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# Internal Labor Markets: Labor Process and Market Power Effects.

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# INTERNAL LABOR MARKETS:
# LABOR PROCESS AND MARKET POWER EFFECTS

A DISSERTATION

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in partial fulfillment of the
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in

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by
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## ABSTRACT

This study contends that previous investigations into the nature of internal labor markets have been hampered by their dependence on various macro-level variables (e.g., sectors, industries, strategies) that ignore the often wide variation of employment arrangements within individual firms. It proposes that a better understanding of the employment arrangements associated with individual jobs may be gained by not only examining a job's technological components, but also the relative power of a firm's various coalitions.

The data used in the reported study were acquired from the headquarters of the U.S. Bureau of Employment and Training's Occupational Field Analysis Centers in Raleigh, NC, and described 250 jobs in nineteen firms operating in six industries. They were collected between 1986 and 1990. Eight hypotheses were tested using hierarchical multiple regression.

Results indicate that employment arrangements are at least in part the result of bargaining (both explicit and implicit) over definitions of work and the relative power of the parties involved in such negotiations. That is, that the inclusion of jobs in internal labor markets is a function of the power employees have over the actual labor process (i.e., task interdependence and jobholder choice)

and the power employees have to restrict available labor supplies in the external market (i.e., union representation and firm-specific skills).

# Chapter 1

## Introduction

The research undertaken in this dissertation investigates internal labor markets from a job-level perspective. In doing so, it departs from earlier work which has taken a macro-level approach to explaining this topic. Macro-level research, primarily based in sociology and economics but more recently management, has examined factors such as labor market dualism (Doeringer & Piore, 1971; Edwards, 1979); the industrial sector or the particular industry in which a firm is located (e.g., Beck, Horan, & Tolbert, 1978; Sonnenfeld & Peiperl, 1988; Tolbert, 1982), and the type of business-level strategy a firm employs (e.g., Miles & Snow, 1984; Schuler & Jackson, 1987) as means for explaining the internal labor market phenomenon. These approaches, however, have failed to recognize the dynamic and diverse nature of individual firms. Each has assumed homogeneity of technologies as well as of employment arrangements across firms, not to mention within departments.

In this dissertation it is argued that a more complex conceptualization of work settings would facilitate a better understanding of internal labor markets. In particular, it is argued that the focus of the above

the exclusion of job-level factors. Firms should, in general, not be viewed as monolithic in their employment arrangements. Within a particular firm, for example, there are usually substantial variations in the promotion structures for various types of jobs and jobholders. Whether this structure is due to technological requirements, control considerations, or custom, firms are likely to establish different promotion structures for different types of jobs and jobholders. For instance, for many jobholders, employment in large white-collar firms such as banks or insurance companies means job security, career prospects, and formal rules with respect to such outcomes as promotion. However, within these same firms, there may be a large number of clerical jobs with low pay, high turnover, and limited prospects for upward mobility (Osterman, 1982).

Such variation in a firm's employment arrangements suggests the possibility that there are underlying differences in the characteristics of various jobs that make them more or less likely to be included in an internal labor market. Drawing on research examining the relationship between technology and organization structure (e.g., Blau & Schoenherr, 1971; Eisenhardt, 1985; Hachen, 1988; Hickson, Pugh, & Pheysey, 1969; Ouchi, 1979; Perrow, 1967; Thompson, 1967), it is arguable that one way to examine these differences is to explore the (a)

interdependence among jobs, and (b) amount of choice jobholders have in performing their work.

A second notion underlying this research is that employment arrangements associated with individual jobs are not strictly determined by a firm's objective features. Instead, it is argued that a job's technological components (e.g., task interdependence and amount of jobholder choice) are often manipulated as various coalitions (e.g., unions, professions) within a firm jockey for power (e.g., Benson, 1977; Cyert & March, 1963; Fligstein & Fernandez, 1988; Mintzberg, 1983; Pfeffer, 1981, 1989; Stark, 1986). Thus, it follows that employment arrangements are also the result of conflict over definitions of work and the relative power of the coalitions involved (Boswell, 1988; Fligstein & Fernandez, 1988; Scott, 1987; Stark, 1986; Strang & Baron, 1990).

This introduction outlines the rationale for the dissertation, the nature of the problem it addresses, and introduces three key terms (i.e., internal labor markets, task interdependence, jobholder choice). It is organized into six sections: (1) definitions of key terms, (2) statement of the focal research problem, (3) reasons for studying job-level characteristics and internal labor markets, (4) significance of the study, (5) outline of subsequent chapters, and (6) chapter summary.

## 1.1 Definitions of Key Terms

Theoretical relationships among the dissertation's focal variables will be discussed in greater detail in Chapters 2 and 3. Before proceeding, however, three key terms will be defined: (a) internal labor markets, (b) task interdependence, and (c) jobholder choice.

### 1.1.1 Internal Labor Markets

According to Dunlop (1966), the term internal labor market refers to "the complex of rules which determines the movement of workers among job classifications within administrative units, such as enterprises, companies, or hiring halls" (p. 32). Doeringer and Piore (1971) add to this definition that entry into an internal labor market is firm controlled, and that jobholders are usually promoted from lower-level jobs to higher-level jobs by means of orderly "lines of progression" or job ladders. Lines of progression are said to exist when "work on one job develops the skills required for more complex tasks on the job above it, and those at one point in the line constitute a natural source of supply for the next job along the line" (Doeringer & Piore, 1971, p. 58). In this sense, internal labor markets result from administrative rules and procedures, and can be characterized as "any cluster of jobs ... that have three basic 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 & Kalleberg, 1981, p. 130).

### 1.1.2 Technology

One important way in which technologies differ is in terms of the degree of task interdependence they create among jobs (Thompson, 1967). Task interdependence refers to the relations that exist among jobs -- the degree to which job performance depends on the accomplishment of other associated jobs. Thompson's (1967) distinction between long-linked, mediating, and intensive technologies is designed to capture such differences. Long-linked technologies are characterized by serial interdependence in which job 'C' cannot be accomplished until jobs 'A' and 'B' have been completed (e.g., assembly-line jobs). In mediating technologies there is little interdependence among jobs. That is, for example, job 'C' does not require that a previous job be completed before it can be accomplished. Instead, connections are among jobs and clients or customers rather than among jobs (e.g., sales clerks or telephone operators). Finally, intensive technologies can have both high and low degrees of interdependence. In these instances, all possible relations among jobs can exist (e.g., R&D jobs).

Another way in which technologies differ is in the degree to which jobholders need to make choices prior to and during transformation processes (Perrow, 1967). In

this dissertation the term jobholder choice refers to the amount of autonomy or discretion individuals have as a result of the technological characteristics of their jobs. For Perrow, raw materials can differ in (a) the degree to which they are well understood, and (b) their stability or variability. If a material is not well understood, choices must be made prior to transformation. If it is well understood, but its properties are unstable or highly variable, then choices must be made throughout its transformation. Finally, if a material is both well understood and stable, then standardized procedures can be used to control transformation processes. Thus, because of the nature of the raw materials encountered, jobs should entail varying degrees of choice (i.e., autonomy or discretion). In such situations employee choice and management uncertainty are reciprocally related.

## 1.2 Statement of the Research Problem

The overall objective of this dissertation research is to explore empirically internal labor markets from a job-level perspective. It is the contention of this study that previous investigations into the nature of internal labor markets have been hampered by their dependence on various macro-level variables (e.g., sectors, industries, strategies) that ignore the often wide variation of employment arrangements within individual firms. Thus, it is proposed that a better understanding of the employment

arrangements associated with individual jobs may be gained by not only examining a job's technological components, but also the relative power of a firm's various coalitions.

## 1.3 Reasons for Studying Job-level Characteristics

The current investigation argues that previous research into internal labor markets (e.g., Beck, Horan, & Tolbert, 1978; Edwards, 1979; Miles & Snow, 1984; Sonnenfeld & Peiperl, 1988; Tolbert, 1982) has assumed that both the explanatory (e.g., labor market dualism, industrial sectors, business-level strategies) and dependent variables (e.g., internal labor markets) being studied are homogeneous categories. Evidence suggests, however, that explanatory variables such as industry boundaries and business-level strategies only imperfectly capture meaningful distinctions in employment arrangements. For example, Baron and Bielby (1980) found that because of diverse technologies and administrative techniques, United States Employment Service analysts often could not agree whether certain industries even existed. Moreover, even when the existence of an industry has been established, researchers often find classifying a particular firm into a particular category to be problematic. That is, industries differ greatly in the degree to which their primary products are produced within an industry and the extent to which particular firms specialize in those products.

Similar imperfections also create problems when business-level strategy is used to capture meaningful differences in employment arrangements. First, such strategies are in part a result of industry context (Mintzberg, 1983). Second, as Porter (1985) has noted, there is a distinct difference between professed and actual strategy. Moreover, as he and others (e.g., Miles & Snow, 1978) have repeatedly stated, many firms fail to conform to a single distinctive strategic pattern.

Even when these problems of aggregation can be overcome, an assumption of homogeneity across these categories (i.e.,labor markets, industrial sectors, business-level strategies) leads to a second assumption that is particularly important to the study of internal labor markets. Namely, that one or a few variables can adequately represent the operations of an entire category. For example, attempts by Schuler and Jackson (1987) to associate business-level strategies with the human resource practices of specific firms assume that a particular strategy necessarily leads to a single set of employment arrangements. The problem here, as with attempts to match industrial sectors to human resource practices (e.g., Bluestone, 1970; Doeringer & Piore, 1971; Edwards, Reich, & Gordon, 1975; Sonnenfeld & Peiperl, 1988), is one of level of analysis. As macro-level analyses, these studies assume that the dependent variable of interest (i.e., human

resource practices and, more specifically, internal labor markets) is homogeneous at the institutional or organizational-level. That is, many researchers have assumed not only that industries or strategies are homogeneous, but also that employment within firms is homogeneous as well.

Extensive research into the relationship between technology and organization structure (e.g., Billings, Klimoski, & Breaugh, 1977; Child & Mansfield, 1972; Comstock & Scott, 1977; Grimes & Klein, 1973; Hachen, 1988) indicates that there is substantial heterogeneity across firms as well as within departments. For example, Hickson, Pugh, and Pheysey (1969) found that, contrary to the findings of previous research (e.g., Woodward, 1965), structure in large organizations will be relatively unaffected by operations technology. Recognizing internal labor markets as a specific example of organization structure, it seems reasonable to expect that there is usually substantial variation in promotion opportunities for different jobs and jobholders (Baron & Bielby, 1980; Baron, Davis-Blake, & Bielby, 1986; Edwards, 1979; Hachen, 1988; Osterman, 1984). Indeed, almost all macro-level research into internal labor markets has ignored the relationship between specific jobholder tasks and positions on the one hand and those of supervisors, subordinates, and co-workers on the other. Also ignored is the fact that

research indicates that many if not most decisions regarding things such as technology and structure are highly political (e.g., Pfeffer, 1981, 1989).

In sum, macro-level studies have, in general, paid little attention to how work and jobs are actually organized within firms. Thus, it is proposed that a better understanding of the employment arrangements associated with jobs (i.e., internal labor markets) may be gained through an examination of the technological components of jobs, as well as the relative power of various coalitions to define those components. Research at this level of analysis might also assist in assessing the relative merits of the previously mentioned macro-level research. For example, do technical and structural arrangements within firms reflect differences between labor markets, industrial sectors, or strategies? Do the relations among jobs in particular labor markets, industrial sectors, or strategic contexts reflect more formally defined career opportunities than jobs in other categories? Are these jobs associated with indicators of participant power such as scarcity of skills, unions, or professional associations?

## 1.4 Significance of the Study

This research is aimed at advancing our understanding of internal labor markets. To date, the vast majority of internal labor market studies have examined factors such as labor market dualism (Doeringer & Piore, 1971; Edwards,

1979); the industrial sector or the particular industry in which a firm is located (e.g., Beck, Horan, & Tolbert, 1978; Sonnenfeld & Peiperl, 1988; Tolbert, 1982), and the type of business-level strategy a firm employs (e.g., Miles & Snow, 1984; Schuler & Jackson, 1987). A recognition of heterogeneity of technologies as well as employment arrangements across firms and departments, however, suggests potential benefits to be derived from a closer, more micro examination of internal labor market characteristics.

The goal of this dissertation is to offer a more in-depth explanation of the nature of internal labor markets. The intent of the macro-level approaches mentioned above is to overcome what is seen as an oversimplification by previous researchers (e.g., Becker, 1964; Hauser, 1980) of issues associated with individual career mobility and advancement. An overaggregation on the part of macro-level approaches, however, ignores the often substantial variation in employment arrangements within and between individual firms. More specifically, these approaches overlook the interactions of decisions regarding a job's technological components, political jockeying for power by various coalitions within a firm, and the consequences of these interactions for individual career mobility and advancement. It is hoped that this research will permit a better understanding of the way macro variables associated

with labor markets, industrial sectors, and business-level strategies together with organization structure, influence the micro-relations among jobholders, employers, and jobs.

In practical terms, the linking of job-level characteristics to organization structure should be significant in at least two ways. First, it is possible that public policy aimed at reducing such persistent problems as unemployment and poverty has been hampered by the exclusive use of remedies either too broad (e.g., national employment programs) or too specialized (e.g., individual training programs). It may be that an additional consideration, the relationship between job-level characteristics and individual career advancement, provides a more tangible starting place for explaining and correcting instability in individual employment patterns.

Second, some researchers (e.g., Sonnenfeld & Peiperl, 1988; Tichy, Fombrun, & Devanna, 1984) contend that, to implement business-level strategies, it is mandatory for a firm to consider its human resource practices. Although this assessment is certainly valid, a simple matching of abstract human resource policies to strategic alternatives without recognition of the interactions of job-level characteristics (e.g., task interdependence, jobholder choice), internal labor markets, and the relative power of relevant coalitions may inadvertently harm strategy implementation and, ultimately, firm performance (Child,

1984). Thus, according to these researchers, managers should perform a thorough examination of the technological components of jobs, internal labor markets, and decision-making constraints (e.g., scarcity of skills, union prerogatives) a firm confronts as well as those it will face in the future before attempting to match human resource practices to strategic plans.

## 1.5 Outline of Subsequent Chapters

Chapter 2 reviews relevant job-level research as well as previous technology/structure findings. Special emphasis is placed on the limited amount of previous research on internal labor markets using a job-level perspective. Because this dissertation is a departure from extant research, prior internal labor market studies focusing on a more macro approach are not recounted in great detail. However, these studies are reviewed in sufficient depth to capture those aspects that are directly relevant to the dissertation. For interested readers, summaries of the macro-based internal labor market literature are otherwise available (e.g., Althauser, 1989; Baron & Bielby, 1980; Granovetter, 1986; Osterman, 1988).

Chapter 3 outlines theoretical justifications for the research hypotheses investigated. Research objectives and research questions are also stated.

Chapter 4 outlines the research design and discusses the methodology used in data collection. Statistical analyses that were undertaken are also discussed.

Chapter 5 presents and discuss ensuing research results.

Chapter 6 provides conclusions that can be drawn from the research results and considers directions for future investigation. Study limitations are also acknowledged.

## 1.6 Chapter Summary

This chapter outlined the rationale for this dissertation, the nature of the subject it addresses, and provided reasons for studying internal labor markets from a job-level perspective. Additionally, the significance of the study was addressed and an outline of subsequent chapters was presented.

# Chapter 2

## Internal Labor Market Research

This chapter reviews prior internal labor market research with special emphasis on the role of job-level characteristics. Conceptual issues and problems characteristic of previous research are discussed. Based on this discussion, it is argued that examination of internal labor markets from a macro perspective alone is unlikely to provide sufficient insight into how and why these employment arrangements are constructed. Moreover, it is suggested that continued insistence on a monocular explanation of internal labor markets will serve only to hamper theoretical progress in this area and that an interactive approach to the relationship between variables at the job-level of analysis holds promise for learning more about the nature of internal labor markets.

Comparatively little job-level research has been directed at understanding how and why internal labor markets develop. This neglect is especially true with regard to interactions among job-level characteristics. Consequently, this dissertation is largely exploratory. However, many of the ideas and findings provided by previous internal labor market research as well as past studies of technology and organization structure (e.g.,

Hickson, Pugh, & Pheysey, 1969) can be useful guides in the current examination.

This chapter is divided into two main sections: (a) previous macro-level research into internal labor markets, and (b) job-level research. Previous macro-level research into internal labor markets is subdivided into research on dual labor markets, research on industrial sectors or particular industries, and research on business-level strategies. Job-level research is subdivided into previous internal labor market research and a discussion of the theoretical basis for this research. This dissertation is primarily directed at issues relating to the content of internal labor markets (e.g., a job's technological components) and social forces that define this content.

## 2.1 Macro-level Internal Labor Markets Research

Although macro-level studies of internal labor markets have been done at a variety of analytical levels, they share at least two underlying similarities. Whether researchers have looked to industrial sectors, labor market dualism, or business-level strategies as the source of variation in the use of internal labor markets, all make assumptions regarding managerial choice and homogeneity of employment arrangements.

Proponents of labor market dualism (e.g., Doeringer & Piore, 1971) assert that labor markets are subdivided into those characterized by the widespread use of internal labor

markets (i.e., primary markets) and those characterized by the relative absence of internal labor markets (i.e., secondary markets). Although researchers using this perspective disagree about whether or not this division is the result of efforts aimed at either labor control (e.g., Edwards, 1979) or improving operational efficiency (e.g., Piore, 1975), all seem to assume managerial choice in such matters.

Researchers who look at industrial sectors (e.g., Averitt, 1968; Beck, Horan, & Tolbert, 1978) as a basis for understanding internal labor markets accept the dualists' position regarding the existence of multiple labor markets. However, labor market dualism is seen as only one outcome of the differential resources controlled by core and periphery firms and their resulting ability to implement successfully strategic plans at an industry level.

Finally, there are those researchers (e.g., Sonnenfeld & Peiperl, 1988) who propose that the presence of internal labor markets is directly related to a firm's choice of business-level strategy. Thus, in terms of managerial choice, the primary difference between these macro perspectives is one of level of analysis (i.e., labor market, industrial sector, firm) and the proposed intent underlying managerial choice.

A second similarity in these macro approaches to internal labor markets lies in their treatment of the

employment arrangements involved. Each fails to recognize the diversity of employment arrangements to be found in a single firm, to say nothing of variance across firms and industries. For example, those taking either a dual labor market or an industrial sector approach have implied that firms of a particular type are characterized by the use of internal labor markets. That is, human resource practices are homogeneous at the institutional or organizational-level. This assumption presupposes that all of the jobs within a firm or industry are identical and that employment arrangements are homogeneous as well.

### 2.1.1 Dual Labor Markets Theory

The basic hypothesis of the dual labor markets theory is that an overall labor market is subdivided into two distinct divisions (i.e., primary and secondary markets), and that each has a unique set of human resource practices prompting, respectively, the widespread use of internal labor markets as contrasted with the relative absence of internal labor markets. Piore (1975) states that,

> the former (i.e., primary sector) offers jobs with relatively high wages, good working conditions, chances of advancement, equity and due process in the administration of work rules, and above all, employment stability. Jobs in the secondary sector, by contrast tend to be low-paying, with poorer working conditions and little chance for advancement; to have

> a highly personalized relationship between workers and supervisors which leaves wide latitude for favoritism and is conducive to harsh and capricious work discipline; and to be characterized by considerable instability in jobs and a high turnover among the labor force. (p. 126)

Piore (1975) adds that while jobholders in the primary sector thus normally have access to the benefits of internal labor markets, their counterparts in the secondary sector are typically subject to job competition in the external marketplace.

As noted, researchers with this perspective disagree as to the source of this differing access. Some economists (e.g., Doeringer & Piore, 1971) assert that internal labor markets develop as a result of firm-specific skills and on-the-job training. They argue that attempts to increase operational efficiency through constant adjusting of equipment and operating procedures results over time in a firm's various technologies becoming more and more idiosyncratic. As a consequence of this increasing technological idiosyncracy, skill requirements also tend to become more firm-specific. Accordingly, these economists posit that internal labor markets are used to foster specific skills and, through on-the-job training, to facilitate their enhancement.

Although other economists (e.g., Edwards, 1979) do not disagree with the association of firm-specific skills and on-the-job training with internal labor market functioning, they disagree about the reason for this connection. They (e.g., Gordon, Edwards, & Reich, 1982) see internal labor markets as part of a larger managerial strategy for controlling the supply, skill, and behavior of labor. It is argued that division of labor and automation are typically implemented in a manner that not only reduces costs, but also maximizes managerial control over production and labor.

Braverman (1974), for instance, contends that this "control imperative" (as opposed to a "technological imperative") is manifested in the deskilling or separation of work into two elements: conceptualization and execution. Conceptualization includes such things as choice of product, rate of production, and technology and is placed almost exclusively in managerial hands, while the execution of work is assigned to labor. As a result, work is differentiated along lines largely unrelated to skill and, more insidiously (in Braverman's view), labor becomes homogeneous with regard to required expertise. Thus, again, according to Stone (1974) and others (e.g., Edwards, 1979; Gordon, Edwards, & Reich, 1982)), it is precisely because of these outcomes that internal labor markets are

implemented by management as a means to pacify and regulate labor (who naturally object to such deskilling).

### 2.1.2 Industrial Sectors

Whereas Piore (1975) and others (e.g., Bosanquet & Doeringer, 1973; Doeringer & Piore, 1971; Klitgaard, 1971) have examined segmentation in terms of labor market characteristics (i.e., primary versus secondary) and labor control, still others (e.g., Beck, Horan, & Tolbert, 1978; Bluestone, Murphy, & Stevenson, 1973; O'Connor, 1973; Tolbert, 1982) contend that the industrial sector in which a firm is located is a more important factor to consider. These latter researchers view labor market characteristics and labor control as merely the outcomes of an economy divided into core and periphery firms. Core firms are postulated to have greater financial and political power than periphery firms and thus are to some degree shielded from competition. This protection produces segmented industry structures and, hence, impacts both labor market characteristics and their associated employment arrangements (e.g., use of internal labor markets).

The emergence of industrial sectors is commonly linked to the development of a "core" group of oligopolistic corporations that grew to dominate the U.S. economy during the late-19th and early-20th centuries. In contrast, peripheral industries are characterized by much smaller firms operating in relatively competitive environments.

Although much of the research done under the industrial sector rubric has employed various industrial classifications (e.g., Beck, Horan, & Tolbert, 1978), it should be remembered that while many core firms can be found in a particular set of industries, it is economic power and not location that establishes a firm's core status (Averitt, 1968). That said, Bluestone, Murphy, and Stevenson (1973) summarize the defining features of these two sectors as follows:

> The core economy includes those industries that comprise the muscle of American economic and political power.... Entrenched in durable manufacturing, the construction trades and to a lesser extent, the extraction industries, the firms in the core economy are noted for high productivity, high profits, intensive utilization of capital, high incidence of monopoly elements, and a high degree of unionization. What follows normally from such characteristics are high wages.... Workers who are able to secure employment in these industries are, in most cases assured of relatively high wages and better than average working conditions and fringe benefits.... Concentrated in agriculture, nondurable manufacturing, retail trade, and subprofessional services, the peripheral industries are noted for their small firm size, labor intensity, low profits,

> low productivity, intensive product market competition, lack of unionization, and low wages. Unlike the core..., the periphery lacks the assets, size, and political power to take advantage of economies of scale or to spend large sums on research and development. (pp. 28-29)

The industrial sector approach would suggest that this division (i.e., core versus periphery) has a significant impact on the type and extent of opportunities an individual jobholder experiences. It is posited that in the core sector human resource systems are characterized by highly differentiated tasks, wage structures, and internal labor markets, while in the periphery such elements are notably restricted or nonexistent (Beck, Horan, & Tolbert, 1978; Gordon, 1972; Spilerman, 1977; Tolbert, 1982).

### 2.1.3 Strategic Processes

The most recent macro approach to the study of internal labor markets centers on business-level strategies. This approach differs from the dual labor market and industrial sector approaches in that its origin is in the strategic planning literature. Moreover, researchers working in this area (e.g., Schuler & Jackson, 1987, 1989) have chosen as their focus human resource systems in general rather than internal labor markets in particular. Despite this focus, their discussions of human resource systems implicitly revolve around the presence or

absence of internal labor markets in association with particular business-level strategies.

This perspective proposes that the underlying logic of a firm's overall business strategy makes it more or less compatible with particular types of human resource systems. To date, three research streams, grounded in two different strategy typologies, are predominant. First, Miles and Snow (1978) suggest that for a firm's strategy to be effective requires that its management address three problems: (a) the entrepreneurial problem or definition and selection of a product market, (b) the engineering problem or selection of an appropriate technology to serve a chosen domain or market niche, and (c) the administrative problem or selection of control systems for reducing operational uncertainty within a firm. It is their contention that a management's response to these problems should specify the relations among a firm's overall strategy, technology, and structure such that it can be viewed as an integrated whole.

In terms of human resource practices, Miles and Snow (1984) suggest that a firm's dependence on internal labor markets will vary depending on its choice of product market (i.e., the entrepreneurial problem) and associated technology (i.e., the engineering problem). At one extreme, those firms whose success comes primarily from efficiently serving a narrow, stable domain (i.e., a

defender strategy) are likely to promote the development of ever more idiosyncratic technologies (cf. Doeringer & Piore, 1971) and, thus, are also likely to employ highly developed internal labor markets as a means to reduce operational uncertainty control (i.e., the administrative problem). In contrast, those firms whose success is based on a continuing search for new product and market opportunities (i.e., a prospector strategy) are likely to shun the development of stable, firm-specific technologies and skills in favor of a more flexible approach (i.e., these firms should have few if any internal labor markets). Degrees of dependence on internal labor markets will vary as a firm's responses to its entrepreneurial and engineering problems vary between these two extremes.

Another group of researchers (e.g., Sonnenfeld & Peiperl, 1988) also base their studies on the Miles and Snow (1978, 1984) typology (i.e., defenders, prospectors, analyzers). In this case, however, a firm's choice of business-level strategy and subsequent technical and human resource decisions are more intimately tied to the nature of its industry. While Miles and Snow (1978) only briefly examine the influence of environment on managerial choice, this more recent formulation focuses almost exclusively on industry effects. That is, Sonnenfeld and Peiperl (1988) tend to equate particular types of industries with particular strategic responses. Thus, in their recognition

of the homogeneity-producing impact of industries, Sonnenfeld and Peiperl (1988) move toward a multi-level analysis of factors influencing internal labor market use.

Finally, some researchers (e.g., Schuler & Jackson, 1987, 1989) have somewhat unsuccessfully attempted to link human resource practices and generic business strategies (i.e., focus, differentiation, cost leadership; Porter, 1985). In contrast to what Miles and Snow (1984) have suggested, these researchers posit that firms using a differentiation strategy to establish the perceived uniqueness of their goods/services should use varied employment arrangements (i.e., broad career paths) to reinforce the development of a range of general job skills. For firms that use a quality enhancement or focus strategy to concentrate their attention on a specific domain or market niche, these researchers likewise posit that the employment issue that is most crucial is extensive and continuous training to ensure predictable employee behavior. And, in firms that pursue a cost leadership strategy to aggressively pursue operating efficiencies, these researchers expect to find narrowly defined employment arrangements that encourage specialization, expertise, and efficiency.

2.2 Job-level Research

As has been noted, one of the most pervasive problems with most macro-level internal labor market research is its

assumption of homogeneity across firms and within departments. For this reason many researchers (e.g., Baron, Davis-Blake, & Bielby, 1986; Osterman, 1982) argue for the superiority of a job-level approach to the analysis of internal labor markets. For example, Baron and Bielby (1980) contend that because employment arrangements within firms are the focus of most macro-level internal labor market research, it makes little sense to examine extra-organizational variables (e.g., industrial sectors) to the exclusion of more directly related variables at the organization and job-levels (e.g., task complexity, skill levels).

As also previously noted, the assumption of homogeneity seems to stem, in part, from a lack of attention to organization theory research dealing with such areas as technology and competing coalitions (Baron & Bielby, 1980). Inclusion of relevant research in these areas as an additional basis for studying internal labor markets arguably offers promise for sensitizing researchers to the unreasonableness of viewing firms as monolithic in their employment arrangements. Continuing debates in organization theory over concepts and measures of both technology and power (e.g., Benson, 1977; Form, Kaufman, Parcel, & Wallace, 1988; Hickson, Pugh, & Pheysey, 1969; Mintzberg, 1983; Piore & Sabel, 1984; Scott, 1987), not to mention organization structure (e.g., Aldrich, 1972; Drazin

& Van de Ven, 1985; Pfeffer & Baron, 1988; Van de Ven & Delbecq, 1974), and organizational decision making (e.g., Child, 1972; Cohen, March, & Olsen, 1972; March & Simon, 1958; Williamson & Ouchi, 1981) are clear indications of the variability to be found within organizations. Close examination will also show that much of the job-level research to be discussed in this section recognizes this variability but fails to consider possible interactions among such variables.

### 2.2.1 Previous Job-level Research

Job- and organization-level explanations for the existence of internal labor markets appear to fall into one of three categories: (a) management/labor conflicts; (b) firm-specific skills and on-the-job training; and (c) scarcity of labor. Some historical accounts of internal labor markets attribute their existence to conflicts among production workers, union or professional workers, and their employers (e.g., Bills, 1987; Colē, 1979; Elbaum, 1984; Finlay, 1983; Schroeder & Finlay, 1986). That is, internal labor markets are seen by some as part of a control strategy that emerges from management's attempt to "turn the tide of conflict on the shop and office floor decisively in its favor" (Edwards, 1979, p. 180).

In an analysis of the historical development of internal labor markets in U.S. manufacturing, for example, Jacoby (1984) found that the primary impetus for internal

labor markets was management's concern over growing shop floor conflict and the fear that such conflict would ultimately result in unionization. Similarly, Schroeder and Finlay's (1986) study of hospital and chemical technicians suggests that differences in the two groups' access to internal labor markets are also the result of conflict. In this case, chemical technicians' jobs were included in internal labor markets because of their power in relation to management. On the other hand, hospital technicians were denied these benefits, in part, because of the presence of a more powerful professional group (i.e., physicians). Finally, Elbaum (1984) found that skilled non-union workers in the steel industry gained power because they posed a threat to both the steel workers' union and management. That is, these workers had "strategic responsibility for operations, equipment, and materials at bottlenecks" in the production process as well as the skills necessary to act as strikebreakers (p. 99).

The concepts of firm-specific skills and on-the-job training as constituent factors in the development of internal labor markets can be found in studies focusing on a variety of explanatory forces (e.g., labor control, operational efficiency, human capital). In terms of particular jobs or occupations, several studies support this linkage. Kanter's (1984) study of the careers of managers in high tech firms is especially supportive of

Williamson and Ouchi's (1981) markets and hierarchies approach (cf. Diprete, 1987). She argues, for example, that internal labor markets are likely to be more elaborate where tasks require firm-specific skills, and where tasks are high in uncertainty and, thus, difficult to monitor. Wholey (1985) found similar results in his study of internal labor markets in large law firms. Like Kanter (1984), he found that firm-specific skills were a determining factor in the development of internal labor markets for attorneys. However, he also found that the power to bring in new clients (or take them away) was also important.

Although these studies support the use of firm-specific skills and on-the-job training as factors associated with internal labor markets, others (e.g., Baron, Davis-Blake, & Bielby, 1986) provide both mixed and contradictory support. For example, the Schroeder and Finlay (1986) study previously mentioned supports the firm-specific skill theory only with respect to chemical technicians. This finding held true even though both groups of workers (i.e., hospital and chemical technicians) had comparable mixes of firm-specific and general skills. In direct contradiction to the firm-specific skill/on-the-job training thesis, Baron, Davis-Blake, and Bielby (1986) found that specific skills were only related to jobs above

entry-level and that these jobs could also be entered from outside a firm.

Schroeder and Finlay also found only indirect support for on-the-job training in that "jobs directly associated with process technology [where theoretically there is a premium on the transmission of skills across workers] tended to be in longer, relatively structured ladders...." (p. 261). Pfeffer and Cohen (1984), too, offer only mixed confirmation. They used two measures of firm-specific skills (i.e., vestibule training and on-the-job training), neither of which is consistently associated with internal labor markets. The only significant relationship to be found was between on-the-job training and status as a non-manufacturing firm. Such reports that manufacturing jobs and entry-level jobs are unrelated to internal labor markets are obviously in contradiction to previous statements (e.g., Doeringer & Piore, 1971; Williamson, 1981) regarding the likely development of such employment arrangements (Althauser, 1989).

Finally, Althauser (1989) proposes that the unifying element in explanations of internal labor markets within firms as well as occupational labor markets across firms is scarcity of skills. He argues that, "by definition, firm-specific [and occupation- specific skills] are not available from the external market" (p. 156). In support of this idea, Osterman (1987) reports that when the supply

of secretaries was tight, the firms he studied chose to create internal labor markets. Bills' (1987) in-depth case study of three different firms (i.e., manufacturing, hospital, consulting) also supports Althauser's (1989) view in at least two cases. Both Northside Manufacturing and Exurb Consulting purposely developed internal labor markets in an attempt to secure a stable, long-term workforce under conditions of scarcity. The third internal labor market that Bills (1987) studied (i.e., City Hospital) faced no such scarcity, but instituted an incernal labor market as a way to mitigate turnover problems. Lastly, Pfeffer and Cohen (1984) found no connection between scarcity of skills and internal labor markets. However, as Althauser (1989) states, their use of an organization-level measure of scarcity is an insufficient test of the thesis that scarcity of skills causes firms to develop internal labor markets.

### 2.2.2 Theoretical Basis for the Present Study

Like the macro-level research into internal labor markets, much of the extant micro-level research also tends to assume that managers' choices, whatever they may be (e.g., operational efficiency versus labor control), are unconstrained. A corollary to this assumption is that either technology (e.g., Doeringer & Piore, 1971; Williamson, 1981) or control (e.g., Edwards, 1979; Stone, 1974) has causal priority in achieving operational goals.

In this section I will discuss each of these assumptions and show how considering both may provide new insight into the reasons and ways internal labor markets develop.

Working from Cyert and March's (1963) coalitional approach to organizational decision-making,one can view few firms as unified actors. Rather, virtually all firms can be alternatively viewed as shifting combinations of interest groups (i.e., competing coalitions) moving up and down in power. When a particular group has a monopoly over some valued resource, such as legal or scientific expertise, it is also likely to have power within its organization (e.g., Hickson et al., 1971; Hinings et al., 1974). One of the ends to which this power is often put is the shaping of a firm's structure. As part of this structuring, more powerful groups will typically try to increase the amount of discretion in their own jobs while maintaining or reducing the level of discretion in other jobs (Scott, 1987). Such claims for increased job discretion or autonomy are often justified by "proofs" of the comparative complexity or value of the jobs in question (e.g., Dornbusch & Scott, 1975; Friedson, 1970).

Task descriptions then cannot be seen as wholly objective statements of work demands since they are based on subjective perceptions of the complexity or value of individual jobs. Thus, if we view firms as always being composed of competing coalitions (i.e., labor and

management), it is reasonable to conclude that the definition of such internal labor market factors as firm-specific skills, operational efficiency, and so on are at least partially perceptual. Moreover, as perceptions, they are also subject to some degree of control by the currently dominant coalition (i.e., the group with the most power; Mintzberg, 1983; Pfeffer, 1981, 1989; Stark, 1986). For example, if labor desires more autonomy it is likely to emphasize the complex and uncertain nature of its tasks. In contrast, managers who wish to retain control are likely to define labor's tasks as simple and routine. Which concept of reality prevails is in part based on power (Benson, 1977). Scott (1987) argues that this is particularly true in firms with a large number of professionals. It would also seem reasonable to expect that this would be true for firms with a strong union (especially when new technologies are introduced), as well as under conditions of labor scarcity.

In a recent reconstruction of Williamson's (1981) transaction cost approach to work relations, Boswell (1988) and others (e.g., Fligstein & Fernandez, 1988) come to similar conclusions with regard to organizational power. In general, Williamson (1981) and others (e.g., Wachter & Wright, 1990) assert that firms will choose hierarchical arrangements (e.g., internal labor markets) over competitive market processes when the transaction costs of

doing business in a market exceed those that would be incurred by internalizing these transactions. Transaction costs are the "exact costs of negotiating and writing, as well as the ex post costs of executing, policing, and when disputes arise, remedying the contract" (Williamson, 1981, p. 1545). The "contract" in this case being an employment contract.

For Williamson, transaction costs are a function of two factors -- asset specificity (e.g., firm-specific skills) and the degree of difficulty encountered in monitoring individual productivity. Asset specificity occurs when workers have firm-specific skills or other firm-specific assets such as in-depth knowledge of work procedures. The result of this asset specificity is labor scarcity or what Williamson (1975) calls a "small numbers game." Difficulties in monitoring individual productivity are the result of an imbalance in information (i.e., bounded rationality). Monitoring becomes difficult when workers have a high degree of choice or discretion in how work is done (what Williamson terms "information impactedness"), and when it is impossible to determine individual team members' contributions (what Williamson terms "interdependence").

Boswell (1988) contends that labor/management conflict is the primary determinant of transaction costs. Williamson's (1981) information impactedness/

interdependence concepts and asset specificity are reinterpreted as "worker control" over the labor process and "worker power" in the external labor market, respectively. Control over the labor process, which is associated with monitoring difficulties, is due to workers' ability to engage in collective restriction of output (i.e., interdependence) and the necessity for creative decision making inherent in some tasks (i.e., information impactedness). Power in the labor market, which is associated with asset specificity, is manifested when individuals with firm-specific skills can safely threaten to quit and when groups like unions or professions can restrict hiring and firing. Thus, internal labor markets are likely to exist where labor has power to raise transaction costs such that "management cannot afford to do without them" (Boswell, 1988, p. 142).

Once the possibilities of conflict and discretion have been introduced, recourse to a monocular explanation of internal labor markets such as operational efficiency or labor control becomes untenable. That is, organizational participants can no longer be seen as passive entities forever compelled to reflect the inevitable logic of a single causal mechanism. As Child (1972) and others (e.g., Georgiou, 1973; Zey-Ferrell & Aiken, 1981) have asserted, there is almost invariably an opportunity for choice in a firm's overall technology and organization structure. For

example, Gerwin (1979) gives two examples in which research purporting to support the determining value of technology can also be interpreted as support for a "structural imperative." First, Blau and Schoenherr (1971) concluded that decentralization in employment security agencies was the result of automation which was thought to provide an impersonal means of labor control. However, Gerwin (1979) argues that an initial choice of decentralization could have been followed by a model of technical support based on multiple computer facilities. A second example is Perrow's (1967) contention that nonroutine technologies produce low formalization and low centralization. Alternatively, he has since suggested that a decision not to organize things that could be organized might in turn produce nonroutineness. Similarly, if as has been suggested, concepts of tasks are in part perceptually determined, then the structural framework in which work is performed is likely to be an important factor. That is, tasks can be divided and simplified through differentiation, while professionalization can increase task complexity and discretion (Scott, 1987). Such was the case in Glisson's (1978) study of human service organizations. He found that differentiation and procedural specifications determine the degree of routinization.

Based on this discussion of competing coalitions and the nature of the technology/control relationship in

organizations, it is proposed that internal labor markets are the result of multiple factors. In particular, it will be argued that decisions informed by efficiency and labor control considerations are constrained by within-organization power differentials. It will likewise be argued that coalitions (whether labor or management) are limited by considerations of operational efficiency and labor control in the extent to which their choices can be fully recognized. Thus, internal labor markets are posited to be the result of interactions among multiple factors.

## 2.3 Chapter Summary

This chapter discussed previous macro- and micro-level internal labor market research and presented the theoretical argument underlying this dissertation. Previous macro-level internal labor market research has assumed both an excessive degree of homogeneity across firms and within departments, as well as unconstrained managerial choice. Micro-level research, while recognizing diversity within firms, has largely accepted the dominance of managerial choice and single-variable explanations.

It was proposed that a better understanding of internal labor markets can be gained from a recognition of limits to efficiency and labor control considerations, as well as to the power of competing coalitions. It was also proposed that internal labor markets are the result of interactions among multiple factors.

The following chapter outlines the theoretical justification for selected research hypotheses. Research objectives, research questions, and hypotheses are also stated.

# Chapter 3

## Research Objectives, Questions, and Hypotheses

This chapter outlines and discusses the research objectives, and questions used to study and test the following stated hypotheses. Accordingly, it is arranged into three major sections: (1) research objectives, (2) research questions, and (3) hypotheses.

### 3.1 Research Objectives

The principle objective of the reported research was to explore empirically internal labor markets from a job-level perspective. To understand internal labor markets, it seems necessary (as argued) to go beyond previous macro-level explanations (i.e., dual labor markets, industrial sectors, business-level strategies) to a consideration of micro-level phenomena. A fuller appreciation arguably requires that we examine the interactions of other factors that have not traditionally been the focus of previous internal labor market studies. At a minimum, such an examination must recognize the variability in employment arrangements within departments and across firms, as well as investigate the factors (e.g., competing coalitions) that influence this variability. Most micro-level research into internal labor markets has examined these individual factors as monocular explanations.

The second research objective is to compare and contrast the influence of power variables (e.g., union jobs versus non-union jobs) and job-level technology variables (e.g., task interdependence) on a job's inclusion in an internal labor market. As noted in the preceding chapter, the majority of micro-level studies have examined internal labor markets from one of three approaches (i.e., operational efficiency, labor control, labor/management conflict). Each of these approaches entails both implicit and explicit assumptions regarding the causal priority of one variable over all others. Some researchers (e.g., Edwards, 1979; Gordon, Edwards, & Reich, 1982) contend that internal labor markets are only part of a larger managerial strategy for controlling the supply, skills, and behavior of labor. In contrast, Williamson (1975) and others (e.g., Doeringer and Piore, 1971) argue for the primacy of a technological imperative. Still others (e.g., Elbaum, 1984; Jacoby, 1984) have suggested that internal labor markets are a function of conflicts between management and labor. Support for each of these approaches is significant enough to warrant a comparison as well as an examination of the combined effects these variables have on internal labor markets.

The third objective of the reported research is to develop a better understanding of internal labor markets by considering the degree to which job-level technology and

power variables combine to determine the existence of internal labor markets. Working from a transaction cost perspective, Boswell (1988) has argued that technology creates situations in which one group (e.g., labor) may gain power over the activities of another group (e.g., management). This argument is consistent with the case of skilled non-union workers in Elbaum's (1984) study who gained some measure of power over both union and management as a result of their critical workflow positioning. Benson (1977) and others (e.g., Mintzberg, 1983; Scott, 1987), however, have suggested that power provides groups with an opportunity to define job-level technologies in such a manner as to serve and protect the status quo. Schroeder and Finlay's (1986) study of equally skilled chemical and hospital technicians illustrates the validity of this position. Obviously, these viewpoints (i.e., that technology creates power versus power influencing technology) are not mutually exclusive. Thus, it would seem that the debate should not revolve around the causal ordering of technology and power, but rather around their potential interaction on the formation of internal labor markets.

## 3.2 Research Questions

Four central questions were investigated in this dissertation. These questions stem from the three research objectives discussed in the previous section and pertain to

the relationship between technical and power variables in internal labor markets, the relationship of these variables to one another, and their combined on the development of internal labor markets. Each of the research questions is outlined below.

Research Question #1: What is the relationship of job-level technology variables (i.e., task interdependence, jobholder choice) to internal labor markets? More specifically, what features differentiate jobs that are and are not included in internal labor markets? Do these features covary or are they independent? If they covary, is the relationship similar across internal labor markets?

Research Question #2: What is the relationship of power variables (e.g., unionization) to internal labor markets? Again, what features differentiate jobs that are and are not included in internal labor markets? Do power variables related to formal associations (i.e., unions, professions) covary with a more general indicator of labor power (i.e., labor market scarcity)?

Research Question #3: What is the relationship between the job-level technology variables addressed in Research Question #1 and the power variables in Research Question #2? Do technology variables covary with power variables? How can the differences among these variables be explained?

Research Question #4: How does the combined influence of technology and power relate to the presence of internal labor markets? What combination of variables differentiates jobs that are and are not included in internal labor markets? Are different combinations of variables associated with different internal labor markets?

## 3.3 Hypotheses

Eight hypotheses were developed in three areas to address the aforestated research objectives and questions. The hypotheses cover the relationship of: (1) job-level technology variables to internal labor markets, (2) power variables to internal labor markets, and (3) technology and power variables to one another as well as their combined impact on internal labor markets.

### 3.3.1 Technology

The relationship between technology and organization structure has long been a topic of inquiry. Early comparative investigations of this relation (e.g., Hickson, Pugh, & Pheysey, 1969; Woodward, 1965) proposed that a firm's technology was the dominant factor affecting its structure. For example, Woodward (1965) found that successful firms were often characterized by a match between the type of industrial technology being used (i.e., unit/small batch, mass production, continuous process) and structural variables such as specialization and decentralization. The Aston Group (e.g., Hickson, Pugh, &

Pheysey, 1969; Pugh, Hickson, & Hinings, 1969) later suggested that as organizations increase in size and become more differentiated the relationship found by Woodward (1965) does not hold. Instead, they argued that a direct connection between technology and structure is only valid in small organizations where structural responses to size have not begun to show. These analyses (i.e., Hickson, Pugh, & Pheysey, 1969; Pugh, Hickson, & Hinings, 1969; Woodward, 1965,), as well as others (e.g., Blau & Schoenherr, 1971; Hage & Aiken, 1967), have typically treated organizations as single units of analysis. Like the macro-level studies of internal labor markets discussed in Chapter 2, few of these studies considered within firm technological and structural diversity.

The systems-oriented perspective of researchers such as Thompson (1967) and Perrow (1967) have yielded a conceptually richer approach to the study of technology. This perspective recognizes, first, that several different technologies are typically necessary for accomplishing an organization's tasks. As Gerwin (1982) has noted, organizations require not only production technologies, but resource acquisition, distribution, and maintenance technologies as well. Thus, it is likely that different divisions, departments, and work groups within an organization will employ various technologies. Second, since this systems view equates technology with a method of

task accomplishment rather than with a task itself, it also recognizes that technology cannot be equated entirely with machinery. That is, technology can be machines as well as programs and procedures.

Task interdependence is the basis for categorization in Thompson's (1967) view of technology. Interdependence, as noted earlier, refers to the relations that exist among jobs -- the degree to which job performance depends on the accomplishment of other associated jobs. Research by Williamson (1975) and others (e.g., Alchian & Demsetz, 1972; Eisenhardt, 1985; Ouchi, 1979; Wachter & Wright, 1990) indicates that interdependence creates difficulties in monitoring individual productivity. Higher levels of interdependence create what Alchian and Demsetz (1972) have referred to as "nonseparabilities" in which it becomes difficult for management to ascertain what portion of a team's productivity should be credited to individual team members. This situation, like that of employee discretion, is the result of bounded rationality or an imbalance of information (Williamson, 1981). In the case of discretion, uncertainty arises because an organization cannot be assured that employee decisions will always be in its best interest. Since discretion precludes the setting of rules and procedures that would allow an organization to bypass employee motives not consonant with its own, it may be necessary for an organization to bind its interests with

those of its employees. Often, this is done through establishing promotion structures and long-term benefits programs (i.e., internal labor markets).

In the second instance, when individual productivity cannot be determined on an immediate basis because of limited information, it becomes necessary to observe marginal productivity over time. That is, information relating to individual performance must be gathered piece-meal with a final decision as to acceptability of performance made at some point in the future. Thus, merit as a basis of reward gives way to seniority and experience and, again, it becomes necessary to bind individual and firm interests to insure against "opportunistic employees" (Williamson, 1981).

From a bottom-up perspective (i.e., that of employees) interdependence creates an opportunity for control over the labor process through collective action. For example, the productivity of piece-rate workers can be severely hampered by materials, suppliers, and dysfunctional peer pressure (Burawoy, 1979; Roy, 1958) Edwards (1979) has also suggested that high levels of interdependence allow worker control through the creation of production bottlenecks (see, also, Elbaum, 1984).

Although Thompson (1967) associated discretion with interdependence, Boswell (1988) and others (e.g., Edwards, 1979; Gerwin, 1982; Williamson, 1975) consider discretion

to be a conceptually distinct aspect of the employment relationship. That is, these researchers argue that higher levels of task interdependence do not necessarily yield lower discretion or vice versa. For example, medical emergency teams are highly interdependent but, because of the variable nature of the raw materials involved (e.g., people, drugs), it is also necessary for team members to have high levels of discretion as well. In contrast, although industrial assembly lines are also high in interdependence, the raw materials utilized are generally well understood and stable. As a result assembly-line jobs typically have relatively low discretion. This same inconsistency also applies to jobs that are usually low in interdependence. For example, although the positions of bank teller and bank president both have fairly low interdependence with other jobs, the raw materials encountered in both positions require vastly different levels of discretion. Moreover, due to the characteristics of some raw materials, even using different technologies to perform the same task does not substantially lower discretion. An example of this situation is that of cataract surgery in the U.S. versus the former U.S.S.R. Although cataract surgery is organized as an intensive technology in the U.S., it was performed in assembly-line fashion in the U.S.S.R. The use of long-linked technology for this operation should reduce discretion to some small

degree. However, discretion cannot be reduced substantially simply because the human body is much too variable in its responses. Thus, jobholder choice or discretion is often related to interdependence, but it should be seen as a conceptually distinct aspect of technology.

Again, the problem for management is one of bounded rationality (Williamson, 1981) in which an organization loses some of its ability to predict behavior and thereby outcomes. Thompson (1967) has said that discretion increases uncertainty and, to the extent that an organization is dependent on jobholders with discretion, jobholder power is also increased. Jobholder choice also entails increases in administrative costs. Higher levels of choice mean that direct supervision becomes more and more difficult since a single supervisor can only monitor so much activity. Added supervisors mean larger payrolls as well as costly duplications of effort and knowledge. At the same time, other types of information systems can be prohibitively expensive (Eisenhardt, 1985). As noted in the preceding discussion of task interdependence, standardization of processes and outputs also becomes more difficult as jobholder discretion increases. At this point, when any kind of measure is costly, it has been argued (Eisenhardt, 1985; Ouchi & Maguire, 1975; Mintzberg, 1983) that organizations have two options in reducing the

expense of uncertainty. First, organizations can hire those whose outside training assures ability as well as acceptable professional standards. Or, second, training and normative indoctrination can be undertaken internally. [It will later be shown that generally neither of these options reduces the potential for worker power. Each merely externalizes the source of power by tying a firm to powerful professional associations and by limiting a firm's pool of replacement labor.] The latter of these options requires a large investment of time and money that an organization would logically be unwilling to forfeit without later payoff. Such payoff would only occur if these employees, trained and indoctrinated, remain over an acceptable payback period. Desired tenure can be secured through the use of incentives such as promotion opportunities, job security, long-term benefits, and so on.

### 3.3.2 Power

While the job-level technology variables discussed in the previous section represent monitoring difficulties (Williamson, 1981) and thus are sources of "worker control" over a labor process (Boswell, 1988), the variables to be presented in this section involve labor scarcity and are thereby sources of "worker power" in a labor market. Williamson (1975; Ouchi & Williamson, 1981) and many others (e.g., Diprete, 1987; Doeringer & Piore, 1971; Kanter, 1984) with an interest in understanding employment

relations attribute this worker power to the existence of asset specificity (explained below). However, as Althauser (1989) has proposed, the common element in these explanations of internal labor markets is not specificity of assets or skills per se, but the end product of any factor that restricts an organization's search and selection process in the labor market -- i.e., labor scarcity (also see, Fligstein & Fernandez, 1988). Scarcity can be an outcome of union and professional association as well as of asset specificity. Each of these factors, their impact on labor scarcity, and their relationship to internal labor markets will be discussed below.

Asset specificity occurs when jobholders have firm-specific skills or other firm-specific assets such as knowledge of unique company procedures or policies. As with monitoring difficulties, the problem in this situation is also caused by "opportunistic behavior" (Williamson, 1975; also see, Matthews, 1986 who emphasizes the purely cognitive costs of organizing and monitoring transactions). The circumstance under which opportunism manifests itself, however, is one of "small numbers" (Williamson, 1975) rather than interdependence or choice. In the beginning of an employee-employer relation, before a jobholder's experience becomes firm-specific, bidding for jobs is open and freely competitive. However, Williamson, Wachter, and Harris, (1975) state that, over time

> the idiosyncratic nature of... [employee] experience effectively destroys parity at the contract renewal interval. Incumbents who enjoy nontrivial advantages over similarly qualified but inexperienced bidders are well situated to demand some fraction of the cost savings which their idiosyncratic experience has generated. (p. 265)

Thus, through the development of firm-specific skills and assets, what began as competitive bargaining for jobs becomes a restricted labor supply situation in which opportunistic behavior can flourish. Williamson, Wachter, and Harris (1975) suggest that the most efficient (i.e., lowest transaction cost) way of handling such idiosyncracies is through the development of internal labor markets where: (a) wages are attached to jobs rather than individuals, (b) job promotion is from within, and (c) ports of entry are at lower hierarchical levels.

Attaching wages to jobs effectively negates the transaction costs associated with individual wage bargaining, yet it also increases the possibility of paying for productivity that never materializes. Internal promotion arrangements, where access to higher levels is restricted to internal appointments, tie the interests of workers to their employing firms. This, combined with lower-level ports of entry, allows a firm to protect itself against unacceptable productivity. Employees are brought

in at lower hierarchical levels and promoted as experience warrants with the assumption that any mismatch between wages and marginal productivity at ports of entry will be corrected over time. "Furthermore, employees who may have been incorrectly upgraded but later have been 'found out,' and hence barred from additional internal promotions, are unable to move to a new organization without penalty" (Williamson, Wachter, & Harris, 1975, p. 274). This use of internal labor markets therefore addresses the problem of scarcity by creating a ready supply of labor within a firm.

While asset specificity (e.g., firm-specific skills) acts as a source of employee power in the market place, collective restrictions such as unions and professional associations also constitute sources of jobholder power in the external market. Boswell (1988) has argued that one purpose of credentialling is to restrict labor supply or rather to create "small numbers" bargaining (see also Mintzberg, 1983). With regard to unions, many researchers (e.g., Elbaum, 1984; Kahn, 1976) have associated their presence with the development of internal labor markets, contending that unions support internal promotion systems, on-the-job training programs, and seniority rights. Upon finding a negative relationship between the presence of unions and internal labor markets, Pfeffer and Cohen (1984) proposed that the contradictory findings were perhaps due to union support of such things as seniority rights on the

one hand and their opposition to features that restrict labor mobility (i.e., those that tie employees to a firm) on the other. Baron, Davis-Blake, and Bielby (1986), however, argue that union favor depends on whether its members have general skills thereby making mobility and control over conditions of work crucial issues; or firm-specific skills, in which case mobility is already restricted and advancement opportunities within a firm take precedence.

Professional associations, in contrast, have consistently been linked to an absence of internal labor markets. From a transaction cost perspective, although professionals such as physicians, lawyers and engineers have valuable skills, "unless these skills are deepened and specialized to a particular employer, neither employee nor employer has a special interest in maintaining a continuing employment relation" (Williamson, 1981). Indeed, researchers (e.g., Hall, 1987; Mintzberg, 1983; Pfeffer, 1981; Scott, 1987) have argued that in addition to protection of skills, the primary purpose of professional associations is to protect member autonomy and mobility.

Based on the preceding arguments, it would seem that Althauser's (1989) contention that labor scarcity in general is more important than asset specificity alone is invalid. However, Boswell (1988) contends that the variables promoting different forms of organization are

numerous and that the absence of firm-specific skills does not always attenuate the possibility of internal labor markets (also see, DiMaggio & Powell, 1983; Finlay, 1983). This is especially the case "where market restrictions are codified through union contracts or state certification, ... [and] market restrictions can become reified and continue to exist even where deskilling has occurred" (Boswell, 1988, p. 144; also see, Strang & Baron, 1990). One example is what Mintzberg (1983) has referred to as a "pseudoprofessionalism," whereby employees with general skills form occupational associations in an effort to protect their jobs and extend their autonomy. Although Williamson (1981) equates asset specificity and internal labor markets with efficiency rather than market power, he does however recognize that "where human asset specificity is slight .... the presumption is that these outcomes [internal labor markets] are driven more by power than by efficiency considerations" (p. 567). Thus, it is quite possible that even when firm-specific skills do not exist, internal labor markets will. That, through the market power afforded by established union contracts and professional credentials, employees can redefine their jobs (Benson, 1977; Scott, 1987; Strang & Baron, 1990) and develop some degree of control over the labor process.

Based on these arguments the following alternative hypotheses were developed:

H1.1a Professional jobs with firm-specific skills are more likely to be located in internal labor markets than professional jobs with general skills.

H1.1b Professional jobs, regardless of skill type, are more likely to be located in internal labor markets than non-professional jobs.

3.3.3 Technology and Power

In this section it is proposed that the greatest possibility of internal labor market development arises where some combination of monitoring difficulties and small numbers exist. That is, internal labor markets should be most likely where workers have control over a labor process and the power to reinforce their control through restriction of supply. Each of these elements (i.e., process control, market power) alone provide some protection against market competition and create a greater possibility of internal promotion. However, control over the labor process and labor market power are to some extent interdependent in that the existence of one establishes conditions for developing the other. As has been noted, where competing coalitions exist (in this case management and labor), the efforts of each will be geared toward securing and increasing their own power, usually at the expense of opposing coalitions (Benson, 1977; Mintzberg, 1983; Pfeffer, 1981, 1989; Scott, 1987).

In the case of workers with control over labor processes, the presence of higher levels of interdependence or choice promotes the development of a market mechanism to protect that control. In contrast, the existence of power in the external market provides opportunities for the elaboration of labor process control through such things as increased autonomy and seniority rights. Possible interactions between sources of labor process control and market power will be discussed next. This section draws extensively on the works of Althauser and Kalleberg (1981), Boswell (1988), Edwards (1979), and Williamson (1981).

While interdependence alone has the potential for increasing transaction costs to a point where individual and small group negotiations are necessary, without the ability to restrict supply, leverage is greatly reduced. The presence of unions or professional associations introduces this leverage and simultaneously raises negotiations to the firm- or industry-level. Boswell (1988) and Edwards (1979) contend that bargaining at this level increases the stability of worker associations and allows them to establish seniority rights within an industry. Where asset specificity is the source of market power, results should be the same as with worker collectives except that the turnover costs should be higher.

High levels of jobholder choice also have the potential for raising transaction costs and this generally results in the labor process being primarily worker controlled. Again, the presence of unions or professional associations serves to restrict labor supply and raise the level of labor negotiations. The primary difference between this situation and that engendered by interdependence is that the focus of negotiations should be on preservation of skills and choice or discretion rather than wages and seniority (Althauser & Kalleberg, 1981; Edwards, 1979). Asset specificity once more raises turnover costs for both parties and as a result may introduce seniority rights as an additional point of negotiation (Boswell, 1988).

These arguments lead to the following hypotheses:

H2.1a Jobs with high levels of task interdependence and union representation are more likely to be located in internal labor markets than jobs characterized by only high levels of task interdependence or union representation.

H2.1b Jobs with high levels of task interdependence and professional representation are more likely to be located in internal labor markets than jobs characterized by only high levels of task interdependence or professional representation.

H2.1c Jobs with high levels of task interdependence and firm-specific skills are more likely to be located in internal labor markets than jobs characterized by only high levels of task interdependence or firm-specific skills.

H2.2a Jobs with high levels of jobholder choice and union representation are more likely to be located in internal labor markets than jobs characterized by only high levels of jobholder choice or union representation.

H2.2b Jobs with high levels of jobholder choice and professional representation are more likely to be located in internal labor markets than jobs characterized by only high levels of jobholder choice or professional representation.

H2.2c Jobs with high levels of jobholder choice and firm-specific skills are more likely to be located in internal labor markets than jobs characterized by only high levels of jobholder choice or firm-specific skills.

## 3.4 Chapter Summary

This chapter has outlined and discussed the research objectives, research questions, and specific hypotheses addressed in this study.

# Chapter 4

# Research Methodology

This chapter outlines the research methodology used in testing the aforestated hypotheses, as well as describes the focal subject sample, data collection and measures, and data analyses methods employed.

## 4.1 Sample

The data used in this study were acquired from the headquarters of the U.S. Bureau of Employment and Training's Occupational Field Analysis Centers (OFACs) in Raleigh, NC. To produce and periodically update The Dictionary of Occupational Titles (DOT; U.S. Dept. of Labor, 1977), OFACs analyze jobs in all U.S. industries that have been assigned an SIC code. Because these job analyses contain specific information about job characteristics, including job technologies, training, skills, and promotion hierarchies they are well suited for testing the hypotheses presented in Chapter 3. Moreover, OFACs also gather information regarding the structure, overall technology, unionization, and environmental competitiveness of the organizations in which jobs selected for analysis are located, thus making examination of more macro issues (e.g., worker power, industry effects) possible as well.

Using all available OFAC data, the hypotheses stated in Chapter 3 were tested for jobs in nineteen firms operating in six industries (i.e., medical services, printing/publishing, electrical equipment, electronic components, radio/ television broadcasting, and aircraft manufacturing). The job analyses which underlie the data to be examined were conducted between 1986 and 1990. Appendix A contains a list of all 250 jobs, as well as their DOT codes and occupational classification. With respect to the latter, 95 jobs were DOT classified as professional and kindred, 33 as clerical/sales, 4 as service work, 12 as process work, 45 as machine work, 21 as benchwork, 22 as stuctural work, and 18 as miscellaneous work. This sample size is sufficient to detect a minimum correlation between a predictor and criterion of .18 with a power value of .80 (according to tables provided by Cohen, 1977).

## 4.2 Data Collection and Measures

### 4.2.1 Data Collection

The primary method of OFAC data collection is observation-interview, with supporting data coming from job descriptions, interviews with administrators, and so on in target organizations. Job analysts are trained in data collection at OFACs by senior analysts and receive refresher courses every few years. The information gathered from observations and interviews is recorded on

Job Analysis Schedules (JAS), while information on organization structure and the like is recorded in a Narrative Report (NR). Appendix B is an example of a completed JAS, and Appendix C a completed NR.

4.2.2 Dependent Variable

Internal labor market standing was based on four binary variables created for each of the 250 jobs examined. This information was taken from the JAS associated with each job. The first variable was coded "1" if a job was in a promotion ladder and "0" if it was not. For jobs in promotion ladders, the second variable was coded "1" if it was at the bottom of the ladder and "0" if it was not. For these same jobs, the third variable was coded "1" if it could not be entered from outside an organization and "0" if it could. Finally, jobs in a promotion ladder were coded "1" if additional promotions were available higher up the ladder and "0" if additional promotions were unavailable. For jobs that were not in a promotion ladder, the remaining three variables were coded as missing.

As noted in Chapter 1, Althauser and Kalleberg (1981) define internal labor markets as "any cluster of jobs ... that have three basic 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" (p. 130). In their study of internal labor markets Baron, Davis-Blake, and

Bielby (1986) examine each component of this definition separately. However, because Althauser and Kalleberg's (1981) definition suggests that these elements operate in concert, the four binary variables were summed to create a single internal labor market measure, thereby allowing a more complete examination of the focal phenomena.

4.2.3 Independent Variables

Task interdependence was measured using DOT scores taken from the JAS for each job. Task interdependence scores represent the highest degree of interpersonal interaction required by a job, with each higher-level form of interdependence incorporating all lower forms. DOT measures were reverse scored to range from 1 (lowest task interdependence) to 9 (highest task interdependence).

These scores range from intensive reciprocal interactions such as mentoring (i.e., "Dealing with individuals in terms of their total personality in order to advise, counsel, and/or guide them with regard to problems that may be resolved by legal, scientific, clinical, spiritual and/or other professional principles.") to simple mediating interactions such as diverting. Jobs classified as mentoring scored a 9, and include tasks such as "counseling clients in legal matters," and "advising/assisting individuals in the solution of their socio-economic problems." Tasks of this nature require constant and complex reciprocal interaction with clients

and peers. An example of a job with a score of 9 on task interdependence is a speech pathologist (DOT Code 076.107-010, Appendix A).

The next most complex level of interpersonal interaction is negotiating (i.e., "Exchanging ideas, information, and opinions with others to formulate policies and programs and/or arrive jointly at decisions, conclusions, or solutions.") which scores an 8 on task interdependence. Tasks such as "contracting with farmers to raise or purchase fruit and vegetable crops" also require a jobholder to engage in complex interactions with others. However, the basis of these encounters is usually not as constant and are more routine than those found under mentoring. An example of a job with a score of 8 on task interdependence is a director of nursing service (DOT Code 075.117-022, Appendix A).

As noted above, decreasing complexity of interpersonal interaction is associated with progressively lower task interdependence scores. A job that scores 7 on this scale is an exercise physiologists (DOT Code 076.121-014, Appendix A). Jobs that score 6 and 5 on task interdependence are a dispersion shift supervisor (DOT Code 559.132, Appendix A) and an automated autoclave operator (DOT Code 590.362, Appendix A), respectively.

The least complex levels of task interdependence are represented by simple mediating interactions such as

helping and serving (i.e., "Attending to the needs or requests of people or the expressed or implicit wishes of people."), and persuading and diverting (i.e., "Influencing others in favor of a product, service, or point of view."). Helping is scored a 4 and serving is scored a 3, while persuading is scored a 2 and diverting is scored a 1. For example, "mixes and serves alcoholic and non-alcoholic drinks to patrons of a bar," describes a task classified as serving, and "writes scripts for radio and television advertising," describes a task classified as persuading. Interdependence in these jobs is between a jobholder and clients or machines rather than between jobs. In Appendix A, jobs that score 3 and 4 on task interdependence are a general duty nurse (DOT Code 075.374-010) and an electronics mechanic (DOT Code 828.281-010), respectively. Examples of jobs that score 1 and 2 are disk jockey (DOT Code 159.147-014, Appendix A) and a sales representative (DOT Code 259.357-018, Appendix A), respectively.

The degree of jobholder choice or discretion a job allows was measured using DOT scores (taken from each job's JAS) that rate a job in terms of required interaction with data. DOT measures were reverse scored to range from 1 (lowest discretion) to 7 (highest discretion). "Data" are described by DOT as, "information, knowledge, and conceptions related to data, people, or things resulting from observation, investigation, interpretation,

visualization, and mental creation. Data are intangible and include numbers, words, symbols, ideas, concepts, and oral verbalization." At one extreme are complex independent actions such as synthesizing (i.e., "Integrating analyses of data to discover facts and/or develop knowledge concepts or interpretations."). Jobs classified as synthesizing are scored 7 and include tasks such as "conceiving and developing ideas for application of mathematics to the fields of science and engineering", and "formulating editorial policies of a newspaper and originating plans for special features or projects." Such tasks require a jobholder to make independent decisions in what are very often unstructured and variable situations. The data involved are generally of an abstract nature (e.g., mathematical concepts, philosophical/ethical ideas). An example of a job that scores 7 on jobholder choice is an aeronautical research engineer (DOT Code 002.061-026, Appendix A).

The next most complex level of data interaction is coordinating (i.e., "Determining time, place, and sequence of operations or action to be taken on the basis of analysis of data; executing determinations and/or reporting on events."). The tasks involved in these types of jobs also require independent decision-making, and score a 6 on jobholder choice.. However, the nature of the data involved is of a more concrete variety. Tasks such as

"authorizing, regulating, and controlling commercial airline flights, according to Government and company regulations" are included. In these instances the nature of raw materials (e.g., aerodynamics, flight plans) may be well understood and, thus, guidelines for decision making can be established ahead of time. However, raw materials also have a large degree of variability (e.g., pilot error, quickly changing weather conditions, mechanical failure) and, thus, jobs still require a great deal of independent decision making on the part of jobholders. An example of a job that scores 6 on jobholder choice is an electronics supervisor (DOT Code 726.130-010, Appendix A).

As noted above, decreasing interaction with data is associated with progressively lower jobholder choice scores. A job that scores 5 on this scale is a laboratory tester (DOT Code 029.261-010, Appendix A). Jobs that score 4 and 3 on jobholder choice are a sheet metal numerical control operator (DOT Code 609.380, Appendix A) and an accounts-payable clerk (DOT Code 216.482-010, Appendix A), respectively.

As data interaction complexity decreases each classification reflects a more prescribed structure, greater situational stability and, so, allows for lesser amounts of jobholder choice or discretion. At the lowest level of the data interaction are simple prescribed actions like copying (i.e., "Transcribing, entering, or posting

data.") and comparing (i.e., "Judging the readily observable functional, structural, or compositional characteristics of data, people, or things."). Copying is scored a 2 and comparing is scored a 1. An example of a task classified as copying is "transcribing addresses from a mailing list to envelopes, cards, advertising literature, packages and similar items," while "grades dressed poultry according to size and quality" describes a comparing task. Information encountered in these tasks is stable and allows for extensive structuring of jobs (e.g., "If X then do Y, else do Z."). In these cases employee jobholder choice is minimized. In Appendix A, jobs that score 1 and 2 on jobholder choice are a telephone operator (DOT Code 235.662-022) and a mail clerk (DOT Code 209.587-026).

It has been argued (Doeringer & Piore, 1971; Williamson, 1975) that internal labor markets develop as a direct result of firms' attempts to recoup training costs and reduce the threat of opportunistic behavior on the part of workers with firm-specific skills. Conversely, provision of training (Doeringer & Piore, 1971; Williamson, 1975) and on-the-job experience (Williamson, Wachter, & Harris, 1975; Wood, 1987) are said to assist in creating such skills. Firm-specific skills were, following Baron, Davis-Blake, and Bielby (1986), measured as the sum of training and experience time (in months) required for entry into a job. Specifically, firm-specific skills were

determined by adding orientation time, on-the-job training time, and time required in other positions in a firm for each job. These data were taken from the JAS associated with each job.

Information about which jobs were unionized was gathered from DOT NRs. A binary variable was created with "1" representing unionized jobs and "0" representing non-unionized jobs. These jobs were 28% of those sampled ($n$ = 70).

DOT job codes were used to determine each job's professional representation. Jobs professionally represented were coded "1" and all other jobs were coded "0." These jobs were 38.4% of those sampled ($n$ = 95).

## 4.3 Multicollinearity

Because all hypotheses were tested using hierarchical multiple regression, the variables interdependence, job-holder choice, and firm-specific skills were standardized prior to data manipulation. This transformation was done to minimize multicollinearity between first-order independent variables and their cross-products (Aiken & West, 1991; Cronbach, 1987).

## 4.4 Chapter Summary

This chapter outlined the research methodology employed in the dissertation research including subject sample, data collection and measures, and data analysis methods.

# Chapter 5

## Data Analysis and Results

This chapter presents the results of the multiple regression analyses discussed in Chapter 4. It is organized into three sections: (1) analysis and results of the relationship among job technology variables (i.e., jobholder choice and task interdependence), power variables, and their interactions; (2) analysis and results of the relationship between power variables (i.e., firm-specific skills, union representation, and professional credentials) and internal labor markets; and (3) supplemental analysis and results of job technology variables, power variables, and their interactions.

Descriptive statistics and zero-order correlation coefficients for all study variables are presented in Table 1. All coefficients $\geq \pm .10$ are significant at $p < .05$. Internal labor market standing is significantly and positively related to union representation ($r = .31$) and firm- specific skills ($r = .26$), but essentially unrelated ($r = .02$) to professional credentials. Although task interdependence is not significantly related to internal labor market standing ($r = .07$) or to firm-specific skills ($r = .07$), it is significantly and negatively related to union representation ($r = -.12$). Jobholder choice is significantly and negatively related to union

Table 1

Correlation Matrix for all Study Variables

| | r | | | | | |
|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 |
| 1. Internal labor market standing | -- | .26 | .07 | -.12 | .31 | .02 |
| 2. Firm-specific skills | | -- | .07 | .14 | .15 | .05 |
| 3. Task interdependence | | | -- | .31 | -.12 | .26 |
| 4. Jobholder choice | | | | -- | -.37 | .57 |
| 5. Union representation | | | | | -- | -.47 |
| 6. Professional representation | | | | | | -- |
| *M* | .92 | 5.71 | 6.10 | 2.98 | .26 | .41 |
| *SD* | 1.26 | 17.56 | 1.98 | 1.84 | .44 | .49 |
| Range | 0-4 | 0-240 | 1-9 | 1-7 | 0-1 | 0-1 |

*Note*. *n* = 250. All correlations ≥ ± .10 are significant at $p < .05$, two-tailed test.

representation ($r$ = -.37), and positively associated with professional credentials ($r$ = .57), and firm-specific skills ($r$ = .14). Finally, jobholder choice is also positively related to task interdependence ($r$ = .31). Thus, contrary to what Thompson's (1967) discussion of these concepts suggests, discretion and interdependence are not always negatively related. That is, an increase in task interdependence does not necessarily mean a simultaneous decrease in jobholder choice. This finding supports Williamson's (1981), Gerwin's (1982), and Boswell's (1988) contention (Section 3.3.1) that instability in the relationship between technological (e.g., task interdependence) and structural (e.g.,jobholder choice) variables requires that they be treated as conceptually distinct.

5.1 Market Power

Competing hypotheses H1.1a and H1.1b relate to the relationship between professional jobs, firm-specific skills, and internal labor markets. H1.1a states that professional jobs with firm-specific skills are more likely to be located in internal labor markets than professional jobs with general skills, while H1.1b states that professional jobs, regardless of skill type, are more likely to be located in internal labor markets than non-professional jobs. Durbin-Watson statistics and variance inflation factors indicated multicollinearity between

first-order variables and their cross-product interaction terms. To avoid multicollinearity between these interaction terms and their constituent variables, all continuous independent variables were standardized prior to analysis (Aiken & West, 1991; Cronbach, 1987). Hierarchical multiple regression was used to test these two hypotheses.

5.1.1 Test of Hypotheses H1.1a and H1.1b

To test these two hypotheses, internal labor market standing was regressed on professional credentials (0 = nonprofessional job, 1 = professional job), firm-specific skills, and their interaction. Table 2 presents the results of the multiple regression, including regression coefficients and $\Delta R^2$ for each step.

Professional credentials was entered into the regression equation in Step 1. This initial variable was not significant ($R^2$ = .000, $df$ = 1/248, $p$ < .72), indicating the absence of a relationship between general skills and internal labor market standing. In Step 2, firm-specific skills was entered into the equation. This variable was significant ($\Delta R^2$ = .066, $df$ = 2/247, $p$ < .001), indicating a main effect. In Step 3, the resulting interaction term was entered. The interaction term was also significant ($\Delta R^2$ = .016, $df$ = 3/246, $p$ < .05). Overall, the full equation explains 8.2% of the variance in internal labor markets and supports the contention (H1.1a)

Table 2

Coefficients from Hierarchical Regression of Internal Labor Market Standing on Professional Credentials and Firm-specific Skills (H1.1a and H1.1b)

| Independent variables | Step 1 $\beta_1$ | Step 2 $\beta_2$ | Step 3 $\beta_3$ |
|---|---|---|---|
| Main effects | | | |
| Professional credentials | .059 | .027 | .025 |
| Firm-specific skills | | .332† | .575† |
| Interaction term | | | |
| Professional credentials × firm-specific skills | | | -.354* |
| $R^2$ | .000 | .066 | .082 |
| $\Delta R^2$ | .000 | .066 | .016 |
| df | 1,248 | 2,247 | 3,246 |

Note. $n = 250$; *$p < .05$; †$p < .001$.

that when professional jobs have firm-specific skills (rather than general skills, H1.1b) they are more likely to be found in internal labor markets.

## 5.2 Technology/Power Interactions

Hypotheses H2.1 and H2.2 address possible interactions between job technology (i.e., task interdependence and jobholder choice) and power (i.e., union representation, professional credentials, and firm-specific skills) variables, and their impact on internal labor markets. As noted, to avoid multicollinearity between interaction terms and their constituent variables, all continuous variables were standardized prior to analysis. After examining the plotted residuals for the task interdependence variable it was determined that a reciprocal root transformation was appropriate to correct for skewness in this variable (Berenson, Levine, & Goldstein, 1983; Neter, Wasserman, & Kutner, 1985). Hierarchical multiple regression was used to test all of the eight hypotheses presented in this section.

### 5.2.1 Test of Hypothesis H2.1a

H2.1a, postulating that jobs with high levels of task interdependence and union representation are more likely to be located in internal labor markets than jobs characterized by only high levels of task interdependence or union representation, was not supported. Table 3 presents the results of the multiple regression for this

Table 3

Coefficients from Hierarchical Regression of Internal Labor Market Standing on Task Interdependence and Union Representation (H2.1a)

| Independent variables | Step 1 $\beta_1$ | Step 2 $\beta_2$ | Step 3 $\beta_3$ |
|---|---|---|---|
| Main effects | | | |
| Task interdependence | .095 | .148* | .146 |
| Union representation | | .946† | .949† |
| Interaction term | | | |
| Task interdependence × union representation | | | .018 |
| $R^2$ | .005 | .112 | .112 |
| $\Delta R^2$ | .005 | .107 | .000 |
| *df* | 1,248 | 2,247 | 3,246 |

Note. $n = 250$; *$p < .05$; †$p < .001$.

hypothesis along with regression coefficients and $\Delta R^2$ for each step. In Step 1, task interdependence was entered into the regression equation. This initial variable was not significant ($R^2$ = .005, df = 1/248, p < .24), indicating no main effect. In Step 2, union representation was entered into the regression equation. This variable was significant ($\Delta R^2$ = .107, df = 2/247, p < .001), indicating a main effect of union representation on internal labor market standing. In Step 3, the resulting interaction term was entered. The interaction term was not significant ($\Delta R^2$ = .000, df = 3/246, p < .95). Overall, the full equation explained 11.2% of the variance in internal labor market standing.

5.2.2 Test of Hypothesis H2.1b

H2.1b, postulating that jobs with high levels of task interdependence and professional representation are more likely to be located in internal labor markets than jobs characterized by only high levels of task interdependence or professional credentials, was not supported. Table 4 presents the results of the multiple regression along with regression coefficients and $\Delta R^2$ for each step. In Step 1, task interdependence was entered into the regression equation. As in the above analysis, this initial variable was not significant ($R^2$ = .005, df = 1/248, p < .24). In Step 2, professional credentials was entered into the equation. Neither was this variable significant ($\Delta R^2$ =

Table 4

Coefficients from Hierarchical Regression of Internal Labor Market Standing on Task Interdependence and Professional Credentials (H2.1b)

| Independent variables | Step 1 $\beta_1$ | Step 2 $\beta_2$ | Step 3 $\beta_3$ |
|---|---|---|---|
| Main effects | | | |
| Task interdependence | .095 | .094 | .125 |
| Professional credentials | | .009 | .007 |
| Interaction term | | | |
| Task interdependence × professional credentials | | | -.044 |
| $R^2$ | .005 | .005 | .005 |
| $\Delta R^2$ | .005 | .000 | .000 |
| df | 1,248 | 2,247 | 3,246 |

Note. $n = 250$.

.000, df = 2/247, p < .96). In Step 3, the resulting interaction term was entered. The interaction term was likewise not significant ($\Delta R^2$ = .000, df = 3/246, p < .82). Overall, the full equation explained less than one percent of the variance in internal labor market standing.

5.2.3 Test of Hypothesis H2.1c

H2.1c, postulating that jobs with high levels of task interdependence and firm-specific skills are more likely to be located in internal labor markets than jobs characterized by only high levels of task interdependence or firm- specific skills, was supported. Table 5 presents the results of the multiple regression along with regression coefficients and $\Delta R^2$ for each step. In Step 1, task interdependence was entered into the regression equation. Again, this initial variable was not significant ($R^2$ = .005, df = 1/248, p < .24). In Step 2, firm-specific skills was entered into the equation. This variable was significant ($\Delta R^2$ = .064, df = 2/247, p < .001), indicating a main effect of firm-specific skills on internal labor market standing. In Step 3, the resulting interaction term was entered. The interaction term was also significant ($\Delta R^2$ = .013, df = 3/246, p < .05). Overall, the full equation explained 8.3% of the variance in internal labor market standing.

Table 5

Coefficients from Hierarchical Regression of Internal Labor Market Standing on Task Interdependence and Firm-specific Skills (H2.1c)

| Independent variables | Step 1 $\beta_1$ | Step 2 $\beta_2$ | Step 3 $\beta_3$ |
|---|---|---|---|
| Main effects | | | |
| Task interdependence | .095 | .070 | .064 |
| Firm-specific skills | | .328† | .416† |
| Interaction term | | | |
| Task interdependence × firm-specific skills | | | .133* |
| $R^2$ | .005 | .069 | .083 |
| $\Delta R^2$ | .005 | .064 | .013 |
| df | 1,248 | 2,247 | 3,246 |

Note. $n = 250$; *$p < .05$; †$p < .001$.

5.2.4 Test of Hypothesis H2.2a

H2.2a, postulating that jobs with high levels of jobholder choice and union representation are more likely to be located in internal labor markets than jobs characterized by only high levels of jobholder choice or union representation, was supported. Table 6 presents the results of the multiple regression along with regression coefficients and $\Delta R^2$ for each step. In Step 1, jobholder choice was entered into the regression equation. This initial variable was significant ($R^2$ = .014, $df$ = 1/248, $p$ < .05), indicating a main effect. In Step 2, union representation was entered into the equation. This variable was also significant ($\Delta R^2$ = .085, $df$ = 2/247, $p$ < .001). In Step 3, the resulting interaction term was entered. The interaction term was likewise significant ($\Delta R^2$ = .011, $df$ = 3/246, $p$ < .05). Overall, the full equation explained a significant 11% of the variance in internal labor market standing.

5.2.5 Test of Hypothesis H2.2b

H2.2b, postulating that jobs with high levels of jobholder choice and professional representation are more likely to be located in internal labor markets than jobs characterized by only high levels of jobholder choice or professional representation, was not supported. Table 7 presents the results of the multiple regression along with regression coefficients and $\Delta R^2$ for each step. In Step 1,

Table 6

Coefficients from Hierarchical Regression of Internal Labor Market Standing on Jobholder Choice and Union Representation (H2.2a)

| Independent variables | Step 1 $\beta_1$ | Step 2 $\beta_2$ | Step 3 $\beta_3$ |
|---|---|---|---|
| Main effects | | | |
| Jobholder choice | -.155* | -.006 | .082 |
| Union representation | | .900† | .796† |
| Interaction term | | | |
| Jobholder choice × union representation | | | -.298* |
| $R^2$ | .014 | .099 | .110 |
| $\Delta R^2$ | .014 | .085 | .011 |
| df | 1,248 | 2,247 | 3,246 |

Note. $n = 250$; *$p < .05$; †$p < .001$.

Table 7

Coefficients from Hierarchical Regression of Internal Labor Market Standing on Jobholder Choice and Professional Credentials (H2.2b)

| Independent variables | Step 1 $\beta_1$ | Step 2 $\beta_2$ | Step 3 $\beta_3$ |
|---|---|---|---|
| Main effects | | | |
| Jobholder choice | -.155* | -.255† | -.183 |
| Professional credentials | | .362 | .600† |
| Interaction term | | | |
| Jobholder choice × professional credentials | | | -.442 |
| $R^2$ | .014 | .026 | .038 |
| $\Delta R^2$ | .014 | .012 | .012 |
| *df* | 1,248 | 2,247 | 3,246 |

Note. $n = 250$; *$p < .05$; †$p < .01$.

jobholder choice was entered into the regression equation. As in the above analysis, this initial variable was significant ($R^2$ = .014, df = 1/248, $p$ < .05). In Step 2, professional credentials was entered into the equation. This variable was *not* significant ($\Delta R^2$ = .012, df = 2/247, $p$ < .07). In Step 3, the resulting interaction term was entered. The interaction term was not significant ($\Delta R^2$ = .011, df = 3/246, $p$ < .10). Overall, the full equation explained 3.8% of the variance in internal labor market standing.

5.2.6 Test of Hypothesis 2.2c

H2.2c, postulating that jobs with high levels of jobholder choice and firm-specific skills are more likely to be located in internal labor markets than jobs characterized by only high levels of jobholder choice or firm-specific skills, was supported. Table 8 presents the results of the multiple regression along with regression coefficients and $\Delta R^2$ for each step. In Step 1, jobholder choice was entered into the equation. Again, this initial variable was significant ($R^2$ = .014, df = 1/248, $p$ < .05). In Step 2, firm-specific skills was entered into the equation. This variable was likewise significant ($\Delta R^2$ = .076, df = 2/247, $p$ < .001), indicating a main effect. In Step 3, the resulting interaction term was entered. The interaction term was significant ($\Delta R^2$ = .034, df = 3/246, $p$

Table 8

Coefficients from Hierarchical Regression of Internal Labor Market Standing on Jobholder Choice and Firm-specific Skills (H2.2c)

| Independent variables | Step 1 $\beta_1$ | Step 2 $\beta_2$ | Step 3 $\beta_3$ |
|---|---|---|---|
| Main effects | | | |
| Jobholder choice | -.155* | -.205† | -.320‡ |
| Firm-specific skills | | .361‡ | .829‡ |
| Interaction term | | | |
| Jobholder choice × firm-specific skills | | | .539† |
| $R^2$ | .014 | .090 | .124 |
| $\Delta R^2$ | .014 | .076 | .034 |
| df | 1,248 | 2,247 | 3,246 |

Note. $n = 250$; *$p < .05$; †$p < .01$; ‡$p < .001$.

< .01). Overall, the full equation explained a significant 12.4% of the variance in internal labor market standing.

5.3 Post Hoc Analyses

The results of H2.1a testing for an interaction effect between task interdependence and union representation at first seem to contradict the literature regarding unions and internal labor markets. This contradiction is reinforced by the significant negative correlation between these variables ($r$ = -.12; Table 1). One possible, but yet untested, explanation for this seeming anomaly is suggested by Baron, Davis-Blake, and Bielby (1986), as well as Edwards (1979). They note that the type of interdependence most often associated with the presence of unions and internal labor markets is serial interdependence. Of the 250 jobs examined in this study, 103 were characterized by the DOT as requiring serial exchanges from one worker to another. Believing that a more detailed examination of the hypothesized relationship between task interdependence and union representation might yield different results, a post hoc analysis paralleling that reported in Table 3 was performed using only the 103 jobs mentioned above. However, as shown in Table 9, this was not the case as the interaction term was not significant ($p$ < .79).

However, in the initial analysis of H2.1a reported in Table 3, the significance of the task interdependence beta weight increased from $\beta$ = .095 ($p$ < .24) to $\beta$ = .148 ($p$ <

Table 9

Coefficients from Hierarchical Regression of Internal Labor Market Standing on Serial Task Interdependence and Union Representation (H2.1a, post hoc)

| Independent variables | Step 1 $\beta_1$ | Step 2 $\beta_2$ | Step 3 $\beta_3$ |
|---|---|---|---|
| Main effects | | | |
| Serial task interdependence | .123 | .194* | .185* |
| Union representation | | 1.145† | 1.152† |
| Interaction term | | | |
| Serial task interdependence × union representation | | | .040 |
| $R^2$ | .010 | .164 | .164 |
| $\Delta R^2$ | .010 | .154 | .000 |
| df | 1,101 | 2,100 | 3,99 |

Note. $n = 103$; *$p < .01$; †$p < .001$.

.05) when the union representation variable was entered at Step 2. This increase to significance and the results of the above post hoc analysis suggest the possible presence of a "suppression effect" (Cohen & Cohen, 1983). To wit, union representation may be acting to suppress the relationship between task interdependence and internal labor market standing. That is, task interdependence may be related to internal labor markets only when the job in question is unionized. To test for this possibility, a partial correlation analysis was conducted. Union representation was partialled from the relationship between all types of task interdependence and internal labor market standing. As a result, the correlation between task interdependence and internal labor market standing increased from $r_{1.1} = .07$ ($p < .12$) to $r_{1.2} = .12$ ($p < .02$) indicating that union representation does indeed vitiate the relationship between task interdependence and internal labor market standing.

Given this finding, three other post hoc analyses were performed. Because it is theoretically possible (e.g., Boswell, 1988; Edwards, 1979) for more than one type of market power to simultaneously impact a job's internal labor market standing, the significant interactions from H2.1c (Table 5), H2.2a (Table 6), and H2.2c (Table 8) were retested to determine whether these interactions continued to hold when other types of market power were also present.

This was done by controlling statistically for the effects of other market power variables and their interactions with task interdependence or jobholder choice.

The first of these post hoc analyses examined the possibility that highly interdependent jobs with firm-specific skills could also have the advantage of union representation. Although Table 1 shows no correlation between task interdependence and firm-specific skills ($r$ = .07), the results of the analysis of H2.1c (Table 5) does indicate an interaction effect of these variables on internal labor market standing. The significant correlations between task interdependence and union representation ($r$ = .26) and between firm-specific skills and union representation ($r$ = .15) also suggest the possibility of simultaneous market power effects.

Thus, a post hoc analysis was performed to determine whether the significant task interdependence by firm-specific skills interaction reported in Table 5 for H2.1c would hold when controlling for task interdependence, union representation, and firm-specific skills, as well as the interaction between task interdependence and union representation. Table 10 presents the results of the hierarchical multiple regression used to test this possibility. In Step 1, task interdependence, union representation, firm-specific skills, and the task interdependence by union representation interaction term

Table 10

Coefficients from Hierarchical Regression of Internal Labor Market Standing on Union Representation, Task Interdependence, Firm-specific Skills, Task Interdependence × Union Representation, and Task Interdependence × Firm-specific Skills (H2.1c, post hoc)

| Independent variables | Step 1 $\beta_1$ | Step 2 $\beta_2$ |
|---|---|---|
| Main effects | | |
| Union representation | .871* | .852* |
| Task interdependence | .112 | .074 |
| Firm-specific skills | .270* | .369* |
| Interaction terms | | |
| Task interdependence × union representation | .106 | .396 |
| Task interdependence × firm-specific skills | | .129 |
| $R^2$ | .154 | .162 |
| $\Delta R^2$ | .000 | .008 |
| df | 4,245 | 5,244 |

Note. $n = 250$; *$p < .001$.

were entered into the regression equation. In Step 2, the task interdependence by firm-specific skills interaction term was entered. The interaction term was not significant ($\Delta R^2$ = .008, $df$ = 5/244, $p$ < .13), indicating no effect of a task interdependence by firm-specific skills interaction on internal labor market standing when a job already has the market power advantage of union representation. Overall, the full equation explained 16.2% of the variance in internal labor market standing.

The second of the above described post hoc analyses examined the possibility that a job with high levels of jobholder choice and union representation could also have the advantage of firm-specific skills. The significant correlations (Table 1) between firm-specific skills and jobholder choice ($r$ = .14), as well as between firm-specific skills and union representation ($r$ = .15) also suggest the possibility of simultaneous market power effects. Thus, a post hoc analysis was also performed to determine whether the significant jobholder choice by union representation interaction from H2.2a and reported in Table 6 would hold when controlling for jobholder choice, union representation, and firm-specific skills, as well as the interaction between jobholder choice and firm-specific skills. Table 11 presents the results of the hierarchical multiple regression used to test this possibility. In Step 1, jobnolder choice, union representation, firm-specific

Table 11

Coefficients from Hierarchical Regression of Internal Labor Market Standing on Jobholder Choice, Union Representation, Firm-specific Skills, Jobholder Choice × Firm-specific Skills, and Jobholder Choice × Union Representation (H2.2a, post hoc)

| Independent variables | Step 1 $\beta_1$ | Step 2 $\beta_2$ |
|---|---|---|
| Main effects | | |
| Jobholder choice | -.167 | -.056 |
| Union representation | .631† | .477* |
| Firm-specific skills | .608† | .637† |
| Interaction terms | | |
| Jobholder choice × firm-specific skills | -.350* | -.355* |
| Jobholder choice × union representation | | -.400* |
| $R^2$ | .160 | .177 |
| $\Delta R^2$ | .012 | .017 |
| df | 4,245 | 5,244 |

Note. $n = 250$; *$p < .05$; †$p < .001$.

skills, and the jobholder choice by firm-specific skills interaction term were entered into the equation. In Step 2, the jobholder choice by union representation interaction term was entered. The interaction was significant ($\Delta R^2$ = .017, $df$ = 5/244, $p < .03$), indicating a consistent effect of a jobholder choice by union representation interaction on internal labor market standing even when the job in question already has the market power advantage associated with firm-specific skills. Overall, the full equation explained 17.7% of the variance in internal labor market standing.

Finally, to further examine the possibility that more than one type of market power can impact a job's internal labor market standing simultaneously, the significant jobholder choice by firm-specific skills interaction from H2.2c and reported in Table 8 was also retested after controlling for the effects of jobholder choice, union representation, and firm-specific skills, as well as the interaction between jobholder choice and union representation. Table 12 presents the results of the hierarchical multiple regression used to test this possibility. In Step 1, jobholder choice, union representation, firm-specific skills, and the jobholder choice by union representation interaction term were entered into the regression equation. In Step 2, the jobholder choice by firm-specific skills interaction term

Table 12

Coefficients from Hierarchical Regression of Internal Labor Market Standing on Jobholder Choice, Union Representation, Firm-specific Skills, Jobholder Choice × Union Representation, and Jobholder Choice × Firm-specific Skills (H2.2c, post hoc)

| Independent variables | Step 1 $\beta_1$ | Step 2 $\beta_2$ |
|---|---|---|
| Main effects | | |
| Jobholder choice | .040 | -.056 |
| Union representation | .603† | .477* |
| Firm-specific skills | .316‡ | .637‡ |
| Interaction terms | | |
| Jobholder choice × union representation | -.396* | -.400* |
| Jobholder choice × firm-specific skills | | -.355* |
| $R^2$ | .164 | .177 |
| $\Delta R^2$ | .016 | .013 |
| *df* | 4,245 | 5,244 |

Note. $n = 250$; *$p < .05$; †$p < .01$; ‡$p < .001$.

was entered. The interaction was significant ($\Delta R^2$ = .013, df = 5/244, $p < .05$), indicating a consistent effect of a jobholder choice by firm-specific skills interaction on internal labor market standing even when the job in question already has the market power advantage associated with union representation. Overall, the full equation explained 17.7% of the variance in internal labor market standing.

## 5.4 Chapter Summary

This chapter presented the results of the data analysis outlined in Chapter 4, as well as various post hoc investigations. Limitations of the study, discussion of these results, and directions for future research will be provided in the following chapter.

# Chapter 6

# Discussion and Conclusion

This chapter is divided into four major sections: (1) overview of the research, (2) discussion of empirical findings, (3) study contributions, and (4) study limitations and directions for future research.

## 6.1 Overview

This study examined the nature of internal labor markets from a job-level perspective. It investigated the relationship of job-level technology variables (i.e., task interdependence and jobholder choice) to internal labor markets by specifically examining which features differentiate jobs that are and are not included in such structures. The relationship of power variables (e.g., firm-specific skills) to internal labor markets was also tested. As with job technology variables, the study looked particularly at what power characteristics differentiate jobs that are and are not included in internal labor markets. The covariance between the above technology and power variables was studied as well. Finally, the research investigated how the combined influence of technology and power relate to the presence of internal labor markets. Specifically, the study tested for interactions between technology and power variables to determine whether jobs

with these effects were more often found in internal labor markets.

To some extent this study was exploratory in that much of the previous research into the development of internal labor markets has been done at a more macro-level of analysis (e.g., Beck, Horan, & Tolbert, 1978; Edwards, 1979; Sonnenfeld & Peiperl, 1988). It was contended that a better understanding of the nature of internal labor markets has been hindered by an almost exclusive dependence on such macro-level variables as sectors, industries, and business-level strategies.

The reported research was undertaken in the belief that a more complete understanding of internal labor markets would be possible through an examination of the technological components of those jobs that are found in internal labor markets. The relative power of workplace participants to define their jobs was also considered to be an important element in the development of internal labor markets.

## 6.2 Discussion of Research Findings

The nonsignificant results for two of the hypotheses involving professional jobs (i.e., H2.1b, H2.2b) provide added support for the traditional contention (e.g., Williamson, 1981) that professional jobs will not be found in internal labor markets. Furthermore, the results of hypothesis H1.1a confirm Williamson's (1981) and others'

(e.g., Wachter & Wright, 1990) belief that if professional jobs are found in an internal labor market, it is due to the firm specific nature of the skills required. However, these results do not provide evidence contravening Boswell's (1988) argument that pseudoprofessional jobs, in which employees with general skills form occupational associations to protect their jobs and extend their autonomy, will also be found in internal labor markets. In the current study the DOT classification of professional and kindred jobs was used and, thus, no differentiation was made between "true" professionals and pseudoprofessionals. Therefore, the beliefs of Boswell (1988) and others (e.g., Mintzberg, 1983) regarding pseudoprofessional jobs could not be tested in this study. Only the interaction effect of professional credentials and firm-specific skills (H1.1a) was directly examined.

Hypothesis H2.1a concerning interactions between task interdependence, union representation, and internal labor market standing (H2.1a) was also not supported. Ostensibly, this result runs counter to the literature regarding unionized jobs and internal labor markets. However, there are several possible explanations for this outcome. First, there is the question of the proxy measure of interdependence employed in this research. The type of interdependence most often associated with the presence of unions and internal labor markets is serial interdependence

(e.g., Edwards, 1979), which was fully represented in this study. Of the 250 jobs examined, 103 were characterized by serial interdependence. However, because the DOT data were not collected for the express purpose of undertaking this dissertation, the presence of some confound in the proxy cannot be ignored. The significant correlation between task interdependence and union representation along with the positive performance of the task interdependence variable in other hypotheses would lead one to conclude that this, however, is probably not the primary reason for nonsignificant results.

A post hoc analysis using only those jobs with serial interdependence again yielded insignificant results for the relationship between task interdependence and internal labor markets, and the interaction task interdependence and union representation was still not significant. However, a partial correlation analysis indicated that union representation was acting to suppress the relationship between task interdependence and internal labor market standing. It was found that task interdependence is related to internal labor market standing only in unionized settings.

A second possible explanation deals with the theoretical differences in craft versus industrial unions. It has been argued that because industrial unions may often represent employees with firm-specific skills and high task

interdependence that they may also favor internal labor market systems (Baron, Davis-Blake, & Bielby, 1986; Finlay, 1983; Fligstein & Fernandez, 1988; Strang & Baron, 1990; Williamson, 1981). In contrast, craft unions, whose members' skills are more general, may reject employment systems that restrict employee mobility (Baron, Davis-Blake, & Bielby, 1986; Caplow, 1954; Fligstein & Fernandez, 1988; Piore, 1975; Strang & Baron, 1990). In this study no distinction was made between these types of union representation, although a perusal of the industries involved (e.g., aircraft manufacturing, radio and television) would suggest that most of the unionized jobs in this sample are likely represented by craft unions.

A third, and possibly related, reason for the nonsignificant interaction between task interdependence and union representation has to do with industries represented in the focal sample. Not only are they industries probably dominated by unit or craft production, but they are also industries in which constant fluctuations in demand may lead to unstable employment systems (Sonnenfeld & Peiperl, 1988). Thus, it is also quite possible that a sample drawn from other industries in which production is continuous, demand is more stable, and industrial unions are more heavily represented, would result in a significant interaction between task interdependence and the presence of union representation.

As was mentioned above, the task interdependence measure performed positively in the other analysis in which it was a factor. This finding supports Williamson's (1975) and others' (e.g., Alchian & Demsetz, 1972; Baron, Davis-Blake, & Bielby, 1986; Eisenhardt, 1985; Ouchi, 1979) belief that higher task interdependence not only makes it especially important for more senior workers to pass on skills to junior workers, but also creates 'nonseparabilities' or difficulties in monitoring individual productivity. When 'nonseparabilities' exist it becomes necessary to observe productivity in a piece-meal fashion with a final decision as to performance acceptability made at some future date. Thus, because performance can only be assessed after an otherwise unacceptable length of time, rewards are based on seniority and, to insure against what Williamson (1981) has referred to as employees' "opportunistic behaviors," a firm will attempt to tie its interests to that of its employees through the creation of internal labor markets. These same "opportunistic behaviors" (e.g., peer pressure, production stoppages, free riding) represent the exercise of what Boswell (1988) and Edwards (1979) have referred to as "control over the labor process."

It was argued in Chapter 3 that although high levels of task interdependence alone are often enough to protect jobholders from a good deal of market competition, leverage

is limited without some mechanism for restricting the supply of replacement labor. Supporting this contention is the significant interaction found between task interdependence and firm-specific skills. The increased control over labor processes represented by high levels of task interdependence naturally encourages the development of market mechanisms intended to preserve that control. This should be especially true where conflicting groups such as management and labor exist. The reverse is also possible in that the market power provided by firm-specific skills should allow for the elaboration of labor process control. The significant interaction between task interdependence and firm-specific skills implies that the two are interrelated to the extent that the existence of one creates the conditions necessary to the development of the other. Finally, however, the post hoc analysis of this interaction (see Table 10) indicates that the effect of firm-specific skills and task interdependence is not operable when other forms of market power exist (i.e., union representation).

The second labor process variable, jobholder choice, was also found to be significantly related to internal labor markets, supporting this study's contention that higher levels of worker discretion increase worker control over the labor process and lessen the employing firm's ability to predict behavior and outcomes. Williamson

(1981) argues that increased uncertainty from worker discretion constitutes a problem of bounded rationality in which the firm finds it necessary to depend on workers to make decisions in its best interest rather than their own. In addition to the problem of bounded rationality, jobholder choice also entails increases in administrative costs. Traditional methods of regulating employee behavior such as direct supervision or standardization of processes and outputs become increasingly difficult at higher levels of discretion. Under these circumstances a firm will resort to the use of professionals whose training assures ability as well as acceptable behavioral standards, or it will choose to train and socialize employees internally. The latter of these options requires that employees remain with the employing firm long enough for training costs to be recouped. Ultimately, bounded rationality and excessive monitoring costs lead to the development of employment systems designed to make employee interests consonant with those of the firm and to retain employees over an acceptable payback period.

As with task interdependence, it was also argued in Chapter 3 that the impact of jobholder choice on development of internal labor markets is strongest when the market power to reinforce control over the labor process is also present. Although this was not found to be the case when external market power was in the form of professional

credentials, interactions between jobholder choice and union representation, and jobholder choice and firm-specific skills were significant. High levels of choice have the potential for raising transaction costs and placing primary control of the labor process in the hands of workers. And, again, this internal power is greatly increased when the presence of unions or firm-specific skills restricts a firm's labor supply. Labor/management negotiations in cases where both jobholder choice engendered labor process control and external market power exist should primarily focus on skill preservation and autonomy, but when skills are firm-specific will also focus on wages and seniority rights. Thus, the interaction of jobholder choice and firm-specific skills was found to be stronger ($p < .01$; Table 8) than that between jobholder choice and union representation ($p < .05$; Table 6). Moreover, post hoc analyses show that each of these combinations of labor process and market power are still effective in promoting the development of internal labor markets when controlling for other significant variables (see Tables 11 & 12).

## 6.3 Contributions

The purpose of this dissertation was to advance understanding of the development of internal labor markets. Most studies of internal labor markets have associated career mobility and advancement with organizations'

responses to the characteristics of dual labor markets (Doeringer & Piore, 1971; Edwards, 1979), industrial sectors (e.g., Beck, Horan, & Tolbert, 1978; Tolbert, 1982), particular industries (e.g., Sonnenfeld & Peiperl, 1988), and specific firms (e.g., Miles & Snow, 1984; Schuler & Jackson, 1987). A recognition of diversity across and within firms, however, suggested the need for a closer, more micro examination of internal labor markets.

The results of this dissertation serve as a bridge between human capital explanations of mobility and advancement and the macro-level explanations of internal labor markets mentioned above. They indicate that interactions of decisions regarding employment arrangements, conflict over definitions of work, and the relative power of competing coalitions can have significant consequences for individual jobholders. Specifically, human capital variables alone are not the only determining factors of individual advancement and success. This study indicates that for human capital to be of value in promoting career mobility and advancement, an individual must first gain access to the "right" job or what Edwards (1979) has called a "good" job. Employment in particular industries (e.g., Sonnenfeld & Peiperl, 1988) or economic sectors (e.g., Beck, Horan, & Tolbert, 1978) is also insufficient for mobility and advancement. Although previous research (e.g., Beck, Horan, & Tolbert, 1978)

indicates that some industries or sectors provide better opportunities for advancement than others, there is often substantial variation in the promotion structures within these categories. Again, the key appears to be a "good" job within a particular industry or sector. Thus, this research would seem to imply that individual career attainment is dependent on the complex interactions of multiple variables spanning several levels of analysis.

In practical terms the results of this study suggest significant changes in at least two types of decision-making. First, public-policy makers would do well to consider the possibility that unemployment and instability in individual employment patterns can not be corrected in the long term through creating just any job or providing just any training. Eyraud, Marsden, and Silvestre (1990) argue that most public retraining programs differ substantially from established methods of skill infusion used in industry, making it difficult to advance the unemployed into skilled jobs. These researchers contend that one reason for these difficulties is a reluctance on the part of employers to do away with employment arrangements that keep workers investing in established forms of training, while Cassell (1990) contends that employers also have a normative bias against public employment services. As noted in this dissertation, these employment arrangements serve to restrict the supply of

replacement workers, and so workers are also inclined to defend the investments they have made in their skills. Thus, this research supports Falk and Lyson's (1988) contention that employment problems will continue until "good" jobs and skills are created.

Second, although the current research did not examine business-level strategies, the results lend themselves to some preliminary conclusions regarding the recent call for inclusion of human resource practices in a firm's business-level plans (e.g., Butler, Ferris, & Napier, 1991; Ferris, et al., 1991; Tichy, Fombrun, & Devanna, 1984). In particular, for human resource practices to become an integral part of strategic planning requires more than a cursory examination of market conditions and overall industrial relations. Instead, the link between such practices and business-level planning must extend all the way down to the level of job design and beyond to the hiring of specific employees. This is especially true if recent theoretical attempts to tie human resource practices to firm performance are supported by empirical research (Butler, Ferris, & Napier, 1991; Ferris et al., 1991). Moreover, Cassell (1990) argues that the link between human resources practices and strategic planning must fully incorporate the strategic notion of change. In particular, decision makers must recognize that environmental changes, organizational responses to such changes, and the responses

of individual workers are all continuous interacting processes.

## 6.4 Study Limitations and Future Research Directions

There are at least three limitations evident in this dissertation. First, although the sample size in terms of number of jobs examined was fairly large, the number of industries used was relatively restricted. As was discussed previously (Section 6.2), a different set of industries with more stable markets and represented by industrial rather than craft unions may have produced different results.

Second, the use of proxies to measure task interdependence and jobholder choice is an acknowledged weakness. Although these indicators seem reasonable, and Spenner (1990) reports that DOT data compare favorably to self-report and other job characteristic measures, anytime data are used for some purpose other than that for which they were originally collected, validity issues must be acknowledged. In the present case, there were measurement limitations related to testing various relationships involving professional jobs. None of the associated hypotheses could be thoroughly tested due to an inability to tap pseudoprofessionalism.

Finally, the DOT may contain gender biases, particularly in title descriptions and ratings (Miller et al., 1980). Spenner (1990), however, reports that

definitions used in the dictionary's current edition (U.S. Department of Labor, 1977), and used in this dissertation are significantly less biased than previous editions. Nevertheless, caution in generalizing the results of this research to jobs held predominantly by women may be warranted.

A number of extensions to this study are possible, some of which address the above limitations. First, a study exploring a broader range of industries would help to solve problems of generalizability across industries or industrial sectors. A larger sample of industries would also allow for comparison of the theoretically hypothesized different effects that craft and industrial unions have on job design and the growth of internal labor markets. Moreover, a broader range of industries could be used to test Sonnenfeld and Peiperl's (1988) theories concerning human resource practices and industry types, as well as the connection between such practices and the variables used in this study.

Second, it is also possible that a connection exists between a firm's chosen strategy and the types of jobs that are created by firms. For example, it can be argued that firms operating in dynamic and unstable environments will attempt to depend on external markets for needed labor rather than risk the long-term ties and loss of flexibility entailed in the use of internal labor markets (e.g.,

Cassell, 1990). Furthermore, one of the major determining factors regarding strategic performance is the success with which a particular strategy is implemented (Porter, 1985).

In discussing occupational labor market (OLM) and internal labor market (ILM) responses to changes in demand, Eyraud, Marsden, and Silvestre (1990) contend that, although OLMs adjust easily to cyclical fluctuations in labor demand, they adjust less readily to technical or organizational changes. The reason for this difficulty is that when general occupational skills are changed to fit new technical or organizational needs, they almost necessarily become more firm-specific and thus less transferable. In contrast, ILMs adjust quite easily to changing requirements inside the firm, but not to increasing unemployment. Moreover, any change away from established ground rules (e.g., employment security, worker autonomy) is likely to create conflict over definitions of work (e.g., Benson, 1977; Scott, 1987). Thus, in terms of both business-level strategies and human resource practices, a firm's environment and its relative dependence on general occupational skills or firm-specific skills may have significant consequences for successful strategy implementation. For example, although not a direct test of the relationship between these skill types and strategy implementation, Ferris et al. (1991) did find a significant relationship between human resource practices, strategic

planning, and firm performance. The question thus arises, "Do successful firms more accurately match their business-level strategies to their internal labor markets than their less successful counterparts?".

Finally, this study highlights the need for further development of task interdependence (Gerwin, 1979) and professional measures. Those measures of interdependence available in the literature are generally only one item (e.g., Hrebiniak, 1974; Mohr, 1971; Van de Ven & Delbecq, 1974) and fail to completely capture the contextual differences implied by Thompson's (1967) discussion of serial, mediating, and intensive technologies. For example, the negative relationship between discretion and interdependence proposed by Thompson (1967) is intuitively appealing. However, there are instances in which a significant decline in discretion as a result of increasing interdependence does not necessarily make sense. An example is when an intensive technology requiring high interdependence involves raw materials that are highly variable and unstable and thus requires high employee discretion as well. To overcome these sorts of problems, an empirical distinction between Thompson's three forms of task interdependence are needed. Pearce and Gregerson (1991) have recently begun work in this area by developing an individual-level measure that distinguishes between serial and reciprocal task interdependence.

Beyond questions of interdependence and discretion, such generalized measures of interdependence make detailed, substantive examination of the relationship between job technologies and other variables such as craft versus industrial unions difficult. Pearce and Gregerson (1991) argue that even the most widely used measure of task interdependence developed by Van de Ven, Delbecq, and Koenig (1976) has significant problems. First, it is constructed to gather information at the level of departments or work groups. Thus, use of the measure for individual- or job-level analyses leads to aggregation error. As was noted throughout this dissertation technologies are seldom homogeneous across firms or within departments. Pearce and Gregerson also note that, unlike Van de Ven, Delbecq, and Koenig's (1976) measure, Thompson's (1967) conception of technological interdependence is based on a Guttman scale. For Thompson, each higher level of interdependence included all lower levels. Although the DOT measure of interaction with people suffers from neither of the above problems, it is also an inexact measure of task interdependence.

Similar problems plague studies of professionalization. As with task interdependence, the methods of measuring professional jobs have not kept pace with theoretical developments. Typically, researchers employ one of many lists (e.g., Dingwall & Lewis, 1981; Freidson,

1970; Hall, 1975; Kerr, Von Glinow, & Schriesheim, 1977) of professional characteristics for classifying jobs as professional, semi-professional, non-professional and so on. Hall (1975), for example, states that professions are distinguished by work autonomy, a continually updated knowledge base, internal regulation, and codes of ethics. Similarly, Kerr, Von Glinow, and Schriesheim (1977) suggest that professionals are characterized by expert knowledge, autonomy, commitment to their work, identification with their profession, codes of ethics, and peer censure. Benveniste (1987) has compiled these and almost twenty other definitions to produce the following six structural criteria: (1) application of skills based on special knowledge; (2) requirements for advanced education and training; (3) some formal testing of competence and control; (4) existence of professional associations; (5) the existence of codes of conduct or ethics; and (6) the existence of an accepted commitment or calling, or sense of responsibility for serving the public. The existence of an accepted commitment or calling to serve the public is actually an attitudinal construct and, thus, should probably be excluded from a list designed to classify jobs rather than individuals. The remaining five items do, however, represent common structural aspects of professional jobs, and can readily be used to examine various jobs.

In this dissertation, DOT classifications reflecting many of the above criteria were available for use in making distinctions between professional and non-professional jobs, but dividing those jobs classified as professional into sub-groups of pseudo- or semi-professional was impossible. Solving this particular problem and that of classifying non-DOT jobs as professional or non-professional requires more than a listing of characteristics. One possibility for future research is a study aimed toward assessing the relative importance of professionalism criteria. Once such assessment has been made and relevant criteria weighted, summation scores similar to those used in point systems of job evaluation (see, e.g., Blegen, Mueller, & Price, 1988) might be employed to determine the degree to which a job is professionalized.

In sum, this dissertation has hopefully furthered understanding of internal labor markets by: (1) empirically exploring internal labor markets from a job-level perspective, (2) comparing and contrasting the influence of power variables and job-level technology variables on a job's inclusion in an internal labor market, and (3) considering the degree to which job-level technology and power variables combine to determine the existence of internal labor markets.

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# APPENDIX A

## DOT CODES, JOB TITLES, AND OCCUPATIONAL CLASSIFICATIONS

Louisiana State University
Department of Management

Rebecca G. Long
Doctoral Candidate
Department of Management
Louisiana State University

### DOT Code Legend

| | |
|---|---|
| Professional & Kindred | 000-199 |
| Clerical/Sales | 200-299 |
| Service Work | 300-399 |
| Process Work | 500-599 |
| Machine Work | 600-699 |
| Benchwork | 700-799 |
| Structural Work | 800-899 |
| Miscellaneous | 900-999 |

| DOT Code | Job Title | Classification |
|---|---|---|
| 002.061-030 | STRESS ANALYST | Prof & Kindred |
| 002.061-026 | AERONAUTICAL-RESEARCH ENGINEER | " |
| 002.061-022 | AERONAUTICAL-DESIGN ENGINEER | " |
| 002.280-010 | RESEARCH MECHANIC | " |
| 003.167-030 | ENGINEER-IN-CHARGE, STUDIO OPERATIONS | " |
| 003.167-034 | ENGINEER-IN-CHARGE, TRANSMITTER | " |
| 007.167-022 | TOOL-DRAWING CHECKER | " |
| 007.261 | SOLVENT RECOVERY TECHNICAL SPECIALIST | " |
| 007.262 | COMPUTER-NUMERICAL-CONTROL (CNC) NESTING OPERATOR | " |
| 012.167 | ASSISTANT DIRECTOR OF MIS | " |
| 012.187-010 | MATERIAL SCHEDULER | " |
| 019.062 | DIRECTOR OF SYSTEMS DEVELOPMENT/TELECOM | " |
| 019.281-010 | CALIBRATION LABORATORY TECHNICIAN | " |
| 020.061-640 | SOFTWARE ENGINEER | " |
| 020.267 | OPERATIONS COORDINATOR | " |
| 029.261-010 | LABORATORY TESTER | " |
| 074.131-010 | DIRECTOR, PHARMACY SERVICES | " |

| DOT Code | Job Title | Classification |
|---|---|---|
| 074.161-010 | PHARMACIST | Prof & Kindred |
| 074.387-010 | PHARMACY TECHNICIAN | " |
| 075.117-022 | DIRECTOR, NURSING SERVICE | " |
| 075.127-022 | NURSE, SUPERVISOR | " |
| 075.361 | IV THERAPIST; IV THERAPY NURSE | " |
| 075.374-010 | NURSE, GENERAL DUTY | " |
| 076.107-010 | SPEECH PATHOLOGIST | " |
| 076.117-010 | COORDINATOR OF REHABILITATION SERVICES | " |
| 076.121-014 | PHYSICAL THERAPIST | " |
| 076.121 | EXERCISE PHYSIOLOGIST | " |
| 076.124 | AQUATICS SPECIALIST; RECREATIONAL THERAPIST | " |
| 076.131 | PHYSICAL THERAPY MANAGER (DIRECTOR) | " |
| 076.224-010 | PHYSICAL THERAPIST ASST. | " |
| 078.131 | SUPERVISOR, CYTOGENETIC LABORATORY | " |
| 078.131 | MANAGER, CYTOGENETIC LABORATORY | " |
| 078.131 | CHIEF OPHTHALMIC TECHNICIAN | " |
| 078.132 | CHIEF POLYSOMNOGRAPHIC TECHNICIAN | " |

| DOT Code | Job Title | Classification |
|---|---|---|
| 078.231 | PHIRESIS TECHNICAL SPECIALIST; MEDICAL | Prof & Kindred |
| 078.261 | CYTOGENETIC TECHNOLOGIST II | " |
| 078.261 | MEDICAL RADIATION DOSIMETRIST | " |
| 078.261 | CYTOGENETIC TECHNOLOGIST I | " |
| 078.361 | EYE BANK TECHNICIAN | " |
| 078.361 | OPHTHALMIC TECHNICIAN | " |
| 078.362 | CT TECHNOLOGIST | " |
| 078.362 | SLEEP DISORDER TECHNICIAN | " |
| 078.362 | STRESS TECHNICIAN | " |
| 078.362 | POLYSOMNOGRAPHIC TECHNICIAN | " |
| 078.362 | ECHOCATDIOGRAPH TECHNICIAN | " |
| 078.362 | RADIOLOGIC TECHNOLOGIST I, SPECIAL PROCEDURES | " |
| 078.362 | RADIOLOGIC TECHNOLOGIST, MAMMOGRAM | " |
| 078.362 | ELECTROENCEPHALOGRAPHIC TECHNOLOGIST III | " |
| 078.362 | RADIOLOGIC TECHNOLOGIST II, SPECIAL PROCEDURES | " |
| 078.362 | ELECTROMYOGRAPH TECHNICIAN | " |

| DOT Code | Job Title | Classification |
|---|---|---|
| 078.362 | SPECIAL PROCEDURES TECHNOLOGIST I, (MRI) | Prof & Kindred |
| 078.362 | SPECIAL PROCEDURES TECHNOLOGIST II, (MRI) | " |
| 078.362 | SPECIAL PROCEDURES TECHNICIAN (CT) | " |
| 078.362 | RADIOLOGIC TECHNOLOGIST, SPECIAL PROCEDURES CT | " |
| 078.362 | POLYSOMNOGRAPHIC TECHNOLOGIST | " |
| 079.067 | DIRECTOR, SLEEP DISORDERS CENTER | " |
| 079.137 | TUMOR REGISTRY MANAGER | " |
| 079.167-014 | MEDICAL RECORD ADMINISTRATOR | " |
| 079.167 | DIRECTOR OF MEDICAL RECORDS AND QUALITY ASSURANCE | " |
| 079.367-014 | MEDICAL RECORD TECHNICIAN | " |
| 079.367 | TUMOR REGISTRAR | " |
| 079.374-014 | NURSE, LICENSED PRACTICAL | " |
| 110.107-010 | LAWYER | " |
| 131.267-018 | REPORTER | " |
| 131.267-010 | NEWSCASTER | " |
| 132.167 | ASSISTANT NEWS EDITOR | " |
| 132.267-014 | EDITORIAL ASSISTANT | " |

| DOT Code | Job Title | Classification |
|---|---|---|
| 143.062-022 | CAMERA OPERATOR, TELEVISION | Prof & Kindred |
| 143.362 | OPHTHALMIC PHOTOGRAPHER | " |
| 159.117-010 | PRODUCER | " |
| 159.117-010 | RADIO PRODUCER | " |
| 159.117 | COORDINATING PRODUCER | " |
| 159.137 | EXECUTIVE PRODUCER/NEWS | " |
| 159.147-014 | DISK JOCKEY | " |
| 159.147-010 | ANNOUNCER | " |
| 160.167-010 | ACCOUNTANT | " |
| 161.117-010 | BUDGET OFFICER | " |
| 165.067-010 | PUBLIC-RELATIONS REPRESENTATIVE | " |
| 166.117-018 | MANAGER, PERSONNEL | " |
| 166.167-022 | MANAGER, COMPENSATION | " |
| 169.137 | DIRECTOR OF CAPTION CENTER | " |
| 183.117-014 | PRODUCTION SUPERINTENDENT | " |
| 184.167-022 | DIRECTOR, OPERATIONS, BROADCAST | " |
| 186.117-014 | CONTROLLER | " |
| 187.117-010 | ADMINISTRATOR, HOSPITAL | " |
| 189.012 | DIRECTOR OF TELECOMMUNICATIONS | " |
| 193.262-026 | RADIO STATION OPERATOR | " |
| 194.262 | MASTER CONTROL ENGINEER | " |

| DOT Code | Job Title | Classification |
|---|---|---|
| 194.360 | VIDEO TAPE ENGINEER | Prof & Kindred |
| 194.382 | STUDIO ENGINEER | " |
| 196.263-042 | TEST PILOT | " |
| 199.162 | PRODUCTION COORDINATOR | " |
| 199.167 | BROADCAST COORDINATOR | " |
| 199.382 | TRAFFIC COORDINATOR | " |
| 201.362-030 | SECRETARY | Clerical/Sales |
| 202.382 | STENOCAPTIONER | " |
| 203.362 | CAPTION TECHNICIAN | " |
| 203.382 | CAPTION WRITER | " |
| 206.367-014 | FILE CLERK II | " |
| 206.367-010 | ENGINEERING-DOCUMENT-CONTROL CLERK | " |
| 209.387-030 | PROOFREADER | " |
| 209.587-026 | MAIL CLERK | " |
| 213.362-010 | COMPUTER OPERATOR | " |
| 213.362 | PATTERN DATA OPERATOR | " |
| 213.382-010 | COMPUTER-PERIPHERAL-EQUIPMENT OPERATOR | " |
| 214.362-026 | INVOICE-CONTROL CLERK | " |
| 214.362-022 | INSURANCE CLERK | " |
| 216.382-022 | BUDGET CLERK | " |
| 216.482-010 | ACCOUNTS-RECEIVABLE CLERK | " |
| 216.482-010 | CASH-POSTING CLERK | " |
| 216.482-010 | ACCOUNTS-PAYABLE CLERK | " |

| DOT Code | Job Title | Classification |
|---|---|---|
| 221.164 | CUSTOMER SERVICE OPERATOR | Clerical/Sales |
| 221.167 | CUSTOMER/PRODUCTION MANAGER; PRODUCTION MANAGER | " |
| 221.167-014 | MATERIAL COORDINATOR | " |
| 221.167 | PRODUCTION COORDINATOR | " |
| 221.367-014 | ESTIMATOR, PRINTING | " |
| 222.387-058 | STOCK CLERK | " |
| 229.267-010 | PARTS CATALOGER | " |
| 229.364 | INK PREP TECHNICIAN | " |
| 235.662-022 | TELEPHONE OPERATOR | " |
| 239.367 | INFORMATION SPECIALIST | " |
| 239.677-010 | MESSENGER, COPY | " |
| 245.362-010 | MEDICAL-RECORD CLERK | " |
| 254.357-018 | SALES REPRESENTATIVE, PRINTING | " |
| 259.357-018 | SALES REPRESENTATIVE, RADIO AND TELEVISION TIME | " |
| 269.167-010 | ADMINISTRATIVE ASSISTANT | " |
| 269.167-034 | MANAGER, OFFICE | " |
| 321.137-010 | HOUSEKEEPER | Service Work |
| 323.687-010 | CLEANER, HOSPITAL | " |
| 355.354-010 | PHYSICAL THERAPY AIDE | " |
| 355.674-014 | NURSE AIDE | " |
| 500.685 | UTILITY WORKER | Process Work |

| DOT Code | Job Title | Classification |
|---|---|---|
| 509.665 | SET-UP III | Process Work |
| 550.381 | PAINT MIXING ATTENDANT; PAINT TINTER | " |
| 550.382-022 | MIXING-MACHINE OPERATOR | " |
| 550.685 | DISPERSION TECHNICIAN; MEDIA PROCESS TECHNICIAN | " |
| 552.382 | SOLVENT RECOVERY OPERATOR | " |
| 559.132 | SHIFT SUPERVISOR, DISPERSION | " |
| 573.684-014 | SETTER | " |
| 590.362 | AUTOMATED AUTOCLAVE OPERATOR | " |
| 590.585 | TESTER, ADJUSTER CRYSTAL PLATES (GRADE 34) | " |
| 590.685 | OVEN TENDER | " |
| 599.685 | AUTOMATED SMALL PARTS PAINTER | " |
| 603.382 | MILLED SPAR SANDING MACHINE OPERATOR | Machine Work |
| 603.685-062 | GRINDER OPERATOR, PRODUCTION | " |
| 603.685 | PARTS FABRICATION MECHANIC | " |
| 605.682-018 | ROUTER OPERATOR, RADIAL | " |
| 605.685 | TRIMATIC SANDER OPERATOR | " |
| 606.382 | ROTARY SHAPER OPERATOR | " |

| DOT Code | Job Title | Classification |
|---|---|---|
| 606.382 | ASSEMBLER-INSTALLER; STRUCTURES; AUTOMATIC FLOOR | Machine Work |
| 615.482-022 | PUNCH PRESS OPERATOR I | " |
| 616.685-014 | CLINCHING-MACHINE OPERATOR | " |
| 617.682-014 | BUMPER OPERATOR | " |
| 619.360 | SPAR ASSEMBLY TOOL OPERATOR | " |
| 621.221-010 | FIELD-SERVICE REPRESENTATIVE | " |
| 621.261 | OPERATIONAL TEST MECHANIC; LINE SPECIALIST | " |
| 621.281-014 | AIRFRAME-AND-POWER-PLANT MECHANIC | " |
| 650.132-010 | SUPERVISOR, TYPESETTING | " |
| 650.582-018 | PHOTOCOMPOSING-MACHINE OPERATOR | " |
| 651.686 | FEEDER | " |
| 651.686 | ROLLSETTER | " |
| 651.686 | ROLL TENDER | " |
| 651.686 | LITHO FLOORHELPER | " |
| 653.360 | BINDERY LEADPERSON | " |
| 653.382 | COLLATOR OPERATOR, ADVANCED | " |
| 653.662-010 | SADDLE-STITCHING-MACHINE OPERATOR | " |
| 653.685-010 | BINDERY WORKER | " |
| 659.686 | JOGGER | " |

| DOT Code | Job Title | Classification |
|---|---|---|
| 673.360 | MACHINE SETTER - CRYSTAL CUT, GRIND | Machine Work |
| 673.685 | TEST EQUIPMENT OPERATOR, CRYSTAL PLATING | " |
| 686.362 | GERBER CUTTER OPERATOR; COMPOSITE WORKER | " |
| 690.135 | SUPERVISOR, SLIT/PUNCH | " |
| 690.485 | SLITTING MACHINE OPERATOR | " |
| 690.685 | BURNISHER | " |
| 690.685 | PUNCHER | " |
| 692.364 | OPERATOR IV | " |
| 692.482-010 | CARBON-AND-GRAPHITE-BRUSH-MACHINE OPERATOR | " |
| 693.280-010 | FORM BUILDER | " |
| 699.132 | CREW CHIEF; COMPOSITE TRIM AND DRILL | " |
| 699.137 | FLEXIBLE MACHINING SYSTEM (FMS) MANAGER | " |
| 699.360 | NUMERICAL CONTROL MACHINE MACHINIST (FMS) | " |
| 609.380 | SHEET METAL NUMERICAL CONTROL OPERATOR | " |
| 699.360 | FLEXIBLE MACHINING SYSTEM (FMS) OPERATOR | " |

| DOT Code | Job Title | Classification |
|---|---|---|
| 699.362 | WATER ROUTER OPERATOR; WATER KNIFE OPERATOR | Machine Work |
| 699.382 | BONDED STRUCTURE PREFIT & LAYUP MAN | " |
| 699.382 | COMPOSITE TRIM/DRILL WORKER | " |
| 699.382 | AUTOMATED GRAPHITE CUTTING MACHINE OPERATOR | " |
| 699.382 | NUMERICAL CONTROL WIRE PREPARATION MACHINE | " |
| 699.685 | SLITTER OPERATOR | " |
| 699.686 | OPERATOR II | " |
| 705.684 | SMOOTH & BURR WORKER - SHEET METAL | Benchwork |
| 706.681-010 | PRECISION ASSEMBLER, BENCH | " |
| 719.381 | BLOCK MAKER | " |
| 721.684-014 | ASSEMBLER, CARBON BRUSHES | " |
| 726.130-010 | SUPERVISOR, ELECTRONICS | " |
| 726.281-014 | ELECTRONICS TESTER I | " |
| 726.364 | CHECKER PROCESS - SAMPLE CRYSTAL UNITS | " |
| 726.682-022 | FUNCTIONAL TESTER, PRINTED CIRCUIT BOARDS | " |
| 726.684 | INSPECTOR - VISUAL AND MECHANICAL | " |
| 726.684 | MEDIA INSPECTOR; CNC INSPEC. | " |

| DOT Code | Job Title | Classification |
|---|---|---|
| 726.684-086 | PRODUCTION REPAIRER, PRINTED CIRCUIT BOARD | Benchwork |
| 726.684-018 | ELECTRONICS ASSEMBLER | " |
| 726.684 | TESTING TECHNICIAN, COATING LINE | " |
| 726.685 | TESTER, SPECIAL PRECISION CRYSTALS (GRADE 36) | " |
| 726.685-014 | AUTOMATIC COMPONENT INSERTION OPERATOR | " |
| 726.685-560 | MAGNETIC TAPE COATER | " |
| 726.685-014 | AUTOMATIC COMPONENT INSERTION OPERATOR | " |
| 728.384-010 | ASSEMBLER, ELEC. WIRE | " |
| 729.381 | ASSEMBLER-SPECIAL PRECISION CRYSTALS | " |
| 759.687 | BAGGER; COMPO BOND WORKER | " |
| 777.381-030 | PATTERNMAKER, PLASTER | " |
| 806.287-010 | SALVAGE INSPECTOR | Structural |
| 806.361-022 | INSPECTOR, FABRICATION | " |
| 806.361 | INSTALLER, INTER ASSEMBLIES | " |
| 806.381-042 | CABLE ASSEMBLER, MOCK-UP | " |
| 806.381 | AIRCRAFT MECHANIC. FUEL CELL | " |
| 806.381 | PLUMBER, AIRPLANE | " |
| 806.382 | OPERATOR A, BONDING EQUIP; COMPUTER CONTROLLED | " |

| DOT Code | Job Title | Classification |
|---|---|---|
| 806.382 | AIRCRAFT ASSEMBLER, STRUCTURES | Structural |
| 806.382 | OPERATOR A, BONDING EQUIP | " |
| 806.382 | NUMERICAL CONTROL TAPE LAYING MACHINE | " |
| 806.382 | FILAMENT WINDING MACHINE OPERATOR; FILAMENT WINDER | " |
| 806.382 | COMPOSITE TRIM WORKER | " |
| 806.681 | COMPOSITES FABRICATOR & ASSEMBLER | " |
| 806.684 | COMPOSITE LAYUP WORKER; LAMINATOR | " |
| 806.684 | COMPOSITE WORKER; LAYUP | " |
| 806.684-030 | ASSEMBLER, METAL BONDING | " |
| 807.361 | PLASMA SPRAY SKIN REPAIR MECHANIC | " |
| 815.682-010 | LASER BEAM CUTTER | " |
| 819.685 | MACHINE OPERATOR (MASS SOLDERING) | " |
| 828.281-010 | ELECTRONICS MECHANIC | " |
| 860.381-022 | CARPENTER | " |
| 899.381-010 | MAINTENANCE REPAIRER, BLDG. | " |
| 920.587-018 | WRAPPER AND PRESERVER | Miscellaneous |
| 920.587-018 | PACKAGER, HAND | " |
| 921.685-026 | CONVEYOR TENDER | " |

| DOT Code | Job Title | Classification |
|---|---|---|
| 929.665 | OPERATOR II | Miscellaneous |
| 962.167-014 | PROGRAM ASSISTANT | " |
| 962.264-010 | EDITOR, FILM | " |
| 962.362-014 | LIGHT TECHNICIAN | " |
| 962.684-014 | GRIP | " |
| 972.281 | STRIPPER | " |
| 972.281 | NEGATIVE PREP ENGINEER | " |
| 972.282 | GERBER OPERATOR | " |
| 972.284 | QUALITY CONTROL | " |
| 972.367 | PLATE INSPECTOR | " |
| 972.381 | NEGATIVE PREP PLATER | " |
| 972.381 | PLATE MAKER | " |
| 972.382-014 | PHOTOGRAPHER, LITHOGRAPHIC | " |
| 972.382 | NEGATIVE PREP OPERATOR | " |
| 972.687 | PLATE CHECKER | " |

# APPENDIX B

## A COMPLETED DOT JOB ANALYSIS SCHEDULE FOR A CNC NESTING OPERATOR
## DOT CODE: 007.262

Louisiana State University
Department of Management

Rebecca G. Long
Doctoral Candidate
Department of Management
Louisiana State University

# JOB ANALYSIS SCHEDULE

ESTB SN: 44
JAR SN: 64
JAR TYPE: B

DOT TITLE: CNC Nesting Operator
IND DESIG: #
DOT CODE: 007.262

SIC CATEGORY: 123
SIC CODE: 3721
SOC CODE: 3974
GOE CODE: 05.01.06

WORK PERFORMED ESTIMATES

WORKER FUNCTIONS Data: 2S
People: 6N
Things: 2S

WORK FIELDS 1: 057
2: 241
3: 233

MPSMS 1: 568
2: 592
3: 0

WORKER CHARACTERISTICS ESTIMATES

GED Reasoning: 4
Math: 3
Language: 3

SVP: 6

APTITUDES Enter Value 1-5 for each:
G 3
V 3
N 3
S 2
P 3
Q 3
K 4
F 3
M 4
E 5
C 5

TEMPERAMENTS: T
INTERESTS: 5,6
JOB COMPLEXITY:

PHYSICAL DEMANDS
LEVEL: S
FACTORS: 8,9,10,12,13,15,18

ENVIR. CONDITIONS:

DATE PREPARED: 03-17-89

ESTABLISHMENT JOB TITLE: Computer-Numerical-Control (CNC) Nesting Operator

JOB SUMMARY:

Lays out original nests of sheet stock, parts, or materials for CNC routing, drilling, or other fabricating machine operations to maximize utilization of materials and minimize machine setups and operations, using computerized nesting equipment, applying knowledge of nesting systems and CNC machine operation.

DESCRIPTION OF TASKS:

1. Lays out nesting pattern: Reviews shop orders to determine job specifications and nesting requirements. Sorts shop orders into groups according to compatibility of parts to be machined, considering such factors as quantity and shape of parts, and type, size, alloy, and gauge of material to be machined. Enters commands into computerized equipment to retrieve part data from permanent files. Displays parts to be nested on display unit, and rotates, moves, and manipulates parts on display screen to produce most efficient and producible nest, using data tablet, stylus, and function box. Enters commands to enter machine controlling criteria, such as table movement, cutting and drilling tool specifications, spindle location, machine starting point, feed rate, and machine speed, utilizing knowledge of machine operation. Enters commands to title and store nest layouts in computer memory. Enters commands to transfer nest data, listings, or layouts to other media, such as hardcopy, tape, or floppy disk, or enters commands to route nest data to machines by direct link. Enters commands to retrieve, revise, correct, or reformat prior nests or data listings and to build source files. (90%)

2. Performs other duties: Loads and unloads disk packs, tapes, or floppy disks. Operates digitizing equipment to produce pattern from existing data as requested. Consults with Machine Operators and other authorized personnel to resolve machining/nesting problems. (10%)

EMPLOYER REQUIREMENTS

FORMAL EDUC: #

LENGTH
VOCATIONAL PREPARATION #D=Days
#W=Weeks, #M=Mths, #Y=Yrs

COLLEGE:
#
VOC. ED:
#
APPRENT:
#
INPLANT:
#
OJT:
1Y
OTHER: numerical control machine operation
1Y

EXPERIENCE/CERTIFICATION

EXPERIENCE: one year machine operation

LICENSES: #

RELATION TO OTHER JOBS AND WORKERS

PROMOTION FROM: CNC Machine Operator

PROMOTION TO: #

SUPERVISION RCV'D: Supervisor

SUPERVISION GIVEN: #

MACHINES, TOOLS, EQUIPMENT, AND WORK AIDS:

Nesting equipment (manufacturer unknown): Floor-mounted, electrically-powered, computer workstation consisting of display unit, keyboard, data tablet, stylus and function box; digitizer; disk packs; tapes; floppy disks; hardcopy patterns; shop orders.

MATERIALS AND PRODUCTS:

Machine control media used as pattern for cutting aircraft parts.

DEFINITION OF TERMS:

Nest: computer-generated pattern of parts to be machined arranged in optimum location to achieve maximum utilization of materials and minimum set up and operation of machines.

GENERAL COMMENTS:

#

*** PHYSICAL DEMANDS ***

1. STRENGTH

Enter percentage Standing/Walking/Sitting:

a) Standing 5%
Walking 5%
Sitting 90%

b) Enter weights for appropriate activities:

| Activity | Not Present | Occasionally | Frequently |
|---|---|---|---|
| Lifting | | | 0-5 |
| Carrying | | 0-5 | |
| Pushing | N | | |
| Pulling | N | | |

c) CONTROLS: Y or N

Hand-Arm Y

Right
Left
Both Y
Either

Foot-Leg N

Right
Left
Both
Either

d) Strength Level: S

Frequency (N,O,F or C) and Criticality (C or N) - ie. NN, FC, etc.

| | | |
|---|---|---|
| 2. | Climb | NN |
| 3. | Balance | NN |
| 4. | Stoop | NN |
| 5. | Kneel | NN |
| 6. | Crouch | NN |
| 7. | Crawl | NN |
| 8. | Reach | FC |
| 9. | Handle | OC |
| 10. | Finger | FC |
| 11. | Feel | NN |
| 12. | Talk | OC |
| 13. | Hear | OC |
| 14. | Smell | NN |
| 15. | Near Acuity | FC |
| 16. | Far Acuity | NN |
| 17. | Depth Perception | NN |
| 18. | Accommodation | FC |
| 19. | Color Vision | NN |
| 20. | Field of Vision | NN |

*** PHYSICAL DEMANDS COMMENTS ***

1a. Sits to operate nesting equipment. Stands and walks to operate digitizer and to obtain supplies or work aids.

1b. Lifts and carries printouts, supplies, diskpacks, tapes, floppy disks, and other work aids weighing from negligible to 5 lbs. Exerts negligible pushing/pulling force to press keys on nesting equipment keyboard and function box and to manipulate stylus, and to operate digitizer.

1c. Uses fingers of both hands-arms to operate controls of computerized nesting equipment and digitizer, such as knobs, keys, and switches.

8 & 10. Reaches for and fingers computer and peripheral equipment controls, such as keys and stylus.

9. Handles hardcopy patterns, shop orders, and other work aids.

12 & 13. Discusses machining/nesting problems with Machine Operators or other authorized personnel to resolve problems.

15 & 18. Reads and follows shop orders, pattern data, and other technical information to layout nest on computer display screen, frequently shifting gaze from computer screen to written data.

*** ENVIRONMENTAL CONDITIONS ***

Frequency (N,O,F or C) and Criticality (C or N), - ie. NN, FC, etc.

| | |
|---|---|
| 1. Exposure to Weather | NN |
| 2. Extreme Cold | NN |
| 3. Extreme Heat | NN |
| 4. Wet/Humid | NN |
| 5. Noise (Decibels) | 80 |
| 6. Vibration | NN |
| 7. Atmospheric Cond. | NN |

| HAZARDS | Frequency (NN or PC) |
|---|---|
| 8. Moving Mech. Parts | NN |
| 9. Electric Shock | NN |
| 10. High, Exposed Places | NN |
| 11. Radiant Energy | NN |
| 12. Explosives | NN |
| 13. Toxic/Caustic Chem. | NN |
| 14. Other | NN |

ENVIRONMENTAL CONDITIONS COMMENTS:

5. Noise from computer operation in office setting, and from cutting and drilling machines in adjacent factory area.

PROTECTIVE CLOTHING/DEVICES:

safety glasses

# APPENDIX C

## A COMPLETED DOT NARRATIVE REPORT FOR AN AIRCRAFT MANUFACTURER SIC: 3721

Louisiana State University
Department of Management

Rebecca G. Long
Doctoral Candidate
Department of Management
Louisiana State University

NARRATIVE REPORT

Establishment No. 44

SIC: 3721

aircraft mfg.

## Purpose of Study

The purpose of this establishment study was to verify the accuracy of the published aircraft-aerospace manufacturing definitions in the 4th Edition of the Dictionary of Occupational Titles.

## Company Background

This company was founded in 1916 and began building flying boats for the U.S. Navy under a U.S. Navy World War I contract. To handle its expanding production, the firm moved from its original location to larger quarters in southern California. However, the worldwide Great Depression that came after the 1929 stock market crash closed the doors of the company.

In 1932, the company was reorganized. During World War II, more than 19,000 aircraft poured out of its plants. Since that time, the company has continued to grow and diversify.

Today, the company builds spacecraft and space systems, strategic missiles, airlifters, antisubmarine warfare and special mission aircraft, tactical weapon

systems, electronic systems, and ships, and provides technical, financial, information, and management services.

Because the company primarily builds military aircraft, and much of the research, design, fabrication, and testing of these aircraft is accomplished in restricted areas and under tight security, the study was limited in the number of jobs observed and workers interviewed.

## Manufacturing Organization

### Manufacturing Control

The Manufacturing Control Department provides time standards, manpower allocations, detailed production schedules, and production analysis. The Fabrication Control and Assembly Control Divisions are responsible for order writing, diversion of parts, expediting, and stock control. Industrial Engineering is included in this Department and is responsible for providing standard systems and procedures, statements of functions and responsibilities, and manufacturing support.

### Manufacturing Engineering

This Department encompasses Manufacturing Planning, Plant Engineering, and Tooling. Manufacturing Planning converts the blueprints provided by Engineering to manufacturing assembly parts lists, shop orders, and tool requirement breakdowns. The Tooling Division designs and produces jigs, fixtures, templates, and other related tooling required by the shop orders. Plant Engineering

provides and maintains space, machinery, and equipment to accomplish the manufacturing processes.

Manufacturing Research Engineering

This Department provides research into advanced manufacturing technologies, test equipment engineering and assembly, and manufacturing process and producibility research.

Fabrication

This Department is broken down into four main divisions.

1) Machine Shops & Sheet Metal Fabrication Division includes the following operations: conventional machine shop, numerical control programming and machine shop, metal fittings and processing, welding subassembly, model shop, sheet metal fabrication, and painting/processing.
2) Production Development & Modification includes research and design of developmental functional and structural parts and assemblies.
3) Electrical & Avionics Fabrication includes the fabrication of electrical parts and subassemblies, as well as development and manufacturing of avionics components and systems.
4) Subassembly includes bonded parts fabrication and assembly, plastic parts fabrication and assembly, and sheet metal subassembly.

Assembly

The Assembly Department encompasses the following operations:

1) The Assembly Division is responsible for assembling parts and assemblies into major subassemblies and structures, such as fuselage, wing, and empennage, performing mating operations of major sections, and trimming.
2) The Final Assembly & Flight Line Division is responsible for final installation of parts and assemblies on the aircraft, systems installation and checkout, final interior and exterior painting of the aircraft, and flight testing.

Quality Control

The Quality Control Department maintains control of product quality through inspection of materials, parts, and finished product, during all phases of manufacturing, to ensure that engineering specifications are met.

Material

The Material Department converts design data into material requirements; purchases and stores raw material and purchased parts; transports materials, parts and finished products; and ships and receives parts, materials, and aircraft equipment.

## Advanced Technology

The manufacturing branch of this establishment is stepping up automation and robotic machinery installation in an attempt to increase their competitive capability. They are moving toward a "factory of the future", however this is presently in the planning stages. The proposed manufacturing plans include:

1) Automated aircraft assembly, utilizing robotic assembly techniques including automated storage, supervisory computers, programmable assembly fixtures, automatic tool changing, simulation using artificial intelligence, and CADAM (computer aided design/automated manufacturing) generated data;
2) Flexible manufacturing system/distributed numerical control program to upgrade the company's machining capability; and
3) Computer-controlled composite lay-up machines.

## Personnel Practices

This company is an equal employment opportunity and affirmative action employer.

Workers employed by this company in Factory, Office, and Technical job classifications are represented in collective bargaining agreements with the company by the International Association of Machinists and Aerospace Workers.

Seniority, experience, skills, and abilities are criteria used to fill job vacancies. In order for a worker covered under the collective bargaining agreement to be considered for a promotion or transfer outside his or her own department, the individual must have on file with the Company a written Placement Request indicating the desired classification, plant, department, shift, and other information requested on the form. The worker is then considered for job vacancies in departments that he/she has indicated.

## Environmental Conditions

Inasmuch as this company is governed by State, County and City regulations dealing with health and safety in the workplace, the company provides necessary safety devices for all employees working on hazardous and unsanitary work. The company furnishes clothing and safety items, such as ear plugs, respirators, safety harnesses, safety glasses, gloves, aprons, face masks, etc., as required.

At intervals established by the Company, physical examinations including X-rays and blood tests are provided for workers involved in potentially hazardous operations, such as painting, sandblasting, tank sealing, etc.

Safety Engineers test ladders, scaffolding, swing stages, hoisting, and other such equipment at reasonable intervals to ensure worker safety.

It is not uncommon for workers to work above ground ten to seventy-five feet above the factory floor on platforms, scaffolding or swing stages when performing assembly work.

## Vita

Rebecca Grace Long is a Ph.D. candidate in the Department of Management, Louisiana State University. She holds an M.B.A. from the University of Southern Mississippi and is now completing her degree at Louisiana State University in management. She has held managerial positions in industry and has been a member of the faculties at University of New Orleans and University of Southwestern Louisiana. Her primary areas of research interest are organizational theory and strategic management.

# DOCTORAL EXAMINATION AND DISSERTATION REPORT

**Candidate:** Rebecca Grace Long

**Major Field:** (Management) Business Administration

**Title of Dissertation:** Internal Labor Markets: Labor Process and Market Power Effects

**Approved:**

Major Professor and Chairman

Dean of the Graduate School

**EXAMINING COMMITTEE:**

**Date of Examination:**

May 6, 1992