1984

Education, Job Complexity and Income in Segmented Labor Markets

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by

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A Dissertation Submitted to the Faculty of the Graduate School of Loyola University of Chicago in Partial Fulfillment of the Requirements for the Degree of Doctor of Philosophy

April

1984

ACKNOWLEDGEMENTS

I wish to extend my thanks to Dr. Kirsten Grønbjerg, Dr. William M. Bates, Dr. Helena Z. Lopata, and Dr. R. Peter Whalley for their patience and assistance. Special thanks go to my typist, Margaret Melville.

VITA

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CHAPTER I

STATEMENT OF THE PROBLEM

INTRODUCTION

The study of income inequality is an important area of sociological investigation since one's position in industrial society is in large part determined by monetary considerations. This income, for most members of industrial society, derives from their occupations and the sources of variation in income returns to differing occupations would seem deserving of detailed study. For the most part, however, stratification research has dealt primarily with individual status attainment to the neglect of income attainment (Bibb and Form, 1977). Further, even research focusing upon income attainment usually assumes an individualistic perspective (Beck, Horan and Tolbert, 1978).

The focus on the individual as the unit of analysis derives largely from theoretical approaches which argue that incomes are the direct result of characteristics of individual workers. For example, Davis and Moore's (1945) Functional Theory of Stratification and Becker's (1975) Human Capital theory both emphasize the importance of individual education to income.

Theory and research focusing on individual characteristics and their importance to status attainment are valuable in that they have provided insights into the operation of the American stratification system. However, empirical results suggest that the importance of individual education to income has been theoretically overstated (Lord and Falk, 1980).

A theoretical alternative to the presumed direct link between individual education and income is the "screening hypothesis" (Thurrow, 1980). In this model, individual education allows one access to occupations, and incomes are attached to occupations, not the individuals holding them.

Assuming that the occupation[1] is the critical link between individual education and income necessitates using the occupation as the unit of analysis. Accordingly, one of the purposes of this research is the examination of the relationship between the educational characteristic of persons occupying positions and income attached to these positions. In other words, does the individual level relationship between education and income hold at the occupational level as well?

The average education of all people in an occupation is not a direct measure of the educational characteristic/requirement of an occupation. However, the implicit assumption

of this research is that the average education of all people in an occupation reflects the educational characteristic/ requirement of the occupation. Further, this approach is defensible since the analysis is for one point in time and not over time.

A related area of concern of the present research is the nature of work itself. If income flows from occupational characteristics a vital analysis involves the manner in which the technical requirements of occupations contribute to income. Hence, a further purpose of this research is investigation of the relationships between complexity of mental work, people oriented work, and manual work, and income.

Unlike education, the nature of work variables are direct measures of characteristics of occupations since they are based on an "outside" evaluation, and not on the aggregate characteristics of individuals holding an occupation. It must be emphasized that this research also assumes that the education measure and complexity of mental work and people oriented work are highly related, while complexity of manual work is not related to these characteristics. If these assumptions hold this would serve to validate the education measure. These assumptions have other consequences which are discussed in a following section (Similarities between Human Capital and the Technical Structure Approach).

A second problem with previous theoretical and research perspectives is the assumption of a single, perfectly competitive, labor market. It has been assumed that the importance of variables such as education to income holds across social structures. However, recent work in the area of Economic Segmentation (e.g. Bluestone and associates, 1973; Osterman, 1975) challenges this assumption. This work suggests that the income determination process may differ in various sectors of the economy. In this study, therefore, using the occupation as the unit of analysis, I examine the role of education and job complexity as determinants of income in both the total economy (or single labor market) and within the context of economic segmentation by industry, occupation, and industry/occupation.

A third problem with previous research is its neglect of women or occupations held by women. Until quite recently most work has been done using males with the implicit assumption that the findings apply also to females. Further, even when recent research has examined the status attainment process among women it has not analyzed the allocation of income among occupations held by females. Accordingly, the present research performs each analysis separately for occupations held by males, occupations held by females, and a list of occupations which are held by both males and females, i.e. those occupations which appear in both the male and female lists. The purpose is to determine if whether or not the

income determination process is similar for occupations differentiated by gender incumbency.

There are several possible outcomes for the analyses comparing occupations held by males with occupations held by females: (1) in the total economy education and technical structure affect income equally for both with no substantial differences in any sector; (2) in the total economy education and technical structure do not affect both equally, but the mediating effects of sector may be (a) similar or (b) different; (d) in the total economy education and technical structure do affect both equally, but the mediating effects of sector may be (a) similar or (b) different.

The first possibility simply means that a single, perfectly competitive, labor market exists and this would support Human Capital and Technical Structure theory in this respect. The second possibility suggests occupational characteristics do not affect income in a similar manner for occupations held by males, and occupations held by females, which would necessitate a revision of Human Capital and/or Technical Structure theory along lines incorporating the gender incumbency of occupations. Further, if economic segmentation theory does not apply to occupations held by males or occupations held by females revision is also necessary taking into account the gender incumbency of occupations. The third possibility suggests that occupational characteris-

tics affect income similarly for both occupations held by males and occupations held by females. However, if the mediating effects of sector are different for both a revision of economic segmentation theory acknowledging the importance of the gender incumbency of occupations is necessary.

In short, outcome 2 implies that occupations held by males and occupations held by females are subject to different rules for income determination, while outcome 2b suggests differences also exist in economic sectors. Outcome 3 implies that occupations held by males and occupations held by females are subject to similar rules for income determination, but outcome 3b implies differences in the economic sectors.

A more critical examination of this argument is possible by performing each of the analyses outlined above for only those occupations shared by males and females. These occupations have, by definition, identical characteristics, and these characteristics should contribute to income in a similar manner for both genders if there is a single, perfectly competitive, labor market. On the other hand, if the income determination process in the total economy is different for males and females in identical occupations this is fairly strong evidence that there is not a single labor market, but that it is split by gender. Likewise, if economic

segmentation theory is not equally applicable among males and females in identical occupations, this would also be strong evidence that the mediating effects of sector are related to gender.

Overall, this research seeks to link the Sociology of Occupations with the Sociology of Labor Markets. This is a very important approach since incomes derive from the characteristics of occupations, but occupations exist within labor markets and the manner in which occupational characteristics contribute to income may vary in different labor markets. One cannot ignore occupations in the study of income inequality, but neither can one ignore labor markets (Stolzenberg, 1975).

The remainder of this chapter details the theoretical perspectives that form the basis of this study (Human Capital and Technical Structure) with specific focus on how education and technical characteristics of occupations may have differing relationships with income in the various economic sectors or labor markets.

INITIAL THEORIES

This section reviews Human Capital and Technical Structure theory and discusses similarities between them. It is called "Initial Theories" because these two approaches are first examined within the context of a single labor market (Total Economy). They then receive analysis within the context of economic segmentation by industry, occupation, and industry/occupation. The latter analyses determine whether or not the single labor market assumption is valid.

The emphasis of the Human Capital approach is the relationship between individual education and income attainment. The present research, however, assumes the validity of the screening hypothesis and examines if the individual level relationship holds at the occupational level. The Technical Structure approach uses the occupation as the unit of analysis.

Human Capital

Neoclassical economic theory explains income differences as deriving from individual workers "respective marginal productivities", i.e. the rate of output of goods and services of each worker in relation to input of labor (Montagna, 1977). A major development of neoclassical theory is the Human Capital perspective.

The concept of human capital refers to anything making a person more productive in a working environment, such as experience and educational attainment. In a competitive market based economic system, income differentials are expected to result from differences in individual human capital since employers will assume that the more human capital one possesses the more productive one will be on the job, and for greater productivity will pay greater wages (Berg, 1971; Stevenson, 1978). It is, therefore, in a person's best interests to obtain as much human capital as possible. This perspective suggests a direct relationship between individual education and income. The empirical evidence, however, calls this direct relationship into question. For example, while a more equal distribution of educational attainment has developed in the United States since the end of World War II, there has been no corresponding equalization of the distribution of income. (Jencks, 1972).

One possible alternative to the Human Capital perspective or the relationship between education and income is the "screening hypothesis" (Blaug, 1976). Briefly, employers face the problem of predicting the future performance of job applicants. Since many of the skills required for job performance are acquired on-the-job, employers use educational credentials as a device for selecting job applicants in terms of trainability (Blaug, 1976). Thurrow (1980) refers to the "screening hypothesis" as the "job competition model."

Since employers used educational credentials to select employees, individuals actually use their credentials to compete for the most lucrative occupation possible. In short, higher education allows access to the more lucrative occupations and income is attached to occupations and not to educational credentials of the individuals holding the positions (Hussain, 1982).

The use of educational credentials as a "screening device" and/or a resource for "job competition" has important implications for the study of income inequality. If individuals compete for jobs with their educations, it follows that the occupation is the critical link between individual education and income. Further, if occupations provide the link between individual education and income, it follows that the characteristics of occupations determine their level of monetary reward and thus the incomes of individuals holding them.

In this research the occupation is taken as as the basic unit of analysis for the study of income inequality, and the relationships between occupational characteristics and income which will be examined.

Technical Structure

Occupations have been taken as the basic unit of analysis in one research tradition, one we shall call the technical

structure approach. Occupations vary in other characteristics in addition to educational requirements. The Technical Structure approach focuses directly on these aspects.

In a major work in this tradition Reiss (1961) noted several characteristics of occupations. The most important for our purposes are characteristics of "...the task: whether one manipulates symbols, physical and/or social objects...". His argument relates the social evaluations of tasks to level of occupational status. According to U.S. cultural norms, mental work (symbols) confers the most status and people oriented work (social objects) enjoys a similar position; while manual work (physical objects) confers the least status.

Fligstein, Hicks and Morgan (1979) suggest that the nature of work should influence income in a manner paralleling that for status and also maintain that the increasing complexity of each form of work should lead to greater monetary reward. They argue that (1) the greater the complexity of each form of work, the more productive the position, or at least it will be perceived to be so; (2) qualified incumbents for more complex positions are generally scarcer; (3) the productivity of more complex positions is difficult to evaluate, therefore (4) incumbents of more complex positions are able to influence evaluations of their own productivity. Hence, more complex tasks produce greater income.

Overall, therefore, in this tradition variation in income is related to the cultural evaluations of the "value" of mental work, people oriented work, and manual work (Reiss, 1961), and within each form of work increasing complexity also contributes to income (Fligstein, and associates, 1979).

Similarities Between the Human Capital and Technical Structure Approaches

There are three similarities between these two approaches which are important for the present research.

First, it is apparent that both approaches assume a single, perfectly competitive, labor market since no distinctions are made regarding economic segmentation, gender incumbency of occupations, or any other criterion.

Second, each approach suggests a positive relationship between the explanatory variables and income which involves arguments about productivity. In the case of the human capital approach, greater education leads to greater productivity. For the technical structure approach, increasing complexity with each form of work results in greater productivity.

Third, Fligstein, and associates (1979) suggestion that "qualified incumbents for more complex positions are generally scarcer" suggests a critical similarity: The more complex the technical structure of the position, the greater are its

human capital requirements.

As a result, under perfect competition (or a single labor market), high technical structure requirements and high human capital requirements should occur together among occupations. Further, each characteristic would similarly affect income owing to the greater productivity resulting from such characteristics.

A qualification is necessary. Complex mental work (e.g., data analysis) or people oriented work (e.g. negotiating) coincides with equally high educational requirements (e.g., professional training), and each of these three occupational characteristics are expected to have a similar influence on income. However, the most complex manual work (e.g., precision work) does not require the same amount of formal education as the most complex mental work or people oriented work, since much of the training for complex manual occupations takes place outside the formal educational system (i.e. apprenticeship system). Therefore, formal education does not entirely measure the human requirement of manual occupations. As a result, increasing complexity of manual work and its corresponding educational requirement would not influence income in a similar fashion. Education should have a much stronger relationship with income than manual work.

However, this doesn not negate the fact that increasing complexity of manual work yields greater monetary reward

among manual occupations. This has important consequences for economic segmentation by occupational sector, which are discussed in a following section.

SEGMENTED ECONOMY CHALLENGES

Both the Human Capital and Technical Structure approaches assume a single, perfectly competitive, labor market. However, the literature on economic segmentation challenges this basic assumption. Various theories of a segmented economy all emphasize that the American economic system has undergone structural changes resulting from the concentration and centralization of capital which have partitioned the total economy into various segments, each characterized by unique structural arrangements. These different structural arrangements, or social organizations, have been shown to be important for absolute income, and it has been argued that the income determination process differs in the various sectors.

It seems useful to outline the historical roots of economic segmentation. According to Reich, Gordon and Edwards (1973) the process began around the turn of the century.

During the period of competitive capitalism (prior to 1890) the labor force was quite homogeneous owing to the factory system eliminating many crafts, creating large pools of semi-skilled jobs, standardizing work requirements, and generally creating common work environments. From 1877 - 1920 (roughly) there also occured much labor unrest indicating "a wide-spread and growing opposition to capitalistic hegomony in general" (1973:360). At the same time (1877 -

1920) olgolopistic/monopolistic elements began emerging in the capitalistic economy. Corporations sought to consolidate their power through control of product production and markets for product consumption. The labor unrest of the period threatened this objective, and employers developed techniques to "divide and conquer" the labor force. These strategies were aimed at changing internal relations within the firm and included scientific management, bureaucratic organization, the institution of different job ladders and patterns of promotion for "white collar" and "blue collar" employees, and the use of education as a credentialing device to regularize skill requirements. Education as a requirement for entering a job also helped perpetuate the distinction between factory work and office work, and led to division among white collar workers as well. Other techniques aimed at creating antagonisms among workers involved the exploitation of racial, ethnic, and sex differences, as well as pitting industrial unions against craft unions.

There is a link between the conscious efforts of employers to create occupational segmentation and segmentation by industry. Another technique of employers to increase their control over workers involved the restriction of benefits to continued employment with the same company. To combat this employer tactic industrial unions, as they gained power, were able to transform some firm-specific benefits into industry-wide priviliges. "The net effect was an intensifi-

cation not only of internal segmentation, but also segmentation by industry..." (1973:362).

There are additional sources of segmentation by industry-systemic forces having the consequence of reinforcing occupational segmentation beginning with conscious employer efforts. "As different firms and industries grew at different rates, a dichotomization of industrial structure developed" (1973:363). This division took the form of larger, more capital intensive firms (the core) characterized by barriers to entry, advanced technology, market power, economies of scale, and high rates of profit, versus smaller, more labor intensive firms (their periphery) not possessing these characteristics to the same degree. The core firms, however, did not "swallow-up" the periphery firms. Given their huge investments in capital, the larger firms required stability of markets and planning. In uncertain market situations the larger capital intensive firms found it convenient to export production to the smaller labor intensive firms. This tactic helped create and maintain industrial dualism.

The industrial segmentation helped reinforce occupational segmentation since the core firms, with more stable production and markets, required equally stable internal relations. Hence, a further need for bureaucratic organization, etc. In the periphery, where production and markets were unstable, jobs tended to be unstable as well. "The result was the

dichotomization of the urban labor market into 'primary' and 'secondary' sectors..." (1973:363-64).

Reich, Gordon and Edwards' (1973) account of economic segmentation emphasizes the reinforcing nature of occupational and industrial segmentation. On the other hand, theoretical treatments tend to emphasize one or the other forms of segmentation. These theories have also been concerned with variation in the influence of individual education on income in the sectors, and have neglected the influence of technical structure. Hence, I discuss the influence of education first. A separate section deals with variation in the influence of technical structure on income in the sectors.

Industrial Segmentation and the Relationship Between Education and Income

Bluestone, and associates (1973) have suggested that the economy consists of two distinct industrial sectors: core industries, characterized by high productivity, high profits, capital intensiveness, monopoly elements, a high degree of unionization and higher wages; and peripheral industries which have almost opposite characteristics and offer lower wages.[2]

The differing characteristics suggest differences in social organization which, in turn, mediate the income determination process. Bluestone, and associates (1973) place

emphasis on the greater extent of formal bureaucratic income setting procedures in core industries and their relative absence in peripheral industries. Education is less important to income in core industries because the rules limit the ability of employers to reward background characteristics. In contrast, education is more important to income in peripheral industries because an absence of rules allows employers more latitude in rewarding background characteristics, such as education.

Occupational Segmentation and the Relationship Between Education and Income

In contrast to the industrial segmentation literature is the literature which focuses on occupational segmentation. Reich, Gordon and Edwards (1973) divide the occupational structure into three segments; independent-primary, subordinate-primary, and secondary. Both categories of primary jobs require stable work habits. The differences between the two involve higher wages and more promotional opportunities for the former. Further, independent-primary jobs require creative problem solving, while subordinate-primary jobs are more routine in nature. Secondary jobs have opposite traits, e.g. unskilled, few promotional opportunities, low wages.

Gordon (1972) maintains that in the primary sectors income is determined by one's (1) access to specific job

clusters, (2) wages attached to job clusters, and (3) speed of advancement through job clusters; with education serving as a critical mediating factor since employers use it as a credentialing device and a measure of potential productivity. Hence, education should be strongly related to income in the independent-primary sector owing to its credentialing function and high degree of promotional opportunity in this sector. In the subordinate-primary sector education should also be strongly related to income, but to a lesser degree. These types of jobs are more routine in nature, but they do require traits of stability, dependability and trainability, and employers assume that possession of varying amounts of education signifies these traits. In the secondary sector wages do not reflect variation in individual characteristics as much as the supply and demand for workers. Consequently, wages will gravitate toward a homogeneous level. Hence, education should exert very little influence on income in this sector.

Industrial/ Occupational Segmentation and the Relationship Between Education and Income

A third approach combines industrial segmentation with occupational segmentation and examines the simultaneous effect of location in industrial/occupational sectors.

Hodson (1978) argues that the highest earnings occur in the core/primary sector and the lowest earnings in the peri-

pheral/secondary sector.[3] Income in the core/secondary and peripheral/primary sectors are intermediary. The characteristics of core industries (e.g., centralized capital, control over markets, extensive unionization) are responsible for the income differences.

Hodson (1978) places emphasis on industrial location. However, a critical issue is the identification of those occupational sectors in which industrial traits have little importance in the income determination process.

Spillerman (1977) notes that among "professional" and secondary sector occupations "the salience of employer characteristics is much reduced" (1977:580). The independent-primary sector is dominated by "professional" occupations, and their characteristics (e.g. knowledge which is not firm specific and confirmed by educational credentials) make for a "national labor market" resulting in "relatively small variance across firms in salaries for individuals with comparable backgrounds" (1977:580-81). Among secondary sector occupations the situation is similar but for different reasons. These jobs are unskilled, lack unionization, and offer little opportunity for advancement. Hence, "industry characteristics are of little salience because workers in secondary jobs do not accrue seniority rights which might bind them to an employer" (1977:581).

Spillerman (1977) does not discuss variation in the im-

portance of education to income, but his discussion implies that location in either core or peripheral industires makes little difference among independent-primary occupations because of their skills and credentials, or among secondary occupations because of their lack of skills and unionization. As a result, education should be most important for income in both core and peripheral independent-primary occupations, be of little importance for income among secondary occupations with little difference by industrial location.

The core/subordinate-primary and peripheral/subordinate-primary sectors are problematic because of the diversity of occupations within them. Since, however, peripheral industries are more likely to reward on the basis of education (Bluestone and associates, 1973), it is probably safe to assume that education would influence income to a somewhat greater degree in the peripheral/subordinate-primary sector.

Economic Segmentation and Relationships between Technical Structure and Income

The Economic Segmentation literature has not so far dealt with relationships between the technical structure of work and income. However, since complex mental work and people oriented work both require greater educational requirements, then it is reasonable to suggest that the manner in which the characteristics of the economic sectors mediate the influence of education may apply equally to mental work

and people oriented work.

The variation in the influence of manual work on income is a special case since the assumption that complex technical requirements run parallel to education requirements does not apply here. However, given the low evaluation that American society places on manual work (Reiss, 1961) its influence should be minimal in core and peripheral industries. On the other hand, manual work may have a strong influence on income in the subordinate-primary occupational sector since many of these occupations have complex manual skills and increasing complexity of any form of work results in greater income (Fligstein and associates, 1979). Similarly, the possibility of a strong influence of manual work in the subordinate-primary occupational sector holds regardless of industrial location, but the effect may be stronger among peripheral/subordinate-primary occupations because of the lack of income setting procedures in peripheral industries. Manual work should not influence income in the independent primary occupational sector since this type of work is not characteristic of these types of occupations. Manual work should also not influence income in the secondary sector since these occupations lack occupational skills. These latter formulations hold regardless of industrial location.

SUMMARY

Previous research has generally examined the relationships between individual characteristics and income. This type of research is valuable in that it provides insights into mobility and status attainment, but an alternative view (the screening hypothesis or job competition model) suggests that individual characteristics such as education, are used only to allow access to occupations, and that incomes are attached to occupations and not the individuals holding them. In other words, the occupation is the link between individual education and income, and the occupation should be the unit of analysis.

The present research builds on this argument and exmines the relationships between occupational characteristics and income. Two major theories receive examination: Human Capital and Technical Structure. For Human Capital the relationship between the educational characteristic of the occupants of occupations and income is the focus. For Technical Structure the area of concern is relationships between complexity of the occupations' requirements for mental work, people oriented work, manual work on the one hand, and income on the other hand.

Our first investigation looks at these relationships within the context of a single labor market, i.e. the total

economy. Our second approach looks at these relationships within different economic segments.

If the Human Capital and Technical Structure theories are correct in their assumption of a single, perfectly competitive, labor market there should be no variation in the manner in which each occupational characteristic relates to income in the total economy compared to the economic sectors. On the other hand, if variation exists this provides evidence that the income determination process at the occupational level varies according to sector, and thus challenges the assumption of a single labor market.

A third step is to perform each analysis separately for occupations held by males, occupations held by females, and a list of identical occupations held by males and females. Most previous research has dealt only with males and assumes that the results apply to females. However, this is an assumption that requires empirical verification, especially at the occupational level.

If it is found that occupations held by males and occupations held by females are subject to a different income determination process in the total economy and/or the economic sectors, this would suggest that occupations differentiated by gender incumbency exist in different environments with separate sets of "rules." Further, if similar findings hold for identical occupations held by males and females this

suggests that different "rules" apply on the basis of gender itself. Findings such as these would necessitate the revision of existing theoretical approaches to income determination incorporating gender.

The research reported in this study is presented as follows. Chapter Two discusses previous research and offers expectations for the present research. Chapter Three presents the research methodology. Chapter Four contains results of the Total Economy Analysis. This analysis serves as a bench mark for the analyses according to the economic segmentation theories. These findings also indicate if occupations held by males, occupations held by females, and identical occupations held by males and females are subject to similar or different rules for income determination in the total economy or single labor market.

Chapter Five presents results for the industrial segmentation analysis. In order for this perspective to receive support there must be substantial variation in relationships between occupational characteristics and income between Core and Peripheral industires and between each of these and the total economy. Further, occupations held by males, occupations held by females, and identical occupations held by males and females must show similar patterns in order for this perspective to apply to all of them. Chapter Six discusses results for the occupational segmentation analysis

If these approaches are to prove useful the same types of patterns noted to Chpater Five must occur. Chapter Eight offers an Overall Summary and Conclusions.

Footnotes for Chapter One

1. An occupation is defined as "the social role performed by adult members of society that directly and/or indirectly yields social and financial consequences and that constitutes a major focus in the life of an adult" (Hall, 1975:6).

2. Bluestone, et. al. (1973) also mention a "hidden economy" which refers to a sector paying for labor in cash and/or involving illegal activities.

3. Hodson (1978) actually uses the terms "monopoly" and "competitude" which refer to the core and periphery, respectively. This research uses the terms core and periphery.

CHAPTER II

PREVIOUS EMPIRICAL RESEARCH AND EXPECTATIONS

GENERAL INTRODUCTION

Using the occupation as the unit of analysis, the purpose of this research is to determine how education and varying kinds of task complexity contribute to income. The major purpose, however, is to find out if the income determination process in both the total economy and its various segments varies according to the gender incumbency of occupations.

This chapter consists of three major sections which review relevant previous work. The first section summarizes work in the Human Capital tradition that pays particular attention to the affect of education on income. The second section discusses previous findings about the influence of the nature of work (technical structure) on income. The third section reviews research which looks at the influences of education on income according to economic segmentation.

The previous research guides the expectations for the present research. It must be emphasized that the Human Capital tradition and the various economic segmentation perspectives always use the individual as the unit of analysis. Such an approach is valid and suggests how individual

characteristics relate to income in a single labor market (Human Capital) and if individual characteristics reveive differential rewards according to variation in location in the labor market (Economic Segmentation). However, analyses of individual characteristics do not reveal how the characteristics of occupations are rewarded in a single labor market, or if occupational characteristics are differentially rewarded according to location in the labor market.

The latter possibilities are a major concern of the present research which assumes the validity of the "screening hypothesis" or "job competition model." Therefore, since the individual level findings provide the major expectations for the present research, a major issue is whether or not the income determination processes occuring at the individual level hold at the occupational level as well.

RESEARCH IN THE HUMAN CAPITAL TRADITION

This review focuses on the relationship between individual education and income. Not surprisingly, previous research has found a positive relationship between individual level education and income for both men and women. However, the importance of education to income is greater for the former than the latter. Several explanations for this difference have been advanced. One of the more popular arguments involves discrimination against women who are underpaid relative to their level of formal education because female education is thought to be, in various ways, inferior to male education.

However, the screening hypothesis suggests a different interpretation involving discrimination. The screnning hypothesis argues that individuals compete for occupations using their educations as a credential, and that incomes are attached to occupations. If it can be demonstrated that occupations held by males and occupations held by females have similar educational requirements, but the latter have less income, an argument involving occupational income discrimination is appropriate. This section seeks to demonstrate the validity of this argument.

Individual Education and Income

Becker (1975) finds that college graduates earn more than high school graduates; both percentage and absolute differences "are substantial and rise with age." For example, in the 25-29 age group college graduates in 1939 earned about 30% ($450) more than high school graduates; while in the 45-54 age category the difference is roughly 60% ($1700).[1] Similar differences obtain for a 1949 sample composed of all whitle males.

It is argued that "five independent adjustments for differential ability - adjustments that cover such diverse influences rank in class, IQ, father's education and occupation, personality, ability to communicate, motivation, and family upbringing - all suggest that college education itself explains most of the unadjusted earnings differentials between college and high school graduates" (1975:166).[2]

Becker's argument is noteworthy, but he does admit that females are not able to capitalize on education to the same extent as males. His explanations involve: (1) the lower labor force participation of women, (2) the prejudice against higher education for women, and (3) the argument that women go to college partly to "increase the probability of marrying a more desirable man."

Other explanations for the lower returns from education for women include: (1) the deterioration and obsolesence of

education because of sporadic work histories (Featherman and Hauser, 1976); (2) restricted occupational opportunities (Treiman and Terrell, 1975; Burnstein, 1979; Semyonov, 1980) and (3) income discrimination (Treiman and Terrell, 1975; Featherman and Hauser, 1976; Taylor, 1979). Females may also receive educational training for occupations which do not pay as well as those occupations for which men receive training, e.g. social workers versus engineers.

Restricted occupational opportunities seems an important factor to the situation of females. With their concentration into clerical occupations there may be an oversupply relative to demand, and this would bring wages down (Stevenson, 1978). However, income discrimination itself also seems part of the picture since women with the same amount of education as men, who also hold occupations of similar status, receive 38% less income than men (Sutter and Miller, 1973).

The observation that women with comparable education and occupational status as men receive less income is particularly important in light of the "screening hypothesis." If men and women use their educations to compete for, and qualify for, occupations of similar status, then the educational requirements of these occupations must be similar. An argument for income discrimination emphasizing individual characteristics is a possibility. However, if occupations held by men and occupations held by women have similar educa-

tion requirements this would suggest that it is the occupation that is underpaid relative to its educational requirements, rather than the individuals education per se. Further, if this should also be the case among occupations held by both men and women this would suggest that the occupation is underpaid relative to its educational requirement on the basis of gender.

Overall, then, a weakness of individual level arguments is that they ignore the fact that men and women can have similar educations and that they use these educations to compete for occupations with similar educational requirements. Income inequality may result from less reward accompaning the educational requirements of occupations held by females than the rewards accompanying the educational requirements of occupations held by males.

Summary and Expectations for the Present Research

Increased education results in greater incomes for both men and women, but women are not able to capitalize on their educational attainment to the same degree as men. This holds true for men and women with similar educations and holding occupations of similar status. In light of the "screening hypothesis" this suggests an alternative to the argument that income discrimination is based on individual characteristics. It is not individual education per se of women that is underpaid, but rather, the educational require-

ments of the occupations they hold do not result in income to the same extent at for occupations held by men.

Hence, for the Total Economy analysis, the expectation is that education is important to the incomes of occupations held by males and occupations held by females, but more important for the former. In other words, the individual level relationships hold at the occupational level.

RESEARCH INVOLVING THE TECHNICAL STRUCTURE OF OCCUPATIONS AND THE INFLUENCE ON OCCUPATIONAL STATUS AND INCOME

A major assumption of this research is that income derives from the characteristics of occupations. The technical structure approach suggests that a major determinant of income is the type of work required of an occupation. Those occupations involved with mental work and people oriented work receive the highest incomes, while occupations involved with manual work the least incomes. Further, increasing complexity with each form of work results in greater income.

This perspective makes no distinctions for the gender incumbency of occupations. However, if occupational income is thought to derive from the nature of work, then whether or not the technical requirements of occupations held by males and occupations held by females are the same is quite important. That occupations held by women receive less income than occupations held by men is well known, but explaining the difference remains an empirical issue, and most attempts have focused on the characteristics of individuals rather than on the characteristics of their occupations.

Focusing on the nature of work allows for alternative explanations to the individualistic ones. Less income may

derive from occupations held by women having less complex technical requirements. On the other hand, an argument emphasizing occupational income discrimination would be appropriate if occupations held by men and occupations held by women have similar technical requirements.

The technical requirements of occupations are direct measures of occupational characteristics. This analysis, therefore, provides a more rigorous test of the occupational discrimination argument than the one using education because the measure of education is an indirect measure of this occupational characteristic.

Previous research in this area is exceedingly rare.[3] Even the one major study found (i.e. McLaughlin, 1978) focuses on the contribution of the nature of work to occupational status (SEI), but given the strong correlation between SEI and income; the assumption here is that the nature of work would have a similar influence on income as SEI.

Technical Structure Characteristics of Mixed, Male, and Female Occupations

Mixed occupations (those which are roughly 50% male and female) have the highest complexity of mental work and people oriented work but minimal involvement with manual work (McLaughlin, 1978). Male occupations have greater involvement with symbols and physical objects (McLaughlin, 1978), and this holds if male and female occupations are further

differentiated by the white collar/blue collar dichotomy (England, et. al. 1982). For working with people, there is evidence suggesting that female occupations have a more complex task structure than do male occupations (McLaughlin, 1978), but there is also a qualitative difference since the former are found to "nurture" people, while the latter "wield power" over people, and this holds for the white collar/blue collar dichotomy (England, and associates, 1982). Hence, occupations differentiated by gender incumbency do show differences in technical requirements.

The next question is how the technical requirements of these occupations influence income and if there are any differences for occupations differentiated by gender incumbency.

Cullen and Novick (1979) do not differentiated occupations by gender composition, but they do find that mental work and people oriented work positively influence the income of occupations, with the former having a somewhat greater effect. Manual work, however, has little influence on income.[4]

On the other hand, differentiating occupations by gender composition shows that among mixed occupations increased status (SEI) largely comes from mental work. Working with people has no influence, while manual work has a negative effect. The status of male occupations is most influenced

by mental work, but involvement with people or manual work has no effect. Among female occupations mental work does not influence status, and involvement with people or manual work negatively influences status (McLaughlin, 1978).[5]

While McLaughlin's (1978) analysis deals with the influence of each form of work on SEI they are instructive if it can be assumed that the nature of work influences income in the same manner as SEI. In other words, contrary to the technical structure argument, not all forms of work may positively contribute to income and the nature of the influence may depend on the gender incumbency of occupations.

England, and associates (1982) do not examine the influence of each form of work on income, but rather estimate the contribution of each form of work to the gender earnings gap. They find that there are differences in the technical requirements of occupations held by males and occupations held by females (see above), but that these differences are of little importance in explaining the gender earnings gap. On the other hand, they do conclude that if occupations held by females have similar technical requirements as occupations held by males they are systematically underpaid for their technical requirements. This latter finding is quite important since it suggests occupational income discrimination.

Summary and Expectations for the Present Research

McLaughlin (1978) finds that only manual work consistently has a negative influence on status for all occupations. In contrast, mental work and people oriented work do not have the same influence on status for occupations held by males and occupations held by females. Overall, the Technical Structure approach needs to incorporate the gender incumbency of occupations into its framework. There is also evidence (England, and associates, 1982) of occupational income discrimination since occupations held by females receive less income than occupations held by males with similar technical requirements.

Using McLaughlin's (1978) findings, the first expectation for the Total Economy analysis is that mental work is positively related to income among occupations held by males and occupations held by males and females, but that it is not related to income among occupations held by females. A second expectation is that people oriented work is not related to income among occupations held by males, and occupations held by males and females, but that it is negatively related to income among female occupations. A third expectation is that manual work has either no relationship or a negative relationship with income among all occupations.

RESEARCH BASED ON ECONOMIC SEGMENTATION PERSPECTIVES

Economic Segmentation theories argue that the income determination process is different in sectors of the labor market. As a result, these theories challenge the assumption of a single, perfectly competitive, labor market made by both the Human Capital approach and the Technical Structure approach. This section summarizes research from three perspectives: segmentation by industrial sector, segmentation by occupational sector, and segmentation by industrial/occupational sector.

The explanatory technique of Economic Segmentation research is unique. The individual is the unit of analysis, but arguments for differences in the income determination process are structural. Individuals are grouped according to sector location, and their characteristics (e.g. education) measured. Regression equations determine the influence of various individual characteristics on income in the sectors.[6] If there are any major differences in the explanatory power of individual characteristics for income between or among sectors, the income determination process is said to be different. However, accounting for variation in the income determination process by sectors uses structural arguments. In the case of industrial segmentation, it is argued that the characteristics of the industrial sectors in which individuals

are located make individual characteristics more or less important to income. In the case of occupational segmentation, it is argued that the characteristics of the occupations held by individuals in the sectors make individual characteristics more or less important to income. Industrial/occupational segmentation explains variation in the importance of individual characteristics to income by suggesting how simultaneous location of individuals in both sectors has an effect on the importance of individual characteristics to income. In short, the structural features of labor market sectors mediate the importance of individual characteristics to income.

The present research groups occupations according to sector location and examines if the structural traits of sectors mediate the influence of occupational characteristics on income in a manner paralleling that for individual characteristics.

There are some weaknesses in economic segmentation research. The arguments that the structural features of labor market sectors mediate the importance of individual characteristics to income are theoretical and often not empirically demonstrated. A major weakness of this type of research is that differences in the income determination process are said to exist solely on the basis of comparing sectors with one another. In other words, no comparisons are made with the income determination process in the total economy, or

single labor market. This latter type of comparison seems necessary because if the income determination process within a sector does not substantially differ from that in the total economy, the sector cannot be genuinely considered a separate sector. Thus, a major advantage of the present research is that comparisons are made with the total economy.

Other problems with Economic Segmentation research are more matters of neglect than weaknesses. The research does not always examine differences in the income determination process separately for men and women. Much of the research uses males only and assumes that the findings apply to females. The present research overcomes this deficiency by performing all analyses separately for occupations held by men, occupations held by women, and identical occupations held by men and women. Previous research has also ignored the possibility that the nature of work may vary in influences on income in the sectors. However, if income flows from occupational characteristics it is important to examine if each form of work has a differential relationship with income in the different sectors.

Industrial Segmentation Research

This approach argues that the economy is made up of two distinct industrial sectors: core and periphery. The core is characterized by high productivity, high profits, capital intensiveness, monopoly elements, and a high degree of unionization. These traits allow for higher wages and better working conditions. The periphery has almost opposite features and, thus, offers lower wages, etc. Further, the differing characteristics of the two sectors, it is argued, foster different social organizations which mediate the influence of education upon income.

It is quite important to note, however, that while there is considerable similarity, there is no strict agreement as to which general industries are core and which are peripheral. The reader should refer to footnotes for procedures concerning the allocation of particular industries to the core and periphery. It is difficult to determine the extent to which differences in sector typologies affect the findings. There is considerable similarity on the differences in the characteristics of core and periphery workers. On the other hand, there is contradictory evidence concerning the importance of education to income in the core versus periphery. These latter findings, however, seem more sensitive to the manner in which education is measured, i.e. "years of schooling" versus "highest degree earned," and thus suggest that school-

ing versus credentials may be quite important to variation in the income determination process in the industrial sectors.

Differences Between Core and Periphery Workers

The previous research is in agreement on several characteristics. Core sector workers have more schooling and better educational credentials, are more likely to be white males, have higher occupational prestige, and are more likely to belong to a union and work more hours per week than peripheral workers (Beck, and associates, 1978; Tolbert, and associates, 1980). Core and periphery workers show no differences in age, or in unemployment rates (Beck, and associates, 1978;[7] Tolbert, and associates, 1980).[8]

Core workers also have higher incomes than peripheral workers (Beck, and associates, 1978; Tolbert, and associates, 1980). These findings hold for subpopulations broken down by race, sex, and education (Hodson, 1978).[9]

The income difference between all core and periphery workers also holds for craftsmen, operatives, and laborers (Wachtel and Betsey, 1972;[10] Dalton and Ford, 1977;[11] Bibb and Form, 1977);[12] and clerical (Dalton and Ford, 1977); and service workers (Bibb and Form, 1977). These findings also hold while controlling for various human capital characteristics, e.g. education (Wachtel and Betsey, 1972; Dalton and Ford, 1977; Hodson, 1978), experience, tenure in indus-

try, and tenure in occupation (Dalton and Ford, 1977).

All interpretations of the greater incomes of core workers involve the greater degree of market control, profit maximization, capital intensiveness, and unionization of core industries compared to peripheral industries. these industrial traits all help in providing considerable profits which may be translated into higher incomes for core workers.

For the purposes of the present research the most important of the above patterns are their showing the greater education and income of core workers. The next question involves the importance of education to income in the industrial sectors.

Bluestone, and associates (1973) find that increases in education yield increases in income, but the degree of improvement is greater in peripheral industries.[13] A lack of formal income setting procedures in this sector allows employers more latitude in rewarding individual characteristics. In contrast, core industries have established income setting policies, and therefore employers do not have much discretion in rewarding individual characteristics. Similarly, Beck, et. al. (1978) find that "years of schooling" is not related to income in core industries; while it positively affects income in the periphery. However, when they measure education according to "highest degree earned"

the opposite pattern obtains.[14] These findings "suggest that the earnings return to education in the core sector rests on the acquisition of a formal degree...in the peripheral sector economic benefits are derived from additional years of schooling, not from increases in...levels of certification" (1978:715). However, Tolbert, et. al. (1980)[15] find that education, measured in "years of schooling" exerts a greater effect on income in core industries.

While there is some contradictory evidence on the influence of education on income in the sectors, the findings do suggest that the assumption of a single, perfectly competitive, labor market is questionable. This raises the issue of whether core and peripheral labor markets themselves are subject to further splits according to gender.

All of the research cited above finds that females earn less than males in both industrial sectors, but that they have higher incomes in core industries. The only research cited above which examines differential income returns from education by industrial sector and gender is Bluestone, and associates (1973).[16] They found that for both genders education is more important to income in peripheral industries, and that the above explanation involving the lack of income setting procedures applies. However, males receive greater income from education in both industrial sectors and this is attributed to a lack of promotional opportunities and discrimination experienced by females in both the core and

periphery. Hence, it seems that the core and peripheral industrial labor markets are each split according to gender.

Summary and Expectations for the Present Research

It seems well established that core industries offer higher incomes than peripheral industries. The fact that this obtains despite differences in samples, sector construction, and under various controls is noteworthy. All of this suggests the validity of industrial segmentation theory, at least for differences in individual income. Similarly, while they are inconclusive, the findings for variation in the influence of education on income do suggest that the social organizations of core and peripheral industries mediate the importance of education to income. However, at the individual level of analysis the exact nature of this mediation remains an empirical issue.

The present research groups occupations according to location in core and peripheral industries and examines if the individual level findings hold at the occupational level of analysis.

Using the findings of individual level research as the criterion, the present research also expects higher income for all occupations in core industries than in peripheral industries, but incomes for occupations held by males are higher than incomes for occupations held by females in both

industrial sectors. The different findings for the influence of education on income in the sectors necessitate alternative expectations which are based on the measurement of education, i.e. "years of schooling" and "highest degree earned." At the individual level "years of schooling" measures one's cumulative knowledge, but at the occupational level measuring education in this manner suggests the knowledge requirements of occupations. If "years of schooling" is more important to income in the periphery than in the core, this might suggest that the lack of income setting guidelines in the periphery allow employers more latitude in rewarding the knowledge requirements of occupations. On the other hand, if education is more important to income in core industries than in peripheral industries, this might imply that the knowlege requirements of occupations are part of the income setting process. Finally, if there is no variation between the core and periphery for the influence of education on income, this means that both industrial sectors use the knowledge requirements of occupations to determine income in the same fashion.

Previous research finds that if education is measured according to "highest degree earned" it is more important to income in core industries than in peripheral industries because the former are more likely to employ credentialism. At the individual level "highest degree earned" measures one's possession of a credential, but at the occupational level it

measures the credential requirements of occupations. The expectation for the present research is that a "degree" will be more important to income in core industries than in peripheral industries. If, on the other hand, there is no variation between sectors for the influence of a "degree" on income, this suggests that both sectors reward the credential requirements of occupations in a similar manner.

Regardless of which industrial sector education proves to contribute more to income, and by whatever means education is measured, the present research expects occupations held by males to benefit more from increasing education than occupations held by females. This expectation derives from Bluestone, and associates (1973) who attribute the differing effects of education to a lack of promotional opportunities and discrimination faced by females. However, since the present research is performed at the occupational level, the findings address the question of whether occupations held by females are subject to income discrimination.

Industrial segmentation theory and research has previously ignored the influence of job complexity on occupational rewards. However, some expectations are possible assuming (1) that job complexity requirements for mental work and people oriented work parallel education requirements, and therefore (2) the influence of these two forms of work would parallel the influence of education.

Using Bluestone, and associates (1973) finding that education (years of schooling) has a greater influence on income in peripheral industries leads to the expectation that mental work and people oriented work positively influence income, but the effect should be stronger in peripheral industries. The varying influence of involvement with symbols and people by industrial sector derives from the lack of income setting procedures in peripheral industries.

The assumption that job complexity requirements parallel education requirements does not apply to manual work since the most sophisticated involvement with physical objects does not require comparable education. Given the low evaluation American society places on working with "things" its influence should be minimal across all industries (Reiss, 1961; Braverman, 1974).

Occupational Segmentation Research

Occupational Segmentation theory divides the occupational structure into three sections: independent-primary, subordinate-primary and secondary. The characteristics of these sectors, or the occupations in the sectors, result in differential income for those holding the occupation and they also mediate the influence of individual education on income.

Independent-primary occupations are characterized by creative problem solving and a high degree of promotional opportunity. Hence they have very high incomes and education is quite important to income because of its credentialing function and its importance for promotion. Subordinate-primary occupations are more routine in nature and offer a lesser degree of promotional opportunity. As a result, wages are lower, and education is somewhat less important to income than in the independent-primary sector. Secondary occupations are unskilled and lack promotional opportunity. Therefore wages are quite low and education is of little importance to income.

As with Industrial Segmentation, there is no strict agreement regarding sector construction. It is difficult to specify the manner in which differences in sector typologies affect the findings. There is considerable similarity in the characteristics of individuals in the sectors, but whether or not the income determination process differs

by sectors is inconclusive. The reader should refer to footnotes for specifics regarding sector construction.

Differences Between Primary and Secondary Workers

At the individual level, those holding primary occupations have more education (Osteman, 1975;[17] Hodson, 1978),[18] job training (Griffin, and associates, 1981)[19] and income (Osterman, 1975; Hodson, 1978; Griffin, and associates, 1981) than secondary sector workers. At the occupational level, primary occupations have more complex technical structures for mental work, people oriented work, and manual work than secondary sector occupations (Griffin, and associates, 1981).[20] Interpretations for the higher incomes of primary sectors workers compared to secondary sector workers involve the greater skills associated with primary sector occupations. The next issue concerns the importance of education to income in the sectors.

Osterman (1975) finds that education is most important to income in the independent-primary sector, followed by the subordinate-primary sectors, but has an insignificant effect on income in the secondary sector. In the secondary sector, only "amount of time worked" exerts an influence. The findings, he argues, result from the structural characteristcs of the sectors. The secondary sector lacks the features of the primary sector(s) which make education important to income (e.g. skills and promotional opportunity). Individual attributes also play a role. Since secondary jobs are unskilled and require little training (formal or on-the-job), employers

assume that workers are interchangeable and are unwilling to make investments in them.

By contrast, Griffin, and associates (1981) argue that the income determination process does not differ in the sectors. However, their analysis is somewhat deficient since they do not include education, and therefore their conclusion may be premature. Interestingly, they seem hesitant to accept their own findings since in a footnote they report results obtained with QES data suggesting education is more important to income in the primary sector than in the secondary sector.

The above research did not examine the influence of education on income by gender. In fact, no research could be found using this approach. The closest analysis is that of Bluestone, and associates (1973).

This study examines the effect of increasing education on race-sex wage ratios for the traditional occupational categories. There is no discussion of the manner in which increases in education affect the wages of each race-sex occupational category, but these data are easily determined from their tables. (The percentage increase in hourly wages is calculated in terms of "less than a high school" education versus a "college" education).

For all race-sex groups the "professional" and "mana-

gerial" categories dominate the independent-primary and subordinate-primary sectors. Hence, the calculations suggest that education is most important to income in these sectors than in the secondary sector, and the influence is greater for men than women. Hence, it may be reasonable to suggest that the occupational sectors themselves are each subject to splits according to gender.

Summary and Expectations for the Present Research

Occupational segmentation theory argues that higher incomes are a characteristic of primary sector jobs and low incomes accompany secondary sector jobs. The findings for differences in income offer support for this portion.

This theory also argues that individual education is more important in the primary sector(s) owing to its use as a credentialing device and in terms of promotional opportunities. Conversely, in the secondary sector, education is not important to income because these jobs lack skills and potential employees are seen as equally productive. The evidence as to whether or not education exerts a differential influence by sector is inconclusive. Comparing Osterman (1975) with Griffin, and associates (1980) is difficult because of differences in the construction of occupational sectors, differences in samples, and most importantly, the lack of education as a variable in the latter study.

However, Osterman's (1975) findings and Griffin, and associates (1980) footnote that education "pays off" more in the primary sector(s) both suggest that there is good reason to expect education to be more important to income in the primary sector(s) than in the secondary sector. Finally, Bluestone, and associates (1973) find that for traditional occupational categories (e.g., professional, managerial, etc.), females experience smaller increases in hourly wages owing to increases in education than do males. Hence, while occupational segmentation theory may apply to females, they may experience less benefit from education in the primary sectors.

The present research groups occupations according to location in occupational sectors and examines if the individual level findings for income and the influence of individual level education on income hold at the occupational level of analysis.

The findings of individual level research show that those holding primary sector(s) occupations have higher incomes than those holding secondary occupations. Hence, the present research expects higher incomes for occupations in the primary sector(s) than occupations in the secondary sector. This expectation holds for occupations held by males and occupations held by females, but the former should have higher income than the latter in all occupational sectors.

At the occupational level of analysis, education measures the credentials associates with occupations. Occupations in the primary sectors would show variation in their credentials, and increasing credentials should result in greater income. Occupations in the secondary sector do not have credentials and, therefore, they cannot influence income. Hence, the present research expects education to have a very strong influence on income in the primary sectors but little or no influence in the secondary sectors. On the other hand, if education is important to income in the secondary sector this might suggest that these occupations have credentials and are monetarily rewarded for them.

The present research also expects the educational credentials of primary sector(s) occupations held by males to be more important to income than occupations in these sectors held by females. If this proves to be the case an argument emphasizing occupational income discrimination is appropriate for explaining the lower income of females compared to males.

The influence of technical structure on income has previously been ignored in occupational segmentation research. However, Fligstein, and associates (1979) mantain that the more "control" a position has within the production process, the higher the monetary returns from each form of work. This specification parallels the distinction between "planning"

and "execution." Independent-primary jobs are involved in the planning stage owing to their involvement with "creative problem solving." These jobs would also have complex requirements for mental work and people oriented work but probably not manual work. Hence, the influence of mental work and people oriented work on income should be the strongest in the independent-primary sector, but the influence of manual work on income should be minimal because this sector generally does not contain manual work.

Subordinate-primary jobs and secondary sector jobs are both involved in the execution stage; the former because of their "routine" nature, and the latter because of their lack of skills. However, certain subordinate-primary jobs do possess moderate mental and people oriented skills, and, in particular, many occupations with sophisticated and moderate manual skills are in this sector (e.g., carpenters, secretaries). Hence, mental work and people oriented work should have an intermediate influence on income among subordinate-primary jobs, while manual work the strongest influence. In the secondary sector each form of work should have the weakest influence owing to the lack of skills in this sector.

Industrial/Occupational Segmentation Research

As already indicated industrial segmentation theory argues that incomes are greater in core industries than in peripheral industries because characteristics of greater market control, higher profits, greater unionization, etc. of the former translate into higher incomes for workers. Occupational segmentation theory emphasizes that occupations in the primary sector(s) have greater skills and more promotional opportunity than secondary occupations and that these characteristics result in greater incomes for workers in the former sectors. The industrial/occupational segmentation approach combines these two perspectives.

Research in this tradition is lacking, and only one study (Hodson, 1978) is available. Further, while Hodson's (1978) work has merit, it is deficient in several areas. First, he focuses only on income distributions among the sectors and ignores the income determination process in the sectors. As a result, his work offers no suggestions concerning any differences in the importance of education to income by sector location. Similarly, he does not consider if the income determination process in the sectors is similar or different for males and females. Lastly, his theoretical explanations for sectoral income differences emphasize industrial location to the neglect of the influence of occupational sector.

With all of these neglected areas one may wonder about the relevance of Hodson's (1978) work to the present research. First of all, since his is the only work found in this area it does provide an initial starting point for further research. In this regard, Hodson's (1978) findings for income distributions among workers in the various industrial/occupational sectors provide the expectations of the present research for income differences for occupations in the various sectors. Secondly, the present research combines Hodson's (1978) emphasis on industrial location for explaining income differences with Spillerman's (1977) theoretical discussion of the reasons industrial location has little effect on income in the independent-primary and secondary sectors, and suggests that the lack of industrial effect in these occupational sectors applies to the income determination process as well. In short, this aspect of the present research builds upon Hodson (1978) and contributes to this economic segmentation perspective by examining the income determination process in the various sectors.

Income Differences Among the Sectors

Hodson's (1978) initial analysis demonstrates that workers in core industries have higher incomes than those in peripheral industries. He accounts for the pattern in a manner quite similar to Bluestone, and associates (1973). A further analysis shows that core/primary workers have much

greater incomes than peripheral/secondary workers. The incomes of core/secondary and peripheral/primary workers are in between, with the latter having the advantage. All of these findings hold while controlling for education, gender, race and age.

Unfortunately, Hodson (1978) does not discuss the effect of workers' simultaneous location in industrial/occupational sectors. His theoretical emphasis is industrial segmentation and the simultaneous classification is actually a supplementary control to further emphasize the importance of industrial location to income.[21]

Summary and Expectations for the Present Research

Hodson's (1978) work is important since it shows that incomes to vary by industrial/occupational sector, with the highest being in the core/primary and the lowest in the peripheral/secondary. Unfortunately, he does not examine the income determination process in the sectors.[22] His analysis only demonstrates that the income differences obtain while controlling for race, sex, age, and education.

Hodson places theoretical emphasis on industrial sector over occupational sector. However, Spillerman (1977) argues that among "professional" and secondary sector workers the importance of employer characteristics is lessened. For the former workers' expertise transferable to any industry allows for a national labor market; among the latter a lack of both skills and protection from a union makes these workers interchangeable. Hence, had Hodson examined the income determination process within the sectors he might have found education to have the greatest influence on income for independent primary sector workers and the effect to be similar in the core and periphery. On the other hand, education's effect on income would be smallest for the secondary sector workers and similar in the core and periphery. The core/subordinate-primary and peripheral/subordinate-primary sectors are problematic.

The present research groups occupations according to location in the industrial occupational sectors and examines if the individual level findings for income distributions hold at the occupational level. In addition the income determination process deduced from Spillerman's (1977) discussion is also examined.

For the income distributions, the present research expects the highest incomes among core/independent-primary occupations and the lowest incomes among peripheral/secondary occupations. Incomes for occupations in the remaining sectors should be intermediate.

At the occupational level education measures the educational requirements/credentials of occupations. Applying Spillerman's (1977) individual level argument, the expectation is that education has the strongest influence on income among independent-primary occupations, and it is similar regardless of industrial location. On the other hand, education's effect on income is smallest for secondary occupations and similar regardless of industrial location.

If education is most important to income among independent-primary occupations with no differences between the core and periphery, this suggests that Spillerman's (1977) argument for a national labor market for these occupations is correct. In contrast, if there is a difference between the industrial sectors this implies that the national labor market does not

exist. Similarly, if there is variation between the core and periphery for the influence of education on the income of secondary occupations, this suggests that industrial location is important to these occuaptions. In particular, if the effect of education is greater among core/secondary occupations perhaps the greater unionization of core industries plays a role in the determination of their income.

The core/subordinate-primary and peripheral/subordinate-primary sectors are problematic. There is a great diversity of occupations in these sectors, all of which have educational requirements. Spillerman (1977) does not discuss these occupations. However, given the possibility of a greater influence of education on income in peripheral industries (Bluestone, and associates, 1973) one expectation is that education has an intermediate influence on income in both, but that the effects is greater for peripheral/surordinate-primary occupations. On the other hand, education may have a greater influence in core industries (Tolbert, 1980). Therefore, an alternative is that the influence of education will be greater among core/subordinate-primary occupations. Overall, the analysis of the effect of education for subordinate-primary occupations in the core and periphery is exploratory.

Regardless of the results of all of the above analyses, an additional expectation of this research is that education

will be more important to the income of occupations held by males than occupations held by females, owing to the well documented income discrimination experienced by females. However, if the same under-payment holds at the occupational level, an argument for occupational discrimination is appropriate.

While industrial/occupation segmentation research has previously ignored the influence of the nature of work on income, some expectations are possible. While mental work and people oriented work both positively influence income, the effect may be stronger in peripheral industries owing to the lack of bureaucratic wage setting procedures in this sector. Both of these forms of work also would exert the strongest influence on income in the independent-primary sector owing to involvement in the planning stage of the production process. Hence, a possible expectation is that mental work and people oriented work have a positive influence income in both the core/independent-primary and peripheral/independent-primary sectors, but the effect is stronger in the latter. Alternatively, however, Spillerman's (1977) suggestion that the influence of employer (industry) characteristics are reduced among "professionals" leads to the alternative expectation that the positive influence of mental work and people oriented work on income is strongest but similar in the core/independent-primary and peripheral/independent-primary sectors.

Because of its involvement in the execution stage of the production process the expectation is that the core/subordinate-primary and peripheral/subordinate-primary sectors should both contain intermediate positive relationships between mental work and income and people oriented work and income, but the effects should be somewhat stronger in the peripheral/subordinate-primary due to the lack of bureaucratic wage setting procedures in peripheral industries.

While mental work and people oriented work influence income in the core and peripheral primary occupational sector(s), the expectation is that both forms of work will have very minimal influence in the core/secondary and peripheral/secondary sectors owing to secondary sector jobs lacking skills and unionization which might help in core industries.

Manual work may show very little influence on income across industries because of its low evaluation in American society. However, the subordinate-primary sector contains many occupations with manually oriented task structures. Given Fligstein, and associate's argument that increasing control over any form of work results in greater reward; the expectation is that in both the core/subordinate-primary and peripheral/subordinate-primary sectors manual work positively influences income and the effect may be greater in the peripheral/subordinate-primary sector owing to the lack of bureaucratic wage setting procedures in peripheral industries.

Manual work is not expected to influence income in the core/independent-primary, peripheral/independent-primary, core/secondary or peripheral/secondary sectors. For the former two this results from the independent-primary sector's lack of involvement with manual work; for the latter two this results from a lack of occupational skills in the secondary sector.

In conclusion, it must be noted that there are alternative possibilities for all the expectations pertaining to variation in the relationships between the nature of work variables and income in the economic sectors. These alternatives are based on the work of McLaughlin (1978) who suggests that the influence of the nature of work dependes on the gender incumbency of occupations. Hence, his findings may negate many of the expectations for the relationships between the nature of work variables and income in the various economic sectors. Among occupations held by males, and identical occupations held by males and females (mixed occupations), working with people may not contribute to income in any sector, while manual work may have a negative relationship with income in the subordinate-primary sector (core and periphery). Among occupations held by females, mental work may not contribute to income in any sector, people oriented work may have a negative relationship with income in all sectors, and manual work may be negatively

related to income in the subordinate-primary sector (core and periphery).

These alternatives are also examined throughout this research.

OVERALL SUMMARY AND CONCLUSIONS

The findings for research in the Human Capital tradition show that individual education positively influences income. However, males are able to capitalize on their education to a greater extent than females, and this holds for males and females in occupations of similar status. The latter findings suggest occupational income discrimination since if status is similar the educational requirements of the occupations should be similar as well. Similarly, the findings for the influence of the nature of work on income show important differences among occupations held by males, occupations held by females, and identical occupations held by males and females. In short, only mental work positively contributes to income among occupations held by males, and identical occupations held by males and females; while none of the forms of work positively contribute to income among female occupations.

Overall, the findings for Human Capital research and Tecnical Structure research suggest that occupations held by males, and occupations held by females are subjec to different rules for income determination in a single labor market. Put another way, previous research offers support for the second possible outcome of the Total Economy analysis noted in Chapter One.

The Economic Segmentation research shows that individual education can vary in its importance to income in sectors of the Total Economy. The patterns are similar for males and females, but education is more important to the income of males in the sectors than it is for females. The findings for sectoral variation question the assumption of a single, perfectly competitive, labor market. However, it must be emphasized that since females experience income discrimination in all sectors, the sectors themselves are also split by gender. In short, possible outcome 2a noted in Chapter one seems appropriate at the individual level of analysis, but with modification. The mediating effects of sector are similar for males and females, but females face income discrimination in all sectors.

All of these prior research findings are based on the individual as the unit of analysis. Whether or not these findings hold at the occupational level of analysis remains to be seen. At any rate, the basic expectations for the present research is that for occupations held by males, occupations held by females, and identical occupations held by males and females, separate labor markets exist in the Total Economy, the mediating effects of sector are similar, but female occupations experience income discrimination in all sectors.

The next chapter details the methodology of the present research.

Footnotes for Chapter Two

1. Becker's (1975) data comes from the 1940 and 1950 U.S. Censuses. Mean earnings are estimated for various age categories by educational attainment. The unit of analysis, therefore, are the age cohorts by educational attainment of white urban males. Several adjustments were performed. Mean earnings were adjusted upward 10% for the 1939 data because of "underestimation of wages and salaries in the Census data." Corrections were also made for "abnormally large unemployment in 1939." Becker notes that the adjustments for earnings raise absolute earnings differentials but not the percentage differentials; while the adjustment for unemployment has the opposite effect. No unemployment adjustment was made for the 1949 data "since 1949 was a rather normal economic year." Additionally, the mean earnings were adjusted for the direct costs of education, mortality, growth rates in earnings, and taxation.

2. This is an issue of considerable debate. Becker's argument is weak since he does not perform these controls on his own data. He only summarizes findings from other studies and uses these to derive his conclusion. Support for Becker may be found in Welch (1975) while arguments against Becker's position may be found in Jencks (1972).

3. Two studies receive emphasis: McLaughlin (1978), and England, Chassie and McCormack (1982). Both use the occupation as the unit of analysis. For McLaughlin (1978) the data represent characteristics of 331 occupations representative of all occupations (71% of the occupations listed by the 1970 Census), held by white, married individuals between 33 and 44 years old. All 331 occupations were classified as being male (more than 75% male), female (more than 50% female) and mixed (between 50% and 75% male).

   The dependent variable, occupational status, was measured with Duncan's SEI. The independent variables, measures of occupational characteristics, were taken from the Dictionary of Occupational Titles (1965).

   England, et. al. (1982) also use the occupation as the unit of analysis. Their sample comes from the 1979 Census classifications. The "Subject Report on Occupational Characteristics" from the 1970 Census is the source of the dependent variable, median earnings of

males and females employed full-time year round in each occupation, and the independent variables - percent female among members of the ECLF in each occupation, and median number of years of schooling completed by males and females in each occupation. Other independent variables include measures of occupations' skill requirements taken from the Dictionary of Occupational Titles (1965).

4. Cullen and Novick (1979) examine 267 occupations taken from the U.S. Census Classifications and the U.S. Department of Labor. They do not specify which occupations were used nor the number from either source. However, they do note that the sample has a slightly higher mean for prestige using Treiman's (1975) scale than Treiman reports for average prestige. Measures for complexity of involvement with symbols, people, and physical objects come from the Dictionary of Occupational Titles (1965).

5. There may be a methodological/conceptual problem with the manner in which McLaughlin (1978) measures job complexity. His measures are based on the Dictionary of Occupational Titles (1965), which offers eight point ordinal scales for involvement with symbols, people, and physical objects, reflecting increasing task complexity for each form of job complexity. McLaughlin (1978) does not use the ordinal scales as present in the DOT, but modifies them. The scale for involvement with symbols is changed into a three point scale, while increasing involvement with people and physical objects is transformed into dummy variables indicating only the presence or absence of a relationship. These modifications, especially for people and physical objects, may not be capturing job complexity at all. The findings actually suggest that the presence or absence of a relationship with people or physical objects results in a particular effect upon status, but they do not reflect how increasing complexity with people or physical objects affects status.

6. There is a second technique which argues that structural variables are at least as important to income as individual human capital variables. It estimates the importance of individual human capital to income and then (1) adds additional variables indicating industrial and/or occupational characteristics to the original equation to determine the additional variance explained by these variables, and/or (2) compares a human capital model with a structural model in terms of explained variance on income.

In this type of approach the unit of analysis is somewhat difficult to specify. The human capital model measures variables at the individual level, while the structural models often use variables which are characteristics of industries and/or occupations of the respondants. The summaries of economic segmentation research which follow do not detail this type of research because the present research is not interested in comparing human capital models with structural models. The present research is interested in whether or not human capital characteristics of occupations, and the technical characteristics of occupations, vary in their relationships with income in the various economic sectors, and if there is any difference for occupations held by males and occupations held by females.

It should be mentioned, however, that this type of research finds that individual education yields greater income returns among males than for females, but that females may be somewhat better off in peripheral industries. Examples of this type of research are Bibb and Form (1977), Lord and Falk (1980), Kalleberg, et. al. (1981).

7. Assignment of industries to the core of periphery is based upon evaluation of the degree to which industries possess traits noted by Bluestone, et. al. (1973). The core includes mining, construction, some durable and non-durable manufacturing, transportation, communications, utilities, wholesale trade, finance, professional services, and public administration. The periphery comprises agriculture, portions of durable and non-curable manufacturing, retail trade, business and repair services, and personal services, and entertainment services.

8. The distinction between core and peripheral industries is measured in two complementary ways. They first treat the core/periphery distinction as a continuous variable. Factor scores are computed for 55 aggregated industries from the 215 Census Industrial Classifications based on 17 industrial traits (the higher the score, the more the industry possesses core traits).

The second procedure treats the core/periphery distinction as a dichotomy. A cut-off point was selected for the factor scores. Industries above the cut-off point were core industries, while those below were peripheral. This procedure yields the following classifications: The core contains mining, construction, most durable manufacturing, about half of non-durable manufacturing, most transportation, most communications, most utilities,

most wholesale trade, most finance, insurance and real estate, professional services, and public administration. The periphery consists of agriculture, forestry and fisheries, retail trade, personal services, entertainment services, and selected durable goods manufacturing, selected non-durable goods manufacturing, selected transportation, selected communications, selected utilities, selected wholesale trade, and selected finance, insurance and real estate. This dichotomy is treated as a dummy variable (core = 1).

9. In constructing industrial sectors, the Standard Industry Classification (1960) provided the specific industry titles. Data pertaining to the amount of capital, economic centralization, and state contracting was obtained for 150 industries.

Cut-off points were determined (subjectively) for each criterion. Industries were placed in the monopoly (core), competitive (periphery), or state sectors on the basis of whether they fell above or below the cut-off point on each criterion. The final placement of each industry was determined by its overall set of ratings. Hodson notes that 131 industries could be classified unambiguously. The remaining 19 industries were allocated arbitrarily to a sector - except of construction which constitutes a separate category.

It should be mentioned that Hodson's classification of the state and construction industries as separate sectors does not change the overall pattern of incomes being higher in the core (monopoly) sector than in the periphery (competitive) sector, the state and construction industries are always classified as core industries in other typologies.

10. They do not employ a core/periphery distinction, but estimate the effect of industrial location on the earnings of craftsmen, operatives, and laborers while controlling for the human capital (independent) variables. The industries used are manufacturing (durable and non-durable), transportation, communications, public utilities, retail trade, wholesale trade, miscellaneous services, agriculture and mining. The first five of these are usually considered core industries, while the latter are usually considered peripheral. The analysis finds that, with some exceptions, craftsmen, operatives, and laborers have higher earnings in the traditional core industries than in the traditional peripheral industries.

11. The analysis uses only two general industrial categories (manufacturing and public utilities which are generally considered core) but dichotomize both according to the degree of oligolopy or competitive traits. Concentration ratios (the proportion of industry shipments accounted for by the largest sellers in the industry for 1967) are the criteria for placing specific manufacturing and public utility industries in either the oligolopy or competitive category. Wages were found to be higher in manufacturing the public utility industries characterized by oligolopy for those in clerical, craft, operative, and laborer jobs, even after the effects of the human capital variables were controlled.

12. Regarding the core/periphery dichotomy, the following are core industries: durable goods manufacturing, selected non-durable goods manufacturing, mining, construction, transportation, public utilities, and government. The peripheral sector includes services, wholesale and retail trade, finance, and selected nondurable goods manufacturing industries. They give no rationale for the classifications.

13. Bluestone, et. al. (1973) examine the income returns from increases in education within industries for race-sex groups considered separately. They simply compute the percentage gain in income resulting from increases in education. They also do not employ a core/periphery distinction, but those industries where the largest percentage increases in income occur usually are those traditionally considered to be peripheral industries. Data are from the 1967 Survey of Economic Opportunity.

14. See footnote 7 for details of sector construction.

15. See footnote 8 for details of sector construction.

16. See footnote 13 for details of sector construction.

17. Osterman (1975) examines the income determination process within three occupational sectors: primary-upper, primary-lower, and secondary.

    Osterman constructs his own occupational sector typology. He bases it on the theoretical work of Piore (1971) with an important modification. He rejects a simple dichotomous approach because it "leaves a primary sector of enormous variety and poor definition," i.e., the primary sector itself requires further division because of the wealth of occupations which may be listed under the category. After discussing and rejecting

various techniques for dividing the primary sector (e.g., the distinction between white collar and blue collar ignores the proletarianization of white collar work), Osterman opts for the degree of autonomy enjoyed by various primary occupations as a basis for classifying them into two groups: primary-upper and primary-lower. Osterman classifies a total of 328 occupations: primary-upper (28), primary-lower (167), and secondary (43). It must be noted that the criteria used to classify occupations is subjective evaluation of an occupation's employment stability, chances for advancement, degree of autonomy, etc. He admits that this procedure is open to criticism, but notes that "it could be corrected only by someone with superior judgement, or even better, by the development of a generally agreed-upon set of criteria for each labor force segment" (1975:514).

18. Occupations were assigned to the primary or secondary sectors according to the scheme developed by Rosenberg (1975). Hodson does not specifically detail Rosenberg's procedure but states (in a footnote) that Rosenberg included measures of education, vocational training, wages, job autonomy, supervisory aspects, instructional aspects, and control over tasks in constructing his typology.

19. Occupational sector is operationalized with Rosenberg's (1975) scheme. Griffin, et. al. do not detail Rosenberg's procedures for allocating occupations to the primary or secondary sectors.

20. Griffin, et. al (1981) do not examine the influence of an occupation's technical structure on income by occupational sector. They present means for involvement with symbols, people, and physical objects by occupational sector only as a vehicle for arguing for the validity of Rosenberg's (1975) sector typology.

21. See footnote 9 for details regarding industrial sectors and footnote 18 for details regarding occupational sectors.

22. Hodson (1978) does, however, present findings for the contribution of industrial and occupational sector considered simultaneously on income, net of the effects of race, sex, age, and education. The findings are presented as deviations from the mean of annual income. For the total sample the mean is $6752. Monopoly-primary workers receive $1358 more than the mean, competitive-primary workers receive $67 less than the mean, monopoly-secondary workers recieve $407 less than the

mean, and competitive-secondary workers receive $1508 less than the mean. Hodson notes that the difference (1358 + 67) between monopoly-primary and competitive-primary workers is $1452 "indicating a slightly stronger effect of capital sector in the primary labor market than in the secondary labor market" (1978:470). This statement coincides with his theoretical emphasis on the importance of industrial over occupational sectors.

CHAPTER III

METHODOLOGY

GENERAL INTRODUCTION

This chapter consists of several sections. The first describes the nature of the education and income data used in this research. The second section deals with the measurement of variables; while the third section presents procedures for the construction of the various economic sectors. After this come sections describing each of the specific analyses of this research: Total Economy Analysis, Analysis According to Segmentation by Industry, Analysis According to Segmentation by Occupational Sector, and Analysis According to Industrial/Occupational Sector. These sections are followed by a discussion of the operationalization of the gender incumbency of occupations and the importance of gender to each analysis.

The Total Economy Analysis is important because its results suggest the income determination process in a single labor market for occupations held by men, and occupations held by women. In short, are occupational characteristics and income similar, and do the characteristics of education and technical structure contribute to income in a similar manner for occupations differentiated by gender?

Another purpose of the Total Economy Analysis is its

serving as a bench mark for subsequent analyses by economic segmentation. In order for any economic segmentation perspective to have validity there must be substantial variation in occupational characteristics and income compared to the total economy, as well as between/among the sectors themselves. Put another way, do occupational characteristics and income show substantial differences between/among sectors and compared to the total economy? Do the occupational characteristics substantially differ in their contribution to income between/among sectors and compared to patterns in the total economy? Finally, are there any differences for occupations held by men and occupations held by women. The answers to these questions serve to confirm or deny the expectations noted in Chapter Two.

The concluding section concerns problems for the present research resulting from the use of Census data.

CENSUS DATA AND ITS CHARACTERISTICS

The data for the educational characteristic of occupations and income are taken from the U.S. Census of Occupation by Industry(1970). This document presents national statistics from the 1970 Census of Population cross classifying occupation by industry. The data (means) "are based on a sample inflated to represent the total population" (1970:iv).

The data for "years of school completed" (education) was gathered from responses to two questions. The first asked about highest grade attended (those respondents previously attending foreign school systems, or whose education was received through private tutors were asked to approximate the equivalent grade in the U.S. school system). The second question asked whether or not the highest grade attended had been finished. Mean years of school completed was calculated for all respondents holding a given occupation in a given industry, separately for men and women.

Data for "money income" received in 1969 was gathered for all persons 14 years old and over. Wage or salary income "is defined as the total money earnings received for work performed as an employee. It represents the amount received before deductions for personal income taxes, Social Security, bond purchases, union dues, etc." (1970:appendix B, p. 4). Self-employment income "is defined as net money

income...from a business, farm, or professional enterprise in which the person was engaged on his own account" (1970: Appendix B, p. 4). Earnings "is the algebraic sum of wage or salary income and self-employment income" (1970: Appendix B, p. 4). Mean earnings were calculated for all respondents who were employed full-time and year round in a given occupation in a given industry, separately for men and women.

The procedures used by the Census are important because, by definition, they exclude part-time workers. Hence, if this research finds lower incomes among occupations held by women, compared to occupations held by men, the income difference cannot be explained as due to the greater likelihood of women working part-time or part-year.

Finally, it must be emphasized that although the original sources of education and income data are individual respondents, the means for education and income are for all respondents in a given occupation in a given industry. Hence, the means represent the average education and income of a given occupation in a given industry. These data, therefore, are at the occupational level.

MEASUREMENT OF VARIABLES

The dependent variable is the mean income of an occupation by industrial location. Income is presumed to be determined by the independent variables of mean education of an occupation by industrial location, and an occupation's complexity for mental work, people oriented work, and manual work.

Mean Income

Income is measured according to the mean income of an occupation within a specific industry as reported in the U.S. Census of Occupation by Industry (1970). The Census gives these means for occupations held by men, and occupations held by women. This research also creates two other "types" of occupations: identical occupations held by men and women, and combined occupations held by males and females. The former simply represents those occupations held by males and females for which separate income information is given. The latter represents those occupations held by men and women where income is for the occupation itself, i.e. not differentiated by gender. The purpose of the combined occupations is discussed in a following section.

For the combined occupations mean income is calculated with the following equation:

$$((X\$M_{ij} * NM_{ij}) + (X\$F_{ij} * NF_{ij}))/(NM_{ij} + NF_{ij})$$

Where:

$X\$M_{ij}$ = mean income of all males in occupation i in industry j

NM_{ij} = number of males in occupation i in industry j

$X\$F_{ij}$ = mean income of all females in occupation i in industry j

NF_{ij} = number of females in occupation i in industry j

Mean Education

Education is also measured according to the mean education of an occupation within a specific industry as presented by the U.S. Census of Occupational by Industry (1970). As with income, these data are also given according to the gender incumbency of occupations. The Census gives mean education data according to "years of schooling." For the analysis which examines variation in the influence of a "degree" in core and peripheral industries the "years of schooling" data is recoded as follows: 1 = elementary and some high school, 2 = high school, 3 = college, 4 = college plus.

The mean education for combined occupations is also created. The equation is identical to the one for income: simply substitute XEM_{ij} (mean education of males in occupation ij) for $X\$M_{ij}$ (mean income of males in occupation ij) and

XEF_{ij} (mean education of females in occupation ij) for $X\$F_{ij}$ (mean income of females in occupation ij). This equation applies to both "years of schooling" and "degree."

Complexity of Mental Work, People Oriented Work and Manual Work

The type of work characteristic of occupations is measured according to the scheme presented in the Dictionary of Occupational Titles (DOT) (1965).[1] Fine and Heitz (1958) who developed the typology for DOT state:

> "What workers do is done at various levels of complexity in relation to things, data, and people. All jobs involve some relation to all three. The way in which workers function in relation to things, data, and people are unique and can be expressed in terms of separate hierarchies. In each hierarchy, the functions proceed from the simple to the complex with each successive function conceived as including the simpler ones and excluding the more complex ones" (1948:180-81).

The DOT (1965) offers the following hierarchy (p. xviii):

SYMBOLS (Mental Work)		PEOPLE		PHYSICAL OBJECTS (Manual Work)	
0 Synthesizing	(8)	0 Mentoring	(8)	0 Setting-up	(8)
1 Coordinating	(7)	1 Negotiating	(7)	1 Precision working	(7)
2 Analyzing	(6)	2 Instructing	(6)	2 Operating-controlling	(6)
3 Compiling	(5)	3 Supervising	(5)	3 Driving-operating	(5)
4 Computing	(4)	4 Diverting	(4)	4 Manipulating	(4)
5 Copying	(3)	5 Persuading	(3)	5 Tending	(3)
6 Comparing	(2)	6 Speaking - Signaling	(2)	6 Feeding-offbearing	(2)
7 NSR *	(1)	7 Serving	(1)	7 Handling	(1)
8 NSR *	(0)	8 NSR *	(0)	8 NSR *	(0)

* NSR = no significant relationship

Thousands of occupations receive codes according to this scheme. Each classification costitutes a separate variable measured with an interval scale. In this research the codes are reversed (the reversals appear in parentheses) so that the larger the number the greater the degree an occupation manipulates symbols, people, and physical objects. This procedure facilitates the interpretation of correlation coefficients.

The scores for the technical structure variables are assigned to each occupation in the analysis. The occupations come from the U.S. Census of Occupation by Industry (1970). Since the Census gives mean income and mean education for occupations by industry, it was necessary to read the DOT (1965) and match the same occupations also classified by the appropriate industrial location. However, in most instances the DOT (1965) gives the same scores regardless of industrial location. There wre a few instances where an occupation could not be assigned job complexity scores. These are occupational titles which are simply too vague, e.g. "not specified operatives," "laborers, n.e.c." For these types of occupations no job complexity scores were assigned.

DETERMINING THE INDUSTRIAL SECTORS, THE OCCUPATIONAL SECTORS, AND THE INDUSTRIAL/OCCUPATIONAL SECTORS

The industrial and occupational classification also come from the U.S. Census of Occupation by Industry (1970).

The industry classification system consists of 227 specific industries classified into the following industry groups:

Agriculture, Forestry and Fisheries (AFF)
Mining (MNG)
Construction (CST)
Manufacturing (MFG)
Transportation (TRN)
Communications (COM)
Public Utilities (PUT)
Wholesale and Retail Trade (WRT)
Finance, Insurance and Real Estate (FIR)
Services (SRV)

The occupational classification system consists of 441 specific occupations arranged by the following categories:

Professional, Technical and Kindred Workers
Managers and Administrators, except farm
Sales Workers
Clerical and Kindred Workers
Craftsmen and Kindred Workers
Operatives, except transport
Transport Equipment Operatives
Laborers
Farm Workers
Service Workers, including private household
Service Workers, except private household
Private Household Workers

Determining Industrial Sectors

Prior research (e.g., Bibb and Form, 1977; Beck, and associates, 1978; and Hodson, 1977) examining the income determination process in industrial sectors disagree about which industries are core and which are peripheral.

The lack of consensus involves five industries: MANUFACTURING, WHOLESALE AND RETAIL TRADE, SERVICES, COMMUNICATIONS, and FINANCE, INSURANCE and REAL ESTATE. Some research divides MANUFACTURING into durable-goods manufacturing and nondurable-goods manufacturing and is inconsistent in classifying both types as either core or peripheral. Likewise, WHOLESALE and RETAIL TRADE is usually considered as two distinct industries (WHOLESALE TRADE and RETAIL TRADE) with disagreement in classification. The SERVICES sector may be divided into four sub-categories: business and repair services, entertainment services, personal services, and professional services. Consensus exists in classifying the first three categories as peripheral; the professional services category is classified inconsistently.

These distinctions are not possible in this research. The industrial categories of the U.S. Census of Occupation by Industry (1970) generally do not provide data for an occupation's mean education and mean income for industrial sub-categories of MANUFACTURING, WHOLESALE and RETAIL TRADE, and SERVICES.

The classification of industries as core or perhiphery is a compromise of past research using the most frequently encountered decisions. It should be noted that the compromises technique results in a classification scheme paralleling Bib and Form (1977).

The CORE INDUSTRIES are:

MINING (MNG)
CONSTRUCTION (CST)
MANUFACTURING (MFG)
TRANSPORTATION (TRN)
COMMUNICATIONS (COM)
PUBLIC UTILITIES (PUT)
PUBLIC ADMINISTRATION (PAD)

The PERIPHERAL INDUSTRIES are:

AGRICULTURE, FORESTRY AND FISHERIES (AFF)
WHOLESALE AND RETAIL TRADE (WRT)
FINANCE, INSURANCE AND REAL ESTATE (FIR)
SERVICES (SRV)

The abbreviations are used in all tables.

For the industrial segmentation analysis, all the industry-specific occupations presented in the census listings are used. The male list contains 102 occupations and the female list has 65 occupations. However, it must be noted that these N's will vary by industry because education and income data is not always given for each industry-specific occupation. This problem receives further discussion in the concluding section of this chapter (Problems with the Census Data).

Determining Occupational Sectors

For occupational segmentation, this research uses the theoretical approach of Gordon (1972) who divides the occupational structure into three sectors: independent-primary, subordinate-primary, and secondary. Osterman (1975) has developed a typology paralleling this approach and it is used in this research for defining the occupational sectors.

However, there are some problems with using this typology. First, it contains some occupations not included in the Census, and vice versa. For the analysis of segmentation by occupational sector, only those occupations present in both the Census listing and Osterman's typology are used. Second, the Census listing has multiple classifications. For example, the Census combines blacksmiths, forgemen, hammermen and boilermakers as one category. Osterman has some multiple classifications as well. Fortunately, there are very few situations where the specific occupations in the multiple classifications of the Census fall into different sectors in Osterman's typology. Where this is the case the occupational category was dropped from the analysis. Third, the Census employes many "other" categories. For example, the Census category of "other construction craftsmen" includes cement and concrete finishers, floor layers, roofers and slaters, structural metal craftsmen, and tile setters. Most of these occupations are in Osterman's (1975) typology, and all fall

into the subordinate-primary sector. There were very few instances where severe matching problems occurred. In any such situations the occupations, or multiple category, was dropped from the analysis. The following lists contain those occupations contained in both the Census and in Osterman (1975) for which there were very few matching problems. In fact, only the secondary sector presented any real problems. These problems involve only three occupational categories: Personal Service Workers, Food Service Workers, and Health Service Workers. For each category there are specific occupations which Osterman (1975) considers as subordinate-primary. For Personal Service Workers, barbers (male list) and hairdressers (female list) are actually subordinate-primary; for Food Service Workers, bartenders is subordinate-primary; for Health Service Workers, midwives is subordinate-primary. In spite of these discrepencies these occupational categories are included in the Secondary sector because all the other occupations subsumed under them are secondary occupations according to Osterman (1975). Finally, it should be mentioned that in the secondary sector most of the Service occupations are female dominated; while the Laborer occupations are male dominated.

INDEPENDENT-PRIMARY SECTOR

Occupations Held by Men	Occupations Held by Women
Accountants	Accountants
Architects	Life and Physical Scientists
Lawyers and Judges	Physicians, Dentists & Re- (cont.)

Occupations Held by Men	Occupations Held by Women
Mathematical Specialists	lated Practitioners
Chemists	Social Scientists
Dentists	Writers, Artists & Enter-
Physicians	tainers
Social Scientists	
Teachers, college & university	
Writers, Artists, & Entertainers	
Computer Scientists	
Operations, Systems, & Research Analysists	

SUBORDINATE-PRIMARY SECTOR

Occupations Held by Men	Occupations Held by Women
Astronautical & Aeronautical Engineers	Engineers
Chemical Engineers	Librarians, Archivists & Curators
Civil Engineers	Registered Nurses, Dieti-
Electrical & Electronic Engineers	tians & Therapists
Industrial Engineers	Health Technologists & Technicians
Mechanical Engineers	Social & Recreation Workers
Other Engineers	Teachers, except college & university
Librarians, Archivists & Curators	Engineering & Science Tech-
Personnel & Labor Relations Workers	nicians
Pharmacists	Technicians, except health engineering & science
Registered Nurses, Dietitians & Therapists	Buyers, Purchasing Agents & Sales Managers
Health Technologists & Techni-	Other Managers & Adminis-
cians	trators
Social & Recreation Workers	Bookkeepers
Teachers, except college & university	Cashiers
Draftsmen	File Clerks
Electrical & Electronic Engineering Technicians	Receptionists
Industrial & Mechanical Engineering Technicians	Secretaries
Other Engineering & Science Technicians	Stenographers
Airplaine Pilots	Typists
Radio Operators & Air Traffic Controlers	Foremen
Other Technicians, except health engineering & science	Mechanics & Repairmen
	Printing Craftsmen
	Assemblers
	Checkers, Examiners & Inspectors, manufacturing
	Produce Graders & Packers
	(cont.)

Occupations Held by Men	Occupations Held by Women
Buyers, Purchasining Agents & Sales Managers	Sewers & Stitchers
Other Managers & Administrators	Deliverymen & Routemen
Bookkeepers	Sales Workers
Cashiers	
Secretaries, Stenographers & Typists	
Stockclerks & Storekeepers	
Brickmasons & Stonemasons	
Carpenters	
Electricians	
Excavating, Grading & Road Machine Operators	
Painters, Plasterers & Paper Hangers	
Plumbers & Pipefitters	
Foreman	
Automobile Mechanics	
Machinists, Job Setters & Tool Makers	
Blacksmiths, Forgemen, Hammermen & Boilermakers	
Stationary Engineers & Power Station Operators	
Assemblers	
Checkers, Examiners & Inspectors manufacturing	
Filers, Polishers, Sanders & Buffers	
Deliverymen & Routemen	
Truck Drivers	
Printing Craftsmen	
Sales Workers	

SECONDARY SECTOR

Occupations Held by Men	Occupations Held by Women
Newsboys	Telephone Operators
Shipping & Receiving Clerks	Grader & Sorters, manufacturing
Construction Laborers	Packers & wrappers, except produce
Freight, Stock & Material Handlers	Laborers
Vehicle Washers & Equipment Cleaners	Cleaning Service Workers
Miscellaneous Laborers	Food Service Workers
Not Specified Laborers	Health Service Workers
Cleaning Service Workers	(cont.)

Occupations Held by Men	Occupations Held by Women
Food Service Workers	Personal Service Workers
Health Service Workers	Private Household Workers
Personal Service Workers	
Guards & Watchmen	
Other Service Workers, including private household	

The total number of occupations in each list is greater than suggested by the above lists because education and income data may appear in up to eleven industries for each occupation. Thus: the total N for independent-primary occupations is 88 (male list) and 59 (female list); for subordinate-primary occupations the total N is 382 (male list) and 182 (female list); for secondary occupations the total N is 86 (male list) and 57 (female list).

A possible problem with dividing the entire occupational structure into three sectors is reduction in the variation for mean values accompanying the variables. That is, because of the similarity of occupations in each sector (particularly the independent-primary and secondary) for education, income, etc. there may not be enough variation to permit analysis of the relationships between the independent and dependent variables. However, this problem does not appear to be severe, based on the values shown in Table 3.1.

Table 3.1

Indicies of Variability for each Variable in the Total Economy and Occupational Sectors for Occupations held by Men and Occupations held by Women

TOTAL ECONOMY

	Educ.	Inc.	Mental	People	Manual
Male	.20	.38	.68	1.90	.94
Female	.12	.33	.74	1.80	1.70

OCCUPATIONAL SECTORS

	Educ.	Inc.	Mental	People	Manual
Male					
I-P	.10	.31	.08	1.20	2.00
S-P	.16	.30	.47	1.80	.80
S	.13	.22	2.60	1.50	.80
Female					
I-P	.11	.27	.07	1.40	1.50
S-P	.09	.35	.43	1.40	1.40
S	.11	.29	2.00	1.30	1.00

The only instances where differences in variability occur in the occupational sectors compared to the total economy are the education having less variation in the male independent-primary sector, and mental work less variation in the male and female independent-primary sector. Interestingly, mental work shows more variation in the secondary sector (male and female) than in the total economy. The same holds for manual work in the male independent-primary sector. All of these differences should be kept in mind since they

may have consequences for the results of the analysis by occupational sector (Chapter 6). At the moment, however, these consequences are unknown.

Determining the Industry/Occupation Sectors

The procedure for constructing the industry/occupation sectors is quite simple. It involves simultaneously classifying occupations according to the core/periphery industries and the independent-primary, subordinate-primary, and secondary sectors. The result is six industrial/occupational sectors for occupations held by men and occupations held by women:

CORE/INDEPENDENT-PRIMARY
CORE/SUBORDINATE-PRIMARY
CORE/SECONDARY
PERIPHERAL/INDEPENDENT-PRIMARY
PERIPHERAL/SUBORDINATE-PRIMARY
PERIPHERAL/SECONDARY

Only those occupations present in the previous section are used. As with the previous section, the total number of occupations depends on income data appearing in up to eleven industries (seven core industries and four peripheral industires). Thus: the total N for core/independent-primary occupations is 55 (male lsit) and 33 (female list); for core/subordinate-primary occupations the total N is 249 (male list) and 111 (female list); for core/secondary occupations the total N is 55 (male list) and 34 (female list); for peripheral/independent-primary occupations the total N is 33

(male list) and 26 (female list); for peripheral/subordinate-primary occupations the total N is 133 (male list) and 72 (female list); for peripheral secondary occupations the total N is 31 (male list) and 23 (female list).

The possible problem with dividing the entire occupational structure into sectors mentioned in the previous section (i.e., reduction in variation of mean values accompanying the variables) also applies to this analysis.

Table 3.2

Indices of Variability for Each Variable in the Industry/Occupation Sectors for Occupations held by Men and Occupations held by Women

	Educ.	Inc.	Mental	People	Manual
Male					
C/I-P	.09	.28	.08	1.20	2.00
C/S-P	.15	.27	.47	1.80	.80
C/S	.16	.17	2.60	1.50	.80
P/I-P	.12	.36	.08	1.20	2.00
P/S-P	.17	.33	.47	1.80	.80
P/S	.09	.21	2.60	1.50	.80
Female					
C/I-P	.10	.21	.07	1.40	1.50
C/S-P	.08	.30	.43	1.40	1.40
C/S	.11	.23	2.00	1.30	1.00
P/I-P	.13	.34	.07	1.40	1.50
P/S-P	.11	.41	.43	1.40	1.40
P/S	.12	.28	2.00	1.30	1.00

However, as with the analysis employing only occupational sectors, this problem does not appear to be severe. In fact,

the figures in Table 3.2 are quite similar to those in Table 3.1. Thus, only education in the male independent-primary sectors (core and peripheral), and mental work in the male and female independent-primary sectors (core and peripheral) shows less variation than in the total economy (compare Table 3.2 with the upper panel of Table 3.1). Likewise, mental work shows more variation in the male and female secondary sectors (core and peripheral) than in the total economy, while manual work shows more variation in the male independent-primary sector (core and peripheral) than in the total economy. These differences should be kept in mind for the results of the analysis by industry/occupation sector (Chapter 7).

SPECIFIC ANALYSES

Total Economy Analysis

This analysis is done without regard to economic segmentation. It is based on information about the education and technical requirements, and income of occupations, and the relationships between these occupational characteristics, and income assuming a single labor market. The primary purpose of the analysis is its serving as a bench mark for the separate analyses for each economic segment.

The precedures first involve computing means and standard deviations for occupational characteristics and income. The means measure the average education, average complexity of mental work, people oriented work and manual work, and income of occupations in a single labor market. The standard deviation measure the average amount of variation for the occupational characteristics and income. These results are subsequently compared to the same findings for each analysis according to economic segmentation. Substantial differences between the means for any occupational characteristic in the total economy versus those in any of the sectors suggest that educational and/or technical requirements are different in the sectors. Similarly, if income is different in any of the sectors, this suggests that the various sectors offer greater/lesser income than obtains in the total economy.

The next aspect of the analysis is computing zero-order correlations between each occupational characteristic and income which suggest the independent relationship between each occupational characteristic and income in a single labor market. These relationships are also subsequently compared to the same findings for each analysis according to economic segmentation. If the relationships between occupational characteristics and income are substantially different in any of the economic sectors than those in the total economy, this suggests that the income determination process differs by sector location, and therefore, questions the assumption of a single, perfectly competitive, labor market.

Analyses According to Economic Segmentation

The occupations used in this research are classified according to the typologies operationalizing the three Segmentation approaches discussed in a previous section. The statistical techniques for each analysis are identical to those for the Total Economy analysis. Therefore all three economic segmentation analyses receive discussion at the same time.

The first aspect of each analysis is examination of the mean values for all occupational characteristics and income in the sectors. This investigation serves to indicate if economic sectors differ in their educational and technical characteristics, and income. The examination is performed in

two complementary ways. Comparisons are first made with the results of the Total Economy analysis. This indicates if any sectors are different from the Total Economy. Second, comparisons are made for occupational characteristics and income between/among sectors. This will show if the sectors are different from one another.

In the analysis by industrial segmentation these comparisons indicate if the previous individual findings that core workers have higher educational characteristics and income than peripheral workers hold at the occupational level of analysis. They also make the additional contribution of examining the technical characteristics of core and peripheral industries. Similarly, for the analysis by occupational sector, these comparisons indicate if the previous individual level findings of primary sector(s) workers having greater educational characteristics and incomes than secondary workers hold at the occupational level, and they also serve to confirm or deny previous findings that primary sector(s) occupations have more complex technical requirements than secondary sector occupations. Identical consequences apply to the analysis by industrial/occupational sectors.

The second portion of each analysis specifies the relationship (zero order correlation) between each occupational characteristic and income in each sector. The correlations

suggest the degree to which an increase in the value of a given independent variable is associated with an increase (or decrease) in income. In other words, the correlations suggest the overall strength of relationship between an independent variable (e.g., education) and income. Comparisons are then made with results in the Total Economy in order to determine if any occupational characteristic has a greater/lesser relationship with income in the sectors than in the Total Economy. If substantial differences exist between the Total Economy and the sectors an argument could be made that the social organizations of the sectors mediate the relationship between the occupational characteristic and income. Comparisons are also made between/among sectors. If the relationships between an occupational characteristic and income are substantially different between sectors an argument could again be made that the social organizations of the sectors are responsible for the difference.

A third procedure invovles examining the "slopes" resulting from separately regressing each independent variable with income. The "slopes" indicate the actual dollar increase for each unit increase in education and/or task complexity. It must be pointed out that since the measure of education ("years of schooling") is at the ordinal level, the slopes are approximations of the dollar increase for each yearly increase in education. However, the measures of technical structure are at the interval level of measurement.

Hence, the slopes for these variables indicate the dollar increase for every unit increase in technical structure.

Comparisons of slopes are made primarily between occupations held by men and occupations held by women, and both portions of identical occupations. For example, if it is found that education has a correlation of similar magnitude with income for gender differentiated occupations, but that occupations held by men have much higher slopes, an argument that occupations held by women experience income discrimination is possible.

For the analysis by industrial segmentation, these comparisons serve to shed some light on the contradictory findings on the relationship between individual education and income in the industrial sectors. Do the contradictory findings hold at the occupational level, or is the educational characteristic of occupations more important to income in either industrial sector?

The analysis also makes the additional contribution of examining the relationships between the nature of work and income in the industrial sectors. Similarly, for the analysis by occupational sectors, the comparisons suggest if the findings of previous individual level research that education is more important to income among primary sector(s) workers hold at the occupational level. They also make the additional contribution of examining sectoral variation in the relation-

ships between the nature of work and income. Similar consequences apply to the analysis by industrial/occupational sector.

The next section adds the gender incumbency of occupations to each analysis and details its importance.

IMPORTANCE OF THE GENDER INCUMBENCY OF OCCUPATIONS

All four analyses are done separately for various lists of occupations. These are (1) a list of occupations held by males, (2) a list of occupations held by females, (3) a list of combined male/female occupations, (4) the male portion of the male/female shared occupations list, and (5) the female portion of the male/female shared occupations list.

Information on all occupations come from the U.S. Census of Occupation by Industry (1970) which offers separate lists of occupations held by males and occupations held by females. There are occupations present in the male list not present in the female list, and vice versa. The male list spans the entire occupational structure. The female list also contains occupations from each major category (i.e., Edwards classifications), but is heavily "clerical" in nature. This research simply relied on the Census listings for the definition of male and female occupations. However, since one of the purposes of this research is to determine if male and female occupations are subject to different rules for income determination the "clerical" bias of the female list is beneficial since it does suggest different occupational structures for occupations according to gender.[2]

The list of combined male/female occupations, and the

separate lists of male/female shared occupations each contain those occupations present in both the list of male occupations and the list of female occupations. The former is a list of occupations for which characteristics and income are not differentiated by gender; while for the separate lists the characteristics and income are differentiated by gender.

The major purpose of this research is to determine if occupations differentiated by gender are subject to similar or different rules for income determination in the Total Economy and its various segments. Hence, for each analysis comparison of results among the list of occupations is the major focus.

In the Total Economy analysis comparison of results indicates the amount of similarity or difference among occupations differentiated by gender in a single labor market. If the characteristics of occupations are found to be similar, while at the same time occupations held by males have much higher incomes, an argument that occupational income discrimination exists in the Total Economy is appropriate. Likewise, comparison of results reveals if occupational characteristics contribute to income in a similar or different fashion for occupations differentiated by gender. In particular, does the individual level finding that education is more important to income for males than females hold at the occupational level? Do McLaughlin's (1978) findings that only mental work contributes to income among occupations held by males, and that no

form of work positively contributes to income among occupations held by females receive support?

The same kinds of comparisons are made for each economic segment. In particular, is education more important to income in core or peripheral industries for occupations held by males and occupations held by females? Is education more important to income in primary occupational sectors for all occupations differentiated by gender? Similar questions apply to the relationships between each form of work and income. In short, the essential question is whether or not the social organizations of the various economic sectors mediate the income determination process in the same manner for occupations differentiated by gender.

CRITERIA FOR ESTABLISHING SUBSTANTIAL DIFFERENCES BETWEEN MEANS AND CORRELATIONS

For all analyses employing mean values, the use of standard deviations is the criterion for establishing substantial differences between means. The standard deviation is used because it is a neutral measure, i.e. it is independent of the manner in which the variables are measured. Two reference points are necessary: a reference point within an analysis, and a reference point between analyses.

Within an analysis, the reference point is those occupations with the highest mean for a particular occupational characteristic or income. In order for any other occupations to have a mean value comparable to that of the highest, its mean must be less than one standard deviation lower. For example, if in the Total Economy analysis, occupations held by men have a mean income of $8000 with a standard deviation of $2000, but occupations held by women have a mean income of $5000, with a standard deviation of $2000, the latter have substantially lower mean income. Adding one standard deviation to the female mean would not equal the male mean.

Since one of the purposes of this research is determining if differences exist for occupational characteristics and income in the total economy versus the various economic

segments, the reference points between analyses are always those means found in the Total Economy analysis. For example, if the mean income of male occupations in the Total Economy analysis is $8000 with a standard deviation of $2000, but the mean income of male occupations in core industries is $11,000; the conclusion is that male occupations in core industries receive greater incomes than male occupations in the Total economy. Adding the standard deviation of the mean income of male occupations in the total economy to its mean income would not equal the mean income of male occupations in core industries.

The comparison of correlations is the critical element in the research. As the standard for assuming a substantial difference between correlations, a .30 criterion is used. This level is chosen because a difference of this magnitude would account for approximately 10% of explained variance. For example, a correlation of .20 between education and income (industry X) as opposed to a correlation of .50 (industry Y) would suggest that an increase in education has less pay-off in terms of income in industry X than in industry Y.

Ordinarily, a T-test is appropriate for determining if a significant difference exists between means, while a test for a significant difference between correlations is the proper procedure. In this research, however, these types of tests are not required. The purpose of tests of signi-

ficance is to determine whether or not relationships are generalizeable to the population. Since the data used in all analyses are for the entire population, any mean or correlation must hold for the entire population.

For the industrial sector analysis, the determination as to whether the distinction between core and peripheral industries helps explain substantial differences in the correlations is accomplished with chi-square analysis (2 x 2 tables). For example, assume the following correlations between education and income across industries:

	CORE						PERIPHERY			
MNG	CST	MFG	TRN	COM	PUT	PAD	AFF	WRT	FIR	SRV
.85	.80	.83	.81	.86	.83	.90	.50	.43	.45	.40

All of the correlations in peripheral industries are substantially lower (SL) than those in core industries (NSL). Chi-square is calculated by arranging the industries according to the following table:

	CORE		PERIPHERY	
(SL)	0		AFF WRT FIR SRV 4	4
(NSL)	MNG CST MFG TRN COM PUT PAD 7		0	7
	7		4	11

For the above table chi-square equals 11, which indicates that the substantially lower correlations in peripheral industries do not result from chance. Obviously, the above

example is the ideal situation. Consider a second pattern:

	CORE					PERIPHERY			
MNG	CST	MFG	TRN	COM	PUT	PAD	AFF	WRT	FIR	SRV
.20	.30	.80	.75	.25	.30	.80	.85	.80	.80	.85

The correlations in MNG, CST, COM and PUT (Core industries) are all substantially lower than the other correlations. The chi-square table for this pattern is:

	CORE		PERIPHERY		
(SL)	MNG CST COM PUT	4		0	4
(NSL)	MFG TRN PAD	3	AFF FIR WRT SRV	4	7
		7		4	11

Chi-square for the above table equals 3.59 which indicates that the substantially lower correlations in MNG, CST, COM and PUT are not related to the distinction between core and peripheral industries; they are due to chance.

The use of chi-square is problematic since there are only eleven industries and the expected frequences for each cell cannot equal five. This problem is handled according to the suggestions of Walker and Lev (1951). Chi-square is computed for any situation involving substantial differences among correlations; a second chi-square employing Yate's correction factor is then calculated. If these two computations are not in agreement, Fisher's Exact Test is employed.

The use of chi-square analysis pertains only to the industrial sectors analysis. For the other economic segmentation analyses there are too few cells to permit a statistical treatment. For these analyses, mere observation of the patterns is used. For example, if in the independent-primary occupational sector there is a correlation of .80 between education and income, while in the secondary occupational sector a correlation of .20 occurs, then obviously education is more important to income in the former sector.

PROBLEMS WITH THE CENSUS DATA

A major feature of the data concerns the list of occupations held by men and the list of occupations held by women. There are more occupations for males (102) than for females (65). Also, there are occupations present for males which are not present for females, and vice versa. The occupations held by men span the entire occupational structure. The entire occupational structure is also represented in the female list, but it is heavily "clerical." Therefore, the correlations between independent and dependent variables for each group are based on somewhat different occupations. However, since one of the purposes of this research is to determine if occupations held by men and occupations held by women are subject to the same rules for income determination, the differences are an important part of the analysis.[2]

A very important aspect of the Census data is the reporting procedure used for education and income. The Census does not always report mean education and mean income for every industry-specific occupation. Any industry-specific occupation for which there is less than 400 incumbents does not have either education or income data reported.

Each of the 102 occupations in the male list and the 65 occupations in the female list may have education and income data reported in up to eleven industries. This re-

porting procedure results in missing data and has the consequence that the number of occupations for which mean income and mean education data are available in each industry varies across industries. Therefore, for the analysis according to economic segmentation by industry, the overall mean values for each industry and the correaltions between education and income are based on somewhat different occupations. Overall, there are 772 industry-specific occupation in the male list and 347 industry-specific occupations in the female list.

The above reporting procedure also has consequences for the list of Combined occupations and the separate lists of male and female identical occupations. As mentioned earlier, each of these lists contain those occupations present in the male list and the female list. However, since education and income data are not always reported, there is quite a bit of missing data. This missing data has the consequence that any analysis employing these lists contains results that are not based on actually the same (number of) occupations. The reader should keep this point in mind when reading and evaluating the results of analyses using the combined list of occupations and the separate lists of male/female identical occupations.

The Census also uses multiple occupational classifications and this creates a problem in assigning the scores for

each technical structure variable. In any situation where an occupation is actually a group of occupations the weighted average technical structure score is used. For example:

$$(TSS_1 * n_1 \ \ldots \ TSS_i * n_i)/N$$

Where:

TSS_1 technical structure score for involvement with symbols for the first occupation in the group

n_1 number employed in the first occupation

TSS_i technical structure score for involvement with symbols for the last occupation in the group

n_i number employed in the last occupation

N total number of employed in the occupation group

Identical equations are used for complexity of involvement with people and physical objects.

It was not always possible to assign a technical structure score, or a weighted average score, because the Census also uses some occupational categories which are simply too vague, e.g., miscellaneous laborers. On the other hand, income data are often reported for such occupational categories. This difference in availability of data has the consequence that the correlations between education and income, and a technical structure variable and income, can be based on different numbers of occupations (owing to pairwise deletion of missing data).

There are also some problems with the industrial categories as presented by the Census. These involve the Census major industrial groups versus some regrouping for the present research.

The Census considers Transportation, Communications, and Public Utilities as one major industry but gives mean education and mean income data separately for Communications and Public Utilities, but not for Transportation. Data for Transportation is given separately for three sub-industries. This research considers Transportation, Communications, and Public Utilities as separate major industries so as to add more detail to the analysis according to segmentation by industry. (It was necessary to combine the data for Transportation, and this procedure is detailed below).

The Services industries presented problems. The Census has four major groups of Service industries, but gives data for sub-industries within each of the four major sectors. It was decided to combine all Service industries into one Service sector. Separate consideration would have resulted in far too much missing data for education and income for occupations in the various Service sub-sectors. Similar considerations apply to combining Wholesale Trade and Retail Trade into one industry: Wholesale and Retail Trade. While this decision may reduce detail for the analysis according to economic segmentation by industry, it adds detail to the

analysis according to segmentation by occupational sector.

In order to combine the mean income data (and mean education data) for the Transportation sub-sectors, the Services sub-sectors, and Wholesale Trade and Retail Trade; the following equation was used:

$$((X\$I_{il} * N_{il}) + \ldots + (X\$I_{in} + N_{in}))/N_i$$

Where:

$X\$I_{il}$ = mean income of all males (or females) in occupation i in the first sub-industry

N_{il} = number of males (or females) in occupation i in the first sub-industry

$X\$I_{in}$ = mean income of all males (or females) in occupation i in the last sub-industry

N_{in} = number of males (or females) in occupation i in the last sub-industry

N_i = all males (or females) in occupation i in all sub-industries

Footnotes for Chapter Three

1. Several alternatives exist for measuring these variables. Interestingly, Spath (1979) notes the past use of occupational prestige scores (NORC, 1974) and Duncan's (1961) SEI as indicators of the tasks accompanying occupations. However, he argues that this is erroneous. Prestige is a measure of public perceptions, while SEI is an indicator of prestige, and neither are a measure of job complexity. The task requirements of occupations should be measured directly.

   Robinson, et. al. (1974) note that other attempts at measuring the technical structure of occupations involve the concept of occupational situs. They discuss five operationalizations of situs: Morris and Murphy (1969), Roe (1956), Super (1957), Census Bureau Industry Groupings (1960), and the Dictionary of Occupational Titles (1965) measures of involvement with symbols, people, and physical objects.

   Morris and Murphy's (1959) scheme differentiates occupations into ten situs categories on the basis of societal function, e.g. Manufacturing, Transportation, Education and Research, Health and Welfare. Roe (1956) groups occupations according to the interests, values, and developmental experiences of persons who enter eight areas, e.g., business, art and entertainment, science. Super's (1957) typology is a modification of Roe (1956). The Census offers percent distributions of the population employed in each major industry group.

   Of the five typologies discussed, only that of the Dictionary of Occupational Titles (1965) seems to capture the nature of tasks performed, or the technical structure of occupations. The typology seems most appropriate because it assigns scores for complexity of involvement with symbols (mental work), people, and physical objects (manual work).

2. Fifty percent of the occupations contained in the female list have at least 60% female incumbents. Hence, operationalizing gender incumbency in this manner seems valid.

CHAPTER IV

TOTAL ECONOMY ANALYSIS

GENERAL INTRODUCTION

This chapter examines occupational characteristics (means) and their relationships with income (correlations) for occupations differentiated by gender in a single labor market. Expectations are based on the findings of previous research which conclude that education is important to income for occupations held by men and women, but is more important for the former. Initial expectations about the effect of technical structure come from Reiss (1961) who argues that mental work and working with people have a greater impact on income than does manual work. A variation of this argument comes from McLaughlin (1978) who suggests that gender makes a difference. He argues that among occupations held by men only mental work contributes to income, and working with people has no effect while manual work a negative effect. Among occupations held by women mental work does not affect income, and both people oriented work and manual work have negative relationships with income. Among occupations held by men and women the pattern is the same as for occupations held by men.

The findings reported in this chapter also serve as a

bench mark for the economic segmentation analyses. The validity of these latter approaches requires that there be substantial variation in the characteristics and incomes of occupations, and in the relationships between these characteristics and income, when compared to the total economy.

OCCUPATIONAL CHARACTERISTICS AND INCOME

This section looks at occupational characteristics and income by presenting means and standard deviations for education, mental work, people oriented work, manual work, and income among gender differentiated occupations and gender integrated occupations.

Occupations held by women have slightly lower means for all occupational characteristics than occupations held by men, but in most instances the differences are trivial. The only occasion where a difference approaches being substantial is for the lower mean for complexity of manual work among occupations held by women. This is not surprising since occupations held by women traditionally do not tend to be "manual" in their tasks[1] (Table 4.1).

Quite interestingly, occupations held by both men and women have somewhat higher occupational characteristics (except for manual work) than the characteristics of occupations held by males or females. This suggests where men and women occupy identical occupations, such positions are characterized by greater education, more complex mental work, and more complex involvement with people. Correspondingly, the sexes share incumbency in occupations having minimally complex manual tasks.[2]

Table 4.1

Means and Standard Deviation for Education, Mental Work,

People Oriented Work, Manual Work and Income

				Identical Occupations	
	Combined Occupations	Occupations Held by Men	Occupations Held by Women	Male Portion	Female Portion
Income	8023 (3528) N = 231	8993 (3444) N = 722	4798 (1590) N = 347	8959 (3296) N = 307	5388 (2151) N = 241
Education	12.4 (2.1) N = 231	12.0 (2.4) N = 772	11.9 (1.4) N = 347	12.3 (2.3) N = 307	12.1 (1.8) N = 241
Mental Work	5.2 (2.5) N = 297	4.5 (3.1) N = 935	3.5 (2.6) N = 484	5.2 (2.5) N = 297	5.2 (2.5) N = 297
People Work	1.7 (2.1) N = 297	1.3 (2.5) N = 935	.8 (1.4) N = 484	1.7 (2.1) N = 297	1.7 (2.1) N = 297
Manual Work	1.8 (2.3) N = 297	3.2 (3.0) N = 935	1.3 (2.2) N = 484	1.8 (2.3) N = 297	1.8 (2.3) N = 297

Standard Deviation in Parentheses

N also given

Occupations held by males generally have similar occupational characteristics as those of females, however occupations held by males have substantially larger mean income than those of females (Table 4.1). It is possible that the income difference results from occupations held by men having slightly greater education and technical characteristics than those of women. However, as noted above, with the exception of complexity of manual work, the differences are trivial. They do not seem to justify the extreme income difference. Indeed, adding two standard deviations to the mean income of occupations held by women would not equal the mean income for men.

More importantly, the same findings occur for identical occupations held by men and women.[3] Since the educational characteristics are virtually identical, and the technical characteristics are identical; the only conclusion that can be drawn from these data is that the female portion of these occupations is systematically under-paid relative to the male portion.

There is another important pattern for income. The combined occupations have a higher mean income that occupations held by women, but a lower mean income than occupations held by men. Since the mean income of the combined occupations is that for gender integrated occupations in general, the implication is that the sharing of occupations

benefits women. This interpretation is reinforced by the analysis of identical occupations where the mean income of the male portion is much the same as for all male occupations (slightly lower), but the mean income for the female portion is somewhat higher than for all occupations held by women. Hence, although the female portion of gender integrated occupations is underpaid relative to the male portion, the female portion does benefit by being in occupations with substantial numbers of males.

In summary, with the exception of the complexity of manual work, occupations differentiated by gender have similar occupational characteristics. However, occupations held by men have much higher mean income than occupations held by women, and this also holds for male/female identical occupations. It also seems that if the sexes share occupations the mean income of the male portion remains much the same compared to all occupations held by men, while the mean income of the female portion is higher compared to all occupationsheld by women. Hence, gender integration of occupations mediates mean income to the benefit of women. However, the effect is not all that great since women in gender integrated occupations are still significantly underpaid relative to the male portion.

THE RELATIONSHIP BETWEEN EDUCATION AND INCOME

This section examines the affect which increasing education has on income for occupations differentiated by gender, and gender integrated occupations. The technique is correlation analysis. A (Pearson) correlation indicates the degree to which two variables are related. The higher the number, the stronger the relationship.

Human capital research finds that at the individual level of analysis education has a positive influence on income, but that the effect is greater for males than for females (e.g., Becker, 1975). The data for this research are at the occupational level of analysis and the findings are quite similar, although with important differences.

Table 4.2

Pearson Correlations Between Education and Income

Combined Occupations	.72 (231)
Occupations Held by Men	.81 (772)
Occuatpions Held by Women	.68 (347)
Male Portion of Identical Occupations	.76 (307)
Female Portion of Identical Occupations	.71 (241)

N in Parentheses

In agreement with previous research, this study finds

that increasing education positively contributes to income among all occupations regardless of gender. In contrast to previous research, the present findings also suggest that the positive relationship between education and income is of similar strength for gender differentiated occupations and gender integrated occupations[4] (Table 4.2). In other words, increasing education increases income in much the same way for all occupations, regardless of gender.

Given the similar magnitudes of relationship between education and income for occupations held by men and occupations held by women, how may we account for the substantially lower incomes for the latter found in the previous section? The previous section concludes that occupations held by women are systematically under-paid compared to occupations held by men even though both have comparable education requirements. A plausible explanation is that part of this under-payment may be in the form of lower income returns from education among occupations held by women. Differences in the income returns from education can be measured with the "slopes" accompanying the correlations. This is done in subsequent chapters.

At the individual level of analysis the lower income returns from education are usually explained in terms of females having restricted occupational opportunities and therefore less experience in occupations (Treiman and Terrel,

1975), or sporadic and interrupted work histories (Featherman and Hauser, 1976). These arguments are valid. However, the present data, at the occupational level, suggest that lower income returns also accompany the education requirements of occupations held by women. Since the education requirements are similar, the implication is that it is occupations held by females which are underpaid relative to their educational requirements, rather than females' education, per se.

The portions of male/female identical occupations show virtually the same correlations between education and income which suggests that increasing education contributes to income in a similar manner for both. However, the previous section finds that the female portion of identical occupations has substantially lower income than the male portion. The above discussion about lower income returns from education accounting for the lower mean income of occupations held by women would seem to apply to the female portion of identical occupations as well. More importantly, the same pattern occuring among the female portion of identical occupations directly points to, and reinforces, the interpretation of occupational income discrimination. In this case, however, the discrimination is directly related to gender.[5]

Recall that comparison of means in Table 4.1 found a slightly lower mean income for the male portion of identical

occupations compared to all occupations held by men, while the opposite held for the female portion of identical occupations. The lower mean income among the male portion of identical occupations may suggest that they are subject to lower income returns from education as well.

In summary, the strength of the correlations between education and income suggest that education contributes to income in a similar manner among occupations held by men, occupations held by women, and both portions of identical occupations. However, occupations held by women and the female portion of identical occupations have substantially lower incomes. These lower incomes may result from lower income returns from education. Finally, lower incomes returns from education apply to the male portion of identical occupations as well.

RELATIONSHIPS BETWEEN THE NATURE OF WORK AND INCOME

This section investigates the affect which increasing complexity of each form of work has on income for occupations differentiated by gender, and gender integrated occupations. Again, the technique is correlation analysis.

Reiss (1961) suggests that mental work and people oriented work have much stronger positive relationships with income than does manual work. Our findings support Reiss (1961), but mental work has a substantially greater impact on income than does people oriented work. Finally, the strengths of these relationships are similar regardless of the gender identification of occupations (Table 4.3).

However, among occupations held by men mental work and working with people might contribute to income in a similar fashion. The relatively high correlation between people oriented work and income may relate to the "power-nurture" dichotomy developed by England, and associates (1982). Occupations held by men dealing with people tend to be those involving administrative power over people. As a result, such occupations may have a relationship to income comparable to that resulting from mental work. Although this argument is intuitively appealing, our data appears to question the interpretation. The mean for complexity of involvement

Table 4.3

Pearson Correlations Between Nature of Work Charateristics and Income

	Mental Work	People Work	Manual Work
Combined Occupations	.69 (183)	.29 (183)	-.11 (183)
Occupations Held by Men	.67 (678)	.43 (678)	-.11 (678)
Occupations Held by Women	.70 (326)	.35 (326)	-.14 (326)
Male Portion of Identical Occupations	.69 (236)	.22 (236)	-.16 (236)
Female Portion of Identical Occupations	.73 (193)	.29 (193)	-.06 (93)

N in Parentheses

with people does not suggest a "power-wielding" relationship with people. On the other hand, the stronger relationship between people oriented work and income may owe to the association between education and people oriented work. That is, the education requirements of occupations held by men may be more appropriate to their people oriented tasks, and part of the treater impact working with people has on income may derive from a strong association with education. This idea receives examination in the section dealing with

relationships among the occupational characteristics.

For occupations held by women and the female portion of identical occupations the relationship between mental work and income is substantially larger than that for working with people. This pattern may be explained by the "power-nurture" dichotomy of occupations. Female occupations typically "nurture" people (the means suggest "serving") and this type of relationship with people tends not to be associated with high earnings.

There is another interesting pattern. Among the male portion of identical occupations the effect of working with people on income is less than that for all occupations held by men, and is quite similar to that obtaining for occupations held by women and the female portion of identical occupations. This may also be explained by the "power-nurture" dichotomy. Among gender integrated occupations the means for complexity of involvement with people do not suggest "wielding of power," they suggest "serving." Since American society traditionally assigns these types of roles to female occupations, male occupations performing them may be seen as violating cultural norms. It may also be the case that such occupations receive low income whether held by males or females.

Our index of manual work has a negative relationship with income, and the effect is similar regardless of gender.

The negative correlation results from the assignment of complexity scores by the DOT (1965) versus mean incomes provided by the Census (1970). Those occupations traditionally called "blue collar" have high manual scores, while those occupations traditionally called "professional" have low complexity scores for manual work. Mean incomes are opposite. Hence, the negative correlation between manual work and income should not be interpreted as implying that increasing manual skills leads to low incomes. The carpenter earns much more than the carpenter's helper. The negative correlation simply points out that "professionals" with low manual scores, but high mental work scores, earn more than "blue collar" workers with high manual scores, but low mental scores.

However, the income difference between "professionals" and "blue collar" workers is, itself, interesting. Put another way, why are complex mental skills more highly valued than complex manual skills? The negative relationships between manual work and income suggest a degeneration of manual work in American society. This may be related to Braverman's (1974) argument that a deterioration of occupational skills among manual occupations in (capitalist) industrial society has occured resulting from the separation of the planning and execution stages of the production process. Workers no longer plan and execute tasks. They are only involved in the execution stage. In the execution stage, moreover,

workers follow specific instructions from management (scientific management), tend machines which do precision work for them, or assemple prefabricated materials. As a consequence, workers have few true occupational skills. Braverman's (1974) argument is at the individual level, but it does imply that occupations having manual orientations have few real skills. Hence, the low incomes of these occupations, compared to "professional" occupations, as well as the negative correlations between the index of manual work and income, are not too surprising.

All the above findings show that mental work and people oriented work positively affect the income of occupations regardless of gender. These findings do not support the alternative expectations based on McLaughlin (1978) that only mental work positively contributes to income among male and mixed occupations, while no form of work positively contributes to income among female occupations. However, a thorough evaluation of McLaughlin (1978) requires using his procedures for measuring each form of work (a three point scale for mental work, and a dichotomy reflecting the presence or absence of people oriented and manual tasks) and the gender identification of occupations (based on the present female in the occupation).

These procedures were applied to the combined occupations.[6] The results (Table 4.4) are quite similar to the

patterns observed for gender differentiated occupations and gender integrated occupations in the original analysis. The only difference is that mental work and people oriented work definitely make similarly strong positive contributions to income among male occupations. However, the important point is that, contrary to McLaughlin's (1978) findings, the index of working with people has a positive relationship with income regardless of gender, and mental work has a positive affect on income for female occupations. In fact, the correlation between mental work and income is higher for female occupationsthan for male occupations. McLaughlin's findings about the negative influence of manual work receives support, but this occurred in the original analysis as well.

Table 4.4

Pearson Correlations Between Nature of Work Characteristics and Income

	Mental Work	People Work	Manual Work
Male Occupations	.32 (121)	.37 (121)	-.25 (121)
Mixed Occupations			
Female Occupations	.47 (56)	.21 (56)	-.35 (56)

N in Parentheses

Note: Not enough cases for Mixed Occupations

In summary, all of the findings suggest that mental work and people oriented work positively contribute to income among gender differentiated occupations and gender integrated occupations, while manual work leads to lower incomes. Further, the strength of relationships are similar for all occupations regardless of gender. Hence, the patterns lend more support to Reiss (1961) than to McLaughlin (1978). There is also the noteworthy finding that among the male portion of identical occupations the contribution of people oriented work to income is less in magnitude compared to all occupations held by men. The same occured for the relationship between education and income. Again, there is evidence that the male portion of identical occupations is more similar to occupations held by women and the female portion of identical occupations for the contribution an occupational characteristic makes to income.

In spite of the overall similarity of magnitudes of relationship for each form of work on income among all occupations, we are still faced with the substantially lower incomes of occupations held by women and the female portion of identical occupations. It may also be that, as with education, occupations held by women and the female portion of identical occupations have lower incomes because they receive lower income returns from increases in complexity of mental work and people oriented work. This possibility is examined in subsequent chapters.

RELATIONSHIPS AMONG THE OCCUPATIONAL CHARACTERISTICS AND THEIR RELATIVE CONTRIBUTION TO INCOME

It is important to examine relationships among occupational characteristics to see whether they serve to confirm or deny the assumptions discussed in Chapter One. Thus, under perfect competition, the greater the technical requirements of occupations for mental work and working with people, the higher should be the education requirements, since the former would require formal training. However, this would not hold for complexity of manual work because training for manual occupations takes place outside the formal educational system.

The assumption that there is a strong positive relationship between mental work and education, and people oriented work and education, leads to the expectation that both technical characteristics and education would make similarly strong positive contributions to income. However, this would not hold for manual work because this form of work is not associated with formal education.

The relationships among the occupational characteristics confirm most of the assumptions and expectations (Table 4.5). Higher education is associated with complex mental work and both have comparable affects on income. On the other hand,

occupations characterized by a high degree of education do not necessarily involve complex relationships with people, and working with people generally has a weaker impact on income than either education or mental work. Finally, manual work has a negative relationship with income and is also negatively related to all the other occupational characteristics.[7]

The relationship between each occupational characteristic and income holds for all occupations regardless of gender. However, there are some differences for the relationships among the occupational characteristics which may help explain some differences among the patterns for occupations held by men and the male portion of identical occupations.

Among occupations held by men education and people oriented work are more highly related that for any other occupations. This association reinforces the earlier argument that the somewhat stronger contribution of people oriented work among occupations held by males, compared to all other occupations, may derive from a greater correspondence between the education requirements and people oriented tasks of these occupations compared to all other occupations.

In contrast, among the male portion of identical occupations education and people oriented work do not occur together. Earlier findings show that this form of work makes less of a positive contribution to income among the male por-

Table 4.5

RELATIONSHIPS AMONG OCCUPATIONAL CHARACTERISTICS

	Combined Occupations	Occupations Held by Men	Occupations Held by Women	Identical Occupations Male Portion	Identical Occupations Female Portion
Education and Mental	.78 (196)	.77 (678)	.78 (326)	.71 (191)	.73 (165)
Education and People	.25 (196)	.43 (678)	.29 (326)	.08 (191)	.21 (165)
Education and Manual	-.34 (196)	-.25 (678)	-.36 (326)	-.42 (191)	..51 (170)
Mental and Manual	-.16 (310)	-.04 (935)	-.50 (484)	-.42 (253)	-.44 (253)
Mental and People	.33 (310)	.33 (935)	.46 (484)	.41 (253)	.41 (253)
People and Manual	-.43 (310)	-.54 (935)	-.21 (484)	-.25 (253)	-.25 (253)

N in Parentheses

tion of identical occupations than all occupations held by men. The original interpretation relates this difference to the possibility that males in the same kinds of people oriented positions as females may be seen as violating cultural norms. The present findings suggest that part of the smaller contribution of people oriented work to income among the male portion of identical occupations may result from no correspondence between the educational requirements of these positions and people oriented tasks.

Since the occupational characteristics are generally related to each other as assumed, it is no surprise that these characteristics contribute to income in the manner expected. Education and complexity of mental work have similarly positive affects on income because they are intercorrelated. Complexity of involvement with people, however, has a weaker affect on income because it is not assicated with education to a high degree. Complexity of manual work has a negative impact on income partially because it is not positively related to the other occupational characteristics.

In summary, the assumptions for relationshps among the occupational characteristics are generally met, and occupational characteristics differentially contribute to income in the manner expected. For the most part, these relationships hold regardless of gender. Exceptions, and their relevance to earlier findings and interpretations are noted above.

OVERALL SUMMARY AND CONCLUSIONS FOR THE TOTAL ECONOMY ANALYSIS

Occupations held by men, occupations held by women, and gender integrated occupations are quite similar with regard to those occupational characteristics that are associated with income. Exceptions are (1) greater complexity of manual work for occupations held by men compared to all other occupations, and (2) slightly more education and complexity of mental work and people oriented work among gender integrated occupations than gender differentiated occupations.

All occupations also show quite similar patterns for the contribution each occupational characteristic makes to income.

With all the similarity of occupational characteristics and their associations with income, it might be expected that occupations held by men and occupations held by women would have similar incomes. This is not the case.

Occupations held by men have much higher levels of average income than occupations held by women. Granted, the former have slightly greater education and complexity of work characteristics than the latter, and even show a slightly stronger positive associations between education and income, but the relationships for the work characteristics are very

similar and cannot explain the difference in income levels. In other words, the small differences in characteristics between gender differentiated occupations produce large income differences.

Occupations held by women are systematically under-paid compared to occupations held by men, with similar characteristics. They appear to be subject to different "rules" for income determination. The different "rules" may be in the form of lower income returns from the occupational characteristics. Lower income returns from the occupational characteristics would account for the lower incomes among occupations held by women.

The income gap obtains for both gender portions of identical occupations, which are even more similar to one another in terms of level of education and technical characteristics. These latter findings suggest that the different "rules" for income determination also occur where males and females hold identical occupations.

There is a noteworthy pattern that appears when identical occupations are compared to occupations held by men. The male portion of identical occupations shows a slightly lower mean income, a lower relationship between education and income, and a lower relationship between working with

people and income. Hence, the different "rules" for occupations held by women, and the female portion of identical occupations, in the form of lower income returns from occupational characteristics seem to apply, to a certain extent, among the male portion of identical occupations. In other words, males who occupy "female" type jobs are subject to the same discriminatory income "rules" as are females.

The occupational characteristics are generally related to each other in the way we initially assumed. The only exception is the relationship between education and complexity of people oriented work where the correlation is moderate rather than strong. However, as expected, education and mental work make similarly strong contributions to income because they occur together. On the other hand, working with people has less affect on income because it does not occur with education to a high degree. Finally, manual work has a negative relationship with income partially because it does not parallel other income generating occupational characteristics. For the most part, these patterns obtain regardless of gender.

In conclusion, it seems that the findings have two important implications. First, while the findings and interpretations are for occupations, and not the individuals holding them, they may have implications for the "screening hypothesis." The "screening hypothesis" suggests that at the

individual level, the positive contribution of education to income occurs because the former allows access to the more lucrative occupations. For occupations held by women the patterns suggest that they are simply not as lucrative as occupations held by men. More importantly, among male/female identical occupations, higher education may allow females access to particular jobs, but the female portion is underpaid relative to the male portion. Hence, at the occupational level the "screening hypothesis" may not be valid for occupations held by women or the female portion of male/female identical occupations.

The second implication stems from the first. The similarity of occupational characteristics, and their contributions to income for occupations held by men and occupations held by women would lead to the expectation that the two have similar incomes. Obviously, this is not true. Hence, the first major conclusion of this research is that the labor market may be differentiated by the gender incumbency of occupations. In other words, the "rules" for income determination are different depending on the gender incumbency of occupations.

It remains to be seen if the findings of this chpater hold when the same types of analyses are performed within the context of economic segmentation approaches. The following chapters examine whether or not this is the case.

Footnotes for Chapter IV

1. The means for complexity of involvement with people are very small for all samples of occupations. The Dictionary of Occupational Titles (1965) consistently assigns low scores for this variable. Even "managerial" occupations are assigned low scores. For example, the group "other managers and administratos" averages out to a 2.3 which seems quite low.

2. Among the male sample, however, the standard deviations for all occupational characteristics are larger, suggesting the greater range of male occupations than either female or co-sex occupations.

3. Some examples from the raw data are:

	Male		Female	
	Education	Income	Education	Income
Computer Specialists	14.6	10641	14.5	7786
Managers and Administrators	12.6	13581	12.5	7133
Sales Workers	12.8	10481	12.0	4304
Bookkeepers	12.8	8023	12.2	4704
Foremen	11.2	9979	11.5	7304

These mean values result from summing the census means for each industry-specific occupation and dividing by 11 (the number of industries). Similar results obtain when the means for each industry-specific occupations are weighted by number of employees and divided by the total N.

4. While male occupations show a slightly stronger correlation between education and income than do female occupations; this conclusion is based on the fact that the correlationsare not substantially different according to the .30 criterion (see the Methodology chapter).

5. This research does not have data to verify or document this conclusion, but at the individual level of analysis there is research demonstrating that females holding identical jobs as males are subject to lower "pay struc-

tures." The general argument involves the notion of "rank segregation." For example, males and females may both be faculty members in a university department, but the former are more likely to be full or associate professors and the latter assistant professors or instructors. The job is the same but there is rank segregation by sex and the higher ranks pay more. This occurs among professional employees (Malkiel and Malkiel, 1973), managerial employees (Halaby, 1979), and professional, administrative, technical, and clerical employees in the Federal Civil Service (Taylor, 1979).

6. The technical structure variables were recoded to meet McLaughlin's (1978) procedures. Complexity of involvement with symbols becomes a three point scale, while complexity of involvement for people and physical objects reflect only the presence or absence of involvement. The sex identification of occupations is measured according to the percent female in the occupation: less than 26% female are male occupations, between 26% and 50% are mixed occupations, and greater than 51% female are female occupations. The analysis was performed for the combined sample only since it is not feasible to perform it for the male sample or the female sample separately. This is so because there are very few occupations in either sample meeting the measurement procedures for sex identification. The combined sample, on the other hand, has occupations meeting these procedures.

7. The technical structure variables are also related to each other. Working with symbols also involves moderate involvement with people. However, working with symbols or people does not involve working with physical objects. In other words, mental work or people oriented work does not involve manual work.

CHAPTER V

ANALYSIS ACCORDING TO ECONOMIC SEGMENTATION BY INDUSTRY

GENERAL INTRODUCTION

Industrial segmentation theory emphasizes the partitioning of the total economy into distinct industrial segments each having unique structural arrangements, or social organizations. The variation in social organization between industrial sectors mediates both income level and the influence of occupational characteristics on income. This chapter examines the effect of industrial segmentation on income and the varying relationships between occupational characteristics and income.

Our major expectations for this analysis are that there will be higher levels of occupational characteristcs and income in core industries than in peripheral industries. Moreover, based on the findings of previous research (and the findings of Chapter Four) occupations held by men should have higher incomes than occupations held by women. Our examination of the relationships between education and income are exploratory in nature since previous research has provided contradictory results. Furthermore, the relationships between each form of work and income are also exploratory since previous research ignores this issue. However, the patterns

for mental work and people oriented work should follow that for education since we found earlier a strong correlation among these characteristics. Manual work should have a weak relationship with income in both industrial sectors. A theoretical exposition of the expectations is given in each major section.

DISTRIBUTION OF OCCUPATIONAL CHARACTERISTICS AND INCOME IN CORE AND PERIPHERAL INDUSTRIES

Previous research, at the individual level of analysis, finds that employees working in core industries have higher education than employees in peripheral industries (Beck, and associates, 1978; Tolbert, and associates, 1980). Our findings do not support this at the occupational level. Occupations in core and peripheral industries do not systematically differ for education to any great degree (as measured by the means). Moreover, there is not much variation in education, in any industry, compared to the total economy. These findings hold for all occupations (Tables 5.1, 5.2, 5.3).

On the other hand, there is variation in technical characteristics across industries, but the (weighted) means for complexity of mental work and people oriented work are not substantially different from the values in the total economy.[1] However, among combined occupations and occupations held by men, core industries do have somewhat greater involvement with manual work, especially the Construction industry. This pattern is not as prevalent among occupations held by women. Overall, industrial technical structures differentiated by gender are quite similar, except for complexity of manual work.

Table 5.1

Means and Standard Deviations for Occupational Characteristics and Income by Industrial Location-Combined Occupations

	Core Industries						Peripheral Industries				
	MNG	CST	MFG	TRN	COM	PUT	PAD	AFF	WRT	FIR	SRV
Income	9883 (4292)	8758 (2959)	8705 (3365)	8503 (3365)	8851 (2920)	8714 (2549)	8335 (2875)	6652 (4224)	6741 (3129)	7569 (3778)	7539 (4355)
Education	12.8 (2.1)	12.0 (1.9)	12.3 (2.1)	11.8 (1.5)	12.7 (1.4)	12.6 (1.9)	12.8 (2.2)	11.5 (2.7)	11.9 (1.7)	12.4 (1.9)	12.9 (2.4)
Mental Work	2.6	4.6	2.2	2.6	3.9	3.1	3.8	2.3	2.6	4.4	3.8
People Work	.7	.5	.6	.7	1.1	.5	1.2	1.5	.8	1.4	2.3
Manual Work	3.3	7.2	2.8	2.6	3.6	2.8	1.1	4.0	1.1	.4	.9

Standard Deviation in Parentheses

Table 5.2

Means and Standard Deviations for Occupational Characteristcs and Income by Industrial Location-Occupations Held by Men Top Panel, Occupations Held by Women Bottom Panel

	Core Industries					Peripheral Industries					
	MNG	CST	MFG	TRN	COM	PUT	PAD	AFF	WRT	FIR	SRV
Income	9216	8872	9312	9089	9569	8973	9438	7136	8310	8582	8949
	(3155)	(2918)	(3518)	(3325)	(3440)	(2458)	(3092)	(2912)	(3474)	(3484)	(4707)
Education	11.6	11.4	11.9	11.6	12.7	11.9	12.6	10.5	11.9	12.2	12.8
	(2.8)	(2.3)	(2.4)	(1.9)	(1.6)	(2.1)	(2.6)	(2.4)	(2.2)	(2.3)	(2.7)
Mental Work	2.5	4.6	2.9	2.6	5.3	3.1	3.6	2.3	2.9	4.8	4.3
People Work	.7	.5	.7	.7	.9	.5	1.3	1.5	.9	1.9	2.7
Manual Work	3.5	7.6	2.9	2.9	4.2	3.2	1.4	4.1	1.6	.5	1.6
Income	5801	5568	5156	5124	5237	5768	5934	3631	4115	4646	4501
	(1917)	(1974)	(1552)	(1490)	(1549)	(1614)	(1908)	(1436)	(2015)	(1457)	(2129)
Education	12.5	11.9	11.6	11.8	12.1	12.4	12.4	11.4	11.6	12.1	12.3
	(1.2)	(1.5)	(1.6)	(1.2)	(1.0)	(1.3)	(1.6)	(1.8)	(1.4)	(1.3)	(2.0)

(cont.)

	Core Industries						Peripheral Industries				
	MNG	CST	MFG	TRN	COM	PUT	PAD	AFF	WRT	FIR	SRV
Mental Work	4.2	3.9	2.1	3.1	2.4	3.2	4.3	2.5	2.0	4.1	3.5
People Work	.9	.8	.4	.8	1.4	.8	1.1	1.3	.7	.9	2.0
Manual Work	.8	.3	2.4	.5	2.9	.5	.5	3.2	.3	.3	.4

Standard Deviation in Parentheses

Table 5.3

Means and Standard Deviations for Occupational Characteristics and Income by Industrial Location-Male/Female Identical Occupations-Male Portion

Top Panel, Female Portion Bottom Panel

	Core Industries							Peripheral Industries			
	MNG	CST	MFG	TRN	COM	PUT	PAD	AFF	WRT	FIR	SRV
Income	10373	8694	9745	9198	9686	9048	9093	7671	8053	8791	8512
	(3204)	(2633)	(3305)	(3253)	(3328)	(2050)	(2672)	(3656)	(3113)	(3569)	(4441)
Education	12.7	11.6	12.5	11.9	12.9	12.3	12.8	10.7	12.1	12.5	13.1
	(2.4)	(2.2)	(2.2)	(1.9)	(1.5)	(1.9)	(2.2)	(3.3)	(.18)	(2.1)	(2.5)
Mental Work	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2
	(2.5)	(2.5)	(2.5)	(2.5)	(2.5)	(2.5)	(2.5)	(2.5)	(2.5)	(2.5)	(2.5)
People Work	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7
	(2.2)	(2.2)	(2.2)	(2.2)	(2.2)	(2.2)	(2.2)	(2.2)	(2.2)	(2.2)	(2.2)
Manual Work	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8
	(2.3)	(2.3)	(2.3)	(2.3)	(2.3)	(2.3)	(2.3)	(2.3)	(2.3)	(2.3)	(2.3)
Income	6638	6231	5580	5510	5589	6230	6281	3697	4410	4927	5057
	(2455)	(2387)	(1737)	(1452)	(1812)	(2043)	(2138)	(1765)	(2464)	(1659)	(2336)
Education	12.3	11.8	11.8	11.7	12.1	12.4	12.6	11.6	11.7	12.2	12.6
(cont.)	(1.7)	(1.9)	(1.7)	(1.5)	(1.3)	(1.6)	(1.9)	(2.0)	(1.5)	(1.5)	(2.2)

Standard Deviation in Parentheses

Note: Means and Standard Deviations for work characteristics are the same across industries because they are based on the same occupations in each industry.

Note: Means and Standard Deviations for work characteristics are not shown for the female portion because they are the same as for the male portion.

Previous research in this tradition also finds higher incomes in core industries than in peripheral industries. Hence, the present research also expects higher incomes in core industries for both occupations held by men and occupations held by women, but with incomes for the former persistently higher than the corresponding levels of income for the latter.

Mean incomes of occupations across industries are not substantially different than the overall mean income in the total economy. However, occupations in core industries do have higher mean incomes than those in peripheral industries (Tables 5.1, 5.2, 5.3).

Bluestone, and associates (1973) attribute the greater incomes in core industries to factors such as greater profits and unionization which translate into higher incomes, for workers. This research cannot specifically evaluate this explanation, but our findings are consistent with Bluestone's expected patterns.

The patterns of levels of income support industrial segmentation theory, but occupations held by men have substantially larger incomes than occupations held by women. Given the similarity of their characteristics, these data point to the systematic-underpayment of occupations held by women compared to occupations held by men.

In summary, all occupations have quite similar levels of education and they also show little variation across industries. There patterns, at the occupational level, do not support research at the individual level which suggests greater education among core industry employees.

All occupations also have quite similar levels of involvement with mental work and people oriented work, both compared to each other and across industries. The only major difference concerns complexity of manual work, which seems greater in core industries, but only for occupations held by men.

Finally, core industries do have higher occupational mean income than peripheral industries, although the differences are less than one standard deviation above or below the mean income for the total economy. In both industrial sectors occupations held by men have much higher mean income than occupations held by women. The findings for variation in occupational mean income support individual level research.

THE RELATIONSHIP BETWEEN EDUCATION AND INCOME IN CORE AND PERIPHERAL INDUSTRIES

Bluestone, and associates (1973) find that for individuals, education (years of schooling) is more important to income in peripheral than in core industries because a lack of income setting procedures allows employers more latitude in rewarding individual characteristcs. In contrast, Tolbert, and associates (1980) find that "years of schooling" is more important to income in core industries than in peripheral industries. On the other hand, Beck, and associates (1978) argue that for individuals a "degree" has a greater impact on income in core industries because of its use as a credentialing device in this sector.

The contradictory findings for "years of schooling" results in expectations which are exploratory. If "years of schooling" is more important in peripheral industries this implies that the lack of income setting guidelines allows employers more discretion in rewarding the knowledge requirements of occupations. If "years of schooling" is more important in the core, this suggests that the knowledge requirements of occupations are part of the income setting process. Finally, if there is no variation between the core and periphery this indicates that both sectors use the knowledge requirements of occupations to determine income in much the

same way. These are issues which receive examination in this chapter.

Similarly, if a "degree" is more important to income in core industries this would suggest that this sector rewards the credential requirement of occupations to a greater extent than in the periphery. In contrast if there is no variation in the importance of a "degree" to income by industrial location, this suggests that both sectors reward the credential requirements of occupations in a similar manner. These issues also receive examination in this chapter.

Regardless of which industrial sector education proves to contribute more to income, and by whatever technique education is measured, we expect, following Bluestone and associates (1973) that occupations held by men should benefit more from education than occupations held by women.

The present findings, at the occupational level, show that irrespective of how education is measured, it is highly correlated with incomes in all industries and, for the most part, there are no substantial differences in the strength of these correlations across industries. Overall, most industries appear to use education as a criterion for establishing occupational income in a similar fashion. The only instances where education (years of schooling or degree) does not have a strong relationship with income are in two core industries (Mining and Construction), but only among

occupations held by women[2] (Table 5.4).

Mining and Construction are industries heavily dominated by males. This domination may devalue the effect of the education of occupationsheld by females in these industries. A blatant example of this occurs in the Mining industry where the affect of a "degree" on the income of occupations held by females is negative!

At the general level, however, our findings do not offer support for Bluestone, and associates (1973) or Beck, and associates (1978) since we find that the importance of education to income shows very little variation across industries. Thus processes occuring at the individual level demonstrated by Bluestone, or Beck, do not appear to apply at the occupationa level. The differences in findings suggest that the emphasis on individual characteristics of most previous research overlook the differences in processes whereby individual achieve positions and processes whereby incomes are attached to positions. Individuals achieve positions with their educational credentials (i.e., screening hypothesis), and both core and peripheral industries use the educational requirements of occupations to determine income in much the same fashion.

Despite the similarity in education for occupations held by men and occupations held by women, and the respective relationships between education and income, there are extreme

Table 5.4

Pearson Correlations Between "Years of Schooling" and Income and "Degree" and Income by Industrial Location

		Combined Occupations			Occupations Held by Men			Occupations Held by Women		
		YEARS	DEGREE		YEARS	DEGREE		YEARS	DEGREE	
	MNG	.56	.48	(9)	.80	.82	(59)	.13	-.07	(16)
	CST	.55	.32	(16)	.87	.79	(71)	.35	.34	(23)
C	MFG	.82	.76	(35)	.88	.83	(90)	.84	.78	(46)
O										
R	TRN	.61	.51	(18)	.80	.81	(66)	.77	.59	(29)
E										
	COM	.72	.56	(14)	.85	.76	(49)	.66	.50	(27)
	PUT	.66	.50	(16)	.83	.76	(68)	.60	.54	(24)
	PAD	.82	.80	(33)	.87	.83	(84)	.77	.79	(40)

(cont.)

		Combined Occupations			Occupations Held by Men			Occupations Held by Women		
		YEARS	DEGREE		YEARS	DEGREE		YEARS	DEGREE	
PHRIPHERY	AFF	.90	.82	(16)	.78	.76	(55)	.79	.57	(21)
	WRT	.82	.83	(29)	.86	.87	(84)	.72	.67	(42)
	FIR	.77	.67	(23)	.83	.77	(58)	.79	.69	(36)
	SRV	.75	.71	(35)	.77	.74	(88)	.85	.81	(43)

N in Parentheses: Same N for Years and Degree

income differences between occupations held by men and occupations held by women in all industries.

From the total economy analysis we concluded that the lower incomes of occupations held by women compared to occupations held by men (despite similar education characteristics and similar strengths of relationships between education and income for both) result from lower income returns from education. The present analysis extends this interpretation to all industries by examining the income returns from education. The procedure involves regressing income with education and looking at the "slopes." The slopes are a different statistic than correlations. Correlations only suggest the degree to which an increase in the magnitude of one variable (education) is associated with the increase (or decrease) in the magnitude of another variable (income). The slopes indicate the dollar increase for each yearly increase in education.[3]

Our findings are consistent with the conclusion of the total economy analysis (Table 5.5). In all industries occupations held by women receive less income returns from increases in education than do occupations held by men (i.e., the slopes resulting from regressing income with education are smaller for occupations held by women than for occupations held by men). In short, occupations held by women have less income than occupations held by men, not because they

Table 5.5

Slopes and Intercepts-Mean Income Regressed with Mean Years of Schooling

		Occupations Held by Men		Occupations Held by Women	
		Intercept	Slope	Intercept	Slope
CORE	MNG	- 1066	897	2395	265
	CST	- 3671	1109	- 389	497
	MFG	- 6254	1308	-3880	771
	TRN	- 6502	1350	-5935	928
	COM	-14508	1896	-5536	886
	PUT	- 2495	966	-3063	691
	PAD	- 3526	1032	-4216	805
PERIPHERY	AFF	- 2924	961	-2831	557
	WRT	- 7999	1374	-3819	667
	FIR	- 6463	1243	-6845	943
	SRV	- 7930	1327	-4398	706

N's are the same as in Table 5.4

have lower educational characteristics, but because a difference in the level of education is associated with much smaller changes in income for occupations held by women than for occupations held by men.

All of the above findings apply to male/female identical occupations as well (Tables 5.6 and 5.7). This latter set of findings is extremely important. For occupations held by men and occupations held by women it is possible to argue that the income returns (slopes) from education are different since male and females hold different occupations. However, the fact that the female portion of identical occupations receive much lower income returns from increases in education compared to males in the same occupations directly points to the existence of occupational income discrimination against the female portion, and this discrimination occurs in all industries.

Recall that in the total economy the male portion of identical occupations showed a lower correlation between education and income than for all occupations held by men. The present findings suggest that this effect results from considerably smaller correlations in Mining, Construction, Public Utilities, and Agriculture, Forestry and Fisheries for the male portion compared to all occupations held by men. On the other hand, the female portion shows larger correlations between education and income, compared to all occupations held by women, in Mining and Construction, but a smaller correlation in Public Utilities, and Agriculture, Forestry and Fisheries (compare Table 5.4 with Table 5.6).

The result of these differences is that the relation-

Table 5.6

Pearson Correlations Between "Years of Schooling" and Income and "Degree" and Income by Industrial Location-Male/Female Identical Occupations

		Male Portion		Female Portion	
		YEARS	DEGREE	YEARS	DEGREE
CORE	MNG	.56	.53(10)	.40	.03(10)
	CST	.56	.58(15)	.47	.21(15)
	MFG	.86	.71(34)	.86	.89(34)
	TRN	.75	.78(25)	.68	.61(25)
	COM	.72	.75(13)	.68	.55(13)
	PUT	.72	.60(15)	.61	.36(15)
	PAD	.83	.76(30)	.82	.84(30)
PERIPHERY	AFF	.90	.55(14)	.84	.52(14)
	WRT	.82	.80(29)	.70	.75(29)
	FIR	.77	.67(22)	.79	.75(22)
	SRV	.75	.68(33)	.78	.85(33)

N in Parentheses

Table 5.7

Slopes and Intercepts-Mean Income Regressed with Mean Years of Schooling-Male/Female Identical Occupations

		Occupations Held by Men		Occupations Held by Women	
		Intercept	Slope	Intercept	Slope
	MNG	- 2248	970	- 119	530
	CST	- 75	781	-1007	611
CORE	MFG	- 6257	1284	-4353	841
CORE	TRN	- 6518	1329	-2603	692
CORE	COM	-10643	1590	-6169	982
	PUT	- 1904	896	-3950	824
	PAD	- 1049	774	-3059	733
PERIPHERY	AFF	- 6214	1224	-3810	667
PERIPHERY	WRT	- 9396	1367	-8877	1142
PERIPHERY	FIR	- 8822	1401	-6314	915
PERIPHERY	SRV	- 9163	1349	-5066	808

N's are the same as in Table 5.6

ships between education and income are even more similar in strength for both gender portions of identical occupations than for all occupations held by men and all occupations held by women. In other words, all industries use education to determine income among gender integrated occupations in an even more similar fashion than for gender differentiated occupations.

However, there is still not a corresponding equalization of the income returns (slopes) from education. In other words, in the great majority of industries the male portion of identical occupations receives more income returns from increases in education than does the female portion of identical occupations - Public Utilities and Public Administration being possible exceptions (Table 5.7).

In summary, the overall patterns suggest that core and peripheral industries use education to determine income in much the same way for occupations held by men, occupations held by women, and male/female identical occupations. With the exception of Mining and Construction, the relationship between education and income is of similar strength in all industries regardless of gender. However, much lower income returns (slopes) from education accompany occupations held by women and the female portion of male/female identical occupations.

THE RELATIONSHIP BETWEEN THE NATURE OF WORK AND INCOME ACROSS CORE AND PERIPHERAL INDUSTRIES

Industrial segmentation theory and research has previously ignored the influence of job complexity on income. However, using Bluestone, and associates' (1973) finding that "years of schooling" has a greater influence on income in peripheral industries because of an absence of bureaucratic wage setting procedures, it is possible to speculate that mental work and people oriented work both contribute to income, but the effect should be greater in peripheral industries. On the other hand, both of these forms of work may be more important to income in core industries which would suggest that increasing complexity of mental and people oriented tasks are part of the income setting process. Given the low evaluation American society places on manual work (Reiss, 1961; Braverman, 1974), it should have a minimal influence on income in the core and periphery.

The analysis uses the same procedures as those for the section dealing with variation in the importance of education to income in industrial sectors. First, the correlations between each form of work and income are presented. These correlations suggest the degree to which an increase in the complexity of a particular task (e.g., mental work) is associated with an increase (or decrease) in income. In other

words, the correlations suggest the overall strength of relationship between increasing complexity of a particular form of work and income. Second, the "slopes" resulting from regressing each form of work with income are examined. The slopes indicate the actual dollar increase for each unit increase in task complexity as measured by the technical structure scales presented in the Methodology chapter.

Contrary to the above expectations, our findings show that mental work and people oriented work show no substantial variation in their separate relationships (correlations) with income across industries (Table 5.8). Perhaps the lack of variation across industries reflects industrial requirements for mental and people oriented work. The weighted industrial means (Tables 5.1 and 5.2) suggest some variation in emphasis, but all industries require these two forms of work to a similar degree. Since core and peripheral industries require these two forms of work they tend to reward increasing complexity in a similar fashion. In other words, increasing complexity of both mental and people oriented work is part of the income setting process in the core and periphery.

The expectation for manual work is that it should have a minimal influence on income in both core and peripheral industries. This is based on Reiss (1961) and our previous observation of a negative relationship between manual work

Table 5.8

Pearson Correlations Between Mental Work and Income, People Oriented Work and Income, and Manual Work and Income by Industrial Location

		Combined Occupations			Occupations Held by Men			Occupations Held by Women		
		MENTAL	PEOPLE	MANUAL	MENTAL	PEOPLE	MANUAL	MENTAL	PEOPLE	MANUAL
CORE	MNG	.71	.42	-.01(9)	.70	.55	-.21(54)	.65	.59	-.01(16)
	CST	.71	.65	-.31(13)	.73	.37	-.03(62)	.72	.63	-.04(23)
	MFG	.76	.34	-.18(28)	.71	.47	-.10(80)	.78	.32	-.34(42)
	TRN	.64	.10	.19(15)	.64	.38	-.06(57)	.76	.39	-.10(28)
	COM	.78	.50	-.28(11)	.58	.51	-.22(43)	.74	.51	-.13(27)
	PUT	.79	.40	-.14(13)	.68	.48	-.10(59)	.70	.49	.09(24)
	PAD	.80	.23	-.06(27)	.75	.37	-.08(75)	.79	.23	-.14(37)

(cont.)

		Combined Occupations			Occupations Held by Men			Occupations Held by Women		
		MENTAL	PEOPLE	MANUAL	MENTAL	PEOPLE	MANUAL	MENTAL	PEOPLE	MANUAL
PERIPHERY	AFF	.70	.75	-.26(12)	.66	.51	-.10(46)	.81	.26	-.33(19)
	WRT	.81	.27	-.28(22)	.70	.40	-.007(74)	.75	.16	-.15(38)
	FIR	.74	.19	-.35(18)	.68	.39	-.24(49)	.80	.43	-.13(33)
	SRV	.62	.34	-.18(28)	.63	.46	-.12(79)	.75	.36	-.25(39)

N in Parentheses

and income in the total economy. We find that this pattern does indeed hold across all industries for occupations held by men and across most industries for occupations held by women (Table 5.8).

Interestingly, among occupations held by women, doing manual work has a positive relationship with income in two industries (Mining and Construction), but the magnitude is very small and does not challenge out initial expectation.

The findings for manual work in the industrial sectors must be interpreted in the same manner as for the negative correlation present in the total economy. That is, the negative relationships result from the DOT (1965) assigning high manual skill scores to "blue collar" occupations which the Census shows to have low mean incomes. On the other hand, occupations with low manual skills scores (e.g., "professional") but high mental skills scores, have much greater mean incomes. Hence, the negative correlations do not suggest that increasing manual complexity results in low income among manually oriented occupations. The relationships merely show that occupations with complex manual skills earn less than occupations with high mental or people oriented skills. The interpretation for the total economy suggests that manual skills are not valued because of their deterioration in industrial society. The present patterns point out that this devaluation holds regardless of

industrial location.

Overall, occupations held by men and occupations held by women show similar levels of involvement with mental work and people oriented work in each industry (Table 5.2). They also show similarity in the independent relationships these two forms of work have with income in each industry (Table 5.8). Despite their similarity, however, occupations held by men and occupations held by women show income differences in each industry.

These findings reflect those in the total economy, and suggest that occupations held by women receive lower income returns from these forms of work in all industries. Accordingly, the income returns (slopes) from increasing complexity of mental work are greater for occupations held by men in all industries (higher slopes); while the income returns from increasing complexity of people oriented work are greater for occupations held by men in all but one industry[4] (Tables 5.9 and 5.10).

The above does not always hold for complexity of manual work. In addition to Mining and Construction where occupations held by women experience positive income returns from manual work the loss of income is less for them in three additional industries (Communications, Finance, Insurance and Real Estate, and Services) than for occupations held by men. The pattern in the latter three industries may have

Table 5.9

Slopes and Intercepts-Mean Income Regressed With Each Technical Structure Variable-Occupations Held by Men

		MENTAL WORK		PEOPLE WORK		MANUAL WORK	
		Intercept	Slope	Intercept	Slope	Intercept	Slope
CORE	MNG	6110	763	8563	1117	10276	-237
	CST	6051	729	8624	705	9297	- 37
	MFG	5870	874	8652	911	9984	-127
	TRN	5854	793	8618	766	9630	- 79
	COM	5831	799	8799	914	10655	-262
	PUT	6490	605	8548	785	9497	- 87
	PAD	5826	837	9125	487	10073	- 89
PERIPHERY	AFF	4647	722	6592	897	7825	-102
	WRT	5028	834	7768	717	8550	- 8
	FIR	4807	884	8120	748	9823	-291
	SRV	4412	1077	8057	939	9972	-201

N's are the same as in Table 5.8

Table 5.10

Slopes and Intercepts-Mean Income Regressed With Each Technical Structure Variable-Occupations Held by Women

		MENTAL WORK		PEOPLE WORK		MANUAL WORK	
		Intercept	Slope	Intercept	Slope	Intercept	Slope
CORE	MNG	2759	634	4821	735	5642	11
	CST	2971	521	4586	733	5392	- 42
	MFG	3416	420	4702	294	5368	-227
	TRN	3323	443	4677	408	5203	- 81
	COM	3349	428	4595	433	5262	- 97
	PUT	3459	433	5045	471	5465	- 64
PERIPHERY	PAD	3601	494	5440	200	5859	-119
	AFF	2108	364	3361	235	3748	-222
	WRT	2596	333	3779	122	4036	- 84
	FIR	2570	485	4238	366	4845	-100
	SRV	2328	473	3880	316	4572	-196

N's are the same as in Table 5.8

something to do with their being more equally composed of male and females.[5]

The similarity of relationships between mental work and income holds for male/female identical occupations. However, gender integration of occupations does slightly modify the strength of the relationships between people oriented work and income. Among the male portion, people oriented work has somewhat less impact on income in most industries (Agriculture, Forestry and Fisheries and Construction are exceptions), and hardly affects income at all in Transportation (table 5.11).

The lower magnitudes of relationship for the male portion reflect the finding for the total economy. For that analysis the interpretation is that male/female occupations having people orientations may "serve/nurture" people. Occupations held by men performing this role are atypical and may be seen as violating cultural norms. The present findings suggest that the pattern in the total economy occurs in most industries as well. Furthermore, the income returns (slopes) from people oriented work are less in all industries where the correlation is of smaller magnitude (compare Tables 5.9 and 5.12).

On the other hand the strength of relationship between working with people and income is slightly higher among the female portion of identical occupations in most industries

Table 5.11

Pearson Correlations Between Mental Work and Income, People Oriented Work and Income, and Manual Work and Income by Industrial Location-Male/Female Identical Occupations

		Male Portion			Female Portion		
		MENTAL	PEOPLE	MANUAL	MENTAL	PEOPLE	MANUAL
CORE	MNG	.72	.38	-.05(10)	.83	.71	.08(10)
	CST	.72	.59	-.48(14)	.79	.66	-.04(14)
	MFG	.76	.44	-.30(29)	.84	.15	-.18(29)
	TRN	.71	.09	-.03(21)	.78	.16	.14(21)
	COM	.81	.45	-.35(12)	.82	.58	-.31(12)
	PUT	.86	.39	-.33(14)	.78	.55	.18(14)
	PAD	.83	.22	-.17(26)	.80	.25	-.13(26)

(cont.)

		Male Portion			Female Portion		
PERIPHERY		MENTAL	PEOPLE	MANUAL	MENTAL	PEOPLE	MANUAL
	AFF	.69	.72	-.32(12)	.83	.41	.009(12)
	WRT	.77	.24	-.35(24)	.78	.21	-.24 (24)
	FIR	.75	.20	-.45(19)	.90	.33	-.30 (19)
	SRV	.63	.41	-.23(28)	.69	.38	-.16 (28)

N in Parentheses

Table 5.12

Slopes and Intercepts-Mean Income Regressed With Each Technical Structure Variable-Male/Female Identical Occupations: Male Portion

		MENTAL WORK		PEOPLE WORK		MANUAL WORK	
		Intercept	Slope	Intercept	Slope	Intercept	Slope
CORE	MNG	5269	977	9365	864	10280	- 97
	CST	6131	623	8336	900	10276	-504
	MFG	5171	980	8812	798	10760	-442
	TRN	4861	936	9326	172	9642	- 50
	COM	4986	920	8920	622	10655	-564
	PUT	5377	718	8685	551	9738	-304
	PAD	4464	936	9031	270	9862	-203
PERIPHERY	AFF	3762	966	6185	1883	9452	_664
	WRT	3929	898	7539	390	8947	-488
	FIR	3688	1080	8594	379	10515	-821
	SRV	3133	1117	7178	1028	9523	-461

N's are the same as in Table 5.11

Table 5.13

Slopes and Intercepts-Mean Income Regressed With Each Technical Structure Variable-Male/Female Identical Occupations: Female Portion

		MENTAL WORK		PEOPLE WORK		MANUAL WORK	
		Intercept	Slopes	Intercept	Slope	Intercept	Slope
CORE	MNG	2900	698	5524	990	6123	83
	CST	3204	557	5161	820	6042	- 43
	MFG	3220	501	5469	130	5895	-129
	TRN	3858	392	5488	149	5491	- 88
	COM	3144	501	5159	429	6168	-267
	PUT	3596	480	5631	565	5902	126
	PAD	2685	706	6062	241	6689	-118
PERIPHERY	AFF	1640	514	3532	449	4401	-535
	WRT	2417	402	4036	153	4536	-180
	FIR	2256	564	4719	271	5501	-243
	SRV	2292	585	4519	462	5486	-160

N's are the same as in Table 5.11

(Manufacturing and Transportation are exceptions), and the income returns (slopes) from this form of work are greater in all the industries showing a stronger correlation between people oriented work and income (Tables 5.11 and 5.13).

Gender integration of occupations produces a very interesting modification of the results for manual work. The male portion shows stronger negative relationships between manual work and income compared to all occupations held by males and the female portion. In contrast, the female portion shows weaker negative relationships between manual work and income compared to all occupations held by females and the male portion. In other words the devaluation of manual work is more severe among the male portion of gender integrated occupations, while the devaluation is less severe among the female portion of gender integrated occupations. This may be because the sexes share incumbency in manual occupations of minimal complexity. Male incumbents may be seen as violating cultural norms since occupations traditionally held by men have more complex manual orientations.

In summary, the overall patterns show that with very few exceptions, the separate relationships (correlations) between mental work and income, and people oriented work and income, are quite similar in all industries regardless of the gender incumbency of occupations. In other words, in-

creasing complexity of these two forms of work results in higher incomes for all occupations regardless of gender. In contrast, the lower incomes of occupations held by women, and the female portion of identical occupations, appear to result from lower income returns (slopes) from increasing complexity of mental work and people oriented work. In other words, occupations held by females experience income discrimination.

The most interesting patterns are relationshps between manual work and income. Doing manual work is likely to have a negative overall effect on income. However, in Mining and Public Utilities it has a very small positive affect on the income of occupations held by women. Further, the female portion of identical occupations losses less income from involvement with manual work than the male portion. These latter findings may be anti-climactic because females typically do not hold complex manual jobs, and because of the extreme income differences between occupations held by men and occupations held by women, and both portions of male/female identical occupations in all industries.

RELATIONSHIPS BETWEEN THE NATURE OF WORK AND INCOME WITHIN INDUSTRIES

While mental work and people oriented work show no substantial differences in their separate impact on income across industries, occupations held by men show these two forms of work having a comparable effect on income within seven industries (Mining, Manufacturing, Transportation, Communications, Public Utilities, Agriculture, Forestry and Fisheries, and Services). Among occupations held by women, this occurs in four industries (Mining, Construction, Communications, and Public Utilities). The pattern for occupations held by men in these seven industries reflects that of the total economy. The pattern for occupations held by women does not.

The interpretation offered for the total economy is that among occupations held by men people oriented tasks and education requirements are more highly related than among other gender differentiated occupations. Therefore, the stronger effect people oriented work has on income (and hence the comparable effect people oriented work and mental work have on income) derives from its association with education. Examination of the relationships between people oriented work and education among the gender differentiated occupations reinforces the interpretation. The present find-

ings, however, suggest that the interpretation for the total economy may only hold for occupations held by men in the seven industries mentioned above. Moreover, the interpretation for occupationsheld by men may apply to occupations held by women in the four industries mentioned above. These possibilities receive examination in the section dealing with relationships among the occupational characteristics.

ANALYSIS OF ALTERNATIVE EXPECTATIONS BASED ON McLAUGHLIN'S (1978) RESEARCH

The work of McLaughlin (1978) suggests that the effect of technical structure on income may vary according to the gender identification of occupations. Accordingly, we have the following expectations: (1) among occupations held by men working with people has no effect on income regardless of industrial location, (2) among occupations held by women mental work has no effect on income and working with people a negative affect on income regardless of industrial location, and (3) among mixed occupations working with people has no affect on income regardless of industrial location. The original expectations of the effect of manual work should hold since McLaughlin (1978) finds that this form of work has either a negative effect (female and mixed occupations) or no effect (male occupations) on income.

For the total economy the patterns do not support McLaughlin's (1978) alternatives since the gender incumbency of occupations does not appear to make much of a difference to the relationships between each form of work and income. The present analysis also offers little support. Only the negative effect of manual work on income is as expected (Table 5.8).

However, a true evaluation requires using his procedures for measuring each form of work (a three point scale for mental work, and a dichotomy reflecting the presence or absence of people oriented work and manual work), and the gender identification of occupations (based on the percent female in the occupation). These procedures were applied to the combined occupations (see footnote 6, Chapter 4).

The results (Table 5.14) are quite similar to the original patterns in Table 5.8. There is also little evidence that location in either core or periphery makes a difference. The only major difference from the original findings (Table 5.8) is the suggestion that among occupations held by women working with people has a substantially lower relationship with income in the periphery than for occupations held by men in the core.

The findings are instructive. Regardless of how the gender incumbency of occupations is measured, and regardless of how complexity of each work characteristic is measured; mental work continues to have the strongest effect on income; followed by people oriented work; while manual work continues its negative effect.

Table 5.14

Pearson Correlations Between the Nature of Work Characteristics and Income by Industrial Location

	Male Occupations		Female Occupations	
	Core	Periphery	Core	Periphery
Mental Work	.71	.50	.63	.58
People Work	.49	.30	.34	.14
Manual Work	-.17	-.29	-.05	-.23

Note: Not enough cases for Mixed Occupations to permit valid analysis

RELATIONSHIPS AMONG THE OCCUPATIONAL CHARACTERISTICS AND THEIR RELATIVE CONTRIBUTIONS TO INCOME

An assumption of this research is that the occupational characteristics of education, mental work, and people oriented work are highly related to each other, while manual work is not related to these characteristics. This assumption leads to the expectation that education, mental work, and people oriented work would all have similar effects on income. However, since education and manual work are not related, the latter would not have such a positive effect on income.

Our analysis of the total economy generally supports the assumptions and expectations. The only exception is that people oriented work is only moderately related to education and mental work, and this may partially account for its smaller effect on income in the total economy.

Most of the time the relationships among the occupational characteristics in all industries reflect those in the total economy for all occupations (Table 5.15). However, there are some problematic issues deriving from the gender incumbency of occupations.

For occupations held by men in the total economy; mental work and people oriented work have comparable effects on income. The same pattern occurs in seven industries (Mining,

Table 5.15

Pearson Correlations Between Occupational Characteristics by Industrial Location

	CORE						PERIPHERY			
	MNG	CST	MFG	TRN	COM	PUT	PAD	AFF	WRT	FIR	SRV
COMBINED OCCUPATIONS											
Educ. & Mental	.80	.75	.84	.69	.90	.81	.78	.80	.79	.91	.76
Educ. & People	-.17	.04	.23	-.08	.17	-.08	.39	.54	.26	.19	.36
Educ. & Manual	.10	-.57	-.31	-.29	-.44	-.56	-.37	-.25	-.42	-.38	-.33
Mental & People	.32	.32	.35	.32	.32	.32	.32	.32	.33	.33	.33
Mental & Manual	-.16	-.16	-.17	-.16	-.16	-.16	-.16	-.19	-.16	-.17	-.16
People & Manual	-.43	-.43	-.43	-.43	-.43	-.43	-.43	-.43	-.43	-.43	-.43
OCCUPATIONS HELD BY MEN											
Educ. & Mental	.80	.80	.82	.75	.69	.79	.77	.62	.79	.80	.78
Educ. & People	.38	.30	.38	.34	.47	.30	.53	.35	.41	.40	.53
Educ. & Manual	-.27	-.15	-.17	-.28	-.31	-.21	-.31	-.11	-.20	-.39	-.28
Manual & People	.33	.33	.33	.33	.33	.33	.33	.33	.33	.33	.33
Mental & Manual	-.04	-.04	-.04	-.04	-.04	-.04	-.04	-.04	-.04	-.04	-.04
People & Manual	-.54	-.54	-.54	-.54	-.54	-.54	-.54	-.54	-.54	-.54	-.54
OCCUPATIONS HELD BY WOMEN											
Educ. & Mental	.48	.72	.81	.73	.83	.84	.83	.84	.75	.85	.78
Educ. & People	.02	.09	.21	.15	.30	.28	.43	.26	.26	.29	.42
Educ. & Manual	-.51	-.41	-.46	-.31	-.15	-.25	-.36	-.47	-.37	-.24	-.38

(cont.)

	CORE					PERIPHERY				
	MNG	CST	MFG	TRN	COM	PUT	PAD	AFF	WRT	FIR	SRV
OCCUPATIONS HELD BY WOMEN											
Mental & People	.45	.45	.45	.45	.45	.45	.45	.45	.45	.45	.45
Mental & Manual	-.50	-.50	-.50	-.50	-.50	-.50	-.50	-.50	-.50	-.50	-.50
People & Manual	-.20	-.20	-.20	-.20	-.20	-.20	-.20	-.20	-.20	-.20	-.20
MALE IDENTICAL OCCUPATIONS											
Educ. & Mental	.80	.76	.84	.69	.71	.74	.74	.73	.77	.85	.73
Educ. & People	-.08	-.14	.12	-.12	-.05	-.13	.23	.10	.007	.13	.28
Educ. & Manual	-.61	-.57	-.52	-.36	-.54	-.45	-.49	-.11	-.47	-.44	-.51
Mental & People	.41	.41	.41	.41	.41	.41	.41	.41	.41	.41	.41
Mental & Manual	-.41	-.41	-.41	-.41	-.41	-.41	-.41	-.41	-.41	-.41	-.41
People & Manual	-.23	-.23	-.23	-.23	-.23	-.23	-.23	-.23	-.23	-.23	-.23
FEMALE IDENTICAL OCCUPATIONS											
Educ. & Mental	.66	.77	.76	.50	.87	.85	.81	.87	.70	.85	.75
Educ. & People	.09	.05	.03	-.08	.23	.18	.37	.27	.14	.21	.35
Educ. & Manual	-.78	-.78	-.54	-.48	-.50	-.44	-.52	-.89	-.45	-.43	-.46
Mental & People	.40	.40	.40	.40	.40	.40	.40	.40	.40	.40	.40
Mental & Manual	-.43	-.43	-.43	-.43	-.43	-.43	-.43	-.43	-.43	-.43	-.43
People & Manual	-.24	-.24	-.24	-.24	-.24	-.24	-.24	-.24	-.24	-.24	-.24

Manufacturing, Transportation, Communications, Public Utilities, Agriculture, Forestry and Fisheries, and Services). The interpretation given for the total economy is that among occupations held by men people oriented tasks and education requirements are more highly related than among other gender differentiated occupations, and the stronger effect people oriented work has on income derives from its association with education. The explanation from the total economy applies in most of the seven industries mentioned above. However, it must be noted that the difference in the strength of relationship between education and people oriented work for occupations held by men compared to those held by women is substantially different only in Mining.

Among occupations held by women, mental work and people oriented work have a comparable effect on income in Mining, Construction, Communications, and Public Utilities. However, it is highly problematic if the similar effect that these two task orientations have in income results from people oriented work being highly associated with education. In Mining and Construction education and working with people are not related, and in Communications and Public Utilities they are no more highly related than in any other industry.

The Mining and Construction industries are also problematic for the separate effects education and mental work have on the income of occupations held by women. In all

other industries these two occupational characteristics are highly related and have comparable effects on income. However, in Mining education and mental work are only moderately related. Mental work also has a substantially larger impact on income than does education. Apparently, occupations held by women located in this industry are involved with forms of mental work not closely linked to education, and this may help account for education's lack of importance to income. In the Construction industry, education and mental work are highly related, but the latter has a substantially larger relationship with income. In this industry mental work requires education, but education is simply not as important to income as in the other industries.

For the most part the assumptions and expectations hold for male/female identical occupations. However, there are some interesting relationships between education and people oriented work.

In the total economy, the male portion shows a lower effect of working with people on income than for all occupations held by men. People oriented work also has less of a positive impact on income in most industries for the male portion of identical occupations. The sharing of occupations which "nurture" people may account for this pattern. In addition, education and working with people are not as highly related in most of the industries among the male portion

compared to all occupations held by males. Moreover, in five industries (Mining, Construction, Transportation, Communications, and Public Utilities) the relationship between education and people oriented work is negative! It may be that the male portion is characterized by more education than necessary for people oriented work of minimal complexity, or that they do not have enough education for people oriented work of more complexity.

In the total economy the relationships between people oriented work and income remains much the same for the female portion of identical occupations, compared to all occupations held by women. However, this relationship is slightly stronger in most industries. It cannot be said that the stronger effect that working with people has on income owes to higher education requirements because the relationship between education and people oriented work is less among the female portion than for all occupations held by women. The greater effect that working with people has on income probably owes to the female portion sharing incumbency with males.

In summary, most of the relationships among the occupational characteristics confirm the assumptions about how these characteristics should be related to one another, and expectations concerning the relative effects these characteristics have on income in all industries. Education and

mental work are highly related in all industries and have a similar effect on income in all industries. People oriented work, however, has a weaker relationship with income in all industries perhaps because it is not associated with education to a high degree in all industries. Lastly, manual work has a negative relationship with income partially because it is not positively related to the other occupational characteristics in any industry.

There are some problematic relationships deriving from the gender incumbency of occupations. These exceptions, and their relavence to earlier findings and interpretations have been noted.

OVERALL SUMMARY AND CONCLUSIONS FOR THE INDUSTRIAL SEGMENTATION ANALYSIS

All occupations differentiated by gender have comparable levels of education in each industry similar to those in the total economy. Also, occupations residing in core and peripheral industries do not systematically differ in educational characteristics. Findings at the individual level suggest that core industry employees have greater education than employees of peripheral industries. However, there is little support for this at the occupational level.

Regardless of gender, core and peripheral industries also have quite similar requirements for mental work and people oriented work. The only major difference is complexity of manual work, which seems greater in core industries, but only for occupations held by men.

Each industry has similar occupational characteristics for gender differentiated occupations, but there is variation in the occupational mean incomes across industries. Mean income is not substantially different from the mean income in the total economy in any industry, but all occupations have higher incomes in core industries, and occupations held by men and the male portion of male/female identi-

cal occupations, have higher incomes than occupations held by women and the female portion of male/female identical occupationsin both sectors. These findings support individual level research. The characteristics of core industries (e.g., higher profits, market control, unionization) translate into higher incomes for employees, and yield greater incomes for occupations. Apparently however, occupations held by women do not benefit from location in core industries to the same extent as occupations held by men.

Education generally has a strong positive effect on income in all industries, and there is little variation in its effect for occupations held by men and occupations held by women in all industries. There is also little variation compared to the total economy. The only exceptions involve occupations held by women in Mining and Construction. The general lack of variation in the impact of education on income across industries also applies to both portions of male/female identical occupations.

The technical structure of occupations also shows little variation in its effect on income across industries. Each form of work generally has a similar effect on income for all occupations, and there is little variation compared to the total economy. The only exceptions are the small positive effects of manual work on income among occupations held by women in Mining and Construction.

Most interesting are the differences occuring among male/female identical occupations. The male portion shows a weaker effect of education on income (compared to all occupations held by men) in Mining and Construction, while the opposite occurs for the female portion. Similarly, the importance of working with people to income is less for the male portion (compared to all occupations held by men) in most industries, but people oriented work is somewhat more important to income among the female portion (compared to all occupations held by women). Further, the contribution of manual work to income is more negative for the male portion, but less negative for the female portion.

On the surface, the patterns for occupations held by men and occupations held by women suggest that both are subject to similar "rules" for income determination in all industries. That is, increasing education and complexity of mental and people oriented work results in higher incomes for both. In contrast, occupations held by women have much lower incomes than occupations held by men in all industries.

The lower incomes of occupations held by women result from their receiving smaller income increases from increases in education or complexity of mental work and people oriented work than occupations held by men. Further, while there is some change in income returns stemming from these occupation-

al characteristics among male and female identical occupations; the changes do little to equalize the incomes of male and female identical occupations.

These latter findings, especially as they pertain to identical occupations, point to different "rules" for income determination. Increases in education and complexity of mental work and people oriented work lead to increases in income for all occupations in all industries. However, occupations held by women and the female portion of identical occupations are systematically under-paid for increases in education and complexity of mental work and people oriented work in all industries.

The only occasion where occupations held by women do not experience income discrimination is for manual work. While all occupations show a negative relationship between manual work and income, and while all occupations also show negative income returns from manual work; the negative income returns are smaller for occupations held by women in some industries, and are smaller for the female portion of identical occupations in all industries.

The findings for the effect of education have important implications for the screening hypothesis which postulates that individuals translate their education into income by gaining access to occupations. For the occupational level of analysis the implication is that the higher the level of

education the more lucrative the occupations. While we do find support for this interpretation for occupations held by women and the female portion of identical occupations (since increasing the education level of an occupation increases its income), there are important reservations. The screening hypothesis is unable to explain the much lower income returns from education for occupations held by women. Women can gain access to occupations with comparable education characteristics as male occupations, but ultimately, the "pay-off" is much less.

In order for the screening hypothesis to be totally applicable to occupations held by women, and the female portion of identical occupations, their income returns need upwards adjustment to the level of occupations held by men. Needless to say, the income returns resulting from the nature of work characteristics also require upward adjustment to the same level as occupations held by men.

The results of these analysis do not lend much support to Industrial Segmentation theory at the occupational level. The only aspect of this approach which receives total support is the finding of higher income in core industries than in peripheral industries for all occupations. However, the results also suggest that the income determination process occuring at the individual level does not apply at the occupational level. At the occupational level, the pre-

sence or absence of income setting procedures which affect individual income from education (Bluestone, and associates, 1973) do not apply. Similarly, the argument that a "degree" is more important to individual income in core industries (Beck, and associates, 1978) also does not receive any support at the occupational level. Individuals may experience varying income from their educational achievements by industrial location, but with the exceptions of occupations held by women in Mining and Construction, all industries use the education characteristic of occupations as a determinant of income in a similar faschion.

The analysis also finds little variation in the effect of the technical structure of occupations on income in the core and periphery. All industries require mental work and people oriented work to similar degrees, and hence, they use increasing complexity of these forms of work as a determinant of income in a similar manner.

Footnotes for Chapter 5

1. Among occupations held by men and occupations held by women the mean values for the nature of work variables are weighted by the number of employees in each industry. It was necessary to weigh these means because the scores for the job complexity variables are assigned and do not vary by industry, and each industry contains the same occupations. Hence, not weighting the means would result in each industry having identical technical structures. Since the means are weighted by the number of employees in each industry-specific occupation, they suggest the actual technical structure of the industries.

   The format of the equation used is:

   ((JC score for accountants * N accountants) + (JC score for computer specialists * N computer specialists) + ...))/N employees in Industry

2. According to chi-square the substantially lower correlations between education and income among occupations held by women in Mining and Construction are not related to the distinction between core and peripheral industries. The following chi-square table was calculated:

	CORE		PERIPHERY	
(SL)	MNG CST	2	0	2
(NSL)	MFG TRN COM PUT PAD	5	AFF WRT FIR SRV	4	9
		7		4	11

Chi-square for the above table equals 1.39; using Yates' correction factor results in a chi-square equaling 1.36. Both figures suggest that the substantially lower correlations in Mining and Construction are due to chance.

3. For this statement to be completely true interval level data is necessary. Since the measure of education is at the ordinal level the slopes are approximations of the dollar increase for each yearly increase in education. However, the measures of technical structure are at the interval level of measurement. Hence, the slopes for these variables indicate the dollar increase for every unit increase in technical structure.

4. Interestingly, in the Construction industry female occupations get $28 more per unit increase in complexity of involvement with people than do male occupations.

5. In the Communications industry females represent about 49% of all employees. The figure for Finance, Insurance and Real Estate is around 50%, and that for the Services industry is about 60%.

CHAPTER VI

ANALYSIS ACCORDING TO ECONOMIC SEGMENTATION BY OCCUPATIONAL SECTOR

GENERAL INTRODUCTION

Occupational segmentation theory emphasizes the partitioning of the total economy into distinct occupational sectors each having unique structural arrangements, or social organizations. Variation in social organizations among occupational sectors mediates both income level and the influence of occupational characteristics on income.

Our general expectations are that there will be higher education and technical structure characteristics, and income, in the primary sector(s) than in the secondary. However, following our previous analyses, we also expect that occupations held by men will have higher incomes than occupations held by women in all sectors. Education should also have a strong effect on income in the primary sector(s) but show a weak relationship in the secondary sector. However, education should be more important to income among occupations held by men than occupations held by women in the primary sector(s).

The relationship between each form of work and income

are exploratory in nature since previous research ignores this issue. However, the patterns for mental work and people oriented work should parallel those for education owing to the high correlation among these characteristics. Manual work should be positively related to income in the subordinate-primary sector only.

Theoretical explanations of the expectations are discussed in each section.

DISTRIBUTION OF OCCUPATIONAL CHARACTERISTICS AND INCOME IN PRIMARY AND SECONDARY OCCUPATIONAL SECTORS

Recall the problem mentioned in Chapter Three (Methodology) about the possible problem with dividing the entire occupational structure into three sectors. That is, because of the similarity of occupations in each sector for characteristics and income, there may not be enough variation to permit analysis. The indicies of variability presented in Chapter Three suggested that this problem is not severe. The only instances where there is much less variability in the occupational sectors compared to the total economy are for education in the male independent-primary sector and mental work in the male and female independent-primary sectors. The reader should keep this in mind when evaluating the results and conclusions of the analysis dealing with the relationships among these occupational characteristics and income.

Research at the individual level of analysis finds that those holding independent-primary occupations have much more formal education than those in secondary occupations (Osterman, 1975; Hodson, 1978). This pattern is also observed at the occupational level. A structural feature of independent-primary occupations is stringent entry requirements (Osterman, 1975). This trait is apparent in the substantially

greater education observed for this sector. On the other hand, the secondary sector has "less than a high school" characteristic indicating minimal educational requirements for entry into these occupations. The subordinate-primary sector has a "high school" characteristic which parallels that for the total economy, but is also substantially larger than that for the secondary sector.

Comparing gender differentiated occupations with each other reveals that occupations held by men in the independent-primary sector have a somewhat higher education characteristic (almost one standard deviation higher) than occupations held by women in this sector. The opposite obtains in the secondary sector (Table 6.1). This pattern also holds for male/female identical occupations (Table 6.2).

There is considerable variation for complexity of mental work both among sectors and compared to the total economy. Both primary sectors have more complex requirements for mental work than the secondary sector, with the independent-primary sector having the most complex requirements. These patterns support occupational segmentation theory which argues for a "creative problem solving" nature of independent-primary occupations (Reich and associates, 1973; Griffin and associates, 1982).

The findings for people oriented work among the different sectors are problematic. The primary sectors have more

Table 6.1

Means and Standard Deviations for Education, Mental Work, People Oriented Work, Manaul Work, and Income for Occupations Classified by Occupational Sector

Combined Occupations

	Education	Mental Work	People Work	Manual Work	Income
Independent-Primary	14.9 (1.4)	7.6 (.5)	1.4 (2.2)	1.2 (2.2)	11252 (3241)
Subordinate-Primary	12.3 (1.5)	5.1 (2.0)	2.0 (2.2)	2.2 (2.4)	8124 (3093)
Secondary	9.9 (.9)	.8 (.6)	.8 (.5)	1.4 (.9)	4533 (986)

Occupations Held by Men

	Education	Mental Work	People Work	Manual Work	Income
Independent-Primary	15.5 (1.6)	7.3 (.6)	2.9 (3.4)	1.3 (2.6)	13556 (4194)
Subordinate-Primary	12.2 (2.0)	5.1 (2.4)	1.0 (1.8)	4.0 (3.0)	9471 (2803)
Secondary	9.7 (1.3)	.7 (1.8)	.6 (.9)	1.2 (.9)	5352 (1156)

(cont.)

	Occupations Held by Women				
	Education	Mental Work	People Work	Manual Work	Income
Independent-Primary	14.1 (1.5)	7.5 (.5)	1.6 (2.3)	1.5 (2.3)	6885 (1849)
Subordinate-Primary	12.2 (1.1)	4.6 (2.0)	1.5 (2.1)	1.7 (2.4)	5219 (1817)
Secondary	10.2 (1.1)	.4 (.8)	.6 (.8)	2.2 (2.1)	3279 (964)

Standard Deviation in Parentheses

Table 6.2

Means and Standard Deviations for Education, Mental Work, People Oriented Work, Manual Work, and Income for Occupations Classified by Occupational Sector

Male/Female Identical Occupations

Male Portion

	Education	Mental Work	People Work	Manual Work	Income
Independent-Primary	15.2 (1.4)	7.6 (.5)	1.4 (2.2)	1.2 (2.2)	12266 (2951)
Subordinate-Primary	12.4 (1.5)	4.8 (2.1)	1.9 (2.2)	2.3 (2.3)	9144 (2760)
Secondary	9.6 (1.6)	.8 (.6)	.8 (.5)	1.4 (.9)	5273 (1068)

Female Portion

	Education	Mental Work	People Work	Manual Work	Income
Independent-Primary	14.2 (1.4)	7.6 (.5)	1.4 (2.2)	1.2 (2.2)	7061 (1176)
Subordinate-Primary	12.1 (1.4)	4.8 (2.1)	1.9 (2.2)	2.3 (2.3)	5632 (1987)
Secondary	10.1 (.9)	.8 (.6)	.8 (.5)	1.4 (.9)	3329 (885)

Standard Deviation in Parentheses

complex involvements with people than in the secondary sector, but actual involvement with people in both primary sectors is quite low. There are also no substantial differences with the total economy in any sector.[1]

Complexity of involvement with manual work is also problematic. Among occupations held by men, only the subordinate-primary sector shows any meaningful involvement with manual work, but the level of complexity is not substantially different from that in the total economy. For combined occupations and occupations held by women, all sectors have minimal involvement with manual work[2] which reflects patterns in the total economy.

Comparing gender differentiated occupations (Table 6.1) shows that only for manual work is there substantial differences among them in two sectors. In the subordinate-primary sector occupations held by men have more complex manual tasks. However, occupations held by women in the secondary sector possess more complex manual skills than occupations held by men.

The patterns for sectoral variation in complexity of each form of work among gender differentiated occupations also hold among male/female identical occupations[3] (Table 6.2).

Previous research has found that independent-primary

occupations have higher incomes compared to subordinate-primary occupations, but both have higher incomes than secondary occupations (e.g. Osterman, 1975). The expectation for this research is that occupational income is much higher in the primary sectors than in the secondary sector, and that occupations held by men have higher incomes than occupations held by women in all sectors. This expectation is met (Table 6.1). Further, incomes in the independent-primary sectors are substantially higher than in the total economy, while incomes in the secondary sectors are substantially lower than in the total economy. Incomes in the subordinate-primary sectors are usually very close (a little higher) to that obtaining in the total economy.

More importantly, these patterns also obtain for the identical occupations (Table 6.2). The only conclusion that can be drawn from these data is that the female portion of identical occupations is systematically under-paid compared to the male portion, in all occupational sectors.

In summary, the education characteristic of occupations grouped according to occupational sector reflects the stricter entry requirements of the primary sectors and the minimal requirements of the secondary sector. The variation in education requirements holds for all occupations regardless of gender.

The complexity of mental work, people oriented work,

and manual work also shows variation by sector which suggests the primary sectors are characterized by greater skill levels than the secondary sector. However, there are some problematic findings for complexity of people oriented work (low in all sectors) and manual work (the subordinate-primary sector having the greatest complexity for occupations held by men, while the secondary sector has the greatest complexity for occupations held by women).

Income also varies by occupational sector with the primary sectors having much higher income than the secondary sector. However, the most important finding is the substantially greater incomes of occupations held by men versus occupations held by women in all sectors. The pattern for income also holds for male/female identical occupations, and points to the systematic underpayment of the female portion of identical occupations.

Overall, the distributions of occupational characteristics and income support occupational segmentation theory. However, it should be mentioned that when the occupational sectors are divided by industrial location (Chapter Seven) there is virtually no change in the patterns. In other words, the distributions of occupational characteristics and income for identical occupational sectors show little differences in core and peripheral industries. The same is true for the relationships among occupational characteristics

and income. Hence, the reader should pay particular attention to findings and interpretations of the following sections because in most cases they apply to the findings of the analysis by industrial/occupational segmentation.

THE RELATIONSHIP BETWEEN EDUCATION AND INCOME IN PRIMARY AND SECONDARY OCCUPATIONAL SECTORS

At the individual level the "screening hypothesis" explains the varying effect of education on income in the occupational sectors. Education allows access to the higher paying primary sector(s), and facilitates promotion since employers use it as a measure of potential productivity. Conversely, education is not important to income in the secondary sector since these jobs are low paying, unskilled, lack promotional opportunities, and employers assume all potential secondary employees are equally productive.

At the occupational level, the expectations are that the effect of education on income is strong in the primary sector(s), but very weak in the secondary sector. Additionally, education is more important to income among primary sector(s) occupations held by men than primary sector(s) occupations held by women.

The procedures for examining these expectations are identical to those used in the previous chapter. First, the correlations between education and income in the sectors are presented. These correlations show relationships, i.e., the degree to which an increase in education results in an increase in income. Second, the "slopes" resulting from regressing income with education are shown. The

"slopes" indicate the actual dollar increase in income from yearly increases in education.[4]

The pattern for combined occupations fits the argument perfectly. It shows that education has different relationships with income for occupations grouped by occupational sector when gender incumbency of occupations is ignored. However, the pattern changes somewhat among occupations held by men, and a great deal among occupations held by women (Table 6.3).

Among occupations held by men the overall pattern meets the expectations, but there is no difference in the strength of relationship between education and income between the primary sectors. Following Gordon's (1972) theoretical approach, perhaps promotional opportunities exist in the male subordinate-primary sector to a similar degree as in the male independent-primary sector. Education also has a greater effect on income in the male subordinate-primary sector than it does for occupations held by women in this sector, perhaps because fewer promotional opportunities exist among the latter, especially clerical occupations.

Among occupations held by women the patterns are quite contrary to Gordon's (1972) argument. Education is most important to income in the independent-primary sector, but it is almost as important in the secondary sector. Further, education's effect on income in the female secondary sector

Table 6.3

Pearson Correlations Between Education and Income For Occupations Classified by Occupational Sector

Combined Occupations	
Independent-Primary	.83 (46)
Subordinate-Primary	.45 (138)
Secondary	.08 (39)
Occupations Held by Men	
Independent-Primary	.80 (88)
Subordinate-Primary	.72 (382)
Secondary	.20 (86)
Occupations Held by Women	
Independent-Primary	.72 (59)
Subordinate-Primary	.47 (182)
Secondary	.61 (57)

N in Parentheses

is substantially larger than that in the male secondary sector.

There are compositional differences which may be important in explaining the difference between the male and female secondary sectors. The male secondary sector contains many "laborer" occupations along with "service" occupations. The

female secondary sector also contains "service" occupations, but only the general category of "laborers." There is a qualitative difference in the educational characteristic between "laborer" and "service" occupations. Many "service" occupations require specific types of training (e.g., stewardesses, hair dressers, practical nurses). Hence, education may have a greater effect on income among secondary occupations held by women because many of the occupations require specific types of education or training.

The present findings reflect results in the total economy since education has a positive relationship with income, but variation in the magnitude of relationship by occupational sectors suggests the relevance of occupational segmentation theory. However, its applicability also seems dependent on the gender incumbency of occupations in the sectors, especially among occupations held by women.

Despite the sectoral differences in the effect of education on income for occupations held by men and occupations held by women; the most important finding for this chapter is the extreme income difference between them in all sectors. This supports the analysis for the total economy which argued that occupations held by women experience income discrimination in the form of lower income returns from education. The present analysis has data lending some support to this interpretation.

Table 6.4

Slopes and Intercepts-Income Regressed with Education

	Occupations Held by Men	
	Intercept	Slope
Independent-Primary	-18343	2054
Subordinate-Primary	- 2913	1009
Secondary	3644	177
	Occupations Held by Women	
	Intercept	Slope
Independent-Primary	- 5370	867
Subordinate-Primary	- 4083	762
Secondary	- 2183	535

N's are the same as in Table 6.3

Table 6.4 contains the slopes resulting from regressing income with education. As mentioned previously, the slopes indicate the dollar increase from yearly increases in education. In the independent-primary sector occupations held by women receive much less income from increases in education than do occupations held by men, despite their having similar levels of education and relationships (correlations) between education and income.

In the subordinate-primary sector occupations held by men and occupations held by women have similar levels of education, but its effect (correlation) on income is larger for the former. The previous interpretation attributes the smaller relationship between education and income among female subordinate-primary occupations to a lack of promotional opportunities among them, especially clerical occupations. Subordinate-primary occupations held by women also experience lower income returns (slopes) from education, compared to male subordinate-primary occupations, and this probably owes to its clerical nature as well. The restricted range of opportunity in this sector among occupations held by women reduces both the degree to which education is related to income (correlation) and the income returns from education (slopes).

The male and female secondary sectors continue to be problematic. Secondary sector occupations held by women show a stronger relationship (correlation) between education and income than do secondary sector occupations held by men, and their income returns (slopes) are higher than for male secondary occupations as well. However, male secondary occupations have much higher incomes. Obviously, there are other factors operating in this sector.

In all three sectors the male portion of identical occupations is similar to occupations held by females and the

female portion of identical occupations. However, the similarity is more apparent for relationships (correlations) between education and income (Table 6.5) than for the income returns (slopes) from education (Table 6.6).

The comparable relationships (correlations) between education and income for both portions of identical occupations in the primary sector(s) indicates that the "rules" for income determination are similar, i.e., increases in education result in increases in income to the same degree. In contrast, the much smaller income returns from increases in education (slopes) show that the female portion of identical occupations experiences occupational income discrimination in the primary sector(s).

In the secondary sector the situation is much different. The female portion of identical occupations shows a stronger relationship between education and income, and their income returns (slopes) from education are higher as well. However, their mean incomes are much less than for the male portion. Again, other factors must be operating on the income determination process of male/female secondary occupations.

In summary, the overall patterns suggest that occupations held by men, occupations held by women, and both portion of identical occupations are subject to somewhat different rules for income determination in the independent-

Table 6.5

Pearson Correlations Between Education and Income for Occupations Classified by Occupational Sector-Male/Female Identical Occupations

	Male Portion	Female Portion
Independent-Primary	.77 (58)	.71 (46)
Subordinate-Primary	.54 (179)	.50 (144
Secondary	.33 (45)	.52 (43)

N in Parentheses

Table 6.6

Slopes and Intercepts-Income Regressed with Education Male/Female Identical Occupations

	Male Portion	
	Intercept	Slope
Independent-Primary	-13132	1673
Subordinate-Primary	- 2783	962
Secondary	- 3140	222

(cont.)

	Female Portion	
	Intercept	Slope
Independent-Primary	- 5357	875
Subordinate-Primary	- 3230	732
Secondary	- 1482	474

N's are the same as in Table 6.5

primary and subordinate-primary sectors. In both of these sectors the correlations show that increases in education yield increases in income to similar degrees. In contrast, the lower incomes of occupations held by women and the female portion of identical occupations derive from lower income returns (slopes) from increases in education. In the secondary sector, gender differentiated occupations are subject to entirely different rules for income determination. In this sector the correlations show that increases in education result in increased income to a much higher degree for occupations held by women and the female portion of identical occupations. Likewise, occupations held by women and the female portion of identical occupations have higher income returns (slopes) from education. In contrast, occupations held by men and the male portion of identical occupations have much higher incomes.

Again, it is necessary to remind the reader that these findings show virtually no differences when the occupational

sectors are divided by industrial location. The only major difference is in the subordinate-primary sector where occupations held by men show a substantially larger relationship (correlation) between education and income in core industries, but not in peripheral industries.

THE RELATIONSHIP BETWEEN THE NATURE OF WORK AND INCOME ACROSS PRIMARY AND SECONDARY OCCUPATIONAL SECTORS

In the total economy complexity of mental work has the strongest effect on income, followed by people oriented work, while manual work has a negative relationship with income. This pattern holds for all occupations regardless of gender. The characteristics of each occupational sector, and their level of involvement with each form of work, suggest some variation in these relationships.

The independent-primary sector "plans" and "solves problems." The planning and problem solving nature of this sector involves complex mental work and people oriented work, and therefore these occupational characteristics should be highly rewarded. Hence, in the independent-primary sector mental work and people oriented work should show the strongest relationships (correlations) with income. On the other hand, manual work should have a minimal, or negative, relationship with income in the independent-primary sector because this sector does not engage in this form of work.

The subordinate-primary sector "executes" tasks and does more routine work. The "executing" nature of this sector involves less complex mental work and people oriented

work than in the independent-primary sector, but more complex manual work. Hence, mental work and people oriented work should also show positive relationships (correlations) with income but of smaller magnitude than in the independent-primary sector; while manual work should show a strong relationship with income.

The secondary sector lacks occupational skills. Hence, each form of work should have the weakest relationships with income.

The above patterns should obtain for all occupations regardless of gender.

The procedures for examining these expectations are the same as for the section dealing with the effect of education on income. First, the correlations between each form of work and income are presented. These correlations show relationships, i.e., the degree to which increases in complexity of each form of work yield increases in income. Second, the "slopes" resulting from separately regressing each form of work with income are given. The slopes indicate the dollar increase in income from each unit increase of complexity of each form of work.

Overall, many of the correlations do not support the expectations. The independent-primary and secondary sectors show unexpected relationships for all three forms of work.

It is also quite apparent that the gender incumbency of the occupations in the sectors is important (Table 6.7).

In the independent-primary sector mental work has no affect on income for occupations held by women, and a negative relationship with income for occupations in general (combined) and occupations held by men.

These findings are entirely contrary to occupational segmentation theory. A plausible explanation may come from examining the industrial location of occupations. The previous chapter shows that all industries strongly reward mental work to similar degrees, but this finding pertains to all occupations in an industry. Certain industries may underpay independent-primary occupations doing complex forms of mental work. Perhaps these are core industries which face constraints in the nature of income setting procedures. The next chapter examines this possibility. Alternatively, the patterns for mental work may be due to this form of work showing less variation in the independent-primary sector than in the total economy (noted by the indicies of variability in chapter three). Put another way, independent-primary occupations held by women may be so similar for complexity of mental work that there is not enough variation in it to produce a strong correlation with income. However, it is unclear if this explanation accounts for the negative correlation between mental work and income among independent-

Table 6.7

Pearson Correlations Between Mental Work and Income, People Oriented Work and Income, and Manual Work and Income for Occupations Classified by Occupational Sector

	Combined Occupations		
	MENTAL	PEOPLE	MANUAL
Independent-Primary	-.10 (46)	.50 (46)	-.03 (46)
Subordinate-Primary	.62 (121)	.32 (121)	-.10 (121)
Secondary	-.03 (29)	.002 (29)	-.19 (29)
	Occupations Held by Men		
	MENTAL	PEOPLE	MANUAL
Independent-Primary	-.29 (88)	.74 (88)	-.13 (88)
Subordinate-Primary	.60 (360)	.12 (360)	-.06 (360)
Secondary	.36 (66)	-.005 (66)	-.08 (66)

(cont.)

N in Parentheses

Occupations Held by Women

	MENTAL	PEOPLE	MANUAL
Independent-Primary	.07 (37)	.25 (37)	.08 (37)
Subordinate-Primary	.60 (176)	.38 (176)	.21 (176)
Secondary	.01 (34)	.54 (34)	.68 (34)

N in Parentheses

primary occupations held by men. Increasing mental skills resulting in less income seems entirely out of hand.

Working with people also has a substantially larger affect on the income of independent-primary occupations held by men, compared to occupations held by women in this sector. This may relate to the "power-nurture" dichotomy of England, and associates (1982). The degree of involvement with people oriented work is much the same for gender differentiated occupations in this sector, but occupations held by men have a larger standard deviation (see Table 6.1) suggesting a greater range of complexity for people oriented occupations, some of which may "wield power" over people.

Another unexpected finding is the moderately strong positive correlation between mental work and income for occupations held by men in the secondary sector. Male secondary occupations have virtually no mental skills (see Table 6.1),

but their large standard deviation suggests that not all of them totally lack mental skills (e.g., shipping and receiving clerks) and apparently they are paid according to the mental skills they demand.

Occupations held by women in the secondary sector show strong positive correlations between people oriented work and income and manual work and income. In theory, secondary occupations lack these skills and the means in Table 6.1 support this perspective. On the other hand, the standard deviations suggest some variation in skill level. Apparently, not all female secondary occupations lack people oriented skills (e.g., telephone operators) or manual skills, and receive income according to the skills they have.

The subordinate-primary sector also shows some unexpected relationships between manual work and income. A positive correlation was expected in this sector. Occupations held by women meet the expectation, but occupations in general (combined) and occupations held by men do not. Certain industries may under-pay subordinate-primary occupations doing manual work if they are held by men. These may be core industries which have income setting procedures along with a high degree of unionization, which may limit the extent to which complexity of tasks "pay-off," or may emphasize other factors instead of complexity of tasks. On the other hand, subordinate-primary occupations held by women with a manual

orientation may not be as subject to unionization and the resulting guidelines may be less applicable among them, or they may be located in peripheral industries which are characterized by fewer constraints and less unionization. Hence, complexity of manual work would "pay-off" more.

Despite the differences between occupations held by men and occupations held by women for patterns of relationship in the occupational sectors, there is one consistent pattern-occupations held by men have much greater income than occupations held by women in all occupational sectors.

The industrial segmentation analysis finds that occupations held by men have higher income returns (slopes) from mental work in all industries, and higher income returns from people oriented work in all but one industry. The differences in income returns from these two forms of work, irrespective of the similar magnitudes of correlation between them and income for gender differentiated occupations, partially account for the lower incomes of occupations held by women.

The present findings (Table 6.8) show that in those sectors where a form of work has a similar effect (correlation) on income for gender differentiated occupations, occupations held by men have greater income returns (slopes). Further, in spite of differences in the direction of the effect (correlation) of certain forms of work on income (and the result-

Table 6.8

Slopes and Intercepts-Income Regressed with Mental Work, People Oriented Work, and Manual Work

Occuptaions Held by Men

	MENTAL		PEOPLE		MANUAL	
	Intercept	Slope	Intercept	Slope	Intercept	Slope
Independent-Primary	33008	-2608	11457	1029	13839	- 219
Subordinate-Primary	5808	706	9215	208	9636	- 58
Secondary	5340	227	5532	- 7	5681	- 118

Occupations Held by Women

	MENTAL		PEOPLE		MANUAL	
	Intercept	Slope	Intercept	Slope	Intercept	Slope
Independent-Primary	4592	308	6653	230	6796	73
Subordinate-Primary	2510	510	4616	292	4809	134
Secondary	3276	50	2802	600	2561	274

N's are the same as in Table 6.7

ing income returns or slopes), occupations held by men still have higher incomes in all sectors.

Among the male portion of identical occupations each form of work has effects (correlations) on income which parallel those for all occupations held by men (Table 6.9). However, substantial differences exist for the positive effect (correlation) of working with people on income in the independent-primary and secondary sectors. In both sectors the effect (correlation) of working with people on income is more similar in strength to those for occupations held by women (compare Tables 6.7 and 6.9).

In the independent-primary sector the male portion of gender integrated occupations shows a weaker effect (correlation) of working with people on income compared to all occupations held by men. The male portion of identical occupations may share incumbency in occupations with a "nurturing" or "serving" orientation. American society traditionally assigns this role to female occupations, and the male portion of gender integrated occupations may be viewed as violating cultural norms, and hence, working with people does not positively affect income to the same degree as among male occupations conforming to the norms.

In the secondary sector the situation is opposite. The male portion shows a stronger positive affect (correlation)

Table 6.9

Pearson Correlations Between Mental Work and Income, People Oriented Work and Income, and Manual Work and Income for Occupations Classified by Occupational Sector-Male/Female Identical Occupations

	Male Portion		
	MENTAL	PEOPLE	MANUAL
Independent-Primary	-.15 (58)	.48 (58)	-.11 (58)
Subordinate-Primary	.57 (157)	.27 (157)	-.25 (157)
Secondary	.24 (34)	.22 (34)	-.02 (34)

	Female Portion		
	MENTAL	PEOPLE	MANUAL
Independent-Primary	.17 (46)	.16 (46)	.02 (46)
Subordinate-Primary	.65 (127)	.40 (127)	-.09 (127)
Secondary	.45 (33)	.51 (33)	-.36 (33)

N in Parentheses

of people oriented work on income compared to all occupations held by men. The magnitude is, however, substantially less than for the female portion.

The female portion of identical occupations also shows differences in some of the effects (correlations) of the nature of work on income compared to all occupations held by women. They are more similar to occupations held by men, and the male portion of identical occupations, for the positive impact (correlation) of mental work on income in the secondary sector, and the minimal or negative effects (correlations) of manual work on income in all occupational sectors.

The previous interpretation, that male secondary occupations are not totally lacking in mental skills are paid for the ones they have, may apply to the female portion of identical occupations in the secondary sector. Hence, the female portion shares incumbency in secondary occupations having some mental skills, and these skills positively affect income.

The differences for the effects (correlations) of manual work on income among the female portion, compared to all occupations held by women, in the subordinate-primary and secondary sectors are striking. In both sectors manual work has a negative effect (correlation) on income (which reflects occupations held by men) compared to the positive

effect for all occupations held by women in these sectors.[5]

The interpretation for the negative effect (correlation) of manual work on income among subordinate-primary occupations held by men suggests that core industries may under-pay them because of constraints resulting from income setting procedures and union guidelines. However, these constraints may not apply to subordinate-primary occupations held by women because they may be located in peripheral industries which are less unionized. The present pattern might suggest that both portions of male/female identical occupations are located in core industries and face similar constraints.

In the secondary sector the female portion of identical occupations shows a negative effect (correlation) of manual work on income, compared to the positive effect for all occupations held by women in this sector. The negative effect of manual work on income is also substantially larger than for occupations held by men, and the male portion of identical occupations, in the secondary sector. Hence, manual work has a differential impact on income in the secondary sector depending on the gender incumbency of secondary occupations.

The differences existing between gender differentiated occupations and gender integrated occupations suggest that each form of work affects income in the sectors in a more

similar fashion for the sexes in the same occupations than for occupations held by men versus occupations held by women. Identical occupations also show differences in income returns (slopes) for each form of work (Table 6.10). Moreover, the male portion does not always have greater income returns (slopes) from mental work and people oriented work. However, the male portion of identical occupations always have higher incomes in all sectors. Obviously, there are other factors influencing the income determination process in the occupational sectors.

In summary, the results of this analysis do not support Reiss' (1961) free market version of the effect of technical structure on occupational income inequality since for all occupations the impact of each form of work on income varies by occupational sector. However, there are also many findings which argue against expectations derived from occupational segmentation theory.

The overall patterns and findings suggest that occupational segmentation theory may not apply to the effects of technical structure on income. Further, the differences between occupations held by men, occupations held by women, and male/female identical occupations are important for two reasons. First, they point to the need for occupational segmentation theory to incorporate gender incumbency of occupations into its theoretical framework. Second, since

Table 6.10

Slopes and Intercepts-Income Regressed with Mental Work, People Oriented Work, and Manual Work-Male/Female Identical Occupations

Male Portion

	MENTAL		PEOPLE		MANUAL	
	Intercept	Slope	Intercept	Slope	Intercept	Slope
Independent-Primary	19820	- 990	11492	801	12456	- 141
Subordinate-Primary	4885	768	8197	355	9484	- 278
Secondary	4973	430	4995	435	5334	- 30

Female Portion

	MENTAL		PEOPLE		MANUAL	
	Intercept	Slope	Intercept	Slope	Intercept	Slope
Independent-Primary	2210	643	6886	150	7043	19
Subordinate-Primary	3080	481	4934	312	5581	- 59
Secondary	2787	657	2735	810	3900	- 392

N's are the same as in Table 6.9

the occupational characteristic of gender incumbency itself is important to the manner in which sector location mediates the effect of the nature of work on income. The overall patterns strengthen the initial argument of this research that the occupation is the appropriate unit of analysis in the study of income inequality.

Finally, it is necessary to again remind the reader that the findings show very few differences when the occupational sectors are divided by industrial location (Chapter Seven). The only major differences are (1) a positive effect of mental work on income among occupations held by women in the core/independent-primary sector, (2) no effect of manual work on income among occupations held by women in the peripheral/subordinate-primary sector, and (3) positive effects of people oriented work and manual work on income among occupations held by men in the peripheral/secondary sector.

THE RELATIONSHIPS BETWEEN THE NATURE OF WORK AND INCOME WITHIN PRIMARY AND SECONDARY OCCUPATIONAL SECTORS

The Across occupational sectors analysis finds that the impact of each form of work on income is not always greater in the primary sector(s) than in the secondary sectors. An alternative analysis is examination of which form of work is most important to income within each occupational sector. In other words, do the overall findings for the total economy (i.e., mental work having the strongest effect (correlations) on income, followed by people oriented work; while manual work a negative effect) occur within each occupational sector?

The subordinate-primary sector is the only one having a pattern matching that of the total economy among all occupations, regardless of gender. This is probably due to the enormous variety of occupations in this sector which reflects much of the total economy. However, there is one slight exception. Manual work has a positive effect on income among subordinate-primary occupations held by women.

In the Across sectors analysis the expectation was for a positive effect of manual work on income in the subordinate-primary sector since many of these occupations have complex

manual skills and increasing complexity of any form of work results in greater income (Fligstein, and associates, 1979). Occupations held by women are the only ones meeting the expectation, and the reason for this is unclear.

In the independent-primary sector, working with people makes the strongest contribution to income among all occupations, regardless of gender. However, the impact among occupations held by women, and the female portion of identical occupations, is less than for occupations held by men and the male portion of identical occupations. The weaker effect of people oriented work among occupations held by women may relate to the "nurturing" orientation to people characteristic of female occupations (England and associates, 1982).[6]

In the secondary sector any form of work may be important to income, dependeing on gender.[7]

ANALYSIS OF ALTERNATIVE EXPECTATIONS BASED ON McLAUGHLIN'S RESEARCH

An important finding for the effects (correlations) of each form of work on income, in addition to the variation by occupational sector, is the variation by the gender incumbency of occupations. The alternative expectations based on McLaughlin (1978) suggest that mental work and people oriented work differentially influence income for occupations held by men and occupations held by women. For the former, mental work positively affects income, but working with people has no effect. Among the latter, mental work has no effect on income and working with people a negative effect. Finally, manual work has a negative impact on the income of both.

The patterns in Tables 6.7 and 6.9 suggest that each form of work does differentially affect income according to the gender identification of occupations, but rarely in the manner McLaughlin specifies, and there is variation by occupational sector as well.

A valid evaluation of McLaughlin, however, requires using his procedures for measuring each form of work (i.e., a three point scale for mental work, and dichotomies reflecting the presence or absence of people oriented work and

manual work), and gender incumbency (i.e., based on the percent female in the occupation). The results of these procedures appear in Table 6.11. Only the prediction of a negative effect (correlation) of manual work on income is supported. In addition, mental work and people oriented work have similarly strong positive effects on income for both occupations held by men and occupations held by women (in the subordinate-primary sector).

Table 6.11

Pearson Correlation Between Mental Work and Income, People Oriented Work and Income, and Manual Work and Income for Occupations Classified by Occupational Sector-Combined Occupations

	Male		
	MENTAL	PEOPLE	MANUAL
Independent-Primary		.31	-.26
Subordinate-Primary	.24	.28	-.55
Secondary			-.03

	Female		
	MENTAL	PEOPLE	MANUAL
Independent-Primary			
Subordinate-Primary	.36	.20	-.23
Secondary		.24	-.30

Note: Empty cells result from too few cases for valid correlation.

RELATIONSHIPS AMONG THE OCCUPATIONAL CHARACTERISTICS AND THEIR RELATIVE CONTRIBUTIONS TO INCOME

A major assumption of this research is that the occupational characteristics of education, mental work, and people oriented work are highly related to each other, while manual work is not related to these characteristics. This assumption leads to the expectations that education, mental work, and people oriented work would all have a similar influence on income. However, since education and manual work are not related, the latter would not have a comparable influence on income.

There is one exception. The expectations for this chapter suggest that manual work would positively contribute to income in the subordinate-primary sector. However, this is not because manual complexity is accompanied by a high level of education, but because many occupations in this sector have complex manual orientations and increasing complexity of any form of work results in higher income (Fligstein and associates, 1979).

The analysis of the total economy shows that the assumptions and expectations are consistent with single labor market theory. The only difference is people oriented work being moderately related to education and mental work. Re-

sults for the analysis by industrial segmentation (Chapter Five) parallel those for the total economy very closely. This analysis examines whether the assumptions and expectations hold for occupational sectors.

The present findings (Table 6.12) show that all occupational sectors have unexpected relationships (correlations) among the occupational characteristics, and there are also different patterns among occupations differentiated by gender.

In the independent-primary sector education is only moderately related (correlations) to mental work among most occupations (occupations held by men having a negative relationship), and only moderately related to people oriented work among all occupations. Further, education and manual work occur together among most occupations (occupations held by men show no relationship). Since the correlations for education and mental work, and education and manual work, are different for occupations held by men and occupations held by women, they receive separate treatment. Independent-primary occupations held by women are discussed first.

The independent-primary sector contains highly trained and skilled "professional" occupations. Among occupations held by women in this sector education and mental work may not occur together to a high degree, perhaps, because many specific mental skills may be learned "on-the-job." This

Table 6.12

Pearson Correlations Between Occupational Characteristics for Occupations Classified by Occupational Sectors

	Independent-Primary	Subordinate-Primary	Secondary
Combined Occupations			
Educ. & Mental	.16	.62	.62
Educ. & People	.28	.37	.70
Educ. & Manual	.15	-.48	-.54
Mental & People	-.61	.51	.96
Mental & Manual	.40	-.31	-.16
People & Manual	-.23	-.56	-.42
Occupations Held by Men			
Educ. & Mental	-.24	.71	.55
Educ. & Peple	.64	.20	-.03
Educ. & Manual	-.06	-.22	-.16
Mental & People	-.65	.25	-.26
Mental & Manual	.54	-.05	-.07
People & Manual	-.37	-.61	-.82
Occupations Held by Women			
Educ. & Mental	.39	.58	-.11
Educ. & People	.25	.31	.93
Educ. & Manual	.22	-.38	.73
Mental & People	-.57	.53	-.38
Mental & Manual	.58	-.23	-.28
People & Manual	-.33	-.34	.63

(cont.)

	Independent-Primary	Subordinate-Primary	Secondary
Male Portion of Identical Occs.			
Educ. & Mental	.10	.51	.15
Educ. & People	.17	.31	.15
Educ. & Manual	.15	-.48	-.03
Mental & People	-.61	.53	.96
Mental & Manual	.40	-.34	-.16
People & Manual	-.23	-.55	-.42
Female Portion of Identical Occs.			
Educ. & Mental	.37	.62	.73
Educ. & People	.21	.37	.80
Educ. & Manual	.18	-.46	-.52
Mental & People	-.61	.53	.96
Mental & Manual	.40	-.34	-.16
People & Manual	-.23	-.55	-.42

extra training would not be captured by our measure of formal education. On the other hand, the moderate relationship between education and mental work may be due to the smaller amount of variation in mental work among independent-primary occupations held by women compared to the total economy (noted by the indicies of variability in Chapter Three). This is, female independent-primary occupations are so similar for complexity of mental work that there is not enough variation in it to produce a strong correlation with education.

The positive relationship between education and manual work among independent-primary occupations held by women suggests that some expertise with manual skills is necessary

for the performance of certain tasks among these occupations. (The fact that mental and manual work occur together among all independent-primary occupations may reinforce this explanation). Moreover, a possible reduction in variation for education and manual work among female independent-primary occupations compared to the total economy would not apply since the indicies of variability (Chapter Three) show that these occupational characteristics have variation comparable to that in the total economy.

Some of the patterns for independent-primary occupations held by men are different. The negative relationship (correlation) between education and mental work suggests that high formal education occurs with less complex mental tasks and, conversely, that low formal education occurs with more complex mental tasks. Overall, this pattern may indicate that the training for more complex mental tasks takes place outside the formal educational system, i.e., "on-the-job," which in effect, actually parallels the pattern for independent-primary occupations held by women. On the other hand, the negative correlation between education and mental work may have something to do with both of these occupational characteristics having less variation in the male independent-primary sector than in the total economy (noted by the indicies of variability in Chapter Three).

Among independent-primary occupations held by men,

education and manual work are not related (whereas they are related among occupations held by women in this sector), but mental work and manual work do occur together (which also is true for occupations held by women in this sector). Apparently, among independent-primary occupations held by men, some expertise with manual skills is necessary for the performance of mental work, which is also true for occupations held by women. However, these manual skills may be learned outside the formal educational system, i.e., "on-the-job," which is not the case fo occupations held by women which show education and manual work occuring together.

The above patterns may account for the lack of effect (correlation) of mental work on income among independent-primary occupations held by women. Mental skills learned "on-the-job" may not result in income to the same degree as mental skills acquired through formal education. However, it is problematic if this explanation accounts for the negative effect (correlations) that mental work has on the income of independent-primary occuaptions held by men, and the male portion of identical occupations. Increasing complexity of mental skills resulting in less income seems entirely out of hand, even if these mental skills may be learned "on-the-job." The effect of mental work on income among independent-primary occupations held by men may relate to industrial location (as mentioned in the section examining this relationship). On the other hand, the negative relation-

ship may be due to mental work having less variation in the male independent-primary sector compared to the total economy (noted by the indicides of variability in Chapter Three).

In the subordinate-primary sector the relationships (correlations) among the occupational characteristics generally conform to the assumptions, and the effects (correlations) of occupational characteristics on income generally conform to expectations. However, there are a couple of exceptions.

Subordinate-primary occupations held by men have the weakest correlation between education and people oriented work. Further, working with people does not have an effect (correlation) on income comparable to that of education or mental work. The earlier interpretation attributes the weak effect of people oriented work on income to the possibility that male subordinate-primary occupations "nurture" people, and this violates cultural norms. Part of the weak effect may also relate to the weak relationship between education and complexity of involvement with people. Minimal training is necessary for "nurturing" people.

Subordinate-primary occupations held by women show a negative relationship between education and manual work, but these occupations are the only ones for which manual work positively effects income. The difference for the effect of manual work on income for subordinate-primary occupations

held by women compared to other subordinate-primary occupations remains a mystery.

In the secondary sector education and mental work are positively related (except for occupations held by women). Similarly, education and people oriented work are positively related (except for occupations held by men). Finally, occupations held by women are the only ones showing a positive relationship between education and manual work.

The relationships between occupational characteristics and income generally conform to occupational segmentation theory among occupations held by men. However, among secondary occupations held by men, education and mental work do make minor contributions and are not as totally lacking in mental demands as occupational segmentation theory argues. Further, the indicies of variability (Chapter Three) lend support to the interpretation. There is more variation in complexity of mental work among male secondary occupations than in the total economy.

The positive relationship between education and mental work may also reinforce the argument for some complexity of mental skills among male secondary occupations. Male secondary jobs requiring even minimally complex forms of mental work require some education, and part of the positive effect of mental work on income may derive from such educational requirements. Similar considerations apply to the

roughly equal contributions education and mental work make to the income of male/female identical occupations in the secondary sector. On the other hand, among female secondary occupations, education and mental work do not occur together. Female secondary jobs requiring some education do not require mental work, and the latter does not contribute to income.

Among secondary occupations held by women, however, the effects of education, people oriented work and manual work on income are strong and, hence do not conform to occupational segmentation theory. Earlier interpretations suggest that while these occupations possess minimal education and skills for people oriented and manual work, they are not totally lacking in them. The fact that these three occupational characteristics occur together may reinforce this interpretation. Secondary occupations held by women requiring even minimally complex people oriented and manual work require some education and the effects of people oriented and manual work on income may, in part, derive from their relationships with education. On the other hand, among secondary occupations held by men education does not occur with people oriented or manual work. Secondary jobs held by men requiring some education do not require working with people or manual work and these latter two forms of work do not contribute to income.

In summary, all three occupational sectors show some

inconsistencies in meeting the assumptions for relationships among occupational characteristics, and expectations for the relative effects of occupational characteristics on income. However, the assumptions and expectations seem more likely to be met in the subordinate-primary sector, with only a couple of exceptions which are related to gender.

The independent-primary sector seems a unique occupational sector, or labor market. The assumption that education, mental work, and people oriented work occur together is only partially met. In addition, contrary to assumption, education and manual work are moderately related (except for occupations held by men which show no relationship). These inconsistencies may help account for the lack of support for the expectation that education, mental work and people oriented work similarly contribute to income.

The secondary sector also seems unique. Education and mental work are positively related (except for occupations held by women), and education and people oriented work are positively related (except for occupations held by men). Finally, contrary to our assumptions, education and manual work occur together among occupations held by women. The positive relationships between education and the three forms of work among certain occupations in the secondary sectors may help account for the contribution of these forms of work to income.

Overall, relationships among the occupational characteristics occuring in the total economy do not necessarily exist in the occupational sectors. Additionally, the gender incumbency of the sectors is also important.

OVERALL SUMMARY AND CONCLUSIONS FOR THE ANALYSIS ACCORDING TO ECONOMIC SEGMENTATION BY OCCUPATIONAL SECTOR

The primary sector(s) are characterized by higher educational requirements and greater complexity of all forms of work than the secondary sector. However, there are some problematic findings for complexity of people oriented work and manual work. For the former, levels of complexity are low in all sectors. For the latter, occupations held by women show slightly higher manual skills in the secondary sector. The distribution of income also conforms to occupational segmentation theory.

Comparing occupations held by men with occupations held by women finds them to be similar in most occupational sectors for most occupational characteristics. However, occupations held by men have higher incomes in all occupational sectors. The pattern for income also holds among male/female identical occupations.

Overall, the patterns for the distributions of occupational characteristics and income support occupational segmentation theory, but they also point to the systematic underpayment of occupations held by women and the female portion of identical occupations in all occupational sectors.

While the distributions of occupational characteristics and income support occupational segmentation theory; there are problematic patterns for the effects (correlations) of occupational characteristics on income. These concern education among occupations held by women, and all forms of work among all occupations.

The effect (correlation) of education on income is stronger in the primary sector(s) than in the secondary sector among occupations held by men. Among occupations held by women, education is also important to income in the primary sector(s), but has an equally strong impact (correlation) on income in the secondary sector.

Comparing occupations held by men with occupations held by women shows the effect (correlation) of education on income to be of similar strength in the independent-primary sector, but of stronger magnitude among subordinate-primary occupations held by men, and of stronger magnitude among secondary occupations held by women. In the analysis of male/female identical occupations, the male portion shows sectoral variations in the effects (correlations) of education on income which are more similar in strength to patterns for occupations held by women and the female portion of identical occupations.

Examination of the income returns (slopes) from education shows higher returns in the primary sector(s) than in

the secondary, for all occupations. However, there are important differences between occupations held by men and occupations held by women.

In the independent-primary sector the similar strengths of relationship between education and income for occupations held by men and occupations held by women suggests that increasing education results in higher incomes for both to much the same degree. In contrast, however, occupations held by men have higher income returns (slopes) from increasing education than occupations held by women. In the subordinate-primary sector education has a somewhat greater effect (correlation) on income among occupations held by men than occupations held by women, and this is also reflected in the higher income returns (slopes) for the former. In the secondary sector education has a greater effect (correlation) on the income of occupations held by women than occupations held by men, and the former also have higher incomes returns (slopes) than the latter. However, occupations held by men have higher incomes than occupations held by women.

Overall, the patterns suggest that gender incumbency is important to the validity of occupational segmentation theory for its argument that education has varying effects (correlations) on income in occupational sectors. It seems more applicable to occupations held by men than occupations held by women or male/female identical occupations. In

other words, for the effect (correlation) of education on income, occupations held by women and male/female identical occupations may operate in a single labor market, while occupations held by men do not. On the other hand, the patterns for the income returns (slopes) from education suggest that occupational segmentation theory is equally applicable to all occupations regardless of gender. In this context, however, occupations held by women and the female portion of identical occupations in the primary sector(s) are subject to income discrimination. In the secondary sector, factors other than education are operating in the income determination process, and further research is necessary.

The analysis of the effects (correlations) of each form of work on income yields many problematic findings. Each form of work has a different effect (correlation) on income across occupational sectors. However, the patterns do not always support expectations derived from occupational segmentation theory.

In the Across sectors analysis there are findings which argue against occupational segmentation theory. In the independent-primary sector increasing complexity of mental work has a negative effect (correlation) on income among occupations held by men, and no effect on income among occupations held by women. In the secondary sector each form of work was expected to have minimal effects (correlations) on

income since this sector presumably lacks occupational skills, However, mental work positively contributes to the income of occupations held by men; while working with people and manual work positively contributes to the income of occupations held by women.

The nature of work has similar effects (correlations) on income among the male portion of identical occupations as for all occupations held by men, but in the independent-primary and secondary sectors the impact of working with people is similar in strength to occupations held by women. The female portion of identical occupations is more similar to occupations held by men for the positive effect of mental work in the secondary sector, and the minimal or negative effect of manual work in all occupational sectors.

Examination of the income returns (slopes) shows that in those sectors where occupations held by men and occupations held by women have similar relationships (correlations) for a form of work and income, the former have higher income returns. The differences among identical occupations, compared to gender differentiated occupations, suggest that increasing complexity of each form of work results in increases (or decreases) in income to similar degress for both. Further, the male portion of identical occupations does not always have the higher income return (slopes) from a form of work. However, occupations held by men and the male portion

of identical occupations always have higher incomes.

Overall, the findings of the Across sectors analysis show that the impact of each form of work on income does vary by occupational sector. However, occupational segmentation theory, in its present form, does little to explain the variation. Further, the differences between occupations held by men and occupations held by women, and male/female identical occupations, point to the need for occupational segmentation theory to incorporate gender incumbency of occupational sectors into its framework.

The Within sectors examination yields results which do not support Reiss' (1961) technical structure argument. Only in the subordinate-primary sector do the patterns conform to his explanation. In the independent-primary sector working with people seems most important to income among all occupations regardless of gender. In the secondary sector any form of work can be important to income, depending on the gender incumbency of the sector.

In conclusion, occupational segmentation theory represents a challenge to theories of income inequality which assume a single, perfectly competitive labor market. The results of this analysis find this segmentation approach to have partial validity.

Its validity depends on (1) the occupational charac-

teristics examined, and (2) the gender incumbency of the occupational sectors. Occupational segmentation seems valid for occupations held by men if the relationship (correlation) between education and income is examined. However, it does not seem applicable to occupations held by women or male/female identical occupations for the relationship between education and income. On the other hand, if income returns (slopes) from education are examined, occupational segmentation theory seems applicable to all occupations regardless of gender.

Occupational segmentation theory does little to account for variations in the relationships (correlations) between the forms of work and income. Each form of work varies in its relationship with income in the occupational sectors, but the variation rarely conforms to occupational segmentation theory, and there are several inconsistencies between occupations held by men and occupations held by women. This holds for variations in income returns (slopes) as well.

Overall, further research is necessary examining the relationships between occupational characteristics and income according to occupational sector, and quite importantly, the gender incumbency of the sectors must be incorporated into the definition of the sectors and any theoretical formulations.

Footnotes for Chapter 6

1. Given the low involvement with people oriented work in the primary sectors, arguments concerning more complex task requirements in these sectors would not seem to apply to working with people.

2. This probably owes to occupations held by females traditionally not requiring complex manual work, and the sexes sharing incumbency in occupations having minimally complex requirements for manual work.

3. There are some non-substantial changes in a few of the sectors (compare Tables 6.1 and 6.2). In the independent-primary sector the male portion holds occupations with less complex relationships with people. In the subordinate-primary sector the sexes share incumbency in occupations with manual complexity in between those usually held by males and females. In the secondary sector the female portion hold occupations with less manual complexity.

4. Since the measure of education is at the ordinal level, the slopes are approximations of the dollar increase for each yearly increase in education. However, the measures of technical structure are at the interval of measurement. Hence, the slopes for these variables indicate the dollar increase for every unit increase on technical structure.

5. Interestingly, the negative relationship between manual work and income in the subordinate-primary sector is stronger for the male portion of gender integrated occupations. Among these occupations there is a change of skill level. The complexity of manual work is less than for occupations held by males, but greater than for occupations held by females. The lowering of manual skills among the male portion of gender integrated occupations may account for the stronger negative relationship. The male portion may be seen as violating cultural norms by being in occupations with such minimal complexity for manual work.

6. It must be pointed out that the male portion of identical occupations shows a substantial decrease in the relationship between people oriented work and income compared to all occupations held by males. This

probably owes to their sharing incumbency in occupations with a "nurturing" orientation which violates cultural norms.

7. It must be pointed out that male/female identical occupations are more similar to each other than are occupations held by males and occupations held by females, and they show a pattern which approaches that in the total economy. However, mental work and people oriented work make roughly equal contributions to income, with the relationships being almost substantially less among the male portion. The weaker relationships among the male portion may derive from their sharing incumbency in secondary occupations of such minimal complexity for these forms of work which may be seen as a violation of cultural norms.

CHAPTER VII

ANALYSIS ACCORDING TO ECONOMIC SEGMENTATION BY INDUSTRIAL/OCCUPATIONAL SECTOR

GENERAL INTRODUCTION

The present chapter examines the income determination process as it occurs in economically segmented labor markets by looking at the effects of simultaneously classifying occupations by both industrial and occupational sectors. By combining the industrial segmentation approach (Bluestone, and associates 1973) with an occupational segmentation approach (Reich and associates, 1973; Osterman, 1975) the result is six industrial/occupational sectors: core/independent-primary, core/subordinate-primary, core/secondary, peripheral/independent-primary, peripheral/subordinate-primary, and peripheral/secondary.

The general expectations for this analysis are that indicies of occupational characteristics (education, complexity of mental, people oriented and manual work) and income should be highest in the independent-primary sectors (core and peripheral) and lowest in the secondary sectors (core and peripheral). The remaining sectors should be intermediate. Education should also have the strongest effect on income in the independent-primary sectors (core and

peripheral) and the weakest effect in the secondary sectors (core and peripehral). However, we expect little variation in the strength of relationships between education and income in the independent-primary and secondary sectors by industrial location.

The examination of the relationships between each form of work and income is exploratory since previous research has ignored these issues. However, we expect patterns for mental work and people oriented work to parallel those for education, because of the assumed match among these characteristics. Manual work should have positive effects on income in the subordinate-primary sectors (core and peripheral).

A theoretical discussion of these expectations is presented in each major section.

DISTRIBUTION OF OCCUPATIONAL CHARACTERISTICS AND INCOME IN INDUSTRIAL/OCCUPATIONAL SECTORS

As with the previous chapter (Six), it is again necessary to remind the reader of the possible problem of reduction in variation in occupational characteristics resulting from dividing the entire economic structure into various segments. The severity of this problem for occupational sectors only is not that great as noted by the indicies of variability in Chapter Three (Methodology). Recall that only education in the male independent-primary sector and complexity of mental work in the male and female independent-primary sectors showed less variation than present in the total economy. The indicies of variability (Chapter Three) also showed that the same pattern occured when the occupational sectors are further divided by industrial location. The reader should keep these patterns in mind when evaluating any analyses involving these occupational characteristics.

Independent-primary occupations (core and peripheral) have substantially higher levels of education than occupations in the total economy; while secondary occupations (core and peripheral) have substantially lower educational characteristics. Subordinate-primary occupations (core and peripheral) have similar educational requirements as in the total economy (Tables 7.1, 7.2 and 7.3). It should be noted that there is

Table 7.1

Means and Standard Deviations for Education, Mental Work, People Oriented Work, Manual Work and Income for Occupations Simultaneously Classified by Industrial Sector and Occupational Sector

Combined Occupations

	Education	Mental	People	Manual	Income
Core/Independent-Primary	14.6 (1.1)	7.6 (.5)	1.4 (2.2)	1.3 (2.2)	11166(2079)
Core/Subordinate-Primary	12.3 (1.4)	5.1 (1.9)	1.9 (2.2)	2.2 (2.4)	8743(2991)
Core/Secondary	9.9 (.9)	.8 (.6)	.8 (.5)	1.4 (.9)	5281(553)
Peripheral/Independent-Primary	15.0 (1.8)	7.6 (.5)	1.4 (2.2)	1.3 (2.2)	11374(4471)
Peripheral/Subordinate-Primary	12.4 (1.6)	5.1 (1.9)	1.9 (2.2)	2.2 (2.4)	7132(3021)
Peripheral/Secondary	9.9 (.9)	.8 (.6)	.8 (.5)	1.4 (.9)	3661(562)

Standard Deviation in Parentheses

Table 7.2

Means and Standard Deviations for Education, Mental Work, People Oriented Work, Manual Work and Income for Occupations Simultaneously Classified by Industrial Sector and Occupational Sector

Occupations Held by Men

	Education	Mental	People	Manual	Income
Core/Independent-Primary	15.5 (1.5)	7.3 (.6)	2.9 (3.4)	1.3 (2.6)	13383(3717)
Core/Subordinate-Primary	12.3 (1.9)	5.2 (2.4)	1.0 (1.8)	4.0 (3.0)	9823(2663)
Core/Secondary	9.5 (1.5)	.7 (1.8)	.6 (.9)	1.2 (.9)	5822(990)
Peripheral/Independent-Primary	15.6 (1.9)	7.3 (.6)	2.9 (3.4)	1.3 (2.6)	13845(4936)
Peripheral/Subordinate-Primary	12.3 (2.1)	5.2 (2.4)	1.0 (1.8)	4.0 (3.0)	8814(2947)
Peripheral/Secondary	9.9 (.9)	.7 (1.8)	.6 (.9)	1.2 (.9)	4517(949)

Standard Deviation in Parentheses

Table 7.3

Means and Standard Deviations for Education, Mental Work, People Oriented Work, Manual Work and Income for Occupations Simultaneously Classified by Industrial Sector and Occupational Sector

Occupations Held by Women

	Education	Mental	People	Manual	Income
Core/Independent-Primary	14.0 (1.4)	7.5 (.5)	1.6 (2.3)	1.5 (2.4)	7267(1516)
Core/Subordinate-Primary	12.2 (1.0)	4.6 (1.5)	1.5 (2.1)	1.7 (2.4)	5619(1672)
Core/Secondary	10.3 (1.1)	.4 (.8)	.6 (.8)	2.2 (2.2)	3698(855)
Peripheral/Independent-Primary	14.2 (1.8)	7.5 (.5)	1.6 (2.3)	1.5 (2.4)	6383(2160)
Peripheral/Subordinate-Primary	12.3 (1.3)	4.6 (2.0)	1.5 (2.1)	1.7 (2.4)	4503(1869)
Peripheral/Secondary	10.0 (1.2)	.4 (.8)	.6 (.8)	2.2 (2.2)	2600(729)

Standard Deviation in Parentheses

greater variation in the level of education between occupational than industrial sectors.

The patterns suggest that processes occuring at the individual level do not necessarily occur at the occupational level. At the individual level core industry employees may have more education than those in peripheral industries, and independent-primary employees in core industries more education than independent-primary employees in peripheral industries. However, the present findings suggest that at the occupational level all industries have approximately similar educational requirements for each occupational sector.

Comparing occupations held by men and occupations held by women in the sectors reveals little variation in education. In fact, only among independent-primary occupations in core industries do occupations held by men have higher education.

In general, all of the above patterns obtain for male/female identical occupations. However, there is one difference. The male portion of independent-primary occupations in core industries does not have a substantially larger education than the female portion (Tables 7.4 and 7.5).

The distribution of technical complexity factors support economic segmentation theory. Primary sector(s) occupations (core and peripheral) have greater complexity on each dimension (mental, people and manual) than occupations in the

Table 7.4

Means and Standard Deviations for Education, Mental Work, People Oriented Work, Manual Work and Income for Occupations Simultaneously Classified by Industrial Sector and Occupational Sector

Male/Female Identical Occupations

Male Portion

	Education	Mental	People	Manual	Income
Core/Independent-Primary	15.1 (1.1)	7.6 (.5)	1.4 (2.2)	1.3 (2.2)	12163(1968)
Core/Subordinate-Primary	12.4 (1.5)	4.8 (2.1)	1.9 (2.2)	2.3 (2.3)	9559(2651)
Core/Secondary	9.8 (.8)	.8 (.6)	.8 (.5)	1.4 (.9)	5848(721)
Peripheral/Independent-Primary	15.5 (1.8	7.6 (.5)	1.4 (2.2)	1.3 (2.2)	12446(4218)
Peripheral/Subordinate-Primary	12.5 (1.7)	4.8 (2.1)	1.9 (2.2)	2.3 (2.3)	8417(2833)
Peripheral/Secondary	9.3 (2.3)	.8 (.6)	.8 (.5)	1.4 (.9)	4485(965)

Standard Deviation in Parentheses

Table 7.5

Means and Standard Deviations for Education, Mental Work, People Oriented Work, Manual Work and Income for Occupations Simultaneously Classified by Industrial Sector and Occupational Sector

Male/Female Identical Occupations

	Female Portion				
	Education	Mental	People	Manual	Income
Core/Independent-Primary	14.1 (1.2)	7.6 (.5)	1.4 (2.2)	1.3 (2.2)	7431(1403)
Core/Subordinate-Primary	12.0 (1.3)	4.8 (2.1)	1.9 (2.2)	2.3 (2.3)	6122(1780)
Core/Secondary	10.1 (1.1)	.8 (.6)	.8 (.5)	1.4 (.9)	3793(813)
Peripheral/Independent-Primary	14.3 (1.6)	7.6 (.5)	1.4 (2.2)	1.3 (2.2)	6535(2005)
Peripheral/Subordinate-Primary	12.2 (1.5)	4.8 (2.1)	1.9 (2.2)	2.3 (2.3)	4886(2069)
Peripheral/Secondary	10.2 (.9)	.8 (.6)	.8 (.5)	1.4 (.9)	2743(577)

Standard Deviation in Parentheses

secondary sectors (core and peripheral). However, there is no variation by industrial location. In other words, the technical structure of work is the same in identical occupational sectors regardless of industrial location[1] (Tables 7.1, 7.2 and 7.3).

Comparing occupations held by men with occupations held by women reveals considerable similarity. The only major differences are for involvement with manual work. Occupations held by men are characterized by substantially more complex manual work in the subordinate-primary sectors (core and peripheral) than occupations held by women. On the other hand, occupations held by women in the secondary sectors (core and peripheral) require somewhat more complex manual tasks than occupations held by men.

The sectoral patterns of technical structure obtaining for gender differentiated occupations hold for male/female identical occupations as well, with a few minor differences. In the independent-primary sectors (core and peripheral) the male portion has less complex requirements for people oriented work compared to all occupations held by men in these sectors. In these sectors men and women share incumbency in occupations having minimal relationships with people. In the subordinate-primary sectors (core and peripheral) the male portion has less complex requirements for manual work compared to all occupations held by men in these sectors;

while the opposite occurs for the female portion. In these sectors men and women share incumbency in occupations with a manual complexity "in between" those usually held by men and women. Finally, in the secondary sectors (core and peripheral) the female portion has less complex requirements for manual work compared to all occupations held by women in these sectors.

Overall, the distributions for occupationsl characteristics support economic segmentation theory. Further, occupations held by men and occupations held by women are quite similar, as are both portions of male/female identical occupations. It must be emphasized, however, that variations for occupational characteristics are more apparent among occupational sectors than for different industrial locations.

The patterns of income also support economic segmentation theory. For all occupations the independent-primary sectors located in core industries have the highest incomes; while the lowest occur in the secondary sectors in peripheral industries. These patterns result from the mutual effect of industrial location and occupational characteristics. Independent-primary occupations have strict entry requirements which result in high income and if they are in core industries they also benefit from the characteristics of these industries which translate into high income (e.g., high profits). The opposite situation hold among secondary

occupations in peripheral industries.

As with the occupational characteristics, however, there is more variation by occupational sector than industrial sector. The only instance where industrial location makes a substantial difference is for secondary occupations. Those in core industries have substantially higher income than those in peripheral industries, perhaps reflecting the greater unionization of core industries.

Similar patterns for income are also observed for male/female identical occupations. However, there are some differences. In all sectors, except secondary occupations in core industries, the male portion has less mean income compared to all occupations held by men, while the female portion has higher income compared to all occupations held by women. These comparisons suggest that gender integration of occupations lowers the mean income of men, while it raises the mean income of women. However, it must be emphasized that the male portion still has a much higher mean income in all the sectors than the female portion. The pattern for secondary occupations in core industries may be the result of industrial unionization protecting the income of these occupations.

In summary, the distributions for occupational characteristics and income lend considerable support to economic segmentation theory, but with the variation being more

apparent for occupational than industrial sectors. Further, gender differentiated occupations and gender integrated occupations have similar patterns for occupational characteristics and income. However, occupations held by men have higher incomes than occupations held by women in all sectors. The findings parallel those of previous analyses. Gender differentiated occupations and gender integrated occupations are quite similar for characteristics which influence income, but quite dissimilar for income.

THE RELATIONSHIP BETWEEN EDUCATION AND INCOME IN INDUSTRIAL/OCCUPATIONAL SECTORS

One important question raised by economic segmentation theory using the simultaneous approach is that of the relative importance of industrial sectors and occupational sectors. Spillerman (1977) argues that among independent-primary and secondary occupations, employer (industry) characteristics have little mediating effect on the importance of education to income. Education should have the strongest effect on income in the independent-primary sector but, because "expertise" in these jobs is likely to be transferable to any industry, we would expect little variation in the effect of education on income by industrial location. On the other hand, in the secondary sectors education should not be important to income because these sectors are characterized by a lack of skills and promotional opportunities, and there should be little variation by industrial location since these occupational characteristics apply in all industries.

Spillerman (1977) does not discuss the manner in which the effect of education on income in the subordinate-primary sectors may or may not vary by industrial location. On the one hand, education should still be important to income but to a lesser degree than in the independent-primary sector since there are fewer promotional opportunities. On the

other hand, there should be greater effect among subordinate-primary occupations in peripheral industries because of the absence of bureaucratic income setting procedures in these industries.

These expectations are examined with procedures identical to those for all previous analyses. First, the correlations between education and income are presented, which suggest the overall strength of relationship between increasing education and income. The larger the number, the stronger the relationship. Second, the "slopes" resulting from regressing income with education are given. The "slopes" indicate the dollar increase for each yearly increase in education.[2]

The results of the correlation analysis (Table 7.6) support Spillerman's (1977) argument that industrial sector will have little effect on the relationships between education and income in core and peripheral independent-primary and core and peripheral secondary sectors, regardless of gender. Further, education shows no variation in its effect on income in the core and peripheral subordinate-primary sectors. Overall, the present findings parallel those identified in Chapter Six in our discussion of occupational sectors. They suggest that industrial location has little impact on the relationship between education and income among occupational sectors.

Table 7.6

Pearson Correlations Between Education and Income Among Occupations Simultaneously Classified by Industrial Sector and Occupational Sector

Combined Occupations

	Core	Periphery
Independent-Primary	.87 (27)	.83 (19)
Subordinate-Primary	.45 (85)	.51 (33)
Secondary	.15 (21)	.05 (18)

	Occupations Held by Men		Occupations Held by Women	
	Core	Periphery	Core	Periphery
Independent-Primary	.87 (55)	.74 (33)	.75 (33)	.77 (26)
Subordinate-Primary	.75 (249)	.70 (133)	.44 (111)	.57 (72)
Secondary	.33 (55)	.32 (31)	.70 (34)	.59 (13)

N in Parentheses

The similarity with the findings of Chapter Six reoccurs when we compare occupations held by men with occupations held by women. In particular, the strong effect (correlation) between education and income among secondary occupations held by women persists in both the core and periphery; while education has little effect on income among secondary occupations held by men in both industrial sectors. In short, the qualitative differences in the education of secondary occupations held by women versus those held by men, which results in the difference in the importance of education to income, holds regardless of industrial location.

There is, however, one difference from the findings of Chapter Six. Education is substantially more important to income among subordinate-primary occupations held by men only in core industries. The interpretation of Chapter Six that subordinate-primary occupations held by men have greater promotional opportunities than those held by women may only apply to subordinate-primary occupations in core industries. The comparability of relationships between education and income for subordinate-primary occupations in peripheral industries suggests slightly better chances for promotion for women in these occupations in the periphery.[3]

Despite the similarity of relationships (correlations) between education and income in the independent-primary sectors for occupations held by men and women, and the dif-

ferences in the subordinate-primary and secondary sectors; occupations held by men have much higher incomes than occupations held by women in all sectors. The analysis of the total economy offers the interpretation that occupations held by women experience income discrimination in the form of lower income returns from education. The present data (i.e., the slopes resulting from regressing income with education) support this interpretation, but only for the independent-primary sectors (core and peripheral) and the subordinate-primary sectors (core and peripheral)[4] (Table 7.7).

Secondary sector occupations in the core and periphery are problematic. Those occupations held by women show a stronger effect (correlation) of education on income than those occupations held by men. Further, female secondary occupations (core and peripheral) have higher income returns (slopes) than male secondary occupations (core and peripheral). However, secondary occupations held by men have higher incomes in both industrial sectors than secondary occupations held by women. These findings parallel the ones of Chapter Six and suggest that other factors are operating on the income determination process of secondary occupations in the core and periphery.

Among male/female identical occupations in the independent-primary sectors (core and peripheral), both portions continue to show a strong effect (correlation) of education

Table 7.7

Slopes and Intercepts-Income Regressed with Education-Occupations Simultaneously Classified by Industrial Sector and Occupational Sector

	Occupations Held by Men			
	Core		Periphery	
	Intercept	Slope	Intercept	Slope
Independent-Primary	-19390	2116	-17017	1977
Subordinate-Primary	- 2778	1027	- 3224	981
Secondary	3755	217	1138	342

	Occupations Held by Women			
	Core		Periphery	
	Intercept	Slope	Intercept	Slope
Independent-Primary	- 4544	841	- 6794	925
Subordinate-Primary	- 3233	726	- 5727	841
Secondary	- 2156	567	- 1060	365

N's are the same as in Table 7.6

on income, and show no differences by industrial location or gender (Table 7.8). Further, the male portion shows somewhat lower income returns (slopes) compared to all occupations held by men in these sectors, but they are still much higher than the income returns (slopes) for the female portion (Table 7.9).

There are also some interesting differences in the core and peripheral subordinate-primary sectors and the core and peripheral secondary sectors among male/female identical occupations. In the subordinate-primary sectors (core and peripheral) the male portion shows a weaker effect (correlation) of education on income, compared to all occupations held by men in these sectors, and the magnitude is similar in strength to the effect of education shown by occupations held by women and the female portion of identical occupations (Table 7.8). However, the income returns (slopes) for the male portion are still greater (Table 7.9). Fewer promotional opportunities among the male portion, matching those for occupations held by women and the female portion, might account for the weaker correlation between education and income. However, since their income returns (slopes) are higher, the only conclusion is that the female portion experiences income discrimination.[5]

In the core and peripheral secondary sectors the female portion of identical occupations show the strong

Table 7.8

Pearson Correlations Between Education and Income Among Occupations Simultaneously Classified by Industrial Sector and Occupational Sector Male/Female Identical Occupations

	Male Portion		Female Portion	
	Core	Periphery	Core	Periphery
Independent-Primary	.75 (37)	.79 (21)	.73 (27)	.76 (19)
Subordinate-Primary	.58 (114)	.53 (65)	.50 (87)	.50 (57)
Secondary	-.04 (26)	.46 (19)	.63 (24)	.71 (19)

N in Parentheses

Table 7.9

Slopes and Intercepts-Income Regressed with Education
Occupations Simultaneously Classified by Industrial
Sector and Occupational Sector
Male/Female Identical Occupations

Male Portion

	Core		Periphery	
	Intercept	Slope	Intercept	Slope
Independent-Primary	- 8070	1336	-16742	1915
Subordinate-Primary	- 3402	1049	- 2559	881
Secondary	6196	- 35	2636	198

Female Portion

	Core		Periphery	
	Intercept	Slope	Intercept	Slope
Independent-Primary	- 4537	846	- 6692	927
Subordinate-Primary	- 2400	707	- 5105	818
Secondary	- 1131	486	- 1990	466

N's are the same as in Table 7.8

effect (correlation) of education on income shown by all occupations held by women. Among all occupations held by men in these sectors education has the weakest effect (correlation) on income. However, the male portion of secondary occupations in core industries shows education having no effect (correlation) on income, while in the peripheral sector education has a moderately strong effect (correlation) on income. The differences in patterns for male/female identical occupations in the secondary sectors might result from peripheral industries being more likely to reward the male portion according to education because of the absence of bureaucratic income setting procedures. It should be pointed out that this mediating effect does not conform to Spilleman's (1977) argument.

Despite the differences in the secondary sectors among the male portion of identical occupations; the female portion still have higher income returns (slopes), but the male portion has higher incomes.

In summary, the overall patterns suggest that among occupations held by men, occupations held by women, and male/female identical occupations, the effect (correlation) of education on income is comparable in the independent-primary sectors (core and peripheral). On the other hand, occupations held by men in the independent-primary sectors (core and peripheral) have higher income returns (slopes) from educa-

tion. The same findings apply for subordinate-primary occupations in peripheral industries, but not in core industries. In the latter sector education has a substantially stronger effect (correlation) on income among occupations held by men. This may reflect greater promotional opportunities among male subordinate-primary occupations in core industries.

In the secondary sectors (core and peripheral) education is substantially more important (correlation) to income among occupations held by women, and their income returns (slopes) from education are also higher. However, secondary occupations held by men, and the male portion of identical occupations, in the core and periphery have much higher incomes. In the core and periphery secondary sectors other factors are operating and further research is necessary.

The applicability of industrial/occupational segmentation theory for understanding the impact of education on income is affected by the gender incumbency of the sectors. However, it is also apparent that variation among gender differentiated occupations is much greater by occupational sector than industrial location. In the core and peripheral independent-primary sectors and the core and peripheral secondary sectors, the lack of variation by industrial location supports Spillerman (1977). The lack of variation in the core and peripheral subordinate-primary sectors argues against the position of Bluestone and associates (1973).

THE RELATIONSHIP BETWEEN THE NATURE OF WORK AND INCOME ACROSS INDUSTRIAL/OCCUPATIONAL SECTORS

It is possible to develop two alternative sets of expectations about the effect of technical structure on income across industrial/occupational sectors.

Independent-primary occupations in both core and peripheral sectors are involved in the planning stages of the production process. Hence, mental work and people oriented work should have the strongest effects on income in these sectors. On the one hand, the effects of both forms of work on income may be greater for independent-primary occupations in peripheral industries because of the absence of income setting procedures in this industrial sector (Bluestone and associates, 1973). On the other hand, the effects of both forms of work may be equal in the core and peripheral independent-primary sectors because "professionals" have a "national labor market" (Spillerman, 1977). Involvement with manual work is not expected to contribute to income in the independent-primary sector, in either core or peripheral industries, because such occupations do not generally perform manual work.

The subordinate-primary occupations in both the core and periphery are involved in the execution stages of the production process, but they do possess certain levels of

skill. Hence, in both sectors, mental work and people oriented work should have intermediate effects on income. Further, the effects may be greater in the periphery owing to the absence of income setting procedures in this industrial sector. Manual work is expected to positively effect income for subordinate-primary occupations in both the core and periphery because this sector has many occupations with moderate to complex manual skills, and increasing control over tasks results in greater reward (Fligstein and associates, 1979). The contribution of manual work may be greater in peripheral industries because of the absence of bureaucratic income setting procedures.

Core and peripheral secondary occupations are also involved in the execution stage of the production process, but these occupations lack skills. Hence, each form of work should have a minimal effect on income, and there should be little difference by industrial location owing to the lack of union protection among secondary occupations (Spillerman, 1977).

The procedures for examining these expectations are identical to those of previous analyses. First, the correlations between each form of work and income are presented. These correlations suggest the degree to which an increase in complexity of a particular task is associated with an increase (or decrease) in income. In other words, the

correlations suggest the overall strength of relationship between increasing complexity of a form of work and income. Second, the "slopes" resulting from regressing each form of work with income are examined. The slopes indicate the dollar increase for each unit increase in task complexity as measured by the technical structure scales presented in Chapter Three (Methodology).

Overall, many of the findings of the correlation analysis do not support expectations (Tables 7.10 and 7.11). Both the independent-primary and secondary sectors, in both core and peripheral industries, show similar effects of the impact of technical structure as those shown in the analysis by occupational sector alone (Chapter Six). Further, there is little variation by industrial location , which supports Spillerman's (1977) arguments that employer (industry) characteristics have little mediating effect on the income determination process in independent-primary and secondary occupational sectors.

Not all of the findings in the independent-primary and secondary sectors, however, mirror those of Chapter Six. There are some exceptions deriving from the gender incumbency of industrial/occupational sectors, and these exceptions do not always consistently occur in core or peripheral industries. Since many of the findings parallel those of Chapter Six, only those which show a difference receive

Table 7.10

Pearson Correlations for Mental Work and Income, People Oriented Work and Income, and Manual Work and Income Among Occupations Simultaneously Classified by Industrial Sector and Occupational Sector

Combined Occupations

	Core			Periphery		
	Mental	People	Manual	Mental	People	Manual
Independent-Primary	.03 (27)	.46 (27)	.24 (27)	-.19 (19)	.54 (19)	-.22 (19)
Subordinate-Primary	.62 (74)	.36 (74)	-.08 (74)	.67 (47)	.32 (47)	-.19 (47)
Secondary	.06 (15)	.10 (15)	-.27 (15)	.35 (14)	.40 (14)	-.39 (14)

N in Parentheses

Table 7.11

Pearson Correlations for Mental Work and Income, People Oriented Work and Income, and Manual Work and Income Among Occupations Simultaneously Classified by Industrial Sector and Occupational Sector

Occupations Held by Men

	Core			Periphery		
	Mental	People	Manual	Mental	People	Manual
Independent-Primary	-.38 (55)	.83 (55)	-.18 (55)	-.19 (33)	.65 (33)	-.09 (33)
Subordinate-Primary	.62 (235)	.15 (235)	-.08 (235)	.60 (125)	.09 (125)	-.05 (125)
Secondary	.44 (43)	-.11 (43)	-.08 (43)	.49 (23)	.27 (23)	-.39 (23)

(cont.)

Occupations Held by Women

	Core			Periphery		
	Mental	People	Manual	Mental	People	Manual
Independent-Primary	.24 (21)	.21 (21)	.18 (21)	-.07 (16)	.35 (16)	-.03 (16)
Subordinate-Primary	.64 (106)	.43 (106)	.34 (106)	.67 (70)	.44 (70)	.04 (70)
Secondary	-.09 (21)	.62 (21)	.76 (21)		.57 (13)	.81 (13)

N in Parentheses

discussion. The reader should refer to footnotes for identification of those findings not discussed here.

In the independent-primary sector (overall) mental work makes no contribution (correlation) to income among occupations held by women (Chapter Six), but this finding does not hold for independent-primary occupations held by women in core industries, where the effect of mental work is positive. Perhaps this difference by industrial location results from the high profits of core industries. However, why this does not apply to independent-primary occupations held by men in core industries is unclear.[6]

In the secondary sector (overall) people oriented work and manual work do not effect (correlation) income for occupations held by men (Chapter Six). In contrast, for secondary occupations held by men in peripheral industries both of these forms of work contribute to income. Apparently, secondary sector occupations held by men have some people oriented and manual skills, but only receive rewards from them in peripheral industries. Perhaps this relates to the lack of income setting procedures in these industries.[7]

There are also some unexpected findings in the subordinate-primary sectors. In this sector (overall) manual work positively contributes (correlation) to the income of occupations held by women, but not occupations held by men

(Chapter Six). These findings hold in the core and periphery, except for subordinate-primary occupations held by women in peripheral industries.

Subordinate-primary occupations possess manual skills, and it is at least reasonable to assume that there would be a positive effect on income from this form of work. Among occupations held by men the previous interpretation (Chapter Six) that income setting constraints in core industries result in the negative effect (correlation) does not hold since the negative effect occurs regardless of industrial location. Among subordinate-primary occupations held by women the previous interpretation (Chapter Six) that they may not be subject to unionization, or located in peripheral industries with less unionization and income setting constraints seems erroneous since subordinate-primary occupations in core industries have the positive relationship. It is tempting to say that unionization among female subordinate-primary occupations in core industries accounts for the positive effect of manual work on income. However, this seems unlikely since female occupations have, traditionally, been very difficult to unionize (Cook, 1968; Blum and associates, 1971). Perhaps the greater profits of core industries account for the difference, or perhaps, complexity of manual work is part of the income setting process in core industries. However, the reason manual work does not positively contribute to income among subordinate-primary occupations held by men in core

industries is unclear.

Despite the differences between gender differentiated occupations for the effects (correlations) of each form of work on income in the industrial/occupational sectors, there is one consistent pattern. Occupations held by men have much higher incomes than occupations held by women in all sectors. The analysis in Chapter Six finds that in those occupational sectors where a form of work has a similar effect (correlation) on income for gender differentiated occupations; occupations held by men have higher income returns (slopes) from that form of work. The present findings (i.e., slopes resulting from regressing income with each form of work) reflect the results of Chapter Six (Table 7.12). Further, in spite of differences in direction of effect (correlation) for certain forms of work in certain sectors, occupations held by men have higher incomes in all sectors.

All previous analyses (Chpaters 4, 5, and 6) also show some differences in the effects (correlations) of each form of work on income for male/female identical occupations compare to all occupations held by men and women. Differences also occur in the industrial/occupational sectors (Table 7.13). These patterns, however, are quite similar to those occuring in the analysis by Occupational Sector (Chapter Six).[8]

In fact, the differences occuring in the occupational sectors (Chapter Six) among both portions of identical occu-

Table 7.12

Slopes and Intercepts-Income Regressed with Each Form of Work-Occupations Simultaneously Classified by Industrial/Occupational Sector

	Occupations Held by Men					
	Core					
	Mental		People		Manual	
	Intercept	Slope	Intercept	Slope	Intercept	Slope
Independent-Primary	36774	-3127	11350	1021	13706	- 267
Subordinate-Primary	6230	687	9550	254	10049	- 69
Secondary	5810	230	6049	- 141	6129	- 98
	Periphery					
	Mental		People		Manual	
	Intercept	Slope	Intercept	Slope	Intercept	Slope
Independent-Primary	27679	-1864	11642	1038	14007	- 161
Subordinate-Primary	5112	723	8562	154	8890	- 45
Secondary (cont.)	4450	235	4526	295	5152	- 435

Occupations Held by Women

Core

	Mental		People		Manual	
	Intercept	Slope	Intercept	Slope	Intercept	Slope
Independent-Primary	1018	841	7055	169	7102	129
Subordinate-Primary	2802	531	5005	319	5121	201
Secondary	3714	- 170	3203	578	2980	260

Periphery

	Mental		People		Manual	
	Intercept	Slope	Intercept	Slope	Intercept	Slope
Independent-Primary	8821	- 328	5815	336	6416	- 30
Subordinate-Primary	2096	473	3994	280	4349	20
Secondary			2261	490	1994	254

N's are the same as in Table 7.11

Table 7.13

Pearson Correlations for Mental Work and Income, People Oriented Work and Income, and Manual Work and Income Among Occupations Simultaneously Classified by Industrial Sector and Occupational Sector

Male/Female Identical Occupations

	Male Portion					
	Core			Periphery		
	Mental	People	Manual	Mental	People	Manual
Independent-Primary	-.04 (37)	.41 (37)	.04 (37)	-.24 (21)	.54 (21)	-.25 (21)
Subordinate-Primary	.58 (100)	.30 (100)	-.26 (100)	.63 (57)	.25 (57)	-.28 (57)
Secondary	.35 (19)	.31 (19)	-.006 (19)	.38 (15)	.38 (15)	-.13 (15)

(cont.)

	Female Portion					
	Core			Periphery		
	Mental	People	Manual	Mental	People	Manual
Independent-Primary	.31 (27)	.12 (27)	.10 (27)	.02 (19)	.28 (19)	-.07 (19)
Subordinate-Primary	.71 (76)	.49 (76)	-.05 (76)	.73 (51)	.43 (51)	-.26 (51)
Secondary	.64 (18)	.71 (18)	-.51 (18)	.54 (15)	.63 (15)	-.49 (15)

N in Parentheses

patterns show no substantial differences when the occupational sectors are divided by industrial location. Hence, the previous interpretations (Chapter Six) offered for the similarity between both portions of identical occupations, compared to all occupations held by men and all occupations held by women, apply in the occupational sectors regardless of industrial location.

The patterns of relationship (correlations) among male/female identical occupations suggest that increasing complexity of each form of work results in increasing (or decreasing) income in a more similar fashion among them than for gender differentiated occupations. However, male/female identical occupations show differences in the income returns (slopes) from each form of work (Table 7.14). In addition, the male portion does not always have the higher income returns from mental work or people oriented work. Despite these differences, however, the male portion of identical occupations has much higher incomes in all industrial/occupational sectors.

In summary, the results of this analysis do not support Reiss' (1961) argument that there is a direct effect of technical structure on occupational income since the effect (correlation) of each form of work varies by industrial/occupational sector. However, there are also findings which argue against the expectations derived from industrial/occupational segmentation theory. Overall, the effect (cor-

Table 7.14

Slopes and Intercepts-Income Regressed with Each Form of Work-Occupations Simultaneously Classified by Industrial/Occupational Sector

Male/Female Identical Occupations

Male Portion

	Core					
	Mental		People		Manual	
	Intercept	Slope	Intercept	Slope	Intercept	Slope
Independent-Primary	13624	- 191	11752	527	12116	33
Subordinate-Primary	5514	742	8615	398	9951	-273
Secondary	5520	469	5558	447	5846	- 6

(cont.)

Periphery

	Mental		People		Manual	
	Intercept	Slope	Intercept	Slope	Intercept	Slope
Independent-Primary	29054	-2194	11051	1080	13072	- 445
Subordinate-Primary	3616	844	7411	314	8695	- 299
Secondary	4073	648	4073	708	4813	- 146

Female Portion

Core

	Mental		People		Manual	
	Intercept	Slope	Intercept	Slope	Intercept	Slope
Independent-Primary	72	974	7337	96	7360	71
Subordinate-Primary	3572	488	5379	367	6018	- 30
Secondary	3088	881	3037	1083	4680	- 590

(cont.)

	Periphery					
	Mental		People		Manual	
	Intercept	Slope	Intercept	Slope	Intercept	Slope
Independent-Primary	5714	109	6168	257	6600	- 71
Subordinate-Primary	2240	493	4198	280	5024	- 154
Secondary	2134	574	2226	746	3316	- 357

N's are the same as in Table 7.13

relation) of each form of work on income in the sectors seems dependent on the gender incumbency of the sectors. In addition, Spillerman's (1977) arguments for a lack of employer (industry) mediating effects in the independent-primary and secondary sectors holds most of the time, but not always, and this also seems dependent on gender.

The importance of gender incumbency is also apparent in the differences occuring among male/female identical occupations, compared to all occupations held by men and women. In other words, each form of work effects (correlations) income in a more similar manner among gender integrated occupations than among gender differentiated occupations. In addition, the male portion of gender integrated occupations does not always receive higher income returns (slopes) from increasing task complexity. Despite these similarities and differences, however, occupations held by men, and the male portion of identical occupations, always have higher incomes in all sectors.

The overall findings suggest that industrial/occupational segmentation theory may not apply to the effects of the nature of work on income. The differences between gender differentiated occupations, and gender integrated occupations, point to the need for industrial/occupational segmentation theory to incorporate gender incumbency of occupations into its framework.

THE RELATIONSHIPS BETWEEN THE NATURE OF WORK AND INCOME WITHIN INDUSTRIAL/OCCUPATIONAL SECTORS

The Across sectors perspective finds that the effects (correlations) of each form of work on income are not always greater in the core and peripheral primary sector(s) than in the core and peripheral secondary sectors. An alternative approach is to examine which form of work is most important to income within each industrial/occupational sector. In other words, to ask whether the overall findings for the total economy (mental work having the strongest effect on income, followed by people oriented work, while manual work a negative effect) hold within each industrial/occupational sector.

Among all occupations, the subordinate-primary sector in both the core and periphery are the only ones having a pattern similar to that in the total economy, with one exception: subordinate-primary occupations held by women in core industries show a moderately strong positive relationship between manual work and income.

In the Across sectors analysis the expectation was for a positive relationship between manual work and income in the core and peripheral subordinate-primary sectors since many of these occupations have complex manual skills. Sub-

ordinate-primary occupations held by women in core industries are the only ones meeting the expectation. The previous interpretation suggested that the greater profits of core industries, or that complexity of manual skills is part of the income setting process in these industries, might be responsible for the effect. Again, however, the reason this does not apply to the subordinate-primary occupations held by men in core industries is unclear.

In the core and peripheral independent-primary sectors, working with people makes the strongest contribution to income among all occupations, except for occupations held by women, and the female portion of identical occupations, in core industries. In these latter sectors mental work has a comparable effect on income as does people oriented work. Independent-primary occupations held by women may have "nurturing" relationships with people, and apparently core industries reward this form of people oriented tasks to a lesser degree than do peripheral industries.

The occupational sector analysis (Chapter Six) found that in the secondary sector any form of work can be important to income depending on the gender incumbency of the sector. The patterns for secondary sector occupations in core industries reflect the findings of Chapter Six. On the other hand, the patterns for secondary sector occupations in peripheral industries reflect those of the total economy

for all occupations, except for occupations held by women.

Perhaps the presence (core) or absence (peripheral) of income setting procedures accounts for the differences in the secondary sectors. However, among occupations held by women in the core, any peripheral secondary sectors, and form of work can contribute to income. Secondary occupations held by women seem subject to an entirely different set of rules.

In summary, the Within sectors examination shows that only the core and peripheral subordinate-primary sectors have patterns conforming to those in the total economy and supporting Reiss' (1961) technical structure argument. In the core and peripheral independent-primary sectors and the core and peripheral secondary sectors any form of work may be important to income, dependeng on the gender incumbency of the sector.

ANALYSIS OF ALTERNATIVE EXPECTATIONS BASED ON McLAUGHLIN'S (1978) RESEARCH

One important finding observed when we analyzed the influence of technical structure on income, in addition to variation by industrial/occupational sector, was the effect produced by gender incumbency in all the sectors. This variation points to the relevance of McLaughlin's (1978) work. His research suggests that mental work and people oriented work differentially influence income for male and female occupations. For the former, mental work positively influences income, while working with people has no influence. Among the latter, mental work has no influence on income, and working with people a negative effect. Manual work negatively influences income for both male and female occupations.

The patterns in Tables 7.11 and 7.12 provide little support for McLaughlin's (1978) suggestions. There is variation by the gender incumbency of occupations, but it is not in the manner he specifies, and it is also quite apparent that sector location modifies his specifications as well.

A strict evaluation of McLaughlin (1978), however, requires employing his procedures for determining the gender identification of occupations (i.e., based on the percent

female in the occupations) and measuring the technical structure variables (i.e., a three point scale for complexity of mental work, and dichotomies reflecting the presence or absence of people oriented and manual tasks). These results appear in Table 7.15. Unfortunately, this table contains insufficient information for a total evaluation.

Table 7.15 suggests that only the prediction of a negative influence of manual work on income obtains for both male and female occupations. An important point of McLaughlin's (1978) argument is that mental work and people oriented work differentially relate to income among occupations held by men and occupations held by women. However, the present results show that both forms of work positively contribute to income among gender differentiated occupations, with one exception: mental work has no effect on the income of male subordinate-primary occupations in peripheral industries. Further, mental work has a substantially stronger effect on the income of subordinate-primary occupations held by women in core industries. Essentially, these findings are opposite of McLaughlin's (1978) findings.

Table 7.15

Pearson Correlations for Mental Work and Income, People Oriented Work and Income and Manual Work and Income Among Occupations Simultaneously Classified by Industrial Sector and Occupational Sector

Combined Occupations

	Male Occupations					
	Core			Periphery		
	Mental	People	Manual	Mental	People	Manual
Independent-Primary		.20	-.04		.43	-.48
Subordinate-Primary	.36	.36	-.52	.04	.22	-.68
Secondary			-.53			

(cont.)

	Female Occupations					
	Core			Periphery		
	Mental	People	Manual	Mental	People	Manual
Independent-Primary						
Subordinate-Primary	.70	.38	-.30	.50	.18	-.23
Secondary						

Note: McLaughlin's (1978) procedures for occupational gender identification and measurement of technical structure variables apply.

Note: Empty cells result from too few cases for valid correlation.

RELATIONSHIPS AMONG THE OCCUPATIONAL CHARACTERISTICS AND THEIR RELATIVE CONTRIBUTION TO INCOME

This research assumes that education, mental work, and people oriented work are highly related to each other, while manual work is not related to these characteristics. This assumption leads to the expectations that education, mental work, and people oriented work all have similar effects (correlations) on income. However, since education and manual work are not related, the latter would not have a comparable effect on income.

There is one exception to the above. The expectations for this chapter suggest that manual work should positively relate to income in the core and peripheral subordinate-primary sectors. However, this is not because manual work is related to education, but because many occupations in these sectors require complex manual work.

The analysis of the total economy generally supported these assumptions and expectations. The industrial segmentation analysis (Chapter Five) also found that the assumptions and expectations which obtain in a single labor market (total economy) generally hold in core and peripheral industrial labor markets. The occupational sector analysis (Chapter Six) showed inconsistencies in meeting the assump-

tions for relationships among occupational characteristics and income. In particular, in the independent-primary sector education, mental work, and people oriented work do not necessarily occur together, and education and manual work can occur together. In the secondary sector education, mental work, and people oriented work can occur together. Finally, there are many differences between occupations held by men and occupations held by women.

The present findings (Table 7.16) are quite similar to those of Chapter Six, especially among occupations held by men. On the other hand, occupations held by women, and male/female identical occupations, show some differences which derive from industrial location. The following discussion focuses on these differences. The reader should refer to footnotes for comments about patterns among occupations held by men.

Among independent-primary occupations held by women, and male/female identical occupations, education and mental work are moderately related, as are education and manual work. Mental and manual work occur together as well (Chapter Six). Previous interpretations suggest that independent-primary occupations held by women, and male/female identical occupations, may learn some mental skills "on-the-job," and that some manual expertise is also required for the performance of mental tasks. The present findings suggest that

Table 7.16

Pearson Correlations Between Occupational Characteristics for Occupations Classified by Industrial/Occupational Sector

	Core			Periphery		
	Ind-Pri	Sub-Pri	Sec	Ind-Pri	Sub-Pri	Sec
Combined Occupations						
Educ. & Mental	.23	.59	.72	.02	.66	.53
Educ. & People	.21	.30	.79	.32	.44	.63
Educ. & Manual	.34	-.52	-.56	-.02	-.44	-.53
Mental & People	-.61	.53	.96	-.61	.53	.96
Mental & Manual	.40	-.34	-.16	.40	-.34	-.16
People & Manual	-.23	-.55	-.42	-.23	-.55	-.42
Occupations Held by Men						
Educ. & Mental	-.21	.71	.62	-.26	.70	.41
Educ. & People	.70	.16	.004	.56	.26	-.10
Educ. & Manual	-.06	-.19	-.18	-.07	-.26	-.09
Mental & People	-.65	.25	-.26	-.65	.26	-.26
Mental & Manual	.54	-.05	-.08	.54	-.05	-.06
People & Manual	-.39	-.61	-.83	-.39	-.61	-.79

(cont.)

	Core			Periphery		
	Ind-Pri	Sub-Pri	Sec	Ind-Pri	Sub-Pri	Sec
Occupations Held by Women						
Educ. & Mental	.69	.48	-.18	.09	.68	
Educ. & People	.02	.20	.93	.44	.43	.92
Educ. & Manual	.50	-.45	.83	-.07	-.31	.55
Mental & People	-.57	.53	-.38	-.57	.53	-.38
Mental & Manual	.58	-.23	-.28	.58	-.23	-.28
People & Manual	-.33	-.34	.63	-.33	-.34	.63
Male Portion of Identical Occupations						
Educ. & Mental	.21	.53	.40	-.004	.49	.11
Educ. & People	.08	.27	.54	.25	.37	.03
Educ. & Manual	.28	-.46	-.72	.01	-.50	.25
Mental & People	-.61	.53	.96	-.61	.53	.96
Mental & Manual	.40	-.34	-.16	.40	-.34	-.16
People & Manual	-.23	-.55	-.42	-.23	-.55	-.42
Female Portion of Identical Occupations						
Educ. & Mental	.66	.60	.74	.10	.67	.73
Educ. & People	-.03	.31	.80	.40	.43	.84
Educ. & Manual	.43	-.50	-.50	-.08	-.42	-.58
Mental & People	-.61	.53	.96	-.61	.53	.96
Mental & Manual	.40	-.34	-.16	.40	-.34	-.16
People & Manual	-.23	-.55	-.42	-.23	-.55	-.42

"on-the-job" training for mental skills is more likely to occur in peripheral industries (no relationship between education and mental work) than in core industries (strong relationship between education and mental work). Additionally, some manual expertise is necessary in both industrial sectors, but the learning of manual skills takes place "on-the-job" only in peripheral industries.[9]

These relationships may help explain the positive contribution mental work makes to income among independent-primary occupations held by women in the core, and the lack of such a relationship among such occupations held by women in the periphery. Part of the relationship between mental work and income for the independent-primary sector in the core may derive from the positive relationship between education and mental work. That is, since mental skills may be learned in the formal educational system, they may be more likely to "pay-off" monetarily than mental skills learned "on-the-job" more common in peripheral industries.[10]

The assumption that people oriented work and education occur together is not met among independent-primary occupations held by women, and male/female identical occupations, in core industries. An interpretation involving "on-the-job" training may also hold account for the weaker relationship between people oriented work and income among these occupations in core industries. That is "people" skills

learned "on-the-job" may not "pay-off" as well as if they are learned in the formal educational system.

Despite differences for occupations held by women, among all core and peripheral independent-primary occupations, education and people oriented work are the most important to income, particularly education.

In the subordinate-primary sectors, in both the core and periphery, the patterns are similar to those of the total economy, and are also quite similar to patterns in Chapter Six. However, there is an exception. Subordinate-primary occupations held by women, in both the core and periphery, show a negative relationship between education and manual work, which also occurs for all other occupations. However, subordinate-primary occupations held by women in the core are the only ones where manual work positively effects income, which meets the expectation for the Across sectors analysis. The original interpretation suggests that perhaps the higher profits of core industries (or manual work being part of the income setting process) is responsible for the positive effect of manual work on income. However, the reason this would not apply to subordinate-primary occupations held by men in the core remains a mystery.

Among secondary occupations in both industrial sectors most of the relationships among the occupational characteristics parallel those found when we analyzed occupational

sector by themselves (Chapter Six). The only differences resulting from dividing the occupational sectors by industrial location are a lack of relationship between education and people oriented work, and a positive relationship between education and manual work among the male portion of identical occupations in secondary occupations in the periphery. The former relationship may help account for the substantially weaker effect working with people has on income among the male portion compared to the female portion. Moreover, the latter relationships might lead one to expect that manual work would positively contribute to income among the male portion in the peripheral/secondary sector, but it does not.

In summary, all industrial/occupational sectors show some inconsistencies in meeting the assumptions that education and mental work and people oriented work are highly related, while manual work is not related to these characteristics. The sectors also show inconsistencies in meeting the expectations that education, mental work, and people oriented work would all have comparable effects on income, while the effect of manual work is minimal. However, the assumptions and expectations seem more likely to be met in the subordinate-primary sectors, core and peripheral, with only a couple of exceptions which are related to gender.

The most important aspect of the findings is their similarity with those of Chapter Six. In other words,

dividing the occupational sectors by industrial location does not result in much difference for relationships among the occupational characteristics and their relative contributions to income. Further, the few differences that exist occur only for occupations held by women, and male/female identical occupations.

OVERALL SUMMARY AND CONCLUSIONS FOR THE ANALYSIS ACCORDING TO ECONOMIC SEGMENTATION BY INDUSTRIAL/OCCUPATIONAL SECTOR

The description of industrial/occupational sector finds that education levels are highest in independent-primary sectors located in core industries and lowest in the secondary sectors in peripheral industries. However, variation in education is more apparent by occupational sector than industrial location. Complexity of mental work is also highest in the core and peripheral independent-primary sectors and lowest in the core and peripheral secondary sectors. There are two problematic patterns for complexity of involvement with people oriented work and manual work. For the former, primary sector(s) occupations in both the core and periphery have more involvement with people than secondary occupations in both industrial sectors, but actual involvement with people is quite low in all sectors. For the latter, only subordinate-primary occupations held by men, in the core and periphery, show any involvement. Interestingly, among occupations held by women, those in the secondary sectors, core and peripheral, show the most involvement with manual work.

The pattern of income distribution supports industrial/occupational segmentation theory. It is much higher in independent-primary sectors (core and peripheral) than in secon-

dary sectors (core and peripheral). However, there is really not too much difference in income between independent-primary occupations in the core and periphery, probably because "professionals" operate in a "national labor market." On the other hand, secondary occupations in core industries have higher incomes than secondary occupations in peripheral industries, which may result from greater unionization in the former industrial sector (Bluestone and associates, 1973). The incomes of subordinate-primary occupations in the core and periphery lie in between the other sectors.

Except for a higher educational characteristic among independent-primary occupations held by men in core industries, and the above mentioned differences for manual work; gender differentiated occupations are quite similar on all occupational characteristics in all sectors. This holds for male/female identical occupations as well.

However, despite similarity in occupational characteristics, occupations held by men have higher incomes than occupations held by women in all the sectors. This also applies to male/female identical occupations. Interestingly, among gender integrated occupations, the male portion has a slightly lower income than all occupations held by men while the female portion has a somewhat higher income than all occupations held by women.

While the distribution of occupational characteristics and income support industrial/occupational segmentation theory, there are problematic patterns for the effects of occupational characteristics on income in the sectors. These concern the effect (correlation) of education on income among occupations held by women, and the effects (correlations) of all three forms of work on income among all occupations.

Among occupations not differentiated by gender (combined) and occupations held by men, education has the strongest effect (correlation) on income in the independent-primary sectors (core and peripheral) and the weakest effect among secondary occupations (core and peripheral). However, among occupations held by men, the effect in the subordinate-primary sectors (core and peripheral) is comparable to that in the independent-primary sectors (core and peripheral). Occupations held by women show a different pattern. Education is very important to income in the independent-primary sectors (core and peripheral) and of intermediate importance in the subordinate-primary sectors (core and peripheral), but it is very important to income in the secondary sectors (core and peripheral).

Among male/female identical occupations, both portions in the core and peripheral independent-primary sectors retain the strong effect (correlation) of education on income. However, in the subordinate-primary sectors (core and peripheral)

education is less important to income among the male portion compared to all occupations held by men. In addition, education is more important to income among the male portion of secondary occupations in peripheral industries compared to all occupations held by men in this sector.

The similarity in the strength of effect (correlation) of education on income in the independent-primary sectors (core and peripheral) for occupations held by men and occupations held by women, and male/female identical occupations, suggests they are subject to similar "rules" for income determination. However, the "rules" are also different. The difference involves the lower income returns (slopes) from education accompanying occupations held by women and the female portion of identical occupations. The difference in income returns (slopes) points to occupations held by women, and especially the female portion of identical occupations, facing occupational income discrimination.

The same conclusion applies for subordinate-primary occupations in peripheral industries. However, for such occupations in core industries the "rules" are entirely different. In this sector education has a stronger effect (correlation) on income among occupations held by men than occupations held by women, and the higher income returns (slopes) may naturally follow. However, there may also be elements of occupational income discrimination since gender

differentiated occupations in this sector are virtually identical in terms of education requirements. On the other hand, male/female identical subordinate-primary occupations in core industries show no difference in the effect (correlation) of education on income, but the male portion has a higher income return (slope). Hence, the female portion faces occupational income discrimination.

The "rules" for income determination in the secondary sectors in both the core and periphery are unclear. Education has a stronger effect (correlation) on income among occupations held by women, and the female portion of identical occupations, and their income returns (slopes) are higher as well. However, occupations held by men, and the male portion of identical occupations have higher incomes. Thus, in the secondary sectors in both core and peripheral industries other factors are operating and further research is necessary.

The analysis of the effects (correlations) of the nature of work on income yields many problematic findings. Each form of work has a differential effect on income in industrial/occupational sectors, and there is also variation by gender.

In the Across sectors analysis there are findings arguing against industrial/occupational segmentation theory. In the independent-primary sectors (core and peripheral)

mental work has a negative effect (correlation) on income among occupations held by men, and no effect among independent-primary occupations held by women in peripheral industries. In the secondary sectors, in both the core and periphery, each form of work was not expected to strongly effect (correlation) income since such occupations lack occupational skills. However, mental work has a positive effect on income among occupations held by men, while working with people makes a positive contribution among secondary occupations held by men in peripheral industries, as well as secondary occupations held by women in the core and periphery. Manual work also contributes to income for both core and peripheral secondary occupations held by women, and secondary occupations held by men in the periphery. Finally, there are a couple of unexpected findings for the effects of manual work among subordinate-primary occupations in the core and periphery.

Overall, the effects (correlations) of each form of work on income in the industrial/occupational sectors seem dependent on gender. The importance of gender is also apparent in the differences occuring among male/female identical occupations compared to gender differentiated occupations. The male portion is similar to occupations held by women and the female portion for the effect (correlation) of working with people on income in the independent-primary and secondary sectors in core and peripheral industries. The

female portion of identical occupations is more similar to occupations held by men and the male portion for the positive effect (correlation) of mental work on income in the secondary sectors (core and peripheral), and the negative or lack of effect of manual work on income in all sectors.

Examination of income returns (slopes) shows that in those sectors where gender differentiated occupations have similar effects (correlations) of a form of work on income, occupations held by men have higher income returns, suggesting that the income determination process is similar, yet different. The greater similarity of the effects (correlations) of each form of work on income among male/female identical occupations, comapared to gender differentiated occupations, suggests that the "rules" for income determination are more similar among male/female identical occupations. Furthermore, the male portion does not always have the higher income returns (slopes). Despite these similarities and differences, however, occupations held by men and the male portion of identical occupations always have higher incomes. Obviously, there are other factors operating on the income determination process in the sectors and further research is necessary.

The Within sectors examination shows that only the core and peripheral subordinate-primary sectors show patterns conforming to those in the total economy and supporting

Reiss' (1961) technical structure argument. However, there is one exception. Subordinate-primary occupations held by women in core industries show manual work to have a moderately strong positive effect (correlation) on income. In the core and peripheral independent-primary sectors and the core and peripheral secondary sectors, any form of work can be important to income, depending on gender.

In conclusion, industrial/occupational segmentation theory represents a challenge to theories of inequality in occupational rewards which assume a single, perfectly competitive labor market. The results of this analysis find this economic segmentation approach to have partial validity. Its validity seems dependent on (1) the occupational characteristic examined, and (2) the gender incumbency of the sectors.

Industrial/occupational segmentation theory seems valid for occupations held by men if the effects (correlations) of education on income are examined. However, it does not seem applicable to occupations held by women, male/female identical occupations for the effects of education on income. These latter groups seem to operate in a single labor market. On the other hand, if income returns (slopes) from education are examined, the approach seems applicable to all occupations, regardless of gender.

Industrial/occupational segmentation seems even less

applicable to the effects (correlations) of each form of work on income. Each form of work has a varying effect on income in the sectors, but the variation rarely conforms to expectations derived from the theory. In addition, there are several inconsistencies between gender differentiated occupations. This holds for variation in income returns (slopes) from each form of work as well.

It is also apparent that variation in the effects (correlations) occupational characteristics have on income occurs more by occupational sector than industrial location. In the core and peripheral independent-primary sectors and the core and peripheral secondary sectors the lack of variation by industrial location supports Spillerman (1977). The lack of variation in the core and peripheral subordinate-primary sectors argues against Bluestone and associates (1973).

Overall, further research is necessary examining the effects of occupational characteristics on income according to industrial/occupational sector. However, and quite importantly, the gender incumbency of the sectors must be incorporated into the definition of the sectors and any theoretical formulations.

Footnotes for Chapter 7

1. Complexity of people oriented work and manual work is somewhat problamatic. Core and periphery primary occupations have greater complexity of people oriented work than core and peripheral secondary sectors. However, actual complexity with working with people is quite low in all sectors, and there are no substantial differences with the total economy. For manual work only occupations held by males in the core and periphery subordinate-primary sectors show any meaningful involvement, but the complexity is not substantially different from the total economy. Among occupations held by females, all sectors show little complexity for manual work, but the core and peripheral secondary sectors have the most complexity for manual work.

2. For this statement to be completely true interval level data is necessary. Since the measure of education at the ordinal level the slopes are approximations of the dollar increase for each yearly increase in education. However, the measures of technical structure are at the interval level of measurement. Thus, the slopes for these variables indicate the dollar increase for every unit increase in technical structure.

3. Among occupations held by males in the core and peripheral subordinate primary sectors the relationships between education and income equal those in the core and peripheral independent-primary sectors. These findings parallel those of Chapter 6. The previous interpretation suggest that the similarity for the relationship between education and income may owe to its comparable use as a credentialing device in both occupational sectors and a comparable amount of promotional opportunity. The present findings suggest this applies regardless of industrial location.

4. The original discussion attributes the lesser importance of education to income among core/subordinate-primary occupations held by females to fewer promotional opportunities compared to core/subordinate-primary occupations held by males. However, comparability for the relationship between education and income between peripheral/subordinate-primary occupations held by males and those held by females suggest a slightly better chance for promotion among the latter. The income returns reflect this as well.

5. The difference in income returns between male/female identical occupations in the peripheral/subordinate-primary sector is not that great. This suggests that while the female portion experiences occupational income discrimination, the discrimination is less in the peripheral/subordinate-primary sector than in the core/subordinate-primary sector.

6. In the independent-primary sector mental work is negatively related to income among occupations held by males. The present findings suggest that this pattern holds regardless of industrial location. The interpretation of Chapter 6 was that perhaps the negative relationship results from core industries under-paying occupations held by males in the independent-primary sector because of income setting procedures. However, this interpretation is erroneous since the negative relationship occurs in the core and periphery.

   In the core and peripheral independent-primary sectors working with people is very important to income among occupations held by males and is also substantially more important to income than among occupations held by females. These findings are identical to those in Chapter 6, and the previous interpretation applies regardless of industrial location. That is, core and peripheral independent-primary occupations held by males "wield power" while occupations held by females in these sectors "nurture."

7. In the core and peripheral secondary sectors working with people and manual work both are positively related to income among occupations held by females. These findings parallel those of Chapter 6, and the previous interpretation that secondary occupations held by females have some people oriented skills and manual skills, and receive income from them, applies regardless of industrial location.

   Similarly, in the core and peripheral secondary sectors mental work contributes to income among occupations held by males, which mirrors the findings of Chapter 6. The previous interpretation that secondary occupations held by males have some mental skills, and are rewarded for them, applies regardless of industrial location.

8. Among the male portion substantial differences exist for the relationship between working with people in the core/independent-primary sector and the core secondary sector. There are also non-substantial differences in the peripheral/independent-primary sector

and the peripheral/secondary sector. Among the female portion differences for the relationship between mental work and income in the core and peripheral secondary sectors, and the relationship between manual work and income in the core and peripheral subordinate-primary and secondary sectors. The result is more similarity between male/female identical occupations, than occupations held by males and occupations held by females, for relationships between each form of work and income in all the sectors.

9. Among core and peripheral independent-primary occupations held by males education and mental work are negatively related, and education and manual work are unrelated. However, mental and manual work occur together. These patterns reflect those of Chapter 6. The previous interpretation suggests that perhaps education and mental work do not occur together because mental skills may be learned "on-the-job." Further, since mental work and manual work occur together, some manual expertise may be necessary for the performance of mental tasks. However, the negative relationships between education and manual work suggests that the manual skills are also learned outside the formal education system, i.e., "on-the-job." The present findings suggest this interpretation holds regardless of industrial location.

10. These speculations cannot account for the negative relationships between mental work and income for core and peripheral independent-primary occupations held by males.

CHAPTER VIII

OVERALL SUMMARY AND CONCLUSIONS

GENERAL INTRODUCTION

The explanation of differential income among occupations is an important area of sociological investigation since occupations, and their corresponding rewards, are an important component of status evaluation in American society.

Neoclassical economic theory explains individual income differences as deriving from workers' marginal productivities. One major version of this approach is reflected in the Human Capital perspective which emphasizes anything that makes a person more productive in the workplace, such as obtaining more education, and therefore worth more wages. It is the variation in the amount of human capital possessed that is held to account for variation in income.

In contrast, the Technical Structure approach argues that income is a function of characteristics of jobs, not individuals. Occupations involving mental work confer the most reward and those dealing with people enjoy a similar position; while manual work offers the least reward. Further, increasing complexity with each form of work leads to greater monetary reward since the more complex the occupation, the

more control over the production process.

Both of these two major approaches assume a single, perfectly competitive, labor market. However, recent work challenges this assumption. Various theories of a Segmented Economy partition the total economy, or single labor market, into segments based on a variety of criteria, and argue that each is characterized by unique structural arrangements. These different structural arrangements, or social organizations, are important because they result in differences for absolute income, and they mediate the effects of education and/or technical structure on income. In other words, there are multiple labor markets and the income determination process differs by sector.

There are three major forms of economic segmentation theory: industrial segmentation, occupational segmentation, and the combination of the two. This research has examined education (Human Capital) and the technical structure of occupations as determinants of income assuming a single labor market (totoal economy) and compared these patterns to those of each form of segmentation.

The findings of the total economy analysis serve as a point of comparison. That is to say, in order for any of the economic segmentation approaches to have validity, there must be systematic variation among the segments in the characteristics of occupations, income, and the effects occupational

characteristics have on income compared to patterns occuring in the total economy.

Another area of investigation has been to determine if economic segmentation theories apply equally well to occupations held by men, occupations held by women, and male/female identical occupations, to discover if they exist in separate occupational environments with different "rules." There were several possible outcomes for the analyses comparing occupations held by men with occupations held by women: (1) in the total economy education and technical structure affect income equally for both with no substantial differences in any sector; (2) in the total economy education and technical do not affect both equally, but the mediating effects of sector may be (a) similar or (b) different; (3) in the total economy education and technical structure do affect both equally, but the mediating effects of sector may be (a) similar or (b) different.

Hence, all analyses were performed for five lists of occupations: (1) a list of occupations held by men, (2) a list of occupations held by women, (3) a list of "combined" male/female identical occupations, (4) the male portion of the male/female identical occupations list, and (5) the female portion of the male/female identical occupations list.

All occupations were taken from the U.S. Census of Occupation by Industry (1970). This document contains a list

of occupations for men and a list of occupations for women. There are occupations present in the male list not present in the female list, and vice versa. The male list spans the entire occupational structure. The female list also contains occupations from each major category (i.e., Edwards classifications), but is heavily "clerical" in nature. This research simply relied on the Census listings for the definition of male and female occupations. However, the clerical bias in the female list does reflect different occupational structures for males and females.

The list of "combined" male/female occupations, and the separate lists of male/female identical occupations each contain those occupations present in both the list of occupations for men and the list of occupations for women. The former is a list of occupations for which characteristics and income are not differentiated by gender; while for the separate lists the characteristics and income are differentiated by gender.

The function of all lists of identical occupations is that of a bench mark for comparison with the list of occupations held by men and the list of occupations held by women. For example, if in the total economy the combined list of occupations shows a comparable effect of education on income as exists for the list of occupations held by women, but the list of occupations held by men has a much stronger effect,

the implication is that education is more critical to the income of occupations held by men than occupations in general (combined list) and/or occupations held by women. Similar considerations apply to the effects of each form of work on income. Further, if the above patterns for education and income vary according to economic segmentation, the implication is that the structural arrangements, or social organizations, of economic sectors mediate the effect of education on income in a different manner, depending on the gender incumbency of occupations. Again, similar considerations apply to the effects of technical structure on income.

This research was carried out in terms of occupations, not the persons holding them. This study assumes that occupational rewards are characteristics of positions, not characteristics of the individuals occupying the positions. Similarly, it is assumed that the distribution of occupational rewards flows from structural processes. The Human Capital emphasis on individual characteristics is very relevant to status attainment research, but the allocation of income to an occupation is a process separable from status attainment and merits separate study. Hence, this research uses the occupation as the unit of analysis.

The data for this research came from two sources. The U.S. Census of Occupation by Industry (1970) provided mean education and mean income of occupations specific to indus-

tries. The Dictionary of Occupational Titles (1965) provided measures of complexity of involvement with each form of work. Statistical techniques included: (1) means and standard deviations for examining the distribution of occupational characteristics and income, (2) correlation analysis for determining the effect of occupational characteristics on income, and (3) regression analysis for specifying the income returns from each occupational characteristic.

Before presenting the results, a brief review of each economic segmentation perspective is given so as to specify the expectations about variations in the effects of education on income. It should be noted that economic segmentation theory and research uses the individual as the unit of analysis. Hence, although this research was conducted at the occupational level, its expectations are derived from individual level findings. A separate section discusses Technical Structure since segmentation theories have ignored it.

ECONOMIC SEGMENTATION PERSPECTIVES AND EXPECTATIONS

Industrial Segmentation theory divides the economy into two sectors. Core industries are characterized by high productivity, high profits, capital intensiveness, monopoly elements, and a high degree of unionization. These traits allow for higher wages. On the other hand, peripheral industries have almost opposite traits and, thus, offer lower wages. The differing characteristics also mediate the income determination process. One expectation follows from the argument that in peripheral industries a lack of "rules" for income determination makes education ("years of schooling") more important to income because employers have more latitude in rewarding individual characteristics. The opposite situation exists in core industries. An alternative expectation comes from the argument that the presence of "rules" for income determination in core industries makes education ("degree") more important to income because of its credentialing function.

Occupational Segmentation theory divides the occupational structure into three segments. Independent-primary occupations have very high wages and are characterized by creative problem solving and a high degree of promotional opportunity. Subordinate-primary occupations have lower wages, are more routine in nature and have some degree of promotional

opportunity. Secondary jobs are very low-paying, unskilled and lack promotional opportunity. Education is expected to be most important to income in the independent-primary sector owing to its credentialing function and its importance for promotion. Subordinate-primary occupations are routine, but they do have skills and some measure of promotional opportunity, and education should also be important to income but to a lesser degree than in the independent-primary sector. Secondary jobs are unskilled and lack promotional opportunity, and education should be of little importance to income in this sector.

The Industrial/Occupational Segmentation perspective combines the above approaches and suggests that incomes will be highest among independent-primary occupations located in core industries and lowest for secondary jobs in peripheral industries. A related approach considers in what sectors the industry effect cancels out the occupational sector effect, and vice versa. The independent-primary sector is "professional" and characterized by mastery over a body of knowledge which is not firm specific but confirmed by credentials, thus making for a national labor market. The result is little difference across industries in income. Among secondary sector occupations the situation is similar. The lack of skills (and lack of union protection) make industry characteristics of little importance to income. Hence, independent-primary occupations should have the highest in-

comes with little difference by industrial location, and secondary occupations and lowest incomes with little difference by industrial location. Subordinate-primary occupations should have incomes "in between" the other sectors but with those in core industries having higher incomes because of the characteristics of these industries.

This perspective implies that the effect of education on income in core and peripheral independent-primary occupations should be greater than in any other sectors, but with little variation by industrial location. Similarly, among secondary jobs education should have little importance to income in both the core and periphery. Subordinate-primary occupations in both the core and periphery are intermediary.

All three approaches ignore the effects of each form of work on income. However, if requirements for mental work and people oriented work are highly associated with education requirements, this leads to expectations that mental work and people oriented work should vary in their importance to income in the sectors in the same manner as education.

The expected patterns for manual work are different. Training for manual work takes place outside the formal educational system. Therefore, education and complexity of manual work should not be highly related. Hence, manual work should not vary in its importance to income in the sectors in a fashion similar to education.

Given the low evaluation American society has of manual work, it should be weakly correlated with income in the total economy and most industrial and occupational sectors. However, subordinate-primary occupations possess moderate or complex manual skills, despite their routineness. Hence, manual work may be strongly associated with income in this sector. The association should also exist among subordinate-primary occupations in both core and peripheral industries, but the effect may be greater in peripheral industries owing to the lack of income setting procedures or "rules."

RESULTS: OCCUPATIONAL CHARACTERISTICS AND INCOME

In the total economy occupations held by men, occupations held by women, and male/female identical occupations have similar education and technical requirements. Exceptions are the greater complexity of manual work among occupations held by men, and slightly greater educational characteristics along with greater involvement with mental work and people oriented work among male/female identical occupations. Despite similarity for occupational characteristics, occupations held by men and the male portion of identical occupations have much higher incomes. Interestingly, however, the male portion of identical occupations has slightly lower income than all occupations held by men, while the opposite holds for the female portion of identical occupations. Apparently, the sharing of occupations by both genders benefits females but has the opposite result for males.

Given the income gap between occupations held by men and occupations held by women, the first major conclusion of this research is that in the total economy separate labor markets exist for gender differentiated occupations. The "rules" for income determination must be different since these occupations are quite similar in most occupational characteristics but quite dissimilar in income.

The patterns for occupational characteristics in the total economy also exist in industrial sectors. The only major difference is for complexity of manual work which is greater in core industries, but only for occupations held by men. On the other hand, all occupations have higher incomes in core industries compared to peripheral industries, but no occupations have incomes substantially different from the total economy. Further, the income gap between gender differentiated occupations, and both portions of male/female identical occupations persists in industrial sectors, along with slightly less income for the male portion of identical occupations and slightly greater income for the female portion of identical occupations. However, the female portion of identical occupations still have incomes much less than their male couterparts. Apparently, the characteristics of core industries (e.g., high profits) translate into higher incomes for occupations, but if occupations are held by women they do not benefit from location in core industries to the same extent as occupations held by men. Hence, the split in the labor market by gender found in the total economy exists in industrial sectors as well.

In contrast to the analysis of the impact of industrial segmentation, the patterns for occupational characteristics in the total economy do not hold in the independent-primary or secondary occupational sectors. The former sector has much higher education and technical characteristics, while

the latter sector has much lower characteristics. The only exception is that manual skills are highest in the subordinate-primary sector. The remaining occupational characteristics in the subordinate-primary sector reflect those in the total economy. There are also no major differences between gender differentiated occupations, but interestingly, occupations held by women have slightly more complex manual skills in the secondary sector compared to secondary sector occupations held by men.

The patterns for income present in the total economy also do not hold in the independent-primary or secondary sectors. They are substantially higher in the former sector and substantially lower in the latter sector. The income distributions apply to all occupations, but occupations held by men and the male portion of identical occupationshave much higher incomes in all occupational sectors. In addition, the pattern of slightly less income for the male portion of identical occupations and slightly more income for the female portion of identical occupations holds in all occupational sectors, but again, the female portion has much lower incomes than their male colleagues.

While the above patterns suggest that gender differentiated occupations, and both portion of male/female identical occupations, are subject to the sectoral distinctions of occupational segmentation theory, the income gap suggests that the split of the labor market by gender exists in oc-

cupational sectors as well.

The patterns for occupational characteristics resulting from partitioning the total economy into industrial/occupational sectors are virtually identical to those employing only occupational sectors. In other words, variation for occupational characteristics is more apparent by occupational sector than by industrial sector. There are also few differences between gender differentiated occupations except that independent-primary occupations held by men in core industries are characterized by substantially higher education than such occupations held by women; and the previously mentioned differences for complexity of manual work.

In general, income patterns also reflect the analysis by occupational sector. There is not much variation between core and peripheral independent-primary occupations, probably because "professionals" operate in a national labor market. In contrast, however, secondary occupations in core industries have higher incomes than secondary occupations in peripheral industries which may stem from the greater unionization of core industries.

The income gap found in all other analyses also exists in all industrial/occupational sectors. Again, it seems that while gender differentiated occupations, and both portions of male/female identical occupations, are subject to

the same sectoral distinctions, a further split of the labor market exists by the gender incumbency of occupations in all sectors.

THE RELATIONSHIP BETWEEN EDUCATION AND INCOME

In the total economy education and income are strongly related among all occupations, with occupations held by men showing only a slightly stronger association than occupations held by women. Interestingly, among the male portion of male/female identical occupations education is slightly less related to income compared to all occupations held by men, while the opposite applies to the female portion of male/female identical occupations. These findings parallel the somewhat lower income for the male portion of identical occupations (compared to all occupations held by men) and the somewhat greater income for the female portion (compared to all occupations held by women) and further suggest that the sharing of occupations is detrimental to males but beneficial to females.

Industrial segmentation theory argues that at the individual level an absence of income setting procedures in peripheral industries results in a stronger effect of education (years of schooling) on income than in core industries which have income guidelines. However, at the occupational level, education (years of schooling) has a similar effect (correlations) on income in core and peripheral industries, and neither sector shows any substantial differences with the total economy. Similarly, the argument that a "degree"

is more important to individual income in core industries because income guidelines in this sector employ credentialism does not apply for the same reason. In other words, for all occupations the income determination process in the total economy exists in both industrial sectors. The only exceptions are weak relationships (correlations) between education and income among occupations held by women in the Mining and Construction industries, and this may derive from these industries being more male dominated than any other industries.

Similar findings hold for both portions of male/female identical occupations. However, the weaker relationship between education and income for the male portion, versus the stronger relationship for the female portion, found in the total economy occurs only in the Mining and Construction industries. In the remaining industries education has a relationship (correlation) with income of similar magnitude for both portions of male/female identical occupations, compared to occupations held by men and occupations held by women.

On the surface, the similar effect (correlation) of education on income for all occupations in the sectors suggests similar "rules" for income determination. However, lower income returns (slopes) from education in both industrial sectors accompany occupations held by women and the female portion of identical occupations. Increasing the

education characteristic increases income in a similar fashion for gender differentiated occupations, but occupations held by women are systematically under-paid. This happens in the total economy and in industrial sectors, which implies that industrial sectors are miniture versions of the total economy.

The patterns in the industrial sectors reflect those in the total economy. On the other hand, the individual level explanations of Occupational Segmentation theory that education is more important to income in the independent-primary sector because of credentialism and promotional opportunity, and of minimal importance in the secondary sector because of a lack of skills and absence of promotional opportunity, apply at the occupational level, but only for occupations held by men. The individual level explanation does not fit occupations held by women or both portions of male/female identical occupations because education has a strong positive effect (correlation) on income in these secondary sectors.

Secondary jobs held by women, and both genders, have a low education characteristic in terms of years of schooling. However, many of them are "service" occupations requiring specific types of training. Requirements for specific education makes these types of secondary occupations somewhat similar to independent-primary occupations. In contrast,

secondary occupations held by men are primarily "laborer" jobs not requiring specific training. The importance of education to income among secondary occupations held by women or both genders, compared to the minimal effect among secondary occupations held by men, may derive from the above mentioned qualitative difference in their education characteristics.

The lack of sectoral variation in the effects (correlations) of education on income for occupations held by women, and male/female identical occupations, indicates they operate in a single labor market; while the sectoral variation among occupations held by men suggests they operate in multiple labor markets. On the other hand, the patterns for the income returns (slopes) from education imply that Occupational Segmentation theory is equally applicable to all occupations. However, in the primary sector(s) occupations held by women and the female portion of identical occupations have lower income returns from education than occupations held by men and the male portion of identical occupations. In the secondary sectors gender differentiated occupations are also subject to different "rules." Education has a stronger effect (correlation) on income among occupations held by women and the female portion of identical occupations. Their income returns (slopes) are also higher. However, occupations held by men and the male portion of identical occupations have higher incomes.

The specific types of training required of secondary occupations held by women results in education having a similar effect (correlation) on income as among independent-primary occupations held by women. However, secondary occupations held by women are low-paying because the length and difficulty of training does not parallel that for the independent-primary sector. On the other hand, the reason secondary occupations held by women have less income than secondary occupations held by men in spite of having higher income returns from education is unknown. Further research about the income determination process in the secondary sectors is necessary. This is discussed in the concluding section of this chapter.

The effects (correlations) of education on income in the core and peripheral independent-primary and secondary sectors are virtually identical to those found in the analysis of occupational sector alone. These patterns support the argument that industrial characteristics do not mediate the importance of education to income among independent-primary and secondary occupations .

However, it must be emphasized that patterns for secondary occupations held by men are entirely different from those among secondary occupations held by women and male/female identical occupations in the secondary sector. In particular, the qualitative difference in the education

characteristic for secondary occupations held by women, and male/female identical occupations, makes education important to income regardless of industrial location.

The differences in income returns (slopes from education between gender differentiated occupations, and male/female identical occupations, also parallel the differences in the analysis according to occupational segmentation. In this context it is important to emphasize that the income discrimination experienced by primary occupations held by women exists in both core and peripheral industries. Similarly, lower incomes of secondary occupations held by women, compared to secondary occupations held by men, exist in both industrial sectors despite secondary occupations held by women having higher income returns (slopes) from education. The above suggestion that further research is necessary for gender differentiated secondary occupations holds for secondary sectors in core and peripheral industries.

THE RELATIONSHIP BETWEEN EACH FORM OF WORK AND INCOME

In the total economy mental work has the strongest effect (correlation) on income followed by people oriented work, while manual work has a negative relationship. A possible exception exists for occupations held by men among which mental work and people oriented work have comparable associations with income, and this may derive from the occupations held by men having "power wielding" interactions with people. These patterns also hold for male/female identical occupations, but among the male portion the effect of people oriented work on income is less than for all occupations held by men which may derive from their having "nurturing" involvements with people which is typical of occupations held by women.

The relationships of each form of work with income in the total economy is followed in core and peripheral industries. The only differences are a very weak positive relationship between manual work and income among occupations held by women in the Mining and Construction industries. In addition, the finding for the total economy, that mental work and people oriented work may similarly relate to income among occupations held by men, occurs in Mining, Manufacturing, Transportation, Communications, Public Utilities, Agriculture, Forestry and Fisheries, and Services. Hence, occu-

pations held by men may be involved in "power wielding" relationships with people only in these industries. Interestingly, mental work and people oriented work have comparable relationships with income among occupations held by women in Mining, Construction, Communications, and Public Utilities which suggests they may have some measure of "power" in these industries.

The findings also show that occupations held by women and the female portion of identical occupations have lower income returns (slopes) from mental work and people oriented work, and this exists in all industries for the former, and in all but one (Construction) industry for the latter. These lower income returns, along with those for education, continue to document the income discrimination experienced by occupations held by women, and industrial location makes little difference.

In spite of the possibility that mental work and people oriented work may similarly contribute to income, the overall patterns suggest that Industrial Segmentation theory is not relevant for predicting variation in the effects of each form of work on income. Apparently, the presence or absence of income setting procedures does not result in any form of work being more or less important to income.

In contrast, each form of work does vary in its effect (correlation) on income by occupational sector. However,

the patterns rarely fit our expectations. In particular, the "creative problem solving" characteristic of independent-primary occupations does not result in a positive correlation between mental work and income. Further, despite minimal levels of skill in the secondary sector, mental work positively contributes to income among occupations held by men, while people oriented work and manual work positively contribute to income among occupations held by women. Only the subordinate-primary sector has patterns meeting the expectations, but even in this sector manual work is not important to income among occupations held by men.

There are also differences among male/female identical occupations compared to all occupations held by men and all occupations held by women. Among the male portion in the independent-primary and secondary sectors the effects (correlations) of people oriented work on income are similar to those for occupations held by women in these sectors. The female portion in the secondary sector is similar to occupations held by men for the positive relationship between mental work and income. In addition, the female portion is similar to occupations held by men for the weak or negative relationship between manual work and income in all occupational sectors.

The only consistency is the continuing finding that occupations held by women and the female portion of identical

occupations are characterized by some form of income discrimination. In those sectors where gender differentiated occupations have a similar relationship between a form of work and income, occupations held by men have higher income returns (slopes). In those sectors where occupations held by men show a negative correlation between a form of work and income, while occupations held by women a positive correlation, occupations held by men have higher incomes. Similar patterns apply to male/female identical occupations.

The only safe conclusions that can be drawn from these findings are that each form of work varies in its effects (correlations) on income in the occupational sectors, and that occupations held by women face income discrimination. However, occupational segmentation theory does little to explain the varying relationships in the sectors. Further research is necessary, and this is discussed in the concluding section of this chapter.

The effects (correlations) of each form of work on income also vary by industrial/occupational sector, but it must be emphasized that independent-primary sectors in the core and periphery show little difference with each other, and secondary sectors in the core and periphery show little difference with each other. These patterns conform to the industrial/occupational approach, but they do not explain the previously mentioned unexpected findings in the indepen-

dent-primary and secondary occupational sectors.

There are, however, a few occasions where industrial location makes a difference. One of these is for independent-primary occupations held by women in core industries where mental work contributes to income, which may result from the higher profits of core industries. Another different pattern is people oriented work contributing to income among secondary occupations held by men in peripheral industries, as well as manual work. These differences may reflect the lack of income setting procedures in this industrial sector. Finally, subordinate-primary occupations held by women in core industries receive income from manual work, possibly due to the greater profits of core industries or manual work being part of the income setting process. These differences by industrial location argue against the industrial/occupational approach, and ultimately raise serious questions concerning a lack of consistency between gender differentiated occupations in the industrial/occupational sectors. This is also discussed in the concluding section of this chapter.

The differences in income returns (slopes) from each form of work in the industrial/occupational sectors also reflect patterns for the analysis employing only occupational sector. Hence, industrial location of occupational sectors does not make a difference for the finding of occupations

held by women, and the female portion of identical occupations, facing some form of income discrimination in all occupational sectors.

The conclusions for the analysis using industrial/occupational sectors are essentially the same as for occupational sectors. Each form of work varies in its relationship to income in the sectors, and occupations held by women experience income discrimination in all sectors. However, industrial/occupational segmentation theory is not very helpful in explaining the varying patterns in the sectors.

RELATIONSHIPS AMONG THE OCCUPATIONAL CHARACTERISTICS AND THEIR RELATIVE CONTRIBUTIONS TO INCOME

The assumption that education, mental work, and people oriented work occur together leads to the expectation that these occupational characteristics have similar effects (correlations) on income. However, since manual work does not occur with education, this form of work would not have a similar relationships with income.

In the total economy the occupational characteristics are generally related to each other as assumed, and each characteristic is generally related to income as expected. However, only among occupations held by men do mental work and people oriented work have comparable effects (correlations) on income, and education and people oriented work are more highly related than for occupations held by women or male/female identical occupations.

Since occupations held by men dealing with people require more education, they may engage in interactions with people involving the "wielding of power" instead of "nurturing" which is typical of occupations held by women. People oriented work may therefore contribute more to the income of occupations held by men because "power" relationships are more lucrative than "nurturing" relationships. In contrast, among the male portion of identical occupations education

and people oriented work do not occur together, and people oriented work is weakly related to income. These different relationships may suggest that the male portion of identical occupations performs the same "nurturing" function characteristic of occupations held by women, and therefore, for these males working with people also contributes less to income.

The relationships observed in the total economy are also evident in most industries. In particular, the comparable relationships between mental work and income, and people oriented work and income, among occupations held by men in the total economy exists in seven industries (see the previous section), and education and people oriented work are more highly related in these seven industries than in the remaining four industries. Further, the weaker relationship between people oriented work and income among the male portion of identical occupations also exists in most industries, as does the weaker relationship between education and people oriented work. Hence, the interpretations for the total economy apply in industrial sectors as well.

Overall, the total economy and industrial sectors are fairly consistent. However, occupational sectors have many unexpected relationships, and there are also differences between gender differentiated occupations and male/female identical occupations.

In the independent-primary sectors education and mental work are only moderately related among occupations held by women, and negatively related among occupations held by men. These relationships might suggest that some mental skills are learned "on-the-job" instead of through formal education or training. Further, some manual skills are necessary for the performance of mental tasks, but occupations held by women require that manual skills are learned within the formal education system while occupations held by men involve "on-the-job" training.

For the most part these relationships also hold for both portions of male/female identical occupations in the independent-primary sector. However, the male portion shows a weak positive relationship between education and mental work, and is therefore more similar to occupations held by women and the female portion of identical occupations.

The possibility that some mental skills are learned "on-the-job" may help account for the lack of effect (correlation) of mental work on income among independent-primary occupations held by women, and the female portion of identical occupations. Mental skills learned "on-the-job" may not result in monetary reward to the same extent as mental skills acquired in formal education. However, it is unclear if this explanation accounts for the negative relationship between mental work and income among independent-primary oc-

cupations held by men, and the male portion of identical occupations. At any rate, education and people oriented work are the most important contributers to income among independent-primary occupations, with education having the greater effect.

The subordinate-primary sector results parallel those for the total economy. However, two deviations deserve mentioning. First, among occupations held by men the relationship between education and people oriented work is very weak, and working with people has a wak positive effect (correlation) on income. Hence, subordinate-primary occupations held by men may "nurture" people. Second, subordinate-primary occupations held by women are the only ones where manual work positively contributes to income, which meets the expectation for this particular analysis. Among male/female identical occupations in the subordinate-primary sector the patterns generally reflect those for all subordinate-primary occupations held by men and women. However, the female portion does not show manual work positively contributing to income. The different relationships between manual work and income require further research.

Among secondary occupations held by men the relationships between education and income conform to occupational segmentation theory, but education and mental work occur together, and both make minor contributions to income. Part

of the effect (correlation) of mental work on income may derive from its educational requirement. On the other hand, education does not occur with people oriented work or manual work, and these two forms of work are not related to income. In contrast, among secondary occupations held by women, education and mental work do not occur together and mental work is not related to income. However, education, people oriented work, and manual work occur with each other, and all three are strongly related to income. The effects (correlations) of people oriented work and manual work on income may derive from their relationships with education.

Among male/female identical occupations in the secondary sector the patterns are somewhat different. Among the male portion, only the relationship between education and manual work reflects that for all secondary occupations held by men. Education and mental work are weakly related, as are education and people oriented work. In addition, people oriented work contributes to income in a manner similar to that for occupations held by women. The female portion has relationships between education and people oriented work, and people oriented work and income which reflect all secondary occupations held by women. However, relationships among education, mental work, manual work and income are similar to those for secondary occupations held by men.

In essence, gender differentiated secondary occupations

show quite different relationships between each occupational characteristic and income, and this may owe, in part, to differences in relationships among occupational characteristics. Conversely, the differences among male/female identical secondary occupations, compared to all male and female secondary occupations, results in similar relationships among the occupational characteristics. This leads to similar patterns for relationships between occupational characteristics and income.

The core and peripheral occupational sectors also contain some unexpected relationships among the occupational characteristics. For occupations held by men the patterns present in occupational sectors hold regardless of industrial location and the previous discussion applies. On the other hand, occupations held by women, and both portions of male/female identical occupations, show some variation in relationships by industrial location.

Among independent-primary occupations held by women, those in core industries are more likely to involve mental skills obtained via formal education and those in peripheral industries are more likely to involve mental skills learned "on-the-job." This difference may help explain the positive relationship between mental work and income among independent-primary occupations held by women in core industries versus the lack of relationship for such occupations in

peripheral industries. The original interpretation suggests that the positive relationship may reflect the higher profits of core industries. However, since mental skills are highly related to education in core industries, these may be learned through formal education and may be more likely to "pay-off" monetarily than mental skills learned "on-the-job" as in peripheral industries.

The assumption that education and people oriented work occur together is not met among independent-primary occupations held by women in core industries. Perhaps people oriented skills among these occupations are also acquired "on-the-job."

For core and peripheral secondary occupations held by women relationships among the occupational characteristics and their separate effects (correlations) on income parallel those for the secondary sector not divided by industrial location. The same applies to core and peripheral secondary occupations held by men. Hence, the previous interpretation that in the secondary sectors occupational characteristics are differentially related to each other applies regardless of industrial location.

Male/female identical secondary occupations in the core and periphery are a different matter. Each portion shows some different patterns compared to male/female identical occupations in the secondary sector only, and compared to

all male and female core and peripheral secondary occupations.

Among the male portion the weak relationship between education and mental work present in the secondary sector only, holds only in peripheral industries - the secondary sector in core industries has a much stronger relationship. The lack of, or the weak, relationship between education and people oriented work holds only in peripheral industries - secondary occupations in core industries show a strong relationship. Finally, contrary to all other findings, education and mental work occur among secondary occupations in peripheral industries.

The female portion has patterns similar to the male portion in the core and periphery. However, it must be emphasized that the relationship between education and mental work, and education and people oriented work, are much stronger than those for the male portion in both industrial sectors. Further, the relationships between education and manual work is negative for both portions in only core industries.

In summary, relationships among the occupational characteristics conform to expectations in the total economy and industrial sectors. On the other hand, in occupational sectors and industrial/occupational sectors the assumptions are not always met. In the occupational and industrial/occupa-

tional sectors some of the unexpected relationships among the occupational characteristics are helpful in accounting for unexpected effects (correlations) of a form of work on income. However, it must be noted that while education, mental work and people oriented work have the strongest relationships with income in the total economy and industrial sectors; any form of work may be important to income in the occupational sectors (core and peripheral), and the patterns are different for gender differentiated occupations.

FINAL CONCLUSIONS AND SUGGESTIONS FOR FURTHER RESEARCH

The analysis of occupational characteristics in the total economy reveals remarkable similarity between gender differentiated occupations and male/female identical occupations for education and complexity of mental and people oriented work, but not manual work. In contrast, the income gap between gender differentiated occupations in the total economy indicates that there is not a single labor market. Separate labor markets exist for occupations held by men and occupations held by women.

The distributions of occupational characteristics in the total economy persist in core and peripheral industries. On the other hand, occupations in core industries do have higher incomes than occupations in peripheral industries, but neither sector shows much difference with the total economy. More importantly, occupations held by men, and the male portion of identical occupations, have higher incomes in both industrial sectors. Hence, the separate labor markets for gender differentiated occupations, and male/female identical occupations, exist in industrial sectors.

On the other hand, occupational segmentation theory is quite applicable at the occupational level of analysis for gender differentiated occupations. Occupational character-

istics and income are substantially greater in the independent-primary sectors and substantially lower in the secondary sectors, compared to the total economy. However, the income gap between gender differentiated occupations, and male/female identical occupations, persists in all occupational sectors.

The persistence of the income gap, in spite of the validity of the occupational segmentation approach, suggests necessary revisions incorporating the finding that while occupations held by women are subject to the same sectoral distinctions as occupations held by men, they are also systematically under-paid in all occupational sectors compared to occupations held by men. The same conclusion applies to the industrial/occupational segmentation approach.

Our conclusions for the analysis of the effects (correlations) of education on income in a segmented economy are entirely different. In the total economy, education and income are similarly related for all occupations. However, only occupational segmentation theory and industrial/occupational segmentation theory are applicable at the occupational level of analysis, but this is only the case for occupations held by men. Among occupations held by women, and to a lesser extent male/female identical occupations, education is highly related to income in all sectors. In particular, education has a very strong positive relationship with income in the secondary sector (core and peripheral). The sector

specific income returns (slopes) from education suggest that occupational segmentation theory and industrial/occupational segmentation theory apply to gender differentiated occupations.

The findings for the relationships between education and income are tentative. The first question which should be asked is: Would the same results have been obtained if a different typology for occupational sectors had been used? The answer is unknown, but the distributions of occupational characteristics suggest the accuracy of the typology employed.

What about further research? Such research must include several additional variables. These should be of two major types: demographic and human capital. Demographically, controlling for such factors as age and race needs to be done since both education and income are related to these variables. Perhaps the patterns for the relationship between education and income vary systematically for certain age and/or racial groups.

Other types of human capital measures must also be examined since the mean education for occupations is not the only measure of human capital. Other possible measures include: specific vocational preparation, general educational development, on-the-job training, tenure with employer, tenure in occupation, labor force experience, and hours worked per week. These variables would apply to occupations in

which the incumbents are full-time workers. Additionally, in keeping with the strategy of this research, all these variables would be measured at the occupational level of analysis.

These types of human capital variables may be incorporated into future analyses as control variables. In this context, tenure with employer, tenure in occupation, and labor force experience seem particularly important since the importance of education to income can vary at different points in the "career." Hours worked per week is an important control for the secondary sector since Gordon (1972) maintains that this is the only attribute which is important to income among secondary occupations.

Another possible technique would be to include all measures of human capital in separate regression equations for male and female occupational sectors. This type of analysis would be particularly insightful since, in addition to allowing for examination of the correlations between the various human capital variables and income, it would provide estimates of the specific income returns (slopes) from each form of human capital in the sectors by gender, and the overall (R^2) importance of human capital to income in the sectors by gender. It should be noted that a possible problem is multicolinearity, but this might be overcome by selecting only those human capital variables not strongly related to each other.

Further examination of the specific income returns from education among occupations held by men and occupations held by women in the sectors is very important. However, the future documentation of lower income returns for primary occupations held by women is not the critical issue (since future analyses will undoubtedly arrive at the same findings) so much as accounting for them. In other words, why are primary occupations held by women under-paid for their human capital, compared to primary occupations held by men? Past explanations usually offer some sort of rationale involving inferior human capital among female occupations. However, as this analysis shows, gender differentiated occupations are remarkably similar for the education characteristic. Further, the under-payment of the female portion of male/female identical occupations testifies that the "inferior human capital" thesis is simply not sound. It may just be the case that the patriarchial nature of American society and the occupational structure defines occupations held by women as second class. Theoretical work is necessary in tracing the historical roots of this ideology.

The secondary sectors are another matter. The relationship between education and income is much stronger for occupations held by women than occupations held by men, and their income returns are also much higher. However, their incomes are much lower than secondary occupations held by men. These patterns should also receive further examination

using various demographic controls and/or human capital controls to determine if they hold up for various groups.

Assuming that education is definitely more important to income among secondary occupations held by women, or that the stronger relationship stands up to all controls, opens up other avenues of research. The interpretation for the greater relationship in the female secondary sector involves the suggestion that there is a qualitative difference between education characteristic of gender differentiated secondary occupations. Future research should explore this possibility. The case study method would be appropriate, and should pay particular attention to differences in specific vocational preparation and on-the-job training between gender differentiated secondary occupations. As with gender differentiated primary occupations, however, the lower income of secondary occupations held by women, compared to secondary occupations held by men, requires theoretical work tracing the "justification" of paying them less than secondary occupations held by men, despite their having comparable human capital in terms of years of schooling.

It is difficult to interpret our findings about segmentation specific relationships between each form of work and income. The lack of support for industrial segmentation theory simply means that industrial sectors are smaller versions of the total economy. On the other hand, the incon-

sistent support for occupational segmentation theory and industrial/occupational segmentation theory suggest that these approaches require further theoretical development, and the incorporation of gender into their definitions of sector.

The initial arguments of this research were that (1) mental work and people oriented work would offer the most reward and manual work the least, and (2) that increasing control over tasks (greater job complexity) results in control over the production process because more complex work involves the planning stage of production, while less complex work signifies the execution stage. Hence, (3) greater complexity of tasks should result in greater income.

Most of the expectations for varying relationships between each form of work and income in the occupational sectors (core and peripheral) were based on assumptions that mental work, people oriented work, and education occur together in the primary sectors, but not in the secondary sectors which lack educational requirements and skills. Therefore, the relationships between mental work and income, and people oriented work and income, should parallel that for education in the primary sectors, while in the secondary sectors none of the forms of work should be related to income because of the lack of skills and lack of relationship with education. The assumptions for the relationships among the occupational characteristics were also rarely met.

Based upon the unexpected relationships among the occupational characteristics in the occupational sectors (core and peripheral) and their unexpected relationships with income, further theoretical development (along with appropriate research) should explore: (1) interrelationships among the occupational characteristics in the sectors, (2) how interrelationships among the occupational characteristics in the sectors combine to influence income, and (3) how sector location mediates the interelationships among occupational characteristics and their influence on income.

Points one and two have already received some discussion. Unexpected relationships between a form of work and income were said to result, in part, from unexpected relationships with education. However, in future research, it would be necessary to apply path analysis to the interrelationships to precisely determine if the relationship between a form of work and income does indeed derive from the relationship with education.

The third point is very important. Path analysis can delineate the relationships among the occupational characteristics in the sectors and decompose the direct and indirect effects on income. However, this is not the same as accounting for these varying relationships.

More specifically, research examining how employing organizations decide education and complexity requirements for

occupations, along with decisions regarding the relationships among occupational characteristics and income should be performed.

There is little variation in the occupational sectors by industrial location for relationships among the occupational characteristics and income. However, occupational sectors do exist in industries. Perhaps the use of gross industrial categories is too broad to capture the subtleties of employing organizations. Research conducted within specific firms may be more appropriate. Firms may set limits on the extent to which increasing complexity of a form of work "pays-off." A couple of examples may illustrate my point.

Independent-primary occupations are involved in the planning stage of production and have some measure of control over the production process. However, they do not engage in policy making decisions for income. Future research should examine decision making in firms focusing on variability in bureaucratic income setting procedures, and how these procedures mediate the relationship between a form of work and income - particularly the relationship between mental work and income. Perhaps income setting procedures limit the extent to which increasing complexity of mental work will result in more income. Beyond a certain level of complexity there may be not corresponding increase in income. Hence, the observation of a negative relationship between mental work and income.

The firms could be classified as core and peripheral, and analyzing these separately may shed some light on our finding of a positive relationship between mental work and income among independent-primary occupations held by women in peripheral industries. Decisions pertaining to the boundary at which increasing complexity of mental work stops resulting in greater income are different for gender differentiated independent-primary occupations in peripheral industries, and the rationale for these decisions should be explored in the future.

Secondary occupations are, theoretically, unskilled and not unionized. However, the findings of a positive relationship between mental work and income among secondary occupations held by men, along with people oriented work and manual work contributing to income among secondary occupations held by women, are quite contrary to theory. Future research should examine the extent of unionization among secondary occupations and the manner in which unionization mediates the relationship between a form of work and income. A strong union might be able to demand greater income even for the slightest increase in job complexity. In this regard, the negotiating process between the firm and the union would be quite important.

Research exploring unionization among secondary occupations would also be helpful in accounting for the income gap

between gender differentiated occupations. Perhaps secondary occupations held by women receive less income than secondary occupations held by men because they are less subject to unionization.

In conclusion, the income gap between gender differentiated occupations, which persists in all economic sectors, clearly shows that separate labor markets exist for each. The split according to gender suggests separate versions of economic segmentation theories for gender differentiated occupations. The most important factor for occupations held by women seems to be gender itself.

Among occupations held by men, further labor market splits occur according to occupational sectors and industrial/occupational sectors, and these splits pertain to both the relationships (correlations) between occupational characteristics and income, and income returns (slopes) from occupational characteristics. Among occupations held by women, labor market splits are more apparent for income returns (slopes) from occupational characteristics than for varying relationships (correlations) between occupational characteristics and income.

Overall, of the possibilities stated at the beginning of this research, the following outcome is observed: in the total economy education and technical structure have similar effects (correlations) on income for occupations held by men

and occupations held by women, but the mediating effects of sector are different for gender differentiated occupations. Finally, it must be emphasized that occupations held by women face income discrimination in the total economy and all economic sectors.

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The final copies have been examined by the director of the dissertation and the signature which appears below verifies the fact that any necessary changes have been incorporated and that the dissertation is now given final approval by the Committee with reference to content and form.

The dissertation is therefore accepted in partial fulfillment of the requirements for the degree of Doctor of Philosophy.

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