

OCCUPATIONAL MOBILITY AND UPGRADING:

AN EMPIRICAL ANALYSIS

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## PREFACE

An empirical investigation of the determinants of occupational mobility and upgrading was conducted using a cross-sectional database constructed from special Current Population Surveys of occupationally mobile workers. Based on human capital and segmented labor market theory, a regression model was built and estimated using ordinary least squares. The model was applied to a variety of labor market cohort samples, including black and white workers of both sexes broken down by age.

The model was estimated for three periods in time for each of the cohort groups examined. The importance of personal attributes and endowments to the outcome of an occupational change is found to vary across racial groups and between sexes. The differences in the relative importance of formal education and human capital between minority workers and white male workers poses important implications for labor and manpower policies.

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## CHAPTER I

### OCCUPATIONAL MOBILITY: AN INTRODUCTION

During any given year roughly ten percent of the American labor force will change occupations. Important functions of labor market operations are served through this mobility. From a macroeconomic perspective, labor mobility can be viewed as the primary mechanism by which the market allocates human resources among competing productive processes. The dynamics of aggregate demand and structural changes in the economy are reflected in the labor market through the movements of workers between jobs and occupations. To individual firms, the labor mobility function enhances the quality of their employees. Employers providing hierarchies of jobs, wherein lower level positions provide training and experience for upper level jobs that require higher degrees of skill, increase the stability of their workforce. Mobility is also of prime significance to the individual worker. Changing occupations and/or employers is vital to worker career achievement as an avenue of receiving job training and work experience. Mobility provides a means of optimizing the economic position of individual workers within the labor market. Once these important market functions are recognized, it becomes clear that the magnitude and distributional patterns of job mobility hold significant implications for both public and private manpower policies.

The mobility of human resources may take several different forms.

Job mobility, in the traditional sense, may consist of the movement between job functions within an occupation or the movement between occupations. Job mobility may also coincide with the simultaneous change in employer, industry, and geographic region of employment. Thus, the form of mobility can be quite complex.

Economists have long recognized the existence of a hierarchy of jobs through which workers advance. It has proven difficult to quantify accurately the movement of workers between job functions within occupations, because of the wide diversity of job titles and responsibilities across the myriad of employers within the economy. However, research into the movement of workers between occupations has proven more successful because it is somewhat easier to distinguish between and catalog occupations. Economists have traditionally classified occupations according to similarities in job functions and skills required by workers engaged in differentiated forms of labor. The mobility of workers between occupations will be addressed in this research.

The importance of occupational mobility has been widely discussed during recent years in both the popular and academic press. Reoccurring cyclical economic fluctuations and structural changes in the economy have forced a reexamination of the process of allocating human resources. The dynamics of the modern economy have caused a greater awareness, at both the industrial and aggregate levels, of the flow of labor resources between alternative jobs and occupations. As the occupational structures of firms and industries evolve over time, greater emphasis is being placed on the mobility of labor to meet the changing needs of business. The ability of labor to adapt to the

changing economic environment is of critical importance for future economic growth.

Attention has further focused on the process whereby workers establish career paths by successfully moving between stations of employment. New colloquial terms such as "Yuppie" and "Yumpie" (Young Upwardly-Mobile Professionals) have been coined to identify those workers that succeed in optimizing their economic position through a progression of jobs along occupational hierarchies. An understanding of the determinants of occupational upgrading is essential to the analysis of labor market dynamics. Career education programs for individuals entering the labor force, and public manpower policies designed to enhance the economic position of the disadvantaged, must take into account the factors that impinge on the occupational mobility process if they are to succeed.

In the academic literature, occupational mobility has been theoretically analyzed from the perspective of orthodox neoclassical economic theory and from the segmented labor market hypothesis point of view. As will be discussed in Chapter II, these two schools of thought are not mutually exclusive and both contribute to the understanding of the mobility process. Neoclassical labor market theory stresses the importance of individual endowments and the acquisition of human capital in the process of occupational mobility. While distinguishing between the various functions served by internal (movements within the employing firm) and external (movements between employing firms) occupational mobility, segmented labor market models emphasize structural and institutional barriers to mobility for various economic minorities and stress the importance of formalized internal hierarchies

of occupations with regard to worker upgrading.

Previous empirical studies have analyzed not only the individual factors contributing to the occupational mobility process, but also the social and economic consequences of mobility. Questions of economic equity and discrimination have also been explored by analyzing the mobility of various race and sex cohorts across occupations. Due to the growing importance of occupational mobility in the modern economy, the present investigation will address the following three critical lines of inquiry:

1. What is the pattern of occupational mobility? Specifically, how strongly are workers attached to internal job markets and to what extent do workers engage in external occupational moves?

2. What level of success do workers achieve through occupational mobility? Are internal or external movers more likely to experience significant gains? What attributes and endowments contribute to successful occupational mobility?

3. Do occupational mobility distributions reflect equity across racial and sexual boundaries? In effect, do economic minorities experience equal returns through occupational change as that received by non-minority workers with like characteristics?

These three areas of questioning bring together the essence of the occupational mobility process in theory and practice. These questions also pose a test for several labor market hypotheses. The first group of questions is aimed at identifying the importance of occupational mobility form in the allocation of human resources. The questions in the second group examine the upgrading potential associated with mobility and seek to identify the personal and structural

characteristics that contribute to worker occupational upgrading. Thus, in essence, these questions examine the tenets of the human capital theory with regard to mobility. The third group of questions looks at possible discrimination in the market for labor resources and whether economic minorities experience equal access to occupational upgrading through the mobility process. The questions taken together also pose a test of the segmented labor market hypothesis. For example, segmented labor market theorists would suggest a preponderance of white males experiencing significant gains through internal mobility while external moves would be dominated by blacks and females experiencing little or no gain in occupational attainment. All of these issues are of great consequence in light of recent attention focused on occupational mobility.

As with any research project, some groundwork must be laid before attempting a new analysis. The next two chapters will focus on examining the theoretical and empirical literature relevant to the questions that will be addressed. Chapter II reviews the analytic framework and economic hypotheses important to the understanding of the occupational mobility process. The role of occupational mobility in both human capital and segmented labor market theories is presented and examined in light of the questions to be analyzed empirically. The distinctions between the human capital and segmented labor market views of mobility are important because previous empirical researchers of occupational mobility have taken a variety of approaches in response to different theoretical influences. Empirical investigations concerning various mobility issues that emphasize either a neoclassical or segmented labor market perspective dominate the literature. However, a

few recent studies of occupational mobility have taken an eclectic approach by synthesizing variables important to each school of thought into their models. Chapter III thus reviews the major findings of each of these categories of past empirical studies dealing with the occupational mobility process.

After the review of the theoretical and empirical literature contained in Chapters II and III, Chapter IV concerns several significant topics. First, important criticisms of previous occupational studies are discussed and analyzed. Second, taking these criticisms into account, an econometric model is constructed to address the mobility issues presented above. Specific hypotheses and expected relationships between the determinants of occupational change are also examined. Lastly, Chapter IV presents an overview of the database utilized in the empirical estimation of the econometric model of occupational mobility.

An indepth analysis of the estimated results is presented in Chapter V for each of the various groups of mobile workers examined. Chapter VI then summarizes the major findings concerning the determinants of occupational upgrading and presents the implications of the estimated results for policy and future research.

## CHAPTER II

### OCCUPATIONAL MOBILITY AND ECONOMIC THEORY

#### Introduction

A synthesis of conventional neoclassical labor theory and the more "radical" segmented labor market (SLM) hypothesis is useful to the understanding of the job mobility process. The divergencies between the two frameworks of thought have often been overstated in the literature. Recent theoretical models that incorporate SLM constructs (ie. internal labor market operations) into basic neoclassical models have proven successful.(1) A comprehensive analysis of job mobility must take into account the implications posed by these two perspectives of the labor market. Thus, a brief review of the theoretical issues is a logical place to begin a study of the job mobility process.

#### Neoclassical Models and Mobility

Standard neoclassical theory is based on the assumption that economic units possess the ability to maximize their economic position through their market behavior. In brief, neoclassical labor economics is composed of the marginal productivity theory of demand (based on the profit maximizing behavior of firms), and a workers utility maximization theory of labor supply. Traditionally, neoclassical labor

supply theory takes two forms; 1.) the theory of investment in human capital, used to explain worker occupational choice, and 2.) the theory of labor-leisure trade-offs used to evaluate the amount of labor supplied by workers. Modifications and variations of the traditional neoclassical labor model have been applied to a wide range of economic problems. Theories of the human capital acquisition process can be used to explain the occupational mobility phenomenon.

Based on the neoclassical assumption that workers seek to maximize their economic position, as measured by discounted earnings, human capital theory assigns work activity two important roles; holding a job creates current earnings, and it provides training and experience that have an influence on future productivity and therefore, future earnings. With regard to mobility decisions, workers are thus faced with making choices between current earnings and investments in human capital through on-the-job-training (OJT) that will affect future earnings potential. By sacrificing current earnings, human capital can be more readily accumulated. Since the period in which returns from investments in human capital can be recovered naturally declines over time, it is predicted that such investments will diminish as workers grow older. Therefore, full-time human capital investments such as formal education will occur at an early stage of life and part-time activities like OJT will diminish with age and approach zero at retirement.

Ben-Porath(2), theoretically connects human capital investments received at work (ie. OJT) with job and occupational mobility. Couched in terms of production-possibilities analysis, he proposes that workers choose among alternative flows of earnings and human capital. A



production frontier represents the different combinations of current earnings and additions to future worker productivity. Movements between combinations would be actualized as changes in job functions (movement along a promotional ladder within a firm), or by movements between employers (changing place of employment).

Based on the premise that growth in earnings requires movements between work activities, Rosen(3) has developed a model that explains the optimal sequence of jobs over a worker's lifetime. Rosen proposes that at early stages in their careers workers purchase OJT by accepting jobs at wages lower than the potential earnings their stock of existing human capital could command. The cost of providing OJT to the worker is recovered by the firm through the difference between actual and potential wages. Workers are willing to incur the positive difference in wages based on the increase in future productivity and earnings allowed by accumulating human capital in the form of OJT and experience. Rosen theorizes that workers maximize the present value of earnings by making periodic job changes. Because of the positive accumulation of human capital over time, subsequent job and occupational moves will reflect higher wages and less opportunity for investments in OJT as actual earnings approach potential earnings.

It is important to note that Rosen's model can also explain employer's behavior. Some firms would find it profitable to provide hierarchies of jobs since human capital in the form of OJT can be sold at a positive price. Workers may then progress up the job ladder through a series of promotions. If firms do not profit from offering sufficient hierarchies, employees may seek access to appropriate opportunities in other firms. Therefore, job upgrading can be

accomplished through intra- and inter-firm movements by workers.

Leigh has noted the importance of Rosen's model to the theory of job mobility because of Rosen's "conclusion that the choice of an optimum progression of work activities simultaneously determines both earnings and occupation patterns over the working life-time" of workers.(4)

The level and pattern of human capital investments may differ among individual workers for a variety of reasons. Logically, the return on human capital investments will be compared to returns in alternative markets. Given an imperfect capital market, where some groups of workers experience cheaper access to financial investments, returns on alternative investments will differ which will cause different incentives among workers to invest in OJT. Rosen and others have acknowledged the differences in innate ability among workers that affect their access to learning and training opportunities.(5) Formal schooling can be viewed as having an impact on increasing a worker's marketable skills and his capacity to learn. Thus, education should help disadvantaged groups to achieve access to job opportunities offering OJT and potential upgrading. However, disadvantaged groups may experience higher implicit costs of obtaining formal education that reduce their level of educational attainment, blocking potential benefits. Mincer, Rosen, and others(6) also note that differences among individuals in learning ability and discrimination in the capital market will exclude groups of workers from participation in some areas of the job market. In effect such workers will be removed from competing for jobs that require certain levels of initial education and/or learning ability. As a consequence, these workers have also

been excluded from many jobs that offer OJT and the potential for advancement through job mobility.

Human capital theory thus explains the persistent existence of low-wage groups of workers due to their inability to obtain jobs offering OJT and promotion ladders. It is the existence of differences in learning ability and incentives to make human capital investments that limit their access to such jobs.

If all workers experienced equal opportunity in obtaining formal education and access to financial markets, human capital theory suggests differences in earning profiles would only reflect variances in individual worker ability or differences in preferences for non-pecuniary compensation. Other than hypothesizing differences across racial and sex boundaries in marketable learning ability, neoclassical theory cannot theoretically explain earnings discrimination.

Neoclassical models have been criticized for failing to account theoretically for empirically observed income differentials across racial and sex boundaries. The "taste" for discrimination in neoclassical models is reflected in employers' willingness to pay higher wages to non-minority workers of equal ability. When discriminators exist in the market, employers with low degrees, or no degree, of discriminatory desire can hire minority workers more cheaply. The average costs to minority-hiring firms are thus lower than the discriminating firms' average costs. In the long-run, the low-cost minority-hiring firms should drive high-cost discriminating firms from the market. This process, of course, is not observable in the real world, opening neoclassical labor market models to the often

heard criticism of being unrealistic. Welch(7) has observed that discrimination questions create a large gap which neoclassical human capital theorists must attempt to fill.

### Segmented Labor Market Models and Mobility

During the last quarter century a school of thought known as the dual or segmented labor market hypothesis formalized to challenge neoclassical thinking and attempt to create economic models that can better explain observed labor market phenomena. Cain(8) notes SLM theories grew out of older debates with standard economic reasoning and the works of neoinstitutional economists during the 1940's and 1950's. The "challenge" to conventional neoclassical economics posed by the SLM hypothesis is far reaching in scope and holds very important implications for job mobility issues.

In a manner not unlike that described by human capital theorists, SLM economists emphasize experience and training acquired on the job to explain earning differentials between workers. Both human capital and SLM theorists acknowledge barriers existing in the labor market that restrict groups of workers from access to jobs offering OJT and upgrading. The major point of departure is in the perception of how the labor market is structured. SLM theorists categorize jobs into two labor market sectors depending on whether or not they offer OJT (hence the "dual" or "segmented" label). Employers in the primary sector find it to their advantage to offer OJT and hierarchies of jobs to reduce labor turnover and establish stable work forces. Experienced workers in the primary sector are allowed to train new employees without fear

of takeover of their own jobs due to established job ladders of progression and preferences for workers with greater seniority. The vertical hierarchies of jobs and occupations within primary sector firms have popularly become known as "internal labor markets." (9)

The secondary sector of the labor market is composed of jobs that offer little or no training. Firms are characterized by the lack of internal labor market lines of promotional opportunity and labor turnover is high. Employers thus tend to structure jobs and production techniques so that worker instability does not hamper efficiency or production output.

To explain how and why the labor market becomes segmented, the SLM hypothesis relies heavily on institutional and sociological variables. Doeringer and Piore (10) suggest a process by which personal job requirements of employers dichotomize the market to form the primary and secondary segments. The heart of the SLM model is the hypothesis that secondary sector workers learn behavioral traits on the job that exclude them from primary sector employment, and employers who expect erratic job attachment have an incentive to use technology requiring only unskilled workers. Doeringer and Piore propose that the erratic work habits developed in the secondary labor market may be reinforced by unstable family and social environments thus greatly limiting the probability of mobility into the primary sector through job changes.

Wachter (11) notes that most SLM theorists conclude that racial discrimination is the major barrier between labor market segments. Indeed, racial acceptability has been cited by many dual writers as a qualification for primary sector employment and success. Economic minorities that do gain access to primary sector jobs may not receive

the same degree of OJT from their supervisors. Prejudice against blacks and other minorities by white coworkers may prevent them from learning their jobs properly and hamper advancement opportunities.

Another important aspect of the SLM hypothesis is the argument that secondary market jobs are compatible with the "street" lifestyle prevalent in low-income neighborhoods and ghettos. Social status in such an environment is linked to association with street groups and gangs, not to any particular employer. Illegal activities and social "welfare," not compatible with primary sector lifestyles, may subsidize earned incomes. SLM theorists also suggest that discrimination in schooling and housing isolates minorities from other social classes, further strengthening unstable employment behavior.

A significant branch of the SLM literature emphasizes the historical development of the American industrial structure in explaining the segmentation of the labor market. Reich, Gordon, and Edwards(12) suggest that industrialization led to large, capital-intensive firms, which due to high entry barriers, tended to be sheltered from competitive forces. Due to their market power, demand for their products generally remained stable, promoting the development of job hierarchies to limit job turnover and encourage stability in the work force. Small, less capital-intensive, firms on the "industrial-fringe" were not free from dynamic competitive forces and therefore faced unstable demand conditions. Over time, instability of demand created unstable work environments in certain sectors of the economy leading to the dichotomization of the labor market into the primary and secondary segments.

"Structural" SLM theorists like Wachtel and Betsey(13) further

propose that labor market status is a function of the characteristics found in the industry of employment. It is hypothesized that the characteristics of the initial industry of employment limit an individuals' future labor market opportunities. Structural barriers often cited to restrain occupational progression that can be found to varying degrees in many industries include: the presence of trade unions, required occupational licensing, lack of good labor market information, financial risks associated with geographic mobility, and educational requirements used as screening devices. It can also be hypothesized that tastes for discrimination may vary across industries and geographic regions, further altering the allocation of labor.

It should be noted that segmented labor market models, including those taking a structuralist approach, are not formulated with variables that are mutually exclusive from neoclassical models. The major points of departure lie in the role and importance assigned to human capital endowments and in the perception of the occupational structure found in the labor market.

#### Summary

As outlined in this chapter, human capital theories place less emphasis on the sociological and structural variables affecting labor market behavior than do segmented labor market models. Both schools of thought, however, stress the great importance of training and experience acquired on the job to future worker success. The ability for all workers to acquire access to human capital within the institutional constraints of the labor market and society is the central question posed by SLM theorists. Intra-firm job mobility is

the process by which workers maximize their position through internal labor markets. Inter-firm job mobility may be viewed as the process whereby workers seek access to OJT, internal labor markets, and job hierarchies offering greater opportunities for advancement. SLM theorists perceive sociological and institutional barriers hampering this mobility process, while human capital theorists place greater emphasis on individual choices between human capital investments and current earnings made by workers maximizing their economic position. The question of which type of factors most affect the potential for worker upgrading through job mobility is an empirical one. The next chapter presents an overview of the empirical evidence to date concerning the determination of occupational upgrading through mobility.



## ENDNOTES

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CHAPTER III  
THE EMPIRICAL EVIDENCE ON  
OCCUPATIONAL MOBILITY

Introduction

The empirical analysis of job mobility began during the late 1940's and early 1950's. It is interesting to note that the first studies were conducted about the same time as "neoinstitutional" economists, such as Dunlop and Kerr(1), began formulating internal labor market theories on which modern segmented labor market models rely heavily. A landmark study conducted by the National Opinion Research Center (NORC) in 1947 was designed to measure and rank the relative prestige of occupations as perceived by the public for future research efforts. One of the major objectives of the NORC study was,

"To study occupational mobility through analyzing peoples's intention to shift to another occupation and their ostensible reasons for choice of an intended occupation, and through investigating mobility in occupations from one generation to another.(2)

A great deal of interest generated by the NORC survey led in the following years to an abundance of articles in the sociological literature. Sociologists such as Lenski(3) and Jackson and Crocket(4) concentrated on the analysis of intergenerational mobility. Problems with data and computational techniques hampered much of the early

research.(5) It was not until the 1960's and 1970's with the increasing popularity of the SLM hypothesis and the advancement of empirical research techniques that economists actively pursued the study of the occupational mobility phenomenon.

In the economic literature, occupational mobility is often studied in the context of testing the validity of internal labor market theories. Studies simply reporting the observed attachment to occupations and firms appear in the literature along with sophisticated econometric models testing occupational upgrading and inter-segment mobility patterns. The related question of racial discrimination is also examined in many studies but the problems of sexual discrimination have largely been overlooked in the occupational mobility context.

This chapter will present an overview of the major empirical works found in the economic literature concerning the process of occupational mobility. Studies investigating the mobility of workers across labor market segments are examined first followed by investigations taking a structuralist approach. The third section will discuss the findings of recent research efforts that have taken an eclectic approach, synthesizing both neoclassical and SLM variables into one model, to the analysis of occupational upgrading through mobility. The final major section looks at the empirical evidence concerning occupational change and female workers. The chapter concludes with a brief summary of the main points of interest.

#### Inter-Segment Mobility Studies

Steinberg(6) looks at both racial and sexual differences in attachment and upgrading patterns through internal labor markets by

observing worker firm and income status over a five year sample period. Using data from the Social Security Administration's Continuous Work History Sample (CWHHS), Steinberg tracks worker income gains between 1965 and 1970 by firm attachment status. His analysis considers worker mobility in terms of income change and whether or not the worker changed employers. Job or occupational moves (and any non-pecuniary benefits associated with such mobility types) are not considered by Steinberg. Based on strong firm attachment of workers between 1965 and 1970 (overall 45 percent of lower-income and 55.5 percent of middle-income employees were with the same firm in both years), he reports the "importance of internal labor markets is well documented.(7)

As expected firm attachment is found to grow stronger with worker age, but of greater interest with regard to this proposed study is the pattern of firm attachment exhibited by females. 53.7 percent of lower income females compared with 38.5 percent for lower income males were found to be firm stayers. A comparable ratio appears in the middle-income sample - 67.0 percent to 53.1 percent. Steinberg concludes females show stronger attachment to internal labor markets but discovers firm staying females experience significantly lower rates of relative advancement. Steinberg does not measure inter-firm mobility but reports that only 39.7 percent of lower-income and 31.0 percent of middle-income females experience upward income mobility through inter-industry job moves over the sample period.

Steinberg also finds different patterns between racial groups for both firm attachment and upward mobility. Blacks in each income group exhibited stronger firm attachment and lesser degrees of income

advancement than their white counterparts (the black-white differences are somewhat smaller than the male-female differences). These findings differ from other studies(8) and appear to conflict with the SLM hypothesis, particularly with regard to the lower-income sample. Steinberg argues that low relative black labor force participation rates and differences between black-white age and education compositions may have biased the results. It is also likely that changing institutional factors (i.e. civil rights legislation) during the sample period may have influenced the data.

An interesting approach used in several studies to test the existence of distinct labor market segments has been to examine worker mobility between the hypothesized segments. The critical task of this methodology is determining how jobs and occupations are to be placed by segment. A variety of procedures has been used to define segments. Some researchers have simply used median income as the criterion; occupations receiving average incomes above the median being placed in the primary sector and below median income occupations being placed in the secondary sector. Other researchers have used job characteristics or industrial sector characteristics to divide the labor market. Still others have preferred to rely on their own personal judgment to define segments. Clearly the wide variety of alternative definitions leaves this methodology open to criticism; however, the empirical results yield important conclusions.

In a well known study, Andrisani(9) uses National Longitudinal Survey (NLS) data of young men in 1968 and a median income scheme of defining labor market segments to estimate the likelihood that a worker will move from an initial secondary sector job to primary sector

employment. Andrisani finds the probability of secondary-to-primary sector mobility to be greater than the probability of confinement to secondary sector employment for both black and white workers.

In another study using income distributions to define segments, Schiller(10) tracks the mobility of male workers between 1957 and 1971. Like Andrisani, Schiller reports sufficient mobility of both blacks and whites to reject the hypothesis of secondary sector entrapment of workers. Even though the choice of the primary-secondary sector boundary used by Schiller is arbitrary, he notes the results are "not sensitive" to the boundary's location.

Using a boundary scheme based on job requirements and industrial characteristics, Rumberger and Carnoy(11) employ a recursive regression model to analyze mobility between segments. Rumberger and Carnoy discover between 1965 and 1970 fewer workers remained in the secondary market than remained in the primary labor market. Thus, in general, upward mobility exceeded downward mobility. However, black males were found to be significantly less upwardly mobile than whites and have a greater probability of downward mobility between segments. After analyzing the results by age, initial employment in the secondary segment appears to be temporary for young white males but more likely to be permanent for young blacks. Mobility patterns are also found to be affected to a greater extent by schooling and marriage for whites than for blacks, but vocational training positively affects upward mobility universally across race.

Rumberger and Carnoy also examine earning differentials between segments. Their results "suggest that human capital variables of education and experience are essentially unrewarded in the secondary

segment of the labour market."(12) However, positive returns are found to exist for marriage and vocational training in the secondary market. Holding individual characteristics constant, the earning functions for black primary employees are very similar to white secondary worker earning functions. It is also reported, as identified in a previous study(13), that white women in the primary segment exhibit similar rewards to human capital variables as white males in the secondary sector. These findings suggest segmentation may vary across both racial and sexual boundaries. Rumberger and Carnoy conclude "the differential treatment of the same worker characteristics within each segment implies that their basis may lie in the social class structure and the nature of incorporation of different groups into the labour force during capitalist expansion."(14)

#### Structural Labor Market Studies

Rumberger and Carnoy's conclusion is supported by writers taking a structuralist approach to empirically testing the duality of the labor market. Oster(15), using factor analysis across 83 3-digit industries, reports findings "consistent with the hypothesis of structural dualism." Among the more interesting conclusions drawn by Oster's study is the finding of increases in black employment being strongly linked to lower industry profit margins, and the industries which hire high proportions of females almost exclusively employ females of the lower skilled ranks.

Important sociological studies by Beck, Horan, and Tolbert(16) and Bibb and Form(17) take a structuralist approach by dividing the economy into "core" and "peripheral" industrial sectors. Core industries are

identified by having high levels of capital intensity, unionization, large assets, high profit margins, product diversification, and high levels of market concentration. Industries on the periphery are marked by small firm size, seasonal variation in demand, labor intense production techniques, weak unionization, and low levels of asset holdings. Using NORC survey data from 1975-1976 and covariance regression analysis, Beck, Horan, and Tolbert report statistically significant differences in labor force composition and economic status of workers between periphery and core industrial segments. Results further suggest that employees are rewarded differently between sectors and these differences are not explained by differences in labor force composition (race and sex) or individual worker characteristics (human capital endowments). The patterns of worker characteristics are hypothesized to be responses to the industrial sectoral structure and not the defining characteristics of each labor market segment.

In another significant empirical study of the dual labor market, Osterman(18) does not explicitly test the mobility issue but looks at earnings determination through internal markets within each labor market sector. Osterman divides the economy into segments based on his own perception of job requirements, work environment, existence of internal job hierarchies, and industrial sector of employment. Osterman employs a standard linear regression technique to predict earnings, and reports that "the human capital model holds up very well for upper tier workers but has little explanatory power for workers in the secondary labor market."(19) Racial discrimination in earnings is suggested to exist in secondary blue-collar occupations. Thus, Osterman concludes his findings support the dual labor market theory.



Mixon(20) has looked at the relationship between voluntary job mobility and the institutional arrangement of enforced minimum wages. Using time-series regression analysis, Mixon finds a negative relationship between minimum wages and worker quits. Thus, as minimum wages rise, worker quits are expected to fall. The results also suggest a depressing effect on mobility due to increases in the level of minimum wages over time. This finding would be anticipated in the context of search theory as increases in the minimum wage alter the reservation wage of workers considering a job move. It is important due to the fact that many jobs conventionally considered secondary sector employment are not covered by minimum wage legislation.

An important paper by Okun(21) contributes to the understanding of job mobility over the business cycle. He notes that industries most sensitive to movements in the business cycle tend to pay high wages and employ, primarily, white males over 25 years of age. Okun hypothesizes that when aggregate output and employment expand, workers are recruited from other industries and demographic groups. Thus, in a "high pressure" economy (cyclical upswings approaching full employment) upward mobility opportunities benefit disproportionately the young, blacks, and females. In a "low pressure" economy (marked by falling output and employment) these same groups will bear the heaviest income losses as upgrading opportunities disappear.

Using CWS data for the period 1964-1971, a period marked by expansion, Vroman(22) tests Okun's high pressure hypothesis by looking at inter-industry employment and relative average incomes of workers. Vroman discovers that the high pressure hypothesis has merit due to a number of findings. Over the sample period, cyclically sensitive

sectors (eg. durable manufacturing) of the economy experienced demographic shifts from prime age white male employees toward other kinds of workers. Black male income relative to white male income was found to be procyclical in nature suggesting upward income mobility patterns. Vroman also reports that while prime age white male workers experienced an essentially constant retention rate, in the aggregate the percentage of firm stayers dropped over the sample period implying economic minorities are more inter-firm mobile over the business cycle.

#### Eclectic Mobility Investigations

In recent years, empirical studies of labor market behavior have broadened their scope of investigation, and theoretical ties, in order to more accurately portray observed phenomena. A few studies of occupational mobility have taken an eclectic approach and cannot be easily cataloged. Still other studies have explicitly tested the relevance of neoclassical and segmented labor market hypothesis constructs in the context of analyzing occupational mobility.

Some of the most comprehensive empirical research into the job mobility process has been performed by Leigh.<sup>(23)</sup> Using census data for the period 1965-1970, and an NLS sample for 1966-1969, Leigh employs a recursive regression model to examine the effect of individual characteristics and structural variables on male occupational upgrading. While addressing human capital and SLM hypothesis issues, Leigh's attention is focused on questions of racial equity. A variety of important empirical results are worth discussing.

As expected, substantial differences in black-white educational

endowments are found across all age categories. A positive highly significant relationship between length of schooling and occupational advancement is reported for both white and black workers. However, whites are shown to experience larger returns to increments in education than blacks. Leigh's results indicate blacks are not confined to jobs where education is irrelevant to worker upgrading, but rather are hampered by relatively low levels of formal schooling even though once obtained, whites receive higher income returns.

Leigh's estimates indicate that formal vocational training often results in greater advancement probabilities for blacks than for whites. This may be due to the greater access whites have to informal OJT, forcing blacks to acquire training outside of the firm. This effect of vocational training on mobility is supported by the previously mentioned study by Rumberger and Carnoy(24) and by cross-sectional studies of occupational earnings by Flanagan(25) and Freeman.(26)

Regression results for industrial and regional variables yield an indication of insignificant barriers to mobility. This is in opposition to what is indicated by the structuralist literature but is analogous to results by Andrisani(27) and Oster.(28) This evidence indicates that human capital and personal endowments play a far more important role in the determination of occupational upgrading than do structural and institutional factors proxied by industrial and regional variables. However, it should be pointed out that the broad industrial and regional categories used by Leigh may not be valid proxies for the different labor market conditions and arrangements found across occupational categories and geographic regions of employment.

Leigh also tests for racial differences in inter-firm mobility and intra-firm upgrading. Using inter-industry moves as a proxy for inter-firm mobility, "very similar" proportions of blacks and whites experience such moves and "the impact on occupational advancement of an industry shift for a black man is roughly as large as the impact for a white across most of the industry categories considered." (29) These findings suggest that blacks can gain access to internal labor markets, as measured by initial upgrading due to an external move, in the same manner as whites holding all other variables constant. This is certainly not in agreement with standard SLM contentions.

Results for firm stayers are reported by Leigh to be mixed. Occupational advancement by intra-firm moves tend to favor whites for the youngest and oldest cohorts considered. However, the prime age sample regressions suggest that black industry stayers (proxy for inter-firm movers) enjoyed occupational advancement approximately equal to that of comparable whites. Again, these results are not consistent with the SLM hypothesis of minorities being blocked from internal job ladders and income upgrading.

A recent study by Dauffenbach (30) has further contributed to the understanding of occupational mobility patterns. Hypothesizing that the existence of internal labor markets hinders the ability of blue-collar workers to readily change occupations (due to the high cost of forfeiting their investment in the formal lines of progression), Dauffenbach builds an "enhanced neoclassical" gravity model (synthesizing neoclassical and SLM variables into one model) to explain mobility flows into occupations. Ordinary least squares and maximum likelihood estimation techniques are applied by Dauffenbach to a census

sample of male blue-collar workers during the 1965-1970 period. The neoclassical base variables are discovered to add greater explanatory power to the models than the "specific attribute" internal labor market variables. Even though it is suggested that the results lean toward the neoclassical explanation of mobility patterns, internal labor market activities appear to have substantial bearing on blue-collar mobility flows between occupations.

In a second study, Dauffenbach(31) expands the empirical analysis of job mobility by investigating the form of mobility and the change in earnings experienced by workers. Using a jointly dependent qualitative variables approach, internal mobility choice (as proxied by occupational-only changes) and external mobility choice (as proxied by industry-occupation changes) relative to industry-only mobility, are analyzed with regard to the simultaneously determined change in earnings. Dauffenbach's model controls for age, education, vocational training, and previous earnings level. Estimates are constructed for white and black males. As expected, vocational training is found to increase the probability of internal mobility and the probability of external mobility decreases with age. Blacks are found to have about a 10 percent greater chance of experiencing negative changes in earnings due to external moves. This is particularly important due to the finding that blacks are more likely to be external movers when mobility occurs. For internal movers; education appears to be the most important determinant for blacks, while vocational training dominates for whites. As anticipated, high initial earnings status reduces the probability of achieving large income changes due to mobility and Dauffenbach's results show that high initial earnings greatly reduce

the probability of blacks to make external job moves. This avoidance seems logical due to the apparent high risks that blacks face in the external labor market. Dauffenbach's results appear to question the belief that racial discrimination within firms poses a greater problem for blacks than does discrimination affecting access to occupations and jobs.

### The Occupational Mobility of Female Workers

The empirical studies discussed thus far have focused primarily on male job mobility. Therefore, questions of labor market discrimination in the mobility process have been handled in terms of racial differences between male workers. The mobility patterns of female workers is a largely untouched topic in the economic literature. This may be due, in part, to limited data resources. However, discrimination against women in the labor market has been an enormously popular topic of empirical research. Several studies drawn from the female discrimination literature directly relate to female job mobility issues.(32)

Using correlation procedures on data from an NLS sample collected for 1967, Treiman and Terrell(33) analyze the effect of educational attainment, occupational attainment of parents, number of children, length of time worked per year, and years of labor market experience upon the occupational status achieved by females. Their results indicate that both educational and occupational attainments of men and women are "highly similar" in nature. Occupational status is found to be largely dependent upon education attainment relative to social

origins. However, income for women is much lower than for men with comparable characteristics. In fact, women in the 30-44 year old cohort sample are shown to earn about half as much as their husbands, with less than half of the divergence attributable to differences in experience and educational attainment. Single women, as expected, are found to earn much more than married women but still substantially less than comparable males.

Treiman and Terrell also report that black women tend to work more hours and for a longer period of their adult lives than white females. Black females thus accumulate human capital faster through their more intense labor market experience. Occupational status patterns for black women are found to be more like black men than white female patterns are like white male patterns. Still black females are "paid much less than black men even when they are as well educated, perform comparable work, have as much experience, and work as many hours."(34)

It has long been recognized that females tend to be segregated into certain occupations. Low level white-collar jobs such as secretarial occupations, many blue-collar occupations such as those found in the garment industry and other light assembly occupations, and even low level professional occupations like nursing have been traditionally labeled as "female" jobs.

Empirical studies by Boskin(35) and by Schmidt and Strauss(36) have developed models to predict the likelihood of an individual making a particular occupational choice. Schmidt and Strauss use multiple logit analysis to predict the probability that an individual is employed in one of five broad occupational categories based on his or her sex, race, educational attainment, and labor market experience.

Assuming tastes and preferences are constant across the entire population, their results suggest racial and sex discrimination exists in the attainment of occupations.

Noting that discrimination can occur in occupational access and in earnings received, Brown, Moon, and Zoloth(37) have developed a technique to isolate and estimate the individual effect of both of these two types of discrimination. Their model incorporates the estimation of occupational attainment probabilities for men using multinomial logit and discriminant analysis based on individual characteristics and endowments. The estimates are then applied to a sample of women to simulate female occupational attainment as if they were treated as men. When this is accomplished, larger portions of women are reclassified into administrative jobs and skilled crafts. Even after adjusting for taste differences between men and women, Brown, Moon, and Zoloth find substantial differences between hypothesized and actual occupational distributions and conclude a significant portion of occupational segmentation of females can be attributed to discrimination.

In a related article, Brown, Moon and Zoloth(38) use the same technique to construct female occupation distributions and then estimate wages as a function of productivity for both sexes. The observed overall wage differential between males and females is thus decomposed into explained and unexplained portions due to occupational and productivity differences. It is reported "that only 14 to 17 percent of the total differential is attributable to differences in endowments."(39) Brown, Moon, and Zoloth thus conclude most wage discrimination occurs within rather than between occupations.



One would hypothesize that discrimination against females with regard to occupational access would be evident in the job mobility distributions of women. Barriers to mobility should help explain the occupational attainment and segregation of female workers, as well as the associated male-female differentials in wages. This aspect of job mobility has often been overlooked in the empirical economic literature.

One empirical study by Lyon and Rector-Owen(40) does directly address the issue of labor market mobility of females. Lyon and Rector-Owen regress an index of parental economic status, personal education, IQ, family status (married and/or children), work experience, and class of work (private vs. public employment) on a dependent variable representing attained occupational prestige and on hourly income. Data are obtained through an NLS sample for 1968 through 1971. Their results show a labor market bias toward white females with education. "Each year of education secured by white (female) workers returns an increase of approximately 15 cents per hour, while each year of education returns only 7 cents or less in increased wages for blacks."(41)

To estimate for possible discrimination, Lyon and Rector-Owen substitute white female means into the estimated black female occupational attainment equations. The results indicate individual endowments account for the greatest differences in labor market rewards between black and white women. It is interesting to note their "technique estimates a decrease in black pay if there is no racial bias in the labor market, but if black and white females have similar individual characteristics, a 20 to 30 percent increase (in hourly

income) is indicated."(42) This tends to suggest black women may be favored as employees by firms even though they possess lower levels of education, IQ, and formal training. This may be due to their work habits closely resembling more stable male patterns or the impact of the employment provision of the Civil Rights Act.(43)

Lyon and Rector-Owen also note that in comparison to male discrimination studies, black females experience less discrimination in occupational attainment than comparable black males and cite Epstein's(44) "positive effects of the double-negative" hypothesis to justify this finding. Epstein proposes black professional females have an advantage over white females for a variety of reasons. These reasons include, 1.) that due to their double minority status, a new unique status is created causing a better bargaining position, 2.) the proposition that black women are the furthest from the normal occupational opportunity structure thereby strengthening their motivation and ambition, and, 3.) black women may have an advantage because of their double minority status in light of institutionalized equal employment opportunity and affirmative action goals. Lyon and Rector-Owens's findings support this theory across a broad spectrum of occupations.

#### Summary

This chapter has explored the empirical literature relevant to the job mobility process. As has been seen, writers have used mobility models to test the segmented labor market hypothesis and its related questions of labor market discrimination. Most studies have focused on male mobility behavior and racial differentials in income and

occupational attainment. Female mobility and sex discrimination questions have not been as thoroughly researched. Occupational mobility has been found to be an important determinant of worker upgrading and success, and possible discrimination in the mobility process has been suggested to occur across both race and sex. However, as has been noted throughout this chapter, the empirical results are not fully consistent across all studies. Given the dynamics of the labor market, many questions remain to be explored.

## ENDNOTES

- (1) See Leigh, p. 18 for a discussion of early empirical investigations of occupational mobility.
- (2) National Opinion Research Center, Final Report of a Special Survey, (Denver, CO, 1947).
- (3) G. Lenski, "Trends in Inter-Generational Occupational Mobility in the United States," American Sociological Review, XXIII (1958) pp. 514-523.
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- (6) E. Steinberg, "Upward Mobility in the Internal Labor Market," Industrial Relations, XIV (1975) pp. 259-265.
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- (8) Steinberg, p. 264.
- (9) P. Andrisani, An Empirical Analysis of the Dual Labor Market Hypothesis (Columbus, OH, 1973).
- (10) B. Schiller, "Relative Earnings Mobility in the United States," American Economic Review, LXVII (1977) pp. 926-941.
- (11) R. Rumberger and Carnoy, "Segmentation in the U.S. Labour Market: Its Effects on the Mobility and Earnings of Whites and Blacks," Cambridge Journal of Economics, IV (1980) pp. 117-132.
- (12) Ibid., p. 128.
- (13) Rumberger and Carnoy, p. 130.
- (14) Rumberger and Carnoy, p. 130.
- (15) G. Oster, "A Factor Analytic Test of the Theory of the Dual Economy," Review of Economics and Statistics, LXI (1979) pp. 33-39.
- (16) E. Beck, P. Horan, and C. Tolbert, "Stratification in a Dual Economy: A Sectoral Model of Earnings Determination," American Sociological Review, XLIII (1978) pp. 704-720.

(17) R. Bibb and W. Form, "The Effect of Industrial, Occupational, and Sex Stratification on Wages in Blue-Collar Markets," Social Forces, LV (1977) pp. 76-91.

(18) P. Osterman, "An Empirical Study of Labor Market Segmentation," Industrial and Labor Relations Review, XXVIII (1975) pp. 508-523.

(19) Ibid., p. 520.

(20) J. Mixon, "The Minimum Wage and Voluntary Labor Mobility," Industrial and Labor Relations Review, XXXII (1978) pp. 67-73.

(21) A. Okun, "Upward Mobility in a High-Pressure Economy," Brookings Papers on Economic Activity, I (1973) pp. 207-252.

(22) W. Vroman, "Worker Upgrading and the Business Cycle," Brookings Papers on Economic Activity, I (1977) pp. 229-250.

(23) Refer to Leigh.

(24) See Rumberger and Carnoy.

(25) R. Flanagan, Labor Force Experience, Job Turnover, and Racial Wage Differentials," Review of Economics and Statistics, LVI (1974) pp. 521-529.

(26) R. Freeman, "Occupational Training in Proprietary Schools and Technical Institutes," Review of Economics and Statistics, LVI (1974) pp. 310-318.

(27) See Andrisani.

(28) See Oster.

(29) Leigh, p. 154.

(30) Dauffenbach, (1982).

(31) R. Dauffenbach, "Job Mobility Form and Change in Earnings Status: Comparisons of Black and White Males," Faculty Working Paper, College of Business Administration, Oklahoma State University, (Stillwater, OK, 1981).

(32) H. Kahne, "Economic Perspectives on the Roles of Women in the American Economy," Journal of Economic Literature, XIII (1975) pp. 1249-1292.

(33) D. Treiman and K. Terrell, "Sex and the Process of Status Attainment: A Comparison of Working Women and Men," American Sociological Review, XL (1975) pp. 174-200.

(34) Ibid., p. 198.

- (35) M. Boskin, "A Conditional Logit Model of Occupational Choice," Journal of Political Economy, LXXXII (1974) pp. 389-398.
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- (37) R. Brown, M. Moon, and B. Zoloth, "Occupational Attainment and Segregation by Sex," Industrial and Labor Relations Review, IV (1980a) pp. 506-517.
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- (40) L. Lyon and H. Rector-Owen, "Labor Market Mobility Among Young Black and White Women: Longitudinal Models of Occupational Prestige and Income," Social Science Quarterly, LXII (1981) pp. 64-78.
- (41) Ibid., p. 70.
- (42) Lyon and Rector-Owen, p. 70.
- (43) P. Grimes, C. Register, and L. Stevans, "Civil Rights Legislation and Racial Employment Differentials," The Review of Black Political Economy, XIII (Forthcoming).
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## CHAPTER IV

### A MODEL OF OCCUPATIONAL MOBILITY

#### Introduction

As is evident from the previous discussion, the determinants of occupational mobility have been discussed and investigated in a variety of contexts, yet the results in many cases are less than clear cut and policy implications remain elusive. This chapter will focus on identifying specific criticisms of past mobility research and present an econometric model that attempts to overcome the major criticisms discussed. The first section of this chapter analyzes and evaluates the criticisms of previous empirical studies, while the second section develops the econometric model and techniques employed in the current study. Lastly, the empirical measures of occupational standing and the variables and characteristics of the database used in the present investigation are discussed.

#### Criticism of Previous Research

Several criticisms of previous empirical mobility studies may be put forth. These criticisms concern both the choice in samples analyzed as well as the analytic techniques employed. It must be noted that the limitations of available data on occupational movers have constrained the ability of many researchers to address all the

important issues involved in the mobility process.

One outstanding constraint found in most previous occupational mobility studies is the limitation of analysis to single time intervals. In fact, the majority of empirical mobility investigations have utilized data from the same time frame; the mid 1960's to early 1970's. This is due, in part, to the abundance of labor force data available from a variety of sources for this period. This time interval represents a period of relative economic prosperity in the United States. Economic activity and output, as measured by the growth in real Gross National Product (GNP), increased substantially over these sample years. Total unemployment during the 1965-1970 period ranged from a low of 3.6% to a high of 4.9%, while the annual change in the Consumer Price Index (CPI) averaged a modest 3.8%.<sup>(1)</sup> Thus, much of the empirical literature has analyzed the mobility process only during "high pressure" economic conditions. It is generally recognized that the labor market is responsive to cyclical changes, yet previous mobility studies have tended to look at the phenomena only during times of peak economic conditions.

Economic reasoning suggests that the movement of workers between jobs and occupations is responsive to changes in the macroeconomic environment.<sup>(2)</sup> An economy experiencing stable growth over time will enhance the ability of workers to achieve occupational upgrading as employers create new jobs and expand their workforce. Thus, the magnitude and degree of success should be positively related to economic expansion. On the other hand, a recessionary economy will decrease the likelihood of occupational upgrading as jobs are eliminated and the labor force shrinks in size. In fact, it can be



hypothesized that the level of downgrading in occupational attainment should increase during recessions due to "job bumping" and other institutionalized seniority rights. It is evident that a robust framework of analysis regarding the occupational mobility process would be enhanced by observing mobility over periods representing varying degrees of general economic health.

Also, given that most of the previous studies of occupational mobility utilize the 1965-1970 time frame, their results concerning racial discrimination in the mobility process should be cautiously interpreted because of the data's close proximity to the passage of the Civil Rights Act of 1964. This legislation formally declared that racial and sex discrimination in the labor market was illegal. In addition to forbidding discrimination in compensation, the law also prohibited job and occupational segregation on the basis of race and sex. Even though the law protected minorities from discriminating firms, enforcement of the Civil Rights Act was dependent upon civil action by the individual until 1972. In that year, the Equal Employment Opportunity Commission (EEOC) was granted the power to pursue employers accused of discrimination through the judicial system and enforce remedies and punishments in cases where discrimination was found to exist. Thus, the "muscle" of anti-discrimination law did not form until the early 1970's. One would expect this new institutional arrangement to affect the labor market behavior, and therefore occupational mobility, of economic minorities. To understand the effects of discrimination upon mobility in today's economy, an empirical analysis of occupational mobility should utilize a sample post-dating the change in institutional structure created by the Civil

Rights Act.

Another important aspect of the occupational mobility process recognized by only a few researchers is the alternative labor market functions served by the various forms that occupational mobility may take. Occupational mobility may be classified as having two general forms; internal or external occupational moves by individual workers. As evidenced by previous discussion, internal moves occur within a business firm and are most often characterized by workers moving up the hierarchy of jobs through promotion and occupational advancement (internal downgrading in occupational attainment is also certainly possible as might be observed in industries undergoing structural change, or as discussed previously, during periods of falling aggregate demand). External moves occur when workers change employers and may occur with or without simultaneous occupational change. Workers who change both occupation and employer may be responding to changes in the composition of aggregate demand for labor, or seeking access to greater promotional opportunity in occupations and firms which they perceive to have more "open" job ladders. Workers who engage in external occupational moves must discount firm specific training and sacrifice seniority rights and benefits earned with their initial employer when mobility occurs. Thus, owing to this cost associated with external occupational mobility, one may hypothesize that as a group external movers experience a lesser degree of occupational upgrading when mobile than internal movers.

A few recent studies, such as the those by Dauffenbach(3), have successfully accounted for mobility form in modeling occupational mobility behavior by recognizing different functions served by mobility

form choices. However, the distinction between mobility forms has often been overlooked in studies taking an orthodox human capital approach. Many segmented labor market theorists have also neglected the distinction between internal and external occupational mobility. For example, empirical analyses testing mobility between secondary and primary labor markets have not made allowances for examining what forms of mobility predominate inter-segment moves. Since individual firms may possess both secondary and primary occupations, occupational upgrading between labor market sectors may be accomplished through internal moves or may require a change in employing firms by workers. Clearly then, the distinction between mobility forms should not be overlooked when analyzing the behavior of occupational movers.

As a final criticism of previous research efforts in the area of occupational mobility, one may cite the lack of attention paid to the occupational mobility behavior of female workers. This apparent neglect could be easily passed over if not for the significant role female employment plays in the modern economy. During the last decade and a half, females have represented the largest growing demographic labor market group in the United States. "The proportion of women working or actively seeking work increased from 41.6 percent in 1968 to 50.1 percent in 1978. In contrast, the participation rate for men declined from 81.2 percent to 78.4 percent."<sup>(4)</sup> The employment gains for women in recent years have occurred mostly in the expanding service sector and industries with traditionally low wages. However, significant inroads by women have been made in a few non-traditional fields like transportation, engineering, and architecture.<sup>(5)</sup> An important aspect of the present study is to analyze the mobility of

females and to determine if females receive the same rewards to occupational mobility as their male counterparts.

The model of occupational mobility constructed in the following pages will attempt to take the criticisms of previous research efforts discussed in this section into account and provide a rigorous means to analyze the occupational mobility process.

### An Empirical Model of Occupational Mobility

#### Introduction

Based on the preceding discussion and analysis, occupational mobility may be described by the following function:

$$O_i = f(W, X, Y, Z)$$

Where  $O_i$  is the level of occupational standing achieved by mobile worker  $i$ .  $W$  is the form of mobility (external or internal).  $X$  is a vector of personal characteristics and endowments assumed to affect the chances of occupational upgrading through mobility. These personal variables are race, sex, age, education, labor market experience, and marital status of the mobile worker.  $Y$  is a vector of the structural variables: initial occupation, form of occupational change, industrial sector, and geographic region of employment, also assumed to affect the likelihood of mobility success.  $Z$  represents the exogenous macroeconomic conditions present at the time of occupational change.

A functional form such as above encompasses the important theoretical variables found in human capital and segmented labor market models of occupational mobility. Both neoclassical and SLM theorists

postulate that worker upgrading through occupational mobility is positively related to human capital acquisition and suggest that the frequency of successful mobility declines with the advancement of age. As previously discussed, neoclassical human capital theory does not account for differences in occupational success due to race and sex endowments. However, SLM economists place great emphasis on race and sex variables and postulate that, due to institutional and sociological factors segregating blacks and women into secondary labor market jobs, economic minorities experience a greater frequency of external mobility with a lower probability of occupational upgrading.

Human capital economists have recognized the possibility that internal occupational hierarchies may vary between employing firms but offer no comprehensive theory to predict under what circumstances occupational hierarchies will form. As noted earlier, structural SLM theorists hypothesize occupational mobility to be a function of the industrial organization of the economy. Industries that hire workers in primary sector occupations enhance job and occupational upgrading while labor-intensive industries in the secondary sector promote job and occupational instability. Institutional arrangements within different industries are also seen as influencing the occupational mobility process. For example, formalized seniority rights may discourage external moves, and, strong occupational identification to union representation (such as that found in many craft and blue-collar occupations) may inhibit occupational change. Further, given that the industrial composition of the economy (and institutional arrangements within industrial sectors) vary across geographic regions, occupational mobility may also be viewed as a function of the regional distribution

of workers.

Finally, any given occupational move is also dependent upon the initial occupation from which the individual worker is moving. The number of occupations that represent upgrading decline the higher a worker moves along a job hierarchy. Thus, the probability of successful occupational advancement declines (and the probability of downgrading increases) with the experience of relatively high occupational attainment. Just the opposite is the case for workers starting near the bottom of the occupational ladder. The existence of large numbers of positions representing higher levels of success increases the opportunity and likelihood of upgrading through occupational mobility. The initial occupational position's effect on worker mobility has been referred to as the "regression-toward-the-mean" effect by writer's such as Leigh.(6)

Taking the issues discussed thus far into consideration, an empirical analysis of occupational mobility may be formalized.

### Model Specification

In order to empirically answer the questions presented in Chapter I, the functional relationship presented above may be written as a single equation second-order multiple linear regression model(7) that can be applied to a variety of race-sex cohort samples:

$$OCC = a + b_1(FORM) + b_2(INITOCC) + b_3(PIND) + b_4(CIND) + b_5(REG) + b_6(ED) + b_7(EXP) + b_8(EXP^2) + b_9(MARSTAT) + e$$

Where:

OCC = degree of change in occupational standing achieved through mobility

FORM = form of occupational change (external or internal)  
INITOCC = initial level of occupational attainment  
PIND = previous industrial sector of employment (pre-mobility)  
CIND = current industrial sector of employment (post-mobility)  
REG = geographic region of employment  
ED = level of education attained  
EXP = years of general labor market experience  
EXP2 = years of general labor market experience squared  
MARSTAT = marital status of occupationally mobile worker  
e = disturbance term due to unobservable random variables

Written in this form, the regression equation reproduces the main determinants of the response under study. Thus, the model captures the functional relationship between occupational upgrading through mobility and the structural and personal characteristics experienced by mobile workers. As such, the model allows the examination of various hypotheses regarding the determinants of occupational mobility (these are discussed in detail in the next section). Estimation of the regression facilitates the analysis of the individual effects of the explanatory variables, which act together to influence the occupational mobility process. The effect of a change in any one explanatory variable on the degree of change in occupational attainment is summarized quantitatively by the estimated regression coefficients.

The model is estimated under the classical assumption that the disturbances are independently and identically distributed with a zero mean. It is well known that under these assumptions, the ordinary least squares estimators are unbiased, consistent, and exhibit a minimum variance. If, in addition, the disturbances are assumed to be

normally distributed, the ordinary least squares estimates will be efficient and the standard hypothesis test procedures will be valid.(8) Regardless of whether the disturbances are normally distributed, the sample sizes employed here suggest that, by the Central Limit Theorem, the ordinary least squares estimators will be distributed approximately normal (assuming the disturbances have zero variance).(9)

Complete interaction of age, race, and sex is allowed by estimating the model for the various cohort groups for each sample year. The hypothesis that the coefficients are equal across cohorts may be tested using a procedure developed by Chow.(10) This statistical test requires that the model be estimated separately for each cohort and the residual sum of squares calculated for each case.

The test of equality of coefficients across two cohorts is performed by comparing the sum of their respective residual sum of squares (the unconstrained sum of squares, ESSur) with the residual sum of squares from a regression in which the coefficients are constrained to be equal (ESSr). Denoting the sample sizes as N and M respectively, and assuming the model contains k exogenous variables (including the constant), the appropriate test statistic is:

$$F = [(ESSr - ESSur)/k] / [ESSur/(N + M - 2k)]$$

The restrictions will not reduce the explanatory power of the model if the null hypothesis is correct. The null hypothesis is rejected if F exceeds the critical value of the F distribution with k and N + M - 2k degrees of freedom. Rejection of the null hypothesis implies that the models differ across cohorts and thus the data should not be pooled.(11).

This statistical procedure will be used to test for significant



changes within like race-sex cohort samples between cross-sections in time due to changing macroeconomic conditions.

### Testable Hypotheses and

### Expected Relationships

Based on the previous discussion, several hypotheses regarding the determinants of occupational mobility may be tested with the above regression model and statistical tools.

A priori, it is expected that the FORM variable will predict a higher return for internal occupational movers. Economic reasoning suggests that a higher opportunity cost is involved in external moves (loss of seniority rights and acquired specific on-the-job-training, for example). Also, external movers may be seeking future advancement opportunities by changing employers and are willing to accept a lateral occupational move in anticipation of later promotion. Internal movers may be viewed as those progressing along the internal labor market hierarchies of jobs and occupations as predicted by segmented labor market theory. SLM theory also predicts that significant differences exist in the incidence and success of internal occupational movers based on race and sex. Thus, the expectation that internal occupational movers experience greater returns to mobility than external movers and that the returns will vary across race and sex boundaries, is the first testable hypothesis.

The INITOCC variable is included in the estimated equation to capture the regression-toward-the-mean effect of occupational standing. As such, it is expected to be significant and negative. This implies that individuals at higher positions of occupational

attainment will tend to experience lesser degrees of advancement than individuals of lower occupational attainment when mobile. Differences in the level of INITOCC across race-sex cohorts may be interpreted as measuring the "openness" of the occupational hierarchy (or upgrading opportunity available) to different labor market groups. SLM economists suggest that the opportunity for occupational upgrading is greater for white majority workers than for economic minorities. By analyzing the INITOCC coefficients for the various race-sex cohorts, the hypothesis that the availability of occupational upgrading varies by race and sex endowments, can be tested.

The variables PIND, CIND, and REG are assumed to capture the effects of varying institutional and structural arrangements across industrial sectors and regions. These variables are assumed to proxy differences in the organizational structure and institutional arrangements found in the different industries and regions of the nation.

Previous empirical models of occupational mobility have discovered that industrial variables often yield insignificant effects on the upgrading process. Most previous mobility models have only examined the impact of the initial industry of employment upon the progression of workers along occupational hierarchies. However, since occupationally mobile individuals may also be industry changers, models that do not account for the structural and institutional arrangements that promote or inhibit entry into an industry may be misspecified. If such a misspecification exists, one would expect poor and insignificant results for industrial variables such as those reported by earlier investigators.

The initial industrial sector of employment (PIND) is therefore included in the model to reflect the structural factors inherent within an individual's industry of employment that stimulate or hinder the decision to make an occupational change. The current industry (CIND) is included to reflect other structural factors that may attract or discourage occupational movers from entering a particular industrial sector of employment. Thus, the model controls for both "push" and "pull" structural variables that may impinge on the consequences of an occupational change. While push and pull factors may generally operate in the same direction for workers changing occupations within an industry, it is not unreasonable to assume that opposing forces may be found within industrial sectors that impinge on the outcome experienced by industry constant occupationally mobile workers. With regard to workers simultaneously changing occupation and industry, the net effect of the pre- and post-mobility industry of employment can be easily calculated for each possible combination of industrial changes by summing the relevant estimated coefficients of the CIND and PIND variables.

It is expected that differences do exist in the impact of industries and regions of employment with regard to the occupational upgrading process. It is hypothesized that the inclusion of both pre- and post-industry of employment will result in structural estimates that are not biased due to a misspecification of the industrial variables. Further, if institutional and structural arrangements vary according to race and/or sex in the different industrial categories and geographic regions of the country, then these practices will also be reflected in the estimated coefficients of the model.

Both SLM and human capital models predict the ED variable to positively affect the success of occupational movers. Greater levels of educational attainment are expected to enhance occupational achievement. Previous empirical studies suggest that the marginal returns to education will eventually begin to fall as more and more education is acquired,(12) therefore, the marginal returns to occupational mobility attributable to education are expected to decline at the upper levels of education. The importance of education to the various race-sex cohorts in the occupational upgrading process can be scrutinized by analyzing the coefficients of ED in each of the samples that are estimated. The model therefore allows for a test of the hypothesis that education enhances the chances for occupational upgrading through mobility and that the marginal returns to education decline at the upper limits of the education distribution.

The experience variable is entered into the model in a quadratic form(13) due to the a priori expectation that the importance of general labor market experience upon occupational upgrading can be represented by a second-degree function. This is apparent due to the observed correlation between experience and age. As a general measure of acquired human capital, labor market experience is expected to positively influence occupational upgrading for young workers, reach a peak, and then decline in importance for older workers. Work experience for relatively young workers is a valuable human capital asset sought by potential employers, and therefore, is expected to significantly enhance the occupational upgrading potential of the young. Older workers are more homogeneous with regard to years of general work experience. Thus, the importance of general work

experience declines as workers become older and, because employers are less likely to retrain or offer on-the-job-training to older workers, specific training becomes more relevant in the hiring decision. The pattern of significance of acquired labor market experience to the various occupationally mobile cohort samples can be analyzed with the estimated regression.

Marital status (MARSTAT) is assumed to be of importance to the mobility process due to the expected premium that employers tend to place on married workers. It is a long held contention that employers prefer married workers because of a perceived "stability" not demonstrated by unmarried individuals.(14) This expectation may not hold true for the younger female samples, as married females, in the aggregate, exhibit a weak attachment to the labor force due to child bearing activities. As a result, females accumulate less human capital in the form of on-the-job-training and experience. Thus, while marriage may enhance the occupational upgrading process for males, it may hinder it for females. The empirical estimation of the above model will also serve as a test for this hypothesis.

## The Database

### An Overview

Based upon the model presented in the last section, the current analysis of occupational mobility will cover more than one recent time frame and reflect the alternative forms of occupational changes experienced by different racial and sex cohorts. In order to test for the significance of the various determinants of occupational mobility

as postulated by human capital and SLM theorists, the data must include information concerning the characteristics and endowments of individual workers (i.e. race, age, sex, education, work experience, etc.) and structural variables (i.e. region, industry, etc.) that are hypothesized to affect the mobility process. The database created by the three supplemental mobility surveys conducted jointly with the Current Population Survey (CPS) over the past decade meets the above criteria. Therefore, the CPS mobility files are used in the current research effort.

The CPS mobility files cover workers who changed occupation during a one year interval. The samples collected during each year are large enough to provide an adequate analysis broken down by race and sex for each year. Also, the CPS data files are reported in such a manner that internal and external occupational moves can be readily identified.

The three cross-sections in time that are represented in the data are 1972, 1977, and 1980. These years covered by the CPS data files are in contrast to the years utilized by previous occupational mobility studies in which "high pressure" economic conditions were experienced. The 1970's and early 1980's are considered by many to be years of economic structural change. The general health of the economy varied over each sample year as marked by different rates of growth in real GNP and other common economic performance indicators. During 1972, the first year reported by the CPS mobility files, the rate of inflation (as measured by the CPI) rose by 3.3% and overall unemployment stood at 5.6%. This is vastly opposed to a 13.5% increase in consumer prices and an annual unemployment rate of 7.1% experienced in 1980, the last sample year of the CPS mobility data. These years, therefore,

represent periods of varying macroeconomic health in the United States and present an opportunity to investigate occupational mobility at three distinct cross-sections in time.

### Measuring the Return to

### Occupational Mobility

A major goal of the current investigation is to analyze the labor market success of occupationally mobile workers. Thus the data must reflect the changes in the economic position of individual workers when mobility occurs. Two alternative measures of occupational standing are used to calculate the economic effect on occupational movers. The CPS mobility files do not report actual changes in income, therefore, the first ranking scheme utilizes predicted earnings to order occupations. Predicted earnings are calculated as the mean income earned in 1969 by workers in each occupation.(15) The second measure of occupational standing is the Duncan socio-economic status index.(16) The Duncan index is an ordinal scale that assigns a prestige score (between 0 and 100) to occupational titles. The degree of mobility success can be calculated by determining the change in occupational standing (as measured by the change in mean earnings and the change in socio-economic status) that is experienced as a consequence of mobility.

Both the predicted income and the Duncan index measures of occupational standing have been widely used and accepted in the mobility literature.(17) The Duncan scale is based on extensive research examining the popular perception of status achievement due to occupational attainment. The normal educational and vocational

requirements, as well as the income earned by individuals, across each occupation is explicitly accounted for in the Duncan ranking scheme. Because of this, several researchers have criticized the use of the Duncan index citing possible bias against blue-collar occupations and other occupations that do not traditionally require advanced levels of education.(18) A few previous researchers have favored the use of income data only to reflect economic occupational success. However, income data alone do not accurately reflect the differences between occupations. Non-pecuniary aspects, such as work environment, prestige, intensity of labor, fringe benefits, etc. must be considered when comparing the rewards to occupational attainment. Duncan scores reflect these non-pecuniary rewards as well as implicitly considering the differences in earnings and income across occupations. Thus, the correct choice between the use of the Duncan index and an income index is not clear.

In order to examine the relationship between the Duncan index and occupational income, statistical tests of rank-order correlation were performed for the data used in the current study. Due to the nature of both the occupational income and Duncan variables, neither are continuous but rather represent levels of occupational attainment that can be interpreted as rankings of occupational order. By coding 1969 mean income (broken down by sex) and Duncan scores to the 429 three-digit census occupational titles, Spearman's Coefficient and Kendall's Tau(19) are calculated.

Spearman's rank-order coefficient is simply the product-moment correlation between two sets of variables when they are expressed as alternative ranks. The test is designed to express the degree of



TABLE I  
 RANK-ORDER CORRELATION TESTS FOR MEASURES  
 OF OCCUPATIONAL STANDING

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	Spearman's Coefficient	
	<u>Male Income</u>	<u>Female Income</u>
Duncan Index	.82122*	.67008

  

	Kendall's Tau	
	<u>Male Income</u>	<u>Female Income</u>
Duncan Index	.63160*	.49269*

---

\* significant at the .0001 level

correlation between sets of ranked observations. It is a nonparametric statistic that requires no restrictions on the population parameters and is entirely based on ranks.

Kendall's Tau is another widely used measure of the relationship between pairs of ranked variables, and is based on the extent of agreement between the relative ordering of observations ranked by the alternative measures. Tau is derived by counting the number of agreements and disagreements between ranked pairs of observations, finding the difference, and then dividing by the number of pairs. Therefore, when  $n$  is the number of ranked observations,

$$t = n(\text{agree}) - n(\text{disagree}) / [n(n-1)/2]$$

As can be seen in Table I, the Duncan index is positively correlated with both male and female income rankings under both alternative tests. In all instances the rank-order correlations are highly significant. The magnitudes of the coefficients are higher between the Duncan index and male income than between the Duncan index and female income. Given these findings the appropriate measure of occupational attainment is still not evident, therefore, both the income and Duncan rankings will be maintained and utilized.

Since the present investigation covers three periods in time, it might be argued the economic rankings of occupations may vary over time. After investigating this contention, Duncan concludes that shifts in the occupational structure of the economy over time may affect occupational status but finds a "high temporal stability" reflected by his ranking scheme.(20) Income data for the three-digit occupational titles reported in the CPS mobility files are not available for the years under consideration, forcing the use of

predicted earnings based on 1969 mean incomes. Therefore, stability in the occupational rankings based on income must also be assumed. This assumption appears to be reasonable and in line with the results of sociologists such as Hodge, Siegel, and Rossi.(21)

### Sample Selection and

### Empirical Variables

Individual observations from the CPS mobility files are included in the cross-section samples if they meet the following criteria:

1. Respondents must be 16 years old or older and employed full time at the beginning and end of the respective sample year.
2. Respondents must report their occupation, industry, length of employment, state of residence, race, sex, age, marital status, and educational attainment.
3. Respondents must exhibit a change in occupation (as measured by Census three-digit titles) between the beginning and end of the respective sample year.

In most cases the independent variables are entered into the model in the form of dummy categorical variables. The industrial sector variables (PIND and CIND) are so represented reflecting five broad industrial categories of employment.(22) Region of residence (REG) is categorized according to the following comprehensive census regional designations; Northeast, North Central, West, and South.(23)

Using the CPS mobility files, internal occupational mobility is identified when an occupationally mobile worker has been employed by the same employer more than one year. Thus, external movers are defined as changing occupations and employers during the respective

sample year. The variable representing the type of mobility (FORM) is entered into the model in the following categorical manner:

FORM = 1 if externally mobile, 0 if internally mobile

Educational attainment is measured by years of school completed and is broken down into the following mutually exclusive categories:

ED1 = 1 if 8 or less years completed, 0 otherwise

ED2 = 1 if 9 to 11 years completed, 0 otherwise

ED3 = 1 if 12 years completed, 0 otherwise

ED4 = 1 if 13 to 15 years completed, 0 otherwise

ED5 = 1 if 16 years completed, 0 otherwise

ED6 = 1 if 17 or more years completed, 0 otherwise

Thus, the returns to education experienced due to an occupational change can be approximated for cohorts with the following levels of formal education; only an elementary education, high school education not completed, high school education, college education not completed, college education, graduate education beyond four years of college.

Individual respondents are classified by marital status (MARSTAT) in the following manner:

MARSTAT = 1 if currently married, 0 otherwise

The continuous variable reflecting general labor market experience (EXP) is calculated for each observation from the original CPS database using a common technique(24). EXP is equal to the age of the individual minus the individual's years of education, minus five. If this procedure yielded a negative number, zero years of experience are recorded in the final data set.

In order to allow for the impact of race, sex and age on occupational mobility, the model is estimated by race-sex cohorts for

each of the following age categories:

Young Workers -- under 25 years of age

Early Prime Age Workers -- 25 through 40 years of age

Late Prime Age Workers -- 41 through 55 years of age

By estimating the model for the race-sex cohorts broken down by age, a greater degree of homogeneity within the samples is assured. Therefore, the potential for sample selection bias is minimized.

#### Summary

Three important aspects concerning the current investigation of occupational mobility have been discussed in this chapter. The first section outlined several criticisms of the previous empirical studies of mobility. A single equation regression model that takes these criticisms into account was formulated in the second section. Testable hypotheses and expected empirical results were also presented. The final section discussed measures of occupational standing and the construction of the empirical variables used in the estimation of the econometric model of occupational mobility.

## ENDNOTES

- (1) Refer to U.S. Department of Labor, Handbook of Labor Statistics, (1980).
- (2) See Okun.
- (3) See Dauffenbach (1982).
- (4) H. Davis, "Employment Gains of Women by Industry, 1968-1978," Monthly Labor Review, CIII(1980), pp. 3-10.
- (5) Ibid., p. 3.
- (6) See Leigh, p. 36.
- (7) N. Draper and H. Smith, Applied Regression Analysis (New York, NY, 1966), pp. 9-10.
- (8) Refer to G. Snedecor and W. Cochran, Statistical Methods (Ames, IA, 1980), pp. 334-364.
- (9) Refer to M. Intriligator, Econometric Models, Techniques, and Applications (Englewood Cliffs, NJ, 1978), pp. 80-119.
- (10) G. Chow, "Tests of Equality between Sets of Coefficients in Two Linear Regressions," Econometrica, XXVIII (1960), pp. 591-605.
- (11) See R. Pindyck and C. Rubinfeld, Econometric Models and Economic Forecasts (New York, NY, 1981), pp. 121-123.
- (12) Refer to R. Freeman, "The Decline in the Economic Rewards to College Education," Review of Economics and Statistics, LIX (1977), pp. 18-29.
- (13) See Draper, p. 9.
- (14) Refer to studies noted in Kahne, pp. 1249-1292.
- (15) U.S. Bureau of the Census, Census of Population: 1970, Subject Reports, Occupational Characteristics, PC(2) -7A (1973), pp. 368-395.
- (16) O. Duncan, "A Socioeconomic Index for All Occupations," Occupations and Social Status, ed. A. Reiss (Glencoe, IL, 1961), pp. 139-161.

(17) For examples refer to Leigh, p. 41.

(18) R. Hall and R. Kasten, "Occupational Mobility and the Distribution of Occupational Success Among Young Men," American Economic Review, LXVI (1976), pp. 309-315.

(19) R. Lindeman, P. Merenda, and R. Gold, Introduction to Bivariate and Multivariate Analysis (Glenview, IL, 1980), pp. 63-71.

(20) Duncan, pp. 152-153.

(21) R. Hodge, P. Siegel, and P. Rossi, "Occupational Prestige in the United States, 1925-1963," Structured Social Inequality, ed. C. Heller (New York, NY, 1969), pp. 192-204.

(22) The CIND and PIND variables reflect five industrial categories of employment derived from aggregating across the industrial definitions of the census three-digit industrial classification system.

IND1 - represents agriculture, forestry, fisheries, and mining.

IND2 - represents construction and manufacturing.

IND3 - represents wholesale and retail trade.

IND4 - represents finance, insurance, real estate, business, personal, and entertainment services.

IND5 - represents public utilities and public administration

(23) Region of employment is defined according to the following census definitions:

REG1 - Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Pennsylvania, Delaware, Maryland, West Virginia

REG2 - Ohio, Indiana, Illinois, Michigan, Wisconsin, Minnesota, Iowa, Missouri, North Dakota, South Dakota, Nebraska, Kansas

REG3 - District of Columbia, Virginia, North Carolina, South Carolina, Georgia, Florida, Kentucky, Tennessee, Alabama, Mississippi, Arkansas, Louisiana, Oklahoma, Texas

REG4 - Montana, Idaho, Wyoming, Colorado, New Mexico, Arizona, Utah, Nevada, Washington, Oregon, California, Alaska, Hawaii

(24) See Freeman, p. 21, and J. Mincer, Schooling Experience and Earnings (New York, NY, 1974).

## CHAPTER V

### EMPIRICAL RESULTS

#### Introduction

The regression model of occupational mobility as detailed in the preceding chapter attempts to account for the important determinants of the mobility process by taking an eclectic approach. As such, variables inherent to both human capital and segmented labor market theories are included in the regression equation. This chapter presents the descriptive statistics derived from the database and the empirical results obtained from estimation of the occupational mobility regression model. Also, this chapter further attempts to sort out the many relationships, as suggested by the results, between the factors under investigation.

The first section of this chapter explores the patterns of occupational mobility as reflected in the CPS database. Specifically, the frequency and magnitude of occupational upgrading as well as the form of mobility demonstrated by the cohort samples are discussed and analyzed. The second section presents the major results obtained from the estimation of the occupational mobility regression model. In order to analyze effectively the regressions, the results for the male samples are discussed first followed by the findings for females. The test results concerning variations over time in the mobility process



are discussed in the third section. A summary of the major findings and a comparison with the results of previous investigations is presented in the next, final, chapter.

### The Empirical Observation of Occupational Upgrading

Two measures of the change in occupational standing due to mobility (change in predicted income and socioeconomic status) are utilized as dependent variables in the regression model of occupational mobility. Before analyzing the relative impact of factors that determine the change in occupational position, it is important to first examine the patterns of the change in occupational standing observed when mobility occurs. The frequency of occupational upgrading(1) experienced by workers through the mobility process are presented in Table II broken down by age, race, and sex characteristics. (Due to the relatively small sample sizes of the late prime age black male and late prime age black female samples, descriptive statistics concerning these groups should be viewed with caution throughout this chapter.)

As is evident from Table II, occupational upgrading dominates lateral moves and occupational downgrading for most sample groups in each cross-section. For all cohorts the rate of income upgrading is greater than or equal to the rate of status upgrading, however, the high degree of correlation between the income and Duncan measures of occupational success is clearly seen by examining Table II. A careful review of the rates of occupational upgrading exhibited by the cross-sectional sample groups reveals several interesting trends.

First, it is obvious that blacks and females do not appear to

TABLE II  
 PERCENTAGE OF OCCUPATIONALLY MOBILE INDIVIDUALS  
 EXPERIENCING UPGRADING WHEN MOBILE

<u>Cohorts</u>	1972		1977		1980	
	<u>Income</u>	<u>Duncan</u>	<u>Income</u>	<u>Duncan</u>	<u>Income</u>	<u>Duncan</u>
White Males:						
Young	60.4	57.4	63.1	56.1	58.6	54.4
Early Prime	55.1	51.5	58.8	55.5	52.4	49.7
Late Prime	50.4	44.4	47.9	47.6	53.9	49.3
Black Males:						
Young	49.4	43.2	56.2	55.1	63.6	61.0
Early Prime	63.9	60.5	63.3	56.0	46.5	47.9
Late Prime	50.0	53.1	57.1	57.1	55.8	48.8
White Females:						
Young	63.9	49.5	63.6	56.8	61.9	55.9
Early Prime	55.5	51.5	56.5	50.8	53.1	49.3
Late Prime	52.5	47.0	55.8	49.5	55.2	48.9
Black Females:						
Young	63.1	39.5	75.0	55.4	60.5	54.7
Early Prime	62.5	50.0	52.6	42.3	52.8	46.4
Late Prime	73.3	73.3	72.2	66.7	56.1	48.8
Total	57.1	51.4	59.3	54.2	55.6	51.6

consistently suffer from significantly lower rates of upgrading due to occupational changes than their white male counterparts. In fact, during two of the three sample years, early prime age blacks actually enjoy a greater frequency of upgrading through occupational mobility than early prime age white males. The frequencies of upgrading exhibited by white female samples very closely resemble the corresponding white male frequencies in each of the age categories for all years. Black female cohorts also report a relatively high incidence of occupational upgrading in each sample year for all age cohorts. Young black females actually appear to enjoy occupational upgrading to a greater extent than young black males while the opposite holds true for the early prime age black samples in two of the three years.

The frequency of upgrading resulting from occupational mobility declines with age for all of the white samples. Young workers consistently report higher rates of occupational upgrading than early and late prime age workers for each of the white male and white female cross-sections. As predicted by human capital labor market theories, this pattern may reflect the initial occupational upgrading experienced by individuals as they complete their formal education and embark on specific career paths. Since the number of individuals completing full-time investments in human capital decline with age, the frequency of upgrading through changes in occupation may also be expected to be inversely related to the age of the worker. It can further be argued that the motivations for older workers to become occupationally mobile may differ from those of younger workers. As individuals approach retirement age, non-pecuniary variables such as geographic preferences

and "second career" ambitions may increase in importance. Thus, older workers may tend to utilize the occupational mobility process to maximize other personal desires rather than for strictly economic advancement.

The black samples do not follow the pattern of upgrading across age brackets discussed above. The frequency of upgrading appears to peak during the early prime age period for black males, while the young and late prime age black females report greater frequencies of success than early prime age black women. The explanation for this divergence is not readily apparent from examination of Table II, but its existence suggests that personal factors varying across racial boundaries by age impinge on the process of occupational mobility. Such factors must therefore be examined in the estimation of the regression model.

Given that the availability of internal occupational hierarchies has been identified as a major determinant of worker success by segmented labor market theorists, the form of occupational mobility must be considered as a major determinant of occupational upgrading. The percentage of occupationally mobile workers that remained with the same employer are reported in Table III broken down according to the appropriate age-race-sex samples. The percentage of such workers experiencing occupational upgrading (by either the income or Duncan definition) are reported in Table IV along with the percent of external movers that also achieve upgrading success. Examination of these two tables reveals some important observations.

It is readily apparent from Table III that the incidence of external occupational mobility outweighs that of internal occupational change for all samples. Part of the relatively low reported

TABLE III  
 PERCENTAGE OF OCCUPATIONALLY MOBILE INDIVIDUALS  
 EXPERIENCING INTERNAL OCCUPATIONAL CHANGE

<u>Cohorts</u>	<u>1972</u>	<u>1977</u>	<u>1980</u>
White Males:			
Young	4.31	3.11	6.60
Early Prime	9.96	7.48	8.94
Late Prime	16.54	11.98	11.57
Black Males:			
Young	3.70	2.25	8.18
Early Prime	10.47	3.67	9.03
Late Prime	18.75*	9.52*	18.60*
White Females:			
Young	4.10	2.84	4.68
Early Prime	7.97	6.33	9.43
Late Prime	9.50	10.95	12.93
Black Females:			
Young	2.63*	3.57	6.98
Early Prime	12.50	7.69	10.40
Late Prime	26.67*	22.22*	14.88*
Total	8.16	6.01	8.35

\* N<50, where N is the number of occupationally mobile workers in original cohort sample.

TABLE IV  
 RATES OF OCCUPATIONAL UPGRADING  
 EXPERIENCED BY OCCUPATIONALLY  
 MOBILE INDIVIDUALS BY FORM  
 OF MOBILITY

Cohorts	1972				1977				1980			
	Income		Duncan		Income		Duncan		Income		Duncan	
	<u>Int</u>	<u>Ext</u>	<u>Int</u>	<u>Ext</u>	<u>Int</u>	<u>Ext</u>	<u>Int</u>	<u>Ext</u>	<u>Int</u>	<u>Ext</u>	<u>Int</u>	<u>Ext</u>
White Males:												
Young	71.8	59.9	61.5	57.3	75.0	62.7	75.0	55.5	67.6	58.0	64.9	53.7
Early Prime	65.2	53.9	65.2	50.0	61.4	58.6	62.5	55.0	63.2	51.4	59.7	48.8
Late Prime	50.7	50.3	52.4	42.8	47.5	48.0	55.0	46.6	50.0	54.5	52.4	48.9
Black Males:												
Young	66.7	48.7	66.7	42.3	100.0	55.2	100.0	54.02	44.4	65.4	44.4	62.4
Early Prime	88.9	61.0	88.9	57.1	50.0	63.8	50.0	56.2	38.5	47.3	61.5	46.6
Late Prime	50.0	50.0	50.0	53.9	50.0	57.9	25.0	60.5	75.0	51.4	37.5	51.4
White Females:												
Young	79.2	63.4	58.3	49.1	60.9	63.7	47.8	57.1	53.3	62.3	46.7	56.4
Early Prime	58.1	55.3	54.8	51.1	70.5	55.6	56.8	50.4	53.6	53.0	48.5	49.4
Late Prime	52.6	52.5	57.9	45.9	58.1	55.6	51.6	49.2	55.6	55.1	42.2	49.8
Black Females:												
Young	0.0	64.9	0.0	40.5	100.0	74.1	0.0	51.4	66.7	60.0	33.3	56.3
Early Prime	57.1	63.3	57.1	49.0	66.7	51.4	50.0	41.7	53.9	52.6	30.8	48.2
Late Prime	75.0	72.7	75.0	72.7	75.0	71.4	75.0	64.3	100.0	53.9	50.0	48.7
Total	62.9	56.6	60.0	50.7	62.9	59.0	59.3	53.9	57.2	55.4	52.5	51.5

frequencies for internal moves may be attributed to the use of the three-digit Census occupational codes. Greater detail in the definitions of occupations would capture the mobility of workers between different job functions not apparent within the broad occupationally designations. The data therefore do not reflect the upgrading of workers through the hierarchies of job functions found within occupations but rather the mobility between occupational definitions.

The percent of occupationally mobile workers that are internal movers increases with age for all of the race-sex groups in each of the sample years. Both human capital and segmented labor market models predict the frequency of external moves to decline, and therefore the relative frequency of internal moves to increase, with age due to the costs associated with the loss of employer-specific training and seniority rights that must be forfeited when an external move is made. It is also apparent from Table III that substantial differences in the frequency of internal moves do not exist between the white male and economic minority samples. The incidence of internal occupational change does not appear to vary solely along the lines of race or sex.

Examination of Table IV does not reveal a consistent overall pattern of difference between race-sex cohorts with regard to the percentage of workers who experience upgrading when mobile. However, a majority of the samples demonstrate a declining probability of upgrading with the advancement of age. This observation holds true for external as well as internal movers.

The most significant finding observed in Table IV is the difference in the rate of upgrading for internal versus external

movers. For a majority of the samples, the percent of internally mobile workers that experienced occupational upgrading exceed the percent of externally upgraded workers. One notable exception to this pattern is found in the black male samples. Late prime age black men appear to enjoy a greater frequency of upgrading through external mobility than through internal occupational changes. However, the importance of internal hierarchies of occupations is clearly in evidence for most occupationally mobile cohort groups.

The major differences between racial and sex cohorts can be seen in Table V that reports the mean levels of occupational standing and change of mobile workers. As expected, black males report consistently lower absolute levels of income and status position than their white male peers. The same holds true when comparing black and white female samples, yet the magnitude of the differences appear to be somewhat less than in the case of the male observations. Also as expected, females report significantly lower levels of predicted income than their male counterparts. However, examination of Table V reveals that the absolute mean levels of occupational status reported by females exceed the status positions reported by their male racial cohorts.

The mean levels of occupational status for white females are always significantly greater than the mean level exhibited by the corresponding white male samples. Black females also experience higher mean levels of occupational status than their black male counterparts. In fact, young black females actually enjoy greater mean levels of status than young white males while the levels reported by early prime age black women closely rival early prime age white men. The source of the divergence between the relative income and status positions of



TABLE V  
 MEAN LEVELS OF INITIAL OCCUPATIONAL  
 STANDING AND CHANGE DUE  
 TO MOBILITY

<u>Cohorts</u>	1972				1977				1980			
	<u>Level</u>	<u>ΔY</u>	<u>Level</u>	<u>ΔD</u>	<u>Level</u>	<u>ΔY</u>	<u>Level</u>	<u>ΔD</u>	<u>Level</u>	<u>ΔY</u>	<u>Level</u>	<u>ΔD</u>
<b>White Males:</b>												
Young	7.25	.63	25.38	4.75	6.88	.84	22.55	4.35	7.11	.57	23.97	3.73
Early Prime	9.11	.42	37.56	1.03	8.84	.72	34.65	4.99	9.22	.26	37.40	1.57
Late Prime	9.45	.22	39.41	-.93	9.48	-.01	36.84	.19	9.65	.10	39.84	1.03
<b>Black Males:</b>												
Young	6.93	.06	23.77	-1.02	6.71	.49	21.12	20.57	6.84	.63	20.57	7.31
Early Prime	8.21	.70	28.25	5.66	7.86	.61	28.03	2.88	8.48	-.26	32.47	.09
Late Prime	7.99	.21	25.75	1.13	7.8	.72	26.45	3.98	7.88	.46	27.50	.26
<b>White Females:</b>												
Young	4.41	.44	39.40	2.54	4.24	.51	33.99	6.85	4.40	.39	35.60	5.07
Early Prime	5.13	.07	42.95	1.75	4.99	.22	42.21	2.70	5.16	.17	43.46	1.64
Late Prime	4.89	.04	41.27	-.50	4.81	.27	40.52	1.22	5.10	.14	42.55	1.09
<b>Black Females:</b>												
Young	4.32	.23	37.21	-.63	4.43	.74	37.57	5.68	4.48	.40	36.60	4.78
Early Prime	4.52	.40	36.10	1.77	4.99	-.03	29.81	-1.40	5.07	.03	42.01	-.71
Late Prime	3.60	.82	33.53	13.93	4.59	.25	26.22	7.44	4.61	.36	32.63	2.27

Income in thousands of dollars.

occupationally mobile females may be traced to at least two possible causes. First, it must be recognized that the Duncan scale of socioeconomic position is designed around occupational titles originally based upon work functions performed by male labor force participants(2), and therefore, may not account for changing occupational roles caused by the great influx of women into the labor market in recent years. However, this explanation is called into question by the high positive correlation between the Duncan scale and female income as demonstrated in the last chapter. Turning to a second possible explanation, it can be argued that women may be experiencing relatively greater non-pecuniary rewards for their labor in lieu of income. The substitution of status for income, as a means of compensation for work, is given credence when one considers the well documented segregation of women into low paying white collar jobs that traditionally carry popular perceptions of prestige and job status (for example, nursing, teaching, etc.).

Examination of Table V also reveals the relationship between occupational standing across age for each of the race-sex samples. The level of occupational standing (measured by both predicted income and socioeconomic status) increases, while the degree of change in occupational position declines, with the advancement in age of occupationally mobile white males. This pattern, again, is in line with what is expected according to the neoclassical models of labor market behavior discussed in Chapter II. However, black males and females of both racial groups do not share the same experience as white males.

Looking at the initial levels of occupational standing of black

males and females of both racial groups, a clear pattern can be seen. Early prime age cohorts report higher levels of income and status than both their corresponding young and late prime age counterparts. However, when examining the reported changes in occupational position for these three economic minority groups, a consistent pattern is not found. While white females exhibit the same negative relationship between age and degree of upgrading as that found in the white male samples, the mean levels of change in occupational position demonstrated by black males and black females appear to vary almost randomly across age brackets for the three cross-sections in time.

When the economic return of occupational mobility (as measured by the mean levels of change in income and occupational status reported in Table V) is examined across all cross-sectional samples, clear patterns are not easily discerned between race and sex cohorts. However, the degree of upgrading experienced by white males exceeds that for black males in six of the nine income samples, while white and black females split almost evenly. The absolute magnitudes of the changes in economic position also vary without a clear pattern over time. These findings further suggest that structural and individual factors other than race and sex apparently impinge on the degree of upgrading experienced by occupationally mobile workers.

One must conclude from the statistics reported in Tables II through V that the results of the occupational mobility process empirically vary in several ways across race and sex. Most importantly, it is apparent that significant differences in initial occupational positions exist between white and black, male and female, occupationally mobile workers, and on average the economic returns to

mobility do not create parity between these groups of workers. However, due to the variety of differences in the rates and magnitudes of occupational upgrading exhibited within and between racial and sex groups, the different patterns of occupational success cannot be solely attributed to the race and sex of an individual worker. The estimated regression results should help identify which individual characteristics are important to the occupational mobility process.

## Regression Results

### Estimation of the Regression Model

The remaining sections of this chapter discuss the results of the occupational mobility regressions and focus on drawing inferences from the estimated model concerning the hypotheses presented in Chapter IV. But before examining the specific regression results concerning the hypothesized relationships that impinge on the occupational mobility process, a few general comments about the estimated regression equations are in order.

The estimated ordinary least squares regression coefficients for the model of occupational mobility outlined in Chapter IV are reported in Tables VI through XVII. Each of the twelve tables corresponds to one of the twelve age-race-sex cohorts under investigation and reports the coefficients for both the income and Duncan variants of the model for each of the three sample years.

Because of insufficient numbers of observations, regression equations cannot be estimated for young and late prime age black females for 1972 and 1977. Also, limited sample sizes allow regression

TABLE VI

ESTIMATED REGRESSION COEFFICIENTS FOR  
YOUNG WHITE MALES

Variable	1972		1977		1980	
	Income	Duncan	Income	Duncan	Income	Duncan
INTERCEPT	7278.56***	28.69***	7753.55***	28.81***	7573.69***	34.05**
FORM	-839.18**	-5.00**	-937.27***	-6.60**	-926.18***	-10.47**
INITOCC	-.88***	-.87***	-.96***	-.91***	-.94***	-.87***
ED1	-1279.82***	-7.93**	-965.20**	-8.38**	-208.82	-.55
ED2	-936.57***	-7.33***	-665.73***	-5.46***	-661.75***	-3.16**
ED3	--	--	--	--	--	--
ED4	511.22**	6.07***	830.34***	8.54***	834.82***	6.36***
ED5Y	3532.21***	26.51***	2681.25***	20.97**	3193.11***	23.70***
EXP	225.57**	1.46**	201.15**	1.43**	328.21***	.48
EXP <sup>2</sup>	-15.87	-.14*	-12.33	-.11	-33.63***	-.10
MARSTAT	621.68***	3.63***	290.65*	1.89	535.82***	3.07**
CIND1	-151.77	-5.27***	57.32	-3.55***	70.10	-4.08***
CIND2	583.91*	2.20	239.57	-.18	604.26**	1.33
CIND3	--	--	--	--	--	--
CIND4	394.76	1.49	110.17	.83	204.99	.85
CIND5	393.31	1.72	566.98**	12.67***	-238.51	5.09***
PIND1	-153.47	.15	-112.47	-1.69	-295.14*	-1.37
PIND2	37.86	2.84	-293.28	-2.07	-17.73	1.78
PIND3	--	--	--	--	--	--
PIND4	101.62	2.80	-640.98***	2.23	-181.52	-.33
PIND5	-391.38	-2.34	-228.83	-3.81**	-577.03**	-4.50**
REG1	70.27	1.03	138.63	1.52	-69.56	1.15
REG2	-108.16	-1.14	17.62	-.33	-115.01**	-.90
REG3	--	--	--	--	--	--
REG4	-556.30**	-2.95	147.32	1.16	-400.38	-2.88**
R <sup>2</sup>	.46	.44	.49	.46	.46	.43
F	37.22	35.40	53.63	47.57	47.25	41.15
N	905	905	1156	1156	1121	1121

\* significant at the .10 level; \*\* significant at the .05 level; \*\*\* significant at the .01 level

TABLE VII  
ESTIMATED REGRESSION COEFFICIENTS FOR  
YOUNG BLACK MALES

Variable	1972		1977		1980	
	Income	Duncan	Income	Duncan	Income	Duncan
INTERCEPT	6630.60***	23.41*	8561.18***	26.18*	6758.32.***	27.43***
FORM	123.99	4.09	-1771.75	-14.63	-94.52	3.53
INITOCC	-.86***	-.78***	-1.11***	-.88***	-.89***	-.79***
FD1	-2090.34	-2.94	-1688.13	-2.53	-2912.24	22.82
ED2	-1526.99***	-12.03**	-1540.95**	-8.64	169.81	-.65
ED3	--	--	--	--	--	--
ED4	-327.94	-2.29	224.83	6.64	241.97	6.12
ED5Y	5412.23***	36.15***	1283.25	34.18**	-654.15	-8.66
EXP	-205.09	.73	-124.47	.41	32.57	-3.68
EXP <sup>2</sup>	40.17	.04	20.58	.01	5.61	-.60
HARSTAT	-212.35	-2.64	928.76	4.13	337.76	-2.27
CIND1	530.60	-5.92	1230.89*	2.19	-366.31	-4.04
CIND2	-154.03	-9.38	862.48	-6.14	-139.33	6.56
CIND3	--	--	--	--	--	--
CIND4	-299.15	-4.78	210.65	1.68	-1769.06*	-16.02**
CIND5	-1200.36	-4.92	1379.09	13.76*	473.49	4.74
PIND1	-804.68	-7.69*	-403.74	-1.95	-170.68	-3.20
PIND2	235.25	1.72	-512.06	-4.36	631.20	.79
PIND3	--	--	--	--	--	--
PIND4	-540.62	-2.95	973.41	13.24	1322.74	7.72
PIND5	374.88	-3.89	527.86	5.64	72.08	-4.08
REG1	571.54	1.57	695.32	2.68	-382.19	-5.23
REG2	857.16	-1.54	899.74	8.39	83.92	4.00
REG3	--	--	--	--	--	--
REG4	-1007.38	-6.87	784.61	5.28	-366.08	2.66
R <sup>2</sup>	.66	.61	.61	.50	.46	.41
F	5.91	4.61	5.37	3.34	3.84	3.08
N	81	81	89	89	110	110

\* significant at the .10 level; \*\* significant at the .05 level; \*\*\* significant at the .01 level

TABLE VIII  
ESTIMATED REGRESSION COEFFICIENTS FOR  
EARLY PRIME WHITE MALES

Variable	1972		1977		1980	
	Income	Duncan	Income	Duncan	Income	Duncan
INTERCEPT	6709.74***	25.01***	7027.94***	33.17***	7431.20***	27.25***
FORM	-597.26*	-3.46*	-104.70	-3.98*	-927.34***	-6.91***
INITOCG	-.83***	-.79***	-.83***	-.81***	-.82***	-.79***
ED1	-570.45	-7.16***	-1224.30***	-12.00***	-793.69	-5.31
ED2	-640.37**	-5.25***	-916.53***	-5.75***	-691.41**	-4.33**
ED3	--	--	--	--	--	--
ED4	1201.85***	7.85***	569.05***	5.50***	929.14***	8.35***
ED5	3295.09***	19.47***	1892.72***	15.26***	1981.05***	16.63***
ED6	3094.49***	23.96***	3118.85***	22.78***	3144.55***	20.73***
EXP	157.84*	.50	129.60*	.14	20.11	.08
EXP <sup>2</sup>	-4.50	-.01	-2.60	.01	.37	.01
HARSTAT	493.79*	1.87	291.42	.96	720.83***	3.73***
CIND1	-715.14***	-6.55***	-962.60***	-7.29***	-485.05*	-4.98***
CIND2	-668.10*	-2.49	-187.24	1.77	-149.70	-.13
CIND3	--	--	--	--	--	--
CIND4	644.93*	4.32*	117.89	.75	316.58	3.57*
CIND5	-663.97	3.50	-136.49	7.63***	123.58	8.63***
PIND1	258.58	4.63***	-94.24	-.28	-60.67	1.22
PIND2	614.99*	3.50	-133.21	-1.93	-76.82	-.46
PIND3	--	--	--	--	--	--
PIND4	192.27	3.81	652.55**	2.85	170.24	2.97
PIND5	172.30	.28	-486.44	-5.54	4.35*	-3.20
REG1	-235.84	-.97	-726.23***	-3.17*	199.66	.59
REG2	-460.63*	-3.32**	-197.20	-1.79	-415.75*	-2.15
REG3	--	--	--	--	--	--
REG4	-82.65	-.33	-27.06	-.29	-223.19	-.58
R <sup>2</sup>	.39	.42	.42	.44	.41	.43
F	27.79	31.65	39.92	42.71	40.64	44.80
N	924	924	1176	1176	1275	1275

\* significant at the .10 level; \*\*significant at the .05 level; \*\*\* significant at the .01 level

TABLE IX

ESTIMATED REGRESSION COEFFICIENTS FOR  
EARLY PRIME BLACK MALES

Variable	1972		1977		1980	
	Income	Duncan	Income	Duncan	Income	Duncan
INTERCEPT	13583.15***	37.65*	7260.91***	27.03	8561.09***	41.00***
FORM	-342.84	-2.95	723.20	3.81	-856.67	-8.20
INITOCC	-1.17***	-.89***	-.69***	-.68***	-.91***	-.84***
ED1	-1132.22	-3.36	-639.87	-4.74	-403.88	-8.27
ED2	-354.96	-4.02	-159.24	-2.37	-903.83	-9.53*
ED3	--	--	--	--	--	--
ED4	1427.61	15.78**	643.79	5.16	853.09	6.70
ED5	5443.24***	41.62***	-470.51	5.12	1828.56**	10.66*
ED6	7546.99***	55.05***	1696.32	12.85	2194.77*	14.13*
EXP	-205.32	-.62	-381.42	-2.42	-101.33	-2.33
EXP <sup>2</sup>	7.02	.02	11.61	.08	3.88	.09
HARSTAT	773.49	4.14	89.13	2.08	-406.63	-.89
CIND1	-2123.03*	-14.30*	-635.65	-6.94	-627.62	-5.61
CIND2	-2760.05*	-16.41*	121.55	-2.25	-78.61	-4.2
CIND3	--	--	--	--	--	--
CIND4	-2387.23	-11.16	-1321.66	-3.96	-1316.08	-9.72
CIND5	-2992.95**	-13.58	-411.41	8.67	-56.34	3.51
PIND1	-1239.70	1.22	621.87	4.85	346.35	1.24
PIND2	-1437.87	-6.31	358.45	5.90	174.84	10.63
PIND3	--	--	--	--	--	--
PIND4	1225.28	10.11	1254.12	8.17	1568.60	14.07*
PIND5	1772.11	-5.13	1061.01	5.37	816.59	11.12*
REG1	866.30	9.31	278.81	3.39	353.25	6.90
REG2	123.10	-5.88	511.99	8.40	178.30	3.65
REG3	--	--	--	--	--	--
REG4	-827.07	-1.95	878.58	3.86	-419.59	-.44
R <sup>2</sup>	.72	.53	.34	.35	.53	.50
F	7.75	3.53	2.12	2.19	6.44	5.81
N	86	86	109	109	144	144

\* significant at the .10 level; \*\* significant at the .05 level; \*\*\* significant at the .01 level



TABLE X

ESTIMATED REGRESSION COEFFICIENTS FOR  
LATE PRIME WHITE MALES

Variable	1972		1977		1980	
	Income	Duncan	Income	Duncan	Income	Duncan
INTERCEPT	4796.23	6.77	4312.65	4.85	2353.48	2.67
FORM	64.44	-3.75	292.45	01.19	453.18	2.83
INITOCC	-0.83***	-.81***	-.81***	-.80***	-.75***	-.71***
ED1	-1389.07***	-12.74***	1542.46***	-14.70***	-1029.86	-7.18
ED2	-567.00	-5.93**	-944.34*	-7.85**	-713.72	-5.42*
ED3	--	--	--	--	--	--
ED4	828.89*	5.14	1112.96**	7.51**	-227.75	-1.27
ED5	2773.59***	18.54***	3464.74***	19.45***	1900.29***	13.80***
ED6	3087.37***	17.64***	2968.69***	20.94***	2596.44***	17.49***
EXP	151.80	1.57	112.21	1.25	365.03	1.88
EXP <sup>2</sup>	-2.82	-.03	-1.78	-.02	-6.89	-.04
MARSTAT	1032.46*	2.64	710.65	3.83	342.06	2.24
CIND1	-390.88	-1.51	-117.24	-5.06	-512.38	-1.86
CIND2	-832.60	.10	-544.74	-1.47	-59.45	6.32
CIND3	--	--	--	--	--	--
CIND4	205.50	2.97	-7.21	-2.73	-331.36	-.90
CIND5	-606.62	-2.51	-838.59	-1.77	-1580.10**	.99
PIND1	512.71	.95	851.51*	5.30*	-148.59	-.85
PIND2	523.71	1.30	1773.81***	9.54**	131.87	.49
PIND3	--	--	--	--	--	--
PIND4	206.78	.66	1200.55*	5.34	-24.70	-.28
PIND5	-235.21	-5.26	371.10	-.90	107.21	.01
REG1	678.68	4.87*	9.70	1.00	-265.46	.25
REG2	-93.61	1.91	-318.33	-2.91	-96.59	1.06
REG3	--	--	--	--	--	--
REG4	486.11	1.85	-35.36	-.71	273.80	1.01
R <sup>2</sup>	.39	.40	.41	.42	.39	.38
F	10.93	11.19	10.44	10.54	10.59	10.08
N	381	381	334	334	363	363

\* significant at the .10 level; \*\* significant at the .05 level; \*\*\* significant at the .01 level

TABLE XI  
ESTIMATED REGRESSION COEFFICIENTS FOR  
LATE PRIME BLACK MALES

<u>Variables</u>	1972		1977		1980	
	<u>Income</u>	<u>Duncan</u>	<u>Income</u>	<u>Duncan</u>	<u>Income</u>	<u>Duncan</u>
INTERCEPT	---	---	8478.46	-46.55	---	---
FORM	---	---	-1317.18	.12	---	---
INITOCC	---	---	-.66**	-.80	---	---
ED1	---	---	-4744.30***	-30.13**	---	---
ED2	---	---	-2538.49*	-7.83	---	---
ED3	---	---	---	---	---	---
ED4	---	---	-1459.95	5.06	---	---
ED5	---	---	-5205.54**	-24.35	---	---
ED6	---	---	3920.73	31.23*	---	---
EXP	---	---	161.59	5.84	---	---
EXP <sup>2</sup>	---	---	-2.67	-.09	---	---
MARSTAT	---	---	770.79	4.67	---	---
CIND1	---	---	797.05	-5.64	---	---
CIND2	---	---	2952.57	20.98	---	---
CIND3	---	---	---	---	---	---
CIND4	---	---	4367.75	21.19	---	---
CIND5	---	---	2027.61	-.33	---	---
PIND1	---	---	-1971.79	.33	---	---
PIND2	---	---	-4790.29	-33.30	---	---
PIND3	---	---	---	---	---	---
PIND4	---	---	-6139.53*	-30.89	---	---
PIND5	---	---	-4957.48	-10.80	---	---
REG1	---	---	-2651.75*	-26.11**	---	---
REG2	---	---	-73.73	5.85	---	---
REG3	---	---	---	---	---	---
REG4	---	---	337.74	1.28	---	---
R <sup>2</sup>	---	---	.71	.77	---	---
F	---	---	2.39	3.12	---	---
N	---	---	42	42	---	---

\* significant at the .10 level; \*\* significant at the .05 level; \*\*\* significant at the .01 level

TABLE XII  
ESTIMATED REGRESSION COEFFICIENTS FOR  
YOUNG WHITE FEMALES

Variable	1972		1977		1980	
	Income	Duncan	Income	Duncan	Income	Duncan
INTERCEPT	4605.69***	41.38***	3454.25***	31.53***	3734.25***	35.78***
FORM	-544.00**	-5.38	293.50	3.37	-148.08	2.56
INITOCC	-.86***	-.80***	-.86***	-.82***	-.82***	-.82***
ED1	-609.25	-7.81	158.59	-.55	-1191.02**	-20.83***
ED2	-157.67***	-7.86***	-293.40**	-4.23**	-408.71***	-5.47**
ED3	--	--	--	--	--	--
ED4	-53.22	-1.84	443.98***	4.84***	195.90*	2.42
ED5Y	1355.81***	13.28***	1634.72***	18.68***	1628.41***	15.18***
EXP	-34.95	-2.75**	42.26	.58	-109.81*	-1.06
EXP <sup>2</sup>	8.66	.29*	-5.53	-.11	20.93*	.15
MARSTAT	-89.62	2.58	-181.82	-2.85*	-157.24	-.06*
CIND1	477.04***	-4.81**	631.90***	-3.47*	832.24***	.01
CIND2	719.058**	7.28**	813.51***	9.29***	1144.25***	7.21***
CIND3	--	--	--	--	--	--
CIND4	162.90	2.80	-84.50	1.52	275.76**	4.38***
CIND5	629.77***	7.36***	513.94***	3.85**	589.21***	4.28***
PIND1	-214.15	-3.59	-23.10	.95	-127.82	-.31
PIND2	-133.71	-1.58	-276.10	-2.56	251.57	4.04
PIND3	--	--	--	--	--	--
PIND4	-120.95	-.97	5.76	-.70	205.57	1.27
PIND5	-112.30	-2.00	-248.07**	-2.14	175.34	-3.94**
REG1	60.96	1.67	117.13	-.52	13.73	-.68
REG2	-143.00	-1.06	10.10	-3.27*	-59.15	-3.19*
REG3	--	--	--	--	--	--
REG4	-202.29	-1.89	-87.60	-3.72**	103.74	1.11
R <sup>2</sup>	.49	.44	.45	.46	.40	.43
F	26.90	21.85	32.33	33.65	31.67	35.74
N	586	586	811	811	962	962

\* significant at the .10 level; \*\* significant at the .05 level; \*\*\* significant at the .01 level

TABLE XIII  
ESTIMATED REGRESSION COEFFICIENTS FOR  
YOUNG BLACK FEMALES

Variable	1972		1977		1980	
	Income	Duncan	Income	Duncan	Income	Duncan
INTERCEPT	---	---	---	---	5799.98***	28.97*
FORM	---	---	---	---	-537.06	-3.33
INITOCC	---	---	---	---	-1.33***	-.91***
ED1	---	---	---	---	-1243.82	-28.77
ED2	---	---	---	---	-787.16*	-19.09**
ED3	---	---	---	---	---	---
ED4	---	---	---	---	793.96**	.95
ED5Y	---	---	---	---	1742.04***	10.76**
EXP	---	---	---	---	-163.41	-.77
EXP <sup>2</sup>	---	---	---	---	15.46	.12
MARSTAT	---	---	---	---	-173.61	.01
CIND1	---	---	---	---	406.00	5.06
CIND2	---	---	---	---	945.75*	20.92***
CIND3	---	---	---	---	---	---
CIND4	---	---	---	---	524.47	11.15*
CIND5	---	---	---	---	668.03	10.57*
PIND1	---	---	---	---	967.00*	12.86*
PIND2	---	---	---	---	1400.58**	-.63
PIND3	---	---	---	---	---	---
PIND4	---	---	---	---	550.89	-.13
PIND5	---	---	---	---	-20.86	-3.56
REG1	---	---	---	---	701.64	7.34
REG2	---	---	---	---	353.40	11.47
REG3	---	---	---	---	---	---
REG4	---	---	---	---	284.78	6.63
R <sup>2</sup>	---	---	---	---	.58	.52
F	---	---	---	---	4.57	3.47
N	---	---	---	---	86	86

\* significant at the .10 level; \*\* significant at the .05 level; \*\*\* significant at the .01 level

TABLE XIV

ESTIMATED REGRESSION COEFFICIENTS FOR  
EARLY PRIME WHITE FEMALES

Variable	1972		1977		1980	
	Income	Duncan	Income	Duncan	Income	Duncan
INTERCEPT	4218.57***	45.24***	5064.16***	42.23***	3706.50***	27.73***
FORM	-189.34	-2.02	-1032.31***	-7.45***	-196.81	-.21
INITOCG	-.84***	-.81***	-.87***	-.82***	-.83***	-.80***
ED1	-770.14*	-14.85***	-366.46	-5.89	-434.89	-11.19**
ED2	-409.30**	-11.29***	-292.22	-5.99**	-478.40***	-8.13***
ED3	--	--	--	--	--	--
ED4	123.02	2.10	-127.08	-.24	488.96***	5.88**
ED5	914.24***	7.56**	683.50***	6.74***	1120.26***	12.76**
ED6	1918.77***	10.76**	761.74***	9.57***	1481.16***	12.45**
EXP	36.52	-.77	16.25	-.18	10.08	.27
EXP <sup>2</sup>	-1.07	-.03	-.47	.01	-.71	-.01
MARSTAT	-234.06	-1.74	-190.09	-2.52*	148.04	1.73
CIND1	348.88	-1.90	392.24**	-3.15	873.11***	3.04*
CIND2	834.53***	11.86***	1037.52***	11.42***	1114.64***	11.81***
CIND3	--	--	--	--	--	--
CIND4	-24.79	2.11	155.11	3.84	383.93**	5.77**
CIND5	483.80**	8.12***	629.96***	8.70***	963.04***	10.36**
PIND1	269.37	.31	-127.74	.18	-95.85	-.95
PIND2	-470.50	-4.61	74.43	.53	24.23	-.24
PIND3	--	--	--	--	--	--
PIND4	149.74	1.22	168.50	.20	125.52	1.97
PIND5	2.11	-.52	100.37	-1.70	-68.57	-.78
REG1	186.65	-2.39	79.29	-.82	60.09	.13
REG2	-452.39***	-7.46***	67.43	-.63	-181.47	-2.38
REG3	--	--	--	--	--	--
REG4	-308.55	-4.68	107.32	-.56	329.98***	-5.25**
R <sup>2</sup>	.47	.46	.42	.42	.42	.44
F	15.39	15.08	23.51	23.63	34.53	38.23
N	389	389	695	695	1029	1029

\* significant at the .10 level; \*\* significant at the .05 level; \*\*\* significant at the .01 level

TABLE XV

ESTIMATED REGRESSION COEFFICIENTS FOR  
EARLY PRIME BLACK FEMALES

Variable	1972		1977		1980	
	Income	Duncan	Income	Duncan	Income	Duncan
INTERCEPT	-1764.26	-8.84	1009.89	-2.93	5222.21***	37.30***
FORM	-822.09	-6.34	-795.94	-3.88	105.80	2.12
INITOCC	-.58***	-.66***	-.86***	-.85***	-.97***	-.82**
ED1	-1209.34*	-13.26	-403.18	-6.90	-1508.91*	-17.11*
ED2	-746.34	-11.35*	129.13	-5.91	-576.38	-6.69
ED3	--	--	--	--	--	--
ED4	64.88	4.22	1033.47**	17.63***	320.72	4.55
ED5	3074.31***	42.56	3652.62***	34.60***	1202.54***	11.27**
ED6	4908.56***	64.03	3606.06***	48.87***	2325.86***	27.92***
EXP	713.64***	2.62**	400.26**	4.12*	-373.90***	-3.70**
EXP <sup>2</sup>	-25.55***	-.23**	-9.73	-.10	14.58***	.13**
MARSTAT	182.23	.18	-717.29**	-10.18**	503.60	-7.20**
CIND1	724.25	-8.95	-340.42	-9.83	884.01	2.04
CIND2	1944.07**	-.63	-2.96	-6.09	1013.18*	10.65
CIND3	--	--	--	--	--	--
CIND4	266.58	-15.57	-1369.16**	14.53	-257.69	-5.10
CIND5	1235.76*	-5.24	-578.93	-8.72	540.82	.77
PIND1	-91.99	4.02	1327.59**	18.23*	11.39	-.22
PIND2	-741.75	8.80	586.24	18.76*	488.23	2.45
PIND3	--	--	--	--	--	--
PIND4	918.80	1.78	1353.19*	16.50	603.95	12.76**
PIND5	351.63	1.72	5.32	-4.50	241.48	5.54
REG1	801.27	1.61	1221.72**	17.31**	730.50	7.81
REG2	-264.10	-6.02	-254.64	-2.73	474.04	2.82
REG3	--	--	--	--	--	--
REG4	-434.31	5.60	126.84	2.91	653.10*	3.89
R <sup>2</sup>	.64	.69	.70	.63	.50	.52
F	2.90	3.55	6.11	4.53	4.83	5.23
N	56	56	78	78	125	125

\* significant at the .10 level; \*\* significant at the .05 level; \*\*\* significant at the .01 level

TABLE XVI

ESTIMATED REGRESSION COEFFICIENTS FOR  
LATE PRIME WHITE FEMALES

Variable	1972		1977		1980	
	Income	Duncan	Income	Duncan	Income	Duncan
INTERCEPT	6840.43***	54.18	-344.55	-58.79*	1724.20	5.34
FORM	-255.08	-6.05	104.24	-2.86	-152.14	-2.22
INITOCC	-.84***	.79***	-.87***	-.71***	-.70***	-.66***
ED1	-1376.08***	-19.11***	-1102.35***	-13.37***	-401.79	-6.97
ED2	-1148.32***	-17.39***	-631.28***	-9.91***	-483.23*	-8.04**
ED3	--	--	--	--	--	--
ED4	-131.47	1.14	102.34	1.34	236.67	3.66
ED5	-168.52	4.47	1172.30***	11.08*	907.84***	10.61***
ED6	1382.31**	14.62**	2712.20***	22.69***	2219.23***	20.51**
EXP	-168.41	-1.27	358.78**	6.97***	172.07	2.11
EXP <sup>2</sup>	2.88	.03	-6.28***	-.12***	-3.18	-.04
MARSTAT	237.01	3.75	-115.08	-2.46	-178.83	.07
CIND1	246.04	-6.55	679.73**	-3.33	219.77	-.85
CIND2	37.10	3.22	813.80***	3.59	216.34	3.73
CIND3	--	--	--	--	--	--
CIND4	113.72	-.03	692.17**	9.00**	-256.38	-1.45
CIND5	-306.78	-6.92*	99.72	-1.40	-63.42	-2.41
PIND1	250.92	1.75	-239.49	.93	-339.36	-3.70
PIND2	529.03	6.79	-268.58	-6.26	638.90*	2.87
PIND3	--	--	--	--	--	--
PIND4	31.74	1.47	-198.79	-1.51	112.35	3.01
PIND5	-162.05	-.74	-244.22	1.34	131.60	1.95
REG1	-43.50	-1.99	-329.82	-4.12	-328.27	-3.74
REG2	-24.38	2.97	-486.09**	-3.34	-102.81	-1.55
REG3	--	--	--	--	--	--
REG4	-548.98**	-5.29	-433.59**	-3.76	-256.11	-1.41
R <sup>2</sup>	.51	.45	.50	.41	.40	.35
F	8.84	6.95	12.24	8.70	8.35	8.54
N	200	200	283	283	348	348

\* significant at the .10 level; \*\* significant at the .05 level; \*\*\* significant at the .01 level

TABLE XVII

ESTIMATED REGRESSION COEFFICIENTS FOR  
LATE PRIME BLACK FEMALES

Variable	1972		1977		1980	
	Income	Duncan	Income	Duncan	Income	Duncan
INTERCEPT	---	---	---	---	21053.01**	83.99
FORM	---	---	---	---	-665.45	8.61
INITOCC	---	---	---	---	-.64*	-.64**
ED1	---	---	---	---	-240.81	-12.11
ED2	---	---	---	---	-216.41	-13.54
ED3	---	---	---	---	---	---
ED4	---	---	---	---	32.70	3.46
ED5	---	---	---	---	2169.54	27.14
ED6	---	---	---	---	-197.01	12.55
EXP	---	---	---	---	-1345.77**	-7.91
EXP <sup>2</sup>	---	---	---	---	23.61**	.18
MARSTAT	---	---	---	---	-8.23	-3.10
CIND1	---	---	---	---	2215.00	7.77
CIND2	---	---	---	---	925.38	30.16
CIND3	---	---	---	---	---	---
CIND4	---	---	---	---	1715.00	10.54
CIND5	---	---	---	---	535.82	14.28
PIND1	---	---	---	---	-678.79	13.17
PIND2	---	---	---	---	-373.85	-4.70
PIND3	---	---	---	---	---	---
PIND4	---	---	---	---	159.21	.17
PIND5	---	---	---	---	-906.15	4.65
REG1	---	---	---	---	535.83	-3.91
REG2	---	---	---	---	-240.09	-19.74
REG3	---	---	---	---	---	---
REG4	---	---	---	---	297.60	.08
R <sup>2</sup>	---	---	---	---	.61	.64
F	---	---	---	---	1.42	1.59
N	---	---	---	---	41	41

\* significant at the .10 level; \*\* significant at the .05 level; \*\*\* significant at the .01 level



coefficients to be estimated for late prime age black males for only one cross-section, 1977.

The ED5Y variable represents 16 or more years of school completed (ED5 combined with ED6) for the young samples due to the remote possibility of completing more than 17 years of formal education within the limits of the age bracket. All of the other variables correspond to their previous definitions.

Several of the variables are entered into the regression model in the form of categorical dummy variables. As such, one variable must be deleted from each vector set of dummies to avoid exact multicollinearity of the model and to assure that the equations can be estimated using a least squares technique.(3) Standard econometric practice calls for the deletion of variables that represent the observations with the greatest frequencies reported in the statistical population. Therefore, the following variables are removed from the model for all cohort samples: ED3, CIND3, PIND3, and REG3. This group of variables is known as the reference group. The coefficients of the remaining corresponding dummy variables are interpreted as the variable's effect on the dependent variable relative to the effect of the deleted variable. Thus, the coefficients of the occupational mobility regression equations are properly interpreted as the variables' effect upon the change in occupational standing relative to the impact of reference group characteristics: high school education, previously and currently working in the industrial sector of retail and wholesale trade, and residing in the South.

Due to the cross-sectional nature of the database, the least squares assumption of homoskedasticity may be violated. Randomly

selected cohort samples were subjected to the Goldfeld-Quandt(4) test for heteroskedasticity. The resulting F-statistics do not allow for the rejection of the null hypothesis of homoskedasticity. Thus, the ordinary least squares procedure is appropriate.

The F-statistics reported for each regression equation in Tables VI through XVII test the null hypothesis that no relationship exists between the independent variables and the change in economic position due to occupational mobility. For all but one pair of the estimated equations the null hypothesis can be rejected at the 1 percent level of significance. The null hypothesis cannot be rejected at recognized levels of statistical significance for the 1980 late prime age black female equation. Therefore, specific conclusions concerning the determinants of occupational upgrading through mobility must be viewed with caution for this cohort group based upon the regression results of this study.

The "goodness of fit" statistic, R-square, is also reported for each estimated regression equation in Tables VI through XVII. Statistically, R-square measures the proportion of the variation in the dependent variable which is explained by the multiple regression equation. The estimated values of R-square range from a low of .34 to a high of .72. Due to the cross-sectional nature of the database, large variations across individual observations are expected to result in the relatively low values of R-square that are reported.(5) The consistency of the R-square values between the corresponding income and Duncan regression equations suggests that the independent variables explain approximately the same degree of variation in income and status change within the samples of occupationally mobile individuals.

Keeping this general overview of the empirical estimation of the occupational mobility regression model in mind, the results concerning the specific hypothesized relationships can be discussed. In order to concisely evaluate the regression results concerning the various cohort samples, the findings are discussed according to age and sex.

### Young Males

Examination of the coefficients for the young white male samples, in Table VI, reveals estimates that correspond to the hypothesized relationship between education and occupational change. The coefficients of ED1 (8 or fewer years of formal education) are always negative for both the income and Duncan variants of the model, and are significant in two of the three cross-sections. ED2 (high school not completed) is also always negative and is statistically significant in all three years. Thus, occupationally mobile young white males with low levels of education experienced economic returns that were significantly less than returns experienced by like cohorts with a high school education (the reference group educational characteristic). The absolute value of the ED1 coefficients in all cases exceeds the absolute value of the ED2 coefficients implying a positive return through mobility for the marginal increment in education between these two levels of formal schooling.

The coefficients of the variables representing the upper levels of education, ED4 and ED5Y, are positive and highly significant in all of the young white male regressions. In each of the regressions, the absolute magnitude of the ED5Y (college degree and beyond) coefficient exceeds that of the ED4 (college not completed) coefficient. Thus, the

"diploma effect" of a college education, measured in terms of both income and socioeconomic status, can be seen in the returns to occupational mobility.

The educational coefficients for young black males, as seen in Table VII, do not reflect the same pattern of statistical significance as that observed for the young white male samples. Only two of the educational variables obtain coefficients of statistical significance during two of the cross-sectional years. In fact, for the 1980 pair of regressions, none of the educational coefficients are significant. The statistical relationship, as captured by the regression results, between formal education and occupational advancement appears to be weak for the young black male samples.

The absolute values of the ED1 and ED2 coefficients for young black men are greater than the corresponding coefficients for young white men in each sample year while the values of ED4 and ED5Y are greater for young white males in two of the three cross-sections. These results indicate a relative disadvantage for young black men with low levels of education and a relative advantage for young white men with high levels of education when mobility occurs.

The results concerning the role of labor market experience in the occupational mobility process for young men can also be found in Tables VI and VII. In each of the six regressions for young white males, EXP and EXP2 reflect the expected signs but in only two are they both significant. However, in five of the six equations EXP does obtain statistical significance implying that any nonlinearities in the relationship between experience and occupational change arise only in later years. These findings are very different from those resulting

from estimation of the young black male regressions. The sign on the EXP coefficient varies across the six equations and is never consistent between the income and Duncan models in any cross-section. EXP2 is positive and not of the expected sign in five of the six cases. In no case are EXP or EXP2 ever statistically significant. Thus, general labor market experience does not play the same positive role for young black men as that found in the corresponding white samples.

Based on the estimated regression coefficients, marital status also appears to positively influence the return to occupational mobility for young white men; a relationship not demonstrated in the black models. MARSTAT obtains the expected sign and statistical strength in five of the six white male equations. In the young black male regressions, however, MARSTAT is positive in only three cases and is never statistically significant. Thus, the advantage of marriage for occupational advancement is indicated for young white men but not for young black men.

Turning to the influence of structural variables on the outcome of an occupational move, it is apparent that the impact of the INITOCC variable is consistent and as expected across all cross-sections for both racial groups of young men. In all instances INITOCC is negative and highly significant. Therefore, the regression-toward-the-mean effect is in evidence for both white and black occupationally mobile young men.

In five of six cases the absolute value of the white INITOCC coefficient exceeds that of the corresponding black coefficient. The somewhat more negative values of INITOCC intuitively suggest that holding other variables constant, the occupational structure may be

slightly more "open" for young blacks than for whites. However, the differences are quite small and do not demonstrate a significant divergence between the opportunity structure for young black and young white men.

An apparent racial difference in the mobility process for young men is observed, however, in the estimates for the FORM coefficients. In each of the white regressions FORM is negative and strongly significant, indicating substantial economic penalties for external movers. Thus, a white internal mover with the same personal and structural characteristics as an external mover received greater income and status returns through the mobility process. For black males, the sign of the FORM coefficients is negative only half of the time, and is never significant. Therefore, the advantage of changing occupations within internal hierarchies is not apparent in the case of young blacks.

The results concerning the hypothesized effects of industrial structure and region of employment upon occupational advancement are not as clear as those concerning other variables. The regression coefficients for the PIND, CIND, and REG variables are relatively small and most are insignificantly different from zero. This holds true for both the white and black samples of young males. The signs and relative magnitudes of the calculated coefficients also vary between income and Duncan regressions without any apparent pattern. These findings present little evidence that barriers to mobility vary substantially across industries and geographic regions, or that the influence of industry and region varies across race.

While such inferences drawn from the estimated regressions are not

consistent with the hypotheses concerning the industrial and regional variables presented in Chapter IV, they are in agreement with the findings of Leigh.(6) In a study of young males, Leigh found essentially no influence of industrial structure upon the occupational advancement of individuals entering career paths after completion of formal schooling. A negligible impact of industry and region upon occupationally mobile workers is also reported by Leigh in a more comprehensive investigation as discussed in Chapter III. The evidence obtained from the young male samples are consistent with Leigh's conclusion that industrial structure and region of employment do not have an important impact on occupational upgrading for young workers relative to the impact of human capital and personal variables.

#### Early Prime Age Males

The regression estimates for the early prime age male groups are found in Tables VIII and IX. Examining the estimated coefficients of the education variables for early prime age white males, the expected relationship with occupational change is very evident. Except for ED1, all of the categorical education coefficients are statistically significant and of the expected sign in each pair of cross-sectional regressions. Negative coefficients are calculated for the variables representing less than a high school education and positive coefficients are found for variables that proxy educational attainment above the high school level. Once again the economic return of college education is seen in the relatively large marginal increments between the absolute magnitudes of the ED4 and ED5 coefficients. In five of the six regressions, the marginal return to formal education beyond

four years of college is less than the marginal return acquired by completion of a four-year college degree. This inference of declining marginal returns to formal educational attainment can be made by comparison of the differences between the ED4 and ED5 coefficients with the differences between the ED5 and ED6 coefficients. These findings concerning the role of education in the occupational mobility process for young white males are in keeping with the expected relationships hypothesized in Chapter IV.

The positive impact of education on changes in occupational standing for early prime age black males is not as consistent as that just discussed for their white counterparts. While the estimated educational coefficients reflect the pattern of expected signs and relative magnitudes in four of the six black regressions, the coefficients demonstrate a lack of statistical significance in many instances. In fact, for the 1977 pair of regression equations no educational variable is found to be statistically different from zero at standard levels.

Only once does a variable representing educational attainment less than the reference level enter into the black equations with statistical significance (ED2 in the 1980 Duncan regression). The variable representing college education of less than a four-year degree is also only significant in one instance (ED4 in the 1972 Duncan regression). The coefficients for the ED5 and ED6 variables have the expected signs, relative magnitudes, and level of significance in the 1972 and 1980 pairs of equations. One may infer from these findings that formal educational attainment of less than a college degree does not have a strong impact upon the occupational upgrading of early prime



age black males. Judging from the regression results, it appears that early prime age black men must achieve levels of education over and above the norm in order to enhance the occupational mobility process.

The size of the calculated coefficients for ED5 and ED6 in the 1972 pair of regressions exceed those estimated for the corresponding white samples. For both the income and Duncan variants, the black coefficients are roughly twice the magnitude of the white in 1972. This differential is not found for the 1977 and 1980 cross-sections. While the size of the ED5 and ED6 coefficients remain fairly constant over time for the early prime age white cohorts, the magnitudes of the higher education coefficients are dramatically less in the latter two years for black cohorts. In fact, for the 1977 and 1980 cross-sections the white educational estimates are greater than those calculated in the black equations, but with a smaller racial differential as that found for 1972. Thus, highly educated occupationally mobile blacks appear to have made strides in improving their relative occupational position during 1972, but lost their advantage in latter years. Based solely on this evidence, one may conjecture that a positive relationship may exist between black occupational upgrading in 1972 and the advent of affirmative action legislation (as discussed in Chapter IV) that went into effect during that year. The hypothesis that anti-discrimination legislation led to a "catching-up" of income and status through occupational mobility for blacks appears plausible. However, as will be discussed latter, statistical tests to determine whether significant differences exist between the cross-section regressions do not support this hypothesis.

Comparison of the results concerning the role of education between

the early prime age and young male samples reveals similar findings. However, the absolute magnitudes of the education variables in the white early prime age samples are generally greater than those calculated for the young white samples. This suggests a relatively greater penalty for low levels of formal education and relatively greater rewards for high levels of educational attainment when mobility occurs during early prime age years. Comparing the results for blacks across age groups, relatively higher returns for early prime age workers are also found for those with educational attainment at the upper end of the spectrum. At the lower end of the educational spectrum, however, the absolute magnitudes of the coefficients are generally smaller for the early prime age black samples than for the corresponding young samples. Thus, unlike their white male counterparts, early prime age black occupational movers with low levels of education do not find themselves with a relative disadvantage over their corresponding young racial cohorts.

Turning to the examination of the variables representing the influence of labor market experience upon the mobility process, it can be seen in Table VIII that EXP and EXP2 obtain coefficients with the expected signs and relative magnitudes in one half of the white early prime age male regressions. In each case the measured impact of experience is less than that estimated for the young white samples reported previously. While EXP is significant in the 1972 and 1977 income equations, EXP2 never enters the white regressions with significance at acceptable levels. Even though the evidence supporting the positive relationship between experience and occupational upgrading for early prime age white men is less than overwhelming, it differs

considerably from the findings for the corresponding black samples.

In each of the six early prime age black male regressions, the coefficient of EXP carries a negative sign and an absolute value that "swamps" the consistently smaller and positive corresponding EXP2 coefficient. Thus, the regressions indicate that the functional relationship between occupational upgrading and years of experience is "U-shaped," just the opposite of that hypothesized in Chapter IV. Nominal amounts of labor market experience are negatively related to occupational advancement for this sample, and a relatively large number of years spent in labor force activities appears to be needed before experience positively enhances the occupational upgrading process for early prime age black males. Based on the estimated regressions, this inference must be considered with caution due to the barely insignificant coefficients calculated for the model.

For both racial groups, the calculated influence of marital status upon the occupational upgrading of early prime age men is quite similar to that found for the young male samples. The early prime age white regressions yield coefficients that are consistently positive and are significant in three of the six regressions. The coefficients for MARSTAT in the early prime black equations are of mixed sign and never significantly different from zero.

Turning to the results concerning the structural variables, similarities are again found between the early prime age male and young male regressions. The income and status upgrading advantage of internal mobility is again uncovered for white workers, as evidenced by the consistency of the negative and highly significant coefficients on the FORM variable. By comparing the absolute values of the FORM

coefficients across age brackets, early prime age white males that are internally mobile appear to suffer a relative disadvantage over their young cohorts that are also internally mobile, holding everything else constant. The early prime age black regressions yield FORM coefficients with inconsistent signs between cross-sections that are never statistically significant, indicating that no relative advantage exists between external and internal occupational movers for this sample.

Uniformly negative coefficients on INITOCC are again found for both the white and black samples of early prime age men. The absolute value of the coefficients do not appear to vary consistently across cross-sections in time within black or white racial boundaries. The differences across racial groups are again negligible with the absolute value of INITOCC being somewhat greater for blacks in the 1972 and 1980 regressions. However, for the male samples under consideration, it is safe to say that the regression-toward-the-mean effect appears to remain fairly stable across race and time.

The coefficients of PIND, CIND, and REG calculated for the early prime age male samples are very similar to those estimated and previously discussed for the young male cohorts. While the absolute size of the coefficients are generally greater for blacks, indicating that perhaps industrial structure and regional characteristics may create a greater variance in the return to occupational change for blacks relative to whites, very few structural variables have coefficients that are statistically different from zero in both white and black equations.

The only consistently significant structural variable is CIND1 in

the white regression estimates. For each of the three cross-sections, the variable representing the agriculture and mining sector is significant and negative. Therefore, occupationally mobile workers accepting a job in this industrial sector are expected to receive negative income and status changes relative to those moving into an occupation within the wholesale and retail trade sector (the reference group characteristic), holding everything else constant. This result is not surprising due to the more compressed range of job hierarchies associated with positions in the agricultural industry relative to the sales industry.

In each case where significant coefficients are found for PIND variables, significance is only demonstrated by one of the pair of cross-section equations. Thus, the consistency of significance between the income and Duncan coefficients observed within the human capital results is not found for the structural influence of industry on occupational change. This lack of agreement between the income and Duncan variants of the model further indicates a weak relationship between occupational upgrading and specific industrial characteristics proxied by the set of PIND categorical variables.

The calculated coefficients for REG are generally negative for the early prime age white male samples and generally positive for the corresponding black male samples. Like each of the other categorical variables, the results must be interpreted relative to the reference group, in this case, mobile workers with geographic residence in the South. While the signs indicate a relative advantage for occupationally mobile southern white men, such conclusions must again be tempered due to a lack of statistical significance in most instances.

### Late Prime Age Males

The least squares regression coefficients estimated for the late prime male samples can be found in Tables X and XI. Looking first at the results concerning the effect of formal human capital development upon occupational upgrading, the now familiar pattern of positive returns to increases in the years of educational attainment can easily be seen in the results for older white male workers. In nearly every case the ED coefficients are of the expected sign and statistically significant for this cohort grouping. In accordance with the young and early prime age black male groups, formal education does not demonstrate a strong relationship to occupational advancement for the late prime age black male group, as evidenced by the calculated regression coefficients.

Compared to the early prime age male estimates, it appears that occupationally mobile late prime age males may encounter a slightly greater economic "risk" when mobile if they report educational attainment near either end of the spectrum. This follows from the relatively greater negative values of ED1 and ED2 and the relatively smaller positive returns estimated for ED5 and ED6 in the late prime age white male samples. The same pattern is found, and to an even greater degree, in the corresponding black regression for late prime age males. Of all the male samples, older black men with low levels of education are in the least advantageous position to achieve occupational upgrading through mobility.

While economic theory does not explicitly hypothesize that the relationship between formation of human capital and occupational

advancement through mobility is negatively influenced by the advancement of age, it must be recognized that the process of occupational mobility may serve different functions for different age groups. Individuals nearing the end of their working lives may choose to change occupations for motives other than income or status upgrading. Geographic preferences and "second careers" are two such alternative motives. Individual utility maximization achieved under such alternative motives does not necessitate maximization of economic position ordinarily assumed in human capital models. The relatively smaller values of the educational coefficients for the late prime age samples is consistent with the supposition of alternative motives for occupationally mobile older workers.

Examination of Tables X and XI reveals that the impact of labor market experience, as measured by the coefficients of EXP and EXP2, upon the occupational upgrading of older male workers is quite similar between racial samples and is consistent with the expected relationship discussed in Chapter IV. The magnitudes of the experience coefficients are not significantly different from those found in the early prime age white regressions. Parallel results are also found in the case of MARSTAT between the young and late prime age male samples for both racial groups.

Evaluation of the structural variables' influence on occupational advancement reveals that the familiar pattern of relatively small and statistically insignificant industrial and regional coefficients is again evident in the regressions for late prime age men. So far as these categorical variables proxy the differences between industrial structures and geographic regions, consistent patterns of structural

influence are not documented for the late prime age male samples.

The consistency of the regression-toward-the-mean effect across age brackets is demonstrated by INITOCC coefficients estimated for the late prime age male samples that closely resemble, in sign and size, those estimated for the younger samples. The most apparent structural divergence uncovered for the late prime age male samples is found in the estimates of the FORM coefficients. The substantial upgrading advantage for internal movers seen in the regressions for young and early prime age white males does not show up in the late prime age male regressions. This may be due to workers reaching the upper limits of internal job hierarchies during their late prime age years after which occupational moves may be based on motives other than economic position maximization. A conclusion such as this is in agreement with the interpretation presented previously for the coefficients estimated for the human capital variables.

#### Young Females

Seventeen of the twenty-four educational coefficients for the young white female regressions, as reported in Table XII, are of the expected sign and significant at acceptable statistical levels. The hypothesized positive return of additional years of education is reflected in the magnitudes of the individual education variables. The "diploma effect" experienced by occupationally mobile young white female college graduates is clearly seen by comparing the coefficients of the ED4 and ED5Y variables in the 1977 and 1980 regression equations.

Comparison of the educational coefficients between the young white



female and young white male regressions reveals that the calculated values of the female coefficients are generally smaller in magnitude. Because the database reflects predicted mean income reported by females within occupational boundaries, this does not necessarily imply that the degree of occupational upgrading, as a percentage of earned income, is less for white females with educational attainment equal to their male peers. However, comparison of the estimated returns to higher education relative to the initial sex-specific mean levels of income in Table V reveals that young white males appear to enjoy relative and absolute income upgrading advantages over their female cohorts with like characteristics.

Inferences concerning young black females must be drawn from the one pair of estimated regressions for the 1980 cross-section reported in Table XIII. While the relative strength of the relationship over time cannot be determined based on the limited information available, the importance of formal human capital attainment to occupational upgrading is apparent in the regression results for young black female workers. For this group, the positive impact of education on occupational advancement is statistically stronger than that estimated for the young black male cohorts in the corresponding 1980 set of regressions. A racial disadvantage is also not apparent in the estimated returns to higher education for young black females when comparisons are made to the young white female results. In fact, the ED4 and ED5Y coefficients are larger in the black regressions than in the white. However, the estimates also indicate that young black females with low levels of formal education experience a relative disadvantage in comparison to their white cohorts, holding everything

else constant.

The resulting functional relationship indicated between occupational advancement and labor market experience for young females of both races closely resembles that found in the early prime age black regressions. When statistically significant, EXP enters the regressions with a negative coefficient that "swamps" a positive and smaller EXP2 coefficient. Thus, it appears that young females must demonstrate a relatively strong attachment to the labor force before experience enhances the occupational mobility process.

While the MARSTAT coefficients do not indicate a strong statistical relationship between upgrading and marital status for young females, the resulting sign on significant entries is always negative for this group. This observation conforms to the expected relationship hypothesized in Chapter IV. The "instability" of labor market attachment by young married females, whether actual or perceived, appears to negatively influence the returns to occupational mobility, as captured by the regression model.

The INITOCC coefficients for the young female samples are always negative and significant. The estimated values of the INITOCC coefficients in both the white and black young female regressions are not significantly different from those calculated for the corresponding male regression equations. Thus, it is reasonable to infer that the level of an individual's initial occupational position similarly affects the ability of both young male and female workers to move along occupational hierarchies, holding other variables constant.

The upgrading advantage of internal occupational change, as reflected in the results for young white men, is not consistently found

for mobile young females. The signs on the FORM coefficients split evenly between positive and negative among the white regressions with the only statistically significant coefficient being negative in the 1972 income equation. FORM enters the one estimable pair of young black female equations with negative but insignificant coefficients for both the income and Duncan variants of the model. Even though this evidence does not clearly imply that attachment to internal labor markets is essential to worker upgrading through the mobility process, in no case do the results indicate that external occupational movers enjoy statistically significant returns greater than internal occupation changers with like characteristics.

The results concerning the hypothesized relationship between industrial characteristics and young female worker success through occupational mobility are not substantially different from those previously discussed for the male samples. It should be noted, that relative to the reference group, a majority of the statistically significant industrial coefficients in the female equations exceed the coefficients estimated for their male counterparts, relative to the reference group. This occurs most consistently in the estimates for individuals that acquire occupations in the agricultural and mining sector (CIND1) as well as the manufacturing sector (CIND2) of the economy, both areas which have been traditionally dominated by male workers. It is interesting to note that while relative income upgrading opportunities thus existed for women in both of these industries for the cross-sections under investigation, simultaneous status downgrading is reported in two of the three years for those females obtaining occupations in agriculture and mining.

Finally, it should be recognized that the regression results concerning regional variations in the occupational upgrading process of young females are not statistically strong and once again very closely resembles the results for young males.

#### Early Prime Age Females

The estimated regression coefficients for early prime age females are reported in Table XIV and Table XV for white and black cohorts respectively.

Looking first at the results concerning education, the expected positive relationship between years of formal schooling and occupational advancement is reflected in the regressions estimates for both black and white groups. The absolute magnitudes of the ED5 and ED6 coefficients in the early prime age white female equations are consistently smaller than those calculated for the corresponding early prime age white male samples. However, this female disadvantage is not found between early prime black women and men. The estimated returns to higher education for mobile early prime age black females closely rivals, or exceeds, the returns estimated for early prime age black men with like characteristics in each cross-section. Early prime age black females with high levels of education also appear to enjoy substantially greater returns to mobility than their white female peers. Analogous to the early prime age black male results, the impact of advanced education, as measured by the ED6 coefficient, declines over time in the early prime age black female equations. This last observation further supports the need to test for variation in the mobility process over time.

The impact of experience differs for occupationally mobile early prime age females when compared to their male peers. EXP and EXP2 are not significantly different from zero in the six early prime age white female equations. However, in the 1972 pair of equations calculated from the early prime age black female sample, both experience variables are of the expected sign, relatively large in magnitude, and highly significant. EXP is also statistically significant and positive for the 1977 black models. In the 1980 early prime age black female regressions the estimated functional relationship between experience and occupational change resembles the pattern found in the early prime age black models, with EXP assuming a negative sign and EXP2 becoming positive.

For both racial groups of early prime age female workers, MARSTAT, when significant, has a negative impact on occupational change. Thus, single women in this age bracket appear to have an advantage over married women with like characteristics when occupationally mobile. This of course conforms to the expected results as hypothesized in Chapter IV.

Turning to the results concerning the form of mobility, it is found that FORM enters the regression equations with negative coefficients in both the black and white early prime age female models but only attains significance in the case of white cohorts. The advantage of internal mobility is clearly more evident in the early prime age female results than in the results for younger female workers. This is expected because older workers have had more time to become attached to internal labor markets and occupational hierarchies and thus the opportunity costs involved in making external moves are

greater. However, the regression estimates indicate that early prime age male workers engaged in internal mobility receive a relatively greater return to occupational change in comparison to their female cohorts, holding other variables constant.

The familiar pattern of negative and significant INITOCC coefficients is again encountered for early prime age females of both races. The values of the INITOCC coefficients do not display wide variations between the black and white models or between cross-sections. The values of the INITOCC coefficients are very similar between each of the cohorts groups that have been discussed suggesting a stable regression-toward-the-mean-effect for the samples under investigation.

In general, the coefficients of the remaining structural variables present patterns quite similar to those estimated for the early prime age male samples. The results concerning the influence of industrial structure and geographic region are again somewhat disappointing. The most significant results indicate substantial income and status returns for early prime white women who acquire occupations in manufacturing (CIND2) or public service (CIND5) industries. The regression coefficients suggest a substantial advantage for occupationally mobile early prime white women in these two sectors of employment relative to their male cohorts for each sample year. The coefficients for the remaining structural variables do not demonstrate consistently significant impacts on occupational change for early prime age mobile women. The influence of personal and human capital variables once again prove to be statistically more important than the industrial and regional characteristics involved in the mobility process.

### Late Prime Age Females

Table XVI reports the estimated regression coefficients for late prime age white women. An insufficient number of observations prevents estimation of the model for late prime age black females for the 1972 and 1977 cross-sections. The resulting estimates for the black 1980 sample are reported in Table XVII. As noted earlier, the low F-statistics for the pair of late prime age black female regressions fail to meet standard levels of statistical significance. Therefore, inferences drawn from the regression results for occupationally mobile late prime age black female workers must be viewed with caution.

Looking first at education, a strong positive relationship between years of formal schooling and occupational advancement is in once again in evidence. The estimated mobility returns to advanced levels of education for the late prime age white female group generally exceed those estimated for the early prime age white female samples and rival the results obtained for young white females in magnitude. While the values of ED5 are in most cases substantially less than the corresponding coefficients derived for the late prime age white male regressions, the magnitudes of the late prime age white female ED6 coefficients are generally quite similar in magnitude to the corresponding male estimates.

For all three years, the signs on the EXP and EXP2 coefficients support the hypothesized second order relationship between occupational upgrading and experience suggested in Chapter IV. Labor market experience appears to be somewhat more important for occupationally mobile late prime age women than for late prime age men. This is

evidenced by the highly significant and relatively large experience coefficients that enter both the income and Duncan equations for the 1977 cross-section. This result is not surprising when one considers that older females traditionally exhibit a pattern of labor market experience that is less homogeneous than that demonstrated by older men. Thus, mobile older females with a proven record of labor force participation may have a comparative advantage over their female cohorts with little experience.

Marriage appears to provide a weaker impact on occupational change for late prime age white women than was found for younger females. MARSTAT coefficients enter the model with mixed signs and do not prove to be significantly different from zero in either income or Duncan variants of the model.

Turning to the structural variables, INITOCC is again found to be negative and statistically important in each cross-section equation. The values of the INITOCC coefficients are almost identical with those calculated for all of the other cohort samples. The influence of initial occupational standing is the most consistent structural variable across all age-race-sex groupings as reported by the regression results. Occupational position is found to be important for all occupational movers and its impact does not appear to vary significantly across the selected age-race-sex samples investigated in this study.

The form of occupational mobility is not found to be a statistically important variable for late prime age white women. FORM generally enters the equations with a negative sign but does not attain acceptable levels of significance. Thus, the importance of internal



labor markets to occupational advancement appears to have diminished for older female workers. This is, of course, analogous to the results obtained for the late prime age male samples and may suggest that the "second career" phenomena discussed earlier also affects female workers during the late prime age years of labor market involvement.

Once again the categorical variables representing industrial structure are relatively small in magnitude and seldom are statistically different from zero. The REG coefficients generally enter the regressions with a negative sign, and when significant, always so. Therefore, it is indicated that late prime age white females residing outside the reference group region, the South, may not experience the same degree of upgrading as those who do. While this is the most apparent pattern observed regarding the influence of geographic region upon occupational change for any of the age-race-sex samples, the results are not substantiated by consistently significant REG coefficients. Given these results, one must conclude that human capital variables are more important than structural influences in determining the degree of occupational upgrading for late prime age women.

### Stability of the Mobility Process

#### Over Time

The statistical procedure discussed in Chapter IV developed by Chow to test for significantly different relationships between dependent and independent variables across separate cross-sectional samples was performed using the results of the mobility regression model. The test was used to check for statistically significant

variations in the determination of occupational upgrading between the three years considered in this investigation. The F-statistics computed from the utilization of the Chow procedure are reproduced in Table XVIII.

From examination of Table XVIII, it is obvious that in most cases the resulting F-statistics do not acquire levels of statistical significance and therefore the null hypothesis that the separate cross-section regressions are identical cannot be rejected. These findings suggest a strong degree of stability over time between occupational change and the human capital and structural variables under consideration.

Interpretation of this stability over time suggests that the differences in macroeconomic conditions across the sample years apparently does not greatly alter the expected relationships between the independent variables and the degree of occupational change for most cohort samples. However, two of the three instances where significant F-statistics are found occur in the tests between sample years 1977 and 1980. Looking at the annual growth in real GNP, 1977 represents a year just past a cycle peak while 1980 represents the bottom of the trough when real GNP fell by two-tenths of a percent.(7) As discussed in Chapter IV, cyclical swings such as this are expected to result in uneven contractions and expansions across the various sectors of the economy and thereby impact on the occupational mobility process. The results indicate that the outcome of an occupational move for white early prime age workers of both sexes may have been influenced by differences in the economic environment between sample years.

TABLE XVIII

F-STATISTICS FOR CHOW TESTS BETWEEN  
CROSS-SECTION REGRESSIONS

Cohorts	Pooled Years					
	1972-1977		1977-1980		1972-1980	
	Income	Duncan	Income	Duncan	Income	Duncan
White Males:						
Young	1.863** (21,2039)	1.673**	1.213 (21,2234)	1.366	.524 (21,1984)	.875
Early Prime	1.526 (22,2056)	.870	1.570** (22,2406)	1.268	1.205 (22,2115)	.759
Late Prime	.400 (22,671)	.353	.730 (22,652)	.760	.721 (22,700)	.778
Black Males:						
Young	1.062 (21,128)	.838	.736 (21,156)	1.068	1.193 (21,149)	1.231
Early Prime	1.335 (22,151)	1.012	.611 (22,208)	.349	1.142 (22,186)	1.210
Late Prime	--	--	--	--	--	--
White Females:						
Young	1.113 (21,1355)	1.150	1.032 (21,1730)	1.193	.944 (21,1504)	1.163
Early Prime	1.202 (22,1040)	.625	2.468*** (22,1679)	1.624***	1.048 (22,1374)	.775
Late Prime	1.306 (22,439)	1.472	1.038 (22,586)	.945	1.527 (22,503)	1.094
Black Females:						
Young	--	--	--	--	--	--
Early Prime	1.472 (22,90)	1.165	1.384 (22,158)	1.562	1.041 (22,137)	1.003
Late Prime	--	--	--	--	--	--

() Degrees of freedom

-- Insufficient observations to estimate

\*\* Significant at the .05 level

\*\*\* Significant at the .01 level

One of the major differences in the significant structural variables of the 1977 and 1980 early prime age white male regressions is the dramatic increase in the estimated penalty for external movers between 1977 and 1980. This is not surprising as a weak economy would be expected to make the process of switching employers riskier. It should also be noted that the results in Table VII suggest an increase in the substantial disadvantage for mobile workers in the North Central region, a region greatly affected by the recession of 1980. The industrial structure variables further indicate a decline in the return to mobility between 1977 and 1980 for those in the sales sector and an increase for those in the service sector.

Similar differences, but with lesser degrees of magnitude, are also found in the early prime age white female regressions as seen in Table XIV. Relative to the corresponding reference groups, occupationally mobile females residing in the West also appear to have had an advantage in 1980 over cohorts with like characteristics in 1977. Further, substantially greater marginal returns to years of formal schooling are also indicated by the human capital variables in the 1980 female regressions.

Thus, while possible fluctuations in the occupational mobility process may be indicated by the Chow test results, the evidence is not overwhelming. It is important to note that cohort groups most often cited as being victims of cyclical swings in economic activity are not found to experience a significant difference in the process of occupational upgrading between the sample years under consideration. The relationship between occupational change and the independent variables of the regression model are statistically stable for black

men and women of all age groups across all three cross-sections of time.

The indication of no significant differences being present between black regression equations, calls for the rejection of the hypothesis that a "catching-up" in income and status occurred during 1972 for highly educated young and early prime age black workers. Even though the estimated coefficients indicate a lessening in the return to higher education for blacks in the post-1972 period, the Chow test results suggest that this trend does not significantly alter the occupational mobility process for blacks.

## ENDNOTES

(1) "Upgrading" is defined to be any positive change in predicted income or socio-economic status due to a simultaneous change in an individual's three-digit occupation.

(2) Refer to Duncan, pp. 139-161, concerning the construction of the socio-economic rankings of occupations and the original occupational titles utilized.

(3) See Pindyck and Rubinfeld, pp. 112-113.

(4) Pindyck and Rubinfeld, pp. 148-150.

(5) Refer to Pindyck and Rubinfeld, p. 64.

(6) D. Leigh, "Job Experience and Earnings Among Middle-Aged Men," Industrial Relations, XV(1976), pp.130-146.

(7) Statistics can be found in numerous government publications including, U. S. Department of Labor, Handbook of Labor Statistics, (1980).

## CHAPTER VI

### SUMMARY AND FINAL CONCLUSIONS

#### Introduction

In previous chapters, the economic issues and theories concerning the occupational mobility process were discussed, a regression model testing the hypothesized relationships of occupational change for various groups of workers was developed, and the empirical results of the estimated model were reported. The purpose of this final chapter is to bring together and summarize the major findings of this study, compare these findings with the results of related research, and identify the economic implications uncovered by the results of this analysis of occupational mobility. The discussion is arranged according to the sets of independent variables and the hypotheses concerning their impact upon occupational change, as analyzed in the regression model. The chapter will conclude with a discussion of policy implications and recommendations for future research into the process of occupational mobility.

#### The Role of Human Capital and Personal Variables

##### Formal Education

Drawing upon both human capital and segmented labor market models, formal education may be viewed as a major determinant of worker

upgrading through occupational mobility. While human capital theories do not predict systematic differences between workers with like endowments in the return to education through mobility, SLM theorists perceive, due to institutional and sociological factors, a dual market whereby blacks and minorities receive smaller economic returns to investments in formal schooling relative to majority workers. The empirical results concerning the role of education may thus be interpreted as testing the relevance of these positions.

Treating education as a categorical variable representing the years of schooling completed, the regression results indicate a strong, highly significant, positive relationship between investments in formal education and occupational upgrading for most of the white male samples. Positive, yet not as consistently strong, relationships between education and upgrading are also indicated for both white and black females samples in a majority of cases. The weakest return to investments in education through mobility are discovered for the black male samples. The positive influence of education on occupational upgrading appears to break down for this cohort as demonstrated by the small and generally insignificant coefficients calculated for the education variables in the black male regressions.

In most instances, the marginal economic return to education is estimated to be greater, in both relative and absolute value, for white males than for females of both races. However, the divergence between whites and blacks found in the male results is not in evidence when examining the female regressions. In fact, early prime age black women with high levels of education are found to experience substantially greater returns than white women with like characteristics. This



finding suggests evidence in favor of the "positive impact of the double negative" (discussed in Chapter III) as put forth by Epstein(1) to explain the labor market success of black professional females.

With the advancement of age from young to early prime, the impact of education upon occupational progression generally increases in magnitude for most cohort groups. Even while early prime age workers are more homogeneous with regard to experience, and thus years of on-the-job-training, formal education is still indicated to positively impact the level of upgrading when mobile. This suggests that formal education may enhance the productive capacity of individual workers so that the returns to education are manifested throughout their working lifetime. Therefore, it may be argued that the evidence indicates education is not used solely as a screening device to allow young individuals to enter occupational hierarchies.

These findings concerning education are in several respects similar to the results of previous investigations. Even though different types of samples are utilized covering different periods in time and discrepancies exist in the choice of age bracket definitions, the estimated education coefficients for young white males are very similar to those estimated by Leigh.(2) For example, using the Duncan scale, Leigh reports that the coefficient of the educational variable representing 13 to 15 years of schooling to be 6.53 for young white male workers, while the ED4 Duncan coefficient estimated for the three cross-sectional samples of young white men in this study ranges from 6.07 to 8.54. Similar patterns are also evident in the education results of the income models. The major point of departure appears to be with the significance of education with regard to the occupational

upgrading of black workers.

The relationship between formal education and occupational upgrading for black males indicated by the regression results differs somewhat from the findings reported by Leigh. According to Leigh, "a highly significant, positive relationship between education and occupational advancement was obtained for young blacks and whites"(3) in his study of occupationally mobile men. The strong influence of education upon the occupational advancement of young black males reported by Leigh is not demonstrated in the regression estimates discussed in the last chapter. However, Leigh further notes that "whites were found to enjoy a larger return than blacks to increments of education,"(4) a finding that can also be seen in the regression estimates of the current study. While Leigh concludes that blacks are primarily hampered by their relatively low levels of educational endowments and not by processes in the labor market that exclude blacks from upgrading opportunities enhanced by educational achievement, the present findings indicate that education may not be as strong a determinant of occupational advancement for black males relative to their white cohorts.

### Experience

Based upon the assumption that labor market experience should decline in significance for older occupationally mobile workers as they become more homogeneous with respect to experience and acquired on-the-job-training becomes more job specific over time, experience was entered into the regression model in quadratic form. Several important differences in the impact of general labor market experience are

indicated by the results for the various cohort groups analyzed.

The results obtained from the regressions indicate that labor market experience positively affects the outcome of an occupational change for white male workers. The relationship appears to be stronger and more direct for younger white men while the hypothesized declining returns to general labor market experience is seen in the late prime age male regressions. Support for the hypothesized relationship is also indicated in the results for early prime age black, and late prime age white females.

Early prime age black males and young females of both racial groups are found to exhibit a different pattern with respect to the impact of experience upon occupational advancement. For these groups, the EXP coefficient is generally estimated to be negative and is greater in absolute value than the positive calculated coefficient of EXP2. Thus, it is indicated that these groups of workers must acquire a number of years of labor market experience before positive returns through mobility are generated by their record of work experience.

To correctly interpret the regression results, it is important to recall that EXP and EXP2 are proxies that reflect only the potential years of labor market experience available to individual workers. Since the experience variable was calculated as the years of labor market experience available to an individual based on the reported age and years of schooling completed, and given that the attachment to labor force activities is traditionally tenuous for economic minorities (women in particular), it may be simply argued that a greater number of years is needed by minorities, relative to white male workers, to acquire equal levels of training through work experience.

This finding may thus be viewed as supporting the hypothesis that young black men and females with relatively few years of experience may be receiving less, or inferior, on-the-job-training, relative to their white male counterparts, thereby reducing the importance of labor market experience in the occupational upgrading process. The regression results, however, are not enough to explain why this phenomena would occur. Such a conclusion is of course in line with the assumptions of segmented labor market models in which minorities are segregated into the secondary sector of employment where experience and on-the-job-training are of little significance to occupational change. However, Lazear(5) has also suggested that legal conditions designed to compel employers to pay economic minorities an equal or higher wage also creates incentives to reduce the quantity of non-pecuniary benefits, such as on-the-job-training, offered to minorities. Lazear sees affirmative action laws as reducing the black-white income gap in the short-run but increasing the gap in the long-run as blacks face fewer upgrading opportunities due to the relatively low levels of training acquired through job experience. The regression results are therefore also consistent with Lazear's hypothesis that does not necessitate an SLM based framework of thought.

Obviously, further research is needed to determine the source of the observed differences in the patterns of economic returns to labor market experience through occupational change between white male and minority workers.

#### Marital Status

Marital status entered the regression model of as a dummy variable

to control for the effect of marriage, and the corresponding lifestyle behavior patterns, upon the occupational upgrading process of workers. The estimated results proved to be very much in line with the a priori expectations.

Based upon the empirical evidence and the long held assumption that employers perceive that married male workers are more stable in their work behavior and firm attachment, it was hypothesized that marriage should positively enhance occupational changes of male workers. The results indicate that such a relationship does exist to some degree for occupationally mobile young and early prime age white male workers. However, the strength of the positive relationship is not as strong for young and early prime age black men. A relatively weak relationship was also indicated for late prime age men of both races. These findings are quite similar to those of Leigh(6),

In contrast to the expected positive relationship between marriage and occupational change hypothesized for men, a negative relationship was predicted for the female samples. Married females, particularly the young, have historically demonstrated erratic patterns of labor force participation thereby reducing the relative acquisition of on-the-job-training over time and creating a perception of instability in the minds of employers. The regressions support such a contention. For young and early prime age females of both racial groups, marriage generally reduced the return to occupational change, holding other variables constant. Also as expected, the strength of the negative influence is found to diminish over time as seen in the mixed results for late prime age white female workers.

## The Role of Structural Variables

### Initial Occupation

The correlation between occupational change and a worker's initial level of occupational standing proved to be the most consistent relationship demonstrated by the regression results across age, race, sex, and time. A priori, a negative correlation was expected because of the regression-toward-the-mean effect. This simply means that the higher one starts on an occupational hierarchy, the less likely one is to advance still higher and the more likely that downgrading will occur due to an occupational change, holding all other variables constant. Alternatively, just the opposite situation would be expected for those holding positions near the bottom of the hierarchy of occupations. Intuitively, the INITOCC coefficient can be viewed as a measure of the flexibility by which upgrading and downgrading can occur along the lines of occupational progression for the various groups under investigation.

Interpreting the results, the more negative the INITOCC coefficient, the less open the occupational hierarchy is assumed to be for the group of workers in question. Surprisingly, the values of the coefficients reveal very small differences in magnitude across cohort samples and across the cross-sections in time. Nearly all significant coefficients of the initial occupation variable were estimated to be less than unity and most in the range between .75 and .90. The regression-toward-the-mean affect appears to be a quite stable phenomena based on these results.

Segmented labor market models predict observable and systematic

differences in the ability of minorities to move along occupational hierarchies. Thus, SLM theorists would expect significantly different patterns between race and sex cohorts than those found in the results concerning the impact of the INITOCC coefficient. In fact, for some cases, the occupational hierarchy appears more upwardly flexible for blacks (for example, examine the young male regressions), however, the racial differences are very small and always insignificant.

Economic reasoning suggests that workers would find the ability to progress along the lines of occupational advancement to diminish during cyclical downturns in economic activity as upgrading opportunities decline in number. Comparing the values of the INITOCC coefficients in 1980 to the previous sample years, the regression-toward-the-mean effect does not appear to be significantly sensitive to cyclical swings. However, it should be noted that the absolute value of the negative early prime age black male INITOCC coefficients increase by roughly 25% between the 1977 and 1980 regressions. Changes of such magnitude are not found for the other sets of workers. This, therefore, may indicate that early prime age black men are faced with less favorable lines of occupational advancement relative to other cohort groups in recessionary periods.

Due to differences in model specification, direct comparison to the results of others cannot easily be made in this case. However, Dauffenbach finds "a more depressing effect of high initial earnings status for blacks (relative to whites) on the probability of achieving gains in earnings through mobility,"(7) while Leigh reports a "quite small" racial differential favoring whites for male workers during the 1965-1970 time frame.(8) Based on the current findings, such

conclusions cannot be decidedly drawn for all of the specified samples investigated in this study. The basic relationship between initial occupational position and occupational advancement through mobility found in previous studies, as indicated by the reported regression-toward-the-mean effect, is however, again indicated in the present results. Further, these findings are also compatible with the empirical sociological literature, including a study by Sorenson(9) examining occupational career paths.

#### Form of Mobility

Entered as a categorical variable in the regression model, FORM captures the expected differences in occupational attainment between internal and external movers, holding all other variables constant. Due to the costs associated with inter-firm occupational moves, and the importance of internal labor market ladders of job advancement, the results were expected to show significant advantages for internal movers relative to those who also changed employer. Based on the implications of the segmented labor market hypothesis, it was further expected that significant differences would result between occupationally mobile white and black, male and female, workers.

The resulting estimates of the FORM coefficients tend to support the expected relationships. Negative and highly significant FORM coefficients are found in the young and early prime age white male regressions, indicating that a substantial disadvantage for external movers in these cohort samples. Alternatively, the regressions do not indicate a significant positive return for internally mobile black men of young and early prime age. While the incidence of internal mobility



was found not to vary significantly between race in the male samples, the regression results tend to indicate that black men do not experience the same degree of occupational progression through internal hierarchies that is found for white men with like characteristics.

In most cases, the results for females indicate an apparent lack of significance in the FORM of occupational mobility with regard to changes in occupational position. Although, negative and significant FORM coefficients can be found in the young and early prime age white female regressions, it must be concluded that the relationship between occupational upgrading and the form of mobility is weaker in the case for female workers relative to their male counterparts. While these findings are not inconsistent with the predictions of SLM models, they should not be strictly taken as evidence that overt discrimination against economic minorities pervasively exists in the internal allocation of labor.

Finally, with regard to age, the results indicate that the return to internal mobility peaks during the early prime age years and declines in importance for late prime age workers of both sexes. As discussed in the last chapter, this finding may indicate that older workers have neared the top of internal hierarchies thereby reducing the potential return to further internal moves and that older workers may seek non-pecuniary returns through the mobility process in greater number than their younger cohorts.

Previous studies of occupational mobility that have addressed the issue of mobility form have been limited by data constraints to measuring external mobility only through various proxies reflecting changes in industry of employment. The data utilized in the current

investigation allowed the identification of actual inter-firm mobility. Therefore, direct comparison of the FORM coefficients to other regression models of occupational mobility is inappropriate. However, the current results tend to support and expand upon the findings of previous investigators such as Leigh(10) and the conclusions drawn by Dauffenbach(11) in his investigation of the various functions performed by the different forms of job mobility. Both of these earlier studies suggest that black males, during the 1965-1970 time period, did not enjoy the same promotional opportunities within internal labor markets as white males. Based on the current results, this conclusion can be tentatively drawn for females, as well as black males, for the three cross-sections investigated. Thus, the relative importance of internal occupational hierarchies does not appear to have increased for economic minorities over time.

#### Industrial and Regional Influences

Structuralist SLM theorists postulate that the labor market is dichotomized into primary and secondary sectors of employment due in part to varying institutional and structural arrangements between industries. Thus, the outcome of an occupational change is dependent upon the structure of the occupational hierarchy inherently different between industries of employment. Moreover, cyclical swings in economic activity and long-run realignments of the economy's macro structure will alter the opportunities for occupational advancement in differing magnitudes, and/or directions, across industries and geographic regions. Therefore, to insure proper specification of the regression model, dummy variables representing initial industry,

post-mobility industry, and region of employment are included as independent variables.

The regression results for these three structural variables demonstrate the weakest, and perhaps the least clear, relationship to changes in occupational position of any of the variables considered to be theoretically important determinants of occupational upgrading. The regression coefficients for the industry and regional variables are seldom significant in either the income or Duncan variants of the model for all cohort groups examined. Also, in several cases inconsistent signs are found between income and Duncan coefficients for industrial variables estimated for the same cohort cross-section sample. Based on these findings, the estimated effects of industry and region do not indicate that these structural variables have a systematic impact on the occupational upgrading process. Further, significant differences are not found between the results for white males and those recorded for blacks and females, thus giving little evidence for the existence of structural barriers to mobility for economic minorities resulting from industrial and regional characteristics.

These conclusions are consistent with the findings of other studies examining the determinants of worker success, including investigations of occupational upgrading. Kalachek and Raines,(12) also utilizing regression techniques, find that structural variables do not demonstrate a significant relationship in the determination of the wage structure for male workers, and that human capital variables are the most important indicators of potential earnings. Leigh includes initial industry and regional variables into his regression model of occupational change with results that are very similar to the ones

found here. Small and insignificant structural variable coefficients lead Leigh to conclude that "industry and region do not generally have important impacts on the occupational mobility of either black or white workers."(13)

Studies such as these, as well as the current investigation, suffer from the fundamental problem that categorical variables representing broad industrial and regional classifications may not accurately reflect the characteristics they are intended to capture. While institutional arrangements and job characteristics vary between industries and regions of employment, they also certainly vary between employers and firms within each industry and geographic region. Likewise, the impact of changing economic conditions over time that affect firms and occupational hierarchies are determined by a variety of factors of which industry and region are only two. Thus, the existence of structural barriers to mobility discussed by SLM theorists and cyclical variations in the mobility process across industries and regions may not be properly tested by such broad, nondiscriminating categorical variables.

#### Implications for Policy and Future Research

Before evaluating the policy implications of the evidence summarized in this chapter, it should be emphasized that studies such as this one that attempt to measure the returns to occupational mobility of individuals are subject to greater error than other empirical labor market investigations. Actual positions on the hierarchy of occupations must first be estimated before the economic rewards of occupational change can be measured. Because occupational

position may be determined by a variety of criteria, two measures of occupational ranking were utilized in this study. The results can only be as correct in as much as the income and Duncan ranking schemes accurately reflect the hierarchy of occupations.

Further biases may result from specification errors. An eclectic regression model was constructed to include variables theoretically important for both human capital and segmented labor market models; however, as previously discussed, the ability of regression analysis to capture all of the relevant characteristics of the structural variables can be questioned. This sort of specification bias is directly tied to the ability of the database to reflect the detailed information needed for a comprehensive analysis.

Finally, while the regression model was utilized on samples of individual workers that were homogeneous with regard to age, race, and sex, the possibility of sample selection bias still exists. It may be that the results of studies which employ samples containing only mobile workers are subject to "self selection bias." In other words, the samples of mobile workers are not truly random and representative of the entire labor force because individuals included in the samples have already elected to become occupationally mobile. The determinants of occupational upgrading are analyzed only for those who have become occupationally mobile, and thus, the results do not treat mobility as a random event. Therefore, it is suggested that the occupational position of mobile workers do not estimate reliably the occupational position that like individuals would have attained had they opted to become mobile. By disaggregating the data into samples with closely homogeneous characteristics, especially by age and sex, this study has

attempted to minimize the potential for a bias of this type. Statistical procedures recently developed by Heckman(14) to correct for self selection bias in regression models have been successfully utilized in studies concerning racial wage differentials(15) and should prove beneficial to future investigations of occupational mobility.

Keeping these caveats in mind, the evidence extracted from the regression model presented in these pages indicate several important findings relevant to labor market policy decisions. It is obvious that the individual determinants of occupational upgrading enter the occupational mobility process with different degrees of importance depending upon the age, race, and sex of the mobile worker. The indicated differences in the mobility process for the various cohorts of workers suggest that policies geared to enhance occupational attainment should be tailored to match the needs of specified target groups.

The results discussed here cast some doubt on the optimistic conclusions of earlier investigations which suggested that black occupational upgrading could effectively be enhanced by greater levels of human capital attainment. The current results do not indicate that formal education is generally of equal importance for occupationally mobile black and white male workers. However, part of the differences between the estimated returns to education between blacks and whites may be attributable to quality differences perceived by employers but not measured in the database.(16) It is not possible to determine if individuals that report identical levels of educational attainment possess like skills and attributes needed for occupational success. The relatively small marginal benefit of formal education estimated for the

black male samples may be alleviated in part by an increase in the relative quality of formal education and training received by minority workers. More research is needed to isolate and measure the potential impact of quality differences in education upon future occupational advancement.

Blacks with formal educational attainment near the upper end of the spectrum demonstrate the strongest and most consistent relationship between education and occupational upgrading, while educational attainment near the reference level does not appear to alter significantly the outcome of an occupational move for black men. Therefore, if educational policies are to enhance the occupational attainment of black males it appears they must succeed in helping blacks achieve levels of formal education over and above the norm.

The probability that advances in educational attainment will lead to greater levels of occupational progression appears to be greater for women of both races than for black men. While formal education appears to play an important positive role in occupational upgrading for women, it must be recalled that the results still indicate smaller absolute and relative returns to education for females compared to males. The samples utilized in this study also indicate that during the time periods under consideration, mobile women were employed in occupations that ranked high on the Duncan socio-economic scale, yet low on the predicted income ranking scale. This finding tends to suggest that educational achievement by women may be rewarded in terms of job prestige and non-pecuniary benefits as opposed to monetary compensation.

Clearly, then, the differences in the occupational distribution of

mobile women, evidenced by the divergence between the income and socio-economic rankings, affects the economic returns attributable to human capital endowments. The initial segregation of women into "female occupations" appears to control the realized economic rewards to occupational mobility. Even with policies designed to elevate female educational levels, income parity for women workers will not be achieved through mobility until the differences in the initial occupational distributions of male and females are further minimized. While the results suggest that the pursued lines of occupational progression are equally open to workers of both sexes they do not indicate that parity can be achieved through the occupational mobility process alone.

The results further indicate that differences do exist between white male workers and economic minorities within internal occupational hierarchies. Consistently significant advantages are found for internally mobile white males while the form of mobility appears to be less important for mobile blacks and females. Also, based on the findings concerning the role of labor market experience in the upgrading process of minorities, it appears that blacks and women may not be receiving adequate levels of informal and on-the-job-training that help determine the ability of individuals to rise within internal labor markets. These discouraging findings suggest that affirmative action and policies designed to encourage disadvantaged minority hiring and retention have not significantly opened internal occupational ladders for blacks and females. Such policies may need to be coupled with stronger programs designed to encourage the formation of personal endowments important to internal promotion. While the effectiveness of



previous government sponsored programs designed to place secondary sector workers in OJT programs and occupations that support career ladders have been hotly debated, the need for policies designed to open available lines of occupational progression for economic minorities is evidenced by the current results.

While this paper has not attempted to present the final authoritative word on the determinants of occupational upgrading and the evaluation of policies designed to enhance the upgrading process for disadvantaged workers is beyond the scope of this study, it is hoped that the results presented in these pages will enable future researchers and policy makers to gain a better insight into the process of occupational mobility.

## ENDNOTES

(1) Refer to Epstein for an indepth discussion on the hypothesized factors that create such an effect.

(2) Leigh, pp. 62-64.

(3) Leigh, p. 149.

(4) Leigh, p. 149.

(5) E. Lazear, "The Narrowing of Black-White Wage Differentials is Illusory," American Economic Review, LXIX (1979), pp. 553-564.

(6) Refer to estimated regression results concerning marital status reported by Leigh. pp. 166-179.

(7) Dauffenbach (1981), p. 27.

(8) Leigh, p. 67.

(9) A. Sorenson, "A Model for Occupational Careers," American Journal of Sociology, LXXX (1974), pp. 44-57.

(10) See Leigh.

(11) See Dauffenbach (1981).

(12) E. Kalachek and F. Raines, "The Structure of Wage Differentials Among Mature Male Workers," Journal of Human Resources, XI (1976), pp. 484-506.

(13) Leigh, p. 152.

(14) J. Heckman, "Sample Selection Bias as a Specification Error," Econometrica, XLVII (1979), pp. 153-161.

(15) D. Shapiro, "Wage Differentials Among Black, Hispanic, and White Young Men," Industrial and Labor Relations Review, XXXVIII (1984), pp. 570-581.

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