentage value change of asset " i ", where " i " = 1, 2, ..., n .

Now if these vectors are partitioned into subvectors to correspond to a particular set of price indices (a configuration):

$$\underline{w}_j = \begin{bmatrix} w_{j1} \\ w_{j2} \\ \vdots \\ w_{ju} \end{bmatrix} \quad \underline{w} = \begin{bmatrix} w_1 \\ w_2 \\ \vdots \\ w_u \end{bmatrix} \quad \underline{r} = \begin{bmatrix} r_1 \\ r_2 \\ \vdots \\ r_u \end{bmatrix}$$

so that \underline{w}_u = subvector of asset value weights for a specific firm and for assets grouped in price index "u", where "u" = 1, 2, ..., k ,

\underline{w}_u = subvector of asset value weights in the economy, and for assets grouped in price index "u", where "u" = 1, 2, ..., k , and

\underline{r}_u = subvector of percentage value changes for assets grouped in price index "u", where "u" = 1, 2, ..., k .

$$\text{Then } R = \sum_{u=1}^k \frac{\underline{w}_u' \underline{e}}{\underline{w}_u' \underline{e}} \underline{w}_u' \underline{r}_u$$

where k = the number of price indices used, and

\underline{e} = a vector of unit elements.

If we assume a particular set of mean (annual) price changes, denoted \underline{U} , and a related variance/covariance matrix, denoted Σ :

$$\underline{U} = \begin{bmatrix} u_1 \\ u_2 \\ \vdots \\ u_n \end{bmatrix} \quad \Sigma = \begin{bmatrix} \sigma_1^2 & \text{cov}_{12} & \cdots & \text{cov}_{1n} \\ \text{cov}_{21} & \sigma_2^2 & \cdots & \text{cov}_{2n} \\ \vdots & \vdots & \ddots & \vdots \\ \text{cov}_{n1} & \cdots & \cdots & \sigma_n^2 \end{bmatrix}$$

Then for a particular configuration of a "k" index system ("k" may vary from 1 to "n"), Bias and MSE for a specific firm can be computed as:⁴

$$\text{Bias} = (\underline{w}^k - \underline{\omega})' \underline{U}, \text{ and}$$

$$\text{MSE} = (\underline{w}^k - \underline{\omega})' \Sigma (\underline{w}^k - \underline{\omega}) + (\underline{w}^k - \underline{\omega})' \underline{U} \underline{U}' (\underline{w}^k - \underline{\omega}),$$

$$\text{where } \underline{w}^k = \begin{bmatrix} \frac{w_1^k e}{\omega_1^k} & \omega_1 \\ \vdots & \vdots \\ \frac{w_k^k e}{\omega_k^k} & \omega_k \end{bmatrix}.$$

The vector \underline{w}^k contains "k" subvectors and has an overall dimension of $n \times 1$. Similar formulas were developed for economy wide measures of Bias and MSE.

Using these formulas, Sunder proved by counter example the following:

1. For a specific firm, Bias and MSE do not necessarily decrease with increasing the number of price indices or their fineness.⁵
2. On an economy wide average, all index configurations have a Bias of zero, and average MSE does not necessarily decrease with increasing the number of price indices; but it does decrease with increasing index fineness.⁶

Summary

The evidence reviewed indicates that few price indices may be necessary to achieve reasonably accurate revaluations. Surprisingly, Sunder's study indicates that in some cases, a fewer number of price indices may actually result in a more accurate revaluation.⁷

To address the study objectives stated in Chapter I, price data were gathered and using Sunder's formulas, probabilities were developed that indicate the extent to which increasing the number of price indices used improves revaluation accuracy. Chapter III describes more fully the collection of data and the methodology used to generate the probabilities.

NOTES

¹Price indices are usually constructed from a sample of price movements for various assets contained in a specific price index category.

²Sunder (1978) proposed the two alternative measures of error because under certain conditions one or the other may be used to predict individual preferences. For example, it can be shown that if a person has a linear loss function (risk neutral) then his preference for a particular error distribution from a set of "n" error distributions can be predicted by simply comparing the mean of each such distribution and selecting the distribution with the minimum mean error. Alternatively, if a person has a quadratic loss function (risk averse) then his preference for a particular error distribution can be predicted by comparing the means and variances of the various distributions. Distributions with lower means and variances would be preferred. Because the MSE error measure is the sum of the variance plus the square of the distribution mean, distributions with lower MSE would tend to be preferred.

³As used in this paper the phrase "configuration" refers to the following structure. Assume there are three assets to be valued. For these three assets we may use one index, two indices, or three indices. The possible groupings of assets into indices are as follows.

Number of indices	Configuration
1	abc
2	ab c
2	ac b
2	a bc
3	a b c

Where letters grouped together signify those assets are grouped together in the same price index. Thus, with three assets, there are five different index configurations possible.

⁴Conceptually, if a particular configuration of price indices was used by a specific firm over a period of several years, then for each year of use there would be some measure of error ($R - R^*$). Taken collectively, these yearly error

measures form a distribution. Bias as defined by Sunder represents the mean value of such an error distribution. MSE as defined by Sunder represents the sum of the distribution's variance and the square of the distribution's mean (Bias). Thus, for each firm, there would be a distribution of error measures for each possible index configuration and each such distribution would have two alternative summary measures of error, Bias and MSE.

⁵Fineness relates to comparisons of information sets. One set is said to be as fine as another if it contains at least as much information. As applied to price index sets, consider the following groupings of four assets into two and three index groups.

Group	Number of indices	Configuration
1	2	a bcd
2	3	a b cd
3	3	ab c d

Group 2 is finer than group 1 because asset "b" is separated from the group "bcd". However, we can make no observations about fineness between group 2 and group 3, or group 1 and group 3, because these groups are not comparable in terms of fineness.

⁶These results were obtained by Sunder based on the following three assumptions.

1. The economy consists of N firms of equal size.
2. The relative weights used for construction of price indices are the relative weights of the goods in the entire economy.
3. The asset portfolio of each firm can be considered as a multinomial random vector drawn from the asset pool of the economy using "p" trials.

⁷This can occur when errors associated with each of the various price indices offset each other.

CHAPTER III

METHODOLOGY

To obtain the data needed for use in the study analysis, a three step procedure was used. First, price data and asset data concerning certain industries and firms were gathered. Second, this data along with Sunder's formulas for Bias and MSE were used to calculate intermediate data. Finally, the intermediate data was used to calculate probabilities, for each firm, that using more indices results in more accurate revaluations. These probabilities were then statistically analyzed. A detailed description of the data collection, generation, and analysis procedures follows.

Collection of Primary Data

Four industries were selected for use in the study.

They were:

1. electric utilities,
2. gas pipeline utilities,
3. telephone utilities, and
4. water utilities.

Public utility industries were selected because their plant asset accounts were quite homogenous among firms.

This homogeneity of accounts was present because Federal regulatory agencies have specified a required chart of accounts to be used by each industry. Further, the Federal regulations have specified in great detail the exact type of assets that were to be classified in each general ledger account.

Once the industries were chosen, twenty-five firms from each industry were randomly selected from various sources (a total of 100 firms). Electric firms were selected from a United States Department of Energy publication (1979). Gas pipeline firms were selected from a second United States Department of Energy publication (1978). Telephone and water firms were selected from Moody's Public Utility Manual. For convenience, each firm selected was assigned a unique identification number.

After selection, information concerning the asset composition of each firm was gathered. Details of historical cost asset balances for electric and gas firms were available from the U.S. Government publications previously cited. A mail questionnaire was used to gather the necessary asset information for telephone and water firms. Tables I, II, III, and IV detail the firms selected, their identification numbers, and their total cost of Utility Plant in Service (net of land and intangibles). Plant totals were prepared net of land and intangibles because in any valuation process these assets would probably be revalued through appraisal or market quotation.

TABLE I
ELECTRIC FIRMS

Firm Name	Firm Number	Plant in Millions
Alabama Power Company	EF1	2,944
Arizona Public Service Company	EF3	1,088
Baltimore Gas and Electric Company	EF13	2,011
California Pacific Utilities Company	EF17	65
Central Illinois Light Company	EF7	642
Central Illinois Public Service Company	EF8	937
Central Maine Power Company	EF11	461
Citizens Utilities Company	EF4	77
Commonwealth Edison Company	EF9	6,094
Duquesne Light Company	EF20	1,723
Idaho Power Company	EF6	817
Illinois Power Company	EF10	1,205
Lake Superior District Power Company	EF21	70
Madison Gas and Electric	EF22	190
Maine Public Service Company	EF12	36
Northern States Power Company	EF23	219
Pacific Power and Light Company	EF18	1,812
Portland General Electric Company	EF19	1,049
Public Service Company of New Hampshire	EF15	472
Public Service Company of Oklahoma	EF16	702
Sierra Pacific Power Company	EF14	284
Southern California Edison Company	EF25	4,737
Southern Electric Generating Company	EF2	157
Superior Water Light and Power Company	EF24	14
Tucson Gas and Electric Company	EF5	595

TABLE II

GAS FIRMS

Firm Name	Firm Number	Plant in Millions
Alabama Tennessee Natural Gas Company	GF1	12
Algonquin Gas Transmission Company	GF2	154
Arkansas Louisiana Gas Company	GF3	733
Arkansas Oklahoma Gas Corporation	GF4	28
Columbia Gas Transmission Corporation	GF5	1,306
Columbia Gulf Transmission Company	GF6	815
Consolidated Gas Supply Corporation	GF7	821
Consolidated System LNG Company	GF8	249
East Tennessee Natural Gas Company	GF9	66
Lawrenceburg Gas Transmission Corporation	GF10	.2
Louisiana-Nevada Transit Company	GF11	1
McCulloch Interstate Gas Corporation	GF12	9
Michigan Gas Storage Company	GF13	49
Michigan Wisconsin Pipe Line Company	GF14	1,581
Mid Louisiana Gas Company	GF15	34
Midwestern Gas Transmission Company	GF24	137
Mississippi River Transmission Corporation	GF25	245
Southern Natural Gas Company	GF16	816
Southwest Gas Corporation	GF17	163
Stingray Pipeline Company	GF18	233
Tenneco Inc.	GF19	2,237
Transwestern Pipeline Company	GF20	428
Trunkline Gas Company	GF21	657
United Gas Pipe Line Company	GF22	671
Washington Gas Light Company	GF23	484

TABLE III
TELEPHONE FIRMS

Firm Name	Firm Number	Plant in Millions
Allied Telephone Company	TF1	177
Carolina Telephone and Telegraph Company	TF13	779
Central Telephone Company of Florida	TF23	223
Central Telephone Company of Illinois	TF24	187
Central Telephone Company of Missouri	TF21	39
Central Telephone Company of Virginia	TF22	221
Chesapeake and Potomac Telephone	TF3	6,416
Cincinnati Bell Inc.	TF7	776
Florida Telephone Corporation	TF16	333
Illinois Bell Telephone Company	TF14	5,478
Indiana Bell Telephone Company	TF2	1,862
Michigan Bell Telephone Company	TF9	4,467
Mid-Penn Telephone Company	TF10	135
Midstate Telephone Corporation	TF12	89
Mid-Texas Telephone Company	TF25	55
Northwestern Bell Telephone Company	TF6	4,517
Orange City Telephone Company	TF17	7
Pacific Northwest Bell	TF4	3,167
Pacific Telephone and Telegraph Company	TF5	13,621
Quincy Telephone Company	TF18	11
Southern New England Telephone Company	TF8	1,861
United Telephone Company of Florida	TF19	398
United Telephone Company of Ohio	TF15	570
United Telephone Company of Pennsylvania	TF11	309
Winter Park Telephone Company	TF20	134

TABLE IV
WATER FIRMS

Firm Name	Firm Number	Plant in Millions
Barnstable Water Company	WF9	2
Bridgeport Hydraulic Company	WF13	100
California Water Service Company	WF14	220
Clinton Water Works Company	WF23	4
Florida Cities Water Company	WF17	32
Huntington Water Corporation	WF18	20
Illinois-American Water Company	WF24	50
Indianapolis Water Company	WF7	142
Kentucky-American Water Company	WF19	48
Laguna Hills Water Company	WF16	11
Long Island Water Corporation	WF2	36
Marion Water Company	WF22	8
Maryland Water Works Company	WF25	2
Middlesex Water Company	WF5	49
Ohio-American Water Company	WF21	8
Pennichuck Water Works	WF12	12
Philadelphia Suburban Water Company	WF1	164
Riverton Consolidated Water Company	WF20	13
San Jose Water Works	WF8	134
Shenango Valley Water Company	WF4	15
Southern California Water Company	WF15	126
Stanford Water Company	WF11	13
Torrington Water Company	WF6	4
Western Pennsylvania Water Company	WF3	160
York Water Company	WF10	26

Having selected the firms and obtained detailed information concerning their asset balances, it was necessary to select the specific asset accounts to be used. Within each industry, asset accounts were assigned unique identification numbers; then, a two step selection procedure was performed. First, asset accounts for which published price indices were not available were eliminated. For the remaining pool of asset accounts, crosssectional totals were calculated. The asset accounts with the five¹ largest² crosssectional totals were selected for use. Table V details the accounts selected and their identification numbers.

Following selection of the asset accounts, the detailed asset cost information (as of 1979 for water and telephone firms and as of 1977 for electric and gas firms) was used to estimate a crosssectional vector of average asset proportions for each industry. Also, within each industry, twenty-five firm specific vectors of asset proportions were calculated. Tables VI, VII, VIII, and IX detail the firm specific as well as crosssectional vectors.³ These tables also detail the proportion of total utility plant in service (net of land and intangibles) that was accounted for by the five asset accounts.

Interestingly, Tables VI through IX show that for most firms, the five asset categories accounted for a relatively high proportion of each firm's Utility Plant in Service. The averages for each industry were: electric-40%, gas-71%, telephone-66%, and water-78%.

TABLE V
ASSET ACCOUNTS

Industry	Asset Selected	Asset Number
Electric	Steam Production Plant- Struc. and Imp.	EA1
Electric	Steam Production Plant- Boiler Equipment	EA 4
Electric	Steam Production Plant- Turbogenerators	EA6
Electric	Transmission Plant- Station Equipment	EA12
Electric	Distribution Plant- Line Transformers	EA23
Gas	Transmission Plant- Struc. and Imp.	GA3
Gas	Transmission Plant- Mains	GA 4
Gas	Transmission Plant- Comp. Sta. Equip.	GA5
Gas	Transmission Plant- Meas. and Reg. Equip.	GA 6
Gas	Transmission Plant- Other	GA18
Telephone	Central Office Equipment- Switching	TA 2
Telephone	Central Office Equipment- Circuit	TA 3
Telephone	Station Apparatus	TA 4
Telephone	Station Connections	TA 5
Telephone	Buried Cable	TA10
Water	Treatment Plant- Equipment	WA 5
Water	Transmission Plant- Dest. Reservoirs	WA 7
Water	Distribution Plant- Mains	WA 9
Water	Distribution Plant- Services Installed	WA10
Water	Distribution Plant- Meters	WA11

TABLE VI
ELECTRIC ASSET PROPORTIONS

Firm Number	Asset Number					Five Assets as a Percentage of Utility Plant in Service
	EA1	EA 4	EA 6	EA12	EA23	
EF1	.10319	.41126	.14006	.17753	.16794	.337
EF2	.15458	.54074	.27047	.03418	.00000	.863
EF3	.04188	.44035	.18044	.17967	.15764	.429
EF4	.04009	.07292	.07047	.34659	.46991	.237
EF5	.09426	.40206	.21655	.18195	.10516	.490
EF6	.12915	.34991	.09772	.19911	.22409	.334
EF7	.31687	.39163	.15715	.06028	.07403	.640
EF8	.19302	.43096	.17192	.12425	.07983	.651
EF9	.13067	.38242	.14714	.23241	.10733	.400
EF10	.17662	.42390	.16838	.09946	.13162	.557
EF11	.12629	.16629	.16178	.23251	.31310	.317
EF12	.11048	.18615	.00000	.31984	.38352	.207
EF13	.15787	.30584	.15830	.20917	.16880	.261
EF14	.09113	.30498	.22122	.18565	.19699	.403
EF15	.15452	.36535	.16397	.17566	.14048	.520
EF16	.10840	.29339	.30368	.14632	.14820	.544
EF17	.02185	.04483	.04634	.18821	.69874	.231
EF18	.08868	.53489	.12922	.09636	.15083	.474
EF19	.00715	.03867	.01050	.40946	.53418	.122
EF20	.16010	.49393	.15157	.09101	.10337	.384
EF21	.18541	.31373	.12677	.21623	.15783	.358
EF22	.18165	.37686	.14736	.19970	.09441	.465
EF23	.02647	.03337	.02129	.49627	.42257	.172
EF24	.25294	.39252	.22255	.00000	.13197	.351
EF25	.08035	.30524	.20587	.23167	.17683	.413
Overall	.12911	.38087	.16570	.17945	.14485	.407

TABLE VII
GAS ASSET PROPORTIONS

Firm Number	Asset Number					Five Assets as a Percentage of Utility Plant in Service
	GA3	GA4	GA5	GA6	GA18	
GF1	.03552	.78047	.07447	.10952	.00000	.908
GF2	.02696	.89565	.05422	.02209	.00105	.975
GF3	.02436	.80395	.07854	.03946	.05367	.353
GF4	.01076	.88125	.01740	.08878	.00179	.204
GF5	.03455	.79221	.13567	.03542	.00112	.561
GF6	.03745	.79813	.14611	.00879	.00950	.995
GF7	.03291	.79890	.13639	.02775	.00403	.383
GF8	.00101	.94231	.00003	.05652	.00012	.431
GF9	.04441	.78353	.12570	.04099	.04532	.810
GF10	.04515	.60424	.00000	.35059	.00000	1.000
GF11	.01724	.91605	.00000	.06669	.00000	.619
GF12	.00772	.62594	.35516	.01116	.00000	.996
GF13	.04029	.78298	.10935	.05878	.00857	.675
GF14	.03791	.75372	.19782	.01002	.00051	.648
GF15	.05134	.82895	.08505	.02545	.00919	.495
GF16	.03932	.82434	.11492	.02119	.00021	.855
GF17	.01511	.87004	.06528	.04918	.00037	.296
GF18	.03330	.67827	.28365	.00476	.00000	.996
GF19	.03469	.78525	.17312	.00589	.00101	.956
GF20	.06283	.67643	.18354	.02072	.05145	.981
GF21	.05790	.78130	.15584	.00494	.00000	.872
GF22	.02711	.83813	.10287	.02450	.00736	.736
GF23	.00923	.82466	.00000	.16609	.00000	.085
GF24	.08440	.64962	.25711	.00875	.00010	.893
GF25	.01403	.78806	.17022	.02357	.00410	.707
Overall	.03738	.78477	.15442	.01710	.00631	.710

TABLE VIII
TELEPHONE ASSET PROPORTIONS

Firm Number	Asset Number					Five Assets as a Percentage of Utility Plant in Service
	TA2	TA3	TA4	TA5	TA10	
TF1	.35186	.12045	.10656	.12615	.29496	.673
TF2	.37217	.19424	.14583	.14988	.13786	.595
TF3	.36408	.16247	.16781	.17562	.12999	.616
TF4	.35089	.16847	.12211	.15945	.19906	.646
TF5	.38581	.20238	.15138	.17457	.08583	.593
TF6	.28805	.19798	.11147	.12870	.27377	.721
TF7	.38065	.14704	.18920	.22633	.05675	.570
TF8	.46706	.17784	.14000	.18976	.02525	.554
TF9	.37222	.17871	.14315	.15331	.15259	.621
TF10	.39606	.19015	.15286	.16134	.09956	.581
TF11	.36575	.16097	.14232	.18865	.14228	.566
TF12	.49875	.08789	.13178	.16575	.11582	.602
TF13	.32372	.15494	.11574	.11662	.28795	.755
TF14	.37799	.14713	.17611	.18735	.11140	.618
TF15	.39399	.11256	.13761	.17460	.18121	.612
TF16	.29307	.13697	.09393	.10384	.37217	.727
TF17	.30245	.04027	.11253	.18222	.36249	.845
TF18	.33760	.11606	.09755	.10162	.34714	.730
TF19	.31193	.11229	.11348	.12420	.33808	.742
TF20	.40078	.07126	.17105	.15749	.19939	.674
TF21	.21834	.03409	.09483	.16379	.48893	.745
TF22	.33388	.06725	.11445	.17318	.31122	.659
TF23	.38080	.09679	.13958	.16292	.21988	.689
TF24	.39157	.01657	.25831	.22535	.10818	.648
TF25	.46895	.12187	.14235	.12387	.14292	.670
Overall	.36617	.17581	.14723	.16577	.14500	.669

TABLE IX
WATER ASSET PROPORTIONS

Firm Number	Asset Number					Five Assets as a Percentage of Utility Plant in Service
	WA5	WA7	WA9	WA10	WA11	
WF1	.06888	.07110	.64861	.16256	.04882	.794
WF2	.02695	.03844	.64648	.23094	.05716	.744
WF3	.09842	.04230	.64637	.17100	.04189	.851
WF4	.21761	.04377	.54392	.15719	.03748	.824
WF5	.12595	.01301	.67085	.14331	.04686	.805
WF6	.02392	.09183	.79890	.00000	.08533	.807
WF7	.12166	.02131	.77950	.03014	.04736	.729
WF8	.01374	.09160	.66684	.15778	.07001	.800
WF9	.00000	.05277	.74544	.14889	.05289	.676
WF10	.12012	.08612	.50472	.14374	.04528	.711
WF11	.08498	.03403	.84810	.00000	.03287	.603
WF12	.00290	.04485	.81928	.07340	.05955	.829
WF13	.01235	.01056	.78577	.06767	.12363	.788
WF14	.01619	.07548	.69907	.14877	.06047	.826
WF15	.01427	.05261	.64777	.20746	.07785	.796
WF16	.00000	.04455	.59638	.17963	.07943	.741
WF17	.13117	.04420	.69675	.07764	.05021	.642
WF18	.19786	.06828	.46195	.20791	.06397	.806
WF19	.09014	.03269	.72448	.11412	.03853	.747
WF20	.11388	.02648	.64242	.17879	.03842	.837
WF21	.06212	.03786	.72388	.14076	.03536	.793
WF22	.12540	.03399	.51486	.18110	.04462	.766
WF23	.04625	.09616	.61493	.19113	.05151	.744
WF24	.18813	.02650	.56145	.19085	.03303	.722
WF25	.13450	.04178	.51716	.16970	.03683	.844
Overall	.06530	.05188	.68094	.14264	.05920	.788

Price data for the asset categories were obtained from price data as reported in the Hardy-Whitman Index of Public Utility Construction Costs. This source detailed construction price indices for public utility plant accounts from 1912 through 1979. However, in this study the indices used were limited to those covering the thirty year period from 1950 to 1979. The price data were then analyzed to generate mean price change vectors and variance/covariance matrices for each industry. Tables X, XI, XII, and XIII detail these vectors and their related variance/covariance matrices.

Summarizing, from each of four public utility industries, twenty-five firms were randomly selected. For each firm, detailed information concerning its assets was gathered. This information was used to select five asset categories for study within each industry and also to generate four industry-wide and one hundred firm specific vectors of asset proportions. Price data on the twenty selected asset categories (five for each of four industries) was gathered and used to estimate four industry mean price change vectors and four related variance/covariance matrices. The information so gathered was then used to generate intermediate data.

Generation of Intermediate Data

Recall that within each industry, five asset categories were selected for use. These five categories were grouped

TABLE X
ANALYSIS OF ELECTRIC PRICE DATA

Name of Data	Asset Number				
	EA1	EA4	EA6	EA12	EA23
Mean Price Change Vector	.0568000	.0587333	.0478000	.0450000	.0235333
Covariance Matrix	.0018652	.0018266	.0017207	.0022888	.0013936
	.0018266	.0025023	.0024147	.0030004	.0021745
	.0017207	.0024147	.0034326	.0030303	.0023286
	.0022888	.0030004	.0030303	.0053088	.0034412
	.0013936	.0021745	.0023286	.0034412	.0038945

TABLE XI
ANALYSIS OF GAS PRICE DATA

Name of Data	Asset Number				
	GA3	GA4	GA5	GA6	GA18
Mean Price Change Vector	.0556333	.0603066	.0583333	.0524000	.0582000
Covariance Matrix	.0018869	.0012420	.0011299	.0013353	.0012930
	.0012420	.0018214	.0010769	.0015678	.0017030
	.0011299	.0010769	.0018586	.0012991	.0011502
	.0013353	.0015678	.0012991	.0017678	.0015446
	.0012930	.0017030	.0011502	.0015446	.0016601

TABLE XII
ANALYSIS OF TELEPHONE PRICE DATA

Name of Data	Asset Number				
	TA2	TA3	TA4	TA5	TA10
Mean Price Change Vector	.0334666	-.0146333	-.0068000	.0420000	.0348000
Covariance Matrix	.0016803	.0005600	.0001900	.0004800	-.0005500
	.0005600	.0033058	-.0012560	.0005600	.0013413
	.0001900	-.0012560	.0026133	-.0002200	-.0009200
	.0004800	.0005600	-.0002200	.0015882	.0015456
	-.0005500	.0013413	-.0009200	.0015456	.0079773

TABLE XIII
ANALYSIS OF WATER PRICE DATA

Name of Data	Asset Number				
	WA5	WA7	WA9	WA10	WA11
Mean Price Change Vector	.0547000	.0705333	.0519000	.0627000	.0242000
Covariance Matrix	.0018946	.0036008	.0028405	.0011500	-.0008500
	.0036008	.0175759	.0056233	.0023289	-.0022380
	.0028405	.0056233	.0056277	.0018925	-.0017720
	.0011500	.0023289	.0018925	.0017595	-.0001600
	-.0008500	-.0022380	-.0017720	-.0001600	.0023600

into various index configurations in fifty-one different ways. Specifically, if four indices were used there were ten possible configurations; if three indices were used there were twenty-five possible configurations; if two indices were used there were fifteen possible configurations; and if one index was used there was one configuration possible. Table XIV details the various possible configurations.

Using the asset proportion and price data gathered, along with Sunder's formulas, Bias and MSE were calculated for each possible firm and configuration combination. Thus, for each of one hundred firms, there were fifty-one Bias measures and fifty-one MSE measures. The appendix details this information.

Inasmuch as the price data used in calculating Bias and MSE figures tended to be quite small, there was some concern that computer truncation would introduce significant error into the calculations. To avoid this problem, all calculations of intermediate data were performed using double precision arithmetic.*

Summarizing, the primary data was used along with Sunder's formulas to calculate Bias and MSE for each firm for each of fifty-one possible index configurations. The resulting intermediate data was used to calculate various firm specific probabilities that using more indices would result in more accurate revaluations.

TABLE XIV
 POSSIBLE CONFIGURATIONS FOR FIVE ASSETS
 ABCDE

Number of Indices	Configuration	Number of Indices	Configuration
1	abcde	3	ab de c
2	a bcde	3	ac be d
2	b acde	3	ad bc e
2	c abde	3	ae cd b
2	d abce	3	ab ce d
2	e abce	3	ab cd e
2	ab cde	3	ac de b
2	ac bde	3	ac bd e
2	ad bce	3	ad ce b
2	ae bce	3	ad be c
2	bc ada	3	ae bd c
2	bd ace	3	ae bc d
2	be acd	3	bc de a
2	cd abe	3	bd ce a
2	ce abd	3	be cd a
2	de abc	4	ae b c d
3	a b cde	4	ad b c e
3	a c bde	4	ac b d e
3	a d bce	4	ab c d e
3	a e bce	4	be a c d
3	b c ade	4	bd a c e
3	b d ace	4	bc a d e
3	b e acd	4	ce a b d
3	c d abe	4	cd a b e
3	c e abd	4	de a b c
3	d e abc		

Note: Letters grouped together signify that those assets are grouped in the same index.

Calculation of Probabilities

Once the intermediate Bias and MSE data were calculated, these were used to generate four separate groups of probability data. Each group involved four industries, twenty-five firms within each industry, six comparisons for each firm, and two alternative methods of performing the six comparisons.

The six comparisons were made as follows. Recall that five assets were selected for use in the study. This meant there were four possible index systems that could result in some valuation error. The four possible index systems were:

1. a one index system,
2. a two index system,
3. a three index system, and
4. a four index system.

With four possible index systems, there were six ways to compare the index systems. The six comparisons were:

1. a four index system versus a one index system,
2. a four index system versus a two index system,
3. a four index system versus a three index system,
4. a three index system versus a one index system,
5. a three index system versus a two index system, and
6. a two index system versus a one index system.

The two alternative methods of performing the six comparisons were made as follows. Within each index system there were several possible configurations (except that a one index system had only one configuration). In comparing

two index systems, all pairs of configurations could have been compared or only those pairs of configurations wherein one configuration was strictly finer than another could have been compared. The first method was referred to as "Non-Fineness" and the second was referred to as "Fineness".

For each comparison, within each group of probability data, the procedure was to count the number of times an index system with more indices had less error and divide by the number of configuration comparisors. The resulting number represented the probability that an index system with more indices had a smaller error.

The four separate groups of probability data were prepared as follows. The first set involved a simple comparison of absolute Bias among each firm's possible configurations. The second set involved a simple comparison of MSE among each firm's possible configurations. The third and fourth sets of probability data were somewhat different.

In Chapter I, one of the stated study objectives was to determine the extent to which "n" index valuation was significantly more accurate than "m" index valuation ($m < n$). For the purposes of this study, an absolute difference in Bias, between two configurations, of .01 or less was not considered significant. A difference in MSE, between two configurations, of .0001 or less was not considered significant.⁵ Therefore, the third group of probability data was generated in exactly the same way as the first group except that only absolute differences greater than .01 were

counted as situations wherein the Bias of one configuration was considered significantly less than the Bias of another configuration. Likewise, the fourth group of probability data was generated in exactly the same manner as the second group except that only differences greater than .0001 were counted as situations wherein the MSE of one configuration was considered significantly less than the MSE of another configuration.

Summarizing, four separate groups of probability data were generated from the Bias and MSE intermediate data. These four groups of data were then analyzed to test certain hypotheses.

Hypotheses

The following discussion details the eight hypotheses that were proposed for testing for each of the four groups of probability data. Because the eight hypotheses were the same for each of the four groups of probability data, they are discussed only once.

Hypothesis 1 was concerned with testing, globally, whether or not increasing the number of price indices used improved accuracy. In other words, were the average probabilities for the six comparisons the same. If the average probabilities were the same, the implication would be that increasing the number of price indices would not improve accuracy.

Hypothesis 2 was concerned with testing whether or not

the results observed in Hypothesis 1 were consistent between industries. In other words, Hypothesis 2 tested to see if there was any interaction between the particular comparison and industry. If no interaction was present, the conclusions of Hypothesis 1 would become more general.

Hypothesis 3 tested to see if, globally, the average probabilities for the Fineness and Non-Fineness methods were the same. If they were the same, the implication would be that improving index fineness did not improve valuation accuracy.

Hypothesis 4 was concerned with testing whether or not the results observed in Hypothesis 3 were consistent between industries. This was a test to determine if there was any interaction between the particular method and industry. If no interaction was present, the conclusions of Hypothesis 3 would become more general.

Hypothesis 5 tested to determine if industry average probabilities were the same. If they were the same, the implication would be that, globally, industry average results (for the four industries tested) did not vary. Thus, conclusions become quite general if each industry responds in the same manner.

Hypothesis 6 tested to determine if, within each industry, firm average probabilities were the same. If they were the same, the implication would be that, within an industry, average results were very general, and thus applied to all firms.

Hypothesis 7 tested to determine if, within each industry, firms showed the same trend over the two methods of performing comparisons. Again, this was a test for interaction of firm and method. If no interaction was present, the implication would be that all firms, within an industry, respond in the same manner to the two methods of making comparisons. That is, overall results become more general because they apply to all firms within an industry.

Hypothesis 8 tested to determine if, within each industry, firms showed the same trend over the six comparisons. This was a test for interaction of firm and comparison. If no interaction was present, the implication would be that all firms, within an industry, respond in the same manner to the various comparisons. This in turn would mean that industry results become more general and apply to all firms within an industry.

Summarizing, eight hypotheses were proposed for testing for each of the four groups of probability data. Table XV presents a summary of the eight hypotheses.

Method of Analysis

The experiment was analyzed using an analysis of variance procedure. The ANOVA procedure was selected because it was the only known statistical procedure that could test for both main effect differences and interactions.

TABLE XV
SUMMARY OF HYPOTHESES

Hypothesis Number	Hypothesis
1	$P_{4x1} = P_{4x2} = P_{4x3} = P_{3x2} = P_{3x1} = P_{2x1}$
2	No industry and comparison interaction
3	$P_{NF} = P_F$
4	No industry and method interaction
5	$P_e = P_g = P_t = P_w$
6	$P_1 = P_2 = \dots = P_{25}$
7	No firm and method interaction in each industry
8	No firm and comparison interaction

Note: 4x1 denotes the comparison of the four index and one index systems,
 4x2 denotes the comparison of the four index and two index systems,
 4x3 denotes the comparison of the four index and three index systems,
 3x2 denotes the comparison of the three index and two index systems,
 3x1 denotes the comparison of the three index and one index systems,
 2x1 denotes the comparison of the two and one index systems,
 NF denotes the "Non-fineness" method,
 F denotes the "Fineness" method,
 e denotes the Electric industry,
 g denotes the Gas industry,
 t denotes the Telephone industry,
 w denotes the Water industry,
 P denotes an average probability, and numbered subscripts denote firms within each industry.

Limitations

There were two broad areas of limitations associated with the study. Methodology limitations were present because of problems encountered in assembling and analyzing the data. Limitations on conclusions were present because certain assumptions were made in generating the probability data.

There were three basic methodology problems. Inasmuch as the four industry wide vectors of average asset proportions were estimated from a sample of twenty-five firms each, these estimates were subject to the usual problem of sampling bias. Also, because Sunder's formulation assumed that all assets were acquired under the same price level, there existed some possibility that the one hundred firm specific as well as four industry wide vectors of asset proportions were biased by the use of historical cost values to estimate asset proportions that should ideally have been based on constant dollar costs.⁶ Finally, in attempting to judge whether differences in Bias or MSE were significant, the author used difference thresholds of .01 and .0001, respectively. Because these thresholds were subjectively determined by the author, others might argue as to their appropriateness.

Extensions of the study conclusions were limited in several respects. First, the analytical model used was a one period model that assumed no change in assets during the period. Whether or not the study results would be altered

if a multi-period model with asset additions and retirements were used is not known. Also, the study used only five asset categories within each industry. How the study results would have been affected by using more asset categories is unknown. Further, within each industry, the firms were relatively homogenous as to asset proportions. If industries with less homogenous firms had been used, the results might have been different. Finally, all conclusions were based, in part, on mean price change vectors and related variance/covariance matrices estimated from the thirty year period 1950 to 1979. The effect of using a different period of time to obtain these estimates is unknown.

Summary

Primary asset proportion and price change data were gathered on twenty-five firms in each of four industries. This primary data was used to calculate Bias and MSE figures for each possible firm and configuration combination. This intermediate data was then used to calculate various probabilities that using more indices would result in less valuation error. These probabilities were then analyzed using an ANOVA procedure. Results are discussed in Chapter IV.

NOTES

¹Because the number of possible configurations increases quite rapidly as the number of assets increases, this study was limited to one sample of five asset types for each industry. This resulted in fifty-one possible index configurations for each sample firm.

²In any valuation process, the accounts with larger balances should contribute relatively more to the total error. That is, a 3% error in an account representing 50% of total assets will contribute more to total error than a 3% error in an account representing only 10% of total assets. Therefore, this study selected asset accounts that tended to, crossectionally, represent a larger proportion of total utility plant in service (net of land and intangibles).

³It is important to remember that all vectors were based only on the five asset accounts selected within each industry. Thus, the five proportions in each vector totaled 1.00 .

⁴Double precision arithmetic is a FORTRAN form of doing calculations that doubles the number of significant digits. Thus, calculations were assured of being more precise and less prone to truncation error.

⁵The difference thresholds selected were of course arbitrary as they were based on personal beliefs. However, the levels were selected to be low enough (conservative) so that if these levels were not exceeded, most researchers would probably agree that the differences present were not material.

⁶For example, an electric utility could have acquired all of its generation plant on inception of the firm and then added distribution plant (electric lines) yearly as the service area grew. If the price level was rising, use of historical cost values would tend to overstate the proportion of constant cost dollars invested in distribution plant and understate the proportion of constant cost dollars invested in generation plant.

Fortunately, there was some evidence to suggest that the vectors of asset proportions for utilities were

insensitive to the fact that assets were normally acquired over several time periods. Because of the inflationary environment that has existed over the most recent decades, the price movements of most asset categories exhibited a high positive correlation. Thus, yearly price changes for most asset categories tended to be similar. Also, yearly additions to utility plant in service tended to be small relative to total plant in service. This was because service area growth was generally modest. Thus, a significant price aberration in one year or a small group of continuous years would have not introduced a significant bias in the relative asset proportions. Finally, due to the very nature of a public utility, i.e.- a somewhat unchanging primary service and to a lesser extent method of production and delivery, the relative mix of assets needed to provide the service should have been fairly stable. As long as yearly additions were in the same relative proportions, and yearly price changes were similar, bias in asset vectors based on historical costs should have been minimal.

CHAPTER IV

RESULTS OF STUDY

Chapter III described the procedures followed in gathering primary data and now it was used to calculate Bias and MSE for each firm and configuration combination. The following sections of this chapter describe the probability data and the results of an ANOVA analysis in testing the eight hypotheses proposed for each data group. The analysis of groups 1 (Bias) and 2 (MSE) is presented first followed by an analysis of groups 3 (materially different Bias) and 4 (materially different MSE).

Analysis of Data Groups 1 and 2

Recall from Chapter III that the group 1 probability data was generated by comparing the absolute Bias among each firm's possible configurations. Likewise, the group 2 probability data was generated by comparing MSE among each firm's possible configurations. For each firm, within an industry, there were six comparisons of various index systems and two methods of performing each comparison. Thus, a total of twelve probabilities were calculated for each firm, for each group of probability data. Tables XVI, XVII, XVIII, and XIX display the group 1 (Bias) probability

data for the electric, gas, telephone, and water industries, respectively. Tables XX, XXI, XXII, and XXIII display the group 2 (MSE) probability data.

TABLE XVI
GROUP 1 - ELECTRIC DATA

Firm Number	Index Systems Compared											
	2x1		3x2		4x3		3x1		4x2		4x1	
	F	NF	F	NF	F	NF	F	NF	F	NF	F	NF
EF1	.40	.40	.56	.58	.63	.64	.60	.60	.70	.70	.80	.80
EF2	.80	.80	.76	.71	.78	.70	.96	.96	.88	.84	1.0	1.0
EF3	.73	.73	.52	.52	.60	.62	.64	.64	.62	.62	.70	.70
EF4	.86	.86	.84	.72	.90	.75	.96	.96	.97	.89	1.0	1.0
EF5	.53	.53	.56	.57	.53	.64	.68	.68	.70	.72	.80	.80
EF6	.73	.73	.69	.66	.71	.67	.84	.84	.80	.80	.90	.90
EF7	.86	.86	.69	.66	.78	.72	.84	.84	.81	.79	.90	.90
EF8	.86	.85	.84	.72	.83	.73	.96	.96	.95	.88	1.0	1.0
EF9	.66	.66	.62	.60	.66	.66	.68	.68	.71	.75	.80	.80
EF10	.66	.66	.74	.70	.78	.73	.92	.92	.92	.89	1.0	1.0
EF11	.80	.80	.86	.74	.38	.75	.96	.96	.98	.90	1.0	1.0
EF12	.80	.80	.74	.70	.80	.70	.96	.96	.91	.85	1.0	1.0
EF13	.66	.66	.60	.63	.65	.67	.84	.84	.77	.78	.90	.90
EF14	.86	.85	.86	.73	.88	.74	.96	.96	.97	.88	1.0	1.0
EF15	.73	.73	.54	.57	.60	.60	.72	.72	.70	.70	.80	.80
EF16	.53	.53	.57	.60	.68	.70	.68	.68	.72	.77	.80	.80
EF17	.86	.85	.84	.72	.91	.75	.92	.92	.95	.88	1.0	1.0
EF18	.66	.66	.69	.60	.70	.65	.84	.84	.81	.76	.90	.90
EF19	.86	.86	.80	.72	.80	.73	.96	.96	.94	.88	1.0	1.0
EF20	.86	.85	.80	.71	.31	.71	.96	.96	.90	.84	1.0	1.0
EF21	.46	.46	.54	.56	.63	.62	.64	.64	.67	.70	.80	.80
EF22	.66	.66	.65	.65	.71	.68	.80	.80	.81	.80	.90	.90
EF23	.80	.80	.81	.72	.33	.72	.96	.96	.95	.87	1.0	1.0
EF24	.66	.66	.62	.59	.61	.66	.72	.72	.78	.78	.90	.90
EF25	.80	.80	.85	.72	.86	.73	1.0	1.0	.97	.88	1.0	1.0

Note: "F" denotes the Fineness method and "NF" denotes the Non-Fineness method. Each table entry represents the probability that the less aggregate index system had a smaller absolute Bias.

TABLE XVII
GROUP 1 - GAS DATA

Firm Number	Index Systems Compared											
	2x1		3x2		4x3		3x1		4x2		4x1	
	F	NF	F	NF	F	NF	F	NF	F	NF	F	NF
GF1	.53	.53	.60	.62	.71	.69	.72	.72	.77	.78	.90	.90
GF2	.93	.93	.72	.62	.71	.68	.96	.96	.81	.77	1.0	1.0
GF3	.13	.13	.53	.57	.60	.59	.28	.28	.64	.67	.40	.40
GF4	.13	.13	.52	.56	.70	.69	.32	.32	.71	.75	.60	.60
GF5	.33	.33	.53	.57	.70	.67	.56	.56	.71	.74	.80	.80
GF6	.80	.80	.76	.70	.76	.71	.96	.96	.90	.86	1.0	1.0
GF7	.13	.13	.50	.54	.66	.67	.20	.20	.68	.72	.40	.40
GF8	.53	.53	.44	.45	.68	.66	.40	.40	.61	.63	.60	.60
GF9	1.0	1.0	.73	.69	.66	.65	1.0	1.0	.85	.83	1.0	1.0
GF10	.66	.66	.69	.66	.76	.71	.80	.80	.85	.82	.90	.90
GF11	.06	.06	.54	.53	.71	.70	.08	.08	.70	.71	.30	.30
GF12	.26	.26	.77	.72	.80	.73	.68	.68	.92	.88	.90	.90
GF13	.53	.53	.65	.62	.30	.72	.76	.76	.78	.76	.90	.90
GF14	.06	.06	.62	.65	.66	.68	.24	.24	.78	.82	.70	.70
GF15	.00	.00	.61	.66	.81	.75	.00	.00	.80	.85	.30	.30
GF16	.66	.66	.61	.61	.66	.68	.72	.72	.81	.81	.90	.90
GF17	.06	.06	.40	.45	.61	.66	.12	.12	.60	.64	.40	.40
GF18	.13	.13	.66	.69	.73	.70	.56	.56	.85	.86	.80	.80
GF19	.53	.53	.62	.64	.76	.70	.68	.68	.74	.77	.90	.90
GF20	1.0	1.0	.69	.64	.66	.62	1.0	1.0	.74	.74	1.0	1.0
GF21	.13	.13	.37	.39	.66	.65	.08	.08	.54	.55	.30	.30
GF22	.80	.80	.49	.55	.66	.69	.84	.84	.72	.74	.90	.90
GF23	.26	.26	.53	.59	.66	.69	.56	.56	.71	.76	.80	.80
GF24	.80	.80	.54	.57	.71	.69	.96	.96	.74	.72	1.0	1.0
GF25	.33	.33	.54	.54	.66	.69	.28	.28	.70	.72	.60	.60

Note: "F" denotes the Fineness method and "NF" denotes the Non-Fineness method. Each table entry represents the probability that the less aggregate index system had a smaller absolute Bias.

TABLE XVIII
GROUP 1- TELEPHONE DATA

Firm Number	Index Systems Compared											
	2x1		3x2		4x3		3x1		4x2		4x1	
	F	NF	F	NF	F	NF	F	NF	F	NF	F	NF
TF1	.60	.60	.68	.64	.75	.68	.76	.76	.85	.80	.60	.60
TF2	.66	.66	.73	.70	.80	.70	.88	.88	.61	.87	1.0	1.0
TF3	.26	.26	.42	.38	.60	.57	.28	.28	.48	.48	.40	.40
TF4	.60	.60	.66	.63	.78	.71	.72	.72	.80	.78	.80	.80
TF5	.60	.60	.58	.58	.75	.68	.68	.68	.75	.74	.60	.60
TF6	.20	.20	.48	.43	.61	.61	.20	.20	.58	.56	.40	.40
TF7	.13	.13	.44	.40	.55	.55	.04	.04	.54	.46	.10	.10
TF8	.20	.20	.44	.36	.65	.56	.16	.16	.50	.46	.30	.30
TF6	.26	.26	.44	.45	.60	.60	.28	.28	.55	.56	.40	.40
TF10	.56	.65	.66	.63	.71	.66	.68	.68	.84	.80	.80	.80
TF11	.60	.60	.76	.66	.85	.74	.84	.84	.65	.88	1.0	1.0
TF12	.73	.73	.66	.66	.71	.68	.88	.88	.82	.80	.60	.60
TF13	.60	.60	.61	.61	.61	.64	.64	.64	.75	.76	.80	.80
TF14	.40	.40	.46	.41	.65	.60	.28	.28	.55	.58	.60	.60
TF15	.80	.80	.88	.76	.83	.74	1.0	1.0	.65	.60	1.0	1.0
TF16	.60	.60	.54	.53	.53	.63	.72	.72	.70	.71	.80	.80
TF17	.66	.66	.70	.65	.78	.70	.76	.76	.60	.84	.60	.60
TF18	.60	.60	.64	.62	.61	.61	.72	.72	.77	.75	.80	.80
TF16	.60	.60	.62	.61	.68	.66	.72	.72	.82	.78	.80	.80
TF20	.73	.73	.66	.64	.68	.66	.84	.84	.85	.80	1.0	1.0
TF21	.60	.60	.64	.61	.75	.66	.72	.72	.78	.77	.60	.60
TF22	.66	.65	.72	.66	.76	.68	.76	.76	.60	.83	.60	.60
TF23	.86	.86	.76	.70	.75	.68	.66	.66	.62	.86	1.0	1.0
TF24	.66	.66	.61	.54	.61	.61	.68	.68	.64	.64	.80	.80
TF25	.73	.73	.58	.60	.60	.64	.76	.76	.77	.75	.60	.60

Note: "F" denotes the Fineness method and "NF" denotes the Non-Fineness method. Each table entry represents the probability that the less aggregate index system had a smaller absolute Bias.

TABLE XIX
GROUP 1- WATER DATA

Firm Number	Index Systems Compared											
	2x1		3x2		4x3		3x1		4x2		4x1	
	F	NF	F	NF	F	NF	F	NF	F	NF	F	NF
WF1	.73	.73	.86	.76	.63	.76	.62	.62	.67	.62	1.0	1.0
WF2	.66	.66	.50	.51	.66	.64	.64	.64	.70	.67	.80	.80
WF3	.66	.65	.60	.63	.51	.58	.84	.84	.74	.73	.80	.80
WF4	.66	.66	.60	.60	.68	.65	.72	.72	.70	.74	.80	.80
WF5	.20	.20	.34	.38	.48	.55	.24	.24	.48	.44	.20	.20
WF6	.73	.73	.53	.56	.51	.55	.76	.76	.64	.64	.60	.60
WF7	.60	.60	.53	.60	.58	.60	.80	.80	.74	.75	1.0	1.0
WF8	.60	.60	.46	.48	.50	.55	.44	.44	.60	.56	.60	.60
WF6	.46	.45	.37	.37	.61	.58	.12	.12	.44	.44	.30	.30
WF10	.73	.73	.72	.64	.73	.67	.80	.80	.81	.80	1.0	1.0
WF11	.40	.40	.58	.60	.68	.66	.72	.72	.74	.75	.60	.60
WF12	.66	.65	.65	.63	.66	.65	.88	.88	.75	.75	1.0	1.0
WF13	.80	.80	.85	.76	.83	.76	1.0	1.0	.65	.62	1.0	1.0
WF14	.40	.40	.50	.48	.63	.63	.40	.40	.61	.62	.60	.60
WF15	.06	.05	.36	.37	.48	.53	.08	.08	.38	.38	.00	.00
WF16	.60	.60	.57	.53	.61	.57	.64	.64	.55	.56	.70	.70
WF17	.40	.40	.42	.46	.60	.63	.40	.40	.62	.61	.50	.50
WF18	.53	.53	.62	.61	.51	.60	.76	.76	.70	.67	.60	.60
WF16	.06	.06	.32	.30	.56	.56	.04	.04	.41	.36	.00	.00
WF20	.60	.60	.52	.53	.50	.51	.72	.72	.52	.57	.80	.80
WF21	.40	.40	.48	.54	.68	.65	.60	.60	.71	.70	.80	.80
WF22	.66	.66	.58	.58	.48	.52	.76	.76	.65	.66	.80	.80
WF23	.66	.66	.77	.72	.73	.70	.62	.62	.61	.87	1.0	1.0
WF24	.60	.60	.54	.57	.53	.56	.76	.76	.68	.68	.80	.80
WF25	.60	.60	.58	.56	.56	.58	.80	.80	.68	.70	.60	.60

Note: "F" denotes the Fineness method and "NF" denotes the Non-Fineness method. Each table entry represents the probability that the less aggregate index system had a smaller absolute bias.

TABLE XX
GROUP 2- ELECTRIC DATA

Firm Number	Index Systems Compared											
	2x1		3x2		4x3		3x1		4x2		4x1	
	F	NF	F	NF	F	NF	F	NF	F	NF	F	NF
EF1	.40	.41	.73	.68	.83	.76	.76	.76	.61	.87	.60	.60
EF2	.63	.63	.66	.77	.63	.77	1.0	1.0	1.0	.62	1.0	1.0
EF3	.66	.65	.65	.61	.78	.72	.68	.68	.81	.76	.80	.80
EF4	1.0	1.0	.66	.76	.65	.76	1.0	1.0	1.0	.61	1.0	1.0
EF5	.73	.73	.73	.67	.83	.74	.80	.80	.61	.86	.60	.60
EF6	.86	.85	.86	.74	.60	.75	1.0	1.0	.67	.60	1.0	1.0
EF7	.66	.66	.82	.73	.60	.76	.62	.62	.64	.86	1.0	1.0
EF8	.80	.80	.63	.77	.68	.77	1.0	1.0	1.0	.63	1.0	1.0
EF6	.63	.63	.84	.73	.85	.73	.66	.66	.65	.88	1.0	1.0
EF10	.86	.86	.86	.76	.60	.77	.66	.66	1.0	.63	1.0	1.0
EF11	.63	.63	.82	.73	.86	.76	.66	.66	.67	.60	1.0	1.0
EF12	.63	.63	.62	.76	.66	.78	1.0	1.0	.68	.62	1.0	1.0
EF13	.86	.86	.74	.68	.80	.71	.88	.88	.61	.85	1.0	1.0
EF14	.86	.86	.86	.75	.66	.77	.66	.66	.68	.61	1.0	1.0
EF15	.60	.60	.68	.63	.80	.72	.64	.64	.82	.80	.80	.80
EF16	.63	.63	.82	.75	.83	.75	1.0	1.0	.62	.86	1.0	1.0
EF17	.63	.63	.60	.74	.63	.76	1.0	1.0	.68	.60	1.0	1.0
EF18	.60	.60	.73	.70	.83	.76	.76	.76	.60	.88	.60	.60
EF16	1.0	1.0	.64	.77	.61	.75	1.0	1.0	.67	.60	1.0	1.0
EF20	.63	.63	.60	.75	.63	.75	1.0	1.0	1.0	.61	1.0	1.0
EF21	.66	.66	.82	.71	.60	.76	.88	.88	.65	.62	1.0	1.0
EF22	.66	.66	.76	.70	.81	.75	.84	.84	.60	.86	.60	.60
EF23	1.0	1.0	.66	.78	.63	.78	1.0	1.0	1.0	.62	1.0	1.0
EF24	.80	.80	.86	.75	.86	.75	1.0	1.0	.67	.60	1.0	1.0
EF25	.86	.86	.88	.75	.60	.78	.66	.66	1.0	.63	1.0	1.0

Note: "F" denotes the Fineness method and "NF" denotes the Non-Fineness method. Each table entry represents the probability that the less aggregate index system had a smaller MSE.

TABLE XXI
GROUP 2- GAS DATA

Firm Number	Index Systems Compared											
	2x1		3x2		4x3		3x1		4x2		4x1	
	F	NF	F	NF	F	NF	F	NF	F	NF	F	NF
GF1	.53	.53	.64	.68	.71	.71	.72	.72	.82	.85	.60	.60
GF2	.86	.86	.77	.72	.75	.72	.66	.66	.60	.87	1.0	1.0
GF3	.66	.65	.73	.67	.85	.72	.88	.88	.64	.86	1.0	1.0
GF4	.66	.66	.61	.66	.76	.72	.62	.62	.85	.84	1.0	1.0
GF5	.66	.66	.68	.68	.75	.71	.88	.88	.87	.86	.60	.60
GF6	.86	.85	.78	.66	.86	.74	1.0	1.0	.62	.87	1.0	1.0
GF7	.66	.66	.66	.68	.76	.72	.62	.62	.88	.85	1.0	1.0
GF8	.73	.73	.68	.66	.76	.72	.62	.62	.88	.83	1.0	1.0
GF6	1.0	1.0	.70	.66	.83	.75	1.0	1.0	.88	.86	1.0	1.0
GF10	.26	.26	.56	.62	.70	.70	.48	.48	.77	.80	.70	.70
GF11	.66	.66	.72	.66	.75	.73	.84	.84	.88	.85	.60	.60
GF12	.60	.60	.76	.68	.81	.73	.76	.76	.88	.85	.60	.60
GF13	.66	.66	.77	.72	.81	.73	.84	.84	.60	.87	.60	.60
GF14	.66	.66	.78	.70	.86	.74	.80	.80	.62	.87	.60	.60
GF15	.60	.60	.80	.71	.83	.74	.76	.76	.61	.87	.60	.60
GF16	.73	.73	.64	.65	.75	.66	.80	.80	.81	.80	.60	.60
GF17	.66	.66	.72	.66	.76	.71	.62	.62	.87	.83	1.0	1.0
GF18	.60	.60	.76	.66	.80	.72	.76	.76	.87	.84	.60	.60
GF16	.53	.53	.78	.72	.83	.76	.84	.84	.62	.88	.60	.60
GF20	.63	.63	.78	.66	.78	.71	1.0	1.0	.62	.86	1.0	1.0
GF21	.53	.53	.66	.66	.80	.74	.76	.76	.85	.83	.60	.60
GF22	.86	.86	.82	.70	.81	.73	.66	.66	.64	.87	1.0	1.0
GF23	.73	.73	.64	.67	.73	.71	.62	.62	.84	.83	1.0	1.0
GF24	.86	.85	.80	.70	.83	.76	.66	.66	.64	.88	1.0	1.0
GF25	.46	.46	.73	.66	.78	.74	.68	.68	.84	.84	.80	.80

Note: "F" denotes the Fineness method and "NF" denotes the Non-Fineness method. Each table entry represents the probability that the less aggregate index system had a smaller MSE.

TABLE XXII
GROUP 2- TELEPHONE DATA

Firm Number	Index Systems Compared											
	2x1		3x2		4x3		3x1		4x2		4x1	
	F	NF	F	NF	F	NF	F	NF	F	NF	F	NF
TF1	.63	.63	.74	.66	.35	.74	.66	.66	.61	.87	1.0	1.0
TF2	.86	.86	.86	.74	.63	.77	.66	.66	.68	.61	1.0	1.0
TF3	.73	.73	.80	.72	.60	.76	.88	.88	.65	.60	1.0	1.0
TF4	.86	.86	.88	.76	.88	.76	.66	.66	.67	.61	1.0	1.0
TF5	.86	.86	.81	.70	.83	.73	.66	.66	.64	.87	1.0	1.0
TF6	.86	.85	.86	.73	.35	.74	.66	.66	.68	.60	1.0	1.0
TF7	.66	.66	.84	.72	.86	.76	1.0	1.0	.64	.60	1.0	1.0
TF8	.66	.66	.78	.70	.83	.73	.80	.80	.88	.86	.60	.60
TF6	.46	.45	.70	.63	.35	.73	.64	.64	.85	.81	.80	.80
TF10	1.0	1.0	.88	.74	.83	.73	1.0	1.0	.65	.88	1.0	1.0
TF11	.60	.60	.68	.68	.83	.75	.76	.76	.87	.86	.60	.60
TF12	.66	.65	.84	.73	.86	.75	.84	.84	.65	.86	1.0	1.0
TF13	.86	.86	.78	.71	.80	.72	.66	.66	.64	.88	1.0	1.0
TF14	.80	.80	.88	.74	.61	.78	1.0	1.0	.68	.62	1.0	1.0
TF15	.63	.63	.84	.73	.88	.75	1.0	1.0	.65	.88	1.0	1.0
TF16	.86	.86	.77	.72	.81	.72	.66	.66	.65	.86	1.0	1.0
TF17	.86	.86	.88	.73	.61	.75	1.0	1.0	.67	.60	1.0	1.0
TF18	.63	.63	.74	.70	.73	.71	.66	.66	.61	.87	1.0	1.0
TF16	.63	.63	.73	.70	.78	.72	1.0	1.0	.60	.86	1.0	1.0
TF20	.63	.63	.84	.73	.83	.73	1.0	1.0	.67	.88	1.0	1.0
TF21	.86	.85	.81	.72	.38	.74	1.0	1.0	.65	.88	1.0	1.0
TF22	.80	.80	.86	.73	.61	.76	.66	.66	.67	.60	1.0	1.0
TF23	.80	.80	.86	.74	.61	.77	.88	.88	.65	.61	1.0	1.0
TF24	.63	.63	.88	.75	.85	.75	1.0	1.0	.67	.61	1.0	1.0
TF25	.66	.66	.72	.66	.83	.75	.76	.76	.61	.60	.60	.60

Note: "F" denotes the Fineness method and "NF" denotes the Non-Fineness method. Each table entry represents the probability that the less aggregate index system had a smaller MSE.

TABLE XXIII
GROUP 2- WATER DATA

Firm Number	Index Systems Compared											
	2x1		3x2		4x3		3x1		4x2		4x1	
	F	NF	F	NF	F	NF	F	NF	F	NF	F	NF
WF1	.73	.73	.73	.71	.80	.75	.92	.92	.92	.89	1.0	1.0
WF2	.60	.60	.73	.66	.31	.73	.76	.76	.87	.84	.90	.90
WF3	.53	.53	.50	.58	.63	.64	.60	.60	.68	.71	.80	.80
WF4	.46	.46	.52	.54	.70	.67	.48	.48	.72	.72	.70	.70
WF5	.33	.33	.58	.63	.71	.71	.64	.64	.84	.84	.90	.90
WF6	.73	.73	.73	.66	.78	.70	.80	.80	.84	.82	1.0	1.0
WF7	.73	.73	.73	.66	.80	.72	.84	.84	.88	.84	1.0	1.0
WF8	.33	.33	.68	.65	.71	.71	.64	.64	.85	.83	.80	.80
WF9	.73	.73	.66	.62	.78	.72	.76	.76	.85	.80	.90	.90
WF10	.66	.66	.73	.67	.80	.70	.84	.84	.92	.86	1.0	1.0
WF11	.80	.80	.81	.71	.83	.74	.96	.96	.94	.88	1.0	1.0
WF12	.93	.93	.82	.71	.78	.72	1.0	1.0	.92	.88	1.0	1.0
WF13	.46	.46	.64	.65	.75	.74	.68	.68	.80	.84	.90	.90
WF14	.40	.40	.64	.67	.81	.74	.68	.68	.87	.86	.90	.90
WF15	.66	.66	.66	.65	.78	.71	.84	.84	.87	.84	1.0	1.0
WF16	.26	.26	.64	.62	.80	.76	.48	.48	.80	.82	.80	.80
WF17	.53	.53	.64	.58	.78	.72	.60	.60	.78	.76	.80	.80
WF18	1.0	1.0	.81	.72	.80	.74	1.0	1.0	.91	.88	1.0	1.0
WF19	.80	.80	.70	.66	.76	.69	.96	.96	.91	.85	1.0	1.0
WF20	.40	.40	.66	.64	.75	.71	.68	.68	.84	.82	.80	.80
WF21	1.0	1.0	.88	.72	.83	.74	1.0	1.0	.92	.86	1.0	1.0
WF22	.80	.80	.68	.64	.71	.68	.76	.76	.80	.78	.90	.90
WF23	.73	.73	.78	.70	.83	.73	.92	.92	.95	.88	1.0	1.0
WF24	.66	.66	.62	.62	.71	.68	.72	.72	.75	.76	.80	.80
WF25	.33	.33	.46	.54	.63	.68	.52	.52	.68	.72	.70	.70

Note: "F" denotes the Fineness method and "NF" denotes the Non-Fineness method. Each table entry represents the probability that the less aggregate index system had a smaller MSE.

The group 1 (Bias) and group 2 (MSE) probability data presented in Tables XVI through XIX and XX through XXIII, respectively, were analyzed using two ANOVA procedures. The results, shown in Table XXIV, were very similar.

Table XXIV shows that, for both groups of data, all effects were significant.¹ That is, there was statistically significant evidence that all main effects had some differences and that interactions were present.

TABLE XXIV
RESULTS OF ANOVA

Source	Degrees of Freedom	Group 1 Data		Group 2 Data	
		F Value	Significance	F Value	Significance
I	3	6.0	.0005	14.0	.0001
F(I)	96	895.2	.0001	240.2	.0001
C	5	53.2	.0001	172.3	.0001
CxI	15	4.8	.0001	3.9	.0001
CxF(I)	480	78.5	.0001	32.2	.0001
M	1	29.2	.0001	351.3	.0001
MxI	3	8.1	.0001	20.4	.0001
MxF(I)	96	3.1	.0001	3.2	.0001
CxM	5	22.7	.0001*	267.0	.0001*
IxCxM	15	6.0	.0001*	16.4	.0001*
Error	480				
Total	1199				

Note: "I" denotes Industry; "F" denotes Firm; "C" denotes Comparisons; "M" denotes Method (Fineness or Non-Fineness); and () denotes a nesting.

* Although the significance levels of these effects are presented, they are not discussed because the presence of these interactions does not affect the interpretation of main effect differences.

Routinely, one would not have expected that all effects would have been statistically significant. However, in this case, because of the large number of observations in each group of data (1200) and the resulting large error degrees of freedom (480), even very small main effect differences and interactions were detectable. The remainder of this section includes a discussion of each hypothesis, a judgment of the extent of main effect differences, and a judgment of whether the presence of interactions seriously inhibited the interpretation of main effect differences.

Hypothesis 1 tested if the six comparison probabilities, on average, were different. The ANOVA's for both groups of data indicated there were statistically significant differences. Duncan's test was performed to determine which comparisons were significantly different. Table XXV shows the average probabilities for both group 1 (Bias) and group 2 (MSE) data sets, and reports the results of both Duncan's tests.

Table XXV clearly shows, for both groups of data, that increasing the number of indices did tend to improve valuation accuracy. Even a moderate increase in the number of indices used resulted in a significant increase in the probability that the higher index system had less error.

Consider for example the group 1 data. The probability that a two index system was more accurate than a one index system was only .56. However, the probability that a four index system was more accurate than a one index system was

.78 . The addition of two indices improved the probability by .22 . The same trend was evident in the group 2 data.

TABLE XXV
COMPARISON MEAN PROBABILITIES

Data Group	Index Systems Compared					
	2x1	3x2	4x3	3x1	4x2	4x1
1	.56 E1	.60 D1	.67 C1	.66 C1	.74 B1	.78 A1
2	.73 E2	.73 E2	.78 D2	.86 C2	.88 B2	.94 A2

Note: Average probabilities with the same letter were not significantly different at an alpha level of five percent.

Hypothesis 2 tested if any comparison and industry interactions were present. The ANOVA's for both groups (1 and 2) of data indicated that interactions were present. Figure 1 charts each industry's comparison means for both data groups. Clearly, the industry lines were not parallel and thus interactions were present. However, each industry showed the same upward trend. That is, increasing the number of indices, increased the probability of a more accurate valuation. Thus, the presence of interactions did

not inhibit interpretation of the Hypothesis 1 results.

Hypothesis 3 tested if, on average, probabilities for the Fineness method were different than probabilities for the Non-Fineness method. The ANOVA's for both sets of data indicated there were statistically significant differences. The average probabilities for the group 1 data were .67 and .66 respectively. The average probabilities for the group 2 data were .84 and .81, respectively. In both groups of data, the results indicated that increasing configuration fineness marginally improved valuation accuracy over and above that which could be expected from simply increasing the number of indices.

Hypothesis 4 tested if there were any method and industry interactions. The ANOVA's indicated the presence of interactions. Figure 2 charts each industry's average probability, by method, for both sets of data. Clearly, the lines, while not parallel, displayed the same upward trend. It was concluded then, that each industry showed the same general trend and that interpretation of hypothesis 3 results were not inhibited by the presence of industry and method interactions.

Hypothesis 5 tested if average probabilities for each industry were the same. The ANOVA's indicated that, for both sets of data, the industries were different. Table XXVI shows the industry average probabilities and the results of Duncan's test for both group 1 and group 2 data sets.

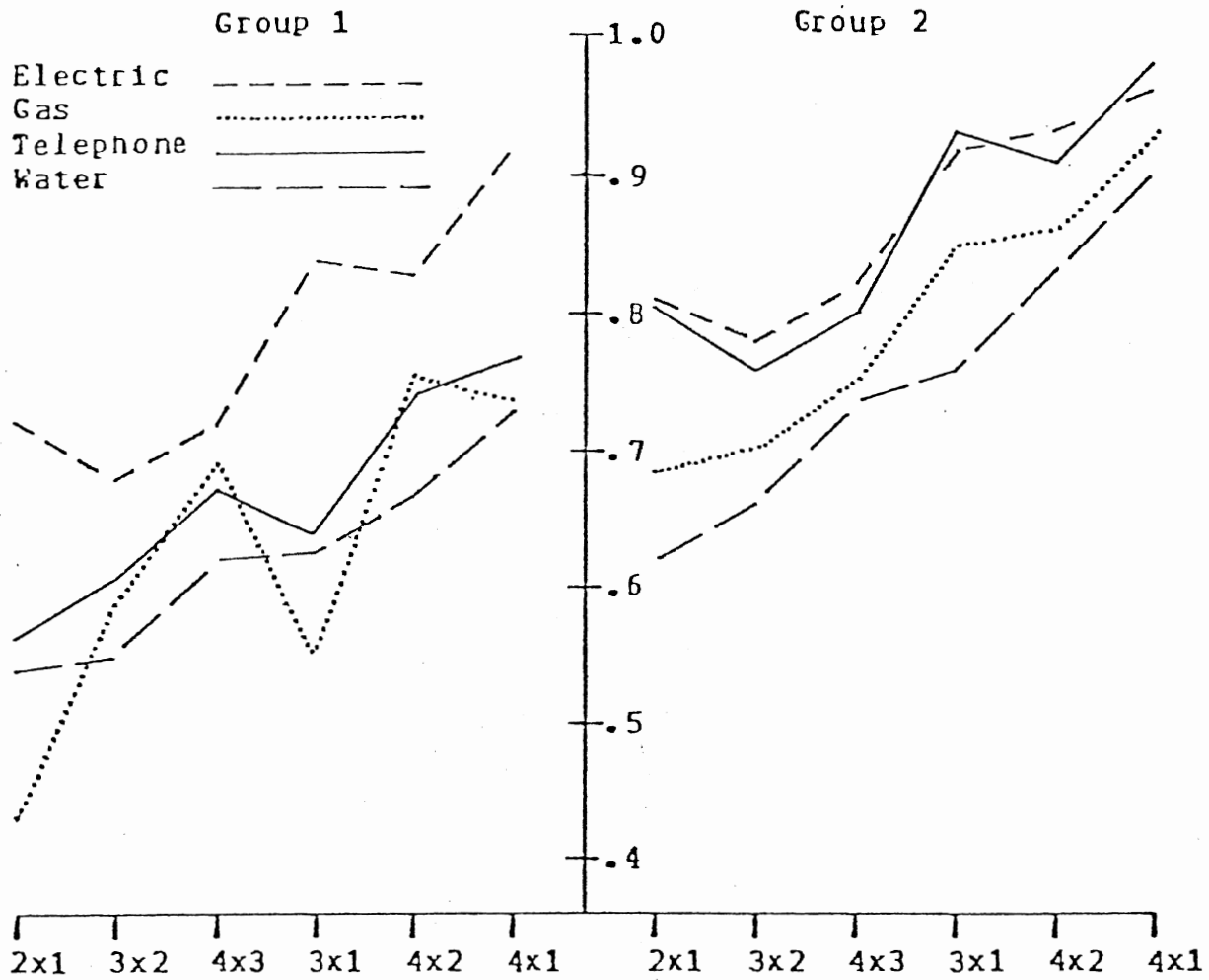


Figure 1. Comparison and Industry Interactions

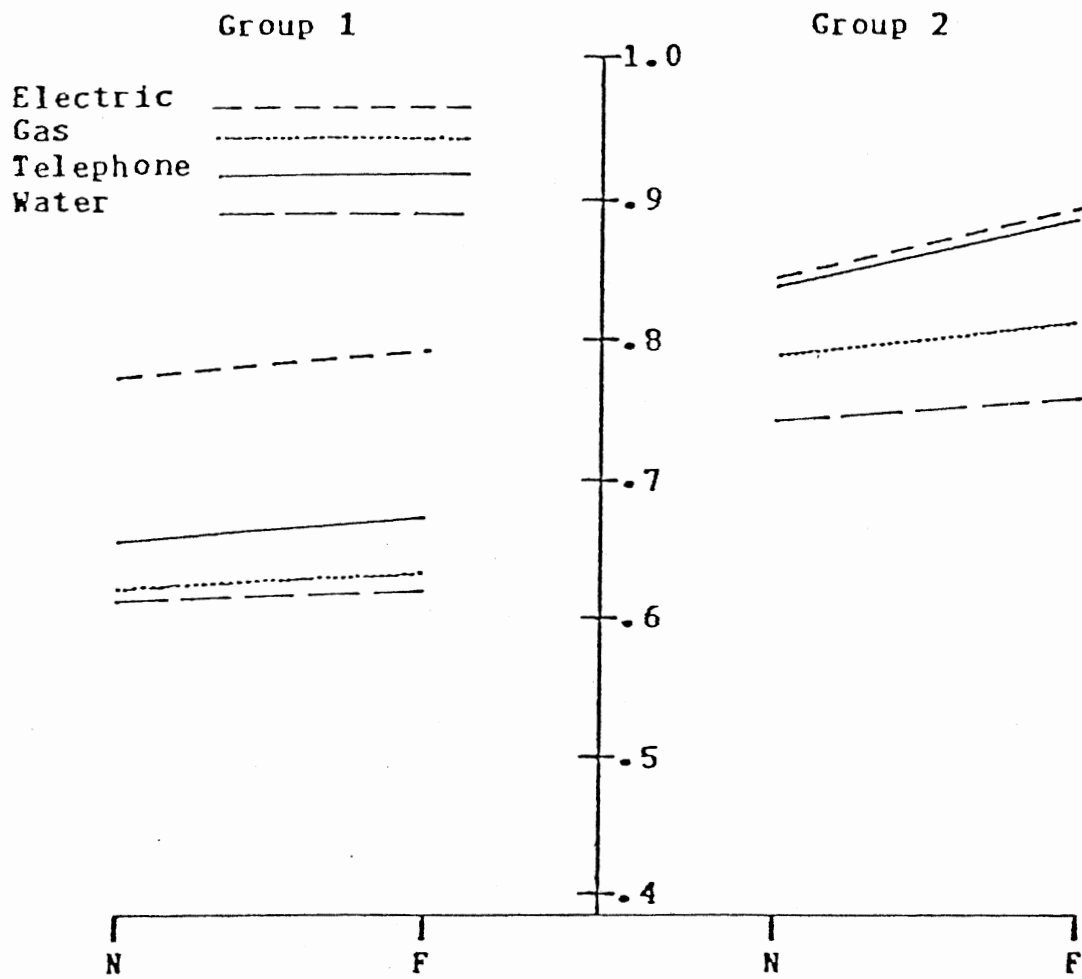


Figure 2. Method and Industry Interactions

TABLE XXVI
INDUSTRY AVERAGE PROBABILITIES

Data Group	Electric	Industry Gas	Telephone	Water
1	.78 A1	.62 B1	.66 B1	.62 B1
2	.87 A2	.80 B2	.86 A2	.75 C2

Note: Average probabilities with the same letter were not significantly different at an alpha level of five percent.

An interesting trend was noticed in Table XXVI. For both groups of data, the electric industry had the highest probability followed by the telephone industry. That is, the electric and telephone industries, on average, showed the greatest improvement in valuation accuracy as a result of increasing the number of indices used. Alternatively, the gas and water industries, on average, showed the least improvement in valuation accuracy as a result of increasing the number of indices used.

This result was easily explained. Sunder (1978) showed that the closer a firm's vector of asset proportions was to the industry-wide vector of average asset proportions, the more accurate valuations would be. This conclusion was

based on the fact that Bias and MSE are functions of the difference between the firm's own specific asset weightings and the industry-wide asset weightings. Naturally, as this difference approaches zero, since Bias and MSE are functions of this difference, Bias and MSE approach zero.

As applied to the four industries examined in this study, this meant the more homogeneous the firms were with respect to asset weightings, the less of a need to increase the number of indices used to achieve valuations of suitable accuracy. Alternatively, industries with less homogeneous firms exhibited a need for the use of more indices to ensure reasonably accurate valuations. Table XXVII details an analysis of the variance in asset proportions within each of the four industries. The results indicated that the electric and telephone industries tended to have the highest variances. Thus, these industries had the highest average probabilities that increasing the number of indices used would improve valuation accuracy. Likewise, because the gas and water industries tended to have the smallest variances of asset weightings, these industries had the smallest average probabilities that increasing the number of indices used would improve valuation accuracy. Judging from Table XXVI, even small increases in the industry-wide variance of asset weightings seems to have a large effect on the average probabilities. This pronounced effect may significantly limit extension of the study conclusions to industries that are considerably more or less homogeneous.

TABLE XXVII
 VARIANCE OF ASSET PROPORTIONS BY
 INDUSTRY

Electric	Gas	Industry	Telephone	Water
EA1 - .0052	GA3 - .0002	TA2 - .0036	WA5 - .0042	
EA4 - .0224	GA4 - .0003	TA3 - .0028	WA7 - .0006	
EA6 - .0057	GA5 - .0074	TA4 - .0012	WA9 - .0081	
EA12 - .0125	GA6 - .0033	TA5 - .0010	WA10 - .0040	
EA23 - .0274	GA18 - .0052	TA10 - .0137	WA11 - .0004	

Hypothesis 6 tested if, within each industry, firm average probabilities were the same. The ANOVA results indicated that for both groups of data there were statistically significant differences between the firms. Tables XXVIII and XXIX show each firm's average probability for the group 1 and group 2 data sets respectively. The tables show that there were large variations in firm average probabilities within each industry. Further, some firm's average probabilities, that a less aggregate index system was more accurate, were as low as or lower than .40 (for example firms GF17, GF21, TF7, TF8, WF5, WF9, WF15, and WF19). These low probabilities were associated with firms whose vectors of asset proportions were very similar to the industry-wide vector of average asset proportions and so increasing the number of indices did not appreciably improve valuation accuracy.

TABLE XXVIII
GROUP 1 FIRM AVERAGE PROBABILITIES

Firm Number	Electric	Industry Gas	Telephone	Water
1	.61	.70	.74	.88
2	.85	.84	.81	.65
3	.63	.43	.40	.71
4	.89	.50	.71	.69
5	.65	.61	.70	.33
6	.77	.85	.40	.68
7	.80	.43	.29	.71
8	.88	.54	.36	.53
9	.69	.87	.42	.38
10	.83	.77	.72	.78
11	.88	.40	.81	.67
12	.85	.71	.78	.76
13	.74	.72	.67	.89
14	.89	.52	.48	.52
15	.68	.42	.89	.23
16	.67	.73	.67	.61
17	.88	.37	.77	.49
18	.75	.62	.68	.68
19	.87	.70	.70	.23
20	.87	.84	.79	.61
21	.63	.35	.72	.61
22	.75	.74	.76	.66
23	.87	.60	.86	.82
24	.72	.79	.66	.65
25	.88	.52	.72	.69

Note: Each table entry represents the average probability that the less aggregate index system had a smaller absolute Bias.

TABLE XXIX
GROUP 2 FIRM AVERAGE PROBABILITIES

Firm Number	Electric	Industry Gas	Telephone	Water
1	.74	.72	.88	.84
2	.93	.86	.90	.76
3	.72	.82	.85	.63
4	.94	.80	.90	.59
5	.80	.78	.88	.67
6	.90	.88	.89	.80
7	.85	.81	.86	.81
8	.91	.82	.79	.66
9	.89	.89	.70	.77
10	.90	.58	.91	.80
11	.90	.78	.76	.87
12	.93	.77	.83	.89
13	.85	.80	.87	.71
14	.91	.80	.90	.71
15	.71	.78	.90	.79
16	.90	.76	.87	.62
17	.92	.81	.90	.67
18	.77	.76	.87	.90
19	.93	.78	.88	.84
20	.92	.88	.90	.68
21	.84	.74	.89	.91
22	.80	.87	.88	.76
23	.94	.81	.87	.85
24	.89	.88	.91	.71
25	.90	.71	.78	.57

Note: Each table entry represents the average probability that the less aggregate index system had a smaller MSE.

Hypothesis 7 tested if there were any firm and method interactions, within each industry. The ANOVA results indicated that interactions were present in each group of data. Table XXX indicates that in group 1, fifty-two of one hundred firms showed a higher average probability for the Fineness method versus the Non-Fineness method. Table XXXI indicates that in group 2, eighty-nine of one hundred firms showed a higher average probability for the Fineness method. Interestingly, the Fineness effect was most evident in the electric and telephone industries. Past analysis has shown the firms within these industries were more heterogeneous than firms in the gas or water industries.

Hypothesis 8 tested if, within each industry, there were any firm and comparison interactions. The ANOVA results indicated that, in both groups of data, interactions were present. Table XXXII indicates that in group 1, ninety-one of one hundred firms showed the same general (although not exact) trend. That is, increasing the number of indices improved valuation accuracy. Table XXXIII indicates that in group 2, ninety-three of one hundred firms showed a similar trend. Of the few firms that did not exhibit the general trend, most were firms where the use of more indices resulted in the same level of accuracy. Even though interactions were present, Tables XXXII and XXXIII indicate that nearly all firms showed a similar general trend.

Summarizing, the analysis of groups 1 and 2 resulted in

TABLE XXX
 GROUP 1 FIRM AVERAGE PROBABILITIES FOR
 THE FINENESS AND NON-FINENESS
 METHODS

Firm Number	Electric		Gas		Telephone		Water	
	F	NF	F	NF	F	NF	F	NF
1	.61	.62	.70	.71	.75	.73	.90	.85
2	.36	.83	.85	.82	.83	.80	.66	.65
3	.63	.64	.43	.44	.41	.39	.71	.70
4	.92	.86	.49	.51	.72	.70	.69	.69
5	.55	.65	.60	.61	.71	.69	.32	.33
6	.78	.76	.86	.84	.41	.40	.68	.69
7	.81	.79	.43	.44	.30	.28	.70	.72
8	.90	.86	.54	.54	.37	.35	.53	.54
9	.69	.69	.87	.86	.42	.42	.38	.38
10	.84	.82	.78	.76	.72	.71	.80	.77
11	.91	.86	.40	.39	.83	.79	.67	.67
12	.87	.83	.72	.69	.78	.77	.77	.76
13	.73	.75	.73	.71	.67	.67	.90	.87
14	.92	.86	.51	.52	.49	.48	.52	.52
15	.68	.69	.42	.42	.91	.86	.22	.23
16	.66	.68	.73	.73	.66	.67	.61	.60
17	.91	.85	.36	.39	.78	.75	.49	.50
18	.70	.73	.62	.62	.69	.68	.68	.68
19	.89	.86	.70	.70	.70	.69	.23	.22
20	.39	.85	.85	.83	.80	.78	.61	.62
21	.62	.63	.34	.35	.73	.71	.61	.61
22	.75	.75	.73	.75	.78	.75	.65	.66
23	.89	.84	.59	.61	.87	.84	.83	.81
24	.71	.72	.79	.79	.67	.65	.65	.66
25	.91	.85	.52	.52	.72	.73	.69	.69

Note: "F" denotes the Fineness method and "NF" denotes the Non-Fineness method.

TABLE XXXI
 GROUP 2 FIRM AVERAGE PROBABILITIES FOR
 THE FINENESS AND NCN-FINENESS
 METHODS

Firm Number	Electric		Gas		Telephone		Water	
	F	NF	F	NF	F	NF	F	NF
1	.75	.72	.72	.73	.90	.86	.85	.83
2	.97	.90	.87	.85	.93	.87	.78	.75
3	.73	.71	.84	.80	.87	.83	.62	.64
4	.98	.90	.80	.80	.92	.87	.59	.59
5	.81	.78	.79	.78	.90	.85	.67	.67
6	.93	.87	.90	.86	.92	.86	.81	.78
7	.87	.83	.81	.80	.88	.84	.83	.80
8	.95	.88	.83	.81	.81	.77	.67	.66
9	.92	.87	.90	.88	.72	.68	.78	.75
10	.93	.88	.57	.59	.94	.89	.82	.79
11	.92	.88	.79	.78	.77	.75	.89	.85
12	.96	.90	.78	.75	.86	.81	.91	.87
13	.86	.83	.81	.79	.89	.85	.70	.71
14	.94	.87	.82	.78	.93	.87	.71	.71
15	.72	.70	.80	.76	.93	.88	.80	.78
16	.92	.88	.77	.76	.89	.86	.63	.62
17	.95	.89	.82	.80	.93	.87	.69	.66
18	.78	.76	.78	.75	.88	.86	.92	.89
19	.97	.90	.80	.77	.89	.86	.85	.82
20	.96	.89	.90	.86	.92	.88	.69	.67
21	.87	.82	.75	.73	.92	.87	.94	.88
22	.81	.78	.90	.85	.91	.85	.77	.76
23	.98	.91	.81	.81	.90	.85	.87	.82
24	.91	.86	.90	.86	.93	.89	.71	.71
25	.93	.88	.71	.70	.79	.78	.55	.58

Note: "F" denotes the Fineness method and "NF" denotes the Non-Fineness method.

TABLE XXII
 GROUP 1 FIRM AVERAGE COMPARISON
 PROBABILITIES

Firm Number	Electric		Gas		Telephone		Water	
	4x1	2x1	4x1	2x1	4x1	2x1	4x1	2x1
1	.80	.40	.90	.53	.90	.60	1.0	.73
2	1.0	.80	1.0	.93	1.0	.66	.80	.66
3	.70	.73	.40	.13	.40	.26	.80	.66
4	1.0	.86	.60	.13	.80	.60	.80	.66
5	.80	.53	.90	.33	.90	.60	.20	.20
6	.90	.73	1.0	.80	.40	.20	.90	.73
7	.90	.86	.40	.13	.10	.13	1.0	.60
8	1.0	.86	.60	.53	.30	.20	.60	.60
9	.80	.66	1.0	1.0	.40	.26	.30	.46
10	1.0	.66	.90	.66	.80	.66	1.0	.73
11	1.0	.80	.30	.06	1.0	.60	.90	.40
12	1.0	.80	.90	.26	.90	.73	1.0	.66
13	.90	.66	.90	.53	.80	.60	1.0	.80
14	1.0	.86	.70	.06	.60	.40	.60	.40
15	.80	.73	.30	.00	1.0	.80	.00	.06
16	.80	.53	.90	.66	.80	.60	.70	.60
17	1.0	.86	.40	.06	.90	.66	.50	.40
18	.90	.66	.80	.13	.80	.60	.90	.53
19	1.0	.86	.90	.53	.80	.60	.00	.06
20	1.0	.86	1.0	1.0	1.0	.73	.80	.60
21	.80	.46	.30	.13	.90	.60	.80	.40
22	.90	.66	.90	.80	.90	.66	.80	.66
23	1.0	.80	.80	.26	1.0	.86	1.0	.66
24	.90	.66	1.0	.80	.80	.66	.80	.60
25	1.0	.80	.60	.33	.90	.73	.90	.60

Note: Due to space limitations, only comparisons 4x1 and 2x1 are presented in this table. These comparisons were the two extremes among the six comparisons.

TABLE KXXIII
 GROUP 2 FIRM AVERAGE COMPARISON
 PROBABILITIES

Firm Number	Electric		Gas		Telephone		Water	
	4x1	2x1	4x1	2x1	4x1	2x1	4x1	2x1
1	.90	.40	.90	.53	1.0	.93	1.0	.73
2	1.0	.93	1.0	.86	1.0	.86	.90	.60
3	.80	.66	1.0	.66	1.0	.73	.80	.53
4	1.0	1.0	1.0	.66	1.0	.86	.70	.46
5	.90	.73	.90	.66	1.0	.86	.90	.33
6	1.0	.86	1.0	.86	1.0	.86	1.0	.73
7	1.0	.66	1.0	.66	1.0	.66	1.0	.73
8	1.0	.80	1.0	.73	.90	.66	.80	.33
9	1.0	.93	1.0	1.0	.80	.46	.90	.73
10	1.0	.86	.70	.26	1.0	1.0	1.0	.66
11	1.0	.93	.90	.66	.90	.60	1.0	.80
12	1.0	.93	.90	.60	1.0	.66	1.0	.93
13	1.0	.86	.90	.66	1.0	.86	.90	.46
14	1.0	.86	.90	.66	1.0	.80	.90	.40
15	.80	.60	.90	.60	1.0	.93	1.0	.66
16	1.0	.93	.90	.73	1.0	.86	.80	.26
17	1.0	.93	1.0	.66	1.0	.86	.80	.53
18	.90	.60	.90	.60	1.0	.93	1.0	1.0
19	1.0	1.0	.90	.53	1.0	.93	1.0	.80
20	1.0	.93	1.0	.93	1.0	.93	.80	.40
21	1.0	.66	.90	.53	1.0	.86	1.0	1.0
22	.90	.66	1.0	.86	1.0	.80	.90	.80
23	1.0	1.0	1.0	.73	1.0	.80	1.0	.73
24	1.0	.80	1.0	.86	1.0	.93	.80	.66
25	1.0	.86	.80	.46	.90	.66	.70	.33

Note: Due to space limitations, only comparisons 4x1 and 2x1 are presented in this table. These comparisons were the two extremes among the six comparisons.

nine similar conclusions for each data group. Those conclusions were as follows:

- 1) a. Globally, increasing the number of indices significantly improved valuation accuracy.
b. Although some interactions were present, the above conclusion was valid for each industry.
c. Although some interactions were present, the above conclusion was valid for nearly all firms within each industry.
- 2) a. Globally, increasing index fineness slightly improved valuation accuracy.
b. Although some interactions were present, the above conclusion was valid for each industry.
c. In group 1, strong firm and method interaction prohibited the above conclusion from being generalized to all firms within each industry. In group 2, because the interaction present was minimal, the above conclusion could be generalized to most firms.
- 3) a. Industries were, on average, significantly different.
b. Within each industry, firm average probabilities were quite heterogeneous.
- 4) In industries where the firms were more heterogeneous, the improvement in accuracy caused by increasing the number of price indices was more pronounced than in other industries.

Analysis of Data Groups 3 and 4

The analysis of data groups 1 and 2 was performed to determine to what extent "n" index valuation was more accurate than "m" index valuation ($m < n$). Results of that analysis suggested that a moderate increase in the number of indices used significantly improved the probability that the valuations performed with "n" indices would be more accurate than valuations performed with "m" indices ($m < n$). Thus, it was concluded that increasing the number of indices used significantly improved the probability that a "more accurate" valuation would result. The next concern was to assess how "more accurate" were valuations using "n" indices versus "m" indices ($m < n$).

Data groups 3 and 4 were used to address the above concern. Recall that data group 3 was generated in exactly the same manner as data group 1 except that absolute differences in Bias of .01 or less were not considered material. Data group 4 was generated in exactly the same manner as data group 2 except that differences in MSE of .0001 or less were not considered material.

Tables XXXIV, XXXV, XXXVI, and XXXVII display the group 3 (Bias) probability data for the electric, gas, telephone, and water industries respectively. Tables XXXVIII, XXXIX, XL, and XLI display the group 4 (MSE) probability data for the electric, gas, telephone, and water industries respectively. The data were somewhat surprising.

TABLE XXXIV
GROUP 3 - ELECTRIC DATA

Firm Number	Index Systems Compared											
	2x1		3x2		4x3		3x1		4x2		4x1	
	F	NF	F	NF	F	NF	F	NF	F	NF	F	NF
EF1	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
EF2	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
EF3	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
EF4	.00	.00	.06	.10	.08	.11	.24	.24	.24	.28	.60	.60
EF5	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
EF6	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
EF7	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
EF8	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
EF9	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
EF10	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
EF11	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
EF12	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
EF13	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
EF14	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
EF15	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
EF16	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
EF17	.13	.13	.18	.26	.20	.28	.40	.40	.45	.50	.70	.70
EF18	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
EF16	.13	.13	.13	.21	.11	.18	.40	.40	.35	.42	.70	.70
EF20	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
EF21	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
EF22	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
EF23	.06	.06	.06	.12	.10	.13	.23	.28	.27	.28	.60	.60
EF24	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
EF25	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00

Note: "F" denotes the Fineness method and "NF" denotes the Non-Fineness method. Each table entry represents the probability that the less aggregate index system absolute Bias was smaller than the more aggregate index system absolute Bias by more than .01.

TABLE XXXV
GROUP 3- GAS DATA

Firm Number	Index Systems Compared											
	2x1		3x2		4x3		3x1		4x2		4x1	
	F	NF	F	NF	F	NF	F	NF	F	NF	F	NF
GF1	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
GF2	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
GF3	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
GF4	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
GF5	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
GF6	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
GF7	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
GF8	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
GF6	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
GF10	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
GF11	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
GF12	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
GF13	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
GF14	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
GF15	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
GF16	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
GF17	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
GF18	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
GF16	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
GF20	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
GF21	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
GF22	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
GF23	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
GF24	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
GF25	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00

Note: "F" denotes the Fineness method and "NF" denotes the Non-Fineness method. Each table entry represents the probability that the less aggregate index system absolute Bias was smaller than the more aggregate index system absolute Bias by more than .01.

TABLE XXXVI
GROUP 3- TELEPHONE DATA

Firm Number	Index Systems Compared											
	2x1		3x2		4x3		3x1		4x2		4x1	
	F	NF	F	NF	F	NF	F	NF	F	NF	F	NF
TF1	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
TF2	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
TF3	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
TF4	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
TF5	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
TF6	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
TF7	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
TF8	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
TF6	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
TF10	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
TF11	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
TF12	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
TF13	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
TF14	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
TF15	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
TF16	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
TF17	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
TF18	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
TF16	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
TF20	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
TF21	.00	.00	.04	.11	.07	.15	.00	.00	.12	.18	.00	.00
TF22	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
TF23	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
TF24	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
TF25	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00

Note: "F" denotes the Fineness method and "NF" denotes the Non-Fineness method. Each table entry represents the probability that the less aggregate index system absolute Bias was smaller than the more aggregate index system absolute Bias by more than .01.

TABLE XXXVII
GROUP 3- WATER DATA

Firm Number	Index Systems Compared											
	2x1		3x2		4x3		3x1		4x2		4x1	
	F	NF	F	NF	F	NF	F	NF	F	NF	F	NF
WF1	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
WF2	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
WF3	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
WF4	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
WF5	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
WF6	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
WF7	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
WF8	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
WF6	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
WF10	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
WF11	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
WF12	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
WF13	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
WF14	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
WF15	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
WF16	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
WF17	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
WF18	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
WF16	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
WF20	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
WF21	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
WF22	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
WF23	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
WF24	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
WF25	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00

Note: "F" denotes the Fineness method and "NF" denotes the Non-Fineness method. Each table entry represents the probability that the less aggregate index system absolute Bias was smaller than the more aggregate index system absolute Bias by more than .01.

TABLE XXXVIII
GROUP 4- ELECTRIC DATA

Firm Number	Index Systems Compared											
	2x1		3x2		4x3		3x1		4x2		4x1	
	F	NF	F	NF	F	NF	F	NF	F	NF	F	NF
EF1	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
EF2	.13	.13	.08	.16	.03	.10	.44	.44	.27	.34	.80	.80
EF3	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
EF4	.60	.60	.54	.56	.40	.48	.62	.62	.84	.80	1.0	1.0
EF5	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
EF6	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
EF7	.00	.00	.00	.01	.01	.03	.00	.00	.07	.08	.00	.00
EF8	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
EF6	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
EF10	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
EF11	.13	.13	.06	.12	.10	.13	.28	.28	.25	.28	.60	.60
EF12	.33	.33	.36	.46	.26	.36	.80	.80	.68	.68	1.0	1.0
EF13	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
EF14	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
EF15	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
EF16	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
EF17	.66	.66	.56	.62	.46	.56	.62	.62	.84	.82	1.0	1.0
EF18	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
EF16	.66	.66	.64	.65	.53	.58	.66	.66	.87	.84	1.0	1.0
EF20	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
EF21	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
EF22	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
EF23	.46	.46	.61	.62	.55	.56	.66	.66	.85	.82	1.0	1.0
EF24	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
EF25	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00

Note: "F" denotes the Fineness method and "NF" denotes the Non-Fineness method. Each table entry represents the probability that the less aggregate index system MSE was smaller than the more aggregate index system MSE by more than .0001.

TABLE XXXIX
GROUP 4- GAS DATA

Firm Number	Index Systems Compared											
	2x1		3x2		4x3		3x1		4x2		4x1	
	F	NF	F	NF	F	NF	F	NF	F	NF	F	NF
GF1	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
GF2	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
GF3	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
GF4	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
GF5	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
GF6	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
GF7	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
GF8	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
GF6	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
GF10	.00	.00	.01	.01	.05	.07	.00	.00	.04	.04	.00	.00
GF11	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
GF12	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
GF13	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
GF14	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
GF15	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
GF16	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
GF17	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
GF18	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
GF16	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
GF20	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
GF21	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
GF22	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
GF23	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
GF24	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
GF25	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00

Note: "F" denotes the Fineness method and "NF" denotes the Non-Fineness method. Each table entry represents the probability that the less aggregate index system MSE was smaller than the more aggregate index system MSE by more than .0001.

TABLE XL
GROUP 4- TELEPHONE DATA

Firm Number	Index Systems Compared											
	2x1		3x2		4x3		3x1		4x2		4x1	
	F	NF	F	NF	F	NF	F	NF	F	NF	F	NF
TF1	.13	.13	.21	.31	.25	.38	.40	.40	.51	.57	.70	.70
TF2	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
TF3	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
TF4	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
TF5	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
TF6	.20	.20	.13	.24	.13	.21	.48	.48	.40	.46	.80	.80
TF7	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
TF8	.06	.06	.10	.14	.11	.16	.32	.32	.30	.31	.70	.70
TF6	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
TF10	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
TF11	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
TF12	.00	.00	.06	.15	.08	.16	.32	.32	.28	.32	.70	.70
TF13	.13	.13	.17	.24	.23	.34	.40	.40	.44	.50	.70	.70
TF14	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
TF15	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
TF16	.40	.40	.37	.48	.38	.50	.72	.72	.68	.71	.60	.60
TF17	.46	.46	.41	.55	.35	.48	.76	.76	.71	.75	.60	.60
TF18	.26	.26	.33	.41	.38	.50	.52	.52	.64	.66	.80	.80
TF16	.26	.25	.33	.41	.33	.42	.56	.56	.61	.64	.80	.80
TF20	.06	.06	.06	.07	.03	.05	.28	.28	.18	.18	.60	.60
TF21	.66	.66	.52	.61	.43	.56	.66	.66	.80	.80	1.0	1.0
TF22	.46	.45	.34	.50	.31	.46	.76	.76	.65	.70	.60	.60
TF23	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
TF24	.40	.40	.34	.46	.33	.43	.72	.72	.68	.70	.60	.60
TF25	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00

Note: "F" denotes the Fineness method and "NF" denotes the Non-Fineness method. Each table entry represents the probability that the less aggregate index system MSE was smaller than the more aggregate index system MSE by more than .0001.

TABLE XLI
GROUP 4- WATER DATA

Firm Number	Index Systems Compared											
	2x1		3x2		4x3		3x1		4x2		4x1	
	F	NF	F	NF	F	NF	F	NF	F	NF	F	NF
WF1	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
WF2	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
WF3	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
WF4	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
WF5	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
WF6	.00	.00	.00	.01	.00	.02	.00	.00	.04	.04	.00	.00
WF7	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
WF8	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
WF9	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
WF10	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
WF11	.13	.13	.06	.11	.05	.05	.44	.44	.17	.20	.80	.80
WF12	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
WF13	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
WF14	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
WF15	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
WF16	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
WF17	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
WF18	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
WF19	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
WF20	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
WF21	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
WF22	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
WF23	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
WF24	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
WF25	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00

Note: "F" denotes the Fineness method and "NF" denotes the Non-Fineness method. Each table entry represents the probability that the less aggregate index system MSE was smaller than the more aggregate index system MSE by more than .0001.

Because so little variation was evident within most industries, the original ANOVA testing procedure was deemed inappropriate. Instead, only a general review of the data was performed.

Table XLII shows the average probabilities for data group 3. Table XLIII shows the average probabilities for data group 4. Both tables confirmed the same basic trends that were evident in data groups 1 and 2. Namely, increasing the number of indices did tend to improve accuracy and increasing index fineness had only marginal effect.

Interestingly, both tables show that for the two more homogeneous industries (gas and water), the probability of a material difference in absolute Bias or MSE was quite low. For the two more heterogeneous industries (electric and telephone) the Bias probabilities were quite low but the MSE probabilities were somewhat higher.

Summarizing, data groups 3 and 4 confirmed the trends first noticed in data groups 1 and 2. Further, these trends were more pronounced in the more heterogeneous industries (electric and telephone). However, data groups 3 and 4 cast considerable doubt as to whether increasing the number of indices used materially improved valuation accuracy.

Prediction Intervals

The analysis thus far has indicated that, generally, increasing the number of indices used, improved valuation

TABLE XLII
GROUP 3 AVERAGE PROBABILITIES

Industry Method		Index Systems Compared						Average
		2x1	3x2	4x3	3x1	4x2	4x1	
Electric	F	.01	.01	.02	.05	.05	.10	.04
	NF	.01	.02	.02	.05	.06	.10	.04
	Mean	.01	.02	.02	.05	.06	.10	.04
Gas	F	.00	.00	.00	.00	.00	.00	.00
	NF	.00	.00	.00	.00	.00	.00	.00
	Mean	.00	.00	.00	.00	.00	.00	.00
Telephone	F	.00	.00	.00	.00	.01	.00	.00
	NF	.00	.01	.01	.00	.01	.00	.01
	Mean	.00	.01	.01	.00	.01	.00	.01
Water	F	.00	.00	.00	.00	.00	.00	.00
	NF	.00	.00	.00	.00	.00	.00	.00
	Mean	.00	.00	.00	.00	.00	.00	.00
Overall	Mean	.00	.01	.01	.01	.02	.02	.01

Note: "F" denotes the Fineness method and "NF" denotes the Non-Fineness method. Each table entry represents the average probability that the less aggregate index system absolute Bias was smaller than the more aggregate index system absolute Bias by more than .01.

TABLE XLIII
GROUP 4 AVERAGE PROBABILITIES

Industry	Method	Index Systems Compared					Average	
		2x1	3x2	4x3	3x1	4x2		
Electric	F	.12	.11	.09	.21	.18	.25	.16
	NF	.12	.13	.11	.21	.18	.25	.17
	Mean	.12	.11	.10	.21	.18	.25	.16
Gas	F	.00	.00	.00	.00	.00	.00	.00
	NF	.00	.00	.00	.00	.00	.00	.00
	Mean	.00	.00	.00	.00	.00	.00	.00
Telephone	F	.14	.13	.13	.28	.27	.41	.23
	NF	.14	.18	.18	.28	.29	.41	.25
	Mean	.14	.16	.16	.28	.28	.41	.24
Water	F	.01	.00	.00	.01	.01	.03	.01
	NF	.05	.01	.00	.01	.01	.03	.02
	Mean	.03	.01	.00	.01	.01	.03	.02
Overall	Mean	.07	.07	.07	.13	.12	.17	.10

Note: "F" denotes the Fineness method and "NF" denotes the Non-Fineness method. Each table entry represents the average probability that the less aggregate index system MSE was smaller than the more aggregate index system MSE by more than .0001.

accuracy. However, because the average errors for the lower index systems tended to be quite small, the improvement tended to be minor.

As an example, Tables XLIV and XLV present the Bias and MSE one index figures for each firm. The Bias figures ranged from a high absolute value of .01810500 to a low absolute value of .00000221. The MSE figures ranged from a high of .00120668 to a low of .00000019. For the majority of firms, absolute Bias was less than .005 and MSE was less than .000025.

Consistent with the previous analysis, the more heterogeneous industries (electric and telephone) tended to have higher Bias and MSE figures. Alternatively, the more homogeneous industries (gas and water) tended to have lower Bias and MSE figures. Also, within each industry, firms whose vectors of asset proportions were most similar to the industry-wide vector of average asset proportions tended to have the smallest absolute Bias and MSE figures.

One limitation of the previous analysis is that means of error distributions were the basis of the many comparisons.² In any valuation process, one would be concerned with average error, but also, one would be concerned that any one year's error should not be excessively large. Accordingly, an analysis was performed for each firm to determine an error prediction interval for the one index configuration for Bias.³

If each industry's price change distributions were

TABLE XLIV
ONE INDEX ABSOLUTE BIAS

Firm Number	Electric	Gas	Industry Telephone	Water
1	.00045586	.00055120	.00416256	.00087076
2	.00589923	.00022467	.00097524	.00065226
3	.00044567	.00006480	.00012298	.00070012
4	.01252410	.00015060	.00138282	.00103407
5	.00087434	.00008525	.00144923	.00020535
6	.00231606	.00007589	.00022920	.00163580
7	.00385986	.00002205	.00009304	.00129886
8	.00285541	.00018550	.00023629	.00045988
9	.00079321	.00216346	.00007154	.00007605
10	.00144300	.00236592	.00101492	.00118890
11	.00660271	.00002792	.00110307	.00108871
12	.00848121	.00020677	.00481226	.00106322
13	.00122573	.00025923	.00200290	.00351244
14	.00245411	.00002178	.00035637	.00033324
15	.00017558	.00000221	.00359404	.00005431
16	.00113136	.00005180	.00378885	.00048017
17	.01810500	.00004398	.00034700	.00041164
18	.00140777	.00013148	.00459658	.00124959
19	.00014930	.00007545	.00431706	.00002351
20	.00276945	.00031650	.00407189	.00062884
21	.00064532	.00001056	.00936878	.00036990
22	.00159643	.00009218	.00682645	.00065427
23	.01234930	.00072604	.00418410	.00150862
24	.00205701	.00035138	.00364581	.00111651
25	.00218785	.00003163	.00243038	.00091759

TABLE XLV
ONE INDEX MSE

Firm Number	Electric	Gas	Industry Telephone	Water
1	.00000226	.00000706	.00020004	.00000629
2	.00015095	.00001654	.00000442	.00001795
3	.00000658	.00000744	.00000561	.00000341
4	.00051114	.00002603	.00002895	.00002975
5	.00000641	.00000039	.00003336	.00001709
6	.00002350	.00000019	.00016703	.00007382
7	.00009410	.00000047	.00007885	.00004934
8	.00003164	.00003945	.00013725	.00001756
9	.00000603	.00000886	.00000056	.00000936
10	.00001760	.00004374	.00002181	.00002096
11	.00012014	.00003432	.00000337	.00011312
12	.00028278	.00005367	.00011737	.00004452
13	.00000568	.00000207	.00016730	.00005383
14	.00001858	.00000254	.00002279	.00000807
15	.00000062	.00000586	.00004849	.00001626
16	.00002369	.00000223	.00004395	.00000732
17	.00009675	.00001271	.00005665	.00000896
18	.00001679	.00002315	.00003431	.00010033
19	.00077773	.00000034	.00003296	.00001238
20	.00003295	.00000512	.00001167	.00001061
21	.00000708	.00000040	.00012068	.00000992
22	.00001015	.00000444	.00003352	.00001314
23	.00063563	.00002891	.00000952	.00002977
24	.00007987	.00002364	.00003200	.00003342
25	.00001956	.00000059	.00000427	.00000746

multivariate normal, then the error distributions associated with each Bias measure (mean) were also normally distributed.⁴ Thus, prediction intervals were prepared assuming the error distributions were normally distributed. Table XLVI shows the probability, for each firm, that a random draw from the one index error distribution would not exceed various absolute values (one, two, and five percent). Clearly, within each industry, and for most firms, the chance that a particular absolute error would approach materiality was small.

Unfortunately, a Kolmogorov/Lilliefors test of normality disclosed that within each industry normality could be rejected for several of the five asset types. Thus, the prediction intervals based on the assumption of normality became suspect.

As an alternative procedure, a second set of prediction intervals were prepared based on Chebyshev's Inequality.⁵ This procedure had the advantage of being reliable for any type of distribution so long as the distribution had a finite variance (Hoel, 1971). Table XLVII presents the prediction intervals based on Chebyshev's Inequality. Again, except for a few firms, random absolute errors tended to be quite small and almost certainly less than five percent.⁶

Thus, it appears that even for the least accurate configuration (one index), errors of more than five percent were extremely unlikely for nearly all firms.

TABLE XLVI
PREDICTION INTERVALS ASSUMING NORMALITY

Firm	Industry											
	Electric			Gas			Telephone			Water		
	5%	2%	1%	5%	2%	1%	5%	2%	1%	5%	2%	1%
1	.99	.99	.99	.99	.99	.99	.99	.84	.51	.99	.99	.99
2	.99	.89	.57	.99	.99	.98	.99	.99	.99	.99	.99	.98
3	.99	.99	.99	.99	.99	.99	.99	.99	.99	.99	.99	.99
4	.97	.61	.33	.99	.99	.94	.99	.99	.93	.99	.99	.93
5	.99	.99	.99	.99	.99	.99	.99	.99	.91	.99	.99	.98
6	.99	.99	.96	.99	.99	.99	.99	.87	.55	.99	.97	.75
7	.99	.96	.69	.99	.99	.99	.99	.97	.73	.99	.99	.84
8	.99	.99	.92	.99	.99	.88	.99	.91	.60	.99	.99	.98
9	.99	.99	.99	.99	.99	.99	.99	.99	.99	.99	.99	.99
10	.99	.99	.98	.99	.99	.86	.99	.99	.96	.99	.99	.97
11	.99	.93	.62	.99	.99	.91	.99	.99	.99	.99	.93	.64
12	.99	.76	.43	.99	.99	.82	.99	.53	.63	.99	.99	.86
13	.99	.99	.99	.99	.99	.99	.99	.87	.55	.99	.99	.82
14	.99	.99	.98	.99	.99	.99	.99	.99	.96	.99	.99	.99
15	.99	.99	.99	.99	.99	.99	.99	.99	.84	.99	.99	.98
16	.99	.99	.95	.99	.99	.99	.98	.65	.36	.99	.99	.99
17	.89	.46	.24	.99	.99	.99	.96	.59	.32	.99	.99	.99
18	.99	.99	.98	.99	.99	.96	.99	.71	.40	.99	.95	.68
19	.92	.52	.27	.99	.99	.99	.99	.72	.41	.99	.99	.99
20	.99	.99	.91	.99	.99	.99	.99	.93	.64	.99	.99	.99
21	.99	.99	.99	.99	.99	.99	.84	.42	.21	.99	.99	.99
22	.99	.99	.99	.99	.99	.99	.99	.72	.40	.99	.99	.99
23	.95	.56	.30	.99	.99	.93	.99	.95	.68	.99	.99	.93
24	.99	.97	.73	.99	.99	.95	.99	.73	.41	.99	.99	.91
25	.99	.99	.97	.99	.99	.99	.99	.99	.87	.99	.99	.99

Note: The table entries represent the minimum probability that a single random error would not exceed the indicated absolute percentage. For example, for electric firm number one, the probability that a random error would not exceed an absolute value of five percent was greater than or equal to 99%.

TABLE XLVII
CHEBYSHEV PREDICTION INTERVALS

Firm	Industry											
	Electric			Gas			Telephone			Water		
	5%	2%	1%	5%	2%	1%	5%	2%	1%	5%	2%	1%
1	.99	.99	.97	.99	.98	.92	.91	.27	.00	.99	.98	.93
2	.94	.41	.00	.99	.95	.82	.99	.99	.95	.99	.95	.79
3	.99	.98	.93	.99	.98	.92	.99	.98	.94	.99	.99	.96
4	.74	.00	.00	.98	.93	.73	.98	.92	.63	.98	.92	.64
5	.99	.98	.93	.99	.99	.99	.98	.90	.57	.99	.95	.82
6	.99	.94	.69	.99	.99	.99	.93	.57	.00	.96	.78	.00
7	.96	.69	.00	.99	.99	.99	.96	.80	.19	.97	.86	.37
8	.98	.92	.54	.98	.89	.59	.94	.64	.00	.99	.95	.80
9	.99	.98	.93	.99	.98	.93	.99	.99	.99	.99	.97	.90
10	.99	.95	.73	.98	.87	.34	.99	.94	.74	.99	.94	.74
11	.95	.57	.00	.98	.91	.65	.99	.99	.97	.95	.68	.00
12	.87	.00	.00	.97	.86	.44	.95	.59	.00	.98	.87	.45
13	.99	.98	.94	.99	.99	.97	.92	.49	.00	.98	.84	.01
14	.99	.95	.78	.99	.99	.97	.99	.94	.75	.99	.97	.91
15	.99	.99	.99	.99	.98	.94	.98	.86	.13	.99	.95	.83
16	.99	.93	.71	.99	.99	.97	.80	.00	.00	.99	.98	.92
17	.37	.00	.00	.99	.96	.87	.71	.00	.00	.99	.97	.90
18	.99	.95	.79	.99	.94	.76	.84	.00	.00	.95	.71	.00
19	.68	.00	.00	.99	.99	.99	.85	.00	.00	.99	.96	.87
20	.98	.91	.51	.99	.98	.94	.95	.60	.00	.99	.97	.88
21	.99	.98	.92	.99	.99	.99	.32	.00	.00	.99	.97	.89
22	.99	.97	.89	.99	.93	.95	.84	.00	.00	.99	.96	.85
23	.65	.00	.00	.98	.92	.66	.90	.68	.00	.98	.91	.61
24	.96	.76	.00	.99	.93	.74	.85	.00	.00	.98	.90	.59
25	.99	.95	.75	.99	.99	.99	.98	.88	.35	.99	.98	.91

Note: The table entries represent the minimum probability that a single random error would not exceed the indicated absolute percentage. For example, for electric firm number one, the probability that a random error would not exceed an absolute value of five percent was greater than or equal to 99%.

Summary of Results

Analysis of data groups 1 and 2 indicated that a moderate increase in the number of indices significantly improved the chance that accuracy would be improved. Improving index fineness had only a small effect. These results were valid globally, for each industry, and for most firms within each industry. Analysis of data groups 3 and 4 confirmed the trends exhibited by data groups 1 and 2 but, also questioned whether increasing the number of indices materially improved accuracy. The prediction intervals constructed for errors resulting from the use of one index (within each industry) to value all industry assets indicated that (for most firms) there was only a remote chance that any single error would exceed five percent.

NOTES

¹Significance levels reported in Table XXIV are those for a regular ANOVA. However, because the cell observations consisted of percentage data, there was some concern that cell variances would not be sufficiently stable so that the related F-test results would be reliable. Accordingly, a second ANOVA was performed using an arc sine transformation suggested in Neter and Wasserman (1974). This transformation has the effect of tending to stabilize cell variances. The ANOVA results from the second (transformed) analysis were consistent with the initial analysis.

²Bias and MSE represented the means of particular error distributions associated with a particular firm and configuration combination.

³The one index configuration was selected because past analysis showed this configuration to be prone to the largest errors. Prediction intervals were prepared for the distributions associated with each Bias measure. Because variance estimates were not available, prediction intervals were not prepared for the distributions associated with MSE.

⁴If a linear transformation is made of a multivariate normal distribution, the resulting distribution is also normally distributed (Morrison, 1967). Referring to the calculation formula for Bias in Chapter II, it can be seen, that for each firm, Bias is calculated as a linear transformation of the mean price change vector.

⁵One form of Chebyshev's Inequality states:

$$P(|X - \mu| \geq t) \leq \frac{\sigma^2}{t^2} \cdot$$

This inequality holds whenever X is a random variable having a finite mean and variance and t is any real number greater than zero. This expression can be manipulated to arrive at:

$$P(-t + \mu \leq X \leq t + \mu) \geq 1 - \frac{\sigma^2}{t^2} \cdot$$

The latter form was used in constructing the prediction intervals.

Inasmuch as the above inequality requires a symmetric area about the distribution mean, the prediction intervals

were constructed so that one tail extended to +5% or -5% and the other tail was somewhat less than -5% or +5%, respectively. For example, the ore index configuration for Efl had a mean of +.000455865 and a variance of .00000206037. The factor "t" was selected to be .0495442. Thus, the lower prediction interval bound was -.0490884 (-.0495442 + .000455865) and the upper bound was +.05 (+.0495442 + .000455865). All numbers between these two bounds were obviously .05 or less in absolute value. However, these two bounds did not include all numbers whose absolute value was less than or equal to .05. Numbers between -.0490884 and -.05 were omitted. Thus, the prediction intervals were conservative. That is, the stated probability of being between $\pm 5\%$ was understated.

*The prediction intervals based on Chebyshev's Inequality indicated there was a high probability that a random error would be less than $\pm 5\%$. Normally, because of its generality, one would have expected that prediction intervals based on Chebyshev's Inequality would have been poor. However, the prediction intervals in this study were generally very good. This result was due to the fact that most error distribution variances were less than .0001.

The price data variance/covariance matrices presented in Chapter III have shown that entries therein tended to be .001 or greater. Yet, error distribution variances tended to be .0001 or less. Because the actual errors comprising the various error distributions were linear combinations of the yearly price changes, it may seem unusual that the variances of these errors were generally no more than 1/10 the size of the price variances. There were two reasons for this result. First, the linear factors were all fractions. Hence, only a fraction of the price variances contributed to the error variance. Secondly, some of the linear factors were negative. This occurred when a firm's proportion of asset cost was less than the economy-wide proportion. Thus, many of the covariance entries resulted in a negative contribution to error variance. (This result is analogous to the portfolio effect when one security is purchased and then a second security, with a high positive correlation to the first, is sold short. The result should be a two security portfolio with a small variance in its returns.)

CHAPTER V

SUMMARY AND CONCLUSIONS

Many prior studies have hinted that disaggregation of asset groupings may not appreciably improve valuation accuracy. Sunder (1978) has shown that disaggregation can, under certain circumstances, result in less accurate valuations. This study has sought to provide some empirical evidence as to whether or not "n" index valuation is consistently more accurate than "m" index valuation ($m < n$). A second objective was to assess the extent to which "n" index valuation is significantly more accurate than "m" index valuation.

Summary of Research

To address the objectives stated above, four public utility industries (electric, gas pipeline, telephone, and water) were selected for study. Twenty-five firms within each industry were randomly selected. Asset price and proportion data were gathered; and for each firm two alternative measures of error were estimated (Bias and MSE).

The error measures were then used to estimate probabilities, for each firm, that using more indices would result in less average error. The resulting firm specific

probabilities were analyzed using an ANOVA procedure. Where main effect differences were noted, Duncan's test was performed to determine which effects were significantly different.

Inasmuch as the analytical model used herein was a one period model and assumed no asset additions or retirements, caution should be exercised in extending study conclusions beyond the scope of such a simple model. The limitations of a one period model are especially critical when one considers that a one percent error for one year is probably not material, but that a one percent error in each of ten consecutive years may be material. Other important limitations were discussed in Chapter III.

Conclusions

Analyses indicated that, globally, increasing the number of price indices significantly improved the probability that a more accurate valuation would result. This conclusion was valid for each individual industry and also for most firms within each industry.

Globally, and for each industry, increasing index fineness slightly improved average valuation accuracy. However, firm specific calculations indicated that for many firms, improving index fineness did not improve valuation accuracy.

In industries where the firms were more heterogeneous, results indicated that the improvement in accuracy caused by

increasing the number of price indices was more pronounced than in industries with less heterogeneous firms.

Results also indicated that even though valuation accuracy was often improved by increasing the number of indices, the improvement tended to be, on average, quite small. In fact, error prediction intervals constructed indicated that, for most firms, the use of one index to value all assets would almost always result in a valuation error of less than five percent. These results are especially important when one considers that the asset categories used in this study, on average, accounted for 40% of each electric firm's plant in service, 71% of each gas firm's plant in service, 66% of each telephone firm's plant in service, and 78% of each water firm's plant in service.

Summarizing, the study indicated that increasing the number of price indices did improve valuation accuracy. However, this improvement tended to be quite small. The study results suggest that using one index for each industry might obtain suitably accurate valuations.

Implications for Future Research

The results suggest at least two areas deserving further research. First, a more powerful analytical model should be developed. Such a model should allow for asset additions and retirements, and also be able to estimate multi-period effects. If such a model were developed, results derived from its use should be more conclusive than

those contained herein. Secondly, the implication that one index would be sufficient for each industry suggests that studies should be performed to determine if, perhaps, one index would be sufficient for groups of industries. If results were positive, a logical extension would be to determine if a general price level index would result in suitably accurate valuations. If results were again positive, the arguments between current cost and general price level adjustment proponents would become moot.

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APPENDIX

BIAS AND MSE FIGURES

ELECTRIC INDUSTRY ONE INDEX BIAS

FIRM 1	FIRM 2	FIRM 3	FIRM 4	FIRM 5	FIRM 6	FIRM 7	FIRM 8	FIRM 9	FIRM10
0.455865D-03	-.589923D-02	0.445674D-03	0.125241D-01	-.874348D-03	0.231606D-02	-.385986D-02	-.285541D-02	-.793217D-03	-.144306D-02

FIRM11	FIRM12	FIRM13	FIRM14	FIRM15	FIRM16	FIRM17	FIRM18	FIRM19	FIRM20
0.660271D-02	6.848121D-02	0.122573D-02	0.245411D-02	-.175585D-03	0.113136D-02	0.181050D-01	-.140777D-02	0.149307D-03	-.276945D-02

FIRM21	FIRM22	FIRM23	FIRM24	FIRM25	AVERAGE
0.645326D-03	-.159643D-02	0.123493D-01	-.205701D-02	0.218785D-02	0.240495D-02

ELECTRIC INDUSTRY TWO INDEX BIAS

FIRM 1	FIRM 2	FIRM 3	FIRM 4	FIRM 5	FIRM 6	FIRM 7	FIRM 8	FIRM 9	FIRM10
0.2268960-03	-5674290-02	-3247960-03	0.1173790-01	-1182200-02	0.2316360-02	-2201610-02	-2291010-02	-7795030-03	-1023460-02
0.9284170-03	-3413790-02	0.1370390-02	0.7736860-02	-5448500-03	0.1834770-02	-3692470-02	-2076630-02	-7690110-03	-7740390-03
0.4960770-03	-6063560-02	0.4225430-03	0.1267350-01	-5441140-03	0.2422660-02	-3846470-02	-2865170-02	-7641130-03	-144720-02
0.4654870-03	-5171860-02	0.4445690-03	0.1168730-01	-8068790-03	0.2217620-02	-3263210-02	-2579040-02	-1058430-02	-1042490-02
-2346350-03	-1566850-02	0.6328140-04	0.2802490-02	0.3129180-03	-5373840-04	-1741710-02	-9106380-03	0.3289670-03	-1047360-02
0.5392400-03	-2443760-02	-7175110-04	0.5123360-02	-1129050-02	0.1739510-02	-1587100-03	-7300290-03	-7352390-03	0.2448520-03
0.2633300-03	-5412900-02	0.1750020-03	0.1183620-01	-8146060-02	0.2062380-02	-3190680-02	-2593570-02	-8567050-03	-1255610-02
0.4224740-03	-6042870-02	0.3413340-03	0.1261780-01	-9131430-03	0.2339670-02	-3777610-02	-2844970-02	-7278430-02	-1481950-02
0.4945500-03	-4271660-02	0.1460640-02	0.9306430-02	0.1420200-03	0.1235390-02	-5453990-02	-2840140-02	-3028730-03	-1910240-02
0.5220990-03	-2216110-02	0.1479720-02	0.6913370-02	0.1283790-03	0.9392710-03	-3828890-02	-2071660-02	-1029780-02	-8068100-03
0.7947620-03	-5725530-02	0.1155380-02	0.1385030-01	-5926470-03	0.2181730-02	-5148350-02	-2916220-02	-1450790-03	-1882310-02
0.4474990-03	-5905910-02	0.4343730-03	0.1252150-01	-8714540-03	0.2308500-02	-3950470-02	-2853090-02	-7875920-03	-1447660-02
0.5722040-03	-5728310-02	0.3824870-03	0.1222060-01	-1099600-02	0.2519990-02	-3320790-02	-2648660-02	-9384890-03	-1116660-02
0.5025810-03	-5165130-02	-5822350-04	0.8314560-02	-1078740-02	0.2210970-02	-2406230-02	-1778320-02	0.2338830-03	-1249830-02
0.2680220-04	-1804550-04	0.1820170-03	0.2546800-02	-1203590-03	0.3113210-03	-8648410-05	-4183510-02	-1106320-02	-4466270-03
0.4311590-03	-4321040-02	0.4970380-03	0.9259260-02	-6402880-03	0.1765680-02	-3059420-02	-2161150-02	-6292340-03	-1052940-02

FIRM11	FIRM12	FIRM13	FIRM14	FIRM15	FIRM16	FIRM17	FIRM18	FIRM19	FIRM20
0.6577770-02	0.8316610-02	0.1479740-02	0.2118650-02	0.4875770-04	0.9483980-03	0.1715770-01	-1764900-02	0.1385360-01	-2495820-02
0.3267050-02	0.5454770-02	0.5535080-04	0.1274490-02	-4168210-03	-2225570-03	0.1288110-01	0.9866810-03	0.9611120-02	-1011730-02
0.6608850-02	0.8741100-02	0.1237320-02	0.2367030-02	-1728760-03	0.9149520-03	0.1829220-01	-1350560-02	0.1517400-01	-2747290-02
0.6137010-02	0.7778270-02	0.1076920-02	0.2423050-02	-1566230-03	0.1277260-02	0.1806110-01	-9917510-03	0.1377900-01	-2326660-02
0.1570930-02	0.1343420-02	0.5096160-03	0.8947250-03	-4491030-04	0.1631230-02	0.1539460-02	-1566430-02	0.3286790-02	-1528630-04
0.2546700-02	0.4501700-02	0.3631440-03	0.3313440-03	0.8679010-05	-8857350-03	0.9840520-02	0.7098950-03	0.6277520-02	-8391710-04
0.6577550-02	0.7792910-02	0.1305510-02	0.2519590-02	-8718740-04	0.1569210-02	0.1725880-01	-1694960-02	0.1389340-01	-2706520-02
0.6662550-02	0.8627200-02	0.1295850-02	0.2416000-02	-1496680-03	0.1066800-02	0.1798740-01	-1555880-02	0.1506030-02	-2838340-02
0.4747630-02	0.5487500-02	0.5072710-03	0.2261110-02	-4623090-03	0.1368140-02	0.1201640-01	-9379550-03	0.1128590-01	-2626200-02
0.3562150-02	0.3465470-01	0.7867190-04	0.2170770-02	-4155810-03	0.1831460-02	0.1176750-01	0.2281160-03	0.8008760-02	-1392540-02
0.4682860-02	0.7835470-02	0.6871210-03	0.1625850-02	-4050650-03	-3023420-03	0.1421470-01	-5644960-03	0.1359730-01	-2476620-02
0.6009960-02	0.8474340-02	0.1231720-02	0.2457820-02	-1724750-03	0.1144520-02	0.1807090-01	-1432800-02	0.1492310-01	-2780650-02
0.6395220-02	0.8588450-02	0.1131490-02	0.2193560-02	-1523070-02	0.6897680-03	0.1857180-01	-9030530-03	0.1461440-01	-2336500-02
0.3592860-02	0.7144890-02	0.9226090-02	0.4822300-03	-6391980-04	-1457150-02	0.1014620-01	-8490730-03	0.1064240-01	-1750190-02
0.2116540-02	0.7974070-03	0.1379210-03	0.1271430-02	-1024590-04	0.1735110-02	0.6699340-02	0.1553860-03	0.2375840-02	-1357850-03
0.4763940-02	0.6289660-02	0.8017470-03	0.1787180-02	-1768370-03	0.7149840-03	0.1363360-01	-7701190-03	0.1109240-02	-1949200-02

FIRM21	FIRM22	FIRM23	FIRM24	FIRM25	AVERAGE
0.1142500-02	-1132390-02	0.1144290-01	-9633600-03	0.1757230-02	0.2371660-02
-3983230-03	-1658760-02	0.6947300-02	-1875880-02	0.1012290-02	0.1460130-02
0.7063740-03	-1567660-02	0.1257590-01	-2146180-02	0.2124850-02	0.2433290-02
0.4611470-03	-1697820-02	0.1076300-01	-1158480-02	0.1926340-02	0.2335390-02
0.2571350-03	-8777310-04	0.4043570-02	-1671650-02	0.1231450-02	0.3496680-03
0.4432260-03	-6916610-03	0.3957450-02	0.4687930-03	-1309520-03	0.1201610-02
0.7101880-03	-1468720-02	0.1142690-01	-1382350-02	0.2155790-02	0.2323420-02
0.7569320-03	-1509140-02	0.1260610-01	-2123700-02	0.2192010-02	0.2417090-02
-2990420-03	-1625010-02	0.9962650-02	-3569470-02	0.2416610-02	0.1519500-02
-8306320-03	-1907440-02	0.5503810-02	-1103040-02	0.1654540-02	0.1317710-02
0.2845470-03	-1403370-02	0.1198470-01	-4051660-02	0.1909790-02	0.1847630-02
0.4537970-03	-1587910-02	0.1236020-01	-2056820-02	0.2154690-02	0.2433710-02
0.6543560-03	-1604500-02	0.1162150-01	-1529490-02	0.1797800-02	0.2422570-02
0.1120500-02	-3366340-03	0.9907620-02	-2862340-02	0.8633600-03	0.1477180-02
-3634360-03	-9843850-03	0.2974070-03	0.1841880-02	0.4808950-03	0.7302850-03
0.3532850-03	-1294210-02	0.9026730-02	-1612960-02	0.1575310-02	0.0

FIRM21	FIRM22	FIRM23	FIRM24	FIRM25	AVERAGE
0.3290850-03	-0.7694850-03	0.3935550-02	0.2957030-03	-0.9756630-04	0.1177300-02
0.1148360-02	-0.1130650-02	0.1147690-01	-0.9800630-03	0.1750810-02	0.2375560-02
0.6616190-03	-0.1248580-02	0.1033740-01	-0.3878650-03	0.1599530-02	0.2322630-02
0.4876140-03	0.8996900-04	0.3803380-02	-0.1189410-02	0.1057650-02	0.3758080-03
-0.7566110-03	-0.1781010-02	0.5452170-02	-0.1498180-02	0.1137830-02	0.1243930-02
-0.3541080-03	-0.1610050-02	0.7498800-02	-0.2325230-02	0.1089640-02	0.1430620-02
-0.3293340-03	-0.3404320-03	0.1907910-02	-0.1615230-02	0.6457640-03	0.6177220-04
0.5482480-03	-0.1658420-02	0.1048540-01	-0.1215530-02	0.1786080-02	0.2377630-02
0.5118690-03	0.1089220-03	0.4677390-02	-0.2051970-02	0.9070340-03	0.3829080-03
-0.1649120-03	-0.1910260-03	0.3649190-04	0.2742640-03	0.6018390-02	0.4720510-04
-0.8438300-04	-0.7155350-03	0.2828090-03	0.1740700-02	-0.1543290-03	0.7073870-03
0.5439550-03	-0.1585530-02	0.1040230-01	-0.8438730-03	0.1953900-02	0.2289790-02
-0.2787070-03	-0.3869860-03	0.2320350-02	-0.1341300-02	0.1149230-02	0.1582640-03
-0.6905480-03	-0.1661060-02	0.6795360-02	-0.2704050-02	0.1370680-02	0.1188660-02
0.7227680-03	-0.3677320-03	0.5252120-02	-0.6372810-03	-0.7406070-04	0.1119540-02
0.2202500-03	0.1317420-03	0.6579910-03	-0.1509010-03	-0.2166190-04	0.6928280-04
-0.6366990-03	-0.1131410-02	0.2139300-03	0.1165330-02	0.2840430-02	0.6309320-03
0.2004800-03	-0.1313720-03	0.4445950-02	-0.2128710-02	0.1225140-02	0.3448530-03
0.4039410-03	-0.7061230-03	0.7498930-02	-0.2546210-02	0.5518090-03	0.1188740-02
0.7774440-03	-0.1508040-02	0.1272190-01	-0.2177430-02	0.2141400-02	0.2436390-02
-0.1480010-03	-0.1568330-02	0.1064520-01	-0.4106490-02	0.2179110-02	0.1510060-02
-0.8606770-03	-0.1841410-02	0.6210910-02	-0.1985520-02	0.1915630-02	0.1207490-02
-0.2725440-03	-0.9197820-03	0.3125600-03	0.1962150-02	0.4357730-03	0.7468940-03
0.1247280-02	-0.2398750-03	0.9716160-02	-0.2536830-02	0.7794780-03	0.1491280-02
0.1088240-02	-0.1193560-02	0.1108840-01	-0.7655820-03	0.1560640-02	0.2396910-02
0.1850250-03	-0.8917900-03	0.5946530-02	-0.1109980-02	0.1331020-02	0.0

ELECTRIC INDUSTRY FOUR INDEX BIAS

FIRM 1	FIRM 2	FIRM 3	FIRM 4	FIRM 5	FIRM 6	FIRM 7	FIRM 8	FIRM 9	FIRM 10
0.8176660-03	-2719040-02	0.1734870-02	0.6661970-02	-9269920-05	0.1241660-02	-4412840-02	-2143490-02	-6155680-03	-1042930-02
0.1684230-03	-8920550-03	0.5977510-03	0.1436180-02	0.2515610-03	0.9683940-04	-1876850-02	-7110870-03	0.2508770-03	-7209390-03
0.3006390-04	0.2041570-03	0.4994130-03	0.7498410-04	0.3767810-03	-2680910-03	-9834280-03	-2987450-03	-8099460-04	-2297160-03
-5231160-04	-4148360-04	-1553750-03	0.2219880-04	-6070350-04	0.1520330-04	0.2658260-03	0.6774800-04	0.1479840-05	0.4752430-04
0.2939360-03	-5244710-02	-2508790-03	0.1127610-01	-1217910-02	0.2320910-02	-1910500-02	-2144140-02	-9719440-03	-7547120-03
-1516370-03	-2059270-02	-2595680-03	0.2914730-02	-6986260-04	0.3196950-03	-1159740-02	-7356140-03	0.4876050-03	-9359630-03
-2940680-03	0.2683320-03	-8440500-04	0.2952590-03	0.3172110-03	-4152380-03	-1007690-03	-1186740-03	-1465330-03	-1221960-03
0.5091340-03	-3061550-02	-1365290-05	0.5286520-02	-1089640-02	0.1725310-02	-8233070-03	-9123290-03	-2757830-03	-2016450-03
0.3474070-04	-3478040-03	-21117280-04	0.3632930-03	-7067230-04	0.1253700-03	-1477450-03	-8325100-04	0.9821340-04	-1114280-03
0.2926670-03	-3277750-03	0.1497560-03	0.2258490-02	-4955350-03	0.7526900-03	0.3013210-03	-2431400-03	-9535680-03	0.6098330-03
0.1726920-03	-1414120-02	0.2210910-03	0.3358960-02	-2068940-03	0.5984350-03	-1184500-02	-7322720-03	-2206220-03	-3462170-03

FIRM 11	FIRM 12	FIRM 13	FIRM 14	FIRM 15	FIRM 16	FIRM 17	FIRM 18	FIRM 19	FIRM 20
0.2697360-02	0.4069490-02	-1304800-03	0.1485520-02	-5152890-03	0.4168720-03	0.1057040-01	0.8048990-03	0.8248950-02	-1195340-02
0.2813900-03	0.8210900-03	-5062770-04	0.2912810-03	-1933160-03	-2142610-04	0.7793490-03	-1327540-03	0.1972670-02	-6492800-03
-1137550-05	-5588550-03	-1746290-03	0.4109730-03	-1353000-03	0.6486550-03	0.7212100-04	0.6076400-04	0.5192000-05	-2124060-03
0.1009510-03	0.6839830-04	0.7825130-04	-1769960-04	0.4427200-04	0.1290760-04	0.9613120-05	-1337780-03	-8596640-05	-1061130-04
0.6371530-02	0.7974630-02	0.1338300-02	0.2065590-02	0.3908600-04	0.9338350-03	0.1738400-01	-1341560-02	0.1324720-01	-2154640-02
0.6914090-03	-6170350-03	0.1923540-03	0.3916520-03	0.3289990-04	0.7547530-04	0.1559810-02	-1453070-02	0.3652270-02	-1322840-02
0.2222650-02	0.4660670-02	0.3537180-03	0.6745100-03	0.3827500-04	0.1341190-02	0.2044990-03	-7884500-03	-4817810-04	-4824130-03
0.7702620-04	0.4299390-03	0.5071330-04	0.4665140-04	-3701950-04	-1518450-02	0.8522550-02	0.4902390-03	0.6797570-02	-3772610-03
0.1489640-02	0.1488750-02	-5429570-06	0.5598540-03	-2576310-05	-2454330-03	0.1855350-03	-5858340-04	0.5351260-03	-9830700-04
0.1534990-02	0.2080900-02	0.2304490-03	0.5835840-03	-7442550-04	0.3574500-03	0.6495200-02	0.8676280-03	0.2419030-02	0.3551300-03
					0.2001100-03	0.4578310-02	-1684670-03	0.3682120-02	-6147990-03

FIRM 21	FIRM 22	FIRM 23	FIRM 24	FIRM 25	AVERAGE
-7866560-03	-1714940-02	0.6159260-02	-2380060-02	0.1358960-02	0.1143690-02
-2046870-03	-2605640-03	0.2268700-02	-1725840-02	0.5924840-03	0.9445950-04
-4381760-03	-3380540-03	-4598510-04	-4022830-03	0.4049860-03	-5214750-04
0.1141410-03	0.7782400-04	0.2184430-04	0.1730900-03	-3338580-04	0.2430710-04
0.9821300-03	-1247480-02	0.1045230-01	-4415910-03	0.1548920-02	0.2341930-02
0.6386550-03	0.2066820-03	0.4485930-02	-1726430-02	0.8201530-03	0.3970010-03
-7402040-04	-1264220-03	0.5164550-04	0.3945400-03	0.5567160-03	0.6380460-04
0.6086270-03	-4455560-03	0.5230230-02	-8103710-03	-4067490-04	0.1094280-02
0.161090-03	0.5391830-04	0.6363970-03	-3239910-03	0.1172400-04	0.4497570-04
-1905240-03	-7033590-03	0.2699150-03	0.1567610-02	-1209430-03	0.6830800-03
0.7476000-04	-4587990-03	0.2551700-02	-5685320-03	0.5098940-03	0.0

GAS INDUSTRY ONE INDEX BIAS

FIRM 1	FIRM 2	FIRM 3	FIRM 4	FIRM 5	FIRM 6	FIRM 7	FIRM 8	FIRM 9	FIRM 10
0.5512050-03	-.2246740-03	0.6480780-04	0.1566090-03	0.8525720-04	-.7547010-04	0.2205560-04	-.1855040-03	-.2163460-02	.2365920-02

FIRM 11	FIRM 12	FIRM 13	FIRM 14	FIRM 15	FIRM 16	FIRM 17	FIRM 18	FIRM 19	FIRM 20
-.2792640-04	0.2067790-03	0.2592390-03	0.2178620-04	-.2217060-05	-.5180650-04	-.4398620-04	0.1314850-03	-.7545590-04	.3165080-03

FIRM 21	FIRM 22	FIRM 23	FIRM 24	FIRM 25	AVERAGE
-.1056210-04	-.9216430-04	0.7260470-03	0.3513810-03	-.3.63800-04	0.9095070-04

GAS INDUSTRY TWO INDEX BIAS

FIRM 1	FIRM 2	FIRM 3	FIRM 4	FIRM 5	FIRM 6	FIRM 7	FIRM 8	FIRM 9	FIRM 10
0.5608930-03	-.2166110-03	-.7921470-05	0.1635460-03	0.9322050-04	-.8079630-04	0.2554290-04	-.1760000-03	0.1645790-03	0.2375610-02
0.5590990-03	-.1802660-03	0.1211580-03	0.2697850-03	0.9727670-04	-.7618640-04	-.4107290-04	-.3585890-04	0.2165570-03	0.2332900-01
0.5384210-03	0.1055200-03	0.1219290-03	0.4439260-03	0.1074160-03	-.3610080-04	0.6413520-04	0.2836170-03	0.1270040-03	0.1828350-02
0.6628660-03	-.5966270-04	0.1897590-03	0.3922470-03	0.1144870-03	-.6220230-04	0.5175120-04	0.6873240-04	0.2815560-03	0.2620220-02
-.1373900-03	-.2618960-03	-.1018310-03	-.3776100-03	-.5130420-04	-.1391710-04	-.5729940-04	-.4792760-03	0.5113880-04	-.1196850-05
0.5829890-03	-.1636770-03	-.6885050-04	0.2777990-03	0.1164430-03	-.8859740-04	0.4930380-04	-.1984830-04	0.5170250-04	0.2360250-02
0.5195540-03	0.9064620-04	0.2634450-03	0.4311350-03	0.9198830-04	-.2646600-04	0.5745750-04	0.2662780-03	0.2424660-03	0.1808210-04
0.6948660-03	-.4900230-04	0.1122970-03	0.3923230-03	0.1234540-03	-.6736900-04	0.5586920-04	0.8191450-04	0.2176580-05	0.2633600-02
0.4310240-04	-.2231510-03	-.3466080-03	-.2396850-03	0.7741790-05	-.4563020-04	-.2736660-04	-.3815680-03	-.1415560-03	0.4352320-03
0.5364850-03	0.1578570-04	0.7535330-04	0.3238320-03	0.9630120-04	-.4374120-04	0.4517180-04	0.1045030-03	0.1593340-03	0.1952400-02
0.7454320-03	0.3796360-04	0.2758640-03	0.5451090-03	0.1341090-03	-.5632210-04	0.7548710-04	0.2673830-03	0.2937950-03	0.2714100-02
0.6203000-04	-.1953540-03	0.1437030-04	-.8676640-04	0.1555870-05	-.3135150-04	-.1129110-04	-.2019250-03	0.6884780-04	0.5225140-03
-.1284410-03	-.1798280-03	-.2212880-03	-.4778770-04	0.3327630-04	-.5042760-04	0.2380120-05	-.1696230-03	-.1162620-03	0.6770070-03
0.7668840-03	0.5078620-04	0.1635600-03	0.5563530-03	0.1465010-03	-.6349270-04	0.9095530-04	0.2826830-03	0.2017300-03	0.2729550-02
0.5213640-03	0.3351660-05	0.1929910-03	0.3131090-03	0.6838860-04	-.3676970-04	0.3974670-04	0.8984950-04	0.2520910-03	0.1937700-02
0.4531070-03	-.8110350-04	0.3204780-03	0.2231540-03	0.7975710-04	-.5194140-04	0.3279470-04	-.9425190-06	0.1369750-03	0.1787160-02

FIRM11	FIRM12	FIRM13	FIRM14	FIRM15	FIRM16	FIRM17	FIRM18	FIRM19	FIRM20
-.1823760-04	0.2164460-03	0.2535970-03	0.3069060-04	-.6641150-05	-.4244330-04	-.3486660-04	0.1411740-03	-.6732630-04	0.2471950-03
0.5769500-04	0.3328810-03	0.2467200-03	0.1952490-04	-.6155940-04	-.6005460-04	0.5068370-04	0.1488360-03	-.6401930-04	0.2083000-05
0.3630170-03	-.2661730-03	0.2537620-03	-.7067630-04	0.1253560-03	0.6603620-04	0.2099360-03	-.1856430-03	-.7400240-04	-.6084950-05
0.2263710-03	-.1237790-03	0.3332950-03	-.4967920-04	0.1120260-03	0.1323930-04	0.1028010-03	-.8131270-04	-.1162550-03	-.2603240-03
-.3975400-03	0.2511430-03	-.5156650-04	0.7456120-04	-.6446360-04	-.8224930-04	-.2830540-03	0.2234340-03	0.8071940-05	0.2895090-03
0.7501210-04	0.3467740-03	0.2389390-03	0.4228570-04	-.6775460-04	-.3562380-04	0.6579450-04	0.1719260-03	-.4438700-04	0.4176770-04
0.3451200-03	-.2861550-03	0.2605190-03	-.8821120-04	0.1382750-03	0.4811850-04	0.1928210-03	-.2052470-03	-.8580730-04	0.1278840-05
0.2397550-03	-.1170700-03	0.3503570-03	-.4082950-04	0.1085170-03	0.2413030-04	0.1143530-03	-.7321010-04	-.9779630-04	0.1845170-03
-.2833240-03	0.7790630-03	-.2505310-06	0.9779040-04	-.6850180-04	-.3992380-04	-.1982120-03	0.2415190-03	0.2191860-04	0.2875140-04
0.2381130-03	-.2443690-03	0.2617630-03	-.5126660-04	0.1369490-03	0.4755730-04	0.1068130-03	-.1331860-03	-.8072640-04	0.1181330-03
0.3865050-03	-.1993630-03	0.3591730-03	-.8250750-04	0.1293470-03	0.3736300-04	0.2205020-03	-.1656140-03	-.1134730-03	0.1750910-03
-.1870150-03	0.3997850-03	0.1823470-04	0.5716180-04	-.1227310-03	-.8434990-04	-.9696400-04	0.2201710-03	-.3876700-06	0.1594550-03
-.1446100-03	0.4181040-03	0.2242690-04	0.8404880-04	-.1252370-05	-.5143540-04	-.6348830-04	0.2460860-03	0.2131360-04	-.5771190-04
0.4020410-03	-.1844890-03	0.3539120-03	-.6885710-04	0.1226690-03	0.5197490-04	0.2349640-03	-.1509990-03	-.1100930-03	0.6759880-04
0.2231460-03	-.2597480-03	0.2671960-03	-.6519190-04	0.1439310-03	0.3301370-04	0.9267630-04	-.1484520-03	-.9340970-04	0.2261280-03
0.1017360-03	0.3746230-04	0.2130120-03	-.7409990-05	0.3334540-04	-.4976630-05	0.4765070-04	0.1663210-04	-.5874640-04	0.1380560-03

FIRM21	FIRM22	FIRM23	FIRM24	FIRM25	AVERAGE
-.8733230-06	-.9370870-04	0.7357360-03	0.3609070-03	-.2824640-04	0.1838960-03
-.9778840-04	-.4851850-04	0.8457160-03	0.1514800-03	0.6763790-04	0.2052390-03
-.2087790-04	0.6673450-04	0.8448450-03	-.5107290-04	-.2183240-04	0.1928620-03
-.1128990-04	-.7294940-05	0.9803440-03	0.1822850-03	-.5764870-04	0.2416630-03
0.8008430-04	-.1473570-03	-.3844140-03	0.4136280-03	-.7987620-04	-.6797820-04
-.6585400-04	-.5630210-04	0.8611540-03	0.1925310-03	0.6783910-04	0.1971850-03
-.3973880-04	0.7025810-04	0.8262970-03	-.7056750-04	-.2840230-04	0.1978360-03
-.2416950-05	-.8086130-05	0.9537280-03	0.1907050-03	-.5426420-04	0.2395210-03
0.5844770-04	-.1142070-03	-.1159100-03	0.4372730-03	-.5679530-04	-.2479380-04
0.3025460-04	0.1096820-04	0.7541610-03	0.1404390-03	-.7964880-04	0.1810230-03
-.6264040-04	0.5458280-04	0.1159490-02	-.4031670-05	-.1369940-04	0.2765460-03
-.5369490-04	-.7668940-04	0.7328860-04	0.1425030-03	0.5954040-04	0.2592930-04
-.2087410-04	-.8302200-04	0.1445460-03	0.1876860-03	0.6461060-04	0.2823560-04
-.4770780-04	0.5227460-04	0.1175050-02	0.1255570-04	-.8425250-05	0.2727140-03
0.1516630-04	0.1354660-04	0.7390660-03	0.1254570-03	-.8456700-04	0.1849980-03
-.1356130-04	-.2631830-04	0.6424070-03	0.1660320-03	-.1694520-04	0.0

GAS INDUSTRY THREE INDEX BIAS

FIRM 1	FIRM 2	FIRM 3	FIRM 4	FIRM 5	FIRM 6	FIRM 7	FIRM 8	FIRM 9	FIRM 10
0.5698200-03	-0.1713460-03	0.3998440-04	0.2777430-03	0.1061030-03	-0.8160600-04	0.4497410-04	-0.1995830-04	0.1347670-03	0.2343510-02
0.5330430-03	0.1038420-03	0.1619770-03	0.4425140-03	0.1032640-03	-0.3310320-04	0.6258350-04	0.2823050-03	0.1585940-03	0.1818660-02
0.6952560-03	-0.4890420-04	0.1058330-03	0.3921840-03	0.1240260-03	-0.6782190-04	0.5606580-04	0.8189920-04	0.2125110-03	0.2633600-02
-0.1280770-03	-0.2512120-03	-0.1808770-03	-0.3708570-03	-0.4287300-04	-0.1914520-04	-0.5353000-04	-0.4693980-03	-0.1360180-04	-0.1127480-03
0.5439500-03	0.8674050-04	0.1425120-03	0.46489760-03	0.1106760-03	-0.4118310-04	0.6842370-04	0.3027590-03	0.1272750-03	0.1878470-02
0.7373910-03	0.7843810-05	0.2642340-03	0.5308670-03	0.1509140-03	-0.6084790-04	0.7572050-04	0.2652050-03	0.2633970-03	0.2615440-03
-0.1448650-03	-0.2170110-03	-0.4841140-04	-0.2727890-03	-0.4195920-04	-0.3449000-04	-0.3449000-04	-0.3262820-03	-0.3262820-03	-0.2094060-03
0.2408110-03	0.3649460-04	-0.8574850-04	0.2172730-03	0.6592250-04	-0.3183800-04	0.3774300-04	0.1453550-03	-0.6787130-04	0.8790240-03
0.3941770-04	0.3069290-04	-0.7439860-05	0.1391340-04	0.4911110-05	0.3207120-05	0.3489260-06	0.2146020-05	0.1528590-04	0.9871830-04
-0.1959410-04	-0.8261680-04	0.2866750-04	-0.1538330-03	-0.2448740-04	0.3427320-05	-0.2779380-04	-0.2124430-03	0.1074910-03	0.6429860-04
0.5541270-03	0.9363590-04	0.5548660-04	0.4639970-03	0.1187160-03	-0.4648840-04	0.7096940-04	0.3020030-03	0.6153620-04	0.1889510-02
0.1934060-03	0.8453940-05	0.1642800-03	0.1746430-03	0.3223910-04	-0.1197890-04	0.2303200-04	0.1083310-03	0.1297300-03	0.7214780-03
-0.7895110-05	-0.7110240-04	-0.5619490-04	-0.1409060-03	-0.1494670-04	-0.2108310-05	-0.2344850-04	-0.1982410-03	0.3717630-04	0.7395080-04
0.3677020-04	-0.1772690-03	-0.3010710-03	-0.1338880-03	0.1796650-04	-0.4512460-04	-0.9099400-05	-0.2271480-03	-0.1763430-03	0.3459630-03
0.2776170-04	0.6221530-04	0.5424950-03	0.1519310-03	-0.7409110-04	0.8393660-04	0.2806470-03	0.1033990-03	0.1033990-03	0.2647570-02
-0.1212410-03	-0.1996540-03	-0.2441740-03	-0.2650050-03	-0.2230430-04	-0.2558100-04	-0.3203320-04	-0.3140680-03	-0.1314530-03	-0.1852810-03
0.5274690-03	0.7279470-04	0.2657900-03	0.4525630-03	0.9709830-04	0.3285990-04	0.6241390-04	0.2858670-03	0.2284720-03	0.1862330-02
0.2455240-04	0.1687700-04	0.1113090-03	0.2063360-05	-0.8080300-05	0.1116310-04	-0.5359330-05	-0.1384750-04	0.1142760-03	0.9771520-04
0.7208760-03	0.1994510-04	0.1777140-03	0.5425780-03	0.1410190-03	-0.6664700-04	0.8040980-04	0.2805530-03	0.1916110-03	0.2630830-02
0.2060550-03	0.2150960-04	0.6927550-04	0.1861610-03	0.64294370-04	-0.1806530-04	0.2796140-04	0.1243720-03	0.5100580-04	0.17319210-03
0.2092210-03	0.6013410-04	-0.1541010-03	0.1454150-03	0.5380740-04	-0.2203920-04	0.2603000-04	0.9000940-04	-0.9755610-04	0.6461340-03
0.1637140-03	-0.4090400-04	-0.2246900-03	-0.9972040-05	0.3623630-04	-0.2909620-04	0.3011490-05	-0.1104260-03	-0.9592520-04	0.6219310-03
0.5374920-03	0.1501280-04	0.1013630-03	0.3228970-03	0.9399930-04	-0.4205810-04	0.4428780-04	0.1036370-03	0.1766290-03	0.1946720-02
0.7293070-03	0.5617310-04	0.1826800-03	0.5566820-03	0.1447860-03	-0.6257340-04	0.8037290-04	0.2827160-03	0.2168620-03	0.2728980-02
0.7248490-04	-0.1856660-04	-0.7252800-04	-0.7403830-04	0.1086950-04	-0.3719580-04	-0.7234940-04	-0.1906210-03	-0.2530680-05	-0.5299050-02
0.3665770-03	-0.3183610-04	0.2221150-04	0.1722590-03	0.5731120-04	-0.3383360-04	0.2600660-04	0.3419880-04	0.7070850-04	0.1171590-02

FIRM 11	FIRM 12	FIRM 13	FIRM 14	FIRM 15	FIRM 16	FIRM 17	FIRM 18	FIRM 19	FIRM 20
0.6861970-04	0.3439110-03	0.2428420-03	0.2935340-04	-0.6660080-04	-0.4973470-04	0.6100040-04	0.1595820-03	-0.5501070-04	0.1314670-03
0.3609600-03	-0.2753370-03	0.2556130-03	-0.7628310-04	0.1328460-03	0.6193980-04	0.2070620-03	-0.1935250-03	-0.7841490-04	0.2898380-04
0.2397550-03	-0.1181430-03	0.3298310-03	-0.3988950-04	0.1077870-03	0.2470440-04	0.1146470-03	-0.7172540-04	-0.9701020-04	0.1789130-03
-0.3875700-03	0.2616060-03	-0.5579540-04	0.8428630-04	-0.6934710-04	-0.7214590-04	-0.2735130-03	0.2340660-03	0.1700150-04	0.2143570-05
0.3573540-03	-0.1445400-03	0.2482440-03	-0.6034710-04	0.8339300-04	0.4733970-04	0.2257770-03	-0.1376690-03	-0.6846730-04	-0.2017920-04
0.3490140-03	-0.2924650-04	0.3291360-03	-0.6082470-04	0.6249540-04	0.1233580-04	0.2219660-03	-0.8873660-04	0.9778230-04	0.1377190-03
-0.3174660-03	0.3821540-03	-0.7127400-04	0.7340940-04	-0.1270930-03	-0.9144160-04	-0.1907210-03	0.2433960-03	0.2174280-04	0.1772520-03
0.1616540-03	0.2395290-04	0.9848180-04	-0.6675410-07	0.3403300-05	0.2890590-04	0.1164690-03	-0.9072670-05	-0.1020070-04	-0.1518930-03
0.3770610-04	-0.1655750-03	0.2804670-04	-0.1892690-04	0.6506200-04	0.2685440-04	-0.6291160-06	-0.7291100-04	-0.1347600-04	0.2094460-04
-0.1331230-03	-0.1092470-03	0.1749420-04	-0.1690370-05	0.5827070-04	-0.1217390-04	-0.1314030-03	-0.6093020-05	-0.2479800-04	0.2269640-03
0.3626620-03	-0.1476350-03	0.2453990-03	-0.5056920-04	0.8450630-04	0.5930050-04	0.2288690-03	-0.1300150-03	-0.6029970-04	-0.9053520-04
0.1146200-03	0.6112430-05	0.9441420-04	-0.2917570-04	0.9788790-05	-0.6699610-05	0.7951600-04	-0.3494740-04	-0.3351910-04	0.8110280-04
-0.1192510-03	-0.1016880-02	0.1404530-04	0.8116540-05	0.5428730-04	-0.3267480-06	-0.1192580-03	0.2998670-05	-0.1363530-04	0.1439160-03
-0.2020180-03	0.4116650-03	-0.2043990-04	0.9761970-04	-0.1317970-03	-0.4811920-04	-0.1046560-03	0.2626130-03	0.3653130-04	-0.9142410-04
0.3707280-03	-0.1645090-04	0.3213620-03	-0.3699780-04	0.5645240-04	0.3923130-04	0.2433840-03	-0.6574350-04	-0.7683010-04	-0.4304520-04
-0.2998720-03	0.3976110-03	-0.7687770-04	0.9704790-04	-0.1337960-03	-0.6623040-04	-0.1375160-03	0.2675040-03	0.4224430-04	0.4481920-05
0.3404370-03	-0.1613160-03	0.2512490-03	-0.75422970-04	0.9108950-04	0.3139830-04	0.2098380-03	-0.1540820-03	-0.8231850-04	0.9806410-04
0.2165640-04	-0.1809340-03	0.3454260-03	-0.3361090-04	0.7228110-04	0.1121330-04	-0.1573510-04	-0.8859990-04	-0.2707910-04	0.1362720-03
0.3643350-03	-0.2117330-04	0.3257910-03	-0.5090020-04	0.5833840-04	0.2434600-04	0.2352990-03	-0.7957270-04	-0.8230200-04	0.5225810-04
0.1304510-03	0.1507130-04	0.9003510-04	-0.1721760-04	0.5391700-05	0.6517310-05	0.9346230-04	-0.2470980-04	-0.2290560-04	-0.1219310-04
0.1417360-03	-0.1526630-03	0.8557230-04	-0.8178730-05	0.6769700-04	0.5722680-04	0.7380620-04	-0.6942380-04	-0.1677350-04	-0.1482330-03
-0.1500540-04	-0.8237540-04	0.6905380-04	0.2259060-04	0.5440900-04	0.3246410-04	-0.4366270-04	0.1193710-04	-0.7342140-05	-0.1429350-04
0.2370180-03	-0.2503260-03	0.2628210-03	-0.54441500-04	0.1392150-03	0.4543730-04	0.1051160-03	-0.1378760-03	-0.8318910-04	0.1374760-03
0.4018260-03	-0.1894300-03	0.3553620-03	-0.71161300-04	0.1244580-03	0.5012500-04	0.2340990-03	-0.1549660-03	-0.1031510-03	0.8402620-04
-0.1758130-03	0.4110940-03	0.1353390-04	0.6786800-04	-0.1282830-03	-0.7324960-04	-0.8620020-04	0.2319340-03	0.9483790-05	0.7638420-04
0.9641660-04	0.4377030-05	0.1395640-03	-0.8192570-05	0.2695800-04	0.5575260-05	0.5223660-04	-0.4225580-05	-0.3698470-04	0.5303140-04

FIRM21	FIRM22	FIRM23	FIRM24	FIRM25	AVERAGE
-0.873157D-04	-0.501873D-04	0.856729D-03	0.161479D-03	0.716434D-04	0.202471D-03
-0.262359D-04	0.689206D-04	0.840453D-03	-0.595684D-04	-0.235976D-04	0.194333D-03
-0.160123D-05	-0.849063D-05	0.993728D-03	0.192037D-03	-0.538986D-04	0.239133D-03
0.907138D-04	-0.149186D-05	-0.375506D-03	0.424040D-03	-0.762699D-04	-0.711068D-04
-0.631897D-04	0.688606D-04	0.889293D-03	-0.101093D-03	0.265643D-04	0.201458D-03
-0.166493D-03	0.495781D-04	0.113941D-02	-0.522015D-04	0.453732D-04	0.261508D-03
-0.789084D-05	-0.103536D-03	-0.285794D-03	0.208754D-03	0.214819D-04	-0.542831D-04
-0.244434D-04	0.224051D-04	0.424255D-03	-0.319637D-04	0.388747D-04	0.859257D-04
0.465272D-04	0.362893D-05	0.201973D-04	0.524034D-04	-0.583268D-04	0.693370D-05
0.833710D-04	-0.564968D-04	-0.148158D-03	0.230827D-03	-0.116193D-03	-0.171847D-04
-0.443430D-04	0.639276D-04	-0.890548D-03	-0.743182D-04	0.214213D-04	0.196896D-03
-0.615071D-04	0.281837D-04	0.344330D-03	-0.772505D-04	0.332539D-04	0.837455D-04
0.926286D-04	-0.574878D-04	-0.135764D-03	0.240200D-03	-0.166579D-03	-0.200469D-04
0.112902D-04	-0.983118D-04	-0.161040D-04	0.232882D-03	0.452106D-04	-0.113742D-04
-0.727733D-04	0.425299D-04	0.115828D-02	-0.110580D-04	0.460973D-04	0.260497D-03
0.250310D-04	-0.111543D-03	-0.272285D-03	0.250701D-03	0.219313D-04	-0.629764D-04
-0.793077D-04	0.713807D-04	0.872972D-03	-0.116369D-03	0.204209D-04	0.205716D-03
0.303492D-04	0.614012D-05	0.582931D-05	0.371707D-04	-0.638773D-04	0.115707D-04
-0.680518D-04	0.490502D-04	0.115495D-02	-0.434799D-04	0.495359D-04	0.266171D-03
-0.446198D-04	0.272507D-04	0.359083D-03	-0.675836D-04	0.376930D-04	0.866006D-04
0.515791D-04	0.119178D-04	0.279687D-03	0.614626D-04	-0.395976D-04	0.543536D-04
0.101171D-03	-0.507771D-04	0.123842D-03	0.254765D-03	-0.867382D-04	0.258808D-04
0.276397D-04	0.121510D-04	0.751460D-03	0.136102D-03	-0.869875D-04	0.181747D-03
-0.503828D-04	0.534483D-04	0.117494D-02	0.602211D-05	-0.917099D-05	0.273821D-03
-0.442348D-04	-0.785808D-04	0.833731D-04	0.153398D-03	0.637943D-04	0.225222D-04
-0.102113D-04	-0.749079D-05	0.445239D-03	0.802929D-04	-0.663759D-05	0.0

GAS INDUSTRY FOUR INDEX BIAS

FIRM 1	FIRM 2	FIRM 3	FIRM 4	FIRM 5	FIRM 6	FIRM 7	FIRM 8	FIRM 9	FIRM 10
0.1711800-03	0.3005430-04	-0.1657310-03	0.1311730-03	0.5061210-04	-0.2653500-04	0.2626340-04	0.0783060-04	-0.1279540-03	0.5479800-03
-0.3037950-06	-0.1481340-06	0.6464100-05	0.1384280-06	-0.5714350-06	0.4528250-06	-0.1965420-06	0.1525420-07	0.5147540-05	0.0
-0.1348870-04	-0.1321280-04	0.1014680-03	-0.1137910-04	-0.1127600-04	0.6637230-05	-0.5125910-05	-0.1602630-04	0.8387170-04	-0.1044290-04
0.1316890-04	0.7668470-05	-0.1088350-03	0.5533570-07	0.1034140-04	-0.6991350-05	0.3329650-05	0.1099920-04	-0.8306430-04	0.1673610-04
0.2068950-03	0.2165680-04	0.6281140-04	0.1860220-03	0.4351510-04	-0.1851610-04	0.2815790-04	0.1243570-03	0.4585420-04	0.7319210-03
0.3004110-04	0.3007980-04	0.1153020-04	0.1424250-04	0.3195670-05	0.4525960-05	-0.2334200-06	0.2178780-05	0.3039790-04	0.9815320-04
-0.7465620-05	-0.7095470-04	-0.6295900-04	-0.1410450-03	-0.1437520-04	-0.2561140-05	-0.2325190-04	-0.1982560-03	0.3202840-04	0.7395080-04
0.7212660-03	0.2009330-04	0.1713500-03	0.5424400-03	0.1415900-03	-0.6709980-04	0.8060630-04	0.2805370-03	0.1864640-03	0.2630830-02
-0.1344100-03	-0.2075230-03	-0.1353390-03	-0.2650610-03	-0.3264560-04	-0.1858960-04	-0.3536280-04	-0.3149770-03	-0.4838890-04	-0.2020170-03
0.5409580-03	0.8596750-04	0.1643220-03	0.4639420-03	0.1083740-03	-0.3949700-04	0.6753980-04	0.3018930-03	0.1446110-03	0.1872770-02
0.1535750-03	-0.9610810-05	0.4488140-05	0.9205280-04	0.2987600-04	-0.1681740-04	0.1417260-04	0.2676610-04	0.2689620-04	0.5759880-03

FIRM11	FIRM12	FIRM13	FIRM14	FIRM15	FIRM16	FIRM17	FIRM18	FIRM19	FIRM20
0.1042460-03	0.1745320-04	0.5553490-04	0.1350410-04	0.8453310-06	0.3222220-04	0.7530070-04	0.7453730-05	0.4917760-05	-0.1856550-03
0.0	-0.1858990-05	0.5264080-06	-0.9700100-05	0.7322080-06	-0.5744330-06	-0.2942920-06	-0.1484690-05	-0.7761140-06	0.5603930-05
-0.1583180-04	-0.1081800-04	0.4905470-05	-0.1192810-04	0.5429410-05	-0.1379130-04	-0.1424060-04	-0.1172230-04	-0.1138860-04	0.9889990-04
0.6392470-05	0.2263190-05	-0.3902930-05	0.1293230-04	-0.1153830-05	0.1411130-04	0.4790400-05	0.1234450-04	0.1063030-04	-0.8969940-04
0.1374510-03	0.1691090-04	0.8950870-04	-0.1624760-04	0.4359370-05	0.7091710-05	0.9375660-04	-0.2322510-04	-0.2213050-04	-0.1779710-04
0.3749020-04	-0.1701160-03	0.3003710-04	-0.2168280-04	0.6685170-04	0.2530460-04	-0.1494500-05	-0.7687760-04	-0.1569050-04	0.3737200-04
-0.1192510-03	-0.9982860-04	0.1351890-04	0.9086550-05	0.5355510-04	0.2476560-06	-0.1189630-03	0.4483350-05	-0.1225920-04	0.1383120-03
0.3643350-03	-0.1931430-04	0.3252650-03	-0.4993020-04	0.5760620-04	0.2512040-04	0.2355930-03	-0.7808800-04	-0.8746010-04	0.4665420-04
-0.3062640-03	0.3941510-03	-0.7597480-04	0.8411560-04	-0.1326420-04	-0.8034130-04	-0.1799570-03	0.2551590-03	0.3161430-04	0.9418130-04
0.3562690-03	-0.1504580-03	0.2493020-03	-0.6350160-04	0.8566010-04	0.4518960-04	0.2240790-03	-0.1423670-03	-0.7092990-04	-0.8357930-06
0.5578370-04	-0.2103500-05	0.6847210-04	-0.4462170-05	0.1412440-04	0.5428000-05	0.3185700-04	-0.5431680-05	-0.1734740-04	0.1270860-04

FIRM21	FIRM22	FIRM23	FIRM24	FIRM25	AVERAGE
0.7726940-05	0.7115210-05	0.2596050-03	0.1323280-04	0.1947490-04	0.4631600-04
-0.8157250-06	0.4045050-06	0.0	-0.132190-05	-0.3656270-06	0.3892900-06
-0.1350300-04	0.1337540-05	-0.1425230-04	-0.1099910-04	-0.4804690-05	0.3533140-05
0.2146170-04	-0.6115790-05	0.3424130-05	0.3105190-04	-0.2804310-05	-0.5286220-05
-0.4700410-04	0.2684620-04	0.3593830-03	-0.6625140-04	0.3893880-04	0.8021230-04
0.4315220-04	0.4802540-05	0.2008160-04	0.4816940-04	-0.5907260-04	0.8037560-05
0.4344440-04	-0.5709530-04	-0.1357640-03	0.2415320-03	-0.1062130-03	-0.2043520-04
-0.9423500-04	0.4664570-04	0.1154950-02	-0.4214770-04	0.4990160-04	0.2657830-03
0.3569250-05	-0.1054270-03	-0.2757100-03	0.2196490-03	0.2573570-04	-0.5769020-04
-0.6580470-04	0.7004340-04	0.8872240-03	-0.1053700-03	0.2522560-04	0.2021820-03
-0.5210810-05	-0.1024010-05	0.2258550-03	0.3275350-04	-0.1586390-05	0.0

TELEPHONE INDUSTRY ONE INDEX BIAS

FIRM 1	FIRM 2	FIRM 3	FIRM 4	FIRM 5	FIRM 6	FIRM 7	FIRM 8	FIRM 9	FIRM10
-.4162560-02	0.9752450-03	0.1229830-03	-.1382820-02	0.1449230-02	-.2292060-03	-.9304070-04	-.2362910-03	0.7154390-04	0.1014920-02

FIRM11	FIRM12	FIRM13	FIRM14	FIRM15	FIRM16	FIRM17	FIRM18	FIRM19	FIRM20
-.1103070-02	-.4812260-02	-.2072900-02	-.3563700-03	-.3594040-02	-.3768850-02	-.8347000-02	-.4596580-02	-.4317060-02	-.4071890-02

FIRM21	FIRM22	FIRM23	FIRM24	FIRM25	AVERAGE
-.9368780-02	-.6826450-02	-.4184100-02	-.3645810-02	-.2430380-02	-.2636620-02

TELEPHONE INDUSTRY TWO INDEX BIAS

FIRM 1	FIRM 2	FIRM 3	FIRM 4	FIRM 5	FIRM 6	FIRM 7	FIRM 8	FIRM 9	FIRM10
-.445106D-02	0.109616D-02	0.809550D-04	-.169092D-02	0.184512D-02	-.180393D-02	0.198909D-03	0.179767D-02	0.193511D-03	0.161748D-02
-.179003D-02	0.185374D-03	0.694568D-03	-.106832D-02	0.310219D-03	-.117933D-02	0.113995D-02	-.323454D-03	-.529655D-04	0.400065D-03
-.285130D-02	0.102337D-02	-.549328D-03	-.572921D-03	0.131546D-02	0.923708D-03	-.144590D-02	-.491361D-05	0.203171D-03	0.833630D-03
-.517467D-02	0.569290D-03	0.379725D-03	-.154419D-02	0.167404D-02	-.117606D-02	0.145432D-02	0.376668D-05	-.246813D-03	0.901702D-03
-.168732D-02	0.857455D-03	-.124739D-03	-.490566D-03	0.472773D-03	0.189609D-02	-.154936D-02	-.221255D-02	0.196811D-03	.265111D-03
-.373276D-02	0.824547D-03	0.218120D-03	-.124326D-02	0.116413D-02	0.115919D-03	-.493152D-05	-.871258D-03	0.162979D-04	.742023D-03
-.430151D-02	0.986864D-03	0.169712D-03	-.148492D-02	0.150934D-02	-.516973D-03	0.496053D-04	0.526452D-06	0.765141D-04	0.110466D-02
-.594126D-02	0.648959D-03	0.379238D-03	-.209523D-02	0.238716D-02	-.402793D-02	0.238194D-02	0.388267D-02	-.139933D-03	.185465D-02
-.511683D-03	0.944591D-03	-.337383D-03	-.339148D-03	0.385450D-03	0.113423D-02	-.207810D-02	-.743618D-05	0.438645D-03	0.596632D-03
0.342014D-03	0.176420D-03	-.216614D-03	0.139838D-03	0.800029D-05	0.404506D-03	-.712108D-03	0.498412D-05	0.126803D-03	0.781732D-04
-.303190D-02	0.945210D-03	0.164437D-03	-.122026D-02	0.102909D-02	-.518797D-04	-.471494D-03	-.546143D-03	0.185315D-03	.896856D-03
-.597060D-02	0.759426D-03	0.664710D-03	-.227576D-02	0.207202D-02	-.311387D-02	0.214312D-02	0.201326D-02	-.129031D-03	.101039D-02
-.397037D-02	0.101663D-02	0.501945D-04	-.130756D-02	0.141823D-02	-.548844D-04	-.338444D-03	-.276547D-03	0.111145D-02	.101012D-02
-.522039D-02	0.105783D-02	0.691139D-04	-.166284D-02	0.198154D-02	-.112920D-02	0.354716D-03	0.991861D-03	0.376107D-04	.740071D-02
-.128844D-02	0.375452D-03	-.112910D-04	-.139233D-03	0.137433D-03	0.215946D-02	-.814002D-03	-.273020D-02	-.553539D-04	-.283755D-03
-.230641D-02	0.764256D-03	0.104945D-03	-.113302D-02	0.118667D-02	-.427744D-03	0.205301D-04	0.905972D-04	0.641153D-04	.868563D-03

FIRM11	FIRM12	FIRM13	FIRM14	FIRM15	FIRM16	FIRM17	FIRM18	FIRM19	FIRM20
-.111143D-02	-.213961D-02	-.285854D-02	-.118017D-03	-.311310D-02	-.526256D-02	-.963144D-02	-.517256D-02	-.541037D-02	-.337413D-02
-.467259D-03	-.104421D-02	-.110864D-02	0.872798D-03	-.105279D-02	-.212457D-02	-.253834D-02	-.203594D-02	-.159495D-02	0.408928D-03
-.944667D-03	-.431401D-02	-.101973D-02	-.128705D-02	-.324315D-02	-.207341D-02	-.722833D-02	-.299501D-02	-.322888D-02	-.485950D-02
-.514586D-03	-.481284D-02	-.325845D-02	0.195034D-03	-.346717D-02	-.537092D-02	-.792666D-02	-.623520D-02	-.537911D-02	-.428328D-02
-.114788D-02	-.524377D-02	0.356451D-03	-.910893D-03	-.310616D-02	-.395692D-04	-.475746D-02	-.126038D-02	-.113049D-02	-.317410D-02
-.100899D-02	-.538775D-02	-.161234D-02	-.252379D-03	-.351973D-02	-.309831D-02	-.711783D-02	-.405174D-02	-.359067D-02	-.364042D-02
-.111633D-02	-.451631D-02	-.218722D-02	-.253536D-03	-.367961D-02	-.410829D-02	-.859570D-02	-.479433D-02	-.453941D-02	-.392424D-02
-.362158D-03	-.440564D-03	-.502374D-02	0.745474D-03	-.240412D-02	-.824241D-02	-.991567D-02	-.765446D-02	-.747691D-02	-.320326D-02
-.110732D-02	-.202941D-02	0.702192D-03	0.942422D-03	-.191229D-02	0.357576D-03	-.420828D-02	0.748167D-04	-.580291D-03	-.167634D-02
-.119879D-03	0.366544D-04	0.406323D-03	-.365324D-03	-.109794D-03	0.533058D-03	-.361977D-03	0.536264D-02	0.745525D-03	-.294480D-03
-.111989D-02	-.376533D-02	-.116941D-02	-.271905D-03	-.309485D-02	-.258932D-02	-.692944D-02	-.312173D-02	-.306603D-02	-.272876D-02
-.767654D-03	-.257449D-02	-.431616D-02	0.833843D-03	-.323941D-02	-.739923D-02	-.991337D-02	-.731795D-02	-.679316D-02	-.311343D-02
-.114637D-02	-.477521D-02	-.181226D-02	-.477138D-03	-.370647D-02	-.351307D-02	-.830333D-02	-.432413D-02	-.413675D-02	-.416948D-02
-.192924D-02	-.438339D-02	-.309116D-02	-.210618D-03	-.393447D-02	-.547125D-02	-.101156D-01	-.607187D-02	-.585849D-02	-.482872D-02
-.577870D-03	-.557279D-02	0.440410D-03	-.669295D-03	-.249632D-02	0.515095D-03	-.225352D-02	-.109220D-02	-.370950D-03	-.287055D-02
-.850748D-03	-.338667D-02	-.170482D-02	-.214965D-03	-.286523D-02	-.319154D-02	-.665248D-02	-.369510D-03	-.352741D-02	-.304284D-02

FIRM21	FIRM22	FIRM23	FIRM24	FIRM25	AVERAGE
-.123488D-01	-.747734D-02	-.389912D-02	-.313337D-02	-.358365D-03	-.266061D-02
-.329499D-02	-.217416D-02	-.797801D-03	0.317849D-02	-.118954D-03	-.623054D-03
-.767936D-02	-.576954D-02	-.363747D-02	-.722633D-02	-.227308D-02	-.236703D-02
-.941937D-02	-.663726D-02	-.325701D-02	-.212392D-02	-.350064D-02	-.279147D-02
-.369252D-02	-.408316D-02	-.254821D-02	-.425344D-02	-.246461D-02	-.161131D-02
-.758256D-02	-.599761D-02	-.378694D-02	-.282020D-02	-.273117D-02	-.234321D-02
-.987476D-02	-.699789D-02	-.416646D-02	-.330095D-02	-.218298D-02	-.266550D-02
-.143095D-01	-.764706D-02	-.379563D-02	-.843211D-03	-.422294D-03	-.286621D-02
-.409072D-02	-.322192D-02	-.177492D-02	-.395366D-02	0.279964D-03	-.986906D-03
-.263125D-03	-.196890D-03	-.119123D-03	-.138691D-02	0.322223D-03	-.329102D-04
-.765811D-02	-.562237D-02	-.320953D-02	-.245946D-02	-.128960D-02	-.201107D-02
-.132333D-01	-.792854D-02	-.410522D-02	0.100845D-03	-.136005D-02	-.293452D-02
-.523860D-02	-.676573D-02	-.415846D-02	-.435426D-02	-.231942D-02	-.267716D-02
-.121897D-01	-.811761D-02	-.483469D-02	-.436434D-02	-.236309D-02	-.316324D-02
-.462266D-03	-.230418D-02	-.230799D-02	-.305306D-02	-.357561D-02	-.116844D-02
-.768919D-02	-.539295D-02	-.322544D-02	-.264624D-02	-.162342D-02	0.0

TELEPHONE INDUSTRY THREE INDEX BIAS

FIRM 1	FIRM 2	FIRM 3	FIRM 4	FIRM 5	FIRM 6	FIRM 7	FIRM 8	FIRM 9	FIRM10
- .215707D-02	0.319207D-03	0.619001D-03	- .124326D-02	0.606879D-03	- .182334D-02	0.115599D-02	0.636903D-03	0.162884D-04	0.742179D-03
- .329857D-02	0.109633D-02	- .445310D-03	- .939877D-03	0.161694D-02	- .391891D-03	- .988424D-03	0.137178D-02	0.263649D-05	0.128829D-02
- .613593D-02	0.539662D-03	0.442668D-03	- .209169D-02	0.238663D-02	- .403793D-02	0.269916D-02	0.379530D-02	- .229226D-03	0.174915D-02
- .363034D-03	0.935506D-03	- .351633D-03	- .281731D-03	0.321513D-03	0.129677D-02	- .216786D-02	- .896149D-03	0.443606D-03	0.541934D-03
0.366246D-03	0.104670D-05	- .812767D-04	0.589303D-04	- .691940D-04	0.176885D-03	- .430480D-03	- .328762D-04	0.990230D-04	0.509317D-04
- .266526D-02	- .247367D-04	0.818246D-03	- .120271D-02	0.554158D-03	- .174161D-02	0.208450D-02	0.973743D-04	- .257794D-03	0.373457D-03
- .671039D-03	0.154296D-03	0.556368D-03	- .647268D-03	- .124598D-03	- .127604D-03	0.395411D-03	- .127615D-02	0.116815D-04	0.576685D-04
- .382854D-02	0.688026D-03	- .255453D-03	- .803237D-03	0.151299D-02	0.196274D-04	- .329231D-04	0.459765D-03	- .693946D-04	0.765023D-05
- .123726D-02	0.937159D-03	- .672207D-03	- .111291D-04	0.655858D-03	0.233806D-02	- .236101D-02	- .136977D-02	0.280977D-03	0.331783D-03
- .199754D-02	0.349478D-03	0.794618D-04	- .368092D-03	0.394230D-03	0.154036D-02	- .271653D-03	- .218969D-02	- .126370D-03	- .124143D-03
- .866623D-03	0.531313D-03	- .491634D-03	0.228857D-03	0.300451D-03	0.255836D-02	- .177324D-02	- .204867D-02	0.710261D-04	- .159768D-03
- .630250D-02	0.495662D-03	0.723664D-03	- .217360D-02	0.208910D-02	- .311835D-02	0.278574D-02	0.191815D-02	- .327846D-03	0.136769D-02
0.170438D-03	0.181065D-03	- .193764D-03	0.773720D-04	0.777249D-04	0.241615D-03	- .599851D-03	0.165224D-03	0.117073D-03	0.132743D-03
- .290475D-03	0.337691D-03	0.319145D-03	- .561741D-03	- .368255D-04	- .226351D-03	- .215763D-03	0.583777D-03	0.175579D-03	0.301731D-03
- .555851D-02	0.626033D-03	0.338440D-03	- .165171D-02	0.188297D-02	- .149801D-02	0.155483D-02	0.653469D-03	- .243359D-03	0.106817D-02
- .171752D-02	0.833945D-03	- .952834D-04	- .544326D-03	0.462485D-03	- .186575D-02	- .146641D-02	- .224447D-02	0.180533D-03	1.246877D-03
- .293872D-03	- .834953D-04	0.321249D-03	- .316189D-03	- .394401D-03	0.491015D-03	0.496810D-03	- .191176D-02	- .116118D-03	0.343243D-03
- .136958D-02	0.860289D-03	- .387465D-04	- .562597D-03	0.366325D-03	0.156465D-02	- .151796D-02	- .201477D-02	0.255974D-03	0.339768D-03
- .378815D-02	0.229990D-03	0.675893D-03	- .165525D-02	0.132625D-02	- .342727D-02	J.239450D-02	0.248899D-02	- .154074D-03	0.117383D-02
- .513489D-02	0.714427D-03	0.452118D-04	- .163269D-02	0.219715D-02	- .298328D-02	0.143049D-02	0.341677D-02	- .514189D-04	0.165692D-02
- .515286D-03	0.978843D-03	- .643261D-03	- .749659D-04	0.537866D-03	- .153719D-02	- .240623D-02	- .490487D-03	0.438147D-03	0.578397D-03
- .172881D-03	0.868533D-04	- .121790D-03	0.234910D-04	0.141131D-03	J.890916D-04	- .191869D-03	0.190391D-03	0.228185D-04	0.819394D-04
0.688837D-03	0.977416D-04	- .226090D-03	0.309767D-03	- .179602D-03	0.750718D-03	- .823976D-03	- .502647D-03	0.987963D-04	- .132370D-03
- .434946D-02	0.109045D-02	0.855123D-04	- .166926D-02	0.179965D-02	- .174754D-02	0.154731D-03	0.171811D-02	0.199741D-03	0.159173D-02
- .544138D-02	0.933736D-03	J.414240D-03	- .213288D-02	0.210185D-02	- .306679D-02	0.144219D-02	0.255310D-02	0.398295D-04	0.179836D-02
- .227615D-02	0.520326D-03	0.810531D-04	- .793005D-03	0.622593D-03	- .386423D-03	0.546224D-04	J.162545D-03	0.455664D-04	0.619146D-03

FIRM11	FIRM12	FIRM13	FIRM14	FIRM15	FIRM16	FIRM17	FIRM18	FIRM19	FIRM20
- .533555D-03	- .161996D-03	- .159652D-02	0.864131D-03	- .103020D-02	- .297699D-02	- .377490D-02	- .255594D-02	- .237281D-02	- .297247D-03
- .980827D-03	- .254143D-02	- .180149D-02	- .946149D-03	- .290974D-02	- .342151D-02	- .833484D-02	- .369742D-02	- .419622D-02	- .420849D-02
- .226657D-03	- .793270D-03	- .519957D-02	0.840824D-03	- .242622D-02	- .841179D-02	- .963958D-02	- .795526D-02	- .757689D-02	- .334391D-02
- .118976D-02	- .210744D-02	J.854787D-03	- .978985D-03	- .188822D-02	0.602315D-03	- .397645D-02	0.278697D-03	- .375364D-03	- .163748D-02
- .144711D-03	0.284659D-03	0.350803D-03	- .139847D-03	0.494227D-04	0.444441D-03	- .260476D-04	0.537770D-03	0.328380D-03	- .189854D-03
- .124165D-03	- .134954D-02	- .202857D-02	0.114554D-02	0.109904D-02	- .332723D-02	- .272468D-02	- .334935D-02	- .253217D-02	- .964074D-04
- .509457D-03	- .140460D-02	0.283700D-05	0.564416D-03	- .884164D-03	- .366267D-03	- .993024D-03	- .506759D-03	- .143371D-03	0.676242D-03
- .493861D-03	- .437629D-02	- .215227D-02	- .727826D-03	- .309999D-02	- .335690D-02	- .702871D-02	- .451252D-02	- .421865D-02	- .491455D-02
- .684734D-03	- .467284D-02	J.534696D-03	- .161076D-02	- .285298D-02	0.399536D-03	- .484089D-02	- .809507D-02	- .111511D-02	- .418012D-02
- .440579D-03	- .546082D-02	- .273750D-03	- .467739D-03	- .260574D-02	- .565458D-03	- .303358D-02	- .199406D-02	- .125217D-02	- .310728D-02
- .562921D-03	- .503772D-02	0.669339D-03	- .131807D-02	- .238020D-02	0.959227D-03	- .263029D-02	- .503942D-03	- .336641D-03	- .370095D-02
- .394222D-03	- .314891D-02	- .472472D-02	0.962040D-03	- .316412D-02	- .770874D-02	- .918121D-02	- .790810D-02	- .699298D-02	- .352543D-02
- .167519D-03	0.104701D-03	0.231353D-03	- .320826D-03	- .137117D-03	0.257929D-03	- .602042D-03	0.299303D-03	0.617132D-04	- .334149D-03
- .649770D-03	- .370409D-03	J.187419D-03	0.287252D-03	- .630540D-03	- .200754D-03	- .150645D-02	- .154921D-04	- .123034D-03	0.766594D-03
- .520137D-03	- .463333D-02	- .364161D-02	0.183636D-03	- .577093D-02	- .598312D-02	- .868523D-02	- .675817D-02	- .596149D-02	- .458628D-02
- .112764D-02	- .532467D-02	0.329191D-03	- .865822D-05	- .319959D-02	- .774312D-04	- .868496D-02	- .139747D-02	- .113547D-02	- .313222D-02
- .223616D-03	- .288065D-02	0.328435D-03	0.491057D-03	- .606456D-03	J.393777D-03	0.519193D-03	- .105049D-03	0.538032D-03	0.520977D-03
- .121599D-02	- .459063D-02	0.473434D-03	- .724834D-03	- .276568D-02	0.511352D-04	- .446561D-02	- .869287D-03	- .877035D-03	- .234810D-02
- .180048D-03	0.645162D-03	- .344996D-02	0.120480D-02	- .105939D-02	- .569241D-02	- .554094D-02	- .496156D-02	- .464364D-02	- .507948D-03
- .393399D-03	- .821314D-03	- .416316D-02	0.174078D-03	- .237215D-02	- .685254D-02	- .918044D-02	- .651038D-02	- .654980D-02	- .366907D-02
- .107223D-02	- .233774D-02	0.706565D-03	- .138088D-02	- .201984D-02	0.493292D-03	- .443658D-02	0.237422D-04	- .758773D-03	- .267122D-03
- .295813D-04	- .169996D-03	- .777430D-04	- .168914D-03	- .183285D-03	- .158601D-03	- .567822D-03	- .205576D-03	- .287782D-03	- .513668D-03
- .119305D-03	- .359974D-03	0.769680D-03	- .427033D-05	- .457761D-04	0.116917D-02	0.444104D-03	0.990355D-03	0.798366D-03	- .238076D-03
- .111917D-02	- .212329D-02	0.276663D-02	- .127332D-03	- .307733D-02	- .512394D-02	0.947964D-02	- .503474D-02	- .527747D-02	- .328095D-02
- .910114D-03	- .157294D-02	- .399899D-02	0.526116D-03	- .330073D-02	- .697809D-02	- .101950D-01	- .662280D-02	- .656789D-02	- .306421D-02
- .574344D-03	- .216631D-02	- .121727D-02	- .119084D-03	- .187497D-02	- .226549D-02	- .458017D-02	- .256213D-02	- .246373D-02	- .202118D-02

FIRM21	FIRM22	FIRM23	FIRM24	FIRM25	AVERAGE
-.528357D-02	-.293374D-02	-.990927D-03	0.275072D-02	0.624637D-03	-.829364D-03
-.100767D-01	-.642213D-02	-.377776D-02	-.619752D-02	-.855933D-03	-.243179D-02
-.139280D-01	-.751769D-02	-.385131D-02	-.560812D-03	-.941722D-03	-.289816D-02
-.370652D-02	-.305955D-02	-.170893D-02	-.399784D-02	0.239113D-03	-.929925D-03
0.194302D-04	0.508944D-04	0.130360D-03	-.344897D-03	0.499975D-03	0.989338D-04
-.392069D-02	-.242296D-02	-.112180D-02	0.365353D-02	-.102849D-02	-.887590D-03
-.749464D-03	-.100014D-02	-.311157D-03	0.266114D-02	-.211220D-03	-.191022D-03
-.792956D-02	-.574831D-02	-.402674D-02	-.555739D-02	-.315404D-02	-.252171D-02
-.389929D-02	-.395097D-02	-.310722D-02	-.742865D-02	-.230584D-02	-.167901D-02
-.178585D-02	-.291770D-02	-.260519D-02	-.271152D-02	-.370839D-02	-.142791D-02
-.971406D-03	-.241035D-02	-.249882D-02	-.591246D-02	-.322359D-02	-.125638D-02
-.122819D-01	-.749716D-02	-.418276D-02	0.336277D-03	-.247589D-02	-.297721D-02
-.664038D-03	-.377151D-03	-.193801D-03	-.132442D-02	0.347677D-03	-.998904D-04
-.169345D-02	-.118837D-02	-.168210D-03	0.154790D-02	0.876473D-03	-.145433D-03
-.105894D-01	-.718450D-02	-.452348D-02	-.250661D-02	-.341362D-02	-.300008D-02
-.360803D-02	-.404126D-02	-.292923D-02	-.406780D-02	-.252075D-02	-.163130D-02
0.152955D-02	0.447566D-04	-.915.75D-04	0.255503D-02	-.119428D-02	0.257580D-04
-.363546D-02	-.376817D-02	-.247715D-02	-.521642D-02	-.158816D-02	-.135719D-02
-.867189D-02	-.429003D-02	-.167179D-02	0.278191D-02	0.462178D-03	-.145227D-02
-.128653D-01	-.705776D-02	-.373838D-02	-.284270D-02	-.629401D-03	-.271154D-02
-.422183D-02	-.337039D-02	-.215444D-02	-.606822D-02	-.220250D-03	-.119346D-02
-.666464D-03	-.418756D-03	-.315469D-03	-.997243D-03	-.130897D-03	-.191826D-03
0.104503D-02	0.365733D-03	0.477163D-04	-.138355D-02	-.389726D-04	0.127625D-03
-.121278D-01	-.736005D-02	-.381591D-02	-.304869D-02	-.318355D-03	-.263770D-02
-.137929D-01	-.794579D-02	-.392628D-02	-.105717D-02	-.313214D-03	-.282895D-02
-.537520D-02	-.369676D-02	-.216154D-02	-.171750D-02	-.100892D-02	0.0

TELEPHONE INDUSTRY FOUR INDEX BIAS

FIRM 1	FIRM 2	FIRM 3	FIRM 4	FIRM 5	FIRM 6	FIRM 7	FIRM 8	FIRM 9	FIRM 10
-0.1486490-03	0.9085320-05	0.1354770-04	-0.5741700-04	0.6393720-04	-0.1525400-03	0.8975630-04	0.1525310-03	-0.4966120-05	0.5469790-04
0.1946700-03	0.1092970-03	-0.6343030-04	-0.3536030-05	0.5306350-06	0.9993440-05	-0.3172230-03	0.1273640-03	0.7929320-04	0.1055010-03
-0.1002940-02	-0.1054690-03	0.6150220-03	-0.5450480-03	-0.1076040-03	-0.1250820-03	0.1038030-02	-0.1371250-02	-0.1871340-03	-0.1836310-03
-0.1575690-02	0.5053390-03	-0.4098810-03	-0.2404230-08	0.5572480-03	0.1939260-02	-0.1160890-02	-0.1508160-02	0.9555890-08	-0.1560300-06
-0.5299560-02	0.6051300-03	0.1096420-03	-0.1628560-02	0.2196520-02	-0.2993270-02	0.1747710-02	0.3289410-02	-0.1407120-03	0.1551320-02
-0.3666180-03	0.9697540-03	-0.6538080-03	-0.1754890-04	0.4739290-03	0.1689730-02	-0.2555990-02	-0.6435170-03	0.4431090-03	0.5233990-03
-0.2423210-04	0.7176810-04	-0.1353390-03	0.8090800-04	0.7719420-04	0.2316210-03	-0.2816270-03	0.3786030-04	0.2777970-04	0.2724150-04
-0.3982820-02	0.1206540-03	0.7393210-03	-0.1651710-02	0.1325720-02	-0.3437270-02	0.2715720-02	0.2361630-02	-0.2433670-03	0.1068330-02
-0.1418260-03	0.3286960-03	0.3055980-03	-0.5043240-03	-0.9476270-04	-0.7351180-04	-0.3055210-03	-0.7363070-03	0.1805410-03	0.2470330-03
0.7990690-03	0.2597340-04	-0.9075280-04	0.2258590-03	-0.2567970-03	0.6190970-03	-0.5423490-03	-0.5405070-03	0.7101650-04	-0.1596120-03
-0.1163860-02	0.2636180-03	0.4379200-04	-0.4098370-03	0.4236010-03	-0.2291970-03	0.4276140-04	0.1169050-03	0.2355730-04	0.3234120-03

FIRM11	FIRM12	FIRM13	FIRM14	FIRM15	FIRM16	FIRM17	FIRM18	FIRM19	FIRM20
0.2436710-05	0.7800840-04	-0.1525940-03	0.3656320-04	-0.2406860-04	-0.2446280-03	-0.2318330-03	-0.2038800-03	-0.2049270-03	-0.3886640-04
-0.1355010-03	0.3527060-03	0.1758330-03	-0.9534920-04	0.2209760-04	0.1693810-03	-0.2660920-03	0.3008040-03	0.9998720-04	0.1406530-03
-0.1363250-03	-0.1974880-02	-0.1657250-03	0.6922610-03	-0.7698760-03	-0.6267760-03	-0.2638610-03	-0.1096910-02	-0.3431890-03	0.2842500-03
-0.4756300-03	-0.4925750-02	-0.1592130-04	-0.1116510-02	-0.2489440-02	-0.1213260-03	-0.3410340-02	-0.1495800-02	-0.1217860-02	-0.3937600-02
-0.2578780-03	-0.1174020-02	-0.4339000-03	0.2694270-03	-0.2364250-02	-0.7021560-02	-0.8920350-02	-0.6811190-02	-0.6649790-02	-0.3809680-02
-0.1074670-02	-0.2415730-02	0.8991590-03	-0.1417450-02	-0.1995810-02	0.7379110-03	-0.4204750-02	0.2276220-03	-0.5338470-03	-0.2632350-02
-0.3201800-04	-0.2480040-03	0.5551980-04	-0.2254770-03	-0.1592170-03	0.8861740-04	-0.3359490-03	-0.1506310-05	-0.8205480-04	-0.4748020-03
-0.4450720-04	0.2924570-03	-0.3625790-02	0.1300150-02	-0.1081490-02	-0.5861790-02	-0.5274890-02	-0.5262370-02	-0.4743630-02	-0.6485990-03
-0.6522070-03	-0.3989170-03	0.3400130-03	0.2506890-03	-0.6064800-03	0.4317440-04	-0.1274620-02	0.1883880-03	0.8189360-04	0.8054630-03
-0.8729130-04	-0.1119770-03	0.7141600-03	-0.2015560-03	0.1094210-03	0.1080350-02	0.7930540-03	0.9918620-03	0.8812210-03	-0.2367260-03
-0.2093610-03	-0.1052610-02	-0.6374240-03	-0.5069020-04	-0.9389110-03	-0.1181610-02	-0.2339960-02	-0.1316300-02	-0.1271300-02	-0.1007490-02

FIRM21	FIRM22	FIRM23	FIRM24	FIRM25	AVERAGE
-0.3844080-03	-0.1709720-03	-0.6598970-04	0.4477210-04	0.4085470-04	-0.5999170-04
-0.3014820-03	-0.1293670-03	0.5567840-04	-0.2824030-03	0.5154290-03	0.3195370-04
0.2019640-03	-0.5687630-03	-0.3887030-03	0.2896570-02	-0.1227050-02	-0.2337110-03
-0.2298990-02	-0.3023870-02	-0.2796610-02	-0.5570920-02	-0.3356370-02	-0.1515850-02
-0.1248380-01	-0.6928430-02	-0.3794060-02	-0.2560300-02	-0.1148830-02	-0.2743530-02
-0.3437420-02	-0.3199410-02	-0.2088430-02	-0.6113000-02	-0.2611040-03	-0.1123480-02
-0.2825550-03	-0.2477840-03	-0.2494800-03	-0.1042020-02	-0.1717510-03	-0.1318440-03
-0.8290410-02	-0.4163640-02	-0.1727460-02	0.3064310-02	-0.5725090-04	-0.1484220-02
-0.1309040-02	-0.1017400-02	-0.1322210-03	0.1503120-02	0.8356160-03	-0.8545180-04
0.1327590-02	0.6135170-03	0.2971760-03	-0.3415390-03	0.1327790-03	0.2594690-03
-0.2773860-02	-0.1883310-02	-0.1088950-02	-0.8401390-03	-0.4753680-03	0.0

WATER INDUSTRY ONE INDEX BIAS

FIRM 1	FIRM 2	FIRM 3	FIRM 4	FIRM 5	FIRM 6	FIRM 7	FIRM 8	FIRM 9	FIRM 10
-.8707620-03	-.6522650-03	-.7001240-03	-.1034070-02	0.2053580-03	0.1635800-02	0.1298860-02	-.4598850-03	-.7605220-04	-.1188900-02

FIRM 11	FIRM 12	FIRM 13	FIRM 14	FIRM 15	FIRM 16	FIRM 17	FIRM 18	FIRM 19	FIRM 20
0.1088710-02	0.1063220-02	0.3512440-02	-.3332470-03	-.5431090-04	0.4801700-03	0.4116440-03	-.1249590-02	0.2351740-04	-.6288400-03

FIRM 21	FIRM 22	FIRM 23	FIRM 24	FIRM 25	AVERAGE
-.3699080-03	-.6542750-03	-.1508620-02	-.1116510-02	-.9175960-03	-.8380950-04

WATER INDUSTRY TWO INDEX BIAS

FIRM 1	FIRM 2	FIRM 3	FIRM 4	FIRM 5	FIRM 6	FIRM 7	FIRM 8	FIRM 9	FIRM 10
-0.864066C-03	-0.724070D-03	-0.638138D-03	-0.749115D-03	0.318894D-03	0.155583D-02	0.140437D-02	-0.556411D-03	-0.198314D-03	-0.108628D-02
-0.514429D-03	-0.901541D-03	-0.877830D-03	-0.118461D-02	-0.515536D-03	0.237660D-02	0.731863D-03	0.276645D-03	-0.556529D-04	-0.554009C-03
-0.764328C-03	-0.538816D-03	-0.586326D-03	-0.583183D-03	0.238601D-03	0.124753D-02	0.974456D-03	-0.413459D-03	-0.288350C-03	-0.937989C-03
-0.644192C-03	0.351890D-03	-0.377627D-03	-0.868719D-03	0.212944D-03	0.136485D-04	0.195322D-04	-0.287663D-03	-0.501413D-05	-0.117645D-02
-0.553530D-03	-0.589968D-03	-0.173922D-03	-0.370431D-03	0.582592D-03	0.837415D-03	0.166607D-02	-0.790111D-03	0.116987D-03	-0.763409C-03
-0.644610D-03	-0.116624D-02	-0.466650D-03	0.396561D-03	0.421436D-03	0.162155D-02	0.155473D-02	-0.577434D-03	-0.715324D-03	-0.305246D-05
-0.779311D-03	-0.421188D-03	-0.695492D-03	-0.108270D-02	0.449558D-04	0.139281D-02	0.807295D-03	-0.251515D-03	-0.734684D-04	-0.112097C-02
-0.656023D-03	-0.195891D-03	-0.118435D-03	0.490423C-03	-0.765626D-03	-0.457507C-04	0.785861D-03	-0.792647D-03	0.615738D-03	-0.677920D-03
-0.771656D-03	-0.638445D-04	-0.930198D-03	-0.293636D-02	-0.498272D-03	0.185803D-02	0.650381D-03	0.133790D-03	0.967309D-03	-0.178462D-02
-0.883977C-03	-0.700518D-03	-0.744597D-03	-0.118042D-02	0.156033D-03	0.179484D-02	0.136734D-02	-0.434089D-03	-0.102001D-04	-0.123119D-02
-0.295495D-03	0.448062D-03	-0.424133D-03	-0.939485D-03	-0.356195D-03	0.126265D-03	-0.804076D-03	0.346467D-03	0.287639D-04	-0.669606C-03
-0.941417C-03	-0.524460D-03	-0.484956D-03	-0.795632D-03	0.615018C-03	0.110732C-02	0.163811D-02	-0.863985D-03	-0.325592D-04	-0.135136C-02
-0.928474C-03	-0.401914D-03	-0.729013D-03	-0.160376D-02	0.161497D-03	0.152099D-02	0.123401D-02	-0.455047D-03	0.252915D-03	-0.153627C-02
-0.333865D-03	-0.193440D-03	-0.479235D-04	0.961121D-03	0.487454D-03	-0.175207D-03	0.202894D-03	-0.418432D-03	-0.807313D-03	-0.557922D-04
-0.889212D-03	-0.819041D-03	-0.721472D-03	-0.102037D-02	0.227934D-03	0.186107D-02	0.153926D-02	-0.510057D-03	-0.759168D-04	-0.116410D-02
-0.697632D-03	-0.429664D-03	-0.535582D-03	-0.764445D-03	0.190866D-03	0.113970D-02	0.918189D-03	-0.372930D-03	-0.101661D-03	-0.961152C-03

FIRM 11	FIRM 12	FIRM 13	FIRM 14	FIRM 15	FIRM 16	FIRM 17	FIRM 18	FIRM 19	FIRM 20
0.112554D-02	0.944639D-03	0.341331D-02	-0.425195D-03	-0.149844D-03	0.357908D-03	0.534950D-03	-0.100144D-02	0.700170D-04	-0.537911C-03
0.757633C-03	0.932818D-03	0.274608D-02	0.104289D-03	-0.407498D-04	0.344202D-03	0.269253D-03	-0.945542D-03	-0.332428D-03	-0.109998C-02
0.538885C-03	0.607859D-03	0.316740D-02	-0.392902D-03	0.548779D-04	0.429374D-03	0.359627D-03	-0.528731D-03	-0.119798C-03	-0.502021C-03
-0.533444C-03	0.275770D-03	0.265992D-02	-0.263494D-03	0.682866D-03	0.900787D-03	-0.327549D-03	-0.507299D-03	-0.300756D-03	-0.217774C-03
0.189342D-02	0.105262D-02	0.154368D-02	-0.371954D-03	-0.624159D-03	-0.137810D-03	0.686363D-03	-0.139525D-02	0.655153D-03	0.642434C-05
0.110680D-02	0.374199D-03	0.257694D-02	-0.586508D-03	-0.553424D-03	-0.240626D-03	0.989033D-03	0.228438D-03	0.795380D-04	-0.398956C-03
0.495858D-03	0.822281D-03	0.334786D-02	-0.234900C-03	0.212880C-03	0.638442D-03	0.152492D-03	-0.975316D-03	-0.193458D-03	-0.660715D-03
-0.349360D-04	-0.139755D-03	0.234355D-02	-0.725998D-03	0.717200D-04	0.221376D-03	0.419548D-03	0.558115D-03	-0.100749D-04	0.145287C-03
0.118569D-02	0.196724D-02	0.334538D-02	0.363376D-03	0.417421D-03	0.113694D-02	-0.418686D-03	-0.324998D-02	-0.372246D-04	-0.103357C-02
0.123590D-02	0.119548D-02	0.357640D-02	-0.291230D-03	-0.869853D-04	0.488328D-03	0.419828D-03	-0.145366D-02	0.480387D-04	-0.693234C-03
-0.127036D-02	-0.579315D-04	0.180315C-02	0.103689C-03	0.909251D-03	0.916063D-03	-0.656663D-03	-0.491773D-04	-0.677725D-03	-0.470939D-03
0.144213D-02	0.111669D-02	0.332767D-02	-0.532088D-03	-0.209312D-03	0.377063D-03	0.544963D-03	-0.141886D-02	0.342361D-04	-0.259333C-03
0.120268C-02	0.138451D-02	0.365127D-02	-0.220447D-03	0.928826D-04	0.723930D-03	0.182897D-03	-0.196443D-02	0.933794D-03	-0.639907D-03
-0.681332D-03	0.679940D-03	0.138514D-02	-0.576960D-03	0.128245D-03	0.320275D-04	0.226010D-03	0.144311D-02	-0.263537D-03	0.116707C-03
0.141540D-02	0.119643D-02	0.353282D-02	-0.347555D-03	-0.215690D-03	0.369564C-03	0.554695D-03	-0.138501D-02	0.118608D-03	-0.658536C-03
0.658843C-03	0.732976D-03	0.282804D-02	-0.293166D-03	0.459984D-04	0.437172D-03	0.269238D-03	-0.843002D-03	-0.352204D-04	-0.460249C-03

FIRM 21	FIRM 22	FIRM 23	FIRM 24	FIRM 25	AVERAGE
-0.375870C-03	-0.541765D-03	-0.154428D-02	-0.886568D-03	-0.788061D-03	-0.535045D-04
-0.630014D-03	-0.986069D-03	-0.687428D-03	-0.158724D-02	-0.110487D-02	-0.139301D-03
-0.511232C-03	-0.436730D-03	-0.129130D-02	-0.723182D-03	-0.707632D-03	-0.683112D-04
-0.351288D-03	-0.216874D-03	-0.957232D-03	-0.568230D-03	-0.609838D-03	-0.125443D-03
0.358744C-03	-0.208613D-03	-0.127339D-02	-0.316826D-03	-0.233886D-03	0.637542C-04
-0.540677D-03	-0.235445D-03	-0.125827D-02	-0.149584D-03	-0.331203D-03	0.471612D-04
-0.496040D-03	-0.635271D-03	-0.123868D-02	-0.112710D-02	-0.934757D-03	-0.120248D-03
0.416187D-03	0.246350D-03	-0.123964D-02	0.446390D-03	-0.380455D-04	0.306866D-04
0.238060D-04	-0.131731D-02	-0.111900D-02	-0.252454D-02	-0.159963D-02	-0.249332C-03
-0.340791C-03	-0.738862D-03	-0.153052D-02	-0.126243D-02	-0.992014D-03	-0.915736D-04
-0.603695D-03	-0.351892D-03	-0.145087D-03	-0.780936D-03	-0.668237D-03	-0.181596D-03
-0.670068D-04	-0.394524D-03	-0.180123D-02	-0.704171D-03	-0.657871D-03	-0.212602D-04
-0.178999C-03	-0.782741D-03	-0.159015D-02	-0.144797D-02	-0.108837D-02	-0.122742D-03
-0.609857C-03	0.359721D-03	-0.582046D-03	0.714322C-03	0.165536D-03	0.360849D-04
-0.320175D-03	-0.700443D-03	-0.158748D-02	-0.115913D-02	-0.926663D-03	-0.674027D-04
-0.339952D-03	-0.462694D-03	-0.118972D-02	-0.805146D-03	-0.701047D-03	0.0

WATER INDUSTRY THREE INDEX BIAS

FIRM 1	FIRM 2	FIRM 3	FIRM 4	FIRM 5	FIRM 6	FIRM 7	FIRM 8	FIRM 9	FIRM 10
-5001540-03	-1015960-02	-7813090-03	-7426230-03	-3466860-03	0.2264080-02	0.8899050-03	0.1344310-03	-2497020-03	-3874690-03
-7624480-03	-5107410-03	-6024220-03	-6600010-03	0.2022380-03	0.1258180-02	0.9271400-03	-3797970-03	-2561350-03	-9622340-03
-6255960-03	0.2364420-03	-2488860-03	-3088770-03	0.4344940-03	-1770550-03	0.1919610-03	-4716210-03	-2416550-03	-9760520-03
-5537130-03	-5875030-03	-1729650-03	-3800860-03	0.5787640-03	0.8399490-03	0.1657160-02	-7868520-03	0.1211970-03	-7668570-03
-5086450-03	-8877720-03	-8648940-03	-1140030-02	-5036720-03	0.2330840-02	0.7079790-03	0.2721450-03	-7997860-04	-5378940-03
-2267580-03	0.1863610-03	-5384260-03	-1016470-02	-5808670-03	0.6537490-03	-7446300-03	0.3429450-03	0.2079120-04	-4752540-03
-2423180-03	-8162420-03	-3468370-03	-5257980-03	-7772000-04	0.1528340-02	0.1139420-02	-1171400-03	0.1259340-03	-2047020-03
-6500850-03	0.4510360-03	-4111150-03	-1217480-02	0.1663410-03	0.2660430-04	0.4511050-03	-2931330-03	0.1880550-03	-1385910-02
-1409660-03	-2178580-03	0.3167840-03	0.1211050-02	0.7796590-03	-5796250-03	0.7290740-03	-7250650-03	-5034240-03	0.1301300-03
-3817860-03	0.2335960-03	0.5993080-04	-2650340-03	0.5713190-03	-4606020-03	0.5909730-03	-6330320-03	0.1664900-03	-7729170-03
-6518820-03	-1202920-02	-4747440-03	0.3838430-03	0.4247380-03	0.1679140-02	0.1613110-02	-2934330-03	-7080250-03	-3889600-03
-7161620-03	0.3773490-03	-2311990-03	-6925360-03	0.5353100-03	-2863810-03	0.3788530-03	-1027230-02	-3043050-03	-3952300-03
-4057600-03	-2450790-03	0.2307470-03	0.7588070-03	0.9908380-03	-4046890-03	0.1251280-02	-6185640-03	0.2413360-04	-1305400-02
-4563330-03	-3292910-03	-1075130-02	-2942560-02	-1101880-03	-2512470-02	0.1821260-03	-4052310-03	0.7590350-03	-1170120-02
-3373550-03	-1258620-03	-4804820-04	0.8892550-03	0.4759170-03	-2381190-03	0.1446980-03	-8052310-03	-7695110-03	-1037000-03
-3624480-03	-1003230-02	-1238320-03	0.7529070-03	0.7432750-03	0.8512500-03	0.1853730-02	-6734790-03	-4007620-03	-7014040-04
-5244890-03	-9630850-03	-8844730-03	-1178040-02	-5008120-03	0.2456310-02	0.8284000-03	0.2512560-03	-5974020-04	-5499210-03
-8579980-03	0.9512540-03	0.2122260-04	-3457180-03	0.6724430-04	-3928510-03	-1792900-03	-6619730-04	0.1906390-03	-5530920-03
-2333260-03	-4079150-03	-2542570-03	0.5492690-03	0.3892800-04	0.5357220-03	0.7178910-04	-1436250-04	-6779720-03	0.1121440-03
-7295370-03	-1445380-03	-2757870-04	0.2758100-03	0.1023870-02	-2897100-03	0.1090620-02	-1066740-02	-5326160-03	-8485890-03
-3441110-03	0.7853600-03	-6429410-03	-2479290-02	-8523640-03	0.4906020-03	-1066620-02	0.7241700-03	0.6540850-03	-1217110-02
-5432760-03	0.7109130-03	-6369370-03	-2596670-02	-4173310-03	0.4820930-03	-3474200-03	0.2144150-03	0.9158910-03	-1711060-02
-8827590-03	-8653830-03	-6711070-03	-7957310-03	0.3163200-03	0.1785680-02	0.1607640-02	-5832530-03	-1726280-03	-1084440-02
-2616360-03	-28861200-03	-2504150-03	-1729440-03	-6753300-04	-1230660-03	-5795760-03	0.1101850-03	-3959510-03	-3802720-03
-7374790-03	-3651540-03	-4560270-03	-6561100-03	0.6678980-03	0.1073370-02	0.1687600-02	-9084590-03	-9367260-04	-1299020-02
-4843120-03	-2508040-03	-3593750-03	-5216560-03	0.1435370-03	0.7126760-03	0.5869390-03	-2621570-03	-7311440-04	-6807650-03
0.8111350-03	0.7496340-03	0.2583550-02	-3403720-04	-1892420-03	0.1525040-03	0.4595610-03	-5561470-03	-2635310-03	-9636010-03
0.5051670-03	0.6289350-03	0.3186870-02	-3648300-03	0.3062570-04	0.4677980-03	0.3169050-03	-5829700-03	-1406650-03	-5271750-03
-5012920-03	0.2873290-04	0.2445790-02	-4410610-03	0.5146230-03	0.6726930-03	-1052100-03	-5312800-05	-2180230-03	-3043690-04
0.1892280-02	0.1056610-02	0.1546790-02	-3685140-03	-6209740-03	-1337190-03	0.6821860-03	-1403760-02	0.6536550-03	0.3406750-05
0.7094690-03	0.8912220-03	0.2722330-02	0.9334570-04	-3056180-04	0.3410290-03	0.2660420-03	-6808730-03	-3417140-03	-1082220-02
-1074860-02	0.4635880-04	0.1724200-02	0.2263890-03	0.7780100-03	0.7966700-03	-2649200-03	-5138770-04	-7283910-03	-6923880-03
-1571140-02	0.9354470-03	0.9131290-03	0.2308170-04	-5947820-03	-2415990-03	0.5499060-03	-1117160-02	0.3157010-03	-3368350-03
-3837300-03	0.5074290-03	0.2785790-02	-1995750-03	0.7337720-03	0.1025340-02	-4271300-03	-9719300-03	-2426860-03	-2450630-03
0.3601200-03	-3822540-03	-2437210-04	-5690800-03	-4204630-03	-4491240-03	0.5901190-03	0.8363910-03	0.3592690-03	0.5610960-03
0.5205620-03	0.4050070-03	0.9334540-03	-3127460-03	0.9024610-03	0.2370710-03	0.6522250-04	-7775110-03	0.3585330-03	0.3152470-03
0.1189880-02	0.4159840-03	0.2552760-02	-5872790-03	-5888970-03	-2606380-03	0.1018940-02	0.1771290-03	0.1031440-03	-4091380-03
-1383270-03	0.3744870-03	0.2575530-02	-4252400-03	0.5077240-03	0.7892960-03	-1693560-03	-6940470-03	-2613330-04	0.4393110-04
0.9959770-03	0.1357650-03	0.7515220-03	-6695130-03	-4953260-03	-3040180-03	0.6785460-03	-9358480-05	0.5977000-03	0.5647520-03
0.8798230-03	0.1787710-02	0.2664080-02	0.71117070-03	0.3975050-03	0.9692520-03	-4890670-03	-2839730-02	-35481140-03	-1431820-03
-7460150-03	-6731210-03	0.1402910-02	-5603500-03	0.1845250-03	0.8802040-04	0.2653630-03	0.1391310-02	-2797370-03	0.1202560-03
0.1881850-02	0.5016510-03	0.8588780-03	-5733430-03	-1005070-02	-6945420-03	0.1139460-02	-2079170-03	0.6795350-03	0.1698020-03
0.8851320-03	0.9847640-03	0.2760350-02	0.95112200-04	-1024600-03	0.3031370-03	0.3250590-03	-9998030-03	-2931180-03	-8790840-04
-2048070-03	0.8905590-04	0.2417100-03	0.7230590-05	0.2534960-03	0.2900370-03	-2561240-03	-1501360-03	-2127710-05	-2686650-03
-5750960-03	-4661740-03	-1307270-02	-2928170-03	0.1028040-03	0.2983440-04	0.2686500-03	0.1170150-02	-4152680-03	-2686650-03
0.3373380-03	0.1265280-04	0.2312300-02	-8401080-03	-5743280-04	0.1673350-03	0.5198160-03	0.2817270-03	-4152680-03	0.3531950-03
-9020900-03	0.8063370-03	0.1879320-02	0.6098800-03	0.1659640-02	0.1390600-02	-4190760-02	-1804010-02	-6402140-03	-8155270-03
-1769700-03	0.1214840-02	0.2652360-02	0.3480000-03	0.9819710-03	0.1417960-02	-3432680-03	-2419010-02	-3011270-03	-6479480-03
0.1424060-02	0.1095670-02	0.3453140-02	-4193840-03	-2811380-03	0.2797920-03	0.6432550-03	-1180240-02	0.1494260-03	-3647550-03
-1236950-02	-4019760-03	0.1480240-02	-1305790-03	0.6799490-03	0.6005440-03	-3558200-03	0.6489310-03	-5725400-03	-2229400-03
0.1457400-02	0.1058230-02	0.3280030-02	-5756420-03	-2554280-03	0.3172410-03	0.6050450-03	-1294200-02	0.3627260-03	-2173720-03
0.3792730-03	0.4721260-03	0.1961540-02	-2100020-03	0.7043590-04	0.3300800-03	0.1552970-03	-5479570-03	-4023120-04	-2985460-03

FIRM21	FIRM22	FIRM23	FIRM24	FIRM25	AVERAGE
-.642103C-03	-.814605D-03	-.734030C-03	-.123458C-02	-.905352D-03	-.927399C-04
-.514697D-03	-.465523D-03	-.127117D-02	-.783998D-03	-.742339D-03	-.777255D-04
-.403435D-03	0.131843D-04	-.101328D-02	-.106504D-03	-.349757D-03	-.673623D-04
0.359054D-03	-.212397D-03	-.127214D-02	-.324574D-03	-.232217D-03	0.627389D-04
-.640269C-03	-.961434D-03	-.676750D-03	-.154426C-02	-.108270C-02	-.137160C-03
-.680327D-03	-.535021D-03	0.794883D-05	-.102747D-02	-.782784D-03	-.191133D-03
0.102644D-03	-.520721D-03	-.541245D-03	-.764675D-03	-.423067D-03	0.936061D-05
-.276096D-03	-.315664D-03	-.103370D-02	-.793935D-03	-.727395D-03	-.146618D-03
0.929125D-04	0.584925D-03	-.532173D-03	0.111642D-02	0.594182D-03	0.148709D-03
0.307310C-03	0.130689D-03	-.830502D-03	0.972927C-04	-.123392D-04	0.226405D-04
-.526059D-03	-.251972D-03	-.128121D-02	-.171432D-03	-.340174D-03	0.498579D-04
-.150993C-03	-.435513D-04	-.122749D-02	-.282598D-03	-.427222D-03	-.731437D-04
0.226726D-03	0.455737D-03	-.102012D-02	0.834728D-03	0.402395D-03	0.143635D-03
-.238150C-03	-.157199D-02	-.403316C-03	-.285400D-02	-.172238D-02	-.288195D-03
-.601343D-03	0.353956D-03	-.574108D-03	0.682892D-03	0.145330D-03	0.272769D-04
0.198524C-03	0.112082D-03	-.109069D-02	0.430960D-03	0.213178D-03	0.163777D-03
-.608828D-03	-.100088D-02	-.724484D-03	-.159952D-02	-.116674D-02	-.132566D-03
0.952898C-04	0.133811D-04	-.120542D-03	-.955676D-04	-.778707D-04	-.329862D-04
-.715521C-03	0.796194D-05	-.276230D-03	0.150795D-03	-.117108D-03	-.145753D-04
-.182402C-03	0.359362D-03	-.148534D-02	0.613398D-03	0.769072D-04	0.674281D-04
-.258615C-03	-.921780D-03	0.100434D-06	-.195343D-02	-.124686D-02	-.302535D-03
-.337697D-03	-.882337D-03	-.708631D-03	-.191813D-02	-.127073D-02	-.266485D-03
-.328007D-03	-.608560D-03	-.181074C-02	-.974589D-03	-.823540D-03	-.444566D-04
-.626137D-03	-.420747D-04	-.202909D-03	-.155565D-03	-.314273D-03	-.103087D-03
-.721128C-04	-.340882D-03	-.181644D-02	-.593528D-03	-.595776D-03	-.674488D-05
-.242354D-03	-.298324D-03	-.819288D-03	-.530115D-03	-.474989D-03	0.0

WATER INDUSTRY FOUR INDEX BIAS

FIRM 1	FIRM 2	FIRM 3	FIRM 4	FIRM 5	FIRM 6	FIRM 7	FIRM 8	FIRM 9	FIRM 10
--217943C-03	0.523659D-03	--.757234C-03	--.255628C-02	--.107704D-02	0.101809D-02	--.100678D-02	0.920649D-03	0.846112D-03	--.101776D-02
--.304271D-04	--.432334D-03	0.110451D-03	0.799197D-03	0.331133D-03	0.131304D-03	0.591920D-03	--.320996D-03	--.374083D-03	0.298071C-03
--.170628D-04	0.895529D-04	--.930700D-04	--.422702D-03	--.157428D-03	0.134633D-03	--.119844D-03	0.128281D-03	0.182867D-03	--.158739D-03
--.144456D-03	0.150281D-03	0.316660D-03	0.113918D-02	0.766122D-03	--.642536D-03	0.664828D-03	--.711865D-03	--.465622D-03	0.822221C-04
--.699100C-03	0.287796D-03	--.138129D-03	--.269834C-03	0.692738C-03	--.421014C-03	0.498697D-03	--.746846D-03	--.158533D-03	--.114666D-02
--.687370D-04	0.261701D-03	0.114293D-03	0.769843D-04	0.224672D-03	--.527484D-03	--.594456D-04	--.196479D-03	0.797266D-05	--.194353D-03
--.375333D-03	0.187754D-03	0.120297D-03	--.403902D-04	0.659705D-03	--.535993D-03	--.659358D-03	--.706234D-03	0.697785D-04	--.693301C-03
--.192899D-03	0.244183D-04	--.364708D-03	--.249928D-03	--.232205D-03	0.404418D-03	--.520131D-03	0.306633D-03	--.303889D-03	--.185923C-03
--.234350D-03	--.822550D-03	--.317898D-03	--.386277D-03	--.248476D-04	0.149439C-02	0.118890D-02	--.161614D-03	0.648602D-04	--.152363C-03
--.307426D-03	--.105264D-02	--.791403D-03	--.755341D-03	--.343385D-03	0.232168D-02	0.948265D-03	0.122975D-03	--.242407D-03	--.391182C-03
--.249177D-03	--.111382D-03	--.180074D-03	--.266536D-03	0.781469D-04	0.337748D-03	0.284579D-03	--.136549D-03	--.373143D-04	--.355999C-03

FIRM11	FIRM12	FIRM13	FIRM14	FIRM15	FIRM16	FIRM17	FIRM18	FIRM19	FIRM20
--.706592D-03	0.910627D-03	0.179860D-02	0.732579D-03	0.103839D-02	0.127066D-02	--.109905D-02	--.184622D-02	--.690879D-03	--.103698C-03
0.466356D-03	--.168888D-03	--.102244D-03	--.284938D-03	--.442903D-03	--.451317D-03	0.524759D-03	0.563428D-03	0.207548D-03	0.175724D-03
--.930845D-03	0.193346D-03	0.160984D-03	0.129930D-03	0.122254D-03	0.170644D-03	--.164414D-03	--.392346C-03	--.527935D-04	--.133541C-03
0.295437C-03	--.375435D-03	--.669842D-03	--.552471C-03	0.364182D-03	--.393131D-03	0.529472D-03	0.784585D-03	0.343469D-03	0.564645D-03
--.129018D-03	0.181141D-03	0.241454D-02	--.555170D-03	0.385470D-03	0.618652D-03	--.494265D-05	--.017010D-03	0.266601D-04	0.177472C-03
--.195498C-03	--.104290D-03	0.807255D-04	--.122700D-03	0.131241D-03	0.119393D-03	--.917107D-04	0.422104D-04	0.506658D-04	0.221446D-03
0.529621D-03	0.304254D-03	0.857670D-03	--.384575D-03	--.564235D-04	0.147299D-03	0.153786D-03	--.572786D-03	0.389752D-03	0.389028C-03
--.104145D-02	--.297686D-03	0.140951D-02	--.787911C-03	0.548707D-03	0.481151C-03	--.264109D-03	0.606720D-03	--.623206D-03	--.444389D-03
0.158641D-02	0.877085D-03	0.865487D-03	--.208721D-04	--.640890D-03	--.301411D-03	0.609988D-03	--.992503D-03	0.336066D-03	--.394843C-03
0.894440C-03	0.791418D-03	0.259937D-02	--.348083D-04	--.224715D-03	0.132493D-03	0.689473D-03	--.607456D-03	--.240325D-03	--.973783C-03
0.169040C-03	0.231197D-03	0.100741D-02	--.110090D-03	0.496955D-04	0.179444D-03	0.683246D-04	--.271607D-03	--.252643D-04	--.145521C-03

FIRM21	FIRM22	FIRM23	FIRM24	FIRM25	AVERAGE
--.335248D-03	--.110491D-02	0.153136D-03	--.219996D-02	--.136141D-02	--.312071D-03
--.127519C-04	0.233165D-03	--.226356D-03	0.552894C-03	0.311712D-03	0.980489D-04
0.186657D-04	--.169748D-03	0.324934D-04	--.343102D-03	--.192418D-03	--.425229D-04
0.101426D-03	0.579160D-03	--.524235D-03	0.108499D-02	0.574150D-03	0.139501D-03
--.169650D-03	0.126196D-03	--.125999D-02	0.605038D-04	--.234804D-03	--.306208C-03
0.766327C-04	0.183129D-03	--.153035D-03	0.246534D-03	0.114547D-03	0.953675D-05
0.299478D-03	0.222572D-03	--.853766D-03	0.2281835D-03	0.906839D-04	0.455866D-04
--.702769D-03	--.223203D-03	--.492732D-04	--.402099D-03	--.428820D-03	--.112624D-03
0.970976D-04	--.467078D-03	--.556452D-03	--.654031D-03	--.560971D-03	0.238759D-04
--.627485C-03	--.831132D-03	--.756978D-03	--.125642D-02	--.914324D-03	--.900432D-04
--.125461D-03	--.145385D-03	--.419505D-03	--.262886D-03	--.240165D-03	0.0

ELECTRIC INDUSTRY ONE INDEX MSE

FIRM 1	FIRM 2	FIRM 3	FIRM 4	FIRM 5	FIRM 6	FIRM 7	FIRM 8	FIRM 9	FIRM 10
0.226120-05	0.1509520-03	0.6589490-05	0.5111420-03	0.6411440-05	0.2350510-04	0.9410570-04	0.3164190-04	0.6631450-05	0.1760250-04

FIRM 11	FIRM 12	FIRM 13	FIRM 14	FIRM 15	FIRM 16	FIRM 17	FIRM 18	FIRM 19	FIRM 20
0.1201480-03	0.2827860-03	0.5684750-05	0.1858590-04	0.6225730-06	0.2369200-04	0.9675090-03	0.1679050-04	0.7777310-03	0.3295850-04

FIRM 21	FIRM 22	FIRM 23	FIRM 24	FIRM 25	AVERAGE
0.7080350-05	0.1015150-04	0.6356360-03	0.7987100-04	0.1956520-04	0.1539620-03

ELECTRIC INDUSTRY TWO INDEX MSE

FIRM 1	FIRM 2	FIRM 3	FIRM 4	FIRM 5	FIRM 6	FIRM 7	FIRM 8	FIRM 9	FIRM10
0.1447160-05	0.1406770-03	0.7424210-06	0.4390930-03	0.7144140-05	0.2350940-04	0.2446050-04	0.1772080-04	0.6008080-03	0.1053110-04
0.1585790-05	0.8623240-04	0.1076670-04	0.2669120-03	0.5661170-05	0.1936470-04	0.9026610-04	0.2113820-04	0.6006440-05	0.1173600-04
0.1583950-05	0.1235070-03	0.6212140-05	0.4795480-03	0.2921750-05	0.1598120-04	0.9473930-04	0.3125780-04	0.5252770-05	0.1744420-04
0.2330960-05	0.6544620-04	0.6582400-05	0.3950200-03	0.6512560-05	0.2085540-04	0.5442300-04	0.2136160-04	0.3052000-05	0.4086240-05
0.8981850-06	0.6170100-04	0.5628830-05	0.1092600-03	0.3399540-05	0.5093370-05	0.6104350-04	0.1192670-04	0.4274550-05	0.1524460-04
0.2498320-05	0.6473730-04	0.4819700-05	0.1960610-03	0.7192850-05	0.1834620-04	0.2193100-04	0.5997960-05	0.5969140-05	0.4922690-05
0.5446970-06	0.9913430-04	0.6024900-05	0.3903810-03	0.5369220-05	0.1350530-04	0.5339780-04	0.2099790-04	0.5667210-05	0.1186250-04
0.2506860-05	0.1315460-03	0.6373910-05	0.5003150-03	0.6040740-05	0.2290850-04	0.1016860-03	0.3204490-04	0.2199450-05	0.1501200-04
0.2394340-05	0.1165550-03	0.9244810-05	0.3659020-03	0.1621150-05	0.1213620-04	0.1147900-03	0.3149120-04	0.4086490-05	0.1921140-04
0.2534110-05	0.2755050-04	0.1178760-04	0.1708780-03	0.2584510-05	0.6451990-05	0.9325070-04	0.1919950-04	0.5974590-05	0.1064530-04
0.2826730-05	0.1497310-03	0.9395640-05	0.4672070-03	0.6108220-05	0.2291310-04	0.1047970-03	0.3201760-04	0.2267780-05	0.1774250-04
0.1305170-05	0.1511090-03	0.6648030-05	0.5698770-03	0.5774380-05	0.2214120-04	0.9673900-04	0.3167890-04	0.4528200-05	0.1639930-04
0.2381740-05	0.1436210-03	0.6039510-05	0.4888740-03	0.5510830-05	0.2479930-04	0.6667200-04	0.2657160-04	0.4997240-05	0.9642640-05
0.2361050-05	0.1394660-03	0.4556920-05	0.3574800-03	0.6807630-05	0.2213710-04	0.7496100-04	0.2199820-04	0.2561280-05	0.1684980-04
0.1192040-05	0.2279140-05	0.5801270-05	0.3349980-04	0.4125290-05	0.4876830-05	0.2902140-04	0.2432350-05	0.6252300-05	0.2914900-05
0.2027370-05	0.1016210-03	0.6714990-05	0.3420210-03	0.5118270-05	0.1690620-04	0.7151440-04	0.2185620-04	0.4606500-05	0.1224290-04

FIRM11	FIRM12	FIRM13	FIRM14	FIRM15	FIRM16	FIRM17	FIRM18	FIRM19	FIRM20
0.1190370-03	0.2729600-03	0.7715180-05	0.1230840-04	0.1739340-07	0.2211450-04	0.8579660-03	0.2147310-04	0.6578100-03	0.2608390-04
0.4115240-04	0.1764070-03	0.1089530-05	0.7953460-05	0.1009570-05	0.2131330-04	0.6203650-03	0.4960320-05	0.4436140-03	0.1082570-04
0.1197060-03	0.2239700-03	0.5351910-05	0.1677540-04	0.6191350-06	0.2237360-05	0.9286310-03	0.1805590-03	0.7671190-03	0.3387500-04
0.1052070-03	0.2058250-03	0.3482120-05	0.1816850-04	0.5575230-06	0.2118340-04	0.9516130-03	0.6340760-05	0.5715330-03	0.1453710-04
0.1830780-04	0.7796500-04	0.3102060-05	0.7114840-05	0.5002020-06	0.2350330-04	0.3106230-04	0.1753100-04	0.1919760-03	0.2109710-04
0.2994470-04	0.1459500-03	0.2327820-05	0.2489710-05	0.3869380-06	0.2355910-04	0.4403540-03	0.8118080-05	0.2648530-03	0.3320160-05
0.1182480-03	0.1846930-03	0.7225050-05	0.1961760-04	0.4229410-06	0.1482690-04	0.7939650-03	0.2352580-04	0.5470470-03	0.3028830-04
0.1195540-03	0.2626220-03	0.4295090-05	0.1752870-04	0.7107010-06	0.1805340-04	0.9618950-03	0.9617070-05	0.7541430-03	0.2894290-04
0.6992550-04	0.1836570-03	0.3401880-05	0.1722160-04	0.8820540-06	0.2366910-04	0.5240990-03	0.1681510-04	0.5781050-03	0.3196360-04
0.4063150-04	0.5640180-04	0.3739780-06	0.1627720-04	0.1081170-05	0.2154920-04	0.4866440-03	0.9818820-05	0.2491050-03	0.1308450-04
0.9015620-04	0.2739790-03	0.5200110-05	0.1167560-04	0.8277170-06	0.1253170-04	0.7655370-03	0.1802400-04	0.7388320-03	0.3194820-04
0.1227660-03	0.2795990-03	0.5505670-05	0.1865800-04	0.6494930-06	0.2238120-04	0.9379860-03	0.7259760-05	0.7738270-03	0.3031470-04
0.1135880-03	0.2875910-03	0.4582090-05	0.1448780-04	0.5465220-06	0.2005930-04	0.9942130-03	0.5902900-05	0.7486930-03	0.1981350-04
0.6328590-04	0.2515540-03	0.4926260-05	0.2725240-05	0.5094450-06	0.1238820-04	0.5171670-03	0.1579730-04	0.5919400-03	0.2547540-04
0.1998770-04	0.1808890-04	0.1134940-05	0.9717820-05	0.4290890-06	0.2375760-04	0.2591310-03	0.9022460-05	0.3510130-04	0.2826080-05
0.7939980-04	0.1934110-03	0.4007540-05	0.1284800-04	0.6099930-06	0.1885660-04	0.6703080-03	0.1275080-04	0.5235800-03	0.2162530-04

FIRM21	FIRM22	FIRM23	FIRM24	FIRM25	AVERAGE
0.8481690-05	0.4784220-05	0.5444410-03	0.4666170-04	0.1074090-04	0.1313580-03
0.5403410-05	0.1055590-04	0.3350960-03	0.7677960-04	0.7846080-05	0.9142940-04
0.3948010-05	0.9751240-05	0.5680330-03	0.7026300-04	0.1980160-04	0.1432630-03
0.4359560-05	0.1072510-04	0.3433210-03	0.1278630-04	0.1264120-04	0.1157260-03
0.6355440-05	0.2443320-05	0.2762140-03	0.7576430-04	0.1246320-04	0.4175480-04
0.6631150-05	0.5030760-05	0.1997850-03	0.4240640-04	0.3037380-06	0.5870150-04
0.8412660-05	0.9019620-05	0.4401700-03	0.3517940-04	0.1876790-04	0.1143310-03
0.2652550-05	0.7459440-05	0.5665810-03	0.6807610-04	0.1947700-04	0.1464870-03
0.5543040-05	0.1034290-04	0.3363300-03	0.8877070-04	0.2078840-04	0.1117180-03
0.2544830-05	0.1215740-04	0.1654990-03	0.5737600-04	0.1443210-04	0.5967570-04
0.7911090-05	0.8741860-05	0.6297260-03	0.7388810-04	0.1823000-04	0.1400770-03
0.6926880-05	0.8649200-05	0.6342690-03	0.79957470-04	0.1833180-04	0.1504720-03
0.7106120-05	0.1019850-04	0.5618040-03	0.5475760-04	0.1014460-04	0.1453200-03
0.7103100-05	0.221610-05	0.5537210-03	0.8439250-04	0.1078770-04	0.1117240-03
0.4422870-05	0.6554190-05	0.3046250-06	0.2059250-04	0.5119010-05	0.2000580-04
0.5053490-05	0.7934950-05	0.4233840-03	0.5917530-04	0.1332500-04	0.0

ELECTRIC INDUSTRY THREE INDEX MSE

FIRM 1	FIRM 2	FIRM 3	FIRM 4	FIRM 5	FIRM 6	FIRM 7	FIRM 8	FIRM 9	FIRM10
0.1920000-05	0.6460170-04	0.1900190-06	0.1561640-03	0.6596690-05	0.1804740-04	0.8067210-05	0.5016980-05	0.5967490-05	0.4487360-05
0.4046650-06	0.1041340-03	0.7746810-06	0.3865150-03	0.3844590-05	0.1440630-04	0.2088010-04	0.1594590-04	0.5262860-05	0.9550900-05
0.1552860-05	0.8582970-04	0.1847750-06	0.3575820-03	0.6865390-05	0.2113530-04	0.9992240-05	0.1255580-04	0.2455390-05	0.1479300-05
0.8971070-06	0.6117030-04	0.6838040-06	0.9872930-04	0.1621410-05	0.5079710-05	0.1581090-04	0.6717850-05	0.4129520-05	0.9956800-05
0.2466440-05	0.2918570-04	0.1218870-04	0.1632650-03	0.1680320-05	0.6549370-05	0.9177110-04	0.1822910-04	0.5364670-05	0.1014500-04
0.3396280-05	0.6097300-04	0.1031910-04	0.2454050-03	0.5815730-05	0.1832670-04	0.6553600-04	0.1739620-04	0.1460510-05	0.3665500-05
0.7586920-06	0.4627760-04	0.7366030-05	0.6713900-04	0.3477150-05	0.5148650-05	0.6507460-04	0.1000850-04	0.3683680-05	0.1146260-04
0.1694640-05	0.7818340-04	0.6053570-05	0.3880360-03	0.2932260-05	0.1555930-04	0.5243760-04	0.2133400-04	0.3008730-05	0.3843500-05
0.5126500-06	0.4874240-04	0.4958110-05	0.1046790-03	0.8327150-06	0.1022640-05	0.6099390-04	0.1201460-04	0.3007050-05	0.1524100-04
0.8585160-06	0.2024660-05	0.5543190-05	0.8184440-06	0.3388410-05	0.2594130-05	0.2014700-04	0.1863590-05	0.2813630-06	0.1128300-05
0.1063250-05	0.9609140-06	0.4786220-05	0.3081830-04	0.2149990-05	0.3448990-05	0.1401550-04	0.1260640-05	0.5491240-05	0.2640000-05
0.2878910-06	0.6865550-04	0.5607580-05	0.3409710-03	0.5407620-05	0.1340120-04	0.4068730-04	0.1701410-04	0.2992730-05	0.3499550-05
0.1251030-05	0.1534950-04	0.6931930-05	0.4315830-04	0.2602130-05	0.1786180-05	0.7008840-04	0.1742510-04	0.1305700-05	0.1072620-04
0.3269130-05	0.8168220-04	0.1074490-04	0.2419890-03	0.1722120-05	0.1320510-04	0.4913990-04	0.2175550-04	0.3876920-05	0.9958300-05
0.2499940-05	0.5198420-04	0.4619380-05	0.1545530-03	0.1765710-05	0.1783440-04	0.1767020-04	0.5593200-05	0.4220060-06	0.6752250-06
0.9477730-06	0.4175600-04	0.4738690-05	0.4530930-04	0.2401430-05	0.5426730-05	0.2123740-04	0.3243930-05	0.3307710-05	0.4715710-05
0.5739420-06	0.2207000-05	0.6460370-05	0.3160320-04	0.4130440-05	0.4331220-05	0.2249420-04	0.2782320-05	0.5955010-05	0.4294630-05
0.2448970-06	0.4425210-04	0.6098630-05	0.9115230-04	0.3329330-05	0.2418130-05	0.4249910-04	0.8854800-05	0.2499750-05	0.1151030-04
0.3187630-05	0.8704410-04	0.7061090-05	0.2495030-03	0.5852730-05	0.1926460-04	0.8394690-04	0.1918200-04	0.1162450-05	0.1147660-04
0.1093800-05	0.1176450-03	0.6299990-05	0.4783430-03	0.3276330-05	0.1586960-04	0.1011490-03	0.3159410-04	0.2226910-05	0.1513000-04
0.2024980-05	0.1031130-03	0.9321520-05	0.3608500-03	0.5562130-07	0.8957980-05	0.1142920-03	0.3137730-04	0.2259100-05	0.1868380-04
0.2537070-05	0.4874670-04	0.1066310-04	0.1712300-03	0.1021430-05	0.5691480-05	0.7340690-04	0.1795220-04	0.1926110-05	0.4599350-05
0.1150460-05	0.1117430-05	0.1702420-06	0.3372360-04	0.2032740-05	0.4231350-05	0.5592790-06	0.5894340-06	0.6136310-05	0.2173060-05
0.1636670-05	0.1344580-03	0.7162990-06	0.3357220-03	0.7072010-05	0.2231030-04	0.2359850-04	0.1430580-04	0.2146360-05	0.1062440-04
0.7726950-06	0.1376050-03	0.3891170-06	0.4345480-03	0.6740070-05	0.2337340-04	0.2735090-04	0.1683780-04	0.4602370-05	0.6836300-05
0.1483820-05	0.5976290-04	0.5313440-05	0.2004720-03	0.3680570-05	0.1077630-04	0.4581180-04	0.1292750-04	0.3237360-05	0.7480910-05
FIRM11	FIRM12	FIRM13	FIRM14	FIRM15	FIRM16	FIRM17	FIRM18	FIRM19	FIRM20
0.2638730-04	0.1455010-03	0.1197350-05	0.2423920-05	0.7669910-08	0.2350000-04	0.4404860-03	0.4531200-05	0.2647420-03	0.3302830-05
0.1182390-03	0.1967870-03	0.7603290-05	0.1192920-04	0.1357570-07	0.2226970-05	0.7886610-03	0.2390950-04	0.5467430-03	0.2691780-04
0.1069450-03	0.2070130-03	0.4660180-05	0.1234670-04	0.1537390-07	0.1812750-04	0.8641550-03	0.8299700-05	0.5115650-03	0.1224390-04
0.2074890-04	0.8001290-04	0.3784760-05	0.4721820-05	0.1797150-07	0.2211670-04	0.2764220-04	0.2135680-04	0.1711960-03	0.1770380-04
0.2932220-04	0.6112850-04	0.7424310-07	0.8163320-05	0.1128980-05	0.98890450-06	0.4783850-03	0.4967170-05	0.2504250-03	0.9004200-05
0.4155770-04	0.1526130-07	0.8832730-06	0.7488840-05	0.8930380-06	0.1270210-04	0.6272110-03	0.2908440-05	0.3901470-03	0.5034270-05
0.2919760-05	0.6439390-04	0.1009350-05	0.4081600-05	0.6906130-06	0.2039970-04	0.1854790-04	0.1252520-05	0.1371080-03	0.9201080-05
0.1053940-03	0.1793450-03	0.3463370-05	0.1483280-04	0.5372690-06	0.2315480-05	0.9383150-03	0.4222690-05	0.5529560-03	0.1367150-04
0.1847050-04	0.5099200-04	0.3022400-05	0.2580920-05	0.4827620-06	0.5004420-07	0.3023270-04	0.1801310-04	0.1740270-03	0.2151250-04
0.4236450-05	0.8538550-05	0.1134980-05	0.6479640-05	0.4247170-06	0.2140000-04	0.4253930-06	0.5961260-05	0.2285820-07	0.2616550-05
0.1515140-04	0.1414140-04	0.1176360-05	0.1965510-05	0.3789150-06	0.17971090-06	0.2545990-03	0.8137600-05	0.3536580-04	0.7879820-06
0.1076610-03	0.1574960-03	0.4501350-05	0.1891500-04	0.4197490-06	0.1491520-04	0.8070420-03	0.4521100-05	0.4658110-03	0.1531200-04
0.7101190-05	0.1506770-04	0.3895620-06	0.7136630-05	0.7166320-06	0.1832520-04	0.1301610-04	0.7146730-05	0.7608830-04	0.1195270-04
0.3148860-04	0.1483890-03	0.8541420-06	0.8461740-05	0.9991630-06	0.1999270-04	0.4505020-03	0.2919390-05	0.4094530-03	0.1019020-04
0.2091390-04	0.1367750-03	0.1981620-05	0.7363240-07	0.38869020-06	0.1292490-04	0.4018280-03	0.4879770-05	0.2558190-03	0.8024200-06
0.3957410-05	0.6415770-04	0.2040420-05	0.1856340-05	0.3793130-06	0.2069900-04	0.1181470-04	0.4579670-05	0.9823090-04	0.3331180-05
0.1338840-04	0.1751870-04	0.7297810-06	0.6852510-05	0.44477640-06	0.1176330-04	0.2566640-03	0.4843490-05	0.3537470-04	0.1538460-05
0.2194230-04	0.5180900-04	0.4164400-05	0.6386950-05	0.64293750-06	0.1034360-04	0.2641470-04	0.2207020-04	0.1418590-03	0.2088460-04
0.3336900-04	0.1788720-03	0.7655810-06	0.1776210-05	0.7906530-06	0.1300130-04	0.4614050-03	0.1210620-05	0.4280990-03	0.1082200-04
0.1203760-03	0.2225910-03	0.4393660-05	0.1672010-04	0.6891690-06	0.2198120-05	0.8976970-03	0.6226130-05	0.7341920-03	0.2925090-04
0.6902480-04	0.1595030-03	0.3535660-03	0.1297240-04	0.8165730-06	0.8746580-06	0.5286750-03	0.1830740-04	0.5585450-03	0.3254480-04
0.3765870-04	0.5633230-04	0.3554570-06	0.1623310-04	0.9260840-06	0.2099220-04	0.1946880-03	0.6582240-05	0.2494740-03	0.9629830-05
0.2125790-04	0.1447140-04	0.3788650-06	0.7709500-05	0.1465530-07	0.2067160-04	0.2591550-03	0.8822750-05	0.3499110-04	0.2622320-05
0.6818400-04	0.2497880-03	0.6181070-05	0.1745680-05	0.1186080-07	0.1214280-04	0.5062670-03	0.1949940-04	0.5437400-03	0.2228180-04
0.1159550-03	0.2756070-03	0.6454570-05	0.1121990-04	0.5050390-08	0.2005750-04	0.8544650-03	0.6948830-05	0.6536990-03	0.1031790-04
0.4691400-04	0.1163590-03	0.2590430-05	0.7802680-05	0.4681490-06	0.1293440-04	0.4145290-03	0.8884710-05	0.3075710-03	0.1246020-04

FIRM21	FIRM22	FIRM23	FIRM24	FIRM25	AVERAGE
0.422177D-05	0.378838D-05	0.197866D-03	0.365621D-04	0.934229D-07	0.571868D-04
0.600116D-05	0.472395D-05	0.442565D-03	0.294412D-04	0.117927D-04	0.111184D-03
0.312940D-05	0.411139D-05	0.315074D-03	0.296146D-05	0.725585D-05	0.103099D-03
0.579604D-05	0.105445D-05	0.252426D-03	0.477853D-04	0.717435D-05	0.355102D-04
0.229354D-05	0.112328D-04	0.159505D-03	0.582871D-04	0.891378D-05	0.569866D-04
0.453605D-05	0.101030D-04	0.224151D-03	0.202353D-04	0.640688D-05	0.775665D-04
0.533832D-05	0.273113D-05	0.188654D-03	0.745775D-04	0.645965D-05	0.303061D-04
0.270368D-05	0.104313D-04	0.332904D-03	0.126877D-04	0.981977D-05	0.110267D-03
0.367349D-05	0.113916D-05	0.251842D-03	0.693602D-04	0.110176D-04	0.363453D-04
0.367376D-05	0.237571D-05	0.889021D-07	0.556417D-05	0.528692D-05	0.428680D-05
0.277101D-05	0.504567D-05	0.465377D-06	0.202260D-04	0.297009D-06	0.171188D-04
0.534792D-05	0.862959D-05	0.287685D-03	0.513239D-05	0.129156D-04	0.965931D-04
0.941487D-06	0.163292D-05	0.101631D-03	0.579826D-04	0.114271D-04	0.197688D-04
0.499934D-05	0.105721D-04	0.332234D-03	0.674358D-04	0.707245D-05	0.792703D-04
0.443426D-05	0.232119D-05	0.151279D-03	0.962867D-05	0.220962D-04	0.510075D-04
0.630940D-05	0.214158D-05	0.138789D-03	0.420063D-04	0.263021D-06	0.213485D-04
0.517843D-05	0.760652D-05	0.418495D-06	0.161804D-04	0.381519D-05	0.126298D-04
0.766087D-05	0.287298D-05	0.212332D-03	0.395730D-04	0.125408D-04	0.317077D-04
0.198175D-05	0.326312D-05	0.337400D-03	0.728971D-04	0.673355D-05	0.816027D-04
0.213404D-05	0.747973D-05	0.538136D-03	0.644743D-04	0.189577D-04	0.136325D-03
0.382968D-05	0.933657D-05	0.505680D-03	0.751585D-04	0.200906D-04	0.106032D-03
0.253685D-05	0.117485D-04	0.140952D-03	0.192546D-04	0.125782D-04	0.527773D-04
0.339000D-06	0.427001D-05	0.479488D-06	0.183209D-04	0.305860D-05	0.179378D-04
0.866904D-05	0.100733D-05	0.503263D-03	0.424882D-04	0.694111D-05	0.101816D-03
0.774261D-05	0.427147D-05	0.512959D-03	0.393315D-04	0.664189D-05	0.127404D-03
0.426172D-05	0.535556D-05	0.245230D-03	0.378621D-04	0.791098D-05	0.0

ELECTRIC INDUSTRY FOUR INDEX MSE

FIRM 1	FIRM 2	FIRM 3	FIRM 4	FIRM 5	FIRM 6	FIRM 7	FIRM 8	FIRM 9	FIRM 10
0.2466'RD-05	0.272511D-04	0.110940D-04	0.163591D-03	0.316742D-09	0.568276D-05	0.717777D-04	0.169355D-04	0.139671D-05	0.400924D-05
0.3573C9D-06	0.156343D-04	0.706702D-05	0.405238D-04	0.124332D-05	0.184243D-06	0.692079D-04	0.993437D-05	0.123657D-05	0.102115D-04
J.216473D-07	0.193131D-05	0.566559D-05	0.134485D-06	0.339556D-05	0.171909D-05	0.231323D-04	0.213469D-05	0.156909D-06	0.126216D-05
0.525692D-06	0.330589D-06	0.461474D-05	0.946657D-07	0.707895D-06	0.444030D-07	0.135747D-04	0.881715D-06	0.420694D-09	0.433878D-06
0.229152D-06	0.729687D-04	J.166964D-06	0.337293D-03	0.393480D-05	0.142892D-04	0.968254D-05	0.121954D-04	0.250597D-05	0.151097D-05
0.243696D-06	0.449436D-04	0.714071D-06	0.900382D-04	0.517285D-07	0.109321D-05	0.142547D-04	0.573510D-05	0.251986D-05	0.928449D-05
0.899435D-04	0.737885D-06	0.737034D-07	0.893410D-06	0.103120D-05	0.176731D-05	0.104064D-06	0.144329D-06	0.220046D-06	0.153023D-06
0.192071D-05	0.518711D-04	0.106197D-10	0.154659D-03	0.657058D-05	0.173365D-04	0.372380D-05	0.460613D-05	0.420890D-06	0.225013D-06
0.413898D-06	0.414844D-04	0.153735D-06	0.452617D-04	0.171283D-05	0.539091D-05	0.743586D-05	0.237682D-05	0.330794D-05	0.425799D-05
0.517649D-06	0.648539D-06	0.135380D-06	0.307908D-04	0.148229D-05	0.341992D-05	0.548078D-06	0.356858D-06	0.548892D-05	J.224494D-05
0.779381D-06	0.257801D-04	0.299903D-05	0.863280D-04	0.201305D-05	0.514173D-05	0.213492D-04	0.553009D-05	0.172542D-05	0.335932D-05

FIRM11	FIRM12	FIRM13	FIRM14	FIRM15	FIRM16	FIRM17	FIRM18	FIRM19	FIRM20
0.266190D-04	0.610426D-04	0.627540D-07	0.813409D-05	0.978713D-06	0.640558D-06	0.411846D-03	0.238801D-05	0.250813D-03	0.526736D-05
J.155565D-05	0.132457D-04	0.503584D-07	0.166694D-05	0.731947D-06	0.901946D-08	0.119333D-04	0.346251D-06	0.764547D-04	0.828193D-05
0.309508D-10	0.747021D-05	0.729400D-06	0.403980D-05	0.437855D-06	0.100638D-04	0.124411D-06	0.883134D-07	0.644769D-09	0.107911D-05
0.195775D-05	0.878724D-06	0.117630D-05	0.601812D-07	0.376524D-06	0.320054D-07	0.177527D-07	0.343798D-05	0.141969D-07	0.216308D-07
0.107691D-03	0.168700D-03	0.475119D-05	0.113183D-04	0.405261D-08	0.231331D-05	0.801665D-03	0.477435D-05	0.465523D-03	0.123153D-04
0.219497D-04	0.497669D-04	0.391045D-05	0.162570D-05	0.114718D-07	0.603740D-07	0.257861D-04	0.223776D-04	0.141373D-03	0.185461D-04
0.475440D-05	0.390180D-05	0.379182D-06	0.466252D-05	0.150133D-07	0.184341D-04	0.428575D-06	0.637079D-05	0.237872D-07	0.238497D-05
0.273386D-04	0.136455D-03	0.857835D-04	0.120438D-07	0.758395D-08	0.127595D-04	0.401950D-03	0.132999D-05	0.255706D-03	0.787621D-06
0.203467D-05	0.633914D-04	0.881984D-06	0.180193D-05	0.227567D-08	0.206528D-04	0.118050D-04	0.117697D-05	0.982038D-04	0.331625D-05
0.133951D-04	0.133791D-04	0.177957D-11	0.189206D-05	0.146661D-06	0.771284D-06	0.251665D-03	0.454413D-05	0.353238D-04	0.561303D-06
0.207301D-04	0.518251D-04	0.127995D-05	0.352136D-05	0.256690D-06	0.657367D-05	0.192022D-03	0.468344D-05	0.132344D-03	0.527593D-05

FIRM21	FIRM22	FIRM23	FIRM24	FIRM25	AVERAGE
0.228099D-05	0.108411D-04	0.139833D-03	0.208799D-04	0.680718D-05	0.501056D-04
0.823140D-06	0.133390D-05	0.101123D-03	0.591988D-04	0.689682D-05	0.175781D-04
0.459230D-05	0.273342D-05	0.567607D-07	0.387076D-05	0.392296D-05	0.316266D-05
0.250275D-05	0.116349D-05	0.920870D-07	0.575944D-05	0.214121D-06	0.155739D-05
0.255877D-05	0.412817D-05	0.289814D-03	0.517289D-06	0.636428D-05	0.934896D-04
0.432288D-05	0.452735D-06	0.213278D-03	0.315892D-04	0.712902D-05	0.284419D-04
0.561497D-07	0.163792D-06	0.273344D-07	0.159524D-05	0.317623D-05	0.209604D-05
0.204992D-05	0.109860D-05	0.151382D-03	0.363414D-05	0.915559D-08	0.494834D-04
0.386118D-05	0.996487D-06	0.138760D-03	0.359983D-04	0.471375D-07	0.197910D-04
0.237908D-06	0.379947D-05	0.410942D-06	0.148341D-04	0.882974D-07	0.155894D-04
0.232860D-05	0.267117D-05	0.103478D-03	0.177873D-04	0.346552D-05	0.0

GAS INDUSTRY ONE INDEX MSE

FIRM 1	FIRM 2	FIRM 3	FIRM 4	FIRM 5	FIRM 6	FIRM 7	FIRM 8	FIRM 9	FIRM 10
0.706547D-05	0.165456D-04	0.744407D-05	0.260390D-04	0.392443D-06	0.192911D-06	0.473926D-06	0.394542D-04	0.886389D-05	0.437476D-04

FIRM 11	FIRM 12	FIRM 13	FIRM 14	FIRM 15	FIRM 16	FIRM 17	FIRM 18	FIRM 19	FIRM 20
0.343221D-04	0.536785D-04	0.297773D-05	0.254503D-05	0.586267D-05	0.223755D-05	0.127109D-04	0.231575D-04	0.343538D-06	0.512035D-05

FIRM 21	FIRM 22	FIRM 23	FIRM 24	FIRM 25	AVERAGE
0.403255D-06	0.444922D-05	0.289134D-04	0.236428D-04	0.596035D-06	0.140112D-04

GAS INDUSTRY TWO INDEX MSE

FIRM 1	FIRM 2	FIRM 3	FIRM 4	FIRM 5	FIRM 6	FIRM 7	FIRM 8	FIRM 9	FIRM 10
0.7153380-05	0.1662070-04	0.6846640-35	0.2613230-04	0.4069300-06	0.1892180-06	0.4799320-06	0.3959940-04	0.8223080-06	0.4394700-04
0.7044650-05	0.1562240-04	0.6828060-35	0.2345980-34	0.3703950-06	0.1935310-06	0.4126920-06	0.3430260-04	0.1077470-05	0.4308420-04
0.7599200-05	0.4313030-06	0.4559160-35	0.5394440-05	0.2025450-06	0.1834560-07	0.8529120-07	0.2130640-05	0.3668370-05	0.9095450-04
0.3798630-05	0.2765710-06	0.4156430-36	0.2035900-35	0.1208850-06	0.3373670-07	0.4706510-37	0.1863170-05	0.7196430-36	0.5612190-04
0.6562640-05	0.1678830-04	0.7955470-05	0.2901030-04	0.4202920-06	0.1333610-06	0.5334540-06	0.4218470-04	0.1022560-05	0.1391050-04
0.7042870-05	0.1542990-04	0.1012350-04	0.2355230-04	0.3723820-06	0.2295710-06	0.4057480-06	0.3443090-04	0.2211970-05	0.4302490-04
0.8494180-05	0.5246460-36	0.7354740-06	0.5638350-05	0.3208110-06	0.3628330-07	0.1139840-36	0.2297520-05	0.8674890-06	0.9514990-04
0.4018840-05	0.2444740-06	0.2563440-35	0.2034880-05	0.1956590-06	0.7396180-07	0.5463300-07	0.1828940-05	0.1352980-05	0.5653730-04
0.5797940-05	0.1653770-04	0.8955180-05	0.2735150-04	0.3685330-36	0.1615560-06	0.4920840-36	0.4042600-04	0.1224450-05	0.1234310-04
0.7941680-05	0.5946040-06	0.6366260-35	0.8488840-05	0.2520030-06	0.1988300-07	0.1549920-36	0.5804650-05	0.3427650-05	0.9737420-04
0.4139440-05	0.1841840-06	0.6094970-06	0.2284910-05	0.1439640-06	0.3915090-07	0.4855710-07	0.5858220-06	0.6988420-06	0.5529410-04
0.1231930-04	0.1613390-04	0.7943570-05	0.3156790-04	0.6376770-06	0.1500980-06	0.5813730-06	0.3949720-04	0.1310530-05	0.7285130-04
0.1043300-04	0.1580510-04	0.1143780-04	0.3019860-04	0.5002160-06	0.1592160-06	0.5281770-06	0.3905940-04	0.2776810-05	0.6154250-04
0.4442260-04	0.1674610-06	0.11936710-05	0.2326450-35	0.2283720-06	0.8125050-07	0.6639540-37	0.6342210-06	0.1656570-05	0.5606350-04
0.900J160-05	0.6523690-06	0.1031620-05	0.8903110-05	0.4141060-06	0.4878970-07	0.2036480-06	0.6165160-35	0.6318820-06	0.1039150-05
0.7037410-05	0.7728230-05	0.5252470-05	0.1522130-04	0.3303180-06	0.1045290-06	0.2805750-06	0.1944000-04	0.1564640-35	0.6324760-04

FIRM 11	FIRM 12	FIRM 13	FIRM 14	FIRM 15	FIRM 16	FIRM 17	FIRM 18	FIRM 19	FIRM 20
0.3446700-04	0.5347820-04	0.2057630-05	0.2505710-05	0.5829940-05	0.2273480-05	0.1278640-04	0.2303170-04	0.3256740-06	0.5221830-35
0.3190550-04	0.5706310-04	0.2095200-05	0.2329980-05	0.6295970-05	0.2291020-05	0.1096360-04	0.2350780-04	0.3517060-06	0.3279690-05
0.3805810-05	0.8549570-05	0.2205020-35	0.4388050-06	0.1522650-06	0.1567490-06	0.1039760-05	0.2809330-05	0.3587670-06	0.2271920-05
0.1357980-05	0.6103530-36	0.9077260-06	0.2091070-07	0.2444380-06	0.4225920-08	0.7406620-06	0.5083830-07	0.9861410-07	0.1654300-05
0.3714590-04	0.5411210-34	0.2039970-05	0.2656000-05	0.6033290-05	0.2302590-05	0.1388400-04	0.2377100-04	0.3562600-05	0.4993390-05
0.3183860-04	0.5709810-04	0.2105920-35	0.2692710-05	0.6295350-05	0.2163540-05	0.1391830-04	0.2394180-04	0.3915320-36	0.3071610-35
0.4098990-05	0.7413090-05	0.2043610-05	0.2509520-06	0.1326440-05	0.2401600-06	0.1237210-05	0.2170400-05	0.2176450-06	0.4246560-06
0.1065700-05	0.5289320-06	0.7857170-06	0.6042960-07	0.1869720-36	0.3753320-37	0.7332920-06	0.1241820-06	0.6657860-07	0.2336830-35
0.3567420-04	0.5424680-04	0.1861460-05	0.2667920-35	0.5997340-05	0.2223240-05	0.1324000-04	0.2374750-04	0.3486850-06	0.4305780-05
0.5116760-05	0.1458900-05	0.1990120-05	0.3227160-06	0.3948300-06	0.2412040-07	0.2488380-05	0.1158960-05	0.2712310-06	0.1929010-35
0.1169170-05	0.5892490-05	0.9648760-06	0.1137330-06	0.9061910-06	0.1275930-06	0.4197130-06	0.1208590-05	0.1117190-06	0.4799790-36
0.3908150-04	0.5737220-34	0.3214040-35	0.2732680-05	0.6562530-05	0.2396590-05	0.1355180-04	0.2450810-04	0.4562850-06	0.3295200-05
0.3681760-04	0.5752140-04	0.3066200-35	0.2888940-05	0.6554690-05	0.2236110-05	0.1299070-04	0.2485190-04	0.5174300-06	0.2601760-05
0.1242330-05	0.6847840-05	0.9029690-16	0.1856940-06	0.1030650-05	0.1076430-06	0.5088250-06	0.1558380-05	0.1224130-36	0.2417530-05
0.5513010-05	0.9722690-06	0.1814130-05	0.1278930-36	0.2992400-06	0.7107320-07	0.2869630-05	0.6069740-06	0.1405430-06	0.1531130-05
0.1793840-04	0.2821060-04	0.1870500-35	0.1347690-05	0.3298700-05	0.1110180-35	0.6558090-05	0.1180320-34	0.2756720-06	0.2627440-05

FIRM 21	FIRM 22	FIRM 23	FIRM 24	FIRM 25	AVERAGE
0.4555700-06	0.4441500-35	0.2907180-04	0.2356100-04	0.5883430-06	0.1368940-04
0.5927470-07	0.3961060-05	0.2702830-04	0.1756610-04	0.2990350-06	0.1286690-04
0.3494810-06	0.1894100-06	0.1897940-34	0.5923280-06	0.6455470-06	0.6358340-05
0.3858590-06	0.1538680-06	0.8435740-05	0.2995140-05	0.5594430-06	0.3334910-05
0.4475880-06	0.4630500-35	0.3100200-34	0.2417450-04	0.6633990-06	0.1306680-34
0.9205750-07	0.4063240-05	0.2711560-04	0.1875540-04	0.2779520-06	0.1312980-04
0.3180540-06	0.1389090-06	0.2013560-04	0.4395140-06	0.6102640-06	0.6248970-05
0.5035640-06	0.1867240-06	0.8575330-05	0.3599650-05	0.5160300-06	0.3535340-05
0.4647770-06	0.4582430-05	0.2792950-04	0.2428250-04	0.6000750-06	0.1264930-04
0.9689700-06	0.4952120-06	0.2540400-04	0.4935670-05	0.6266270-06	0.7110370-05
0.5278460-06	0.2237010-37	0.1049520-04	0.5198130-06	0.7604860-06	0.3509850-05
0.2254890-06	0.4317070-35	0.4489210-04	0.1900240-04	0.3441410-06	0.1615820-04
0.3562300-06	0.4373880-05	0.4119490-34	0.2000560-04	0.3379870-06	0.1555240-04
0.3645780-06	0.2314100-37	0.1674460-34	0.3543180-06	0.8245170-06	0.3794320-05
0.6908920-06	0.4056940-06	0.2714540-04	0.3967280-05	0.7088610-06	0.7115320-05
0.4106810-06	0.2132330-05	0.2344100-04	0.1097670-04	0.5535140-06	0.0

GAS INDUSTRY THREE INDEX MSE

FIRM 1	FIRM 2	FIRM 3	FIRM 4	FIRM 5	FIRM 6	FIRM 7	FIRM 8	FIRM 9	FIRM10
0.7131610-05	0.1568740-04	0.6254020-05	0.2355420-04	0.3852400-06	0.1912390-06	0.4188110-06	0.3443610-04	0.8205430-06	0.4329670-04
0.8396500-05	0.4860610-06	0.7757190-06	0.5568310-05	0.3029410-06	0.3227010-07	0.1991200-06	0.2231280-05	0.9693070-06	0.9589550-04
0.3892660-05	0.2561050-06	0.2604300-06	0.2056170-05	0.1304470-06	0.3770710-07	0.4786640-07	0.1827450-05	0.4231650-06	0.5653730-04
0.6614980-05	0.1685730-04	0.7433170-05	0.2907590-04	0.4294280-06	0.1288300-06	0.5378320-06	0.4229500-04	0.7870860-06	0.1397510-04
0.7873540-05	0.1847230-06	0.5403290-05	0.6235380-05	0.2252650-06	0.1963710-07	0.1343930-06	0.2593460-05	0.3678850-05	0.9943890-04
0.4114260-05	0.2988530-08	0.6063520-06	0.2319640-05	0.1462120-06	0.3207230-07	0.4836410-07	0.5907770-06	0.5784810-06	0.5589180-04
0.6446920-05	0.1585130-04	0.7258640-05	0.2594500-04	0.3868880-06	0.1316520-06	0.4588490-06	0.3661820-04	0.1056200-05	0.1506220-04
0.3270650-05	0.2755370-07	0.2127900-05	0.2850500-05	0.1210290-06	0.1989050-07	0.5698550-07	0.1272980-05	0.1206090-05	0.4294330-04
0.2505050-06	0.1673840-06	0.2497920-05	0.4733180-07	0.1391260-07	0.2126390-07	0.2214070-08	0.1056850-08	0.2075520-05	0.1914250-05
0.8078430-08	0.3045540-06	0.2134430-06	0.1145410-05	0.1715320-07	0.5822710-09	0.3325640-07	0.2263260-05	0.2207770-06	0.2869290-06
0.8702410-05	0.2168310-06	0.2963510-05	0.6501130-05	0.3449070-06	0.4800000-07	0.1342870-06	0.2752250-05	0.1919100-05	0.1052680-03
0.4128820-05	0.5309140-07	0.4289430-06	0.3334810-05	0.1917240-06	0.3572260-07	0.7844500-07	0.1513810-05	0.2464440-06	0.5111170-04
0.9250380-08	0.2622520-06	0.3695560-05	0.1136910-05	0.2184120-07	0.1611720-07	0.2633580-07	0.2191810-05	0.1631450-05	0.3043380-06
0.5836730-05	0.1560690-04	0.9209310-05	0.2445080-04	0.3399150-06	0.1604570-06	0.4230920-06	0.3541930-04	0.1358540-05	0.1287450-04
0.4516540-05	0.1602790-07	0.1432570-05	0.2397580-05	0.2180110-06	0.5634700-07	0.6173630-07	0.6419960-06	0.8843730-06	0.5760020-04
0.6709940-05	0.1564660-04	0.1133660-04	0.2600250-04	0.3524890-06	0.1572990-06	0.4413790-06	0.3671620-04	0.2566930-05	0.1456920-04
0.8937540-05	0.2409860-06	0.7745360-06	0.6572630-05	0.4466170-08	0.4778900-08	0.4532700-09	0.6381300-06	0.1413290-05	0.5638700-04
0.3236400-06	0.1905130-06	0.1963460-06	0.4466650-07	0.4929930-06	0.5128860-07	0.1427450-07	0.2020350-05	0.5439480-06	0.1061990-03
0.4449660-05	0.6923220-08	0.2311860-05	0.2344810-05	0.2435270-06	0.7247000-07	0.7594810-07	0.5556160-08	0.2450720-06	0.1980680-05
0.4051600-05	0.4488960-07	0.3395600-05	0.3303200-05	0.1929630-06	0.4344670-07	0.7594810-07	0.1471940-05	0.2106720-05	0.5094320-04
0.5450710-06	0.1548000-06	0.3511010-06	0.2102900-06	0.2856550-07	0.1388310-07	0.7716970-08	0.8413540-07	0.4156300-06	0.5094320-04
0.3083520-06	0.2583070-06	0.5803760-06	0.1021190-05	0.2839830-07	0.9173040-08	0.2860140-07	0.2012560-05	0.1771030-06	0.4233000-05
0.8916650-05	0.6152070-06	0.1225840-05	0.8808250-05	0.3948340-06	0.4563330-07	0.1966640-06	0.6037350-05	0.6037820-06	0.1037080-03
0.4260640-05	0.1825560-06	0.2462020-06	0.2361560-05	0.1609010-06	0.4330770-07	0.5313270-07	0.6360420-06	0.4159030-06	0.5578170-04
0.1202830-04	0.1615910-04	0.7543070-05	0.3154730-04	0.6354450-06	0.1448170-06	0.5837440-06	0.3998100-04	0.1168310-05	0.7281720-04
0.4864940-05	0.3986570-05	0.3094010-05	0.8753430-05	0.2277580-06	0.6071890-07	0.1657020-06	0.1028210-04	0.1102100-05	0.4494850-04

FIRM11	FIRM12	FIRM13	FIRM14	FIRM15	FIRM16	FIRM17	FIRM18	FIRM19	FIRM20
0.3211850-04	0.5690700-04	0.2078270-05	0.2496630-05	0.6270550-05	0.2319360-05	0.1103890-04	0.2340510-04	0.3362040-06	0.3401440-05
0.4021650-05	0.7437670-05	0.2059220-05	0.2589190-06	0.1332930-05	0.2279820-06	0.1193380-05	0.2191900-05	0.2262440-06	0.2669680-06
0.1065700-05	0.5837770-06	0.8936750-06	0.1596930-07	0.2352390-06	0.4493640-08	0.7309590-06	0.4185900-07	0.8487330-07	0.1178180-05
0.3775900-04	0.5397050-04	0.2025390-05	0.2620160-05	0.6002330-05	0.2335420-05	0.1394360-04	0.2365330-04	0.3414990-06	0.5074930-05
0.3598660-05	0.1414190-05	0.2647490-05	0.2960060-05	0.3681870-06	0.2411380-07	0.1293520-05	0.1137680-05	0.2909620-06	0.1839420-05
0.1014690-05	0.7357000-08	0.3782450-06	0.2949910-07	0.3108870-07	0.4142230-08	0.4148430-06	0.6243310-07	0.7585220-07	0.2252260-06
0.3461820-04	0.5764630-04	0.2147530-05	0.2647690-05	0.6534680-05	0.2364670-05	0.1193100-04	0.2419020-04	0.3808980-06	0.3167340-05
0.1322600-05	0.1953690-07	0.6566540-06	0.5859240-07	0.2155720-08	0.1290375-07	0.6815110-06	0.8756100-07	0.7459670-07	0.6253180-06
0.2792710-06	0.6497700-05	0.2422170-06	0.2077200-06	0.1065690-05	0.9812400-07	0.6499560-08	0.1639610-05	0.1181740-06	0.2592800-05
0.8387240-06	0.5811240-06	0.1277860-07	0.4013280-08	0.1667110-06	0.2615390-08	0.8296080-06	0.1807450-08	0.1352110-07	0.1528070-05
0.3788090-05	0.6952040-06	0.1901830-05	0.1651120-06	0.2240970-06	0.7637810-07	0.1495590-05	0.6746630-06	0.1857740-06	0.1180070-05
0.1662820-05	0.3273290-07	0.7541700-06	0.2382620-07	0.1857440-08	0.9993970-08	0.8653200-06	0.4843950-07	0.4397270-07	0.2309870-06
0.7913230-06	0.5194600-06	0.1873320-07	0.8194920-07	0.1388830-06	0.2282380-07	0.7421440-06	0.1619400-06	0.3570280-07	0.2081010-05
0.3323650-04	0.5785130-04	0.1934930-05	0.2677920-05	0.6506590-05	0.2270740-05	0.1136960-04	0.2419450-04	0.3780090-06	0.2787320-05
0.1149420-05	0.2771110-08	0.8303690-06	0.2768670-07	0.2546170-07	0.4392210-07	0.4856600-06	0.4642030-07	0.5416710-07	0.1088100-05
0.3438970-04	0.5769730-04	0.2189420-05	0.2829360-05	0.6385650-05	0.2224570-05	0.1184280-04	0.2465910-04	0.4439660-06	0.3021300-05
0.3911730-05	0.6649790-06	0.1861880-05	0.1143800-06	0.1303970-06	0.7304410-07	0.1561700-05	0.5928870-06	0.1436750-06	0.1681870-06
0.2954690-06	0.5918460-05	0.1843590-06	0.9726120-07	0.5137420-06	0.1332350-06	0.3802050-08	0.1207680-05	0.5163090-07	0.4322400-06
0.1081420-05	0.2142220-06	0.7585540-06	0.5018380-07	0.3363550-07	0.3806450-07	0.5076710-06	0.1178950-06	0.5509130-07	0.1983140-06
0.1618920-05	0.2521170-06	0.7992400-06	0.9565450-07	0.3977750-07	0.2583110-07	0.8315750-06	0.2156340-06	0.9447370-07	0.2144050-05
0.3627410-06	0.5964670-05	0.1993390-06	0.1017040-06	0.9146310-06	0.1301810-06	0.6452440-07	0.1217670-05	0.5158300-07	0.7478970-06
0.7259920-06	0.5910400-06	0.5551590-07	0.8444920-08	0.1662830-06	0.1161450-07	0.7165180-06	0.2232390-08	0.7730380-08	0.1625000-05
0.5440200-05	0.9633010-06	0.1825770-05	0.1369780-06	0.2971480-06	0.6148320-07	0.2792890-05	0.6249940-06	0.1443940-06	0.1066640-05
0.1232890-05	0.5897640-05	0.7491450-06	0.1057860-06	0.9038620-06	0.1269160-06	0.4561610-06	0.1200130-05	0.9003560-07	0.2863600-06
0.3816160-04	0.5722540-04	0.3207060-05	0.2076390-05	0.6540410-05	0.2419940-05	0.1359310-04	0.2442020-04	0.4484640-06	0.3389820-05
0.9757970-05	0.1519410-04	0.1223090-05	0.7143150-06	0.1818580-05	0.6025170-06	0.3575690-05	0.6231830-05	0.1672220-06	0.1662940-05

FIRM21	FIRM22	FIRM23	FIRM24	FIRM25	AVERAGE
0.509101D-07	0.395442D-05	0.271965D-04	0.174850D-04	0.296102D-06	0.128612D-04
0.324605D-06	0.140392D-06	0.199700D-04	0.450740D-06	0.609125D-06	0.621668D-05
0.399999D-06	0.156061D-06	0.857535D-05	0.305229D-05	0.550501D-06	0.332151D-05
0.454502D-06	0.462333D-05	0.319260D-04	0.241016D-04	0.555067D-06	0.130471D-04
0.271954D-06	0.268160D-06	0.223177D-04	0.707054D-06	0.700438D-08	0.646334D-05
0.899275D-07	0.200070D-07	0.106425D-04	0.217938D-07	0.177944D-07	0.311482D-05
0.816715D-08	0.412060D-05	0.280554D-04	0.179311D-04	0.248723D-06	0.122163D-04
0.334595D-06	0.793739D-07	0.105031D-04	0.658849D-06	0.135235D-06	0.276758D-05
0.304724D-06	0.192390D-07	0.801287D-07	0.360456D-06	0.766269D-06	0.866555D-06
0.457567D-06	0.104379D-06	0.107312D-05	0.317938D-05	0.639277D-06	0.560218D-06
0.230684D-06	0.163465D-06	0.237100D-04	0.551670D-06	0.235372D-07	0.655668D-05
0.201132D-06	0.679053D-07	0.123681D-04	0.405648D-06	0.141698D-06	0.311957D-05
0.643180D-06	0.232124D-06	0.102564D-05	0.383932D-05	0.580005D-06	0.807941D-06
0.676018D-08	0.407697D-05	0.252908D-04	0.180055D-04	0.274501D-06	0.118235D-04
0.861635D-07	0.168532D-07	0.109725D-04	0.121256D-06	0.173596D-07	0.331374D-05
0.854575D-07	0.422973D-05	0.279769D-04	0.191649D-04	0.230548D-06	0.124570D-04
0.122354D-06	0.147007D-06	0.235456D-04	0.322364D-06	0.211930D-07	0.642291D-05
0.400278D-06	0.471810D-08	0.376697D-07	0.480244D-06	0.713461D-06	0.557994D-06
0.630162D-07	0.164307D-07	0.108455D-04	0.059753D-07	0.424877D-07	0.335431D-05
0.279870D-06	0.839543D-07	0.122664D-04	0.573104D-06	0.141611D-06	0.340437D-05
0.390559D-06	0.488713D-08	0.767994D-06	0.469738D-06	0.732222D-06	0.745449D-06
0.497327D-06	0.180400D-06	0.124535D-05	0.324589D-05	0.601060D-06	0.714436D-06
0.729410D-06	0.409026D-06	0.273113D-04	0.404814D-05	0.696084D-06	0.707056D-05
0.507442D-06	0.216694D-07	0.107163D-04	0.509947D-06	0.764384D-06	0.351679D-05
0.229902D-06	0.431179D-05	0.449213D-04	0.189394D-04	0.338246D-06	0.161397D-04
0.287186D-06	0.109881D-05	0.157071D-04	0.555085D-05	0.367340D-06	0.0

GAS INDUSTRY FOUR INDEX MSE

FIRM 1	FIRM 2	FIRM 3	FIRM 4	FIRM 5	FIRM 6	FIRM 7	FIRM 8	FIRM 9	FIRM 10
0.3243310-06	0.9997610-08	0.3040130-06	0.1904450-06	0.2835260-07	0.7793330-08	0.7634610-08	0.8538370-07	0.1812140-06	0.3323640-05
0.1041300-07	0.1503690-08	0.2863650-05	0.1313260-08	0.2237890-07	0.1405290-07	0.2647380-08	0.1594710-10	0.1815950-05	0.0
0.3108110-08	0.2977770-08	0.1758820-06	0.2211950-08	0.22172040-08	0.7525440-09	0.44888490-09	0.4387580-08	0.1201690-06	0.1862960-08
0.2347120-07	0.8637130-08	0.1739750-05	0.4497390-12	0.1570740-07	0.7179120-08	0.1628340-09	0.1776940-11	0.1013400-05	0.4113960-07
0.4072180-05	0.4461860-07	0.3733230-06	0.2291990-05	0.1801370-06	0.3261590-07	0.7542740-07	0.1471190-05	0.2000610-06	0.5096320-04
0.2963700-06	0.1851020-06	0.2770150-07	0.4154310-07	0.2091430-08	0.4194990-08	0.1115650-10	0.9721940-09	0.1892420-06	0.1973350-05
0.3101410-08	0.2801500-06	0.2235690-06	0.1106980-05	0.1149930-07	0.3650310-09	0.3038480-07	0.2187160-05	0.5700340-07	0.3043080-06
0.4234230-05	0.3189240-08	0.2303640-06	0.2397160-05	0.1633280-06	0.3668060-07	0.5293370-07	0.6411730-06	0.2832580-06	0.5638700-04
0.6686940-05	0.1593960-04	0.6779770-05	0.2600530-04	0.3944720-06	0.1279110-06	0.4628720-06	0.3672210-04	0.8666790-06	0.1510580-04
0.8039520-05	0.2233390-06	0.8131250-06	0.6501720-05	0.3547760-06	0.4712270-07	0.1377910-06	0.2753010-05	0.6315990-06	0.1059420-03
0.2449970-05	0.1666930-05	0.1354070-05	0.3953840-05	0.1174920-06	0.2786680-07	0.7714790-07	0.4386540-05	0.5358650-06	0.2340430-04

FIRM11	FIRM12	FIRM13	FIRM14	FIRM15	FIRM16	FIRM17	FIRM18	FIRM19	FIRM20
0.1202820-06	0.3371630-08	0.3413620-07	0.2318430-09	0.7909290-11	0.1149190-07	0.6275990-07	0.6149370-09	0.2676050-07	0.3812980-06
0.0	0.2368410-06	0.1899110-07	0.6448470-07	0.3674300-07	0.2251200-07	0.5935560-09	0.1510660-06	0.4128150-07	0.2152240-05
0.4281730-08	0.1999170-08	0.1110780-09	0.2430530-08	0.5035750-09	0.3249160-08	0.3464320-08	0.2347390-08	0.2215630-08	0.1670900-06
0.6001890-09	0.1204070-08	0.2237310-08	0.2456430-07	0.1955300-09	0.2924550-07	0.3370500-08	0.2238180-07	0.1659650-07	0.118760-06
0.1618920-05	0.2727020-07	0.7621820-06	0.2511340-07	0.1807900-08	0.4784440-08	0.8362430-06	0.5131480-07	0.4659190-07	0.3013190-07
0.2078500-06	0.5926810-05	0.1847760-06	0.9628520-07	0.9152830-06	0.1283470-06	0.4574250-09	0.1210440-05	0.5042310-07	0.2860370-06
0.7013230-06	0.5545470-06	0.1016990-07	0.4594370-08	0.1565990-06	0.3412910-11	0.7875090-06	0.1118490-08	0.8362800-08	0.1064500-05
0.1081420-05	0.3039060-08	0.8619240-06	0.2031050-07	0.2703540-07	0.5140990-08	0.4521880-06	0.4967780-07	0.6231830-07	0.1773270-07
0.3471830-04	0.5750220-04	0.2130510-05	0.2618930-05	0.6512210-05	0.2399160-05	0.1198690-04	0.2409840-04	0.3699410-06	0.3283190-05
0.3834050-05	0.684660-06	0.1877380-05	0.1218060-06	0.2216450-06	0.6169500-07	0.1516710-05	0.6121760-06	0.1519710-06	0.2110080-10
0.4246240-05	0.6494250-05	0.5889730-06	0.2980510-06	0.7875030-06	0.2655410-06	0.1565540-05	0.2619950-05	0.7499660-07	0.8564000-06

FIRM21	FIRM22	FIRM23	FIRM24	FIRM25	AVERAGE
0.6602430-09	0.5603500-09	0.7459530-06	0.1938160-08	0.4197940-08	0.2332950-06
0.4560290-07	0.1121340-07	0.0	0.1216280-06	0.9161820-08	0.3359890-06
0.3114710-08	0.3056130-10	0.3470310-08	0.2066660-08	0.3943570-09	0.2044160-07
0.6765190-07	0.5493590-08	0.1722070-08	0.1416210-06	0.2125700-08	0.1743630-06
0.2173990-06	0.6856360-07	0.1226640-04	0.4175600-06	0.1377950-06	0.3089750-05
0.4938330-06	0.4723600-08	0.8259000-07	0.4752030-06	0.7146620-06	0.5391140-06
0.4858860-06	0.1864960-06	0.1025640-05	0.3246220-05	0.6277470-06	0.5262310-06
0.7234670-07	0.1927890-07	0.1046650-04	0.1447240-07	0.2028720-07	0.31220560-05
0.4715420-08	0.4114050-05	0.2813650-04	0.1785770-04	0.2451530-06	0.1220140-04
0.1308620-06	0.1481960-06	0.2377760-04	0.3353790-06	0.1922140-07	0.6389590-05
0.1422010-06	0.4558610-06	0.7690530-05	0.2261380-05	0.1780750-06	0.0

TELEPHONE INDUSTRY ONE INDEX MSE

FIRM 1	FIRM 2	FIRM 3	FIRM 4	FIRM 5	FIRM 6	FIRM 7	FIRM 8	FIRM 9	FIRM 10
0.200644D-03	0.442790D-05	0.561953D-05	0.289526D-04	0.333601D-04	0.167034D-03	0.789592D-04	0.137250D-03	0.564584D-06	0.218121D-04

FIRM 11	FIRM 12	FIRM 13	FIRM 14	FIRM 15	FIRM 16	FIRM 17	FIRM 18	FIRM 19	FIRM 20
0.337335D-05	0.117371D-03	0.167305D-03	0.227905D-04	0.484980D-04	0.439522D-03	0.566573D-03	0.343110D-03	0.329678D-03	0.116774D-03

FIRM 21	FIRM 22	FIRM 23	FIRM 24	FIRM 25	AVERAGE
0.120668D-02	0.335227D-03	0.952837D-04	0.320048D-03	0.427328D-04	0.193316D-03

TELEPHONE INDUSTRY TWO INDEX MSE

FIRM 1	FIRM 2	FIRM 3	FIRM 4	FIRM 5	FIRM 6	FIRM 7	FIRM 8	FIRM 9	FIRM10
0.1931070-03	0.4768470-05	0.5900740-05	0.2534310-04	0.2984400-04	0.1043340-03	0.7019480-04	0.7013850-04	0.8760470-06	0.1668290-04
0.1719480-03	0.8141100-06	0.3815490-05	0.2846420-04	0.2624020-04	0.1608370-03	0.6898430-04	0.1373480-03	0.4521660-06	0.1986330-04
0.1770410-03	0.4423370-05	0.2170630-05	0.2158300-04	0.3265120-04	0.1422810-03	0.5711380-04	0.1402010-03	0.4137110-06	0.2083180-04
0.2107220-03	0.2699340-05	0.5516280-05	0.2989600-04	0.3511930-04	0.1735960-03	0.7908130-04	0.1401560-02	0.4664790-06	0.2118730-04
0.9929450-05	0.3399630-05	0.3901330-05	0.1358640-05	0.2213690-05	0.2491730-04	0.2694130-04	0.1195990-04	0.4630580-06	0.6099240-06
0.1369630-03	0.1664800-05	0.5764050-05	0.2265670-04	0.1563430-04	0.1383810-03	0.8278320-04	0.7712490-04	0.7271930-06	0.9593840-05
0.1631740-03	0.4731300-05	0.2149950-05	0.1602010-04	0.2800150-04	0.5840710-04	0.3649420-04	0.6978710-04	0.6990630-06	0.2007010-04
0.1966700-03	0.3661230-05	0.4790550-05	0.2661020-04	0.3287310-04	0.1053280-03	0.4971500-04	0.6625390-04	0.4020290-06	0.1446640-04
0.1343600-03	0.1667260-05	0.6000130-05	0.2308630-04	0.2417820-04	0.1659460-03	0.8539600-04	0.1355930-03	0.8597520-06	0.1950960-04
0.1853980-03	0.4042010-05	0.5114810-05	0.2940520-04	0.2926430-04	0.1726980-03	0.9244560-04	0.1408520-03	0.1054370-05	0.2122110-04
0.1810310-03	0.3632370-05	0.1290740-05	0.2003320-04	0.3139620-04	0.5901050-04	0.1943020-04	0.7636700-04	0.2612180-06	0.1802410-04
0.1974270-03	0.3353000-05	0.1877730-05	0.2575380-04	0.3374910-04	0.1416420-03	0.4722290-04	0.1349610-03	0.1884330-06	0.2178600-04
0.1248970-03	0.3564800-05	0.5589370-05	0.2241390-04	0.1584700-04	0.1218340-03	0.6965460-04	0.6204750-04	0.5067670-06	0.1162980-04
0.6103910-04	0.1979990-05	0.3109430-05	0.7931620-05	0.8537690-05	0.8571630-04	0.6269430-04	0.5842900-04	0.7917790-06	0.3332770-05
0.1524920-03	0.3243030-05	0.4347720-05	0.2161340-04	0.2475840-04	0.1212200-03	0.6184140-04	0.9864020-04	0.5870820-06	0.1576890-04

FIRM11	FIRM12	FIRM13	FIRM14	FIRM15	FIRM16	FIRM17	FIRM18	FIRM19	FIRM20
0.3413650-05	0.2852270-04	0.1399120-03	0.1908450-04	0.4447850-04	0.3669190-03	0.5385420-03	0.3220020-03	0.2923040-03	0.1080280-03
0.6131080-06	0.3625590-04	0.1643130-03	0.1412070-04	0.9226030-05	0.4278460-03	0.3853700-03	0.3119980-03	0.2936150-03	0.9420160-05
0.3356290-05	0.1215560-03	0.1498080-03	0.1409900-04	0.4813040-04	0.3893810-03	0.5429940-03	0.3051040-03	0.3065420-03	0.1126180-03
0.1093790-05	0.1173810-03	0.1817540-03	0.2163110-04	0.4523300-04	0.4717350-03	0.5500680-03	0.3801690-03	0.3534930-03	0.1209450-03
0.3615310-05	0.1081540-03	0.1760780-05	0.1446710-04	0.3423840-04	0.2213410-05	0.9135020-04	0.8320910-05	0.6577930-05	0.9331140-04
0.2577290-05	0.1253470-03	0.1234360-03	0.2334500-04	0.3562430-04	0.3047550-03	0.2538990-03	0.2435690-03	0.1943860-03	0.7012030-04
0.3878070-05	0.4266220-04	0.1046360-03	0.6708640-05	0.4754300-04	0.2814460-03	0.5038060-03	0.2664080-03	0.2518940-03	0.101840-03
0.1410280-05	0.1869430-04	0.1419020-03	0.1420720-04	0.3655920-04	0.3830880-03	0.5739990-03	0.3264490-03	0.3131020-03	0.1033870-03
0.3775580-05	0.6698400-04	0.1425610-03	0.2509130-04	0.1997430-04	0.3676630-03	0.3991920-03	0.2496670-03	0.2521700-03	0.6485190-04
0.7469900-06	0.5864320-04	0.1464370-03	0.2281490-04	0.7659450-05	0.3737520-03	0.4202760-03	0.2556930-03	0.2500230-03	0.520810-04
0.4308590-05	0.5961890-04	0.1739810-03	0.2265830-04	0.2715420-04	0.4485820-03	0.4763000-03	0.3322350-03	0.3115820-03	0.3634600-04
0.2074800-05	0.1891020-04	0.1164960-03	0.1884900-05	0.4182360-04	0.3159000-03	0.5631000-03	0.2915400-03	0.2848860-03	0.8793600-04
0.2662870-05	0.1237950-03	0.1554920-03	0.1116020-04	0.4989450-04	0.4123160-03	0.5761060-03	0.3328140-03	0.3263890-03	0.1096340-03
0.3278830-05	0.1144710-03	0.2639290-04	0.2266210-04	0.4293560-04	0.2668540-03	0.3308800-03	0.2068910-03	0.1806710-03	0.8068770-04
0.2546480-05	0.1193510-03	0.5483920-04	0.2044160-04	0.2721330-04	0.1475120-03	0.1050700-03	0.1164000-03	0.9145080-04	0.9145080-04
0.2690080-05	0.7739080-04	0.1271810-03	0.1682510-04	0.3455390-04	0.3397440-03	0.4136640-03	0.2630840-03	0.2472720-03	0.8259370-04

FIRM21	FIRM22	FIRM23	FIRM24	FIRM25	AVERAGE
0.1044780-02	0.3255200-03	0.9489780-04	0.2955900-03	0.9024150-05	0.1661680-03
0.1015450-02	0.2187120-03	0.3344520-04	0.6361190-04	0.1430500-04	0.1447150-03
0.1142820-02	0.3180370-03	0.9439510-04	0.2142440-03	0.4368720-04	0.1762600-03
0.1209070-02	0.3293160-03	0.9665590-04	0.2884350-03	0.5200280-04	0.1969370-03
0.5815810-04	0.6186910-04	0.4352590-04	0.3131160-03	0.4219500-04	0.3873890-04
0.5713760-03	0.1644090-03	0.3278700-04	0.2533400-03	0.5106670-04	0.1182210-03
0.9259210-03	0.3047770-03	0.9557180-04	0.1543930-03	0.1430980-04	0.1401360-03
0.1173340-02	0.3394720-03	0.9190410-04	0.2334910-03	0.1523000-04	0.1717220-03
0.9589080-03	0.2197150-03	0.4765580-04	0.3284980-03	0.1903060-04	0.1507230-03
0.8681580-03	0.1740620-03	0.3400570-04	0.2724170-03	0.2387060-04	0.1380830-03
0.1116120-02	0.2742990-03	0.5539350-04	0.1823700-03	0.1137260-04	0.1684810-03
0.1091220-02	0.3364110-03	0.9420290-04	0.6930020-04	0.1239550-04	0.1495420-03
0.1206870-02	0.3393220-03	0.9774140-04	0.1507740-03	0.5585590-04	0.1821130-03
0.6580120-03	0.2061430-03	0.6310150-04	0.2907010-03	0.4245290-04	0.1219050-03
0.2151720-03	0.6959040-04	0.4064250-04	0.3195220-03	0.4828360-04	0.7085300-04
0.8036950-03	0.2454430-03	0.6906040-04	0.2286540-03	0.3031880-04	0.0

TELEPHONE INDUSTRY THREE INDEX MSE

FIRM 1	FIRM 2	FIRM 3	FIRM 4	FIRM 5	FIRM 6	FIRM 7	FIRM 8	FIRM 9	FIRM 10
0.139653D-03	0.292421D-06	J.449591D-05	0.226567D-04	C.159985D-04	0.104445D-03	0.680914D-04	0.556754D-04	0.727185D-06	0.959356D-05
0.159501D-03	0.476816D-06	J.127531D-05	0.150197D-04	0.280083D-04	0.595816D-04	0.356012D-04	0.623382D-04	0.665765D-06	0.144428D-04
0.211639D-03	0.265234D-06	0.523880D-05	0.265019D-04	0.328568D-04	0.105931D-03	0.602618D-04	0.793034D-04	0.480328D-06	0.172533D-04
J.510498D-06	0.373903D-06	U.456366D-05	0.130289D-05	0.172556D-05	0.179341D-04	0.333570D-04	0.176687D-05	0.732122D-06	0.970439D-06
J.125603D-03	0.728650D-06	0.123583D-05	0.199177D-04	0.247068D-04	0.140372D-03	0.521454D-04	0.140188D-03	0.347610D-06	0.180979D-04
0.183361D-03	0.481064D-06	0.418133D-05	0.293724D-04	0.278908D-04	0.167444D-03	0.758375D-04	0.140202D-03	0.465139D-06	0.197415D-04
0.319954D-05	0.404620D-06	J.121119D-05	0.123802D-05	0.465333D-07	0.519574D-07	0.448374D-05	0.610885D-05	0.267507D-06	0.362671D-06
0.194273D-03	0.259416D-05	0.141842D-05	0.225461D-04	0.343090D-04	0.140959D-03	0.487902D-04	0.141376D-03	0.164327D-06	0.204601D-04
J.994906D-05	0.327511D-05	0.168335D-05	0.647307D-09	0.181987D-05	0.223795D-04	0.209494D-04	0.100711D-04	0.412681D-06	0.575723D-06
J.113964D-04	0.172787D-05	0.358030D-05	0.126265D-05	0.205670D-05	0.222428D-04	0.173453D-04	0.114251D-04	0.148778D-06	0.143128D-06
0.613705D-04	0.148245D-05	0.226671D-05	0.659369D-05	0.801921D-05	0.813834D-04	0.513868D-04	0.579267D-04	0.634916D-06	0.320746D-05
U.190740D-03	0.240883D-05	0.140529D-05	0.109131D-04	0.315902D-04	0.590941D-04	0.247255D-04	0.749927D-04	0.263951D-06	0.157602D-04
0.141686D-05	0.144268D-05	0.407093D-05	0.144275D-05	0.130988D-05	0.117760D-04	0.199137D-04	0.796162D-06	0.404967D-06	0.497665D-06
0.135243D-03	0.102363D-05	U.167137D-05	0.226967D-04	0.243503D-04	0.141612D-03	J.471459D-04	0.134671D-03	0.183411D-06	0.192179D-04
0.133420D-03	0.127171D-05	0.564521D-05	J.223244D-04	0.148956D-04	0.123756D-03	0.710740D-04	0.613873D-04	0.484663D-06	0.953966D-05
J.122130D-04	0.166862D-06	J.766236D-06	0.750064D-06	0.149003D-05	0.180985D-04	0.703561D-05	0.133669D-04	0.961246D-07	0.179493D-06
J.636074D-04	0.113676D-06	0.208939D-05	C.707438D-05	0.845946D-05	0.477736D-04	0.393003D-04	0.463670D-04	0.697622D-06	0.344761D-05
U.431149D-05	0.344557D-05	0.247744D-05	0.102565D-05	0.826493D-06	0.105034D-04	0.253758D-04	0.886706D-05	0.768332D-06	0.104031D-05
0.118549D-03	0.722454D-06	0.384857D-05	0.224169D-04	0.143932D-04	0.961321D-04	0.497574D-04	0.510171D-04	0.395175D-06	0.115199D-04
J.173324D-03	0.358429D-05	J.126819D-06	C.174825D-04	0.316941D-04	0.584721D-04	0.167282D-04	J.765726D-04	C.240777D-06	0.181184D-04
J.134753D-03	0.409661D-05	J.262324D-05	0.149661D-04	0.258689D-04	0.149044D-03	0.709780D-04	0.141419D-03	0.871486D-04	0.194035D-04
0.132564D-03	0.439779D-05	0.579867D-05	0.230649D-04	0.242730D-04	0.165346D-03	0.750308D-04	0.139043D-03	0.368296D-06	0.177338D-04
J.647870D-04	0.131914D-05	0.373466D-05	0.934277D-05	0.853112D-05	0.678670D-04	0.627993D-04	0.359778D-04	0.912172D-06	0.313324D-05
J.147197D-03	0.378373D-05	0.544416D-05	0.223631D-04	0.160339D-04	0.954310D-04	0.757740D-04	0.452194D-04	0.107859D-05	0.110863D-04
0.186363D-03	0.322745D-05	J.437187D-06	0.232484D-04	0.311781D-04	J.594004D-04	0.187744D-04	0.664920D-04	0.161632D-06	0.169537D-04
0.103711D-03	0.206445D-05	0.293514D-05	0.142089D-04	0.164929D-04	0.788251D-04	0.424771D-04	0.641188D-04	0.478702D-06	0.100912D-04
0.106280D-05	0.147416D-05	0.120582D-03	J.143154D-04	0.955307D-05	J.306401D-03	0.233443D-03	0.249144D-03	0.201264D-03	0.677680D-05
0.366441D-05	0.244876D-04	0.108515D-03	0.608885D-05	0.439833D-04	0.280487D-03	0.502504D-03	0.262757D-03	0.251363D-03	0.102312D-03
0.492014D-06	0.163558D-04	0.153617D-03	0.155158D-04	0.375016D-04	0.401978D-03	0.538774D-03	0.356177D-03	0.322929D-03	0.107569D-03
0.388660D-05	0.281772D-04	0.278384D-05	0.149789D-04	0.164165D-04	0.299791D-05	0.729227D-04	0.172007D-06	0.206193D-05	0.680012D-04
0.465383D-06	0.384664D-04	0.142541D-03	0.842957D-05	0.364239D-05	0.366403D-03	0.323917D-03	0.255809D-03	0.254892D-03	0.980327D-05
0.695617D-07	0.358194D-04	0.174246D-03	0.153765D-04	0.545575D-05	J.450772D-03	0.389431D-03	J.333271D-03	0.308107D-03	0.931788D-05
J.109939D-05	0.122249D-04	0.105114D-05	0.149225D-05	0.222001D-05	0.164641D-05	0.420130D-05	0.450961D-05	0.464075D-06	0.169233D-05
0.111922D-05	0.123281D-03	0.159562D-03	0.105796D-04	0.455068D-04	0.413228D-03	0.534293D-03	0.336355D-03	0.327930D-03	0.114684D-03
J.363135D-05	0.111484D-03	0.154292D-05	J.999746D-05	0.350599D-04	0.113725D-05	0.907390D-04	0.825709D-05	0.661065D-05	0.798964D-04
J.107107D-05	0.110954D-03	0.607027D-06	0.124055D-04	0.290887D-04	0.172541D-05	0.619480D-04	0.105918D-04	0.703598D-05	0.924571D-04
0.256973D-05	0.125693D-03	0.640675D-04	0.139420D-04	0.280596D-04	0.145426D-03	0.996547D-04	0.116174D-03	0.915546D-04	0.703639D-04
J.519368D-06	0.236323D-04	C.125034D-03	0.221630D-05	0.406689D-04	J.327997D-03	0.523950D-03	0.312790D-03	0.291981D-03	0.949746D-04
0.781307D-06	0.184907D-04	0.154863D-05	0.112556D-04	0.552621D-05	0.251020D-05	0.262145D-04	0.296427D-05	0.142150D-05	0.590310D-04
U.118092D-05	J.351554D-04	J.137692D-03	0.890759D-03	0.559606D-05	0.361448D-03	J.354627D-03	0.249031D-03	0.253025D-03	0.889954D-05
0.108164D-05	J.119987D-03	0.107501D-03	0.217950D-04	0.359213D-04	0.280294D-03	0.259859D-03	0.226905D-03	0.183594D-03	0.749551D-04
0.256466D-05	0.119087D-03	0.308178D-06	0.201320D-05	0.320876D-04	0.730806D-07	0.640330D-04	0.107191D-04	0.711697D-05	0.746178D-04
0.107359D-05	0.158379D-04	0.635369D-04	C.615485D-05	0.317035D-05	0.143425D-03	J.754641D-04	0.123304D-03	0.908688D-04	0.761838D-05
0.452733D-05	0.399865D-04	0.292692D-05	0.814042D-05	0.104723D-04	0.313665D-05	0.673977D-04	0.404594D-05	0.165378D-05	0.253967D-04
0.713840D-06	0.643057D-05	0.983128D-04	0.121317D-04	0.920181D-05	0.266109D-03	0.252624D-03	0.204055D-03	C.176816D-03	0.261911D-05
U.145422D-05	0.817540D-05	J.115515D-03	J.467294D-06	0.370215D-04	0.310480D-03	0.553092D-03	0.283100D-03	0.282721D-03	0.895426D-04
0.432525D-05	0.568339D-04	0.142433D-03	0.151025D-04	0.188436D-04	0.362495D-03	0.4000619D-03	0.251323D-03	0.256269D-03	0.360024D-04
0.289452D-06	0.573216D-04	J.144654D-03	0.222392D-04	0.769992D-05	0.371716D-03	0.322049D-03	J.251461D-03	0.249556D-03	0.520665D-04
0.133707D-05	0.166167D-04	0.670469D-04	0.187713D-04	0.613140D-05	0.153937D-03	0.871292D-04	0.123764D-03	0.952892D-04	0.504964D-04
0.439237D-05	0.215861D-04	0.106303D-03	0.189532D-04	0.272439D-04	0.277609D-03	0.322432D-03	0.225251D-03	0.188475D-03	J.153367D-04
0.211812D-05	0.107078D-04	C.120206D-03	0.833397D-06	0.424079D-04	0.322962D-03	0.556100D-03	0.301443D-03	0.280968D-03	J.894148D-04
0.181408D-05	0.471260D-04	J.864841D-04	0.110443D-04	0.220225D-04	0.222241D-03	0.268546D-03	0.180135D-03	0.165938D-03	J.537887D-04
0.106280D-05	0.147416D-05	0.120582D-03	J.143154D-04	0.955307D-05	J.306401D-03	0.233443D-03	0.249144D-03	0.201264D-03	0.677680D-05
0.366441D-05	0.244876D-04	0.108515D-03	0.608885D-05	0.439833D-04	0.280487D-03	0.502504D-03	0.262757D-03	0.251363D-03	0.102312D-03
0.492014D-06	0.163558D-04	0.153617D-03	0.155158D-04	0.375016D-04	0.401978D-03	0.538774D-03	0.356177D-03	0.322929D-03	0.107569D-03
0.388660D-05	0.281772D-04	0.278384D-05	0.149789D-04	0.164165D-04	0.299791D-05	0.729227D-04	0.172007D-06	0.206193D-05	0.680012D-04
0.465383D-06	0.384664D-04	0.142541D-03	0.842957D-05	0.364239D-05	0.366403D-03	0.323917D-03	0.255809D-03	0.254892D-03	0.980327D-05
0.695617D-07	0.358194D-04	0.174246D-03	0.153765D-04	0.545575D-05	J.450772D-03	0.389431D-03	J.333271D-03	0.308107D-03	0.931788D-05
J.109939D-05	0.122249D-04	0.105114D-05	0.149225D-05	0.222001D-05	0.164641D-05	0.420130D-05	0.450961D-05	0.464075D-06	0.169233D-05
0.111922D-05	0.123281D-03	0.159562D-03	0.105796D-04	0.455068D-04	0.413228D-03	0.534293D-03	0.336355D-03	0.327930D-03	0.114684D-03
J.363135D-05	0.111484D-03	0.154292D-05	J.999746D-05	0.350599D-04	0.113725D-05	0.907390D-04	0.825709D-05	0.661065D-05	0.798964D-04
J.107107D-05	0.110954D-03	0.607027D-06	0.124055D-04	0.290887D-04	0.172541D-05	0.619480D-04	0.105918D-04	0.703598D-05	0.924571D-04
0.256973D-05	0.125693D-03	0.640675D-04	0.139420D-04	0.280596D-04	0.145426D-03	0.996547D-04	0.116174D-03	0.915546D-04	0.703639D-04
J.519368D-06	0.236323D-04	C.125034D-03	0.221630D-05	0.406689D-04	J.327997D-03	0.523950D-03	0.312790D-03	0.291981D-03	0.949746D-04
0.781307D-06	0.184907D-04	0.154863D-05	0.112556D-04	0.552621D-05	0.251020D-05	0.262145D-04	0.296427D-05	0.142150D-05	0.590310D-04
U.118092D-05	J.351554D-04	J.137692D-03	0.890759D-03	0.559606D-05	0.361448D-03	J.354627D-03	0.249031D-03	0.253025D-03	0.889954D-05
0.108164D-05	J.119987D-03	0.107501D-03	0.217950D-04	0.359213D-04	0.280294D-03	0.259859D-03	0.226905D-03	0.183594D-03	0.749551D-04
0.256466D-05	0.119087D-03	0.308178D-06	0.201320D-05	0.320876D-04	0.730806D-07	0.640330D-04	0.107191D-04	0.711697D-05	0.746178D-04
0.107359D-05	0.158379D-04	0.635369D-04	C.615485D-05	0.317035D-05	0.143425D-03	J.754641D-04	0.123304D-03	0.908688D-04	0.761838D-05
0.452733D-05	0.399865D-04	0.292692D-05	0.814042D-05	0.104723D-04	0.313665D-05	0.673977D-04	0.404594D-05	0.165378D-05	0.253967D-04

FIRM21	FIRM22	FIRM23	FIRM24	FIRM25	AVERAGE
0.5864450-03	0.1451610-03	0.2597580-04	0.7674330-04	0.1904400-05	0.9607220-04
0.9265150-03	0.318990-03	0.9425760-04	0.1428230-03	0.7680930-05	0.1376220-03
0.1078600-02	0.3264030-03	0.9440040-04	0.2357610-03	0.1095560-04	0.1703700-03
0.5041550-04	0.4157610-04	0.2349680-04	0.3341160-03	0.5824110-05	0.2822170-04
0.8904030-03	0.176480-03	0.2654140-04	0.1444240-04	0.1532700-04	0.123380-03
0.1032540-02	0.2224180-03	0.3536230-04	0.6965890-04	0.1091230-04	0.1498490-03
0.5388700-05	0.2987270-05	0.4692160-06	0.2707220-04	0.9801100-05	0.3745980-05
0.1154990-02	0.3173010-03	0.9644390-04	0.1498470-03	0.5473360-04	0.1779050-03
0.5690590-04	0.6252430-04	0.4253480-04	0.2185820-03	0.4297350-04	0.3371750-04
0.3193140-04	0.4537990-04	0.3592830-04	0.2802490-03	0.5157530-04	0.3394790-04
0.2093900-03	0.6845330-04	0.3854150-04	0.1803590-03	0.5110170-04	0.6350490-04
0.1021990-02	0.3184290-03	0.9581420-04	0.6762260-04	0.1551130-04	0.1473210-03
0.2120760-04	0.1371860-04	0.1392970-04	0.2383380-03	0.1622560-04	0.1874590-04
0.9340400-03	0.1919470-03	0.2703760-04	0.2342990-04	0.1451210-04	0.1252050-03
0.5625360-03	0.1690340-03	0.5574390-04	0.2496060-03	0.5420540-04	0.1138580-03
0.3269910-04	0.4938940-04	0.3808650-04	0.1507700-03	0.5453190-04	0.2791930-04
0.2231660-03	0.4699740-04	0.1114130-04	0.3909570-04	0.7477720-05	0.4340170-04
0.5425760-04	0.4120120-04	0.1763810-04	0.1501530-03	0.6620330-05	0.2017140-04
0.6181540-03	0.1509770-03	0.2297040-04	0.6549950-04	0.8370870-05	0.9054550-04
0.1084830-02	0.3264140-03	0.4209160-04	0.5427640-04	0.1036620-04	0.1458360-03
0.4633980-03	0.2203660-03	0.4395190-04	0.1491180-03	0.1025470-04	0.1400140-03
0.8727650-03	0.1751560-03	0.3411140-04	0.2676860-03	0.1911530-04	0.1373110-03
0.2189810-03	0.5259640-04	0.2076210-04	0.2728430-03	0.7462270-05	0.5803880-04
0.6585990-03	0.1971180-03	0.4538070-04	0.1921940-03	0.3008410-06	0.1092080-03
0.1169770-02	0.3361150-03	0.9583660-04	0.3993230-04	0.8287630-05	0.1475420-03
0.5755200-03	0.1600040-03	0.4331390-04	0.1467690-03	0.1984130-04	0.0

TELEPHONE INDUSTRY FOUR INDEX MSE

FIRM 1	FIRM 2	FIRM 3	FIRM 4	FIRM 5	FIRM 6	FIRM 7	FIRM 8	FIRM 9	FIRM 10
0.1337320-03	0.4995660-06	0.1110810-05	0.1995230-04	0.2474110-04	0.1478240-03	0.4875940-04	0.1408080-03	0.1489680-06	0.1810730-04
0.1230310-05	0.3906560-06	0.1315750-06	0.4088950-09	0.9208140-11	0.3265960-08	0.3290870-05	0.5304850-06	0.2607460-06	0.3639960-06
0.3433810-05	0.4090780-07	0.1291240-05	0.1014140-05	0.3952630-07	0.5340930-07	0.3678290-05	0.6418920-05	0.1195460-06	0.1151120-06
0.1199730-04	0.1233980-05	0.7765540-06	0.2793150-16	0.1530530-05	0.1817240-04	0.6512150-05	0.1099100-04	0.4412480-15	0.1176430-12
0.1843980-03	0.2434220-05	0.7749490-07	0.1741340-04	0.3168030-04	0.5882590-04	0.2005470-04	0.7104160-04	0.1299990-06	0.1580090-04
0.5021520-06	0.3513080-05	0.1596340-05	0.1150430-08	0.8390470-06	0.1066580-04	0.2440510-04	0.1546970-05	0.7334680-06	0.1023360-05
0.1291160-06	0.1132560-05	0.4027490-05	0.1439400-05	0.1310270-05	0.1179650-04	0.1744010-04	0.3151860-06	0.1698890-06	0.1631780-06
0.1298060-03	0.1192010-06	0.4472780-05	0.2232440-04	0.1438190-04	0.9668050-04	0.6035080-04	0.4563900-04	0.4846600-06	0.9339440-05
0.5931850-07	0.3184420-06	0.2754100-06	0.7500630-06	0.2648220-07	0.1593650-07	0.2752720-06	0.1548810-05	0.9612340-07	0.1799660-05
0.6329480-04	0.8492770-07	0.1036940-05	0.6593690-05	0.2301750-05	0.4825130-04	0.3702960-04	0.3677850-04	0.6349090-06	0.3207150-05
0.5285910-04	0.9737540-06	0.1479730-05	0.6948890-05	0.8282060-05	0.3252890-04	0.2217960-04	0.3156680-04	0.2778110-06	0.4830040-05

FIRM 11	FIRM 12	FIRM 13	FIRM 14	FIRM 15	FIRM 16	FIRM 17	FIRM 18	FIRM 19	FIRM 20
0.3593530-07	0.3682940-04	0.1409250-03	0.8090970-05	0.3506000-05	0.3621910-03	0.3252840-03	0.2515710-03	0.2541610-03	0.9142400-05
0.6004340-06	0.4068220-05	0.1011070-05	0.2973140-06	0.1596980-07	0.9382350-06	0.2315500-05	0.2959120-05	0.3269410-06	0.6469610-06
0.6344210-07	0.1331430-04	0.5079050-06	0.1637600-05	0.2023340-05	0.1610110-05	0.2322980-06	0.4107410-05	0.4020620-06	0.2758220-06
0.1093150-05	0.1172430-03	0.2095600-08	0.6023730-05	0.2994630-04	0.7112980-07	0.5620010-04	0.1081160-04	0.7166980-05	0.7492400-04
0.4366880-06	0.9049570-05	0.1236110-03	0.4766060-06	0.3763700-04	0.3237380-03	0.5224450-03	0.3045950-03	0.2903300-03	0.9529130-04
0.4314270-05	0.2180040-04	0.2757450-05	0.7505420-05	0.1487990-04	0.2034380-05	0.6604530-04	0.1935490-06	0.1064620-05	0.2588500-04
0.2254170-06	0.1352440-04	0.6777890-06	0.1117900-04	0.5574110-05	0.1726780-05	0.2481680-04	0.4989120-06	0.1509530-05	0.4957050-04
0.1620960-07	0.6999000-06	0.1075770-03	0.1383240-04	0.9571030-05	0.2811720-03	0.2276870-03	0.2266380-03	0.1841340-03	0.3442420-05
0.1254440-05	0.4692930-06	0.3409330-06	0.1285310-06	0.1084710-05	0.5676780-08	0.4791140-05	0.1046610-06	0.1977780-07	0.1913240-05
0.9592540-06	0.1578220-05	0.6420700-04	0.5114250-05	0.1507260-05	0.1469990-03	0.7660200-04	0.1238490-03	0.9776000-04	0.7054800-05
0.8999240-06	0.2185760-04	0.4416150-04	0.5434260-05	0.1057460-04	0.1120170-03	0.1306420-03	0.9248000-04	0.8568750-04	0.2681460-04

FIRM 21	FIRM 22	FIRM 23	FIRM 24	FIRM 25	AVERAGE
0.8943300-03	0.1769140-03	0.2635510-04	0.1213180-04	0.1010170-04	0.1216100-03
0.4759150-05	0.5473020-06	0.1013800-06	0.2608010-05	0.8623320-05	0.1449210-05
0.1392430-06	0.1104230-05	0.5157790-06	0.2864150-04	0.6011800-05	0.3071660-05
0.2553970-04	0.4418410-04	0.3777620-04	0.1499670-03	0.5443520-04	0.2666620-04
0.1023230-02	0.3151690-03	0.9451160-04	0.4303850-04	0.8665400-05	0.1437620-03
0.5500990-04	0.3823860-04	0.1629330-04	0.1395950-03	0.2546770-06	0.1762790-04
0.1755520-04	0.1350040-04	0.1368570-04	0.2387520-03	0.6486320-05	0.1746830-04
0.5624240-03	0.1416550-03	0.2441910-04	0.7683820-04	0.2622110-07	0.8974800-04
0.5053420-05	0.3052530-05	0.5155590-07	0.6663000-05	0.2059170-05	0.1225790-05
0.2218800-03	0.4738540-04	0.1111930-04	0.1468490-04	0.2219460-05	0.4411240-04
0.2809520-03	0.7817500-04	0.2248290-04	0.7129190-04	0.9908390-05	0.0

WATER INDUSTRY ONE INDEX MSE

FIRM 1	FIRM 2	FIRM 3	FIRM 4	FIRM 5	FIRM 6	FIRM 7	FIRM 8	FIRM 9	FIRM 10
0.629555D-05	0.179507D-04	0.341829D-05	0.297582D-04	0.170931D-04	0.738247D-04	0.493479D-04	0.175648D-04	0.936133D-05	0.209638D-04

FIRM 11	FIRM 12	FIRM 13	FIRM 14	FIRM 15	FIRM 16	FIRM 17	FIRM 18	FIRM 19	FIRM 20
0.113125D-03	0.445232D-04	0.538360D-04	0.807981D-05	0.162632D-04	0.732401D-05	0.896551D-05	0.100335D-03	0.123819D-04	0.106157D-04

FIRM 21	FIRM 22	FIRM 23	FIRM 24	FIRM 25	AVERAGE
0.992833D-05	0.131483D-04	0.297770D-04	0.334200D-04	0.746765D-05	0.285908D-04

WATER INDUSTRY TWO INDEX MSE

FIRM 1	FIRM 2	FIRM 3	FIRM 4	FIRM 5	FIRM 6	FIRM 7	FIRM 8	FIRM 9	FIRM 10
0.626044D-05	0.230040D-04	0.204162D-05	0.252485D-05	0.142716D-04	0.624725D-04	0.621459D-04	0.175614D-04	0.183769D-05	0.189908D-04
0.163523D-05	0.148879D-04	0.312282D-05	0.302223D-05	0.230422D-05	0.566545D-04	0.432348D-04	0.207997D-05	0.934270D-05	0.374305D-05
0.368933D-05	0.110654D-04	0.385464D-05	0.238193D-04	0.178468D-04	0.447756D-04	0.839908D-05	0.158193D-04	0.327724D-05	0.201047D-04
0.637214D-05	0.240949D-05	0.133876D-05	0.242524D-04	0.170198D-04	0.105238D-04	0.149872D-04	0.181124D-04	0.108705D-04	0.208921D-04
0.628685D-05	0.150578D-04	0.822174D-05	0.482041D-04	0.217636D-04	0.108222D-03	0.416885D-04	0.197951D-04	0.660398D-05	0.218211D-04
0.209581D-05	0.191211D-04	0.573180D-05	0.671300D-04	0.262415D-04	0.741981D-04	0.610839D-04	0.226738D-04	0.159652D-04	0.613618D-04
0.523412D-05	0.123026D-04	0.329833D-05	0.372867D-04	0.216967D-04	0.470199D-04	0.986569D-05	0.185616D-04	0.959524D-05	0.169348D-04
0.646433D-05	0.593474D-05	0.297314D-05	0.180595D-04	0.179950D-04	0.107445D-04	0.267619D-04	0.200374D-04	0.319146D-05	0.230520D-04
0.615937D-05	0.176067D-04	0.304146D-05	0.351541D-04	0.180592D-04	0.639960D-04	0.794182D-04	0.215529D-04	0.501025D-05	0.276412D-04
0.690573D-05	0.579050D-05	0.467647D-05	0.342091D-04	0.181927D-04	0.265122D-04	0.225946D-04	0.192304D-04	0.399882D-05	0.259531D-04
0.218827D-05	0.163943D-04	0.293964D-05	0.278408D-04	0.136548D-04	0.622865D-04	0.462287D-05	0.949536D-05	0.106627D-04	0.118439D-04
0.495096D-05	0.205479D-04	0.513055D-05	0.435843D-04	0.141429D-04	0.101956D-03	0.268016D-04	0.956704D-05	0.804015D-05	0.144230D-04
0.502724D-05	0.317486D-04	0.342642D-05	0.278428D-04	0.183120D-04	0.808768D-04	0.577754D-04	0.178243D-04	0.516268D-05	0.127552D-04
0.282892D-05	0.134707D-04	0.469376D-05	0.245432D-04	0.208195D-04	0.590880D-04	0.129769D-04	0.168719D-04	0.519591D-05	0.972814D-05
0.671363D-05	0.936399D-05	0.234871D-05	0.338092D-04	0.197175D-04	0.205451D-04	0.296322D-04	0.214069D-04	0.933724D-05	0.220165D-04
0.494776D-05	0.161809D-04	0.385599D-05	0.318862D-04	0.175438D-04	0.553314D-04	0.334659D-04	0.167329D-04	0.720639D-05	0.167009D-04

FIRM 11	FIRM 12	FIRM 13	FIRM 14	FIRM 15	FIRM 16	FIRM 17	FIRM 18	FIRM 19	FIRM 20
0.121265D-03	0.284447D-04	0.544259D-04	0.547009D-05	0.238601D-04	0.117270D-04	0.146316D-04	0.496221D-04	0.153298D-04	0.741354D-05
0.113912D-03	0.441504D-04	0.203520D-04	0.202590D-05	0.163788D-04	0.551455D-05	0.916601D-05	0.976910D-04	0.107044D-04	0.546664D-05
0.721878D-05	0.448776D-05	0.652421D-04	0.822863D-05	0.698143D-05	0.100702D-04	0.571640D-05	0.123483D-04	0.213661D-05	0.113301D-04
0.203066D-04	0.135859D-04	0.598767D-04	0.889637D-05	0.246906D-05	0.432949D-05	0.332977D-05	0.545940D-04	0.720575D-05	0.602235D-05
0.713588D-04	0.448560D-04	0.569797D-04	0.849283D-05	0.767892D-05	0.370037D-05	0.692899D-05	0.936916D-04	0.679990D-05	0.201135D-04
0.113714D-03	0.125371D-04	0.187503D-04	0.151935D-04	0.232136D-04	0.115901D-04	0.217734D-04	0.958427D-04	0.136692D-04	0.163969D-04
0.582675D-05	0.850049D-05	0.704207D-04	0.120543D-05	0.576505D-05	0.840483D-05	0.814739D-05	0.313518D-04	0.101476D-05	0.117803D-04
0.321342D-04	0.401184D-05	0.751858D-04	0.721226D-05	0.123336D-04	0.129831D-04	0.914659D-05	0.180390D-04	0.115697D-04	0.825003D-05
0.106267D-03	0.191184D-04	0.505243D-04	0.678100D-05	0.332936D-04	0.249063D-04	0.324134D-04	0.377461D-04	0.137168D-04	0.869294D-05
0.149217D-04	0.110426D-04	0.752240D-04	0.687366D-05	0.537960D-05	0.943142D-05	0.706309D-05	0.343147D-04	0.663504D-05	0.110096D-04
0.363497D-04	0.174149D-04	0.271638D-04	0.781488D-05	0.979344D-05	0.838048D-05	0.521001D-05	0.511485D-04	0.339267D-05	0.107404D-04
0.772924D-04	0.406572D-04	0.632650D-04	0.846376D-05	0.122229D-04	0.739330D-05	0.662985D-05	0.812846D-04	0.214878D-05	0.145655D-04
0.938716D-04	0.200420D-04	0.496800D-04	0.103138D-04	0.267745D-04	0.170017D-04	0.234216D-04	0.292490D-04	0.793703D-05	0.107212D-04
0.358153D-04	0.853592D-05	0.392370D-04	0.953306D-05	0.131533D-04	0.110746D-04	0.772907D-05	0.194732D-04	0.706161D-05	0.149897D-04
0.158094D-04	0.103855D-04	0.556325D-04	0.978638D-05	0.475600D-05	0.677620D-05	0.111529D-04	0.412475D-04	0.558177D-05	0.779822D-05
0.581373D-04	0.211007D-04	0.508304D-04	0.847669D-05	0.135875D-04	0.102189D-04	0.114973D-04	0.498429D-04	0.766053D-05	0.110221D-04

FIRM 21	FIRM 22	FIRM 23	FIRM 24	FIRM 25	AVERAGE
0.956339D-05	0.609359D-05	0.308724D-04	0.103780D-04	0.237030D-05	0.241431D-04
0.941623D-05	0.105538D-04	0.624928D-05	0.293719D-04	0.745469D-05	0.222031D-04
0.142471D-05	0.947764D-05	0.207129D-04	0.261865D-04	0.839167D-05	0.141882D-04
0.934234D-05	0.465014D-05	0.277994D-04	0.155852D-04	0.350415D-05	0.147392D-04
0.339106D-05	0.218580D-04	0.301168D-04	0.586052D-04	0.171717D-04	0.303762D-04
0.789464D-05	0.214865D-04	0.181015D-04	0.662231D-04	0.164613D-04	0.318569D-04
0.154816D-03	0.117920D-04	0.215438D-04	0.348054D-04	0.248196D-05	0.161297D-04
0.897446D-05	0.377142D-05	0.273781D-04	0.133555D-04	0.667407D-05	0.154263D-04
0.390377D-05	0.695003D-05	0.328115D-04	0.216515D-04	0.814572D-05	0.282157D-04
0.403973D-05	0.845376D-05	0.292070D-04	0.281250D-04	0.112902D-04	0.172415D-04
0.689610D-05	0.112982D-04	0.672769D-05	0.291272D-04	0.589463D-04	0.159713D-04
0.123412D-05	0.201153D-04	0.169118D-04	0.532471D-04	0.138879D-04	0.267786D-04
0.139300D-05	0.119975D-04	0.241686D-04	0.312041D-04	0.782993D-05	0.250671D-04
0.639091D-05	0.127611D-04	0.113391D-04	0.337963D-04	0.940919D-05	0.164213D-04
0.423195D-05	0.619499D-05	0.325933D-04	0.220166D-04	0.646054D-05	0.166166D-04
0.532297D-05	0.111636D-04	0.224349D-04	0.315785D-04	0.889786D-05	0.0

WATER INDUSTRY THREE INDEX MSE

FIRM 1	FIRM 2	FIRM 3	FIRM 4	FIRM 5	FIRM 6	FIRM 7	FIRM 8	FIRM 9	FIRM 10
0.926364C-06	0.1968510-04	0.1782710-05	0.2509290-05	0.1062100-05	0.4670180-04	0.5595660-04	0.1220940-05	0.1903330-05	0.4261800-06
0.5694160-05	0.1079610-04	0.2256290-05	0.1784700-05	0.1191060-04	0.4260340-04	0.3358130-05	0.1100580-04	0.2858580-06	0.1858980-04
0.6564330-05	0.1341510-05	0.2232080-05	0.1201040-05	0.1515990-04	0.1077760-04	0.1652310-04	0.1735920-04	0.1463520-05	0.1956120-04
0.6124820-05	0.2625850-04	0.4113640-05	0.4758980-05	0.1583050-04	0.8980830-04	0.5456650-04	0.1779450-04	0.2717690-06	0.1712380-04
0.1043630-05	0.4791510-05	0.4780850-05	0.3368430-04	0.6032830-05	0.2205470-04	0.7721000-05	0.4179090-05	0.3662530-05	0.3539490-03
0.4088720-06	0.1262780-05	0.1332790-05	0.2515480-04	0.2614430-05	0.2106330-05	0.2583930-05	0.1734780-05	0.1084430-04	0.2985200-03
0.6101040-05	0.1620700-04	0.7048640-05	0.4810620-04	0.4413030-05	0.8732170-04	0.3181440-04	0.1627230-05	0.6625620-05	0.6951690-05
0.6109060-05	0.1366510-05	0.2637780-05	0.3172370-04	0.1874910-04	0.1139310-04	0.1283340-04	0.1771520-04	0.5277530-05	0.1578910-04
0.1477010-05	0.1312220-04	0.4977720-05	0.2499770-04	0.2331870-04	0.6834350-04	0.7483330-05	0.1893230-04	0.3641960-05	0.7249490-05
0.5016910-05	0.2966870-05	0.2613720-05	0.4113420-04	0.2204910-04	0.1499390-04	0.1941350-04	0.2226650-04	0.7804180-05	0.2200670-04
0.2834710-05	0.7203250-05	0.4898060-05	0.5812040-04	0.2718720-04	0.2660520-04	0.3223620-04	0.2445510-04	0.1223820-04	0.6137550-06
0.3597460-05	0.1797840-05	0.1721220-05	0.3809410-04	0.1651460-04	0.8927680-05	0.9057770-05	0.1493920-04	0.9437480-05	0.1431110-04
0.4986080-05	0.5574080-05	0.7519800-06	0.1428610-04	0.1734030-04	0.1072810-04	0.2225480-04	0.1942680-04	0.3334500-05	0.1948740-04
0.1223570-05	0.3328800-04	0.3120430-05	0.3529530-04	0.8121880-05	0.5140820-04	0.7417530-04	0.9791750-05	0.4441950-05	0.5607220-05
0.2224780-05	0.1060270-05	0.47712180-05	0.5982540-04	0.2611580-04	0.1777740-04	0.1914120-04	0.2222600-04	0.1528160-04	0.5703760-06
0.2276890-05	0.2217530-04	0.9916740-05	0.7694060-04	0.2980460-04	0.1079110-03	0.5389300-04	0.2421170-04	0.1146740-04	0.1287710-05
0.8472780-06	0.9040840-05	0.2417960-05	0.3520070-04	0.4755230-05	0.1678200-04	0.1026240-04	0.3486130-05	0.9383560-05	0.4761140-05
0.1069020-05	0.1565340-04	0.6403980-05	0.4729930-04	0.2202760-04	0.7925520-04	0.3419120-05	0.1604540-04	0.7716150-05	0.1147710-04
0.5419270-06	0.4286080-05	0.2917320-05	0.1770720-04	0.5035110-05	0.2324820-05	0.1603560-04	0.5048470-05	0.3127780-05	0.3231150-06
0.5884290-05	0.6234530-05	0.6337430-06	0.1690480-04	0.6396970-05	0.3049510-05	0.8305740-05	0.7125300-05	0.2902470-05	0.2116940-04
0.3794140-05	0.2394980-04	0.3927330-05	0.4193210-04	0.1105230-04	0.5307110-04	0.1073920-04	0.6326330-05	0.5582970-05	0.2463400-04
0.6881080-05	0.3891810-05	0.4191330-05	0.4907270-04	0.1952100-04	0.1440590-04	0.1871620-04	0.1984220-04	0.5843900-05	0.2915670-04
0.2467780-05	0.4779260-05	0.2585130-05	0.2474950-05	0.1487120-04	0.2609590-04	0.2182300-04	0.1734360-04	0.3305230-06	0.1887000-04
0.4923480-05	0.1684320-04	0.2954600-05	0.1356170-05	0.9847040-05	0.5760650-04	0.6902590-05	0.7433580-05	0.1360960-05	0.1163410-04
0.3406840-05	0.2854320-04	0.2684840-05	0.3822540-05	0.6259670-05	0.8447320-04	0.3770230-04	0.5607740-05	0.6261270-06	0.1392950-04
	0.1129160-04	0.3504990-05	0.2854380-04	0.1383960-04	0.3826100-04	0.2227700-04	0.1284580-04	0.5395940-05	0.1187850-04

FIRM 11	FIRM 12	FIRM 13	FIRM 14	FIRM 15	FIRM 16	FIRM 17	FIRM 18	FIRM 19	FIRM 20
0.1214760-03	0.2780800-04	0.1886380-04	0.8424580-05	0.2356660-04	0.9182120-05	0.1466980-04	0.4567270-04	0.1355150-04	0.2721360-05
0.5797890-05	0.2091010-05	0.6245020-04	0.5206080-05	0.3915150-05	0.5853750-05	0.1264280-05	0.1312720-05	0.3868920-06	0.7510740-05
0.2198080-04	0.3833970-05	0.7274580-04	0.5437170-05	0.4732250-05	0.5395250-05	0.1561350-05	0.1418350-04	0.9246020-05	0.6858910-05
0.8428910-04	0.2592190-04	0.4401150-04	0.5267180-05	0.1311310-04	0.4117950-05	0.1208840-04	0.3873690-04	0.7575310-05	0.1185660-04
0.4917570-05	0.6031380-05	0.3713760-04	0.2616080-05	0.5399970-05	0.7923620-05	0.6613000-05	0.1779880-04	0.2511890-05	0.6251050-05
0.1611900-04	0.1166670-04	0.2027660-04	0.3009350-05	0.2845230-05	0.3253950-05	0.2934220-05	0.4813410-04	0.4319280-05	0.2257410-05
0.7366980-04	0.4405810-04	0.3890050-04	0.2529720-05	0.7727740-05	0.2900980-05	0.6604750-05	0.8901500-04	0.2246030-05	0.1223220-04
0.2296570-05	0.3787620-05	0.6874460-04	0.1036200-04	0.5058440-05	0.8476490-05	0.6578630-05	0.1584100-04	0.2762270-05	0.7708620-05
0.7911670-05	0.5298130-05	0.1274110-05	0.9473560-05	0.4741010-05	0.4546720-05	0.5511630-05	0.1149220-04	0.2852540-05	0.1749620-04
0.1001980-04	0.1147160-04	0.3076310-04	0.9574470-05	0.3634600-05	0.7315390-05	0.7313850-05	0.4549580-04	0.6208330-05	0.9933550-05
0.1030900-04	0.6444770-05	0.2681700-04	0.1544800-04	0.7678060-05	0.7245560-05	0.1765820-05	0.2724870-04	0.5261910-05	0.1398000-04
0.1742540-06	0.7703260-05	0.6137100-04	0.1092490-04	0.3318500-05	0.7022020-05	0.6340770-05	0.3229680-04	0.7272450-06	0.5624160-05
0.1412010-04	0.4029800-05	0.2626800-04	0.6783200-05	0.4400750-05	0.5438100-05	0.6750450-05	0.1941780-04	0.6151360-05	0.5887180-05
0.1041710-03	0.1624650-04	0.1972440-04	0.4261860-05	0.3308920-04	0.2175980-04	0.3290510-04	0.2355620-04	0.1132480-04	0.5380200-05
0.1527710-04	0.1080870-04	0.3165190-04	0.1533350-04	0.7249180-05	0.7453180-05	0.1217890-04	0.4664780-04	0.7617670-05	0.1381320-04
0.3674460-04	0.3708460-04	0.2398060-04	0.1506340-04	0.1580750-04	0.8628960-05	0.2045060-04	0.7519870-04	0.7557840-05	0.2462900-04
0.3457080-05	0.6900050-05	0.2102080-04	0.4117210-05	0.4520350-05	0.6282230-05	0.9657140-05	0.3089210-04	0.5216850-06	0.4238770-05
0.9992040-05	0.1374280-04	0.6186990-05	0.9426890-05	0.5821850-05	0.7954850-05	0.6666260-05	0.3863500-04	0.1580820-05	0.1937790-04
0.2841330-04	0.1406300-05	0.3591950-04	0.1771280-05	0.1227930-04	0.1100200-04	0.8991420-05	0.8564580-05	0.8840290-05	0.4847920-05
0.5541580-05	0.1297010-05	0.7447670-04	0.4253850-05	0.7650590-05	0.1164540-04	0.6124210-05	0.9619570-05	0.9193480-06	0.8061040-06
0.1288870-04	0.4995970-05	0.3110220-04	0.4000720-05	0.1755670-04	0.2142850-04	0.1498300-04	0.2254460-04	0.2752390-05	0.1057280-04
0.1127210-04	0.1116760-04	0.5947170-04	0.7433920-05	0.7718180-06	0.3718180-06	0.1032550-04	0.4483680-05	0.7215360-05	0.1077410-04
0.1527580-04	0.6870210-05	0.6284720-04	0.5306550-05	0.1296310-04	0.9271690-06	0.2135200-05	0.1466720-04	0.5191080-05	0.7440990-05
0.3787430-04	0.5753310-05	0.3973960-04	0.3670960-05	0.3622870-05	0.1928430-04	0.1091510-04	0.7750860-05	0.3088350-05	0.9479000-05
0.8403070-04	0.2213510-04	0.5920770-04	0.3522870-05	0.1928430-04	0.1928430-04	0.1091510-04	0.2725980-04	0.3451900-05	0.6594250-05
0.3130400-04	0.1194070-04	0.3892580-04	0.66596200-05	0.9377920-05	0.8435850-05	0.5403680-05	0.3022100-04	0.5050470-05	0.9217180-05

FIRM21	FIRM22	FIRM23	FIRM24	FIRM25	AVERAGE
0.8942690-05	0.3951510-05	0.7531500-05	0.7275860-05	0.2348260-05	0.1766990-04
0.1282700-05	0.5096310-05	0.1951450-04	0.9110860-05	0.2711330-05	0.9670770-05
0.9072230-05	0.2087360-05	0.2714060-04	0.4304760-05	0.2897550-05	0.1134650-04
0.3277770-05	0.9773020-05	0.3208980-04	0.1835320-04	0.4809270-05	0.2209420-04
0.1791080-05	0.8147990-05	0.1908070-05	0.2862790-04	0.1169670-04	0.9794510-05
0.8544630-05	0.3292140-05	0.3287680-06	0.1394360-04	0.3869490-05	0.7834270-05
0.4943260-06	0.1823530-04	0.7792270-05	0.5186720-04	0.1608760-04	0.2346330-04
0.6046050-06	0.7952000-05	0.2423410-04	0.2755970-04	0.8569640-05	0.1297320-04
0.1481190-05	0.1436230-04	0.1084050-04	0.3718830-04	0.9470770-05	0.1269940-04
0.3219350-05	0.8748640-05	0.2635290-04	0.3090400-04	0.9018630-05	0.1521790-04
0.1423490-05	0.1449420-04	0.2014950-04	0.5088690-04	0.1433130-04	0.1743080-04
0.5755120-06	0.7922690-05	0.2166610-04	0.2871120-04	0.7454170-05	0.1288920-04
0.3190920-05	0.2638450-05	0.2651350-04	0.9222830-05	0.2378070-05	0.1046480-04
0.1720020-05	0.6675020-05	0.1158400-04	0.2348480-04	0.9000690-05	0.2206070-04
0.6932040-05	0.1482250-04	0.1431400-04	0.5221070-04	0.1423490-04	0.1757930-04
0.6492860-06	0.2824030-04	0.1870800-04	0.8432000-04	0.2409020-04	0.3204150-04
0.1993240-05	0.5481220-05	0.3248670-05	0.2162160-04	0.6991340-05	0.9115590-05
0.1328680-05	0.1841760-04	0.6444940-05	0.5206780-04	0.1441280-04	0.1685690-04
0.7805580-05	0.2688830-05	0.1030860-05	0.1220710-04	0.6809210-05	0.8433310-05
0.3410940-06	0.1149020-05	0.1832700-04	0.6531530-05	0.3463420-05	0.9230280-05
0.1217060-05	0.9015160-05	0.4863690-05	0.2872770-04	0.1064510-04	0.1553210-04
0.3376100-05	0.9237820-05	0.2517940-04	0.3471910-04	0.1323910-04	0.1749740-04
0.3902780-05	0.3679920-05	0.3103930-04	0.7522500-05	0.3256870-05	0.1145960-04
0.6335940-05	0.6577740-05	0.6089240-05	0.1168490-04	0.3371020-05	0.1158240-04
0.9467380-06	0.8190680-05	0.1716600-04	0.1438030-04	0.3343870-05	0.1924160-04
0.3217320-05	0.8843110-05	0.1536230-04	0.2669930-04	0.8339660-05	0.0

WATER INDUSTRY FOUR INDEX MSE

FIRM 1	FIRM 2	FIRM 3	FIRM 4	FIRM 5	FIRM 6	FIRM 7	FIRM 8	FIRM 9	FIRM 10
0.351545D-06	0.202951D-05	0.424380D-05	0.483628D-04	0.858529D-05	0.767120D-05	0.750174D-05	0.627310D-05	0.529847D-05	0.766632D-05
0.205139D-07	0.414157D-05	0.270311D-06	0.141526D-04	0.242958D-05	0.382017D-06	0.776341D-05	0.228310D-05	0.310072D-05	0.196864D-05
0.686682D-07	0.189153D-05	0.204302D-05	0.421427D-04	0.584542D-05	0.427520D-05	0.338758D-05	0.368132D-05	0.786595D-05	0.594320D-05
0.104212D-05	0.112785D-05	0.500761D-05	0.648087D-04	0.294650D-04	0.206177D-04	0.220732D-05	0.253070D-04	0.108271D-04	0.337616D-06
0.604641D-05	0.102468D-05	0.236043D-06	0.900765D-06	0.593687D-05	0.219287D-05	0.307676D-05	0.690051D-05	0.310926D-06	0.162663D-04
0.113489D-05	0.164500D-04	0.313769D-05	0.142357D-05	0.121247D-04	0.668332D-04	0.848816D-06	0.927266D-05	0.152679D-07	0.907309D-03
0.499236D-05	0.124261D-05	0.512837D-06	0.578128D-07	0.154231D-04	0.101810D-04	0.154069D-04	0.176754D-04	0.172556D-06	0.170346D-04
0.596443D-06	0.955739D-06	0.211320D-05	0.100125D-05	0.136863D-05	0.262162D-05	0.433646D-05	0.150712D-05	0.146026D-05	0.554082D-06
0.181190D-05	0.231957D-04	0.322207D-05	0.475726D-05	0.196847D-07	0.712009D-04	0.450665D-04	0.832754D-06	0.134127D-06	0.740144D-06
0.102886D-05	0.442676D-05	0.250221D-05	0.227937D-05	0.471075D-06	0.215344D-04	0.359258D-05	0.604174D-07	0.234757D-06	0.611345D-06
0.170935D-05	0.555405D-05	0.233077D-05	0.179887D-04	0.816694D-05	0.207510D-04	0.113054D-04	0.739934D-05	0.294442D-05	0.601947D-05

FIRM 11	FIRM 12	FIRM 13	FIRM 14	FIRM 15	FIRM 16	FIRM 17	FIRM 18	FIRM 19	FIRM 20
0.369515D-05	0.613728D-05	0.239421D-04	0.397195D-05	0.798031D-05	0.119497D-04	0.893991D-05	0.252269D-04	0.353264D-05	0.795852D-05
0.481505D-05	0.629023D-06	0.231636D-06	0.179898D-05	0.434654D-05	0.451326D-05	0.610164D-05	0.703402D-05	0.958154D-06	0.684208D-06
0.204366D-07	0.881709D-05	0.611251D-05	0.398175D-05	0.352518D-05	0.686808D-05	0.637573D-05	0.363072D-04	0.657376D-06	0.420610D-05
0.435888D-05	0.703906D-05	0.218093D-08	0.152428D-04	0.662343D-05	0.771827D-05	0.140001D-04	0.307416D-04	0.569143D-05	0.159220D-04
0.205931D-06	0.405933D-06	0.721255D-04	0.381304D-05	0.183823D-05	0.473492D-05	0.302232D-09	0.112609D-03	0.879315D-08	0.369652D-06
0.918036D-05	0.261253D-05	0.156529D-05	0.361627D-05	0.413729D-05	0.342399D-05	0.202029D-05	0.427969D-06	0.616600D-06	0.117793D-04
0.994038D-05	0.328053D-05	0.258316D-04	0.524126D-05	0.112822D-06	0.768905D-06	0.838117D-06	0.116267D-04	0.538332D-05	0.536333D-05
0.173856D-04	0.142045D-05	0.319455D-04	0.995095D-09	0.482605D-05	0.371085D-05	0.111809D-05	0.590048D-05	0.622549D-05	0.316546D-05
0.802405D-04	0.245270D-04	0.238825D-04	0.138897D-07	0.130956D-04	0.289653D-05	0.118632D-04	0.314068D-04	0.360088D-05	0.497061D-05
0.319618D-05	0.240231D-05	0.269938D-04	0.488405D-08	0.201740D-06	0.701320D-07	0.957163D-06	0.147421D-05	0.230742D-06	0.378837D-05
0.133042D-04	0.573712D-05	0.212533D-04	0.376858D-05	0.466687D-05	0.466546D-05	0.522145D-05	0.151272D-04	0.271054D-05	0.582276D-05

FIRM 21	FIRM 22	FIRM 23	FIRM 24	FIRM 25	AVERAGE
0.831815D-06	0.903541D-05	0.173560D-06	0.358200D-04	0.137174D-04	0.104359D-04
0.360309D-08	0.120463D-05	0.113530D-05	0.677346D-05	0.215294D-04	0.315596D-05
0.820997D-07	0.679812D-05	0.249026D-06	0.277651D-04	0.873262D-05	0.791388D-05
0.513741D-06	0.167511D-04	0.137248D-04	0.587893D-04	0.164625D-04	0.157758D-04
0.356065D-06	0.197021D-06	0.196440D-04	0.452881D-07	0.682074D-06	0.593846D-05
0.141060D-05	0.805540D-05	0.562546D-05	0.145992D-04	0.315169D-05	0.770147D-05
0.317836D-05	0.175555D-05	0.258316D-04	0.281489D-05	0.291429D-06	0.739829D-05
0.791654D-05	0.812943D-06	0.398698D-07	0.259165D-05	0.254754D-05	0.422060D-05
0.300592D-06	0.695566D-05	0.987224D-05	0.136382D-04	0.415437D-05	0.152960D-04
0.157302D-05	0.275974D-05	0.228926D-05	0.630668D-05	0.333986D-05	0.369719D-05
0.161664D-05	0.543235D-05	0.785813D-05	0.169144D-04	0.556324D-05	0.0

VITA

Thomas Wallace Hall

Candidate for the Degree of
Doctor of Philosophy

Thesis: AN EMPIRICAL TEST OF THE EFFECT OF ASSET
AGGREGATION ON VALUATION ACCURACY

Major Field: Business Administration

Biographical:

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Education: Graduated from Sam Houston High School in
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lor of Business Administration and Master of Pro-
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