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**Empowering structures in organizations: Toward a specification
of the resource perspective**

Siahpush, Mohammad Seyed, Ph.D.

The Ohio State University, 1990

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EMPOWERING STRUCTURES IN
ORGANIZATIONS: TOWARD A SPECIFICATION OF THE
RESOURCE PERSPECTIVE

Dissertation

Presented in Partial Fulfillment of the Requirements for
the degree Doctor of Philosophy in the
Graduate School of the Ohio State University

by

Mohammad Seyed Siahpush, B.S., M.S.

* * * *

The Ohio State University

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To Robert Kaufman
and Sociology Graduate
Students at OSU

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CHAPTER I

INTRODUCTION

In the past two decades, stratification research has gone through substantial transformations and modifications. During the late 60s and most of the 70s, the most prominent model of stratification research was the status attainment paradigm (e.g. see Blau and Duncan, 1967; Sewell and Hauser, 1975). This research tradition focused on a series of life cycle variables, both achieved and ascribed, as determinants of a person's occupational success. Status attainment was criticized mainly on the grounds that it ignored structural variations in the economy and that it assumed a homogeneous labor market and a meritocratic system. Many critics of this research tradition relied on works of Averitt (1968), O'Connor (1973), and Bluestone (1970) and contend that the industrial structure of the U.S. is not homogeneous such that the private sectors of the economy can be classified into a core/periphery division. Averitt (1968) writes that firms in the center (core) are large in size, vertically and horizontally integrated, technologically progressive, and are concentrated. On the other hand,

the periphery sector is populated by small firms that operate locally, are technologically backward, and are often satellites of core firms. Research on the dual economy has shown that this dual division is consequential for workers such that not only worker outcomes (e.g. earnings and proportion of workers under poverty level) vary between sectors, but also returns to human capital variables are different across sectors (e.g., see Tolbert, Horan, and Beck 1980).

Not long after the dual economy perspective became popular among sociologists, the idea of the unidimensionality of economic segmentation was placed under scrutiny both empirically and theoretically. Kaufman, Hodson, and Fligstein (1981) recognize that most attempts to operationalize industrial sectors are not empirical (Bibb and Form, 1977; Beck, Horan, and Tolbert, 1978); they rely on narrative descriptions of various industries. The few attempts to empirically operationalize the core/periphery dimension (e.g. see Tolbert et al., 1980) have also been criticized. Hodson and Kaufman (1981), for example, in a commentary on Tolbert et al.'s operationalization of the dual classification (1980), argue that it is based on a circular conceptualization and that their finding of a one-factor solution is incorrect. The dual economy theory has also been criticized based on theoretical grounds. For example, Hodson and Kaufman (1982) argue that the dualists have never elaborated a systematic model of dual economic segmentation. Cain (1976) contends that the theories are vague, sketchy, and internally conflicting. Finally, Kalleberg and Sorensen (1979), and Kaufman et al. (1981) suggest that the dual approach is primarily descriptive and not theoretical.

As the result of the aforementioned shortcomings of the dual economy approach, research has moved towards a multidimensional specification of economic segmentation. Kaufman et al. (1981), perform factor analysis and cluster analysis on several industrial variables and come up with 16 distinct industrial sectors. Similarly, Wallace and Kalleberg (1981), using factor analysis, show that industrial segmentation is multidimensional. Kalleberg, Wallace, Althauser (1981), Hodson (1983, 1986a, 1986b), Parcel and Mueller (1983), and others show the usefulness of a multidimensional approach by employing various industrial dimensions in studies of inequality and models of worker outcome determination.

Along with the development of the multidimensional view of segmentation and closely related to this view is the "resource perspective". The resource perspective, as it was first developed by Hodson and Kaufman (1982), recognizes the multidimensionality of the economic structure and also proposes a new way of looking at these dimensions. Whereas, in the past, especially among dual economic theorists, industrial structures were viewed as created and manipulated by the capitalist class, the resource perspective suggests that these structures are created in interaction with labor and can act as resources and vulnerabilities for them in their struggle against employers (Hodson and Kaufman, 1982:736). For example, size of companies can be viewed as a resource for workers. In large firms, employees have better communication and organizing opportunities than workers in several small dispersed shops. Conglomerate domination can also be viewed from the resource perspective. Workers' organizations

(e.g., unions) in companies that operate in more than one industry can gain footholds in those industries and among workers of other plants. Similarly, many other dimensions of economic segmentation can be used as resources by workers for their struggle to gain higher wages and other benefits.

In Chapter 2, "Resource Perspective, Organizational Structures, and Worker Power", I will provide a critique of the resource perspective. I will argue that empirical research using the resource theory has been scant. Most research in this field has been done by Hodson (1983, 1986a, 1986b) (See also works by Kaufman, 1986 and Grant and Parcel, 1990). I will argue that all of Hodson's work comes short of an empirical examination of the resource theory. First, despite the fact that in the article by Hodson and Kaufman (1982) which marked the birth of this perspective, references were made to measures at the organization level -- "a firm's monopoly market position", "company size", "conglomerate domination", "multinational organizational forms" (Hodson and Kaufman, 1982: 736)-- Hodson's subsequent work predominantly uses industry level data. However, Hodson's conviction for the necessity of organizational data is also reflected in the following statements:

"What is needed for an understanding of working conditions is less a theory of the enterprise's commodity market structure than a theory of the organization of the productive enterprise itself. These conclusions all point to the importance of the literature of complex organizations in continuing work in this field." (Hodson, 1983: 196)

The second shortcoming of previous research on the resource perspective arises from its central argument that organizational structures should be viewed as resources or vulnerabilities to actors

(both workers and employers). I do not believe that Hodson's empirical work directly assesses whether economic structures are being used as resources or as vulnerabilities. Hodson uses the sign of the effect of a series of industrial variables on earning as an indication of whether these variables act as resources or vulnerabilities for workers. In Chapter 2, I will argue that in order to correctly identify resources and vulnerabilities, we should focus on the effect of structures on worker power measures and not on earnings.

The aim of this research is to specify more clearly the contours of the resource perspective. This will require a more accurate conceptualization of arrangements that empower workers. This will also require an operationalization of variables at a more appropriate level of analysis. Thus, the primary purpose of this research is, first, to identify direct measures of worker power, and, second, to assess the impact of a set of variables at the organization level on these worker power measures. Chapter 2 introduces two such measures -- unionization and internal labor markets (ILMs) -- and develops hypotheses regarding the effects of a set of widely used organizational variables in complex organization literature on worker power measures.

Chapter 3, "Methods", discusses the data, and operationalization of various organizational constructs employed in this research. Special attention will be given to how each construct has been operationalized in previous research.

In Chapter 4, "Results and Discussion of Worker Power Analyses", the results of the generalized Least Square regressions of unionization and ILM on organizational variables will be presented. Based on the

sign of the effects of variables on the two measures of worker power, I will identify structures that act as resources and those that should be considered vulnerabilities. As I discuss below, variables with positive effects on unionization and/or ILMs will be labeled resources and those with negative effects will be identified as vulnerabilities. Chapter 4, also provides a discussion and implication of the results of unionization and ILM analyses.

Chapter 5, "Organizational Structures and Earnings", will argue that in order to maintain continuity with most stratification research, in general, and empirical work in the resource perspective, in particular, the effects of organizational structures and worker power measures will be estimated on earnings, the most commonly used worker outcome. This chapter then develops hypotheses for these effects. Results of the earnings analyses will be presented in Chapter 6, "Results and Discussion of the Earnings Determination Analyses". I will show that results significantly differ for men and women, and, thus, two separate equations will be estimated for each group. A summary and discussion of the earnings model will conclude chapter 6.

Finally, Chapter 7, "Discussion", will summarize the findings and discusses the limitations of the dissertation. A section on directions for future research will end this work.

CHAPTER II

RESOURCE PERSPECTIVE, ORGANIZATIONAL STRUCTURES, AND WORKER POWER

INTRODUCTION

In this chapter, I will introduce the "resource perspective" and provide a methodological and theoretical critique of this approach in stratification studies. I will argue that in order to identify resources and vulnerabilities for workers in their struggle vis-a-vis employees, we have to focus on the effect of structures on worker power measures. Then, I will introduce two such worker power measures and will argue for the use of organization as the appropriate level of analysis. The bulk of the chapter will be devoted to reviewing literature and developing specific hypotheses for the effects of a number of organizational variables on measures of worker power.

RESOURCE PERSPECTIVE: A CRITIQUE

Stratification studies have clearly moved away from individualistic models to structural explanations of inequality known as the "new structuralism" (Baron and Bielby 1980, p. 737). The "resource perspective" which is a recent development of this paradigm argues for a multidimensional view of segmentation¹ and a theoretically novel

interpretation of the emergence of industrial structures and their effects on stratification (Hodson and Kaufman 1982; Hodson 1983). This approach argues that economic structures "are created in interaction with labor. And, capital structure, once in place, creates resources and vulnerabilities for workers in their struggle at the workplace." (Hodson and Kaufman 1982, p. 736). Control of the work force is not the only goal of employers. Capitalists' strategies for growth are the result of the interaction of societal control mechanisms, technology, and environmental constraints. The resulting corporate structures, once created, might be used by workers as resources. Most subsequent empirical work endorsing this perspective focused on industry level structures and interpreted their effects on earnings using the resource language that if a given structure positively affects earnings, that structure is a resource for workers and if it has a negative impact on earnings, it should be considered a vulnerability for them.

I believe that the resource theory, which is still in its youth, has two shortcomings. The first of these is the predominant use of industrial level data despite, as will be discussed below, the importance of organizations as a critical level of analysis in stratification research. The second shortcoming is the logic of specifying what are resources and vulnerabilities for workers. Instead of examining the effect of capital structures on earnings, the resource theory should assess the impact of these structures on what I argue to be valid measures of worker power: unionization and internal labor markets. Thus, attending to these two shortcomings, the goal of this research is to provide a better specification of the resource theory.

This involves conceptualization of structures at the organization level of analysis and assessment of the effect of these structures on unionization and internal labor markets. To accomplish this goal, departing from much prior research, I employ an establishment-level analysis using data on 52 manufacturing plants in the Indianapolis metropolitan area.

The critical place of organizations in the process of stratification was highlighted when Stolzenberg (1978) and Baron and Bielby (1980), in their landmark papers, suggested that stratification research had been ignoring organizations which, the authors contended, are the major agents of the distribution of rewards among the labor force. They argue that it is within firms that labor is priced and allocated, power is executed, and technology is implemented. Mobility occurs between and within firms. Societal and institutional structures affect workers through the medium of organizations. In short, firms bridge structures and processes.

The logical/theoretical problem with the resource perspective is the identification of resources and vulnerabilities which is usually done using the sign of the effect of an industrial structure variable on earnings of workers. For example, when employment size of industries is positively related to earnings, Hodson writes: "Size is *interpreted* as producing higher wages because of the expanded basis of solidarity possible in large enterprises." (Hodson 1986, p. 289) He also writes: "We have *interpreted* the role of industrial structure in terms of the resources it provides to employees for the attainment of improved working conditions." (Hodson 1986, p. 289) (*Italics are added*).

I contend that the empirical examination of the resource perspective has remained at the level of interpretation. It has not been empirically tested whether a structure acts as a resource for workers. The fact that a structural variable might have a positive impact on earnings does not necessarily mean that it is a worker resource. Higher earnings levels do not guarantee more autonomy at work, more power of decision making or more input on employment conditions. In fact, increased earnings can be used by employers as a way of appeasing workers rather than granting them more power in the workplace.

In short, research within the resource perspective has focused on the determinants of earnings as a worker outcome. Instead, I argue that, logically, the focus should be on the determinants of worker power and how worker power as a mediating factor affects worker outcomes. Current research has omitted this crucial intervening variable. The model that underlies the resource approach involves a causal path from corporate structures to worker power measures to worker outcomes. Without entering worker power in the model we are left with the direct effects of corporate structure variables on worker outcomes and with the fallacy that the sign of these effects identify resources and vulnerabilities. But the true model involves the indirect effects of structural variables on outcomes via two sets of intervening factors: worker power measures and a host of other variables (e.g. productivity and efficiency). Thus, the direct effect of structures on outcomes can not reliably assess the resource approach since it includes not just effects mediated by way of worker power but also effects mediated via a set of other factors.

Thus, I argue that a better and a more accurate outline of the resource theory requires the specification of structures that directly represent worker power. After such empowering structures are identified, then, the sign of the effect of a given structural variable on these measures of worker power can be correctly used as a way of assessing whether that variable is a resource or a vulnerability for workers.

This dissertation considers two measures of worker empowerment: unionization and internal labor markets (ILMs), which are defined as a cluster of jobs that have three structural features: " (a) a job ladder, with (b) entry only at the bottom and (c) movement up this ladder, which is associated with a progressive development of knowledge or skill." (Althauser and Kalleberg, 1981: 130). These two measures have been identified as key indicators of worker power by Kalleberg et al. (1981, p. 656). They contend that "Worker power refers to the ability of employees, individually or collectively, to obtain an advantaged position in the stratification system" (p. 656).

Both unionization and ILMs have been contended by neo-Marxist scholars to be methods of disciplining and controlling the labor force. This contention is not as developed for unionization as it is for ILMs. O'Connor (1973) is among those who argues that there is a tacit agreement between monopoly capital and labor, especially since the end of the Second World War. He argues that economic prosperity has been to a great extent dependent on the existence of a disciplined labor force and harmonious capital/labor relations. Capital has accomplished this goal by the redistribution of a portion of corporate profits among

unionized workers in return for the attempt of union leaders to contain spontaneous rank-and-file activity and to maintain labor discipline (O'Connor, 1973: 23). Note, however, that this thesis suggests that workers through their unions were empowered with respect to economic issues. At most, this view indicates that unionization might be a mix of empowerment and loss of power with respect to sets of issues. Despite this argument, the role of unions as empowering agents is well known and agreed upon among most industrial sociologists and labor economists. Bibb and Form (1977) view unions as a form of power established by collective and institutionalized arrangements between employer and workers. Kerr (1954) and Freeman (1976) argue that unions protect workers against wage-depressing strategies of capital to lower production costs. Similarly, Freeman and Medoff (1984) maintain that unions provide workers a voice in determining rules and conditions of work, institute grievance and arbitration procedures for appealing supervisors' decisions, decrease wage inequality, and have political success in the areas of general labor and social goals that benefit workers as a whole.

There are also opposing arguments about the origins of internal labor markets. Neo-Marxist writers contend that ILMs are created by employers as a way of labor control (Stone, 1974; Marglin, 1978; Edwards, 1979; Gordon, Edwards, and Riech, 1982), which refers to a strategy to ensure that workers will actually engage in work as desired. Edwards' *Contested Terrain* (1979) is the most central work on the issue of control and the different forms it has taken in the capitalist U.S. In this book, Edwards traces the development of ILMs to the emergence

of bureaucratic control. Central to this type of control is the creation of job ladders, which differentiates the work force and provide incentives for adherence to organizational goals and requirements as well as inducement to remain in the organization. Edwards (1979) writes:

"The defining feature of bureaucratic control is the insitutionalization of hierarchical power. 'Rule of law' -- the firm's law -- replaced 'rule by supervisor command'.... Work becomes highly stratified; each job is given its distinct title and description; and impersonal rules govern promotion. 'Stick with the corporation,' the worker is told, 'and you can ascend up the ladder.' The company promises the worker a career." (p. 21)

Edwards (1979) views ILMs as part of a central strategy that developed "out of the core firms' attempts to turn the tide of conflict on the shop and office floor decisively in its favor." (p. 180) ILMs impose artificial gradations in an effort to divert attention of workers from utilizing the power inherent in their skills to promotional opportunities and status achievements. ILMs also institutionalize labor force divisions and prevent working-class cohesion. Again, note that this argument suggests a focusing of power on different sets of issues rather than representing only a control and loss of power.

Although Edwards' treatment of bureaucratic control system is popular among many scholars, his thesis has not been immune to criticism (see Thompson, 1983). Burawoy (1979) contends that arrangements such as ILMs are in workers' interest, in that they give workers some discretion, and provide protection from managerial authority. Similarly, Friedman (1977) and Rubery (1976) argue that ILMs are not primarily the result of divide and conquer strategies by

capital. Instead, ILMs are developed in response to the demand of labor to formalize and rationalize employment practices and promotional opportunities. They suggest that these arrangements result from accommodations to workers' struggles to gain job control and security. Rubery (1980: 266) comments: "Thus the radicals have overstressed the control offered by the bureaucratic division of labor force, and at the same time underestimated or ignored the benefits for the working class of a sheltered, secure, albeit stratified, labor market." Furthermore, Friedman (1977: 114) argues that the stratification of working class is not a new phenomenon and that overemphasizing working class divisions as a conscious managerial strategy seriously downplays the systematic divisions on the basis of such factors as sex, race and skills that predate capitalism. Finally, Kahn's study of San Francisco longshoremen (1976) demonstrated that through coastwide strikes labor succeeded in creating ILMs and transforming longshoring in San Francisco from a casual job to a steady job and thus from a secondary towards a primary job structure. Similarly, in this dissertation, I treat ILMs not as labor control structures, but as empowering agents for workers that give them partial monopoly over jobs vis-a-vis employers, protect them from outside competition, and provides them chances of promotion to jobs that have better pay, prestige, and perhaps greater autonomy from supervision.

The next section of this chapter develops hypotheses regarding the effects of various organizational arrangements on unionization and ILMs.

ORGANIZATIONS AND THEIR EFFECTS ON WORKER POWER

As noted above, a central aim of this dissertation is to examine the impact of various organizational structures (as opposed to industrial structures) on measures of worker power -- unionization and ILMs. The most frequently discussed organizational dimensions in the organizational literature are size, complexity, formalization, span of control, centralization, and technology (e.g. see Pugh, Hickson, and Hinings 1968, 1969; Hall 1987; Corwin 1987). Most of these variables have also been used in the stratification literature. For example, size and technology are discussed as organizational determinants of stratification by Baron (1984) (see also Kalleberg and Lincoln, 1988, and Baron, Davis-Blake and Bielby, 1986), Stolzenberg (1978) underscores the importance of formalization (documentation) on the socioeconomic achievement of employees of organizations, and Kalleberg and Lincoln (1988) use indicators of complexity (e.g. number of ranks) in a study of the structure of inequality in the U.S. and Japan. In addition to these variables, the effects of organizational dependence and percentage of workers who are women on worker power measures will also be assessed (for examples of studies which use organizational links and percentage women see: Baron, Davis-Blake, and Bielby, 1986; Pfeffer and Cohen, 1984; and Hodson and England, 1986). Finally, in this section, I will argue that unionization has an impact on the prevalence of internal labor markets.

When a rationale is developed for a positive (or negative) effect of a given variable on both worker power measures, then that variable will be hypothesized to act as a resource (or vulnerability). However, the

situation becomes somewhat complicated when expectations of the effect of an organizational variable on unionization and ILMs are of differing signs. But, because unionization and ILMs represent different aspects of worker power, such differing effects are not unexpected. If a given variable has a positive effect on unionization and not on ILMs, then we can consider that variable to be a resource for workers only in empowering their bargaining ability vis-a-vis employers for higher wages, better working conditions, and fringe benefits. On the other hand, if a variable affects only ILMs positively and not unionization, we can argue that it empowers workers in their ability to pursue gainful promotions and in their competition with other workers in the labor force for job vacancies in the employing firm. The rest of this chapter is devoted to the development of hypotheses on the determinants of worker power. I formulate these hypotheses based on an extensive review of literature within sociology, labor relations, and labor economics disciplines. For several of the variables used here (e.g., complexity, span of control, and centralization) I found only few previous empirical and conceptual works. After the hypotheses are discussed, table 2.1 will summarize the predicted effects of each organizational characteristic.

The effects of size

Size is probably the most widely used variable in organizational literature. Overwhelmingly, studies support the positive relationship between unionization and establishment size. For example, Miller (1984), and Hirsch and Berger (1984) show that the level of

unionization and establishment size in manufacturing industries are positively related (see also Kuhn, 1988). Bain and Elsheikh (1979) establish the same finding using a small sample of manufacturing firms in Great Britain. Large organizations can be more easily unionized as the relative cost of establishing unions is lower in such organizations (Hirsch and Addison, 1986, p. 61), and communication and organization possibilities in larger organizations are conducive to unionization (e.g. see Hodson 1983). Moreover, in large plants, where worker-management communication and monitoring are usually difficult, the benefits from formalized work, and grievance procedures are valued more. Therefore, I hypothesize that size has a positive impact on unionization.

Size of an organization is known to have a positive impact on the prevalence of ILMs (Pfeffer and Cohen 1984; Baron et al. 1986). From the organizational efficiency point of view, Weber (1947) argues that guarantee of lifetime employment and existence of graded career ladders are efficient forms of organizing large bureaucratic organizations. From the control perspective (e.g., see Edwards, 1979) size is also expected to positively affect ILMs. As Edwards (1979) contends, large firms in the core sector, as a method of control of the work force, rely on bureaucratic control systems that involve the creation of internal labor markets. I hypothesize that size affects ILMs positively.

The effects of complexity

Complexity refers to the extent of the division of labor and the

number of hierarchical levels within an organization. In complex organizations with many ranks and job titles already existing, there may be a lesser need for unionization and the union's efforts to proliferate job titles and establish a ranking system. Also, as Gordon, Edwards, and Reich (1985) argue, job title proliferation and creation of artificial gradations have been used by the management as a control mechanism and as a means of disuniting workers. Lack of unity among workers makes unionization efforts difficult. Thus, I hypothesize that complexity negatively affects unionization.

Because the proliferation of horizontal and vertical differentiation is conducive to and a prerequisite for the creation and expansion of internal labor markets, I hypothesize that complexity has a positive impact on ILMs.

The effects of formalization

Formalization refers to the degree of documentation or the extent to which organizations' decisions are codified in formal rules and regulations. In this research, no hypothesis is developed regarding the effect of formalization on unionization. In fact, I view formalization not as a determinant of unionization but rather as a consequence of it (also see Lincoln, Hanada, and McBride, 1986). Formalization, however, affects ILMs negatively. Employees in organizations which rely on a multitude of written rules and procedures do not need to rely on the creation of ILMs as a mechanism of monitoring employee activities. The prevalence of written documents guarantees adherence to rules to a certain degree. This is due to the institutionalization

that accompanies formalization. As norms are encoded in documents, if not contested, with the passage of time, they become reified and gain legitimacy. Legitimate rules serve as a coordination device which is argued to be a reason for the development of ILMs (Williamson, Wachter, and Harris, 1975). Therefore, in highly formalized organizations, the management does not need to rely on ILMs to coordinate the work force. I hypothesize that formalization negatively affects ILMs.

The effects of span of control

Span of control refers to the average number of subordinates that supervisors and managers have in an organization. In organizations for which the ratio of subordinates to supervisors and managers is higher there is more interaction among workers and there is a higher chance that workers will develop an awareness of their interests, organize and form unions. Thus, I hypothesize that span of control positively affects unionization.

Large spans of control pose to the employer the problem of coordination and resolution of conflict between subordinates (Slater 1985, p. 145). ILMs both provide a mechanism for coordination and divert attention of workers from interpersonal conflict and disagreement to organizational goals, career and promotional opportunities. Therefore, I hypothesize that span of control positively affects ILMs.

The effects of centralization

Centralization refers to the extent to which the locus of authority

to make decisions is confined to the higher levels of hierarchy. In centralized organizations where many decisions are made at the top levels of hierarchy, workers are rendered powerless and as a result are more prone to welcome organizing efforts of unions. Child (1973, p. 13) shows that centralization of decision making negatively affects job autonomy (perceived authority), and enhances routinization in organizations. Similarly Hage (1980) shows that centralization (non-participation in strategic decisions) has a negative impact on job autonomy of workers. Because workers in centralized organizations lack power of decision making and autonomy they are more interested in unionization. Thus, I hypothesize that centralization positively affects unionization.

In centralized organizations where decisions are made at the top and the life of the organization is planned and controlled by persons of high ranks, employers face a lesser need to create ILMs so far as they perceive these structures as a way of controlling the labor force. Incentives for the creation of ILMs are also reduced as centralized decision making provides coordination and monitoring of employee activities. Therefore, I hypothesize that centralization negatively affects ILMs.

The effects of technology

I expect automation and continuous process technologies to positively and custom/small batch production to negatively affect unionization. In plants that employ automation and/or continuous process technologies strikes are more effective since work stoppages at

one stage of production can potentially halt a large segment of the total operation. Workers in such workplaces have a greater power to demand unionization. Moreover, as Blauner (1964) contends, in establishments that predominantly use continuous process and automation technologies, workers are free to move about in the factory, take many breaks, and interact with each other. He writes: "The technology, economic situation, and social structure of the chemical industry also contribute significantly to the integration of the work force in a cohesive industrial community." (1964, p. 146) Such cohesion among workers is highly conducive to unionization. On the other hand, because custom/small batch production involves work activities that do not necessarily require the completion of other tasks (i.e., production is not as interrelated as in automated plants or those which use continuous process techniques), in plants that employ this type of technology, strikes are not likely to be very effective and consequently demands of workers for unionization may not be fruitful.

Literature in the economics discipline also suggests that Workplaces that employ capital intensive technologies (e.g., Automation and continuous process technologies) are more likely to be unionized. Hirsch and Berger (1984) using a sample of manufacturing industries show that capital intensity increases the likelihood of union membership and jobs among production and non-production workers. In capital intensive organizations (i.e., organizations with a high capital to labor ratio), labor comprises a smaller fraction of total costs. Consequently, the labor demand curve which plots wage rates against number of workers employed, is less elastic (more steep) (see

Marshall, 1923:518-538, Hicks, 1966: 241-247, Hirsch and Addison, 1986: 61). Capital intensive firms are also less mobile due to high fixed costs, and, thus have a more elastic short run labor demand curve (Hirsch and Berger, 1984: 667) and lower organizing costs.

In addition to the argument above, Sattinger (1980) acknowledges the existence of a "scale resource effect" that means that more able workers are matched with greater amount of capital. If unions provide a means by which labor quality and productivity is enhanced (e.g., by decreasing turnover), then capital intensive firms are more likely to favor unionism. Similarly the "capital-skill complementarity" hypothesis, supported by Hamermesh and Grant's empirical work (1979), that argues that the elasticity of substitution between capital and high-skill labor is less than between capital and low-skill labor, implies that the demand for high-skill union members may be greater in more capital intensive firms.

In organizations where mass production techniques prevail workers have a fixed physical location, the scope of interaction among them is limited, and they have little opportunity to discuss grievances and converse about wage rates and working conditions (Edwards 1979, p. 114). Lower communication and opportunities to organize in these organizations results in lower rates of unionization. On the other hand, plants that use mass production and assembly line work are ideal places to organize strikes in that only a few workers in key stations need to go on strike for the whole production to stop. The potential high cost of strikes for employers puts labor in a good position to demand unionization. Considering the above two opposing rationales for

the effect of mass production on unionization, I do not make a prediction as to the direction of this effect.

Doeringer and Piore (1971, p. 16-17) suggest that idiosyncratic technologies such as custom and small batch, which have low levels of complexity, give rise to specific skills. Therefore, one would expect firms that predominantly use these technologies to rely on specific skills of workers and therefore to be more prone to establish ILMs to reduce the costs of training. However, Baron et al. (1986) found a negative relationship between craft production and ILMs. Custom/small batch techniques which predominantly require craft skills are not necessarily the firm-specific skills that contribute to the creation of ILMs. Craft workers develop and monopolize skills that are often useful across firms. The locus of the power of craft workers is in their occupations rather than in their employing firms. They do not necessarily rely on within firm promotions; mobility for them spans firms. Caplow (1954, p. 164-169) suggests that craft workers, because they rely on general human capital, their mobility systems are not firm-bound. Therefore, I expect to find a negative relationship between craft/small batch technology and prevalence of ILMs.

I expect mass production technology to negatively impact the extent of ILMs. As Edwards (1979) argues, firms that employ assembly lines, impose technical control on workers who are being monitored by programmed machinery. Where technical control is prevalent in an organization, the need for ILMs as a method of coordination is reduced.

In organizations that employ continuous process and automated technologies a different situation prevails. Blauner (1964, p. 129-131)

argues that because of the high degree of responsibility that continuous process technologies demand and the capital intensive nature of the equipments, employers offer benefits such as job security and life-long careers. Similarly, Osterman (1987, p. 55) asserts that in capital intensive firms, employees of various skill levels can impose serious damage due to mere human error. As the result employers choose to implement stable employment systems, not because of skill requirements, but for the potential cost of misuse or abuse of machinery. A similar argument is suggested by Hodson (1983). He writes that capital intensity makes for enhanced worker power as workers may be "able to secure improved conditions through the implicit threat of misuse, sabotage, or outright destruction of ... machinery." (1983, p. 49) Baron et al. (1986, p. 250) also maintain that continuous process technologies promote ILMs because of the need for mitigation of conflict and perception of inequity that arise when tasks are highly interdependent and inseparable and when it is difficult to determine who should deserve rewards or be blamed for mistakes. Thus, I hypothesize that automated and continuous process technologies have a positive effect on ILMs.

Workflow rigidity, which refers to nonadaptability in the pattern of operation, is another measure of technology often used in organizational research (e.g. see, Pugh et al. 1969; Lincoln et al. 1986). In firms with rigid workflows -- raw materials are supplied only in the beginning of the process, machinery and equipment are not generalizable, the order of operation is fixed, etc. -- workers are bound to the pace of machines, to their work stations, and to their

specialized equipment. These are, as Edwards (1979) argues, characteristics of technical control. When technical control prevails, the need for ILMs as a control and coordination mechanism is reduced. Therefore, I hypothesize that workflow rigidity has a negative impact on the extent of ILMs.

I expect workflow rigidity to have a positive effect on unionization. Because of the high degree of interdependence among different stages of operation in plants with rigid workflows, strikes are very effective. In such situations, as discussed above, workers are in a good position to demand unionization.

The effects of organizational dependence

Workers in plants that are part of larger organizations have more chances of contact with other workers in the same or a different industry. Heightened communication and organization opportunities among workers leads to greater possibilities of unionization. On the other hand, because multi-establishment firms have additional resources (e.g., high levels of profit, access to sophisticated anti-union strategies, etc.) that can be used to fight unionism, it is plausible to think that unions are not prevalent in such organizations. Therefore, I do not make a directional hypothesis regarding the extent of unionization and organizational dependence.

Corporate dependence has been shown to positively affect ILMs. Pfeffer and Cohen (1984, p. 567) find that branch establishments are more likely to adopt ILM practices. Being a subsidiary or a branch improves promotional opportunities. They argue that companies with

multiple production sites are more concerned with worker loyalty because it may be necessary to move workers from one production establishment to the other if production shifts and vacancies arise in different sites (p. 559). In organizations where loyalty of workers is crucial, ILMs are more likely to be developed. Baron et al. (1986) also show that establishments that are linked to other organizations are more likely to have ILMs than autonomous firms. They argue that this is because of coordination difficulties that multiplant firms face and the need for bureaucratic procedures and specialized subunits (e.g. personnel departments) that accompany ILMs. I hypothesize that independent plants are less likely to have ILMs than branch establishments.

The effects of gender composition

Partly because of the historical predominance of unions in the manufacturing industries which are male dominated sectors, union organizing attempts have not been strong among women. Also because some of the fringe benefits (e.g. health insurance) won by unions are not valued as much by women as they are by men, women are slightly less likely to want to be unionized (Freeman and Medoff 1984, p. 28). Therefore, I hypothesize that percentage of women in an organization negatively affects unionization.

According to the neo-Marxist perspective (e.g. Edwards 1979), racial and gender divisions are used by employers as a method of control. Women compared to men are placed in positions with lower chances of advancement and promotion opportunities (Kanter 1977; Blau

1977; Baron and Bielby 1985; Baron et al. 1986). The neo-classical economic literature (e.g., see Mincer and Polachek 1974; Polachek 1981) also suggests that because of the interrupted work histories of women, employers tend to invest less in their firm-specific skills. As the result women are not as likely to participate in career ladders that accompany progression of skills. Thus, I hypothesize a negative relationship between percentage of women in an organization and the extent of ILMs.

The effect of unionization on ILM

The dual economy literature suggests that the core sector of the economy is highly unionized (Bluestone et al. 1973; Beck et al. 1978; Gordon et al. 1982). It is also argued that the core sector employs bureaucratic control of the labor force that involves the creation of ILMs (Edwards 1979). Moreover, a major goal of unionization, which is to reduce management's arbitrary employment practices, is to attach wages to jobs and not to individual workers. Because of this, jobs should be carefully defined so that it would be clear who is doing what job and thus who is to be paid what wage (Osterman 1987, p. 50). This need for detailed job descriptions and classification is intensified by the seniority system unions propose in order to provide job security. Thus, I hypothesize that unionization positively affects ILMs.

CONCLUSIONS

This chapter provided a critique of the resource perspective. According to this perspective, the structure of segmentation

is multidimensional, labor plays an active role in affecting labor market outcomes, and corporate structures are viewed as resources or vulnerabilities for actors -- employees as well and employers.

Following recent calls for the organization level of analysis in stratification research (Stolzenberg, 1978; Baron and Bielby, 1980), I have argued that the resource perspective should be examined from an organizational instead of solely an industrial point of view.

Moreover, past research using this perspective has been inadequate as a method of discovering structures that act as resources and vulnerabilities for workers. Instead of looking at the sign of the effects of structural variables on earnings as a way of identifying resources and vulnerabilities, I have proposed that a more valid method of accomplishing this goal is to assess the impact of structural variables -- in this research, organizational variables -- on direct measures of worker power. Higher earning levels does not necessarily mean workers are being empowered. In fact, wage increases have been used by employers as a way of appeasing workers and desensitizing them towards power relations and control issues. In this chapter, I introduced two structures that empower workers (and as such are direct measures of worker power): unionization and internal labor markets. I argued that the variables which positively affect these measures should be considered resources and those that have a negative impact on them should be regarded vulnerabilities for workers. Finally, the latter part of the chapter developed hypotheses regarding the effects on measures of worker power of a host of organizational variables commonly used in complex organization studies.

FOOTNOTES

1. One of the major works that should be considered as a precursor to the resource perspective is Parcel and Meuller's *Ascription and Labor Markets: Race and Sex Differences in Earnings* (1983). This work not only argues for a multidimensional view of segmentation but also, using several rich data sets and a contextual model containing industrial, regional, organizational, and individual variables, delineates the mechanism through which ecological factors determine earnings levels.

Table 2.1. Hypothesized Effects of Organizational Variables on Unionization and Internal Labor Markets

Variable	Effect on Unionization	Effect on ILMs
Size	+	+
Complexity	-	+
Formalization		-
Span of Control	+	+
Centralization	+	-
Custom/Small batch Technology	-	-
Large Batch/Mass Production	+/-	-
Continuous Process	+	+
Automation	+	+
Workflow Rigidity	+	-
Branch Establishment*	+	+
Percent Women	-	-
Unionization		+

* The positive effects of branch establishment (organizational links) denotes that the extent of unionization and ILMs are greater in branch organizations than in those that are independent.

CHAPTER III

METHODS

INTRODUCTION

This chapter, first, provides a description of the data set used in this dissertation. A detailed discussion of the variables and constructs and the way some of them depart from previous operationalizations will follow. It will be argued that for the worker power models, the establishment is the appropriate unit of analysis, while a contextual model should be employed for the earnings equations using the individual as the unit of analysis. The chapter will then briefly discuss techniques of analysis. Because of data aggregation, heteroskedasticity creates a problem in regression analyses for worker power models, and, therefore, Generalized Least Squares regressions will be used. However, for the earnings equations, Ordinary Least Squares regression, is the appropriate method of analysis and will provide unbiased estimates of effects.

DATA

The data used in this research was collected as part of a larger project, the Indianapolis/Tokyo Work Commitment Study (Kalleberg,

Lincoln, and Near, 1982; Lincoln and Kalleberg, 1985). The data collection started by sampling plants in south-central Indiana. Investigators obtained a list of manufacturing plants from chambers of commerce, government agencies and similar sources. They stratified the list by industry and employment size of plant. Within each strata a random sample of plants was drawn. In some instances, the research team eliminated unsuitable plants (e.g. if plants were not production sites). With a success rate of 35% (1), sampling yielded 52 plants located in seven industries: transportation equipment, chemicals, electrical machinery, food processing, non-electrical machinery, printing and publishing, and prefabricated metals. Kalleberg and Leicht (1986) believe that the population of manufacturing workers in south-central Indiana is representative of that population in the whole U.S. Kalleberg and Lincoln (1989) argue that the distribution of firms and workers in the seven industries presented in the sample is consistent with the United States as a whole.

The next step of data collection consisted of conducting structured interviews with the top management personnel. The purpose of these interviews was to gather data about several characteristics of the firm: history, operation, market environment, personnel policies, structure of the plant.

The research project also conducted interviews with the full-time, nontemporary employees. In small plants (less than 50 employees) all employees were surveyed and in large plants, in most cases, a random sample of employees was surveyed. The personnel were divided into three categories -- managers, supervisors, and workers --, and separate

questionnaires were used for each group. The sampling yielded a total of 4567 individuals.

UNIT OF ANALYSIS

I use a different unit of analysis for testing each set of hypotheses developed in this dissertation. For the hypotheses discussed in Chapter 2 on the determinants of unionization and internal labor markets the unit of analysis is the establishment. Here, most variables are drawn from the top management interviews. However, in some cases which will be specified below in the measurement section, aggregations of individual-level data (the mean score across all employees of a plant) are used due to a lack of appropriate measures at the establishment level.

For the earnings determination analysis introduced in Chapter 5, the individual is the unit of analysis. Two sets of measures are used as independent variables: individual characteristics and structural characteristics of establishments in which workers are employed. The structural variables are exactly those used in the unionization and ILM models. In effect, for the earnings analysis, we have a contextual model in which variables at two different levels of aggregation are used.

MEASUREMENT OF DEPENDENT VARIABLES FOR THE WORKER POWER ANALYSIS

Unionization

There are two variables, an individual level and an organizational level variable, in the data set that tap unionization. The former asks

whether respondents are union members or not. At the plant level, personnel managers are asked if a union is represented at their plants. The latter variable is dichotomous and does not measure extent of unionization. Thus, a plant that has only 1% of its work force unionized would have the same score of unionization as a plant in which all employees are union members. The individual level variable, however, can be used to construct a continuous measure of unionization. Unionization, in this research, is the percentage of workers with no supervisory responsibilities who are unionized in a given firm. The values of percentage unionized range from 0 to 100.

Internal Labor Market

Most authors define internal labor markets (ILMs) as a cluster of jobs having the following characteristics: the presence of a vertical job ladder; entry at the bottom of the job ladder (or limited ports of entry which protect incumbents of an ILM from competition with other members of the labor force); and movement up the job ladder that is associated with a progression of firm-specific skills and knowledge (Doeringer and Piore, 1971; Althauser and Kalleberg 1981). It is also commonly agreed that firm internal labor markets should be distinguished from occupational internal labor markets. Whereas the latter crosscut firms, the former refer to employment arrangements within given firms. The focus of this dissertation is on firm internal labor markets.

Empirical measures of ILM do not consider all components of the definition presented above. Pfeffer and Cohen's study (1981) of

determinants of firm internal labor markets, using a sample of large establishments, focused on two aspects of ILMs: promotions within a job ladder, and existence of limited ports of entry. Their measure was based on whether an establishment followed an established promotion-from-within policy, had promoted employees with at least five years of service at least once, offered entry-level jobs with some promotion potentials, frequently promoted unskilled labor to semiskilled jobs, etc. In this operationalization, the authors did not include variables that tap the dimension of ILMs dealing with progression of firm-specific skills accompanying promotions. In fact they use the prevalence of firm-specific skills as a determinant of FILM.

Similarly, Wholey (1985) examining FILMs in law firms, only uses number of promotions and number of lateral entries (recruitment from outside a law firm) as a measure of FILM. Finally, Baron et al. (1985) also focus on promotion opportunities and limited entry ports as indicators of ILM. They use items such as: percentage of jobs in promotion ladders: percentage of bottom level jobs and percentage of jobs that could not be entered from outside the establishment. In short, previous empirical research on ILMs do not take into account all defining features of internal labor markets in their operationalization; they do not consider progression of skills and knowledge accompanying promotions.

Investigators employing the same data set used in this dissertation have used proxies for both existence of promotion ladders and firm-specific training in their measure of ILM. Kalleberg and Leicht (1986) use number of ranks as a rough proxy for the presence of

promotion opportunities and average length of tenure as a proxy for employment stability. For measuring firm-specific-training, they factor analyzed a set of items which were responses to the following questions: "How important were each of the following as sources of the skills that you use in your job? a) informal learning, b) formal on-the-job training, c) work experience in other companies, d) apprenticeship e) vocational school, and f) formal education. Based on the first two items that loaded together on the same factor, the authors created their firm-specific-training scale that reflects the degree to which skills are obtained through informal learning and on-the-job training.

Through a closer examination of the data, I discovered a different set of items that more directly measure all aspects of ILMs. These items are a mix of establishment level data and individual level data. In the latter case, the variables were aggregated to the establishment level, using the mean across all employees of a plant. Three variables pertain to the existence of promotion opportunities and job ladders: whether in an establishment there are documents about a job classification system, indicating qualifications for positions; the responses of employees to the questions about whether they think chances of promotion are good (ranging from "1-strongly disagree" to "5-strongly agree") and whether they expect to be promoted ("0=no", "1=yes"). The first of these three items is drawn from the establishment level data and the last two are based on individual level data. Another aspect of ILMs, i.e., protection against outside competition for jobs inside the firm and existence of limited ports of entry, is reflected in a question asked from employees about their

attitude towards the statement "Employees in this company have an advantage over outsiders in competing for job openings" ("1-strongly disagree" through "5-strongly agree"). This item is based on the individual level data. The remaining part of the nominal definition of ILM concerns the existence of firm-specific-training -- an aspect that has been ignored in previous operationalizations. Tapping this aspect, at the establishment level, there is a question on whether there exist documents and rules regarding training and education of non-managerial employees. Three individual level variable reflecting firm-specific-training are also identified: how important were informal learning and on-the job training for the respondent's present job (ranging from "0-never had" to "4-very important"), and whether the present job skills will be useful for future jobs in the same company (ranging from "0-not at all" to "3-very useful").

A principle component factor analysis, using oblique rotation, of the 8 items mentioned above, resulted in three factors with eigenvalues greater than 1 (table 3.1). On the first factor which explained 31.6% of the total variance, four items have loadings of greater than .4². These four items together are used to construct a FILM scale. In order to assess the reliability of this composite, because the items have different response scales, they were first standardized. Then, Cronbach's reliability score (1951) was computed, alpha=.78. The values of this scale are the sum of the z-scores of each of the four items. These values range from -8.76 to 7.39. In establishments that score high on this scale, a greater proportion of their employees expect to be promoted, believe that promotion possibilities are good, feel that

they have advantage over outsiders in competing for jobs openings, and claim that their present job skills will be useful for a future position in the plant. In such establishments there is a higher possibility that ILMs exist compared to establishments that score low on the scale.

MEASUREMENT OF INDEPENDENT VARIABLES FOR THE WORKER POWER ANALYSIS

Size

Employment size of establishment is based on a question asked from general managers of plants. Size of establishments in the sample range from 21 to 5266 workers. In this research, following most organizational research, natural logarithm of employment size is used (e.g. see Baron et al., 1986; Pfeffer and Cohen, 1984; Villemez and Bridges, 1988). Past literature provides two plausible rationales for the logarithmic transformation of size. First, size is transformed because this variable is often positively skewed. Log transformation reduces variance in the distribution of the values of size across observations, converts the distribution to one that more closely approximates a normal distribution, and, thus, makes size a more suitable variable for regression analyses. Examples of this technical rationale is found in Hawley et al. (1965: 253) and Hickson et al. (1969: 97-98). In the data set used in this dissertation, size is highly positively skewed with the median of 170 and a mean of 515 employees.

The second rationale for the transformation is more theoretical than methodological. Logarithm of size implies a curvilinear relationship

between size and other variables in the equation. For very large organization the effect of size is not as notable as it is for smaller organizations. In other words, the structure of large organizations is not as sensitive to size differences as that of smaller organizations. This curvilinear effect is often seen to provide a better fit to the data, meaning that it yields higher correlation coefficients (Holdaway and Blowers, 1971; and Blau and Schoenherr, 1971:22).

Formalization

In general, formalization refers to the extent of "rules and procedures designed to handle contingencies faced by the organization." (Hall, 1987: 73) This concept is of great importance in organizational studies because it implies organizational control over the individual. While unwritten rules can be as constraining as written ones, formalization in most research is measured by the extent of "written rules" that exist in an organization. Hage (1965: 295) writes:

Some organizations carefully codify each job, describing the specific details, and then ensure conformity to the job prescription. Other organizations have loosely defined jobs and do not carefully control work behavior.

Formalization, is measured by the proportion of codified jobs and the range of variation that is tolerated within the roles defining the job. The higher the proportion of codified jobs and the less range of variation allowed, the more formalized the organization.

Hage and Aiken (1967) operationalize the two indicators of formalization -- job codification (the degree of work standardization) and rule observation (latitude of behavior that is tolerated from standards) -- using responses of members of organizations to questions about the extent of codification and the possible variations allowed in

their own organizations.

A different operationalization of formalization was done by Pugh et al. (1968) of the University of Aston in England. They defined formalization as "the extent to which rules, procedures, instructions, and communications are written." (p. 75) Their research asked a manager, a chairman, or some other administrator about the existence of a total of 38 written documents. These items were then factor analyzed. The analysis resulted in a single formalization factor. The scale that was created based on the factor analysis is commonly known as the Aston Formalization Scale.

I argue that Pugh et al. (1968) have created by far a better measure of formalization than Hage and Aiken (1967). First, the Aston scale includes 38 items whereas Hage and Aiken's research considers only 7 items in their scale. Second, the former, using factor analytical techniques shows that all 38 items empirically underlie one dimension whereas the latter does not verify the scalability of their items. Finally, and most importantly, the Aston group asked the administration of establishments about whether a variety of written documents (e.g. records of inspection, number of handbooks, records of maintenance) exist in a plant, whereas Hage and Aiken simply ask employees whether their work is subject to rules and ignore the importance of written and codified documents as a defining feature of formalization. Formalization items in their questionnaire are: "I feel that I am my own boss"; "a person can make his own decisions without checking with anyone else"; "people here are allowed to do almost as they please"; etc. These items, I contend, indicate job autonomy more than

formalization.

In this dissertation, I use a similar measurement of formalization as the one used by Pugh et al. (1968). Based on the formalization questions in the Aston scale, 19 items were included as part of the management questionnaire of the data set used here. Each of these items specify a document that could exist in an organization. The general manager of each plant was asked whether each of these documents exist in the plant. A complete list of these items is as follows:

1. Company journal
2. Employee handbook
3. Employment contract form
4. Company policy, goals, or principles
5. Rules regarding supervisory authority
6. Rules and procedures governing personnel evaluation
7. Labor management contract
8. A job or occupational classification system, indicating qualifications for positions
9. Hiring and dismissal procedures
10. Congratulations and condolences
11. Safety and hygiene regulations
12. Regulations and descriptions concerning fringe benefits
13. Description and procedures regarding retirement plan
14. Description and rules regarding training and educational opportunities for nonmanagerial employees
15. Descriptions and a wage/salary schedule, indicating pay levels by job grade, length of service, etc.
16. Job descriptions or instructions
17. Work or job rules (not included in job descriptions; e.g., work rules specified in union contract)
18. Production schedule or program
19. Research program or reports

Investigators who have used the same data set as I do in this dissertation compute a formalization score for a given establishment using the ratio of the number of documents that exist in that plant to the total of 19. (e.g. see Leicht and Wallace, 1988; and Kalleberg and Leicht, 1986; Lincoln, and Kalleberg, 1985). The decision of using all formalization items in a single scale, however, was not empirically

based, i.e., no factor analysis was performed and no reliability score was reported. I, therefore, factor analyze these items using principle component analysis with oblique rotation. The skree criteria suggested that the data can be reduced to two factors. These two factors, however, by no means represented conceptually distinct dimensions of formalization (see table 3.2). I then proceeded to force factor analysis to a single factor solution. The results (table 3.3) revealed that 14 out of the original 19 items have high loadings on the single factor. These items make up a scale with Chronbach's reliability of $\alpha=.82$. The scores of this scale reveal the proportion of existing written documents to the total of 14. The scores of this scale range from .00 to 1.00. There is one extremely informal establishment in which no written document is kept. This establishment has a score of zero for formalization. There are four very formal plants in which all 14 documents exist. The formalization score of these plants is 1.00.

Complexity

Richard Hall (1987: 60) suggests that the three elements of complexity most commonly identified in the literature are "horizontal differentiation; vertical, or hierarchical differentiation; and spatial dispersion." Horizontal differentiation refers to the subdivision of tasks within an organization. Vertical differentiation denotes depth of hierarchy or proliferation of supervisory levels (Hall, 1978: 62). In the present research I focus on these two aspects of complexity and do not consider spatial dispersion.

Variables that have been used in the past to measure horizontal

differentiation are of two kinds. First, some scholars such as Hage (1965) and Price (1968) take horizontal differentiation to mean specialization and use the degree of education of the members of an organization and number of occupational specialties as indicators of specialization. Others such as Blau and Schoenherr (1971: 16) define horizontal differentiation as the number of different positions and different subunits in the organization.

The present research uses both of these operationalizations to measure horizontal differentiation: average education, number of departments, number of sections, number of job titles in a plant, and number of functions. Number of functions performed in a plant is based on a question that asks the general managers whether there is a department dealing with each of a series of 20 functions. These functions are as follows:

1. Acquire information on the operational field (market, research, economic analysis, etc.)
2. Obtain and control materials and equipment (materials, buying, stock control, etc.)
3. Transport of materials or products (driving, receiving and shipping)
4. Maintenance of buildings and equipment (construction, maintenance, works engineer)
5. Quality control of materials, tools, and products (buying inspection, product inspection, etc.)
6. Assessment and improvement of production methods or processes (time and motion study, operations improvement, product technology)
7. Control of production (control of workflow, production planning)
8. Dispose of, distribute and service products (sales, pricing, sales records, after service, etc.)
9. Development of new products, new machinery, etc.
10. Establishment and paperwork control of administrative procedures
11. Procuring capital
12. Record and control financial resources (salaries, costs, disbursements, accounts)
13. Auditing
14. Employment and allocation of new employees (employment, personnel)
15. Education and training of employees (every type of education and training)

16. Safety and social welfare (safety, sales within company, sports, recreation, insurance, medical care)
17. Labor relations
18. External relations (advertising, public relations, exhibits, etc.)
19. Legal and insurance matters
20. Computer operations and data processing

Vertical differentiation is measured commonly as a straightforward indicator of the depth of the hierarchy. The Aston group operationalized this concept as the "count of the number of job positions between the chief executive and the employees working on the output." (Pugh, et al. 1968: 78) Hall, Hass, and Johnson (1967: 906) used the "mean number of levels for the organization as a whole" (total number of levels in all divisions of an organization divided to the number of divisions) as an indicator of vertical complexity. In this dissertation, for vertical complexity I use a similar measure: number of ranks (number of supervisory levels) in a plant.

I use principle component method with oblique rotation to factor analyze six complexity items: average education, number of departments, number of sections, job titles, functions, and ranks. The results provide a two factor solution (Table 4). All items except average education have high loadings on the first factor. On the second factor, only average education and number of ranks have loadings of above .4. Based on the first factor, one scale of complexity is created. This scale includes all aforementioned variables except average education. The Chronbach's reliability of this scale is $\alpha = .56$. The value of this scale for each establishment is the mean of Z-scores of the five variables that make up this composite. These values range from -1.36 to 1.59. Establishments that score high on this scale, in comparison to those that have low scores of complexity,

have a larger number of departments, sections, and job titles. They are functionally more diversified and have a greater number of ranks.

Centralization

The concept of centralization refers to the distribution of power among social positions in an organization and "the locus of decision-making authority within an organization" (Van den Ven and Ferry, 1980: 399). Previous organizational research has operationalized centralization in various ways. Hage and Aiken (1967: 77-78) use two indexes of centralization: participation in decision making and the degree of hierarchy of authority. The former was measured by computing an average score of participation by staff in four organizational decisions: hiring and promotion of personnel, adoption of new policies, and institution of new programs. These individual level variables were then aggregated to the organization level. The degree of hierarchy of authority is a scale composed of items reflecting employees' perception of whether decisions have to be referred to a superior in the chain of command. I consider Hage and Aiken's operationalization of centralization inadequate because they do not measure the level of hierarchy at which decisions are made and, thus, do not distinguish between highly centralized organizations in which the majority of decisions are made by top management and less centralized organizations which relegate decision making to first-line supervisors.

Van den ven and Ferry (1980: 340), in comparison to Hage and Aiken's operationalization, take into account the locus of authority in their measurement of centralization. They ask questions from employees

and supervisors on whether decisions about performance criteria and appraisal, rules, policies, and procedures are made by workers, supervisors, groups, or higher management.

The measure of centralization used in this research which is similar to Van den ven and Ferry's operationalization is derived from the research done by the Aston group (Pugh et al., 1968). The scale they developed measures the level to which a decision is delegated across a large battery of decisions. The data set used here includes 33 Aston centralization items, all drawn from the establishment level data. For each of the items the general manager of a plant was asked to give the title of the position of the person(s) who in practice make(s) the decision. The response categories are coded such that 1-direct worker, 2-supervisor, 3-middle manager, 4-department's head, 5-plant manager, and 6-higher unit. Previous research using this data have constructed a centralization scale based on all of the 33 items (Kalleberg and Leicht, 1986; Leicht and Wallace, 1988). However, the decision of constructing a composite using all these items was not guided by factor and reliability analyses and it was assumed that the centralization is a unidimensional concept. I, therefore, factor analyzed these items using principle component analysis with oblique rotation. The initial analysis resulted in three factors (table 3.5). Examination of these items in each factor unveiled a clear pattern of the dimensionality of centralization. Items with high loadings on the first factor were predominantly related to decisions regarding the labor force. The items with high loadings on the second factor were all related to decision making about operation and marketing. The third

factor was composed of items from both of these dimensions. Thus, the data identify two distinct dimensions of centralization that previously have not been noticed in formal organization literature and research.

In order to further verify the existence of the two dimensions, I divided the centralization items into two sets each relating to one dimension of this concept. The first set contains all variables on labor decisions.

1. The size of the work force.
2. The employment of direct production workers (operatives).
3. Promotion of production workers to supervisory positions.
4. Who will represent management in a labor dispute.
5. The number of first line supervisors.
6. Outside recruitment of first-line supervisors.
7. Promotion of first-line supervisors.
8. Salary of first-line supervisor.
9. Dismissal of supervisor.
10. Methods of personnel selection.
11. Methods of employee training.
12. Who takes over in chief executive's (general manager's) absence.
13. Welfare facilities and employee services to be provided.

The majority of the variables in the second set pertain to decisions regarding operation and marketing:

1. The use of unbudgeted or unallocated funds (or left-over funds) on capital items (investment in equipment).
2. Selection of brand or type for new equipment.
3. Allowing or requesting overtime work of employees and setting the amount of overtime.
4. Delivery dates or priority of orders.
5. New products or services.
6. Sales territory to be covered.
7. Extent and type of market to aim at.
8. Inspection: quality control methods (e.g. to what products applied; methods used)
9. Which operations will have work study done on them (i.e. investigations made).
10. Outputs to be scheduled against given plans (from among the various production plans, which products to give priority to).
11. Methods of work to be used (concrete methods).
12. Which machinery or tools to use on a particular job.
13. Allocation of work among employees.

14. Price of product/output.
15. Changing responsibilities or areas of work of functional specialist departments (Change in responsibility or scope of work of STAFF departments).
16. Creation of a new department--functional specialist of LINE (Establishment of new department-- whether LINE or STAFF).
17. Establishment of a new job (Whether LINE or STAFF).
18. Putting work out to sub-contractors.
19. Purchasing procedures.
20. Which suppliers to buy raw material or parts from.

Each of the above set of items were factor analyzed using principle component analysis with oblique rotation. The factor analysis of the first set resulted in 3 factors and that of the second set of variables resulted in 6 factors with eigenvalues above unity. However, both analyses suggested that a one factor solution fits the data the best; the eigenvalue of the first factor in each analysis was about 3 times as large as that of the second factor. Factor analyses were repeated, this time forcing items into one factor. All items in each set have loadings above .4 (tables 3.6 and 3.7). Thus, two centralization scales were created. The first scale, labor centralization, which represents the mean level at which 12 decisions regarding personnel decisions are made, ranges from "3" to "6". The second scale, operation/marketing centralization, ranges from "3.10" to "5.56".

Technology

I measure technology in several different ways. First, drawing on seminal research of Woodward (1965) on types of technology, I employ five different measures: custom, small batch, large batch, mass production and continuous process. In the data set used here, management and CEO's were asked to specify the extent to which each of these five technologies were being used in the plant. The response

categories range from "1=not at all" to "5=a great deal". Woodward (1965: 40) suggests that the five types of operation technology can be placed on a scale of chronological development and technical complexity: "the production of unit articles to customer's individual recruitments being the oldest and simplest form of manufacture, and the continuous-flow production of dimensional products, the most advanced and most complicated." (P. 40) These types of technologies are also believed to exhibit linear differences in degree of mechanization (Blau, et al. 1976: 28).

As it is the case with Woodward's discussion, I combine custom and small batch into one scale and large batch and mass production into another. The former two are correlated at .51 and the latter two variables have a correlation coefficient of .35. The decision to construct these two scales was also confirmed using factor analysis. A principle component analysis of custom and small batch resulted in one factor explaining over 75% of the variance. Factor analysis of large batch and mass production also showed a one factor solution explaining over 67% of the variance. The reliability of custom/small batch scale is .67. The values of this scale is the sum of custom and small batch questions asked from CEO's and ranges from 2 to 6. The alpha reliability of large batch/mass production is .52. This scale ranges from 2 to 6.

The second measure of technology used in this research is based on Amber and Amber's (1962) automation scale. One variable in the data set represents this measure. The general manager of each firm was asked to name one item among the following that best describes the bulk of the

machinery used in production:

- 1- Hand tools and manual machines (pliers, hammer, files, etc.)
- 2- Powered machines and tools (Muscles are replaced for the basic machine function, but machine action and control are completely dependent on the operator. Uses mechanical power, but man positions work and machine for desired action. e.g. electric tools.)
- 3- Single-cycle automatics and self-feeding machines (completes an action when initiated by an operator. Operator must set up, load, initiate actions, adjust, and unload. E.g. production machines without accessory automatic control system, grinder, planer, lathe, etc.)
- 4- Automatic: repeats cycle (At this level all energy is mechanized. Carries out routine instructions without aid by man. Starts cycle and repeats actions automatically -- self-feeding. Loads, goes through sequence of operations, unloads to next station or machine. No self-correction but obeys internal program such as cams, tapes, or cards. E.g. engine production lines, self-feed press lines, automatic copying lathe, etc.)
- 5- Self-measuring and self-adjusting feed-back (Measures and compares results to desired state and adjusts to minimize error. Although feedback control of the actual surface of the workpiece is preferable, positional control of machine table or tools is of great value, too. E.g. feed-back from product, automatic sizing grinders, size-controlled honing machines, process controllers, etc.)
- 6- Computer control and automatic cognition (Computer monitors multiply factors on which machine or process performance is predicated -- evaluates and reconciles them to determine proper control action.)

High scores on this variable indicate high levels of automation.

The last measure of technology used here is workflow rigidity which first was introduced by the Aston group (Pugh et al. 1969). This concept generally refers to the adaptability in the pattern of operations. I chose 5 items from the data set that reflected workflow rigidity. Response categories for the following items are coded such that "0=no" and "1=yes".

1. Equipment, machinery and tools are used only for designated jobs, and are not generalizable.
2. The fixed order of operations can not be changed.
3. The input (raw materials, parts) or processing is supplied only at the beginning of process (can not be supplied at a later stage.)

4. In the case of a breakdown, the course of processing can not be changed.
5. When a breakdown of processing occurs, all processing ceases immediately.

A principle component analysis of these items resulted in a single solution with all the items having high loadings (table 3.8). The Cronbach reliability of this scale is $\alpha=.75$. The values of this scale range from -1.10 to .95. Lower values represent flexible workflows and higher values mean rigid workflows in production.

Span of Control

The concept of span of control refers to the average number of subordinates supervisors and managers have in an organization. Woodward (1965) uses the average number of operators responsible to first-line supervision, number of people directly responsible to the chief executive, and ratio of managers and supervisors to non-supervisory staff as measures of span of control. Throughout organizational literature very similar indicators of this concept have been employed (e.g. Blau, 1974; Lincoln et al., 1986).

In this dissertation the following three variables are used in a factor analysis for the construction of a span of control index: First-line supervisor span of control; ratio of direct supervisors to direct production worker, and the ratio of all managerial supervisory personnel to all other employees. The principle component analysis resulted in one factor on which all three variables have high loadings (table 3.9). The scale of span of control was thus created using the mean of z scores of all three variables. The scores of the scale range from -2.36 to 1.49. High scores represent high span of control and low

scores represent low span of control. The Cronbach's reliability of the scale is $\alpha = .81$.

Organizational Link

Organizational link is measured such that "0-independent firm" and "1-subsidary or one of several branch plants in a division".

MEASUREMENT OF THE DEPENDENT VARIABLE IN THE EARNINGS ANALYSIS

Earnings is the annual earnings in dollars before taxes from the respondent's main job the year preceeding the survey. Earnings provides a better reflection of the operation of the labor market structure than income (Kalleberg and Lincoln, 1988: 132; Sorenson, 1983). Using income (e.g., Wright, 1979) confounds labor market outcomes with such additional sources of money as capital gain, nonlabor incomes, public support, and the contribution of family members. The natural logarithm of earnings is used because the distribution of this variable is negatively skewed, i.e., more people are concentrated at the lower end of the distribution than its upper end. Moreover, as Stolzenberg (1978: 822) suggests, there is an abundance of evidence that the form of the earnings function is logarithmic (also see Heckman and Polachek, 1974; Griliches, 1977).

MEASUREMENT OF INDEPENDENT VARIABLES IN THE EARNINGS ANALYSIS

Two sets of independent variables are used in the earnings determination analysis. One set consists of all the variables used in the worker power models. The measurement of these variables are

discussed in detail above. A set of standard human capital variables are also selected as controls for the earnings model:

Sex is coded such that "male=0" and "female=1".

Race is coded such that "non-white=0" and "white=1".

Education is coded such that

0. none	4. High school diploma
1. Some grade school	5. Some college
2. Completed grade school	6. College degree
3. Some high school	7. More than college

Age is measured in years.

Tenure is the number of years a worker has worked in the firm of his/her present employment.

SEI is coded according to Duncan's Socioeconomic Index of occupational Ranking (Duncan, 1961).

Number of weeks worked per year and number of hours worked per week.

Despite the fact that many studies do not control for weeks worked (e.g. Beck et al., 1978; Wright, 1979; Kalleberg et al., 1981; Bibb and Form, 1977) and almost none control for hours worked, these two variables are argued to be important in earnings determination models (Sorenson, 1983). This is because earnings is a function of wages per unit time and amount of time spent on the job and, therefore, is influenced by variations in hours worked per week and weeks worked per year. Mincer (1974) using census data, shows that the number of weeks worked adds about 25% to explained variance of an equation with education and work experience as independent variables. Hauser (1980) also establishes that weeks worked makes a substantial difference in

earnings equations that use the structural variable of core/periphery sectors.

METHODS OF ANALYSIS

For both worker power and earnings models, I will use regression analyses.

Worker Power Analyses

Preliminary analysis showed that because of the use of aggregate data heteroskedasticity poses a problem and, therefore, ordinary least square can not be used as a method of estimating the effects of organizational variables on unionization and internal labor markets.³ Heteroskedasticity in regression analysis refers to a situation in which error variances do not have the same magnitude across levels of an independent variable. In analyses which use aggregate data, units that are larger in size have lower variances than those which are smaller in size (Hanushek and Jackson, 1977:143) when the dependent variable is an aggregation of individual responses (as is the case for both unionization and ILM). The 52 manufacturing firms used in this research are of varying employment sizes, ranging from 21 to 5266 employees. Because many of the variables used in the analysis are means of individuals level data aggregated to the establishment level, establishments with a larger number of employees have smaller error variances and those with smaller number of employees have larger error variances. The presence of heteroskedasticity was also empirically verified. The plot of error variances against size very clearly revealed that as size increases the variance decreases.

When heteroskedasticity is present, regression results using ordinary least squares can not be trusted. The standard errors of metric coefficients become biased and tests of significance can no longer be relied upon (Hanushek and Jackson, 1977). Because of unequal variances, estimates of the standard errors are usually inflated and the analysis becomes subject to unnecessarily stringent tests of research hypotheses.

In order to account for unequal error variances in computing regression estimates, Generalized Least Squares (GLS) regressions are used. GLS provides the best linear unbiased estimators even in the presence of heteroskedasticity. SHAZAM is the computer software which I employ for GLS analyses.

When heteroskedasticity is present, the proportional reduction in error measure, R^2 , used in Ordinary Least Squares is not valid. For Generalized Least Square estimations, which properly deal with unequal error variances, Buse (1973) developed a different statistic: Buse R^2 . The value of Adjusted Buse R^2 ranges from zero to one and can be tested for its significance by an F-statistic. The magnitude of this statistic reveals the amount of variation in the dependent variable accounted for by the independent variables in the equations. For unionization and ILM analyses, the table of results will present Adjusted Buse R^2 .

Treatment Of Missing Data

The technique used here to deal with missing data is described by Cohen and Cohen (1983: 284-289). A dummy variable scored "1" for cases

with missing data and "0" for cases with valid values is created for each regression equation. Cases which have a missing value on a particular independent variable are coded as "0" for that variable. If the results show that the effect of this dummy variable is significant, then the data that is missing is nonrandom. However, if this effect is not significant, then the missing data is random and the regression estimates can be trusted. An advantage of this method of dealing with missing data as opposed to other proposed methods (see Cohen and Cohen, 1983: Chapter 7) is that we avoid loss of statistical power due to reduced sample size. In instances where data is missing for the dependent variable, cases should be dropped (Cohen and Cohen, 1983: 275). For two establishment we do not have information on unionization, and, therefore, in the regression model for the determinants of unionization the number of cases is reduced to 50. For all regression results presented below the missing data dummy variable is nonsignificant meaning that the data that is missing is random and does not affect the result of the regression analysis.

Earnings Analyses

In the earnings determination equations where the unit of analysis is the individual error variances are stable and, therefore, I use ordinary least squares regression. Because the process of attainment has been shown to be different for men and women, sex interactions will be examined (see e.g. Parcel and Mueller, 1983; Kalleberg et al., 1981).

FOOTNOTES

1. Lincoln and Kalleberg (1985) claim that, considering the heavy demand made of plants in terms of data collection, this success rate is comparable with other similar projects (also see Blau et al., 1976).

2. The second and third factors were not included in the analysis. Only 2 items had loadings above .4 on the second factor. The third factor, however, included 3 items with loadings greater than .4. This factor was not considered in the analysis because of its low reliability, $\alpha = .42$.

3. In order to detect heteroskedasticity, I plotted squared residuals of the regression of unionization on independent variables against size. This scatter plot clearly showed that at lower size levels the residual variances were larger than at higher size levels. I conducted the same procedure for ILM analyses and again the data revealed the presence of heteroskedasticity.

Table 3.1. Factor Structure Matrix of Internal Labor Market Items

Variables*	Factor 1	Factor 2	Factor 3
Var1 (job class.)	.0336	-.1239	.7039
Var2 (Chance of promot.)	.8205	-.2817	.0704
Var3 (Expect promot.)	.9145	-.0499	-.1041
Var4 (Advantage outsider)	.6283	.1637	.4998
Var5 (Document training)	-.1305	-.0218	.7700
Var6 (Informal learning)	-.1120	.8764	-.1070
Var7 (OTJ training)	-.0836	.8686	-.0341
Var8 (Present skills)	.6283	.1637	.4998
Variance			
Explained	31.6	19.9	16.7
Eigenvalue	2.52	1.59	1.37

The correlation coefficients for factors 1 and 2, 1 and 3, and 2 and 3 are -.07, .03, and -.03 respectively.

* Descriptions of variables are presented below. Abbreviations are provided in parentheses.

- Var1 - Presence of documents on job classification systems indicating qualifications for positions.
- Var2 - Chances of promotion are good.
- Var3 - Expect to be promoted.
- Var4 - Employees in the company have an advantage over outsiders in competing for job openings.
- Var5 - Presence of documents on rules regarding training and education of non-managerial employees
- Var6 - How important was informal learning for your present job?
- Var7 - How important was on-the-job training for your present job?
- Var8 - Will the present job skills be useful for your future jobs in this company?

Table 3.2. Factor Structure
Matrix of Formalization Items

Variables*	Factor1	Factor2
Var1 (Journal)	.7356	-.0081
Var2 (Handbook)	.2821	-.3947
Var3 (Contract form)	-.1760	.5847
Var4 (Policy & goals)	.4880	.1543
Var5 (Super. authority)	.4426	.5028
Var6 (Personnel eval.)	.5698	-.0004
Var7 (Labor mang. contract)	-.0066	.9002
Var8 (Occ. classification)	.4496	.0412
Var9 (Hiring procedures)	.5571	.0242
Var10 (Congradulations)	.3898	.2670
Var11 (Safety regul.)	.7239	-.0069
Var12 (Fringe regul.)	.3394	.4443
Var13 (Retirement plan)	.2204	.4250
Var14 (Training)	.7591	.0674
Var15 (Wage schedule)	.6404	.0122
Var16 (Job description)	.6028	.2118
Var17 (Work rules)	.0969	.7040
Var18 (Production sched.)	.4429	-.2166
Var19 (Research report)	.4918	.3886
Variance	24.2	13.9
Explained		
Eigenvalue	4.59	2.63

Table 3.3. Factor Structure Matrix
of Formalization Items (One Factor)

Variables	Factor1
Var1	.7094
Var2	.2017
Var3	-.0650
Var4	.4993
Var5	.5180
Var6	.5506
Var7	.1554
Var8	.4419
Var9	.5427
Var10	.4247
Var11	.6983
Var12	.4078
Var13	.2894
Var14	.7457
Var15	.6211
Var16	.6206
Var17	.2202
Var18	.3891
Var19	.5161

Factors 1 and 2 are correlated at .10.

*Descriptions of variables in tables 2 and 3 are presented below.
Abbreviations are provided in parentheses.

- Var1. Company journal
- Var2. Employee handbook
- Var3. Employment contract form
- Var4. Company policy, goals, or principles
- Var5. Rules regarding supervisory authority
- Var6. Rules and procedures governing personnel evaluation
- Var7. Labor management contract
- Var8. A job or occupational classification system, indicating qualifications for positions
- Var9. Hiring and dismissal procedures
- Var10. Congratulations and condolences
- Var11. Safety and hygiene regulations
- Var12. Regulations and descriptions concerning fringe benefits
- Var13. Description and procedures regarding retirement plan
- Var14. Description and rules regarding training and educational opportunities for nonmanagerial employees
- Var15. Descriptions and a wage/salary schedule, indicating pay levels by job grade, length of service, etc.
- Var16. Job descriptions or instructions
- Var17. Work or job rules (not included in job descriptions; e.g., work rules specified in union contract)
- Var18. Production schedule or program
- Var19. Research program or reports

Table 3.4. Factor Structure Matrix of Complexity Items

Variables	Factor1	Factor2
Average Education	.2232	.8222
No. of Departments	.6673	.0113
No. of Sections	.5808	.2602
No. of Job Titles	.6744	-.1866
No. of Functions	.6008	-.0313
No. of Ranks	.4308	-.6666
Variance Explained	30.7	20.3
Eigenvalue	1.83	1.21

The correlation between factors is -.02.

Table 3.5. Factor Structure Matrix of Centralization Items

Variables*	Factor 1	Factor 2	Factor 3
Var1 (Labor size)	.7008	.2920	-.1873
Var2 (Employment of worker)	.7811	.1561	-.4557
Var3 (Promotion of worker)	.7715	.2112	-.6964
Var4 (Represent management)	.6333	-.1424	-.5805
Var5 (No. of supervisors)	.7142	.7074	-.6315
Var6 (Recruitment of super.)	.5149	.3574	-.7486
Var7 (Promotion of super.)	.7009	-.1169	-.6799
Var8 (Salary of super.)	.7158	.0129	-.7599
Var9 (Dismissal of super.)	.5966	.0423	-.7707
Var10 (Hiring method)	.5128	.0746	-.4659
Var11 (Training method)	.5359	.0804	-.5104
Var12 (CEO's replacement)	.8339	.2668	-.2673
Var13 (Welfare facilities)	.6424	.1113	.0285
Var14 (Use of extra funds)	.4541	.5329	-.4886
Var15 (Selection of equip.)	.7075	.0808	-.6910
Var16 (Overtime of worker)	.6442	-.0755	-.4525
Var17 (Delivery date)	.7548	.3663	-.4048
Var18 (New products)	.0867	.9271	-.2295
Var19 (Sales territory)	.1490	.9098	-.1762
Var20 (Extent of market)	.0284	.8416	-.1746
Var21 (Inspection)	.4458	.6111	-.0691
Var22 (Work investigation)	.4496	.3411	-.6117
Var23 (Product priority)	.5386	.4621	-.3045
Var24 (Work methods)	.2952	.2279	-.7606
Var25 (Use of which machine)	.2464	.5045	-.5083
Var26 (Work allocation)	.4743	.1865	-.6172
Var27 (Price of product)	.1404	.7344	.1401
Var28 (D.O.L. changes)	.7861	.2967	-.3816
Var29 (New departments)	.7742	.0920	-.3430
Var30 (New jobs)	.7133	.0013	-.2264
Var31 (Sub-contractors)	.5206	.3631	-.4999
Var32 (Purchasing procedure)	.1158	-.0263	-.8096
Var33 (Which supplier)	.2084	-.0263	-.8485
Variance			
Explained	40.8	12.9	8.5
Eigenvalue	13.45	4.25	2.80

The correlation coefficient between factors 1 and 2, 1 and 3, and 2 and 3 are .18, -.39, and -.13 respectively.

* Description of variables are as follows (abbreviated names are provided in parentheses):

Var1. The size of the work force.

Var2. The employment of direct production workers (operatives).

- Var3. Promotion of production workers to supervisory positions.
- Var4. Who will represent management in a labor dispute.
- Var5. The number of first line supervisors.
- Var6. Outside recruitment of first-line supervisors.
- Var7. Promotion of first-line supervisors.
- Var8. Salary of first-line supervisor.
- Var9. Dismissal of supervisor.
- Var10. Methods of personnel selection.
- Var11. Methods of employee training.
- Var12. Who takes over in chief executive's (general manager's) absence.
- Var13. Welfare facilities and employee services to be provided.
- Var14. The use of unbudgeted or unallocated funds (or left-over funds) on capital items (investment in equipment).
- Var15. Selection of brand or type for new equipment.
- Var16. Allowing or requesting overtime work of employees and setting the amount of overtime.
- Var17. Delivery dates or priority of orders.
- Var18. New products or services.
- Var19. Sales territory to be covered.
- Var20. Extent and type of market to aim at.
- Var21. Inspection: quality control methods (e.g. to what products applied; methods used)
- Var22. Which operations will have work study done on them (i.e. investigations made).
- Var23. Outputs to be scheduled against given plans (from among the various production plans, which products to give priority to).
- Var24. Methods of work to be used (concrete methods).
- Var25. Which machinery or tools to use or a particular job.
- Var26. Allocation of work among employees.
- Var27. Price of product/output.
- Var28. Changing responsibilities or areas of work of functional specialist departments (Change in responsibility or scope of work of STAFF departments).
- Var29. Creation of a new department--functional specialist of LINE (Establishment of new department-- whether LINE or STAFF).
- Var30. Establishment of a new job (Whether LINE or STAFF).
- Var31. Putting work out to sub-contractors.
- Var32. Purchasing procedures.
- Var33. Which suppliers to buy raw material or parts from.

Table 3.6. Factor Structure Matrix
of Labor Centralization Items

Variables*	Factor 1
Var1	.5259
Var2	.7416
Var3	.8928
Var4	.7172
Var5	.8453
Var6	.7520
Var7	.8406
Var8	.9315
Var9	.8562
Var10	.6810
Var11	.6884
Var12	.6462
Var13	.5527
Variance Explained	56.8
Eigenvalue	7.39

* For description of variables
see table 3.5.

Table 3.7. Factor Structure Matrix
of Operations/Marketing Items

Variables*	Factor 1
Var14	.7363
Var15	.6876
Var16	.5698
Var17	.7755
Var18	.6828
Var19	.6220
Var20	.5734
Var21	.5912
Var22	.5387
Var23	.6312
Var24	.5768
Var25	.6407
Var26	.5980
Var27	.4716
Var28	.7089
Var29	.5450
Var30	.5864
Var31	.7498
Var32	.6174
Var33	.6240
Variance Explained	39.8
Eigenvalue	7.96

* For description of variables
see table 3.5.

Table 3.8. Factor Structure Matrix of Work-Flow Rigidity Items

Variables	Factor
Var1. Equipment, machinery and tools are used only for designated jobs, and are not generalizable.	.7358
Var2. The fixed order of operations can not be changed.	.7592
Var3. The input (raw materials, parts) or processing is supplied only at the beginning of process.	.6675
Var4. In the case of a breakdown, the course of processing can not be changed.	.8203
Var5. When a breakdown of processing occurs, all processing ceases immediately.	.5383
Variance Explained	50.5
Eigenvalue	2.53

Table 3.9. Factor Structure Matrix of Span of Control Items

Variables	Factor 1
First-line supervisor span of control	-.7157
Ratio of direct supervisors to direct production worker	.9276
Ratio of all managerial/supervisory personnel to all employees	.9053
Variance Explained	73.1
Eigenvalue	2.19

CHAPTER IV

RESULTS AND DISCUSSION OF WORKER POWER ANALYSES

INTRODUCTION

This chapter provides the results of the Generalized Least Squares regression of worker power measures on organizational variables. The findings will identify resources and vulnerabilities based on the signs of the effects of these variables on unionization and ILM. A summary of results and a discussion of their implications for worker empowerment will conclude the chapter.

RESULTS I: DETERMINANTS OF UNIONIZATION

Table 4.1 provides the zero order correlations, means and standard deviations for variables used in the analysis of the determinants of unionization. On the average, about 52% of the workers of the plants in our sample are unionized. 67% of plants are branch establishments, and, on the average, 24% of the workers in these organizations are women. On the average, establishments in the sample have about 214 employees. The scores of the scales of complexity, span of control, and workflow rigidity are all made up of average z-scores, and, thus, have means of about zero and standard deviations of close to 1.

Employment centralization has a mean of 4.47 which is the average of the mean level at which 12 decisions regarding personnel practices are made. This average is about the level of "department head". The average score of operation centralization is 4.29 (the level of "department head") which is the average of the mean level at which 20 decisions about operation are made. The scores of both centralization measures are highly clustered around the mean as the standard deviations of these two scales are quite small relative to their respective means. The mean level of both custom/small batch and large batch/mass production technologies are about 3.00. This corresponds to an answer between "not at all" and "somewhat" to the question asked from CEOs regarding the extent to which each type of technology is used. There are moderate variations of scores around the mean levels of these two measures of technology. The average level of continuous process technology is 1.90 which represents the midway between no use to some use of this type of technology. The standard deviation of this variable is 1.43 which reveals a large amount of variation about the mean. Finally, automation has a mean of 3.12 which corresponds to the prevalence of "single cycle automatic and self-feeding machines". The variation of the scores of this variable around the mean is small. On the average, about 67% of establishment are branches or subsidiaries of larger firms. The mean of percent women among establishments of our sample is 24%. There is a large amount of variation about the mean of this variable.

The bivariate correlations between unionization and most of the independent variables (size, span of control, custom/small batch

technology, branch establishment, and percentage of women) are significant and in the expected direction. The correlation between unionization and complexity is opposite to what was hypothesized. However, this effect disappears when other organizational variables are controlled for.

Table 4.2 presents results of the regression of unionization on establishment characteristics. The two centralization scales used in the analysis are highly correlated. If both are included in the same regression model, they create problems with multicollinearity. Therefore, two equations are estimated, each including one centralization measure.

As hypothesized, the log of size has a positive impact on the percentage of the work force that is unionized. Therefore, size should be viewed as a resource for workers in their struggle against employers.

There is no effect of complexity, span of control, and centralization on unionization. Thus, with regard to unionization, these variables cannot be viewed either as resources or vulnerabilities for workers.

Contrary to expectation, the negative effect of custom/small batch technology on unionization is not significant. Mass production, however, has a significant negative effect on unionization. Because of the fixed physical locations of workers in plants that employ this type of technology, communication and organizing efforts are difficult and unionization is not prevalent. Mass production technology should be considered as a vulnerability for workers.

As expected, continuous process production positively affects unionization. However, the results refute the hypothesis that plants that employ automated technologies have a smaller portion of their work force belonging to unions. This is perhaps because automated organizations are capital intensive and such firms are usually part of the core sector of the economy (Averitt, 1968; Beck et al., 1980), and presumably are more profitable than enterprises that employ labor intensive methods of production. More profitable organizations have resources to offer their workers benefits such as higher wages and better fringe benefits that unionization usually provides and thus these firms reduce organizing drives among employees. Therefore, whereas continuous process production is shown to be a resource for workers, automation is a vulnerability for them.

Workflow rigidity and the dependent status of an establishment do not affect its extent of unionization. These two variables can neither be viewed as resources nor as vulnerabilities for workers.

Finally, as predicted, percentage of women in an establishment has a negative impact on unionization. Thus, the data suggest that the presence of women in organizations acts as a vulnerability for workers. Of course, by no means am I suggesting that a male-dominated (uni-sex) work force is a goal for which to strive. However, the present structuring of organizations that is the result of a long history of corporate strategies and labor-capital struggle is such that the predominance of men in organizations act as a resource for workers.

RESULTS II. DETERMINANTS OF INTERNAL LABOR MARKETS

Table 4.3 provides the zero order correlations, means, and standard deviation of variables used in the analysis of the determinants of ILMs. Since all variables except ILM and formalization are used in the unionization analysis and, therefore, their means and standard deviations are similar if not identical to those mentioned in the previous section, I will not describe their distributions again. The mean level of ILM which is a scale made up of z-scores is .09. The standard deviation of 3.12 represents a great amount of variation about the mean of this variable. The formalization mean indicates that, on the average, 77% of a total of 19 possible documents exist in the establishments of our sample. The amount of variation of this variable is quite small. Most of the bivariate correlations involving ILM are nonsignificant. Among the significant ones, contrary to expectation, the correlation between ILM, on the one hand, and size, span of control, and unionization, on the other, are negative. However, net of other organizational variables, the effect of span of control and size disappear. The negative impact of unionization and ILM is discussed below. Complexity squared, with its negative correlation, and branch establishment, with its positive correlation with ILM, act as hypothesized.

Table 4.4 presents the results of the regression of ILM on establishment characteristics. Because the two centralization scales used in this research are highly correlated and create a problem with multicollinearity, separate regression models are estimated each including one of the centralization measures. The results of these two models are almost identical.

There is no effect of log of size on ILMs. However, the zero-order correlation between these two variables is negative and significant. This negative correlation can be explained with reference to the nature of the ILM measure used in this paper. As discussed in the measurement section, items comprising the scale are derived from the individual-level data and are based on responses of employees to questions about promotion, utility of skills, and job protection. The fact that in large organizations workers may not be able to readily perceive linkages between jobs and discern career ladders could be a reason why size and ILMs are negatively associated. An analysis not shown here reveals that it is after the inclusion of unionization in the regression model that the significant negative effect of size disappears. The effect of size is mediated via unionization which, as will be discussed below, negatively affects ILMs. Therefore, with respect to ILMs, employment size of organizations is neither a resource nor a vulnerability for workers.

The effect of complexity on ILM is parabolic with a negative square term which indicates that the parabola opens downward as in an inverted U. In partial support of what was hypothesized, for about 78% of the establishments, complexity positively affects ILMs. The magnitude of this effect diminishes as the parabola reaches its turning point at which the score of complexity is .5124. This effect, for the rest of the establishments, i.e., for about 22% of the cases, is negative. For very complex organizations, complexity negatively affects ILMs. This apparently anomalous finding can be explained using the same rationale discussed above for the negative correlation of size and ILM. It may

be the case that in highly complex organizations where there are a multitude of ranks and divisions, employees do not have a clear understanding of the links between jobs and progression of skills attached to job ladders. Therefore, in such work organizations, workers might underestimate their promotion chances and the utility of their present skills for future jobs. Only for about one fifth of establishments at high levels of complexity this variable should be viewed as a vulnerability for workers.

As hypothesized, formalization has a negative impact on ILMs. When establishments become more formalized and rely on a more sophisticated system of written documents stating the rules and policies of the organization, the extent of ILMs in such organizations decreases. Formalization should be viewed as a vulnerability for workers.

There is no effect of span of control on the extent of ILMs. This variable neither can be considered as a resource nor as a vulnerability for workers.

Centralization of decision-making, as predicted, has a negative impact on the extent of ILMs. Among all establishments, those that are more centralized have a smaller likelihood of ILMs. Thus, centralization should be viewed as a vulnerability for workers.

As predicted, among the measures of technology, custom/small batch, mass production, and workflow rigidity have negative effects on ILMs and should be considered as vulnerabilities for workers, and automation has a positive impact on ILMs and as such should be viewed as a resource for labor. This conclusion is congruent with the optimistic outlook of the consequences of technological developments

for the labor force (e.g. see Blauner, 1964; Bell, 1973; Hirschhorn, 1984). Capital intensive technologies act as resources for workers, empowering them in their efforts to secure careers, promotion opportunities, and job protection.

As expected, ILM arrangements are more prevalent in branch establishments. Links to other organizations, therefore, serve as a resource for workers.

As predicted, percentage of women is shown to affect the extent of ILMs negatively.

Unionization, contrary to what was hypothesized, negatively affects ILMs. This finding is consistent, however, with results reported by Pfeffer and Cohen (1984: 564). Drawing on Edwards (1979) and Gordon et al. (1982), Pfeffer and Cohen suggest that this negative relationship is due to the effect bureaucratic control and ILMs have on fragmenting and dividing the work force and therefore reducing chances of unionization. It may also be due to the recent reliance of management on human resource strategies to forestall unionization (Strauss, 1984: 1). These strategies aim at offering benefits that are traditionally provided by unions and thus reduce worker incentives for unionization. These explanations are not satisfactory because, instead of interpreting the negative effect of unions on ILMs, they discuss the impact of ILMs on unionization. Pfeffer and Cohen (1984: 568) provide an explanation with a correct causal order. They argue that unions provide both "an alternative source of control of the work force and a competing interest that is less likely to be sympathetic to bureaucratic control strategies." Unions promote certain aspects of bureaucratic control

such as seniority rights and are against other aspects that relate to loyalty and commitment to organizational goals.

Another explanation for the negative impact of unions on ILMs can be derived from the exit-voice analysis discussed by Freeman and Medoff (1984: 139). The exit-voice explanation emphasizes the role of unions as voice institutions. This view differentiates between " 'true' dissatisfaction, which leads workers to leave their jobs, and 'reported' or 'voiced' dissatisfaction which results from critical attitudes toward the work place and a willingness to complain about problems." (Freeman and Medoff, 1984: 139) One result of unionization is the politicization of the work force such that they will become vocal about the work conditions and are more likely to complain about chances of promotion and job security. Therefore, considering that the ILM measure used in this research is based on responses of workers to questions about promotion chances, utility of skills, and job protection, it is no surprise that in unionized establishments, employees report discontent with the extent of ILMs.

SUMMARY AND DISCUSSION

This chapter examined the effects of organizational variables on unionization and internal labor markets. The results for unionization showed that among all establishment characteristics, employment size, large batch/mass production, continuous process, and automation technologies have significant effects on unionization. The positive impact of size, which is the strongest predictor of unionization, reveals this variable to be a resource for workers as large

organizations enhance the communication and organization possibilities of workers. Also, in large organizations, the relative cost of unionization is lower and because of difficulty in worker-management communication, unions are valued more. Large batch/mass production technology with its negative impact on unionization should be regarded as a vulnerability for workers in their struggle against employers. In organizations that predominantly use this type of technology, the limited scope of interaction among workers and their fixed locations is not conducive to communication and exchange of ideas about wages and working conditions that is necessary for the growth of unions. Continuous process production has a positive effect on unionization and should be regarded as a resource for workers. As Blauner suggests (1964), in establishments where this type of technology prevails, workers have more chances of interacting with each other and are more cohesive -- conditions conducive to unionization. Moreover, in plants that use continuous process technologies which are capital intensive, the labor demand curve is less elastic and organizing costs are low. Automation, on the other hand, has a negative impact on unionization and should be viewed as a vulnerability for labor. Automated plants are profitable and have enough resources to provide workers with benefits usually offered by unions.

Other organizational variables -- span of control, complexity and centralization -- which represent the degree of bureaucratization of workplaces do not have any impact on unionization. Percentage women has a negative effect on unionization. Needless to say, I do not suggest that percent women should be viewed as a vulnerability and that

presence of women in work organizations must be avoided. The data, however, suggests that the present structure of work disempowers those workers who are part of establishments which employ a high proportion of women. In short, although, bureaucracies have a long range of effects on workers and their work conditions, the extent of bureaucratization as measured by span of control, complexity and centralization does not have any consequences for worker power in bargaining with employers.

According to the analysis of the determinants of internal labor markets, among bureaucratic characteristics of organizations only complexity (for the majority of establishments) acts as a resource for workers, since proliferation of ranks and divisions are necessary for the creation of ILMs. Formalization and centralization are shown to be vulnerabilities for labor. These structures restrain workers and act as control/coordination mechanisms and thus reduce the motivation of employers to establish ILMs. Among measures of technology, less capital intensive techniques of production (custom/small batch, mass production techniques, and rigid workflow productions) are vulnerabilities and more capital intensive methods (automation) are resources for workers. In establishments that custom/small batch techniques are prevalent, mobility structures are not firm-bound. Mass production and rigid workflow technologies impose technical control on workers and reduce the need for ILMs as coordination and control mechanisms. In capital intensive establishments, because of the high degree of responsibility of workers, employers offer promotion opportunities and job stability. Also in such workplaces due to the high cost of damage to machinery

that may result from human error or sabotage, workers are in a position of power to demand ILM arrangements.

Branch organizations in comparison to autonomous ones have a higher prevalence of ILMs. Multi-establishment firms are more likely to develop ILMs because of their concern with worker loyalty that helps relocate workers from one establishment to the other if vacancies need to be filled. Coordination difficulties in multi-branch organizations also lead to expansion of structures such as personnel departments which accompany ILMs.

Finally, unionization is shown to have a negative effect on ILMs. Unions lower turnover and training costs which are part of the management's incentive to create ILM structures. Unions do not necessarily consider ILMs to be to the full benefit of workers. Some aspects of ILMs such as job protection are looked upon favorably and other aspects such as loyalty to employing firms is viewed unfavorably by unions.

In view of the paucity of empirical works similar to this research, especially regarding the use of the organization as the unit of analysis, the results can not be readily compared to previous findings. Most studies in the resource perspective have used the effects of industrial measures on earnings to identify resources and vulnerabilities. Despite these differences in levels of analyses and choice of the dependent variable, some congruities as well as inconsistencies can be identified between the present study and previous ones. For example, Hodson's analysis (1983, 1986) concluded that because industries populated with large enterprises provide an

expanded basis of solidarity among workers, and because in capital intensive industries workers have great responsibilities for the care and maintenance of expensive equipment, these two variables -- size and capital intensity -- affect earnings positively and are resources for workers. Accordingly, the results of this paper reveal that workers are empowered by large size of organizations and their use of capital intensive technologies --continuous process techniques and automation as it positively affects ILMs. On the other hand, whereas Hodson (1983, 1986) showed that because of the exploitation of satellites by parent companies, industries with the predominance of conglomerates -- industries that are in a subsidiary relationship to other industries -- offer lower wages and thus conglomerate domination should be viewed as a vulnerability for workers, the present research reveals that links to other organizations (organizational dependence) serves as a resource for them. Branch organizations and subsidiaries offer career ladders and job protection and as such empower labor. Hodson's conclusion that industrial dependence is a vulnerability since it negatively affects earnings may have been premature. Higher wages in industries that are autonomous may be used as a method of control and appeasement of workers without really empowering them.

A major concern I had before the analysis was completed relates to a situation in which variables would have opposite signed effects on unionization and ILMs. Such a situation would have confounded the identification of resources and vulnerabilities. Fortunately, the results have posed this difficulty of interpretation only in the case of the effect of automation which is negative on unionization and

positive on ILMs. Other than this, size, complexity, continuous process technology and organizational links all act as resources, and formalization, centralization, custom/small batch, large batch/mass production technologies, and workflow rigidity act as vulnerabilities for workers. The former set are resources because they enhance worker-empowerment structures; they result in arrangements in which workers either gain a stronger voice in negotiating work conditions with employers or they secure careers, employment stability, and freedom from outside competition for jobs in the employing company. On the other hand, the latter set of variables are vulnerabilities since they curtail empowering structures for workers.

The opposite signs of the effects of automation on unionization and ILMs might reflect a situation in which employers are in favor of enhancing and implementing one form of worker power (ILMs) and are against the expansion of another form (unionization). In automated plants where, because of the profitability of capital intensive technologies, employers have assets to provide benefits that are usually offered by unions, the creation of ILMs could well be one of the provisions that are meant to curb unionization incentives among workers.

One finding that deserves much thought and attention is that of the negative relationship between unionization and ILMs. As discussed earlier, both structures undoubtedly are empowering agents for workers (e.g. see Freeman and Medoff, 1984, and Kalleberg and Wallace, 1981). The negative relationship can be explained with reference to distinct dimensions that the two measures represent. Unionization empowers

workers vis-a-vis employers in bargaining for wages, fringe benefits, and better working conditions. However, internal labor markets, or more specifically firm internal labor markets (FILMs) in the context of this research (see Althauser and Kalleberg, 1981), empower workers vis-a-vis employers in securing promotion chances and circumscribing employer's tendency to hire from the low-wage reserve army of labor. In this regard, FILMs differ from unions also in that they bestow power to workers vis-a-vis other members of the labor force not working for the employing firm. Here lies the dilemma as to the implications of the findings for the empowerment of workers. If unionization is to be enhanced -- a plausible goal in the face of the sharp decline of unions in the past few decades --, then one by-product of this will be the decline of internal labor market arrangements. And if it is desirable that ILMs become the predominant agent of worker power, we should do away with unions. But, as discussed above, one reason behind expansion of ILMs is employers' fear of unionization. If unions become extinct and forgotten, then employers may not continue to provide benefits once offered to workers to curb unionization incentives. Ostensibly this is a catch-22 situation. But, considering that ILM arrangements may not be promoted once unions disappear, I believe that enhancing unionization should be the primary goal of worker empowerment agendas. ¹

FOOTNOTES

1. I should note that this conclusion somewhat downplays the fact that employers create ILMs partly because of their desire for efficiency in organizations. Taking this into account, even if unions become nonexistent, employers may still promote internal labor markets.

Table 4.1. Zero-order Correlations Among All Variables in the
Unionization Model

	1	2	3	4	5	6	7	8	9	10	11	12	13	Mean	s
1. % Unionized														51.91	46.72
2. Log of Size	.540 ^a													5.37	1.22
3. Complexity	.346 ^a	.737 ^a												-.03	.64
4. Span of Control	.309 [#]	.467 ^a	.256 [#]											.00	.87
5. Centralization (Employment)	-.131	-.397 ^a	-.272 [#]	-.207 ^{\$}										4.47	.63
6. Centralization (Operation)	-.097	-.323 [#]	-.191 ^{\$}	-.155	.765 ^a									4.29	.67
7. Custom/Small Batch	-.231 ^{\$}	-.408 ^a	-.260 [#]	-.370 ^a	.002	-.210 ^{\$}								3.00	1.19
8. Large Batch/ Mass Production Process	.070	.360 ^a	.240 [#]	.240 [#]	-.011	.211 ^{\$}	-.677 ^a							2.98	1.29
9. Automation	.046	.119	.140	.121	-.198	-.119	-.341 ^a	.468 ^a						1.90	1.43
10. Workflow Rigidity	-.194	-.010	-.118	.173	-.021	-.137	-.268 [#]	.386 ^a	.464 ^a					3.12	.88
11. Branch Establishment	.144	.225 ^{\$}	.337 [#]	.145	-.036	.123	-.382 ^a	.362 ^a	.225 ^{\$}	.140				-.002	.70
12. Percent women	.200 ^{\$}	.346 ^a	.326	-.006	-.041	.028	-.125	.329 ^a	.091	-.085	.104			.67	.47
13. Percent women	-.242 [#]	.124	.115	-.009	.028	.083	-.289 [#]	.302 [#]	.198 ^{\$}	.118	.063	.288 [#]		.24	.22

^a P < .01, one-tailed test.

[#] P < .05, one-tailed test.

^{\$} P < .1, one-tailed test.

Table 4.2. Generalized Least Square Regression of Unionization on Establishment Characteristics

Independent Variables	Model 1		Model 2	
	Metric Coef.	Beta	Metric Coef.	Beta
Log of Size	20.372*** (5.645)	.510	20.648*** (5.719)	.517
Span of Control	3.230 (7.768)	.059	3.774 (7.806)	.068
Complexity	8.192 (10.130)	.110	8.325 (10.047)	.112
Centralization (Employment)	-2.205 (3.918)	-.006		
Centralization (Operation)			1.125 (3.851)	.034
Custom/Small Batch	-5.890 (5.815)	-.163	-5.213 (5.943)	-.144
Large Batch/Mass Production	-10.362 ^a (4.857)	-.306	-10.615 ^a (4.841)	-.313
Continuous Process	7.441** (4.422)	.235	7.671** (4.322)	.242
Automation	-9.914# (4.843)	-.305	-9.766# (4.888)	-.301
Workflow Rigidity	-2.396 (8.922)	-.034	-2.747 (8.911)	-.039
Branch Establishment	-11.247 (12.907)	-.115	-10.844 (12.828)	-.110
Percent Women	-67.848*** (23.191)	-.318	-64.773*** (23.566)	-.304
Intercept	22.215		15.089	
N	50		50	
Buse Adjusted R ²	.53		.53	
SEE	489.00		488.46	

Note: Standard Errors are presented in parentheses

*** p < .005, one-tailed test.

** p < .05, one-tailed test.

* p < .1, one-tailed test.

p < .1, two-tailed test for direction opposite of that hypothesized.

^a p < .1, two-tailed test.

Table 4.3. Zero-order Correlations and Descriptive Statistics for All Variables in Internal Labor Markets Model

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1. ILM																
2. Log of Size	-.245 [#]															
3. Complexity	-.103	.717 ^a														
4. Complexity (squared)	-.288 [#]	.137	.160													
5. Formalization	-.133	.502 ^a	.451 ^a	.009												
6. Span of Control	-.224 ^{\$}	.417 ^a	.207 ^{\$}	.097	.191 ^{\$}											
7. Centralization (Employment)	-.064	-.391 ^a	-.252 [#]	-.207 ^{\$}	-.291 [#]	-.198 ^{\$}										
8. Centralization (Operation)	.027	-.375 ^a	-.207 ^{\$}	-.059	-.301 [#]	-.200 ^{\$}	.772 ^a									
9. Custom/Small Batch	.059	-.359 ^a	-.212 ^{\$}	-.071	-.023	-.332 [#]	-.032	-.228 ^{\$}								
10. Large Batch/Mass Production	-.101	.335 ^a	.221 ^{\$}	.167	.101	.204 ^{\$}	-.015	.176	-.682 ^a							
11. Continuous Process	.080	.167	.172	-.075	.087	.163	-.205 ^{\$}	-.099	-.379 ^a	.513 ^a						
12. Automation (log)	.072	-.048	-.121	-.147	-.143	.110	.034	-.092	-.219 ^{\$}	.365 ^a	.421 ^a					
13. Workflow Rigidity	-.124	.225 ^{\$}	.337 [#]	-.278 [#]	.026	.145	-.036	.123	-.382 ^a	.362 ^a	.225 ^{\$}	.140				
14. Branch Establishment	.192 ^{\$}	.329 [#]	.313 [#]	-.049	.528 ^a	-.042	-.039	.003	-.105	.311 [#]	.111	-.084	.104			
15. Percent women	-.087	.044	.059	.142	.035	-.091	.049	.060	-.243 [#]	.266 [#]	.247 [#]	.164	.288 [#]	.031		
16. Unionization	-.392 ^a	.540 ^a	.346 ^a	.007	.238 [#]	.309 [#]	-.131	-.097	-.231 ^{\$}	.070	.046	-.194	.144	.200 ^{\$}	-.242 [#]	
Mean	.09	5.29	-.06	.40	.66	-.04	4.47	4.26	3.04	2.93	1.94	1.09	-.003	.67	.24	48.79
Standard Deviation	3.12	1.18	.63	.55	.28	.85	.63	.63	1.18	1.28	1.45	.30	.71	.47	.22	46.94

^a P < .01, one-tailed test.

[#] P < .05, one-tailed test.

^{\$} P < .1, one-tailed test.

Table 4.4. Generalized Least Square Regression of ILM on Establishment Characteristics

Independent Variables	Model 1		Model 2	
	Metric Coef.	Beta	Metric Coef.	Beta
Log of Size	-.112 (.472)	-.044	-.310 (.494)	-.122
Span of Control	-.428 (.510)	-.119	-.365 (.526)	-.101
Complexity	1.491 (.988)	.307	1.680* (1.015)	.346
Complexity Squared	-1.455** (.669)	-.258	-1.408** (.692)	-.268
Formalization	-4.003** (1.923)	-.364	-3.315** (2.019)	-.302
Centralization (Employment)	-.823**** (.283)	-.388		
Centralization (Operation)			-.671**** (.284)	-.309
Custom/Small Batch	-1.068**** (.399)	-.417	-1.128**** (.427)	-.474
Large Batch/Mass Production	-.523* (.356)	-.196	-.531* (.370)	-.237
Continuous Process	.209 (.302)	.098	.254 (.312)	.120
Log of Automation	1.638** (.872)	.264	1.296* (.902)	.209
Workflow Rigidity	-1.686**** (.520)	-.364	-1.613**** (.536)	-.348
Branch Establishment	2.638**** (1.080)	.404	2.612**** (1.121)	.399
Percentage Women	-4.447** (1.854)	-.321	-4.164** (1.917)	-.301
Unionization	-.026# (.009)	-.404	-.028# (.010)	-.418
Intercept	9.631		10.079	
N	52		52	
Buse Adjusted R ²	.47		.44	
SEE	35.160		36.366	

Note: Standard Errors are presented in parentheses

**** p < .005, one-tailed test.

*** p < .01, one-tailed test.

** p < .05, one-tailed test.

* p < .1, one-tailed test.

p < .01, two-tailed test for direction opposite of that hypothesized.

CHAPTER V

ORGANIZATIONAL STRUCTURES AND EARNINGS

INTRODUCTION

The focus of this chapter is on an earnings determination analysis within the context of the resource perspective as it has been formulated and specified in the present research. The chapter will develop an earnings model and a set of hypotheses that will highlight the critical place of organizations, the mezo-level of analysis, in studies of inequality and attainment.

The primary importance of including an earnings determination analysis in this dissertation is to establish links and maintain continuity with past research in stratification in general and the resource perspective in particular. Earnings analyses as they shed light on the topic of social inequality and the process of attainment have been central to stratification research in such diverse perspectives as the status attainment paradigm (e.g., Blau and Duncan, 1967) and the new structuralism (e.g., see Beck et al., 1978; Kalleberg et al., 1981).

As a recent development of the new structuralist research, past works on the resource perspective have mainly focused on earnings as the

sole dependent variable and as a way of determining resources and vulnerabilities (e.g., see Hodson, 1983). Corporate structures that have positive effects on earnings are considered resources and those that negatively affect earnings are viewed as vulnerabilities. As discussed in Chapter 2, in this dissertation, I criticize the resource theory regarding the logic it employs to determine resources and vulnerabilities, i.e, the sign of the effect of industrial structures on earnings. Despite this criticism, in view of the fact that earnings has been the most important worker outcome in stratification research, in this chapter, I develop a model of earnings determination. Moreover, it is of considerable importance to assess the impact of the variables identified as resources and vulnerabilities in chapter 4 on earnings. Do worker power measures of unionization and internal labor markets introduced in this research enhance earnings as a worker outcome? Do organizational structures that act as resources enhance earnings? Do those arrangements in organizations that are vulnerabilities negatively affect earnings? Positive answers to these questions will be comforting, because one would expect that organizational resources that empower workers would translate into higher earnings and that vulnerabilities that disempower workers would have negative impacts on earning levels of workers. However, in developing hypotheses of the direct effects of organizational variables on earnings, the rationals I use rest on how these structures affect earnings aside from the way in which they create resources/vulnerabilities via worker power. According to the formulation of resource theory presented in Chapter 2, organizational

variables affect outcomes via both measures of worker power and a set of other variables (e.g., efficiency and productivity) not measured in this dissertation. To the extent that the empirical work here does not include the full range of indicators of worker power, the resource effects are underestimated and the direct effects of the organizational variables are overestimated.

An earnings analysis, as it will be modeled here, will add substantially to our knowledge of the process of attainment within organizations, an issue which has received scant attention in the stratification research. Among all previous earnings models, very few have used structural variables at the organizational level of analysis (e.g. see Kalleberg and Lincoln, 1988; Villemez and Bridges, 1988). And almost none have focused on the impact of bureaucratic structures as measured by complexity and formalization, for example, on earnings. I know of no empirical work that links types of technology to earnings of workers. Thus, the uniqueness of the hypotheses developed in this chapter and the analysis presented in the following chapter is their use of a host of organizational measures in conceptualizing an earnings determination model.

As mentioned above, attempts to provide rationales for direct effects of organizational structures on earnings have been scant. However, an extensive review of literature provided two types of explanations for the *indirect* effect of organizational structures such as size on earnings. First, according to neoclassical economics, because scale economies enhance worker productivity, with which wages are associated, and because higher wages can be absorbed by increased

product prices in large firms, large bureaucracies provide increased earnings (Brown, 1977: 225-26). Here the explanation introduces levels of economic profit and productivity as intervening variables. Several empirical studies report positive impacts of profit level and productivity¹ on earnings (for a review see Farkas et al., 1988: 101-103). Second, the neo-Marxists maintain that large organizations are more vulnerable to labor unrest and, thus, offer higher wages in order to avoid labor-capital conflict (see Baron, 1984: 42). In work situations where workers are alienated and do not identify with management, class consciousness is heightened and as a result workers are offered higher wages as a way of reducing chances of industrial conflict (Farkas et al., 1988: 110; Freeman and Medoff, 1984). Accordingly, in developing many of the hypotheses for the effects of organizational variables on earnings, I will explain effects on productivity/efficiency, profitability, and labor unrest as indicative of impacts on earning levels.

The hypotheses developed in this chapter refer only to workers; managers/supervisors are excluded from the analysis. The analysis is restricted to workers with no supervisory responsibilities because of the emphasis of the resource perspective on the struggle of workers vis-a-vis employers, the contradictory position of managers/supervisors in the relations of production, and the use of unionization as a measure of worker power in the present research. Wright (1982) argues that the present class structure of the U.S. includes positions that can not clearly be placed in a dichotomized classification of proletariat/bourgeoisie. Managers are one such grouping. Similar to

the capitalist class they exercise control over physical capital and labor and, like the proletariat, they are excluded from control over money capital. This ambiguity in the position of managers, in addition to the fact that they identify themselves more with the capital than the labor, is one reason I exclude them from the present analysis. Another reason is that persons with supervisory responsibilities are not covered by the National Labor Relations Act; they are not union members. Therefore, considering that the effect of organizational factors on percent of workers unionized has been a determining factor for identifying resources and vulnerabilities in this research and that in the computation of unionization the proportion of workers with no supervisory responsibilities were used, managers/supervisors are excluded from the earnings analysis.

In the ensuing sections of this chapter the expected effects on earnings of all organizational measures developed in this dissertation will be discussed. A brief section on the effect of control variables and a conclusion will close the chapter.

THE EFFECT OF UNIONIZATION

I expect the degree of unionization, which is one of the measures of worker power employed in this dissertation, to have a positive impact on wages of all workers within that organization.

Traditionally, the major demand of unions at the bargaining table has been wage increases. The wage gains of unions for their members also carry over to non-union employees, both blue-collar and white-collar workers, of an organization (Freeman and Medoff, 1984). Unions are in

favor of "single rate" pay plans. This plan attaches wages to jobs as opposed to attaching wages to workers. When within an organization, it is a person's job that determines his/her pay, then even a non-unionized employee will benefit from holding a job that pays more due to union arrangements.

Unions positively affect earnings of nonunionized workers also because unionization leads to a reduction of inequality within firms (Freeman and Medoff, 1984). For reasons of organizational unity and solidarity, unions are likely to equalize wages among workers doing similar tasks.

The positive wage impact of unionization can also be due to its effect on productivity of organizations. According to Freeman and Medoff (1984: 163), empirical evidence suggest that unionism enhances productivity. Brown and Medoff (1978) found that a portion of the productivity effect of unionization is due to lower quit rates in unionized sectors. Lower quit rates mean lower hiring and training costs and less disruption in work groups that results in increased productivity. Moreover, because in unionized enterprises, workers stay with the firm for longer periods, there are more incentives for investments in specific skills, a factor that contributes to production efficiency.

Another way in which unionization affects productivity is the seniority-based promotions and reward systems in organized firms. Many benefits in such firms depend on length of service rather than individual performance. Feelings of rivalry are less pronounced and the informal training workers are willing to provide one another is

greater and, thus, the cost of direct training of workers is reduced.

The productivity effect of unionization is also due to changes in the management practices from paternalistic and authoritarian personnel policies to practices in which relies on explicit rules. Based on a comprehensive study of over one hundred unionized firms, Slichter et al. (1960) conclude: "The challenge that unions presented to management has, if viewed broadly, created superior and better-balanced management..." (p. 95). Regarding changes in the management orientation, Freeman and Medoff (1984: 15) maintain that unions improve the labor/management communication, increases flow of information between the two and as such improve productivity of firms. Marshall (1987: 121) writes that the process of negotiation provides management with valuable information that may only be available at a greater cost in non-unionized businesses. Finally, Reynolds (1982: 474) asserts: "Unions can do valuable work by pointing out improvements that perhaps should have been obvious to management but were not, and that, once discovered, can be installed with a net gain to the company as well as the worker."

THE EFFECT OF INTERNAL LABOR MARKETS

I expect ILM, which is conceptualized as a measure of worker power in this research, to have a positive effect on earnings. Part of this effect is due to the impact of ILMs on organizational efficiency and productivity. From the institutionalist point of view (e.g. Williamson, 1981; Williamson et al., 1975; Doeringer and Piore, 1971) ILMs contribute to efficiency in organizations. Specific training increases

the value of workers to the firm and if the employment is discontinued, organizations are faced with increased training costs. Thus, providing career opportunities and job protections for employees who have acquired firm-specific training ensures their continued employment and, therefore, cuts down the training costs of new employers.

ILMs enhances productivity also because they reduce the cost of perpetual monitoring and coordination of employee activities in large organizations where such coordination is difficult and where it is hard to identify in advance the full range of employee tasks and responses to particular situations (Osterman, 1987: 46).

Another rationale for the positive effect of ILMs on earnings is based on the dual economy literature (e.g., Edwards, 1979; Gordon et al., 1985). ILMs are prevalent in the core sector of the economy where firms monopolize the market, are large, technologically advanced and profitable. Such firms afford to pay higher wages to workers (Tolbert et al., 1980; Beck et al., 1978; Hodson, 1978) partly because they are profitable and partly due to their ability as monopolies to pass on costs to consumers.

Finally, as Villemez and Bridges (1988:141) show, the job protection component of ILMs is positively associated with higher earnings net of other factors. Protection from competition provides workers with a partial monopoly vis-a-vis employers over jobs. As the result, employers become increasingly dependent on the existing work force and are willing to offer higher wages.

THE EFFECT OF SIZE

I expect large organizations to offer higher earning levels. Empirical studies on the impact of size on wages have generally found that workers in larger establishments earn more than those in smaller ones (e.g., see Lester, 1967, and Bridges and Villemez, 1988). Kalleberg and Berg (1987: 141) assert that one reason for this positive effect is that large organizations are more vulnerable to worker unrest and, therefore, provide increased rewards in order to reduce industrial conflict.

The wage effect of size is also due to the impact of increased number of employees on the employer's income, and corporate profits (Aldrich and Wiess, 1981). These relationships are posited by both Marxist economics and microeconomic theories of the firms. In Marxist literature, employment size implies the existence of potential surplus value for the owners from the exploitation of an ever increasing number of workers (Marx, 1867: 322-35; Wright, 1979: 91-6). Microeconomic theory of the firm also assumes a positive relationship between work force size and owner's income (and corporate profits), as enterprises reap benefits from economies of scale.

Scale economies include factors such as: "the efficiencies that arise with an increasing division of labor within the firm which lead to higher levels of productivity, and the ability of larger businesses to purchase larger quantities of goods at reduced prices..." (Aldrich and Wiess, 1981: 282)

THE EFFECTS OF COMPLEXITY, CENTRALIZATION, AND FORMALIZATION

Hage's review of Weber's writings on the consequences of

bureaucratization (Hage, 1980: 26) maintains that organizational complexity, centralization, and formalization positively affect productivity and efficiency. Bureaucracies are characterized by the separation of offices into clear spheres that are arranged in strict hierarchies. Such arrangements make for heightened productivity and efficiency. This is because of the discipline and control engendered by hierarchy of authority, limited authority, and division of labor that are essential elements of ideal typical bureaucracies. Hage (1980: 26) writes:

It is this hierarchy that gives orders their legitimacy; they come from a superior in the chain of command, therefore they are quickly obeyed. The strict hierarchy also means that each person's work is carefully supervised. Since the superior has both authorities -- the right to give orders and to supervise -- and the means to enforce them, the subordinate does what he is told. On the other hand, the rights of the superior are carefully bounded as well and the subordinate has formal appeal procedures in case the superior exceeds his limits of power. The theme that runs through almost all of Weber's discussion is the stringency of discipline that is obtained by the structure of bureaucracy as he visualized it. In a sense, a mechanism of control becomes the intervening variable that connects the structure and the performance or function of efficiency.

Drawing upon Weber's discussion of bureaucracy and efficiency, Hage (1980:26) contends that formalization is another dimension of bureaucracies that enhances productivity. If functions are specified and bounded by official rules, calculability and certainty are enhanced. When jobs are well defined as in the case of highly formalized organizations, they can be learned effectively. Rules and procedures that are explicitly specified in a written form provide the standard to which employees must conform and against which their performances will be judged. Employees can then be easily evaluated and supervised (Dornbush and Scott, 1974). Moreover, in formalized work places,

because of the practice of recording all acts, decisions, etc., work activities become highly visible and easy to grasp, learn, and ultimately performance quality will be enhanced. In formalized organizations, individual judgments are kept to a minimum and calculability and predictability is enhanced and efficiency is heightened. High efficiency and productivity result in higher earnings levels.

THE EFFECT OF SPAN OF CONTROL

No past literature has hypothesized or empirically examined the effect of span of control on earnings of workers. I should remind the reader that the earnings analysis in this dissertation is restricted to workers with no supervisory responsibilities, i.e., workers with no subordinates. There is no literature on the effect of span of control on the earnings of such workers. However, there is theoretical and empirical works on the positive impact of span of control on the earnings of supervisors. For example, Mueller and Parcel (1986) empirically establish this relationship. They argue that due to increased time and effort required for managing additional employees and/or to the reliance on positive social control mechanisms in the higher management levels, span of control positively affects earnings. Robinson and Kelly (1979) also acknowledge this relationship and argue that because increased span of control creates anxiety and worry, supervisors with a larger number of subordinates deserve to get paid more.

Although no work has been done on the relationship of span of

control with earnings of workers with no supervisory responsibilities, we can extend the above arguments to the case of these employees. We can postulate that the higher earning levels of supervisors and managers in organizations with large spans of control spills over to workers' wages. I contend that because organizations try to avoid great amounts of inequality within their work force that may lead to unrest and labor-management conflict, workers would have higher earning levels if supervisors and managers have high salaries.

Span of control can affect earnings indirectly via efficiency and productivity. There is no previous literature that establishes this relationship. In fact, increase in span of control is not usually acknowledged as a concomitant of bureaucratization. However, Michels' (1949) writings on the future of bureaucracies suggests that bureaucratization is accompanied by a tendency for organizations to become oligarchies ("the iron law of oligarchy"). Tendency toward oligarchy implies an ever increasing span of control and, thus, as such, span of control can be viewed as a dimension of bureaucracy and should positively affect efficiency and worker's wages.

I expect span of control to affect wages positively also because of the potential for labor/management conflict in work places where many employees are subject to the orders of only a few supervisors and managers. Employers in organizations that have large degrees of span of control are willing to offer higher wages because they fear possible labor unrest due to the common subordinate position of many workers who may become aware of their similar position in the relations of production and their exploitation by employers.

THE EFFECT OF TECHNOLOGY

I hypothesize that more capital-intensive organizations offer labor higher earnings; small batch and mass production technologies negatively affect wages and automation, continuous process technology, and workflow rigidity have a positive impact on earnings levels. Two reasons for this expectation can be cited. The first explanation is based on one of Hicks-Marshall's Laws (see Marshall, 1923:518-538; Hicks, 1966:241-247; Farkas et al., 1988: 100). According to the fourth of these laws, the share of labor in total costs -- labor intensity -- has a negative relationship with wages. The larger the labor share is, the more elastic (the less steep) the labor demand curve (which plots wage rates on the vertical axis and the number of workers employed by a firm on the horizontal axis) will be. A more elastic labor demand curve in contrast to a less elastic one suggests that a larger number of workers will lose their jobs for a certain amount of wage increase. In the former case workers undergo a greater risk if they demand wage hikes. The reason that in labor intensive firms employment loss is greater for a unit increase in wages -- i.e., the labor curve is more elastic or less steep -- is that in such firms as wages increase product prices will rise more drastically. This will lead to a drop in quantity of goods sold which in turn translates to lower employment rates. Therefore, in labor intensive businesses, workers do not ask for large wage increases for they know about the employment risk they take in making such demands. It follows that wages are higher in organizations that employ capital-intensive technologies.

The second explanation is based on the high cost of sabotage and malfeasance in capital-intensive firms. Working with expensive machinery and the threat of equipment misuse and sabotage gives workers enhanced bargaining power that can be used to demand higher wages (Hodson and Kaufman, 1982; Hodson, 1984). This sociological explanation is similar to Bulow and Summers' (1986) and Katz's (1986) economic theory of "efficient wages". According to one version of this theory, the "shirking model", wages offered by employers depend on the cost of malfeasance and the costs of detecting such actions. Workers know that even with minimum surveillance, there is always the chance that they could lose their jobs for industrial misconduct. They may more readily take the risk of losing their jobs if wages are the same in other companies. However, if workers are paid more than they could make elsewhere, they will not engage in shirking that can be detected and cost them their jobs. In situations where the cost of detecting and repairing malfeasance is high, employers realize that it is cheaper to raise wages than to spend money on the technology or personnel that would be needed for a more thorough surveillance (Farkas et al., 1988).

THE EFFECT OF ORGANIZATIONAL LINKS

I expect establishments that are part of a larger company to offer higher wages to employees. This effect of organizational link on earnings has been substantiated by Kalleberg and Lincoln (1988) within the manufacturing sector both in the U.S. and in Japan using the same data set employed in this dissertation. Also, Hodson (1983) argues that organizations with branch establishments and subsidiaries provide

substantial resources for capital. These companies permit employers to internally arrange prices and judiciously realize profits in selected locations (Hodson, 1983: 49). The profitability of multi-branch companies allows workers to request a larger portion of corporate profits.

THE EFFECT OF PERCENT WOMEN

I expect percent women to have a negative effect on earnings levels. The relationship between sex composition of firms and wages is established by Blau (1977). She argues that this relationship is due to the presence of "statistical discrimination" (Blau, 1977:30) which refers to a situation where a category of workers is regarded as less productive on the average and is, therefore, discriminated against and is excluded from certain types of employment on a probabilistic basis (Aigner and Cain, 1977; Arrow, 1973). Employers may discriminate against women because of their average productivity which is thought to be less than that of men. Here, sex is assumed to be a characteristic that provides information on expected productivity. Blau (1977) argues that high-wage firms are able to adopt more restrictive hiring standards than firms that offer lower wages. Employers in the former type of organizations have the freedom to exercise hiring preferences. Because they offer higher wages, these firms are able to choose from workers in a large labor pool and indulge in their discriminatory ideas about female workers. Blau (1977: 36) writes that in sexually mixed occupations a fairly widespread preference among employers for male over female labor exists. A preference for male labor could be based on

a broad spectrum of attitudes ranging from simple distaste for employing women, particularly outside a narrow group of traditionally female occupations, to employer beliefs about the differences in the quality of or costs associated with male and female labor. The result of this process of screening in hiring decisions is the low percentage of women in firms that offer higher levels of wages.

Blau's discussion of the relationship between sex composition and wages, although sound, does not delineate a causal relationship between these two variables. Her research does not specifically suggest that sex composition of establishments leads to or causes variations in earnings of employees. In order to provide a rationale for a clearer causal connection, I argue that the reason employees of establishments with higher proportion of women earn less is that these work places have more jobs that consist of a higher percentage of women or are female dominated and that such jobs pay less even to male workers. Hodson and England (1986: 17) note that even after adjusting for differences between jobs in their skill demands and the human capital of their incumbents, the finding that the sex composition of jobs affects their wage levels is not altered. Hodson and England (1986: 17) further argue that, all else equal, both men and women earn less in jobs with a higher percentage of women. This is because of two related reasons: discrimination and overcrowding. Some employers practice discrimination by taking the sex composition of jobs into account in attaching wages to jobs. Indulging in "tastes for discrimination" could lead to setting lower wages for women and for the jobs that are female dominated (Blau, 1984). Tastes for discrimination can exist

among customers and male employees as well as among employers. In order to compensate for the disutility of having female workers, employers offer lower wages to women and if discrimination varies across jobs it will also lead to job sex-segregation.

There are a variety of other reasons why discrimination results in sex-typed jobs that offer differential rewards. Employers may not value traditionally female work and feel it should not be rewarded highly. They might see women as less in need of money because they are not the family's breadwinner. Women may also have been socialized to devalue female jobs and thus may not bargain as hard for higher wages. "The fact that this discrimination is largely between jobs discourages bargaining because the relevant comparisons with higher male wages in other occupations requiring similar skill are not obvious." (England and MacLaughlin, 1979: 208)

The second reason for the association between sex composition of jobs and their wage level is the effect of overcrowding (Bergman, 1974; Johnson and Solon, 1984). As a result of employers' tastes for discrimination, women are crowded into certain jobs. Because these jobs are not as numerous as male-dominated jobs, the supply of labor is high and, as a result, wages are depressed.

Table 5.1 summarizes all the hypothesized effects of organizational variables on earnings.

THE EFFECTS OF CONTROL VARIABLES

A standard set of standard human capital variables -- sex, race, education, age, tenure, SEI, weeks and hours worked -- are used as

control variables in the earnings analyses. The direction of the effect of these variables have been well established by a multitude of previous research. Men and whites are expected to earn more than women and non-whites respectively. Education, tenure, SEI, weeks and hours worked are expected to positively affect earnings. Age is expected to have a curvilinear impact on earnings such that up to a certain age this variable affects earnings positively and for older workers this effect will be negative.

CONCLUSIONS

In this chapter I argued that in order to establish continuity with most research in stratification in general and the resource perspective in particular an earnings determination analysis is included in this dissertation. Also, it is of interest here to estimate the effects of organizational structures, which were shown to be resources (or vulnerabilities) in the previous chapter, on earnings of employees. It would make sense to empirically find that the variables that are shown to be resources for workers will positively affect earnings and those shown to act as vulnerabilities will have a negative impact on earnings. However, as it has been argued in this dissertation, I should stress that the effect on earnings is not a test of whether a given corporate structure should be viewed as a resource or vulnerability to employees.

FOOTNOTES

1. Productivity is often used as a proxy for levels of economic profit (e.g., see Shepherd, 1970, 1979)

Table 5.1. Hypothesized Effects of Organizational Variables
on the Log Earnings

Variable	Effect on the Log Earnings
Unionization	+
ILM	+
Size	+
Complexity	+
Centralization	+
Formalization	+
Span of Control	+
Custom/Small Batch Technology	-
Large Batch/Mass Production	-
Continuous Process	+
Automation	+
Workflow Rigidity	+
Branch Establishment*	+
Percentage Women	-

* The positive effect of branch establishment means that earning levels are higher in establishments that are branches or subsidiaries of larger organizations.

CHAPTER VI

RESULTS AND DISCUSSION OF THE EARNINGS DETERMINATION ANALYSES

INTRODUCTION

This chapter provides results of the regression of the log earnings on a set of individual level characteristics and a host of organizational variables. In effect, I will present the results of a contextual model of earnings determination.

I will show that sex interacts with many of the other variables in its effects on earnings. Therefore two separate models, one for males and the other for females, will be estimated.

Regression results will be presented in five stages. First, I include only the human capital variables in the model. Next, worker power measures (unionization and internal labor markets) will be added to the equation. Then, all other organizational variables except percentage women will enter in the equation. In stage four, percentage women is included. I treat this variable differently from other establishment level variables because of its nature which is not indicative of the structure of an organization but is a demographic variable measured at the establishment level of analysis. Change in

the significance levels of variables and proportion of variance explained by models will be examined from one model to the next as a new set of variables (or a variable) is incorporated into a previous equation. To test the hypotheses developed in the previous chapter for the effects of organizational structures on earnings, I will focus on model 4 which includes all variables introduced in this dissertation. At the final stage, average log earnings of individuals in an establishment is used as a regressor. This variable captures any and all of the variations in earnings that can be attributed to establishments. Model 5, which contains mean earnings for each establishment, will be used to assess the extent to which organizational variables used in this research capture the variations in the log earnings that can be attributed to differences between establishments.

The next section of this chapter summarizes the results and provides a discussion of the findings as they relate to the formulation of the resource theory specified in this dissertation.

PRELIMINARY ANALYSES

The preliminary analyses for the earnings determination models consist of an examination of the parabolic impact of age and the interaction effects of sex with all the other determinants of earnings used in this research.

In the earnings analysis, I include a squared term for age which is a proxy for work experience. I made this decision based on both previous empirical work (e.g., Hodson, 1986, England, 1984, and Alexander, 1974), and the statistical significance of age squared in

the multiple regression equations. Appendix A provides the results of the regression of the log of earnings on all variables except age squared for both men and women. Comparing this table with model 4 of tables 6.4 and 6.5, we can see that except for the effects of race for men and branch establishment for women, the inclusion of the parabolic impact of age on earnings yields almost identical results in term of the signs and significance levels of the regression coefficients. After age squared is added to the models, the nonsignificant effect of race for male workers becomes significant and positive and the nonsignificant effect of branch establishment for female workers turns significant and negative.¹ Given these minor changes and the usual practice of specifying a parabolic age-earnings profile, I decided to focus on the results including age-squared.

Table 6.1 provides the results of the differences of slopes between male and female equations. Several slopes, mostly those of organizational variables, are significantly different for males and females. The result of a global F-test also revealed that sex has a significant interaction effect with all other variables as a set². Thus, two separate equations based on sex will be estimated.

DESCRIPTIVE STATISTICS

Descriptive statistics for male and female workers are presented in table 6.2. The average earnings of male and female workers are \$18,920 and \$13,200, respectively. The amount of variation about the means of this variable is quite small for both males and females. On the average, about 90% of male workers and 85% of female workers are white.

The average level of education of all workers is about some high school (less than high school diploma) and there is a moderate amount of variation about the mean in the distribution of this variable. The mean ages of male and female workers are 36.5 and 38.6 years, respectively. The standard deviation of age shows that the scores have a moderate amount of variation about their mean. On the average, males have worked 10.2 years and females have worked 9.4 years, in their employing firms, respectively. The variability of the scores about the mean of tenure is large as the standard deviation of this variable for both males and females is about as large as their respective means. On the average, workers in our sample work all year round, about 48 weeks a year. The distribution of this variable is tightly clustered around the mean. The mean number of hours worked per week is about 41 and 40 hours for men and women, respectively. The standard deviation of this variable reveals a small amount of variation.

The average level of unionization of the organizations in which male and female workers are employed are 64% and 53%, respectively. There is a large amount of variability in the distribution of this variable. The average level of ILM which is a scale composed of z-scores is $-.750$. The amount of variation in this variable is very large. The mean level of the organizational size of the establishments where male and female workers are employed is 476 and 459 respectively. Complexity, span of control, and workflow rigidity are all scales made up of average z-scores and, thus, the interpretation of their means is not informative. These three variables, especially, span of control and workflow rigidity have a large amount of variations in their

distributions. Employment centralization of organizations has a mean of 4.3 for both men and women. This is the average of the mean level at which 12 decisions regarding personnel practices is made. This level is approximately the "department head". The average score of operation centralization is about 4 which refers to the average of the mean level at which 20 decisions about operation are made. This average score is at the level of the "department head". The scores of both centralization measures are highly clustered around their means. The mean levels of custom/small batch technology is about 2.8 for both men and women. The mean levels of large batch/mass production technology for male and female workers are 2.8 and 3.3, respectively. Females are more likely to be in organizations where large mass production is used. All these figures (around 3) corresponds to an answer between "not at all" and "somewhat" to the question asked from CEOs regarding the extent to which each type of technology is used. There are moderate amounts of variation about the mean of these two types of technologies in organizations for both men and women. The mean level of continuous process technology for male and female workers are 1.8 and 2.5, respectively. Women are more likely to work in organizations where this type of technology is used. Automation has a mean of about 3 for both men and women. This score corresponds to the prevalence of "single-cycle automatic and self-feeding machines." There is a small amount of variation about the mean of this variable. On the average 80% and 78% of males and females work in branch establishments, respectively. On the average, men and women work in organizations where 19% and 40% of the work force consists of female workers. The amount of variability of

this variable is large.

ANALYSIS OF EARNINGS FOR MALE WORKERS

The zero-order correlations for variables used in the earnings model for males is presented in table 6.3. The results of the regression of the log of earnings on human capital and organizational variables for males are presented in table 6.4. As model 1 in table 6.4 shows, all coefficients of human capital variables are significant in the expected direction for male workers³. This set of variables explain 30.1% of the variation in log earnings.

Model 2 of table 6.4 includes unionization and ILMs, the two measures of worker power used in this dissertation. Unionization has a significant positive impact and ILM has a significant negative impact on the log earnings. The negative impact of ILMs on earnings is not consistent with what has been hypothesized in this research. This is due to model misspecification, since the negative effect disappears after other organizational variables are entered in later stages. As mentioned in the introduction of this chapter, earnings determination hypotheses developed in this dissertation are tested with reference to model 4 which incorporates all variables (human capital, worker power measures, and organizational variables) in the same model. The addition of worker power variables to model 1 increases the R^2 by about 5%. Even though this is not a substantial amount, this increase is significant.⁴

Model 3 of table 6.4 includes all other organizational variables in the equation. The R^2 of this model is substantially greater than that

of model 1: an increase of about 53% from .304 to .466. The positive impact of unionization disappears when variations in organizational structures are taken into account and the negative impact of ILM on earnings transforms into a significant positive effect. In this model the effect of all other variables except centralization (operation and marketing) and continuous process technology are either nonsignificant or in the expected direction.

Model 4 which includes percentage women is the final model based on which hypotheses are evaluated. The first important result of this model is its high adjusted R^2 (.477). For male workers, there is an increase of about 60% in the explained variance when organizational measures are added to a model that consists of only human capital variables. This finding highlights the important role of organizational structures in the process of attainment. Comparing model 4 with model 3 we find that percentage women by itself adds about 4% to the proportion of explained variance and that the inclusion of this variable nullifies the effects of ILMs and centralization.

Unionization and ILMs, the two measures of worker power employed in this research, do not have significant effects on the log of earnings, controlling for all human capital and organizational variables. As hypothesized, the log of size has a significant positive impact on the log of earnings.

Among bureaucratic dimensions of organizations, span of control and complexity do not have any effects on the log of earnings. However, as hypothesized, formalization and centralization (employment), have positive impacts on earnings. As indicated by the magnitude of betas (standardized

regression coefficients), the effect of formalization on earnings is the second strongest among all variables in model 4.

Among measures of technology, as hypothesized, custom/small batch and large batch/mass production techniques negatively affect the earnings of male workers. The effect of custom/small batch technology is the strongest among all variables in the equation. Automation has no effect on earnings and workflow rigidity, as expected, affects earnings positively. However, contrary to expectation, continuous process technology has a negative impact on earnings.

Links to other organizations does not have an effect on earnings of male workers. As hypothesized, percentage women has a negative effect on earnings. This variable is the third most important predictor of earnings among both human capital and establishment level variables.

Finally, model 5 includes the mean level of the log earnings for each establishment as a regressor. This enables us to evaluate the ability of our full model (model 4) to account for earnings differences across establishments. Model 5 yields an R^2 of .573 which represents an increment of .269 ($.573 - .304 = .269$) from model 1 where no establishment variables are included. On the other hand, model 4 in which mean earnings is not incorporated represents an increment of .179 ($.483 - .304 = .179$) from a model including no organizational variables. This increment is 64% of the total increment ($.179 / .269 = .64$). Thus, organizational measures used in this research account for most of the earnings variations caused by establishment effects.

ANALYSIS OF EARNINGS FOR FEMALE WORKERS

Descriptive statistics of variables in the earnings analysis for female workers are presented in table 6.2. Zero-order correlations of these variables are provided in table 6.5. Table 6.6 provides the results of the regression of the log of earnings on sets of independent variables in stages for female workers. Model 1 of table 6.6 reveals an earnings equation with only human capital variables as regressors. This model accounts for 27% of the explained variance.

Model 2 of table 6.6 shows that unionization has a strong positive effect and ILMs has a negative effect on the earning levels of women. As the standardized regression coefficients (betas) indicate, among all variables in this model, unionization is the strongest predictor of women's earnings. The inclusion of worker power measures to model 1 with only human capital variables results in a substantial 28% increase in R^2 from .276 to .355.

Model 3 of table 6.6 incorporates all establishment level variables except percent women. This model yields an adjusted R^2 of .447. The effect of unionization does not disappear and this variable remains a strong predictor of earnings. In this model, the effects of other establishment variables except complexity and continuous process technology are either nonsignificant or as hypothesized.

Model 4 of table 6.6 includes all establishment variables. The adjusted R^2 of this model is .498. The addition of percentage women results in a considerable 11% increase in R^2 of model 3. Proportion variance explained for model 4 represents a substantial increase of about 86% from model 1 with only human capital variables. This increase, as was the case for male workers, reveals the importance

of organizational variables in the earnings determination process.

Unionization and ILMs, the two measures of worker power, do not have any effects on earnings of female workers. Controlling for percentage women, the effects of unionization and ILMs disappear.

Log of size, as hypothesized, has a significant positive effect on earnings. This effect, as shown by the standardized coefficients, is the second strongest among all variables.

Among bureaucratic dimensions of organizations, span of control and complexity do not have an impact on the earning levels of female workers. However, as hypothesized, formalization and centralization (employment) affect earnings positively. Formalization is the third strongest predictor among all variables in the model.

Among measures of technology, as hypothesized, custom/small batch techniques have a negative impact and automation has a positive effect on earnings. The effect of large batch/mass production and workflow rigidity are nonsignificant. Contrary to expectation, continuous process technology has a negative impact on earnings.

Contrary to expectation, organizational link (branch establishment) has a negative impact on earning levels of female workers such that women in independent establishments earn more than women in establishments that are either a subsidiary or a branch plant. This could be because women are more "place-bound" than men; women's careers are more strongly linked to their particular work organization than men's. This idea which was developed by Villemez and Bridges (1988) will be discussed in more detail in the next section of this chapter.

Finally, as hypothesized, percentage women has a negative effect on

earnings of female workers. The standardized coefficient of this variable suggests that it is the strongest predictor of earnings among all variables in model 4.

Model 5 includes mean earnings for each establishment as a regressor. The R^2 of this model represents an increment of .27 (.546-.276=.270) from model 1 with only human capital variables as independent variables. Model 4 in which all organizational measures (except mean earnings) are included shows an increase of .239 (.515-.276=.239) in R^2 from model 1. This increment is as large as 88.5% (.239/.27=.885) of the total increment when all and any establishment effects on earnings are taken into account. Thus, the organizational variables chosen for this earnings analysis for female workers represent a very large proportion of all variations in earnings accounted for by establishment differences.

MALE-FEMALE DIFFERENCES IN THE ORGANIZATIONAL EFFECTS ON EARNINGS

Models of earnings determination for male and female workers presented above are different in regards to proportion variance explained and the size of the effects of independent variables. While the R^2 of the model with only human capital variables (model 1) for females is smaller than that for males (.276 vs. .304) -- a finding in accordance with some previous findings that human capital variables are better explanatory variables for earnings of males than females (e.g. Form, 1985:139) --, after organizational variables are included (model 4), a larger proportion of variance is shown to be explained for females (.515) than for males (.483). Also, comparing the

unstandardized regression coefficients (bs) of male and female models, many organizational variables (size, formalization, centralization, continuous process technology, and percentage women) are shown to have larger impacts on earnings of women than that of men. Male workers receive higher returns to their pool of human capital characteristics than do female workers. On the other hand, male workers' earnings is not determined as strongly by organizational variables as female workers' earnings. This can be explained with reference to the concept of "place-bound" introduced by Villemez and Bridges (1988: 253). They argue that the extent that a person's work career tends to be linked to a specific organization, the attributes of the organization will have a stronger effect on that person's earnings. We can argue that women are more place-bound and that they have careers that tend to be strongly linked to a particular organization as opposed to cross cutting several organizations. The more place-bound one is, the more important salience of the particular place will be in terms of effects on earnings.

INDUSTRIAL EFFECT ON EARNINGS

Table 6.7 provides the results of earnings models in which 6 dummy variables capturing industrial variations in the data set are included. This analysis provides insight as to how much of the organizational effects on earnings are due to the industrial location of the establishments. Comparing the results of table 6.7 to column 4 of tables 6.4 and 6.6, first, we can see that the inclusion of industry dummies significantly adds to the explanatory power of the models since at least one of the dummy variables has a significant effect on the log

of earnings for both men and women.⁵ The increment in R^2 for men and women equations after accounting for industrial variations are 4.5% and 3.5%, respectively. For male workers, controlling for industrial variations turns the effects of mass production and continuous process technologies nonsignificant and the impact of branch establishment becomes significant and positive. For female workers, accounting for industrial variations nullifies the effects of size, continuous process technology and branch establishments.

This analysis reveals that industrial variation has some effect on the relationship between organizations and workers' earnings. This effect is prominent regarding the impact of technology. Organizations within the same industry have certain structural features in common. One of the most important of these is technology. Firms producing the same product try to update their technology so that it would match the state-of-the-art methods of production. Thus, technology at the industrial level sets precedents for firms and as such renders part of the organizational effect of this variable on earnings of workers spurious. The same mechanism is at work for the effect of organizational links on earnings as the impact of this variable changes when industrial location is taken into account. This may be due to the fact that firms within the same industry probably share the same pattern of proliferation of plants, branch establishments, and subsidiaries.

SUMMARY AND DISCUSSION

This chapter provided the results of a unique earnings analysis in

that the effects of a host of important organizational variables often mentioned in the complex organization literature on earnings are estimated. The findings showed that these variables play an important role in affecting the earning levels of workers in manufacturing plants. The R^2 from a model with only human capital variables increased by 60% and 86% for males and females, respectively, when organizational variables were added. It was also established that structural variables employed in this research account for most of the variation in earning levels that is explained by any and all establishment differences.⁶

Size, formalization, and centralization have positive impacts on the earnings of males and females. The positive effect of size is due to the impact of increased number of employees on the employer's income, and corporate profits (Aldrich and Wiess, 1981). It is also due to the fact that large organizations, in order to avoid worker unrest, offer workers increased rewards (Kalleberg and Berg, 1987). Formalization and centralization which are two dimensions of bureaucracies enhance earning levels because they make for a more efficient and productive work organization (Hage, 1980). In centralized organizations, the discipline and control inherent in hierarchy of authority contribute to productivity. Reliance on written rules in formalized organizations minimize individual judgement, and calculability and predictability is enhanced. As a result efficiency is heightened.

Custom/small batch and continuous process technologies have negative impacts on the earnings of male and female workers. Large batch/mass production technologies affect earnings of male workers

negatively. The effects of small batch and mass production techniques of production are because labor-intensive organizations have a more elastic labor demand curve such that wage increases are associated with a larger degree of employment and layoffs. In such places, fearing higher risks of job loss, workers settle for smaller wage increases.

Workflow rigidity and automation have positive effects on the earnings of men and women, respectively. These effects are attributed to the capital-intensive nature of these technologies. In capital-intensive plants, employees working with expensive machinery can use the threat of sabotage as a bargaining power to demand higher wages (Hodson, 1984).

Percent women is shown to affect earnings of both men and women negatively. I have argued that this is because in organizations where percent women is higher, there are more female dominated jobs and more jobs with higher proportion of women incumbents. These jobs, due to discrimination and overcrowding, are not high paying.

Comparing the male and female results, we come to the conclusion that organizational variables are better predictors of female earnings than male earnings. This is because women are more place-bound than men; women's careers and labor force trajectories are more linked to specific organizations than are men's. This is clearly reflected in the negative impact of branch establishment on the earnings of females and not of males; women in independent establishments earn more than those in subsidiaries or branch plants.

The inclusion of industrial variations in the earnings models

altered some of the results and revealed that industries are important in shaping the effect of organizations on worker outcomes.

Specifically, industries precede establishments in their effects on earnings of the type of technology used and organizational links.

In chapter 5 where earnings determination hypotheses were developed, I mentioned that it would make sense for the results to reveal that organizational factors which were identified as resources, i.e., enhance unionization and/or ILMs, would have a positive effect on earnings and that those which were shown to be vulnerabilities for workers, i.e., diminish unionization and/or ILMs, would affect earnings negatively. However, the results in this chapter established that some factors (continuous process and organizational links) that are identified as resources in this dissertation have negative impacts on the earnings of workers, and some other factors (formalization, centralization, and workflow rigidity) identified as vulnerabilities have positive effects on earning levels. This discrepancy emanates from the fact that part of the total effect of an organizational variable on earnings is composed of three indirect effects: an effect via efficiency/productivity; an effect via unionization and ILMs; and an effect via unmeasured worker power structures. None of these effects is estimated in this research. Thus, it may be the case that, e.g., formalization which is identified as a vulnerability but has a positive impact on earnings has an indirect positive effect via productivity that is greater than other components of its total effect on earnings. In other words, there may be a situation in which a given resource for workers would affect their earnings negatively because it might have a

strong negative effect on productivity. In this situation the indirect effect of that resource via productivity would result in a negative total effect despite existing positive direct and indirect effects.

We have seen in this chapter that whether a given organizational structure is a resource or a vulnerability is not indicative of that structure's effect on the earnings of workers. A resource does not necessarily enhance workers' earnings. In fact, the results show that even measures of worker power, unionization and ILMs, controlling for all the establishment variables, have no effects on earnings. It is worth reminding the reader that, in the formulation of the resource perspective in this dissertation, worker power agents are identified according to their ability to bestow power on workers vis-a-vis the employers and not their effectiveness in generating higher earning levels, and that effects on earnings do not determine whether a structure is a resource or a vulnerability.

The fact that unionization and ILMs in a multivariate analysis turn out to have no effect on earnings is of considerable importance. Almost all studies, from both anti-union and pro-union perspectives, cite the monopoly wage effect of unionism (Freeman and Medoff, 1984). This wage effect, according to the present research, disappears when different dimensions of organizational structure are taken into account. The wage effect of unionization, the ability of unions to enhance earnings, is explainable in terms of the structures that promote unions or are simply associated with this form of worker power.

FOOTNOTES:

1. While the coefficient for the linear effect of age changes substantially this is due entirely to the changed meaning of the linear term when used as part of a quadratic functional form (Pehazur, 1982: 414).

2. The formula used to test this is as follows (Cohen and Cohen, 1983, p. 145):

$$F = [(R^2_2 - R^2_1) / (DF_1 - DF_2)] / [(1 - R^2_2) / (DF_2)] \quad \text{Eq. 1}$$

in which

R^2_2 - The proportion of variance explained in an equation where interaction terms are included.

R^2_1 - The proportion of variance explained in an equation where interaction terms are not included.

DF_1 - Degrees of freedom of the equation in which interaction terms are not included.

DF_2 - Degrees of freedom of the equation in which all interaction terms are included.

Accordingly, the F statistic for the global interaction of sex and all variables in the model in their effects on earnings is computed as follows:

$$F = [(9.545 - .530) / (2542 - 2519)] / [(1 - .545) / 2519] = 3.611$$

This value of F is significant at .01 level (F critical for 23 and 2519 degrees of freedom is 1.79).

3. Readers might note that the standardized coefficients for age and age-squared are well above one. Standardized coefficients, however, are not meaningful whenever multiple variables are used to represent non-linear relationships (Cohen and Cohen, 1983).

4. The F-statistic for the difference between the R^2 s of model 1 and model 2 is 19.265 and is considerably larger than the F critical (with 2 and 1877 degrees of freedom) which is 4.60 at .01 level of significant. The computation of F-statistic follows the formula presented in equation 1 above:

$$F = [(.318 - .304) / (1879 / 1877)] / [(1 - .318) / 1877] = 19.265$$

5. The F-statistic for the difference between the R^2 of equations with and without industry dummies for men is 13.76 and is larger than the F critical (with 6 and 1858 degrees of freedom) which is 2.80 at .01 level of significant. The computation of F-statistic follows the formula presented in equation 1 above:

$$F = [(.505 - .483) / (1864 - 1858)] / [(1 - .505) / 1858] = 13.76$$

The F-statistic for the difference between the R^2 of equations with and without industry dummies for women is 4.17 and is larger than the F critical (with 6 and 649 degrees of freedom) which is 2.85 at .01 level of significant. The computation of F-statistic follows the formula presented in equation 1 above:

$$F = [(.533 - .515) / (651 - 649)] / [(1 - .533) / 649] = 4.17$$

6. There is a host of other establishment level factors not included in this analysis that can affect a firm's productivity and thus the earning levels of its workers. Industrial relations within organizations is one set of such factors whose impact on firm performance is of growing interest to industrial relations students (Block, 1987). For example, form or the mix of various elements of total compensation which may include base pay, a variety of incentive schemes, cost-of-living adjustments, sick-leave policies, etc. may have a bearing on the performance of the firm (Ehrenberg and Milkovich, 1978: 89-90). For example, Winckle's study of teacher absenteeism reveals that generous sick-leave policies encourage absenteeism which in turn diminishes productivity (Winckle, 1980). Ehrenberg and Milkovich (1978: 90) argue that the process whereby compensation is administered, the extent to which compensation information is made public, and the role of employees in determination of compensation have an impact on firm performance and consequently on wages.

Another industrial relation factor that is posited to have an impact on a firm's performance is the quality of work life (QWL) plans which involves employee participation in decision making processes and humanizing working conditions (Gershenfeld, 1987). For example, based on a sample of five automobile plants, Kochan (1984) shows that QWL programs positively affect worker satisfaction which in turn enhances productivity.

Pension coverage is yet another industrial relations factor affecting productivity and wages (Allen, 1987). Pension coverage affects productivity of firms because of its negative effect on turnover rates. Lower turnover rates mean that fewer resources are being used for training new workers. Lower turnover rates also increases proportion of workers with a greater amount of job tenure which makes for enhanced productivity (Allen, 1987: 238). Based on a longitudinal sample from the 1973 and 1977 Quality of Employment Surveys, examining the relationship between pension coverage and quits and job changes, Mitchell (1982) found that men were 10% less likely to quit if they were covered by a pension plan. McCormick and Hughes (1984) also found the same relationship in a sample of working adults in the United Kingdom.

Finally, hiring procedures via their effects on turnover rates are recognized to have an impact on productivity. For example, using a 1982 survey of 3,500 firms which was a follow up of a 1980 survey, Holzer (1987) finds that the use of current employees to recruit applicants (announcing job vacancies to current employees) as opposed to other recruiting techniques, produces workers who have higher perceived productivity and lower turnover. This type of recruitment generates older and more experienced workers.

Table 6.1. T-statistics for the Interaction of Sex With Human Capital and Organizational Variables in their Effects on Earnings

Race	-1.594
Education	-1.173
Age	-1.481
Age square	1.262
Tenure	1.646*
SEI	-1.268
Weeks Works	.957
Hours Worked	.445
% Unionized	.760
ILM	-1.232
Log of Size	2.462*
Span of Control	-.054
Complexity	-1.479
Formalization	.975
Centralization (Employment)	2.085*
Centralization (Operation)	1.802*
Custom/ Small Batch	1.211
Large Batch/ Mass Production	1.493
Continuous Process	-1.121
Automation	2.979**
Workflow Rigidity	-2.228*
Branch Establishment	-1.055
Percentage Women	-2.310*

** p < .01, one-tailed test.

* p < .05, one-tailed test.

Table 6.2. Means and Standard Deviations for Variables in Earnings Analysis for male and Female Workers

	Male Workers		Female Workers	
	Mean	Standard Dev.	Mean	Standard Dev.
Log Earnings	9.848	.461	9.488	.479
Race	.896	.305	.848	.359
Education	3.133	.862	2.819	.804
Age	36.565	10.856	38.623	11.322
Age Square	1454.803	873.550	1619.739	927.715
Tenure	10.231	8.728	9.916	8.737
SEI	24.942	14.556	23.191	12.751
Weeks Works	48.219	4.464	48.465	4.229
Hours Worked	41.136	4.761	39.997	4.002
% Unionized	64.386	40.124	52.920	44.458
ILM	-.750	2.739	-.736	2.485
Log of Size	6.167	1.139	6.130	1.361
Span of Control	.185	.529	.081	.760
Complexity	.423	.569	.444	.616
Formalization	.771	.182	.793	.210
Centralization (Employment)	4.388	.635	4.348	.604
Centralization (Operation)	4.072	.503	4.068	.684
Custom/Small Batch	2.875	.895	2.735	.997
Large Batch/Mass Production	2.799	1.151	3.306	1.368
Continuous Process	1.823	1.419	2.490	1.564
Automation	2.999	.854	3.108	.907
Workflow Rigidity	.346	.789	.153	.789
Branch Establishment	.808	.394	.784	.412
Percentage Women	.193	.154	.399	.208
Mean Earnings (Log)	9.833	.295	9.662	.348

Table 6.3. Zero-order Correlations Among Variables in the Earnings Model for Male Workers

	Y1	X1	X2	X3	X4	X5	X6	X7	X8	X9	X10	X11	X12	X13	X14	X15	X16	X17	X18	X19	X20	X21	X22	X23	X24
Y1.	---																								
X1.	.10a	---																							
X2.	.12a	.01	---																						
X3.	.26a	.04#	-.23a	---																					
X4.	.21a	.04#	-.23a	.99a	---																				
X5.	.29a	.11a	-.19a	.70a	.70a	---																			
X6.	.19a	.10a	.29a	.09a	.09a	.04#	---																		
X7.	.22a	.01	-.02	.07a	.06a	.02	.06a	---																	
X8.	.20a	.03#	.05a	-.05a	-.06a	-.08a	.02	.20a	---																
X9.	.19a	.09a	-.10a	.26a	.23a	.36a	-.05a	-.04#	-.07a	---															
X10.	-.09a	-.02	.03#	-.19a	-.17a	-.29a	.04#	-.00	.12a	-.43a	---														
X11.	.40a	.08a	.05a	.23a	.19a	.35a	.00	-.04#	-.01	.55a	-.25a	---													
X12.	.18a	.08a	-.00	.13a	.11a	.20a	-.01	.05a	.05a	.22a	-.19a	.43a	---												
X13.	.39a	.03	.06a	.09a	.06a	.15a	.00	.00	.03	.41a	-.28a	.71a	.16a	---											
X14.	.17a	-.02	.07a	-.02	-.03#	-.03	-.06a	.00	.11a	.23a	-.30a	.33a	.14a	.45a	---										
X15.	.06a	-.01	.03	-.00	-.01	.06a	.01	.04#	.04#	-.14a	.01	-.09a	-.02	-.18a	-.28a	---									
X16.	-.10a	-.01	.03#	-.07a	-.06a	-.13a	.05a	-.03	-.05a	-.03	.05a	-.24a	-.13a	-.17a	-.16a	.59a	---								
X17.	-.24a	-.08a	-.12a	-.10a	-.08a	-.18a	-.03#	.06a	.05a	-.29a	.08a	-.41a	-.30a	-.30a	-.01	-.20a	-.27a	---							
X18.	.04#	.04#	.04#	.10a	.10a	.20a	.02	-.10a	-.11a	.14a	-.08a	.37a	.22a	.27a	.11a	-.02	.14a	-.66a	---						
X19.	-.10a	-.08a	.07a	-.08a	-.07a	-.07a	.04#	.03#	.06a	-.06a	.06a	-.06a	.08a	-.01	.08a	-.16a	-.06a	-.29a	.38a	---					
X20.	.01	-.08a	.12a	-.02	-.01	-.00	.20a	.05a	-.02	-.31a	.21a	-.02	.18a	-.19a	-.31a	.28a	.03	-.27a	.42a	.37a	---				
X21.	.31a	.02	.08a	.04#	.02	.10a	.03	-.03	-.04#	.27a	-.26a	.36a	.08a	.55a	.13a	.06a	.12a	-.47a	.29a	-.07a	.08a	---			
X22.	.25a	.03	.06a	.04#	.02	.07a	-.08a	-.02#	.12a	.27a	.06a	.43a	-.09a	.42a	.56a	.04#	.10a	-.25a	.26a	-.03#	-.19a	.38a	---		
X23.	-.16a	-.02	.11a	-.10a	-.09a	-.10a	.15a	.00	.04#	-.10a	-.14a	.05a	-.03	.13a	.26a	-.11a	-.00	-.06a	.26a	.40a	.12a	-.02	.11a	---	
X24.	.65	.05a	.12a	.18a	.13a	.23a	.04#	.03#	.06a	.24a	-.10a	.58a	.24a	.54a	.18a	.13a	-.15a	-.36a	.04#	-.22a	-.01	.44a	.34a	-.36a	---

a p < .01, one-tailed test.

p < .05, one-tailed test.

Y1. Earnings (log); X1. Race; X2. Education; X3. Age; X4. Age Sq.; X5. Tenure; X6. SE1; X7. Weeks Works; X8. Hours Worked; X9. % Unionized
 X10. ILM; X11. Log of Size; X12. Span of Control; X13. Complexity; X14. Formalization; X15. Centralization (Employment); X16. Centralization (Operation)
 X17. Custom/ Small Batch; X18. Large Batch/Mass Production; X19. Continuous Process; X20. Automation; X21. Workflow Rigidity; X22. Branch Establishment;
 X23. Percentage Women; X24. Mean Earnings(log)

Table 6.4 Regression of Log Earnings on Human Capital Variables and Establishment Characteristics for Male Workers

Independent Variables	1		2		3		4		5	
	b	beta	b	beta	b	beta	b	beta	b	beta
Race	.088** (.029)	.029	.085** (.029)	.056	.042 (.026)	.027	.047* (.026)	.031	.063** (.024)	.041
Education	.083** (.011)	.011	.086** (.011)	.160	.042** (.010)	.079	.047** (.010)	.089	.030** (.009)	.055
Age	.080** (.006)	1.871	.072** (.006)	1.707	.047** (.006)	1.098	.044** (.005)	1.028	.036** (.005)	.841
Age Sq.	-.000** (.000)	-1.743	-.000** (.000)	-1.578	-.000** (.000)	-.968	-.000** (.000)	-.906	-.000** (.000)	-.766
Tenure	.013** (.001)	.255	.011** (.001)	.205	.007** (.001)	.145	.008** (.001)	.151	.008** (.001)	.158
SEI	.004** (.000)	.119	.004** (.000)	.126	.005** (.000)	.145	.005** (.000)	.168	.004** (.000)	.133
Weeks Works	.016** (.002)	.161	.016** (.002)	.166	.017** (.002)	.168	.017** (.002)	.171	.017** (.002)	.172
Hours Worked	.015** (.002)	.159	.016** (.002)	.167	.016** (.002)	.149	.015** (.002)	.153	.014** (.002)	.146
% Unionized			.001** (.000)	.094	.000 (.000)	.018	-.000 (.000)	-.034	.000 (.000)	.003
ILM			-.010** (.002)	-.061	.015** (.015)	.073	.004 (.005)	.024	.000 (.004)	-.006
Log of Size					.041** (.015)	.101	.042** (.015)	.104	.017 (.014)	-.042
Span of Control					.019 (.010)	.022	.014 (.021)	-.016	.027 (.019)	-.031
Complexity					.042 (.030)	-.053	.021 (.031)	.026	.018 (.028)	-.022
Formalization					.016** (.014)	.242	.051** (.013)	.229	.190** (.069)	.075
Centralization (Employment)					.064** (.023)	.091	.068** (.022)	.093	.031 (.021)	-.042
Centralization (Operation)					.128** (.028)	-.139	.118 (.027)	-.129	.058* (.026)	.063
Custom/Small Batch					.143** (.017)	-.277	.121** (.017)	-.234	.028* (.017)	.054
Large Batch/Mass Production					.056** (.013)	-.140	.042** (.013)	-.106	.038** (.013)	.094
Continuous Process					.053** (.009)	-.164	.026** (.009)	-.082	.000 (.008)	.002
Automation					.006 (.016)	.011	.005 (.016)	.009	.014 (.014)	-.025
Workflow Rigidity					.117** (.018)	.199	.085** (.018)	.146	.033* (.016)	.056
Branch Establishment					.018 (.036)	-.015	.008 (.036)	-.007	.072* (.032)	-.061
percentage Women							.554** (.069)	-.185	.010 (.069)	.003
Mean Earnings(log)									.939** (.046)	.600
Intercept	6.298		6.314		7.253		7.185		-2.086	
D.f.	1879		1877		1865		1864		1863	
R ²	.304		.318		.466		.483		.573	
Adjusted R ²	.301		.314		.459		.477		.567	
SEE	.386		.382		.339		.334		.303	

Note: Standard Errors are presented in parentheses.

* p < .01, one-tailed test.

* p < .05, one-tailed test.

Table 6.5. Zero-order Correlations Among Variables in the Earnings Model for Female Workers

	Y1	X1	X2	X3	X4	X5	X6	X7	X8	X9	X10	X11	X12	X13	X14	X15	X16	X17	X18	X19	X20	X21	X22	X23	X24
Y1.	Y1																								
X1.	-.08a	X1																							
X2.	-.01	-.12a	X2																						
X3.	.28a	.02	-.27a	X3																					
X4.	.26a	.03	-.26a	.99a	X4																				
X5.	.39a	.04	-.18a	.64a	.64a	X5																			
X6.	.06#	.07a	.24a	-.02	-.02	-.07#	X6																		
X7.	.21a	.02	-.06a	.08a	.07a	-.00	.08a	X7																	
X8.	.18a	.00	.02	-.00	-.00	.02	-.00	.09a	X8																
X9.	.33a	-.02	-.14a	.25a	.23a	.48a	-.17a	-.13a	-.01	X9															
X10.	-.26a	-.01	.09a	-.18a	-.17a	-.38a	.10a	.11a	.07#	-.53a	X10														
X11.	.45a	-.05	-.08a	.28a	.26a	.53a	-.14a	-.05#	.08a	.62a	-.25a	X11													
X12.	.31a	-.07a	-.08#	.22a	.20a	.42a	-.08a	.02	.07#	.54a	-.24a	.53a	X12												
X13.	.43a	-.07a	-.05#	.15a	.13a	.41a	-.13a	-.00	.16a	.51a	-.36a	.74a	.49a	X13											
X14.	.37a	-.11a	-.11a	.20a	.18a	.33a	-.21a	-.07#	.05#	.38a	-.25a	.66a	.20a	.62a	X14										
X15.	-.24a	-.02	.04#	-.28a	-.27a	-.37a	-.06#	.06#	-.08a	-.41a	.05	-.61a	-.22a	-.39a	-.37a	X15									
X16.	-.31a	-.00	.02	-.29a	-.28a	-.36a	-.05	.03	-.11a	-.36a	.04	-.52a	-.18a	-.27a	-.26a	.77a	X16								
X17.	.00	-.10a	-.11a	.05#	.04#	-.05#	-.04	.04#	.02	-.02	.05#	-.24a	-.19a	-.21a	.07a	.06#	-.18a	X17							
X18.	.04#	.08a	-.00	.05#	-.05#	.22a	.01	-.11a	-.12a	.06#	-.14a	.41a	.15a	.27a	.23a	-.20a	-.06#	-.56a	X18						
X19.	.03	.04	.05#	-.02	-.01	-.00	.05#	-.07a	.01	.09a	.08a	.19a	.10a	.08a	.03	-.26a	-.29a	-.29a	.61a	X19					
X20.	-.06#	-.10a	.10a	-.05#	-.04	-.21a	.26a	.06#	-.04#	-.32a	.23a	-.19a	-.03	-.33a	-.26a	-.06#	-.16a	.04	.19a	.41a	X20				
X21.	-.11a	-.06#	.04#	-.15a	-.15a	.18a	.02	.01	.02	-.04	-.10a	-.26a	.04	.16a	-.17a	.17a	.30a	-.18a	-.18a	-.23a	.00	X21			
X22.	-.34a	.04#	.02	-.10a	-.08a	-.08a	-.05#	-.03	-.05#	-.41a	.31a	.01	-.19a	-.15a	-.10a	.08a	.18a	-.42a	.39a	.06#	.09a	.00	X22		
X23.	.21a	-.04#	-.04#	.09a	.07a	.13a	-.09a	-.08a	-.05#	.20a	-.05#	.42a	-.08a	.32a	.75a	-.14a	-.10a	.11a	.23a	.01	-.12a	-.00	-.01	X23	
X24.	.61a	-.12a	.02	.23a	.19a	.39a	.00	.02	.08a	.52a	-.32a	.67a	.56a	.70a	.52a	-.31a	-.37a	-.04	.11a	.10a	-.04	-.05#	-.52a	.33a	X24

a p < .01, one-tailed test.

p < .05, one-tailed test.

Y1. Earnings (log); X1. Race; X2. Education; X3. Age; X4. Age Sq.; X5. Tenure; X6. SEI; X7. Weeks Works; X8. Hours Worked; X9. % Unionized
 X10. ILM; X11. Log of Size; X12. Span of Control; X13. Complexity; X14. Formalization; X15. Centralization (Employment); X16. Centralization (Operation)
 X17. Custom/ Small Batch; X18. Large Batch/Mass Production; X19. Continuous Process; X20. Automation; X21. Workflow Rigidity; X22. Branch Establishment;
 X23. Percentage Women; X24. Mean Earnings(log)

Table 6.6 Regression of Log Earnings on Human Capital Variables and Establishment Characteristics for Female Workers

Independent Variables	1		2		3		4		5	
	b	beta	b	beta	b	beta	b	beta	b	beta
Race	-.072 (.045)	-.054	-.092* (.042)	-.069	-.023 (.041)	-.018	-.027 (.038)	-.020	-.013 (.038)	-.009
Education	.056** (.022)	.022	.047* (.026)	.078	.025 (.019)	.042	.023 (.018)	.039	.013 (.018)	.022
Age	.062** (.010)	1.429	.038** (.010)	.895	.031** (.009)	.736	.028** (.009)	.672	.022** (.009)	.528
Age Sq.	-.000** (.000)	-1.375	-.000** (.000)	-.798	-.000** (.000)	-.662	-.000** (.000)	-.621	-.000** (.000)	-.491
Tenure	.022** (.002)	.410	.011** (.003)	.195	.010** (.003)	.192	.013** (.002)	.231	.012** (.002)	.223
SEI	.002 (.001)	.051	.003* (.001)	.083	.004** (.001)	.121	.004** (.001)	.096	.003** (.001)	.081
Weeks Works	.018** (.004)	.160	.023** (.004)	.199	.021** (.003)	.187	.020** (.003)	.180	.005** (.003)	.196
Hours Worked	.019** (.004)	.161	.019** (.004)	.156	.015** (.004)	.123	.016** (.003)	.138	.020** (.003)	.169
% Unionized			.003** (.000)	.277	.003** (.000)	.259	.000 (.000)	.026	.000 (.000)	-.015
ILM			-.023** (.007)	-.122	-.030** (.008)	-.158	-.008 (.008)	-.040	-.014* (.008)	-.099
Log of Size					.105** (.032)	.300	.125** (.030)	.356	.031 (.033)	.088
Span of Control					.045 (.028)	.072	.016 (.028)	-.025	.059* (.028)	-.094
Complexity					.218** (.070)	-.281	.082 (.069)	-.115	.114* (.067)	-.147
Formalization					.092** (.048)	.396	.070** (.048)	.338	.095** (.048)	.217
Centralization (Employment)					.173** (.048)	.217	.174** (.048)	.218	.001 (.052)	-.001
Centralization (Operation)					.007 (.049)	.010	.020 (.047)	-.029	.095* (.049)	.136
Custom/Small Batch					.057* (.023)	-.118	.087** (.022)	-.181	.009 (.024)	-.019
Large Batch/Mass Production					.036 (.025)	-.103	.000 (.025)	-.002	.008 (.024)	.022
Continuous Process					.031* (.018)	-.100	.049** (.018)	-.158	.022 (.018)	-.073
Automation					.094** (.025)	.177	.089** (.024)	.169	.037 (.024)	.070
Workflow Rigidity					.039 (.034)	.066	.003 (.033)	.005	.036 (.032)	-.059
Branch Establishment					.006 (.071)	-.087	.082** (.068)	-.076	.159* (.068)	-.129
Percentage Women							.837** (.102)	-.363	.130 (.145)	-.056
Mean Earnings (log)									.802** (.120)	.573
Intercept	6.283		6.441		4.799		5.460		-1.623	
D.F.	670		668		656		655		654	
R ²	.276		.355		.465		.515		.546	
Adjusted R ²	.270		.345		.447		.498		.529	
SEE	.410		.388		.356		.339		.329	

Note: Standard Errors are presented in parentheses.

** p < .01, one-tailed test.

* p < .05, one-tailed test.

Table 6.7 Regression of Log Earnings on Human Capital Variables, Establishment Characteristics, and Industry

Independent Variables	Men		Women	
	b	beta	b	beta
Race	.083** (.055)	.026	-.029 (.039)	-.022
Education	.044** (.010)	.082	.024 (.018)	.040
Age	.041** (.005)	.960	.036** (.009)	.719
Age Sq.	-.000** (.000)	-.851	-.000** (.000)	-.676
Tenure	.007** (.001)	.139	.015** (.002)	.268
SEI	.005** (.000)	.148	.004** (.001)	.100
Weeks Works	.017** (.002)	.169	.021** (.003)	.183
Hours Worked	.016** (.002)	.168	.019** (.003)	.156
% Unionized	.001 (.000)	.109	.000 (.000)	.069
ILM	-.001 (.005)	-.007	-.012 (.009)	-.063
Log of Size	-.064** (.021)	-.162	.019 (.051)	.055
Span of Control	.032 (.024)	.037	.035 (.039)	.055
Complexity	-.054 (.037)	-.067	-.076 (.087)	-.097
Formalization	.892** (.097)	.351	1.051** (.292)	.461
Centralization (Employment)	.170** (.026)	.234	.108* (.054)	.136
Centralization (Operation)	-.162** (.029)	-.177	-.021 (.054)	-.029
Custom/ Small Batch	-.094** (.020)	-.183	-.064** (.023)	-.132
Large Batch/ Mass Production	.019 (.017)	.046	.048 (.033)	.138
Continuous Process	.002 (.011)	.007	-.037 (.026)	-.121
Automation	-.014 (.017)	-.025	.075** (.027)	.142
Workflow Rigidity	.045* (.024)	.076	.003 (.047)	.006
Branch Establishment	.119** (.042)	.201	.110 (.078)	-.095
percentage Women	-.618** (.092)	-.206	-.529** (.189)	-.230
Industry ^a :				
Electronics	-.205** (.065)	-.155	-.045 (.124)	-.046
Chemicals	-.303** (.072)	-.204	-.146 (.123)	-.097
Metals	-.429** (.099)	-.130	-.188 (.183)	-.049
Food	-.573** (.084)	-.389	-.087 (.142)	-.061
Machinery	-.253** (.074)	-.206	.174 (.121)	.108
Transportation	-.127* (.072)	-.135	.212* (.114)	.146
Intercept	7.182		5.674	
D.F.	1858		649	
R ²	.505		.533	
Adjusted R ²	.497		.512	
SEE	.327		.335	

Note: Standard Errors are presented in parentheses.

** p < .01, one-tailed test.

* p < .05, one-tailed test.

^a The reference category is printing and publishing.

CHAPTER VII

CONCLUSIONS

I started this work with an exposition of the "resource perspective" as one of the most recent developments of the "new structuralist" paradigm in stratification studies. Chapter 2 argued for a reformulation of the resource perspective in terms of the identification of resources and vulnerabilities. Most research using this perspective has looked at the sign of the impact of corporate structures on earnings of workers as an indication that these structures are vulnerabilities or resources for workers. This approach views a resource as a structure that enhances earnings. In this dissertation, I have proposed that in order to call a given structure a "resource", that structure should enhance the power of labor vis-a-vis capital. Earnings are not sources of power for workers in their struggle against employers. In fact higher earnings levels are sometimes offered to workers in order to appease them. I have argued that instead of focusing on earnings, we should conceptualize arrangements that correctly reflect worker power. Two such worker power measures were introduced earlier: unionization and internal labor markets (ILM). I contended that in order to identify resources and

vulnerabilities, we should look at the impact of economic structures on these worker power measures. Those structures that enhance unionization and/or ILMs should be viewed as resources and those that diminish them should be considered vulnerabilities. I developed and tested hypotheses regarding the effects of a variety of organizational structures on worker power measures. Subsequently, I developed and tested hypotheses about the effect of organizational structures on earnings, net of basic human capital controls. Before summarizing these results and discussing their implications, I will present several limitations of the study.

LIMITATIONS OF THE STUDY

Several limitations of this dissertation are prominent. First, a major shortcoming of this study is the fact that the plants in the sample are limited to the Indianapolis Metropolitan Area and to only seven manufacturing industries. This limitation of the study poses the problem of external validity, the problem that whether the conclusions reached in this study can be generalized to other industries and regions of the United States. Considering the decline of manufacturing in the past few decades accompanied by a shift from manufacturing to services, and the rise of high-tech industries, it is of considerable importance to examine the determinants of worker power measures and worker outcome in non-manufacturing sectors of the economy as well.

The sample limitation mentioned above poses another possible problem which relates to the amount of variability in independent and

dependent variables which in turn affects the significance levels for the impact of the former on the latter. Because of the concentration of plants in only a few manufacturing industries, the distribution of some organizational variables may not be as wide as they would otherwise be if all industries were sampled. This influences the standard errors of the effects of variables such that within the present sample a variable that could have a significant impact might be shown to have no effect on a given dependent variable.

Another shortcoming relates to the measurement of internal labor markets. The reader may recall that in Chapter 3 where measurement and methodology were discussed, a scale of ILM using four variables derived from the individual level data was constructed. Workers were asked questions about their perception of promotion opportunities, relevance of skills to jobs they expect to get in the future, and priority over outside job applicants for job vacancies. These variables were aggregated to the establishment level and a scale of ILM was created. Thus, this scale measures perception of ILMs and not actual ILMs. Of course it is very likely that perception of ILMs coincides with the actual existence of such structures, that if workers who report that chances of promotion are good and that they expect to be promoted actually are employed in workplaces that have promotion opportunities and job ladders. However, I would have preferred to have constructed the ILM scale from such establishment variables not available in the data set as whether a plant has promotion-from-within policies or the percentage of jobs that could not be entered from outside the establishment.

SUMMARY OF FINDINGS

The results of the effects of organizational structures on measures of worker power were presented in chapter 4. The following discussion provides a list of the findings for the unionization and internal labor markets analysis. Table 7.1 summarizes predicted and actual effects of organizational variables on unionization and ILMs.

Results of Unionization Analysis:

1. Employment size has a positive effect on unionization and as such is a resource for workers. The relative cost of unionization is small in larger workplaces and such organizations enhance the communication and organization possibilities of workers. Because of possible difficulty in worker-management communication, large organizations value unions more.

2. Continuous process technology has a positive effect on unionization and as such should be considered a resource for workers. In establishments with a predominance of this type of technology, workers have greater chances of interaction with each other and are more cohesive and, in turn, can more easily be unionized. Also, because continuous process technologies are capital-intensive and in such workplaces labor demand curve is less elastic, cost of organizing is low.

3. Large batch/mass production technology negatively affects unionization and as such should be viewed as a vulnerability for workers. This effect is due to the fact that in mass production establishments, the limited scope of interaction of workers due to

their fixed locations is not conducive to communication and organization possibilities necessary for the growth of unions.

4. Automation has a negative impact on unionization and as such should be regarded a vulnerability for workers. Automated plants, because they are profitable, have sufficient resources to offer workers benefits usually provided by unions, and, consequently, curb unionization drives.

5. The percentage of women negatively affect unionization. Historically, union organizing efforts have been weak among women, and, overall, women are slightly less likely to want to become unionized than men.

Results of Internal Labor Market Analysis:

1. Complexity positively affects internal labor markets and as such is a resource for workers. Proliferation of ranks and divisions within organizations is a necessary condition for the creation of ILMs.

2. Automation positively affects internal labor markets and, in this regard, should be considered a resource for workers. In automated plants, because workers have a high degree of responsibility and the cost of sabotage is high, they are in a position of power to demand promotion opportunities and job stability.

3. Organizational-links positively affects internal labor markets and should be regarded resources for workers. Multi-establishment firms are more likely to develop ILMs because of their concern with worker loyalty which helps relocate workers from one establishment to the other if vacancies need to be filled. Also because of the increased need for coordination in multi-branch organizations, personnel

departments that accompany ILMs are expanded.

4. Formalization negatively affects internal labor markets and as such should be viewed to be acting as a vulnerability. In formalized organizations where written rules and documents are prevalent, employers do not have to rely on internal labor market arrangements to coordinate and monitor employee activities.

5. Centralization negatively affects internal labor markets and should be regarded a vulnerability. Centralized organizations restrain workers and act as control, monitoring, and coordination mechanisms and as such reduce the motivation (or ability) of employers to establish ILMs.

6. Custom/small batch technology negatively affects internal labor markets and should be viewed as a vulnerability. Where this type of technology is prevalent, workers predominantly rely on craft skills which are not necessarily firm specific and, thus, mobility structures are not firm-bound.

7. Large batch/mass production technology negatively affects internal labor markets and should be considered a vulnerability. Mass production uses assembly lines, monitors workers by programmed machinery, imposes technical control on workers, and as such reduces the need of ILMs as control and coordination mechanisms.

8. Workflow rigidity negatively affects internal labor markets and should be regarded a vulnerability. In workplaces which use this kind of technology, technical control prevails as workers are bound to the pace of machines, to their work stations, and to their specialized equipments. Where technical control is used, the need for ILMs as a

control and coordination mechanism is reduced.

9. The percent of women negatively affects internal labor markets. Women, compared to men, are less likely to be placed in positions with chances of advancement and promotion opportunities. Because women work more intermittently, employers are reluctant to invest in their firm-specific training. Thus, they are not likely to be located on career ladders that accompany progression of skills.

10. Unionization affects internal labor markets negatively. Because unions lower turnover and training costs, they lead management to have less an incentive to create ILM structures. Unions do not view some aspects of ILMs such as loyalty to the company as favorable and as such oppose these arrangements.

No organizational variables except automation listed above have opposite signed effects on unionization and ILMs. This variable is shown both to act as a resource, in that it affects ILMs positively, and a vulnerability as it has a negative effect on unionization. This discrepancy reflects a situation in which employers decide to promote one form of worker power and actively fight another form. Automated plants, because they are capital intensive and profitable, can afford to offer workers job security and promotion opportunities which make for the creation or expansion of ILM structures. At the same time the creation of ILMs so far as they provide some of the benefits that unions promise to deliver could be a strategy used by management to prevent or fight unionism.

Once resources and vulnerabilities were identified, the

dissertation, in Chapter 5, proceeded to focus on the effect of these structures on earnings of workers. This chapter highlighted the importance of including an earnings analysis in this research. I argued that in order to maintain continuity with research in stratification and resource perspective, effects of organizational variables on earnings should be estimated. Moreover, no previous work has developed an earnings model using a contextual analysis which employs a set of organizational variables such as the ones introduced in this research. Most rationales developed in Chapter 5 for the effects of organizations on earnings of workers rely on their indirect impact via productivity, profit levels, and potentials for worker unrest and industrial conflict. Chapter 6 provided the results of the regression of earnings on human capital and organizational variables. The following presents the main findings of the earnings analysis (Table 7.2 summarizes the predicted and actual effects of organizational variables on earnings):

Results of Earnings Analysis

1. Employment size positively affects earnings because large organizations produce higher corporate profits and, in order to avoid industrial conflict and worker unrest, offer workers increased rewards.

2. Formalization affects earnings positively because reliance on written rules and documents minimizes individual judgement, and work activities and performance becomes more calculable and predictable. This enhances productivity and earnings are in turn increased.

3. Centralization has a positive impact on earnings because discipline and control inherent in centralized organizations contribute

to productivity and efficiency.

4. Continuous process technology, Custom/small batch technology (for both men and women) and large batch/mass production (only for men) have negative impacts on earnings. In labor-intensive work organizations where the labor demand curve is more elastic, workers demand smaller earnings increases.

5. Workflow rigidity and automation have positive effects on the earning levels of men and women, respectively. In capital-intensive plants, employees working with expensive equipment can use the threat of sabotage, gain bargaining power, and as a result demand higher wages.

6. Percent women negatively affects earnings. In organizations with higher percent of women in their labor force, female dominated jobs and/or jobs with higher proportion of women are more prevalent. These jobs, because of discrimination and overcrowding, pay less.

7. Organizational links negatively affect earnings of women. Women in independent establishments earn more than women in establishments that are either a subsidiary or a branch plant. Women's careers are bound to single establishments and their advancement does not cross cut firms; they are place-bound.

8. Organizational variables are better predictors of female than male earnings. Women are more place-bound than men. Women's labor force trajectories are more linked to specific organizations and the attributes of the organization have a stronger effect on their earnings.

9. Organizational measures used in this research account for most of

the variation in earnings that is explained by any and all establishment differences.

10. Controlling for industrial variations, some of the effects of technology and the effect of organizational links on the earnings of both male and female workers is altered.

IMPLICATIONS

Several implications of the findings for stratification research in general and the resource perspective in particular can be noted. First, the results of this research strengthens the position of the "new structuralist" paradigm in that the findings underscore the impact of contextual/structural variables on the process of stratification and attainment. This research should be viewed as an evidence for the rejection of the contention that workers operate in homogeneous markets and rewards are determined only by individual characteristics.

In the same vein, this research also underscores the assertion of the resource perspective that segmentation is multidimensional, that it is useful to conceptualize structures "in terms of resources and vulnerabilities provided by various dimensions of economic and labor market organization." (Hodson and Kaufman, 1982:735). In fact, this dissertation moved beyond conceptualizing structures as resources/vulnerabilities to empirically testing which dimension of organizational structure are resources and which ones should be considered vulnerabilities. Thus, I believe that this work specifies the resource perspective more clearly and provides a direct test -- instead of a mere interpretation -- of the role of various organizational

structures in affecting worker power.

Although this study shows fruitfulness for the approach of studying organizational structures and their effects on worker power as a method of identifying resources and vulnerabilities, little if any evidence was provided for the hypotheses that worker power measures have positive impacts on earnings, a major worker reward and labor market outcome. Moreover, the earnings results showed that in many cases variables that were identified as resources (in chapter 4) negatively affect earnings and those that were labeled vulnerabilities positively influence earnings levels of workers.

At first glance, these findings suggest that the resource perspective does not provide an explanation for the relationship between organizations and worker outcomes and as such should be discarded or revised. However, before arriving at such a conclusion, several caveats should be considered. First, the sample limitation of the study which restricts the variability of the organizational variables (described in the "limitation" section of this chapter) could be responsible for the lack of significant effects of worker power measures on earnings.

Second, earnings levels are only one type of worker outcome that workers receive from their jobs. Worker power measures might have an impact on nonmonetary outcomes such as job satisfaction, alienation, and property rights of jobs. In fact, perception of property rights of jobs have been the topic of a recent paper by Leicht and Wallace (1988). They use the resource approach to interpret the effects of several establishment level variables along with measures from other

levels of analyses on workers' perception of property rights of jobs. They find, for example, that employment size of organization and number of ranks are resources for workers in that in large and differentiated organizations the threat of job loss is less salient, workers occupy specialized roles, and since they do not see much of the decision-making process in their immediate view "the hierarchical structure of the work force confronts [them] as 'natural' and immutable" (p.201) and as a result, such workers are likely to support managerial prerogative at the expense of job entitlement.

Third, The fact that some resources are shown to have a negative impact on earnings could be because the total effect of an organizational variable on earnings is not only composed of an indirect effect via measures of worker power introduced in this research, i.e., unionization and ILMs, but also includes indirect effects via productivity/efficiency, and via some unmeasured indicators of worker power. The sum total of these effects plus the direct effect of an organizational variable on earnings might turn out to have a sign different from that of the indirect effect via unionization or ILM. In such a situation we might see that a resource has a negative effect on earnings or a vulnerability affects earning levels positively.

Another implication of the study relates to the use of organizational/establishment level data in stratification research. For years, researchers in dual economy and segmentation approaches used the industry as the level of analysis in their empirical works. Although focusing on organization as the link between macro and micro processes of work and distribution of rewards was recognized to be valuable and

recommended by many sociologists (e.g. Baron and Bielby, 1980), perhaps due to the lack of availability of data, only few empirical works actually brought in organizations to their research. This dissertation not only highlighted the importance of organizations as an important contextual factor, but also strengthened the link between the stratification and complex organization subfields within sociology.

DIRECTIONS FOR FUTURE RESEARCH

Several directions for future research in the resource perspective can be envisaged. One extension of this study would be to include a wider range of organizational variables in the worker power models. The type of data that is not represented here are financial measures such as assets, sales, income, and profits, and productivity/efficiency indicators.

Although this research points to resources and vulnerabilities in work organizations, one can not ignore the effects of other factors at broader levels of analysis (regional, industrial, national, etc.) on measures of worker power. For example, a similar analysis could be performed among a larger number of organizations from a broader range of industries. An interesting comparison to this dissertation would be a similar study among establishments within the service industries. Granovetter (1984) argues that when production workers in the manufacturing sector are employed in one plant of a multi-establishment company, that particular plant defines the labor market in which the line of their careers progress. He shows that a greater proportion of employees work in branch establishments in manufacturing in contrast to

services and retail. Thus, he concludes that establishments are more important in shaping individual outcomes in manufacturing than in other sectors. Villemez and Bridges (1988), using a sample of both manufacturing and non-manufacturing workers, demonstrate that the positive effect of establishment size on earnings is significant only in the manufacturing sector. Accordingly, in an analysis where a cross section of industries are included, I would expect establishment variables to have similar but stronger effects on worker outcomes in manufacturing than in any other industries. Regarding the effect of organizational links, I would hypothesize that since manufacturing workers are more bound to the particular plant in which they are employed, they benefit less from being part of the labor force of a multi-establishment corporation than would non-manufacturing workers.

A further development of this research could use cross cultural comparisons of the configuration of empowering agents and their determinants. Such a study should first identify the proper structures that empower workers. It is an empirical question whether unionization that is a measure of worker power in the U.S. can be treated the same in other countries. Japan would be a good example for such a comparison because the data used in this dissertation are part of a larger data set that include parallel information on 55 Japanese manufacturing establishments. Whether the behavior of Japanese enterprise unions is similar to industrial and trade unions of the U.S. has been the subject of considerable discussion (Kalleberg and Lincoln, 1988, provide a good review of this debate). Burawoy (1983) and Galenson (1976: 630) contend that Japanese labor organizations are little more than company unions.

These unions do not usually challenge management decisions on labor allocation, nor do they work hard in increasing leave time or shortening workweeks. Enterprise unions often participate with management in strategic decision making at the firm level (Shirai, 1983). Moreover, the fact that first- and second-line supervisors can become union members, and that union office holding can be used as an avenue to management positions also sheds some doubt on whether enterprise unions should be considered as worker power measures. On the other hand, Kalleberg and Lincoln (1988) contend that there is agreement that Japanese unions fight hard for bread-and-butter issues such as wages and job security, and that the volume of strike activity in Japan is higher than in France and Germany.

Regardless of whether the same structures in Japan represent worker power as in the U.S., one can predict certain patterns of relationships at the organizational level of analysis. For example, Lincoln et al. (1986) show that technology has a similar but stronger effect on various organizational structures such as centralization of decision making and subunit differentiation in the U.S. than in Japan. These two features of organizations are normally closely related to worker empowerment as decentralization of decision making enhances workers' inputs in the operation of the firm and subunit differentiation facilitates the creation and expansion of ILMs. Therefore, I expect technology to have a stronger effect on empowering structures in organizations in the U.S. than in Japan. The reason that technological imperatives loom larger in the U.S. is reliance on rigid mass technology in this country, and the prevalence of flexible

specialization, in which product designs and organizational forms are not closely linked to the dictates of technology in Japan (Piore and Sable, 1984). A historical reason for this tendency is the greater legacy in the U.S. of scientific management which presses for maximum fit between organizational structures of the workplace and the technical operations (see Lincoln, et al., 1986).

It is also possible to hypothesize differences between effects on earnings of various organizational variables between the U.S. and Japan. Kalleberg and Lincoln (1988), examining the structure of earnings inequality between these two countries, show that organizations have a pivotal role in determining Japanese workers' earnings. Many Japanese firms provide life time employment, promotions based on seniority, abundant welfare services, internal training, and a strong corporate culture (Cole, 1979). Accordingly, taking into account the importance of Japanese workers' ties to their employing organizations, I would expect to find larger organizational effect on earnings in Japan than in the U.S.

An important advantage of looking at an expanded sample of establishments from a wider variety of industries and countries is that other worker power structures could be identified. Today the number of firms that implement programs of worker participation in shopfloor decisions and even strategic corporate decisions are expanding. Many firms are experimenting with job enlargement, job enrichment, and quality of work life programs. All these are empowering structures for workers that might with some modifications replace unionism or make for the reemergence of unions

with a different structure (for more discussion of this trend see Heckscher, 1988). Thus, an augmented sample of firms might identify these emerging structures -- new forms of worker power measures -- and determine the factors that contribute to the emergence of these structures, factors that in the language of the resource perspective would be called resources.

Another useful application of the resource theory would be a longitudinal analysis of the factors affecting unionization and the development of ILMs and other worker power measures through time. A longitudinal study is especially important because it can consider the effect that passage of law that expand employee rights (e.g., Civil Rights Act, Vocational Rehabilitation Act, Occupational Safety and Health Act, etc.) or otherwise give employers latitude to actively oppose employee organizations (e.g., Landrum-Griffin Act).

The earnings analysis performed in this dissertation can also be expanded in future research. A larger host of organizational variables including financial measures such as profit levels, assets, etc. along with variables from other units of analysis (e.g., regional and industrial units of analysis) could be incorporated in the earnings models presented here.

Table 7.1. Predicted and Actual Effects of Organizational Structures on Worker Power Measures

Variable	Effect on Unionization		Effect on ILMs	
	Predicted	Actual	Predicted	Actual
Size	+	+	+	0
Complexity	-	0	+	+
Formalization			-	-
Span of Control	+	0	+	0
Centralization	+	0	-	-
Custom/Small Batch Technology	-	0	-	-
Large Batch/Mass Production	+/-	-	-	-
Continuous Process	+	+	+	0
Automation	+	-	+	+
Workflow Rigidity	+	0	-	-
Branch Establish.*	+/-	0	+	+
Percent Women	-	-	-	-
Unionization			+	-

* The positive effect of branch establishment denotes that the extent of unionization and ILMs are greater in branch organizations than in those that are independent.

Table 7.2. Predicted and Actual effects of organizational Structures on Earnings of Workers

Variable	Predicted Effect	Actual Effect
Unionization	+	0
ILM	+	0
Size	+	+
Complexity	+	0
Formalization	+	+
Centralization	+	+
Span of Control	+	0
Custom/Small Batch Technology	-	-
Large Batch/Mass Production	-	- ^a
Continuous Process	+	-
Automation	+	+ ^b
Workflow Rigidity	+	+ ^a
Branch Establishment*	+	- ^b
Percentage Women	-	-

^a This effect is true only for male workers.

^b This effect is true only for female workers.

* The positive effect of branch establishment means that earning levels are higher in establishments that are branches or subsidiaries of larger organizations.

APPENDIX A

REGRESSION RESULTS WITHOUT THE PARABOLIC EFFECTS OF AGE

Regression of Log Earnings on Human Capital Variables (Except
(age Squared) Establishment Characteristics for Male and Female Workers

Independent Variables	Men		Women	
	b	beta	b	beta
Race	-.041 (.026)	.027	-.040 (.039)	-.030
Education	.050** (.010)	.093	.017 (.018)	.028
Age	.005** (.001)	.127	.002* (.001)	.059
Tenure	.007** (.001)	.134	.011** (.002)	.207
SEI	.005** (.000)	.172	.004** (.001)	.103
Weeks Works	.018** (.002)	.180	.021** (.003)	.189
Hours Worked	.015** (.002)	.154	.017** (.003)	.139
% Unionized	-.000 (.000)	-.027	-.000 (.000)	.047
ILM	-.003 (.005)	.020	-.008 (.008)	-.044
Log of Size	.053** (.015)	.132	.122* (.031)	.348
Span of Control	-.009 (.021)	-.011	-.015 (.028)	-.024
Complexity	-.016 (.031)	.019	-.089 (.089)	-.115
Formalization	.581** (.074)	.229	.754** (.181)	.331
Centralization (Employment)	.078** (.022)	.108	.173** (.048)	.218
Centralization (Operation)	-.135** (.027)	-.147	-.034 (.047)	-.048
Custom/ Small Batch	-.130** (.017)	-.252	-.089** (.022)	-.185
Large Batch/ Mass Production	-.046** (.013)	-.119	-.000 (.025)	.000
Continuous Process	-.028** (.009)	-.087	-.051** (.018)	-.165
Automation	-.002 (.016)	-.004	.085** (.024)	.161
Workflow Rigidit	.089** (.018)	.153	.002 (.033)	.004
Branch Establish.	-.006 (.036)	-.005	-.066 (.068)	-.057
Percentage Women	-.584** (.069)	-.194	-.844** (.103)	-.366
Intercept	7.871		6.006	
D.F.	1865		656	
R ²	.469		.508	
Adjusted R ²	.463		.492	
SEE	.338		.342	

Note: Standard Errors are presented in parentheses.

** p < .01, one-tailed test.

* p < .05, one-tailed test.

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