

COLLECTIVE ACTION AND CHANGES IN WAGE LABOR

by

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CHAPTER I

CHANGES IN THE DISTRIBUTION OF LABOR

Over the last two decades a body of sociological literature has developed analyzing the employment trends of wage laborers (Bell, 1973; Galbraith, 1967; Gibbs and Browning, 1966; Wright, 1976; Wright et al., 1982; Stone, 1974). Wage laborers are workers who sell their labor for a wage or salary and are not considered principal owners of the means of production. Principally, it has been found that since 1900, white collar workers (professionals, technical workers, managers and administrators, clerical, and sales workers) have more than doubled; service workers have increased 250 percent; and since 1950, the demand for manual workers (craftsmen, operatives, and laborers) has declined steadily (Miller and Form, 1980: 74-75). Changes in the distribution of wage labor have also been at the forefront of theoretical postulations about new class structures in advanced or post industrial societies (Giddens, 1973; Dahrendorf, 1959; Parkin, 1974; 1979; Bell, 1973; Galbraith, 1967; Poulantzas, 1975; Carchedi, 1977; Ehrenreich and Ehrenreich, 1979; Wright, 1976; Burris, 1980).

Taking manufacturing industries as a case in point, Table 1 presents the involvement of seven occupational

groups as a percentage of the total work force for the Twenty Two Digit Standard Industrial Classification of Manufacturing Industries. The percentage involvement of the seven occupational groups is shown for 1950 and 1980 along with the change in percent. It can be seen that the occupational composition of manufacturing industries has changed in the post World War II era. In particular, the percentage involvement of professionals and managers has increased in virtually all industries. Clerical workers and craftsmen have generally increased except in a few industries. Sales workers have stayed the same, while the involvement of operatives and laborers has declined. While the changes are easily documented, the more difficult problem has been to explain why occupational groups differentially expand or contract.

Two competing explanations have emerged which attempt to account for changes in the distribution of labor, the Weberian rationality thesis and the Structural Marxist control thesis. For Weberians, changes in the distribution of labor stem from the changes that have occurred in the organization and methods of production (e.g. Bell, 1973; Galbraith, 1967; Chandler, 1969). These changes are: 1) the development of technology, which reflects the continuous application of science to produce more sophisticated technologies and increase productivity,

TABLE 1
Involvement and Change of Seven Occupational Groups as a Percentage of the Total Manufacturing Workforce

Industry	Professionals		Managers		Clerical		Sales		Craftsmen		Operatives		Laborers		Total Employed	
	1950	1980 % Δ	1950	1980 % Δ	1950	1980 % Δ	1950	1980 % Δ	1950	1980 % Δ	1950	1980 % Δ	1950	1980 % Δ	1950	1980
Furniture	.02	-.03 +.01	.05	-.06 +.01	.08	.10 +.02	.02	.02 .00	.25	.21 -.04	.50	.52 +.02	.06	.05 -.01	323,340	520,000
Electrical	.09	.19 +.10	.03	.07 +.04	.15	.13 -.02	.01	.01 .00	.18	.14 -.04	.47	.42 -.05	.04	.02 -.02	770,970	2,360,000
Transportation	.07	.17 +.10	.02	.05 +.03	.12	.11 -.01	.01	.01 .00	.18	.27 -.01	.41	.35 -.06	.05	.02 -.03	1,356,230	2,137,000
Textile	.01	.04 +.03	.02	.05 +.03	.06	.10 +.04	.01	.01 .00	.10	.14 +.04	.71	.59 -.12	.05	.05 .00	1,232,790	744,000
Primary Metals	.04	.08 +.04	.02	.05 +.03	.10	.10 .00	.01	.01 .00	.29	.31 +.02	.33	.35 +.02	.18	.07 -.11	1,162,700	1,155,000
Apparel	.01	.02 +.01	.05	.05 .00	.07	.08 +.01	.02	.02 .00	.06	.06 .00	.78	.73 -.05	.01	.02 +.01	1,071,660	1,262,000
Chemical	.12	.20 +.08	.06	.09 +.03	.15	.15 .00	.05	.04 -.01	.16	.16 .00	.33	.28 -.05	.10	.05 -.05	654,480	1,285,000
Food	.03	.04 +.01	.07	.08 +.01	.11	.10 -.01	.05	.03 -.02	.15	.15 .00	.45	.47 +.02	.10	.09 -.01	1,380,210	1,780,000
Stone	.04	.08 +.04	.05	.09 +.04	.09	.10 +.01	.02	.03 +.01	.15	.18 +.03	.45	.45 .00	.17	.06 -.09	458,640	643,000
Fabricated Metals	.05	.07 +.02	.05	.08 +.03	.12	.13 +.01	.02	.02 .00	.24	.23 -.01	.42	.42 -.01	.07	.04 -.03	831,330	1,441,000
Machinery	.07	.16 +.09	.05	.09 +.04	.14	.14 .00	.03	.02 -.01	.31	.24 -.07	.32	.32 -.03	.04	.02 -.02	1,283,640	2,853,000
Paper	.03	.08 +.05	.04	.07 +.03	.11	.11 .00	.02	.02 .00	.14	.19 +.05	.45	.45 -.07	.10	.05 -.05	464,280	731,000
Printing	.10	.13 +.03	.08	.13 +.05	.18	.20 +.02	.15	.11 -.04	.34	.25 -.09	.14	.14 +.02	.01	.02 +.01	868,020	1,594,000
Rubber	.05	.07 +.02	.03	.08 +.05	.13	.10 -.03	.02	.02 .00	.13	.16 +.03	.51	.51 -.02	.06	.04 -.02	236,010	666,000
Instruments	.09	.18 +.09	.05	.10 +.05	.15	.17 +.02	.03	.03 .00	.22	.17 -.05	.32	.32 -.08	.02	.02 .00	196,740	615,000
Misc. Manufacturing	.03	.06 +.03	.08	.11 +.03	.12	.12 .00	.04	.02 -.02	.17	.16 -.01	.48	.48 -.04	.03	.03 .00	457,350	506,000
Tobacco	.01	.09 +.08	.04	.06 +.02	.06	.09 +.03	.02	.04 +.02	.08	.17 +.09	.39	.39 -.29	.08	.13 +.05	92,340	69,000
Petroleum & Coal	.14	.19 +.05	.06	.11 +.05	.17	.16 -.01	.02	.02 .00	.21	.22 +.01	.24	.24 -.03	.10	.04 -.06	284,280	232,000
Leather	.01	.02 +.01	.03	.04 +.01	.08	.09 +.01	.02	.02 .00	.06	.12 +.06	.68	.68 -.07	.03	.03 .00	377,490	259,000
Lumber	.01	.03 +.02	.06	.08 +.02	.04	.06 +.02	.01	.01 .00	.10	.17 +.07	.39	.39 .00	.39	.26 -.13	851,130	680,000

2) the concentration of capital, which leads to vertical integration and consolidation of firms, and 3) the bureaucratization of production, which represents the most rational and efficient form of organization for an industrial firm. Changes in the organization and methods of production, the Weberian thesis states, have in turn led to a demand for a new skilled labor force to handle the complex technical aspects of modern industries (Mills, 1963). In particular, a growing stratum of managers and administrators, professional and technical workers, clerical, and sales workers emerged whose functions were to control, direct, plan, and coordinate the interlocking processes of production, distribution, and development. For Weberians, changes in the methods and organization of production, as well as the increasing white collar labor force, are caused by the advancement of rational production.

Structural Marxists, in contrast to Weberians, focus on changes in the labor process -- the organization of labor at the point of production -- to account for changes in the distribution of wage labor (e.g. Braverman, 1974; Edwards, 1979). Organizational and technological changes in the labor process represent attempts by capitalists to control the labor process and to increase worker productivity. Structural Marxists typically argue that

inherent in the capital accumulation process is the competition among capitalists which forces capitalists to transform the labor process in ways that provide for increased capitalist control (Braverman, 1974; Edwards, 1979). Structural Marxists identify a set of variables similar to the Weberians as being causes of changes in the distribution of labor: 1) capitalization of technology, 2) concentration and centralization of capital, and 3) the bureaucratization of production.

Both approaches, however, ignore the role of collective action in their explanations of changes in the distribution of wage labor. Weberians ignore collective action because the character of technology and organization are presumed to be ideologically neutral. That is, technology and organization do not serve specific interests and are not arenas in which class struggles take place. Similarly, the rationalization of collective bargaining and business unionism have supposedly eliminated industrial conflict in advanced capitalist societies. Workers' collective action, then, is not a determinant of the industrialization process. The Structural Marxists' emphasis on the structural laws of the capitalist accumulation process leads them to overlook human agency in their analyses of transformations in the distribution of labor. Human beings are merely the

incumbents of structurally determined roles. Struggles are said not to occur between exploiting and exploited peoples until after certain structural properties are in place (Gordon et al., 1982; Edwards, 1979). Collective action, when discussed, is typically viewed as a response to changes in the structure of the labor process and changes in the distribution of labor rather than a cause of these changes.

Methodologically, Weberian and Structural Marxists attempts to explain changes in the distribution of wage labor remain weak. Most studies are either grounded in the observations of specific industries (Shiba, 1973), in historical case studies (Zimbalist, 1979; Stone, 1974), in chosen selective cases to illustrate an overall trend (Clawson, 1980; Edwards, 1979), or in broad descriptions of the changing occupational structure of society (Bell, 1973; Miller and Form, 1981). Studies of single industries, historical case studies, and the use of selective cases lack generalizability. To my knowledge, there does not exist a study which attempts to systematically explain changes in the distribution of wage labor for all manufacturing industries. Moreover, there does not exist a study of changes in the distribution of wage labor that incorporates a measure of workers' collective action to explain these changes.

This study attempts to overcome these limitations by systematically analyzing the development of manufacturing industries in the United States during the period 1950-1980. I will argue that workers' collective action negatively impacts on capital accumulation and capitalists attempt to overcome that impact by introducing changes in the labor process. Changes in the labor process encourage additional labor protests which limit capital accumulation. The development of the labor process under capitalism, in other words, is dialectical. Capitalists are forced to constantly transform production methods in order to overcome the organized opposition of workers. Changes in the labor process, and hence changes in the distribution of wage labor, will be viewed as a consequence of the struggle between labor and capital, creating in turn new conditions for continued struggle.

Conventional Explanations

Explanatory Variables

Weberians and Structural Marxists employ similar variables to explain changes in the distribution of wage labor. These are: 1) capitalization of technology, 2) concentration of capital, and the 3) bureaucratic organization of production.

Capitalization of technology typically refers to the amount of resources invested for technological development within an industry. It is commonly assumed that the more sophisticated and advanced technologies cost more money to develop because of the direct application of science. The reduction of gaps in the movement of materials to and from different stations in the production process with conveyors and assembly lines, that is a continuous process technology, costs more to develop than batch production technology. Technological development has important consequences for the organization of production, among them are an increase in the levels of hierarchical authority and administrative functions within the industrial enterprise (Blau et al., 1976; Woodward, 1965; Perrow, 1971; 1972; Blauner, 1964).

The concentration of capital is often taken as an indicator of the size and scale of operating firms within an industry (Bell, 1973; Chandler, 1959; 1969; 1980; Braverman, 1974; Burris, 1980; Aqlietta, 1976). Both Weberians and Structural Marxists agree that a wave of mergers and consolidations occurred throughout the late eighteenth and early nineteenth centuries and again in the late 1920's and early 1930's. The first wave is depicted as horizontal mergers where competitors were eliminated. The second wave consisted of vertical mergers where

suppliers of resources and unfinished components, as well as marketing and distribution services, were integrated into one large corporation. These mergers led to the development of managerial hierarchies, functional specialization, and large administrative and sales apparatuses which were conducive to the growth of white collar occupational groups (Chandler, 1959; 1969; 1980; Edwards, 1979; Braverman, 1974).

The bureaucratic organization of production is the functional integration of specialized tasks where

the definition and direction of specialized work tasks, the evaluation of worker performances, and the distribution of rewards and imposition of punishments come to depend on established rules and procedures, elaborately and systematically laid out (Edwards, 1979: 131).

With an increased use of the bureaucratic organization of production presumably there comes an increase of white collar workers, especially those involved with administrative or clerical duties. Although there is common agreement on the major explanatory variables to account for changes in the distribution of wage labor, Weberians and Structural Marxists differ significantly in their use of these variables.

The Weberian Thesis

Two arguments stand out in the Weberian tradition and both emphasize the progressive advancement of rationality in the production process. These are: 1) the inevitability of the bureaucratic organization of work, and 2) technological determinism (often referred to as the "technogenic" thesis). The inevitability of the bureaucratic organization of work argument relies directly on Weber's discussion of bureaucracy. The argument is that only through the bureaucratic organization of work can production operate efficiently on a large scale (Perrow, 1972; Blau, 1956; Form, 1981; 1979). Blau states:

Modern machines could not be utilized without the complex administrative machinery for running factories employing thousands of workers..... Rationalization in administration is a prerequisite for the full exploitation of technological knowledge in mass production, and thus for a high standard of living (Blau, 1956: 16).

The technological determinist argument is quite similar, only technological development takes precedence over organization. Technology means the systematic application of scientific or other organized knowledge to practical tasks. Technological determinists typically view the organization of production as an adaptation to the technology employed in the industrial enterprise

(Woodward, 1965; Perrow, 1971; 1972; Blauner, 1964).¹ The more sophisticated the productive technology employed within an enterprise, the more complex the organization of production because of the planning, coordination, and control. Galbraith (1967: 25-29) identifies six additional consequences of technological development: 1) there is an increasing span of time separating the beginning from the completion of any such task, 2) there is an increase in the capital that is committed to production (typically involving the development of a machine for performing detailed functions), 3) the performance of a particular task becomes increasingly inflexible, 4) each task requires specialized manpower, 5) the inevitable counterpart of specialization is organization, and 6) the necessity for planning. Its most important consequence, then, is forcing the division and subdivision of any task into its component parts.

The technological determinist argument presents the growth of technology as a more or less linear process, moving from less to more complex forms, that generates

¹Rushing (1968) argues that it is the hardness of material that is related to the division of labor (complexity) in manufacturing industries. However, when sophisticated continuous production technologies are employed with soft materials the division of labor is greater. Thus, production technology is employed as an explanatory variable to help explain the deviant cases in Rushing's analysis. Production technology helps to explain the complexity of organization in an industrial firm.

changes in organizational structure and the distribution of wage labor. Sophisticated productive technologies require multi-levels of managerial authority, an expansion of the non-productive component of firms, an increase in professional and technical workers to design, implement, and man the new technologies, and the elimination of blue collar workers engaged in direct and indirect production activities.

The Weberian argument can be summed in the following manner. The expansion of markets and increased demand for products led to a wave of mergers which created the tendencies for the bureaucratization of production and the expansion of white collar workers within the industrial enterprise. The continuing concentration of capital, the increasing size and scale of operating firms, required increased bureaucratization and the further expansion of white collar workers. Moreover, once the rationalization of administration had begun, the full exploitation of technology was enhanced and technological development generated further expansionary tendencies for white collar workers and a reduction in the ranks of direct and indirect producers.

The Structural Marxist Thesis

Recent analyses of transformations in the labor process and changes in the distribution of wage labor within the Structural Marxist framework tend to focus on the structural properties of the capitalist accumulation process (Braverman, 1974; Edwards, 1979; Aglietta, 1976; Burris, 1980). Two important contributions, Braverman's Labor and Monopoly Capital and Edwards' Contested Terrain, describe aspects of the historical development of the capitalist labor process and changes in the distribution of wage labor. For Braverman and Edwards, capitalist control over the labor process is a structural imperative of the accumulation process, inherent in which are the competitive struggles among capitalists, but a struggle between workers and capitalists results from the latter's efforts to control the labor process.

Braverman (1974) and Edwards (1979) note three important transformations in the labor process, or systems of control, that have important consequences for changes in wage labor. First is the concentration and centralization of industrial capital. The years 1894 to approximately 1930 are depicted as the transition to monopoly capitalism. The concentration and centralization of industrial capital corresponds to an immense growth in the scale of management and administrative operations as

well as putting firms under greater pressure to expand marketing and sales efforts. Vertical integration brought all aspects of production and distribution into the large corporation and the increased size of the firm created a rudimentary form of social planning that appears within the firm as a need for increased administration. According to Edwards (1979: 87),

Each firm has become a huge aggregation of activities, separated spatially and by industrial and even national lines. Previously, these activities had been coordinated (if that is the word) through the market. Now the firm itself needed a larger administrative apparatus.

With the increase in the average scale of the capitalist enterprise, functions which were once vested in the entrepreneurial capitalist have been progressively transferred to a differentiated institutional apparatus (Poulantzas, 1975; Burris, 1980; Braverman, 1974). The differentiation of the functions of capital introduces a new dimension into the labor process and brings into existence a distinctive array of occupational positions: managers and administrators, professionals, clerical workers, and sales workers.² Thus, according to Braverman and Edwards, the concentration and centralization of

²From a relatively small base of less than 15% of the total employed labor force in 1910, the number of white collar workers grew to one third of those employed in 1960 and to nearly 40% in 1975 (Edwards, 1979: 85).

capital generates expansionary tendencies for white collar workers because the size of the corporation, resulting from increased concentration, expanded the need for technical coordination as well as greater control over the production and distribution process.

The second important transformation in the labor process identified by Braverman and Edwards is a shift to controlling the labor process with machinery, referred to by Braverman as the mechanizing tendency of modern industry and by Edwards as technical control. According to Braverman, the key element in the evolution of machinery is the manner in which its operations are controlled. In the earlier stages of machine development, the tendency was to harness workers to machines that controlled and directed individual work tasks. However, technological development under monopoly capitalism generates a tendency to mechanize all processes of production and link them together in such a manner as to control the direction and pace of work for entire factories, or at least large segments of it. For Braverman, a necessary consequence of both scientific management and technological development is a reduction in the demand for labor. But, according to Braverman, the most striking tendency is the change in the occupational composition within industries. The removal of all

possible mental work (for Braverman the work of conceptualization) from the shop floor to the front office -- and the further necessity of maintaining a replica of the entire process of production in paper form -- brings into being large technical and office staffs along with a mass of clerical workers (Braverman, 1974: 239). Thus, for Braverman, technological development expands and reinforces the bureaucratic organization of production.

Edwards (1979) describes technical control in much the same manner as Braverman depicts the mechanizing tendency of modern industry. Technical control is different from simple mechanization in that simple mechanization merely increases the productivity of labor without altering the elements of control, direction of work tasks, evaluation of work performance, and rewarding or disciplining the work force. Technical control, according to Edwards (1979: 113), emerges only when the entire production process of the plant, or large segments of it, are based on a technology that paces and directs the labor process. Edwards (1979: 112) describes technical control as:

designing machinery and planning the flow of work to minimize the problem of transforming labor power into labor as well as to maximize the purely physically based possibilities for achieving efficiency.

The assembly line was the primary form of technical control prior to World War II. The assembly line relieved foremen of the first element of control, the direction and pacing of work, and in some instances reduced the demand for direct supervision. However, the evaluation of work performance, and rewarding and disciplining the work force, was not embedded in the structure of the assembly line. Thus, foremen and a small army of inspectors and monitors were still required to keep watch over the production process.

More recent developments in technology, especially computer technology and robotics, may generate further changes in the distribution of wage labor. Edwards (1979) argues that computer-based controls extend and make more powerful the direction of work activities by technical means. Moreover, the feed-back systems of computer technology have contributed a new element to technical control -- the evaluation of work tasks. In this sense, new productive technologies represent a qualitative advance over the assembly line by subsuming both the direction and pace of work and the evaluation of work performance under the power of machines. Besides eliminating direct producers in the labor process, sophisticated computer technologies create a computer hierarchy of control that takes its place alongside the human hierarchy (Edwards, 1979: 124).

The final significant transformation in the labor process is the bureaucratization of production. Bureaucracy emerged with the concentration and centralization of capital and the transition to monopoly capitalism. For Braverman, the vast industrial engineering and record-keeping divisions of modern corporations have their origins in the wake of scientific management because of planning, estimating, and layout requirements. Thus, the emergence of scientific management expanded professional and technical workers, managers and administrators, clerical workers, while at the same time destroying labor activities requiring craftsmanship.

According to Edwards, technical control did not solve the crisis of control in the industrial firm. Rather, technical control elevated shop floor conflict to plantwide collective action. Bureaucratic control emerged in the post-war era as a new control system. Bureaucratic control is embedded in job categories, work rules, promotion procedures, work discipline, wage scales, definitions of responsibility, etc. (Edwards, 1979: 131).³

³Bureaucratic control should not be confused with bureaucracy. Bureaucracy accompanied the concentration and centralization of industrial capital in most large firms in the early part of this century. Bureaucratic control was a shift, by management, towards relatively greater dependence on the organizational method of controlling the labor process (Edwards, 1979: 131).

Bureaucratic control creates a greater hierarchical stratification of the firms work force through social or organizational distinctions. An important consequence of this expanded hierarchical stratification system, according to Edwards, has been the rapidly growing number of employees who supervise other workers. This in turn leads to an expansion, according to Edwards, in the ranks of professionals, managers, and clerical workers.

Thus, the Structural Marxist thesis and the Weberian thesis posit similar variables to explain changes in the distribution of wage labor. Both argue that increases in the capitalization of technology, concentration of capital, and the bureaucratization of production are significant transformations in the labor process that generate expansionary tendencies for white collar workers (professionals, managers, clerical workers, and sales workers), while decreasing the demand for direct producers (craftsmen, operatives, and laborers) in the production process. The two perspectives differ when explaining the causes of these transformations. Weberians typically argue that technological development, the concentration of capital, and the bureaucratization of production represent the progressive rationalization of production and are the only methods for producing efficiently on an expanded scale. Structural Marxists, on the other hand, argue that

these transformations in the labor process represent the progressive loss of control over the labor process by direct producers while strengthening capitalist control. Similarly, Weberians and Structural Marxists disagree on the consequences of changes in the labor process and the distribution of wage labor. Weberians argue that the industrial work force becomes more skilled and industrial conflict declines due to these changes. Structural Marxists, on the other hand, argue that these changes tend to routinize and deskill work processes as workers lose control over their immediate production process and that workers respond to these changes via collective action.

Critique of Conventional Explanations

Two criticisms can be made against the Weberian thesis for why changes occur in the distribution of wage labor. First, Weberians tend to ignore the role of collective action in shaping the changes that have occurred in the methods and organization of production in the process of industrialization. Second, and highly interrelated with the first criticism, is the questionable assumption of the ideological neutrality of technology and bureaucracy.

With regard to the former, Marx's analysis of the development of the labor process constantly points to the

role that workers' struggles play in shaping the labor process and the distribution of wage labor. For Marx, changes that occur in the methods and organization of production in the process of capitalist development are conditioned by the intensity of workers' struggles as well as competition among capitalists. Thus, the collective action of workers should be an important determinant of transformations in the labor process and changes in the distribution of wage labor. The Weberians may have misspecified their model by excluding collective action as a causal variable for changes in the methods and organization of production and, hence, changes in the distribution of wage labor.

Weberians ignore collective action because the changes that have occurred in the methods and organization of production in the process of industrialization are presumed to be ideologically neutral. Technological development and the bureaucratic organization of production do not serve particular class interests but represent the rationalization of the production process. For Weberians, the rationalization of production through bureaucratization removes bureaucracy from the arena of class struggle. Bureaucratization is not expanded to increase capitalist control over the labor process, nor is it expanded in response to the barriers to capital accumulation erected by workers' collective action.

The ideologically neutral character of bureaucracy has received an abundance of criticism (Marqlin, 1974; Stone, 1974; Edwards, 1979; Clawson, 1980; Clegg and Dunkerly, 1980). Marxists typically argue that bureaucracy expands managerial control over the labor process in terms of capitalist priorities, problems, and interests. Edwards argues:

Bureaucratic organization promotes efficiency or rationality only within the context of managerial control. Bureaucratic organization, with its reliance on multiple levels of authority and supervision and its emphasis on discipline and predictability, is probably the only way of ensuring efficient production using alienated labor (Edwards, 1972: 118).

Bureaucracy may be rational in terms of capitalist categories of decision-making, but to the extent that is true, bureaucracy is not an abstractly neutral or rational phenomena.

Marxists make a similar argument in countering the claims of technological determinists. Salaman (1978: 543) argues that the design, installation, and selection of technology cannot be seen as rational and neutral because it maximizes the profitability of labor and intensifies capitalist control over the amount and direction of workers activity, while cheapening labor. Technology means control and technological innovation is a management

technique, or as Braverman (1974: 195) expresses, "machinery offers to management to do by wholly mechanical means that which it had previously attempted to do by organizational and disciplinary means." According to Noble (1978), technological innovation and implementation are rarely viewed as a range of possibilities that might potentially provide for increased productivity and greater shop floor worker control. Noble (1979: 317) argues:

The domain of technological development is the special product of managerial choices made to increase productivity through the enhancement of managerial, not worker control.

Technological growth and development, like the expansion of bureaucracy, may be rational in terms of capitalist categories of decision-making, but it is not an abstractly rational or neutral phenomena.

By treating technology and bureaucracy as ideologically neutral, Weberians ignore the possibility that these may be arenas for class struggle. Weberians then suggest that industrial conflict will decline because of this ideological neutrality. And empirical evidence suggests that industrial conflict has not declined in this society (Camp, 1983; Wallace, 1979; Hibbs, 1976; Shorter and Tilly, 1972; 1974; Korpi and Shalev, 1979; Ingham, 1974).

Weberians, then, ignore the possibility that technical and bureaucratic control are expanded in the labor process in response to workers' struggles. Capital does not attempt to increase worker productivity and hence the surplus value expropriated from workers through increased capitalist control over the labor process because the new technostructure is driven by the rational motivations of survival and growth. Thus, according to the Weberian thesis, the collective struggles of workers should not be related to increased capitalization of technology and the bureaucratization of production. Similarly, because these are ideologically neutral phenomena, increases in capitalization and bureaucratization should decrease workers' collective action. But these are empirical questions that the Weberians have not systematically analyzed in the post-war era. This analysis attempts to correct for this flaw by incorporating workers' collective action as an explanatory variable for explaining changes in the methods and organization of production and the distribution of wage labor.

Likewise, the major criticisms of Structural Marxism have stressed the overriding emphasis on the structural determination of transformations in the labor process and the relative neglect of the role of human agency in

shaping the labor process (Stark, 1980). The emphasis on the structural imperative of capitalist control over the labor process has led either to the exclusion of workers' collective action as an explanatory variable for explaining transformations in the labor process (e.g. Braverman, 1974) or to explanations of transformations in the labor process and changes in the distribution of wage labor which rely on struggle in their analysis without using systematic measures for workers' struggles or for key transformations in the labor process (e.g., Edwards, 1979; Clawson, 1980; Burris, 1980).

Braverman's analysis of transformations in the labor process and changes in the distribution of wage labor has been criticized for the absence of class conflict (Littler and Salaman, 1982; Stark, 1980; Zimbalist, 1979) and its strain of Marxist functionalism (Littler and Salaman, 1982). Braverman develops a highly abstract conception of classes. Braverman assumes a universal recalcitrance on the part of workers. By assuming this, Braverman is able to avoid consideration of trade union or shop floor resistance to the process he describes (Littler and Salaman, 1982). In this manner, Braverman tends to ignore or minimize the role of collective action in shaping the labor process and the employer, in effect, is portrayed as having uncontested control over the labor process. The

reorganization of the labor process is presented as the outcome of conscious design by management rather than as the product of the struggles between contending groups (Stark, 1980). Littler and Salaman (1982: 256) state: "This perspective leads to an almost conspiratorial concept of capitalism in which every event is planned by the capitalist class and is in the interest of each and every unit of capital." The end result of such theorizing is a Marxist functionalism that ignores the dynamics of structure and struggle in the process of capitalist development.

Edwards' (1979) analysis is equally problematic. Like Braverman, Edwards centers his analysis on the structural imperative for capitalist control over the labor process. Workers' collective action, when analyzed, is seen as a response to the convergence of these imperatives. Moreover, workers do not engage in collective action until certain structural properties are in place. It is not until the concentration and centralization of industrial capital begins to take place, Edwards reasons, that collective action can emerge.*

*This conclusion may apply only to certain industries. Wardell and Johnston (1983), in their analysis of the anthracite coal industry, observed that collective action on the part of miners and the formation of trade unions was most endemic in the Schuylkill (Southern) field where the concentration and centralization of capital was virtually non-existent prior to the 1870's, as opposed to the high concentration and centralization of capital in

Edwards, like Braverman though, portrays transformations in the labor process as a result of conscious design on the part of capitalists. Market demands and competition intensify the structural contradictions of control systems that leads to worker resistance and in turn motivates capitalists to institute new systems of control. Workers do not struggle or resist the new control systems, but rather passively accept them until the structural contradictions of the new control system become evident.

Thus, for both Braverman and Edwards, workers' collective struggles do not play an important role in shaping the development of the labor process. Capitalists respond to competition demands by intensifying control over the labor process. Certainly, changes in the capitalization of technology, concentration of capital, and bureaucratization of production are key transformations in the labor process for explaining changes in the distribution of wage labor. However, it is altogether possible that these transformations began and continue not only because of competition demands to capitalists. Workers' collective action may have played an important role in these transformations as well as shaping their continuous development.

the Wyoming Field (Northern). Yet, it was in the Schuylkill Field that most strikes and attempts to form industrial unions took place prior to 1870.

Edwards, for example, implies that workers did not begin to struggle until after the concentration and centralization of capital made the structural contradictions of hierarchical control evident to workers. This completely ignores the possibility that the wave of mergers in the early part of this century may have been the result of capitalists attempting to exercise control over a previously separate labor force. Workers in separate firms that supplied raw materials and unfinished components to firms dependent on this production may have been able to disrupt production at the dependent firm. Capital may have responded to the militancy of these workers by vertically integrating into their firms all separate production operations in the previously separate firms that were crucial to their survival in order to exercise more control over these workers. Edwards does not acknowledge the possibility that the concentration and centralization of capital were outcomes of a process begun by workers organizing themselves to resist the domination of capital.

Similarly, Braverman and Edwards do not acknowledge that the expansion of technical and bureaucratic control over the labor process may be just as much the result of collective action as the competition among capitalists. Workers, via collective action, create barriers to capital

accumulation that must be overcome. Expanding technical and bureaucratic control over the labor process to increase worker productivity, lower labor costs, and enhance the realization of surplus value may be processes by which capital overcomes the barriers to accumulation erected via collective action.

Braverman's and Edwards' analyses of transformations in the labor process tend to reify workers' collective struggles rather than analyzing them within the various contexts of capitalist development. If class struggle is the motor of social change in society, we cannot be satisfied with discussing that struggle only on theoretical grounds; we must incorporate measures of collective action into our analyses of transformations in the labor process and changes in the distribution of wage labor.

An Alternative Model

In Volume I of Capital, Marx argues that the development of the labor process and changes in the distribution of wage labor are a result of a dialectical interaction between the structure of the labor process and class struggle. At the heart of the capitalist accumulation process, according to Marx, is the competitive struggle among capitalists and the struggle

between labor and capital. In the course of this struggle, workers' collective action creates barriers to capital accumulation. Capitalists respond to this limitation by transforming the labor process in ways that provide for more capitalist control over the production process, increase the productivity of labor, and enhance the production of surplus value. The central argument to this analysis is that workers' collective actions, and the difficulties they add to capital accumulation, motivates capitalists to transform the labor process.⁵ Transformations in the labor process lead to the redistribution of wage labor, but so does workers' collective action. Changes in the labor process and the distribution of wage labor, then, feed back on workers' collective action.

This study will systematically analyze changes in the distribution of wage labor first, and next inspect variations in the impact of collective action. This study does not negate the Structural Marxist thesis. Rather, the study represents an elaboration of the Structural Marxist perspective by adding the dimension of collective action as an explanatory variable for transformations in

⁵Capital responds to the intensity of workers' collective action and to the barriers to accumulation won via this action. Barriers to accumulation include both an environment of conflict and gains won in wages, pensions, control of work rules, etc..

the labor process and changes in wage labor. The hypothetical model presented in Figure 1 depicts the dialectical interaction between the labor process and workers' collective action for explaining transformations in the labor process and changes in the distribution of wage labor. The model will be referred to as a class conflict model because of the central focus on the struggle between labor and capital as a causal factor for labor process development and changes in wage labor.

Hypotheses

The Weberian and Structural Marxist perspectives suggest that increases in the capitalization of technology, concentration of capital, and the bureaucratization of production are the significant factors which explain changes in the distribution of wage labor. The following three hypotheses will be tested.

Ho 1: There is a tendency within manufacturing industries for increases in the capitalization of technology to increase the ranks of professional and technical workers, managers and administrators, clerical and kindred workers as well as sales workers, but decrease the ranks of craftsmen, operatives, and laborers.⁶

⁶There may be an inverse relationship between changes in capitalization and changes in professionals, managers, and clerical workers if computer controlled production systems have become widespread in manufacturing industries. Implied by Edwards, although never explicitly argued, is the notion that computers can become a technical middle management.

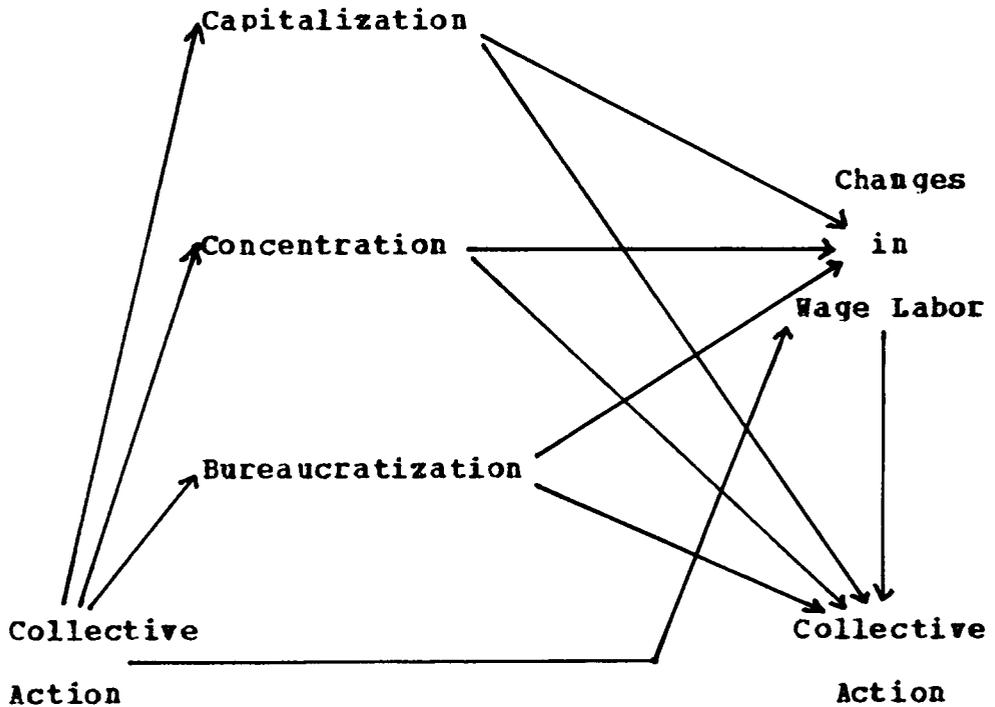


FIGURE 1

Class Conflict Model of Changes in Wage Labor

Ho 2: There is a tendency within manufacturing industries for increases in the concentration of capital to increase the ranks of professional and technical workers, managers and administrators, clerical and kindred workers as well as sales workers, but decrease the ranks of craftsmen, operatives, and laborers.

Ho 3: There is a tendency within manufacturing industries for increases in the bureaucratization of production to increase the ranks of professional and technical workers, managers and administrators, clerical and kindred workers as well as sales workers, but decrease the ranks of craftsmen, operatives, and laborers.

Marx (1967) argues that the special army of wage laborers engaged in controlling the production process expands as workers' struggles become more intensified. The impact of collective action, in other words, partially determines the expansionary tendencies of white collar workers and the reduction in the ranks of blue collar workers. Thus, the following hypothesis will be tested.

Ho 4: There is a tendency within manufacturing industries for the impact of strike volume to increase the ranks of professional and technical workers, managers and administrators, as well as clerical and kindred workers, but decrease the ranks of craftsmen, operatives, and laborers.

Because the Weberians completely ignore the role of collective action and the Structural Marxists fail to systematically analyze it in relation to transformations in the labor process, the following three hypotheses will be tested.

Ho 5: There is a tendency within manufacturing industries for the impact of strike volume to increase the capitalization of technology.

Ho 6: There is a tendency within manufacturing industries for the impact of strike volume to increase the concentration of capital.

Ho 7: There is a tendency within manufacturing industries for the impact of strike volume to increase the bureaucratization of production.

As the model in Figure 1 predicts, workers' collective struggles are seen as leading to transformations in the labor process, which in turn lead to changes in the distribution of wage labor. However, the model also predicts that changes in the labor process and in the distribution of wage labor reconstitute workers' collective struggles. Following the Weberian and Structural Marxist perspectives, two explanations can be offered to account for how changes in the distribution of wage labor might reconstitute workers' collective struggles. The first explanation is derived from the Weberian industrialization thesis (Bell, 1973; Galbraith, 1967). The general argument presented is that the growing white collar occupations are characterized by higher education levels, higher wages, and are therefore not susceptible to mobilization for collective action with traditional blue collar workers. White collar workers typically align themselves with the technostructure, identifying themselves with the accepted system of motivation.

Galbraith (1967: 273) argues that "the shift in power from ownership and the entrepreneur to the technostructure, technological advance, the regulation of markets and aggregate demand, and the imperatives of price and wage regulation have had a deleterious effect on the position of the union as a mobilizing agent for workers' collective action." The new technostructure is motivated by survival and growth and will often trade profits to obtain these goals. Moreover, as machinery replaces repetitive and drudging work and eliminates skilled craft occupations, it opens the way for a massive shift from workers who are within the reach of unions to those who are not. Thus, Weberians would hypothesize that the increasing numbers of persons employed in white collar occupations would lead to decreased strike volume.

The class conflict model follows the Structural Marxists in asserting that changes in the distribution of wage labor lead to an increase in workers' resistance. The transferring of traditional blue collar workers' skills, knowledge, and control over the labor process to white collar workers may intensify blue collar workers' resistance to the increased erosion of their importance in production and to more white collar workers. Thus, the increased presence of white collar workers in the labor process to control production workers may be met with

increased resistance on the part of traditional blue collar workers. The following two hypotheses will attempt to test the Weberian and Marxist arguments.

Ho 8: There is a tendency within manufacturing industries for increases in the ranks of professional and technical workers, managers and administrators, and clerical workers to decrease strike volume.

Ho 9: There is a tendency within manufacturing industries for increases in the ranks of professional and technical workers, managers and administrators, and clerical workers to increase strike volume.

Finally, the model in Figure I depicts direct effects from the three labor process variables to workers' collective action. Hypotheses will be derived from the Weberian and Structural Marxist positions. Weberians would argue that these processes represent the progressive advancement of rationality in the production process and, as such, workers would not resist these changes and industrial conflict would decline. Thus, changes in the three labor process variables should be inversely related to changes in strike volume.

Structural Marxists, on the other hand, would argue that the capitalization of technology, concentration of capital, and bureaucratization of production are mechanisms by which capital intensifies labor activity, raises worker productivity, and devalues workers' labor. Thus, changes in the three labor process variables should be positively related to changes in strike volume. The

following two hypotheses represent the Weberian and Structural Marxist positions.

Ho 10: There is a tendency within manufacturing industries for increases in the capitalization of technology, concentration of capital, and the bureaucratization of production to decrease strike volume.

Ho 11: There is a tendency within manufacturing industries for increases in the capitalization of technology, concentration of capital, and the bureaucratization of production to decrease strike volume.

I turn now to a discussion of the research methods and the data analysis procedures to be employed in the study.

CHAPTER II

RESEARCH METHODOLOGY

This chapter will be divided into three sections. Section one will provide the data sources and the variables generated from each source. Section two will address the measurement of the variables in the analysis. Finally, section three will present the data analysis procedures utilized in the study.

Sources of Data

The cases for analysis in the study are the twenty Two-Digit SIC (Standard Industrial Classification) Manufacturing Industries.⁷ The data for the study were generated from a variety of sources: Census of Manufactures, Census of the Population, and Department of Labor Bulletins and data banks. From these sources,

⁷These are: 1) food and kindred products; 2) tobacco products; 3) textile mill products; 4) apparel, other textile products; 5) lumber and wood products; 6) furniture and fixtures; 7) paper and allied products; 8) printing and publishing; 9) chemicals and allied products; 10) petroleum and coal products; 11) rubber, miscellaneous plastics products; 12) leather and leather products; 13) stone, clay, glass products; 14) primary metal industries; 15) fabricated metal products; 16) machinery, except electrical; 17) electric, electronic equipment; 18) transportation equipment; 19) instruments, related products; and 20) miscellaneous manufactures industries. Ordinance and not otherwise coded manufacturing industries were not included because the earlier Census of Manufactures did not always divide the two groups.

consistent data were obtained for the twenty manufacturing industries from 1947 to 1980.*

The data for occupational groups by industry were obtained from the 1950, 1960, and 1970 Census of the Population. The same data for 1980 were obtained from the Bureau of Labor Statistics. The occupational groups include: 1) managers and administrators, 2) professional, technical and kindred workers, 3) clerical and kindred workers, 4) sales workers, 5) craftsmen and kindred workers, 6) operatives except transport, 7) transportation operatives, 8) laborers, and 9) service workers.†

Four variables were obtained from the Census of Manufactures for the years: 1947, 1954, 1958, 1963, 1967, 1972, and 1977. These were the years that the Census of Manufactures gathered data on manufacturing industries. The following four variables were obtained for each industry: 1) total employed, 2) number of production workers, 3) new capital expenditures, and 4) four firm concentration ratios of the market share of the value of

*The methods of gathering data differed to some extent for each of the data sources. I will have to accept the reliability and validity of the data as presented by each source. The data were gathered in accordance with the theoretical model and although there are limitations in combining different data sources, I do not feel that these limitations will hinder the analysis.

†The operative categories will be combined in the analysis due to the fact that the 1950 census did not break them down into two classifications. Service workers will not be included in the analysis because they are significantly underrepresented in manufacturing industries.

shipments in each industry.

Three variables were obtained by industry from the Department of Labor publications and their data banks to measure workers' collective strike activity. These are: 1) number of strikes, 2) number of workers involved in strikes, and 3) number of man days idle lost to strikes. The three work stoppage variables were collected annually for the years 1947 to 1980 and are combined to create measures of strike volume.

Measurement of Variables

Capitalization of technology will be measured as the actual dollar amount spent within each industry for new structures and equipment standardized by industry size. Thus, the measure is the dollar amount per worker spent for new structures and equipment. The measure depicts both technological development in machinery¹⁰ and in the designing of buildings that facilitate efficiency and productivity in the production process. The measure then indicates the degree to which industries commit themselves to advancing technical control over the labor process (Edwards, 1979).

¹⁰Wallace and Kalleberg (1983) refer to new capital expenditures in structures and equipment as a desirable measure of capital intensity.

Concentration of capital is the proportion of the value of shipments by the four largest firms in an industry.¹¹ In this analysis concentration ratios are used as indicators of the range in the size and scale of operating firms within an industry.

Bureaucratization of production within each industry is the proportion of nonproduction, or administrative and technical workers, to the total number of workers employed in each industry. The higher this index, the more bureaucratic control, since proportionally more employees would be involved in administrative jobs.

One measure of workers' collective action will be employed in the analysis, strike volume. Strike volume has been employed in numerous studies of industrial conflict (Shorter and Tilly, 1971; Korpi and Shalev, 1980; 1979; Britt and Galle, 1972; Hibbs, 1976; Wallace, 1979) and is intended to capture the net impact or financial

¹¹This measure was created by summing the four digit SIC industries within each two digit classification and dividing by the number of four digit industries to obtain an overall measure of each two digit industry's concentration ratio. It should be noted that this measure represents the average level of industrial concentration of capital in each two digit SIC manufacturing industry. Within each two digit SIC manufacturing industry there are numerous four digit classifications. For example, within the two digit SIC industry food and kindred products, there are forty-seven four digit SIC classifications such as meatpacking plants and ice cream and frozen desserts. Concentration ratios are only published under the four digit classification so an overall measure of concentration was created.

damage caused by strikes (Hibbs, 1976: 1035). Strike volume is measured by taking the number of man days idle per 100,000 workers within an industry.

In this analysis, strike volume is actually an estimated annual average. Man days idle were averaged for each time period. However, I did not have corresponding data for total employed. Thus, I averaged the total employed across the same period of time utilizing two measurement points and then standardized by 100,000 workers in the industry.¹² Henceforth, I will employ the term average annual strike volume but in actuality these are estimated averages. There will be six measures of strike volume employed in the analysis. These are the estimated average annual strike volumes from, 1) 1947 to 1954 (VOLS1), 2) 1955 to 1963 (VOLS2), 3) 1964 to 1972 (VOLS3), 4) 1973 to 1980 (VOLS4), 5) 1947 to 1963 (VOLS5), and 6) 1964 to 1980 (VOLS6).

¹²For the overall 1950 to 1980 time period, total employed was averaged for the years 1954 and 1963 and the years 1967 and 1977 for the two measurement points of strike volume. I also averaged the first measurement point with the years 1947, 1954, 1958, and 1963 and the second measurement point with the years 1963, 1967, 1972, and 1977. There was very little difference in these averages. Thus, the two measurement points were utilized in the analysis.

Change Scores

Raw gain scores were constructed for each of the seven occupational groups, capitalization of technology, concentration of capital, bureaucratization of production, and strike volume for four time periods: 1950 to 1960, 1960 to 1970, 1970 to 1980, and 1950 to 1980.

Social scientists attempts to measure change of particular social phenomena range from simple observation, "eyeballing" the data at successive points in time, to sophisticated and complex trend analysis. Pendleton et al. (1980: 87) state "the measurement of change and the formation of longitudinal designs open a "Pandora's Box" of dispute and controversy." Despite these controversies, there is some agreement that longitudinal methodologies in sociology are becoming increasingly necessary to understand changing social phenomena (Loether and McTavish, 1976; Harris, 1963).

Two of the most popular measures of change are difference scores and ratios. These two measures, however, have recieved an abundance of criticism (Cronbach and Furby, 1970; Bohrnstedt, 1969; Pendleton et al., 1980). A third approach to measuring change uses residualized difference scores (Bohrnstedt, 1969). Kessler (1977), however, argues that raw gain scores provide the same conclusions as residualized difference

scores and are more easily interpreted. The measurement of change in a particular social phenomena remains a controversial issue with no clear cut answers on which measures are most appropriate for longitudinal analysis.

I have chosen to use raw gain scores in this analysis, and my reasons for their utilization are derived from the explanations I hope to achieve. Following the Weberians and Structural Marxists, the analysis attempts to explain changes in the seven occupational groups with changes in the three labor process variables. It is assumed that the level of capitalization, concentration, and bureaucratization in each industry by 1950 explains the distribution of wage labor up to that point. The concern of this analysis is to explain the changes in the distribution of wage labor that have occurred since that time with the changes that have also occurred in the three labor process variables since 1950. Following my critique of the Weberian and Structural Marxist perspectives, the impact of collective action in a time frame prior to and partially during the specific time period under investigation is seen as leading to changes in the seven occupational groups and the labor process that occur during that time period. The question asked is whether workers' collective action, in a time frame prior to and partially during the time period of measured change, can

explain changes in the labor process and the distribution of wage labor. Also, can changes in the labor process that occur during the time period under investigation account for changes in the distribution of wage labor? Raw gain scores provide a measure of the actual amount of increase or decrease in these variables. Similarly, changes in the labor process and the seven occupational groups are utilized as feedback to explain workers' collective action. The concern here is whether changes in the labor process and the seven occupational groups can account for variations in the impact of collective action.

Change measures for the three labor process variables, the seven occupational groups, and strike volume were computed for four time periods. For the time period 1950 to 1960, changes in the concentration of capital were computed by subtracting the 1954 value from the 1958 value and multiplying by one hundred.¹³ The

¹³This procedure converts the value from a proportion to a percentage and makes the interpretation of the b values easier. If the change were measured as a proportion, the interpretation of the b values would be misleading because change would be measured as a decimal value. A unit increase, if the change variable was independent, would be a change similar to moving from 0 concentration to a perfect concentration of 1. By converting these proportions to percentages, the interpretation of the b value is simplified because a unit increase is an increase of 1%. Similarly, when proportion change values appear as dependent variables, their interpretation is also simplified. Thus, change measures for the industrial concentration of capital, and the bureaucratization of production were converted from proportions to percentages. This will be done to make the interpretation of the b

change measures for the bureaucratization of production were computed the same way. Change in the capitalization of technology was found by taking its value in 1954 and subtracting it from the value in 1958. Change in the seven occupational groups were computed by subtracting their 1950 value from their 1960 value. Finally, change in the volume of strikes, the feed-back side of the model, was computed by subtracting the average annual strike volume between 1947 and 1954 (VOLS1) from the average annual strike volume between 1955 and 1963 (VOLS2).

For the time period 1960 to 1970, the change measures for the three labor process variables were computed in the same manner utilizing the values from 1963 and 1967. Changes in the seven occupational variables were computed utilizing their 1960 and 1970 values. Change in the volume of strikes was computed by subtracting the average annual strike volume between 1955 and 1963 (VOLS2) from the average annual strike volume between 1964 and 1972 (VOLS3).

For the time period 1970 to 1980, the change measures for the three labor process variables utilized their 1972 and 1977 values. The change measures for the seven occupational groups utilized their 1970 and 1980 values.

values easier for the reader. The procedure does not in any way affect the betas or the significance of the relationships between variables.

Change in strike volume was computed by subtracting the average annual strike volume between 1964 and 1972 (VOLS3) from the average annual strike volume between 1973 and 1980 (VOLS4).

Finally, for the 1950 to 1980 time period, the change measures for the labor process variables utilized their 1954 and 1977 values. The change measures for the seven occupational groups utilized their 1950 and 1980 values. Change in strike volume was computed by subtracting the average annual strike volume between 1947 and 1963 (VOLS5) from the average annual strike volume between 1964 and 1980 (VOLS6).

Data Analysis Procedure

The limitations of when government agencies gather data on manufacturing industries and the limitation of gathering consistent data on only the twenty Two-Digit SIC manufacturing industries restrict the statistical procedures which can be employed in the analysis. The Census of Manufactures gathers data on these industries at irregular intervals. Moreover, the data collection procedures changed after 1946, limiting the measurement of capitalization of technology.¹⁴ Similarly, the Census of

¹⁴Specifically, the Census of Manufactures did not collect data on new capital expenditures prior to the 1947 census. Losing a measure of technological development was deemed too important to risk examining changes in the

the Population gathers data on occupations by industry at ten year intervals, limiting the measurement of changes in the distribution of wage labor to four measurement periods. The limitations of not having this data at annual intervals precludes the use of more sophisticated time series analysis. Also, the lack of multiple indicators of the theoretical concepts and the small N (20) preclude the use of more sophisticated analyses such as LISREL (Joreskog, 1973).

Each relationship in the model was tested with either bivariate or multiple regression techniques. This enabled the testing of the strength and direction of the relationships among the variables in the model. Similarly, since one of the uses of multiple regression as an interpretive tool is to evaluate the relative strength of the independent variables, the multiple regression analyses for changes in the seven occupational groups allowed for the control of the effects of all independent variables in the regression analysis. Similarly, multiple regression analyses for change in the volume of strikes allowed for the control of all independent variables in the equation. The relationships between the impact of collective action and changes in the three labor process

distribution of wage labor for earlier years. It was felt that technological development would account for a large portion of these changes and the model would be misspecified were it to be omitted.

variables were tested with bivariate regression analyses.

Testing the Hypotheses

This analysis employed the direction of relationships and the magnitude of the beta weights from the regression results as rules of thumb to determine substantively important relationships. Beta coefficients, or standard regression coefficients, are used for two reasons. First, the variables in the analysis use different units of measurement (e.g. numbers, dollars, percentages). The b measures a change in one variable by a change in another variable(s) with the original unit(s) of measurement(s). Utilizing b 's rather than beta coefficients could produce misleading findings since different units of measurement are being used. Second, when two or more independent variables are measured in different units, standardization allows for a comparison of the relative effects of each independent variable on the dependent variable (Kim and Kohout, 1975; Lewis-Beck, 1982).

There is a long standing controversy concerning the applicability of tests of statistical significance in determining relationships when an entire population has been enumerated and for non-experimental research (Namboodiri et al., 1975; Blalock, 1972; Gold, 1969; Selvin, 1957; Duqqan and Dean, 1968). Frequently, this

controversy centers on utilizing tests of significance to determine substantive meaning which is not the purpose of significance testing. I have chosen to utilize the direction and magnitude of beta weights as a rule of thumb for determining substantively meaningful relationships for two reasons. First, tests of significance are conventionally used to make inferences concerning the statistical relationships of variables in a sample to a population from which the sample is drawn. For example, if I had drawn a sample of Four Digit manufacturing industries that were representative of the aggregate Two Digit manufacturing industries, then tests of statistical significance would be important to determine if the observed relationships in the sample could be generalized to the larger Two Digit manufacturing industries. In this study, a sample is not being used and generalizing the findings to manufacturing populations in other countries should be made with caution due to cultural variations and differences in political-economic structures. In short, the results apply to the Two Digit manufacturing industries, which is the largest aggregation of manufacturing industries in the United States.

Second, the small N (20 units of analysis) discourages the use of statistical tests of significance. The magnitude of the beta coefficients would have to be

extremely large to be statistically significant at conventional levels of significance. Following Skipper et al. (1967), this may lead to a Type I error; rejection of the null hypothesis which in fact is a substantive relationship. Furthermore, as N increases, so too does the possibility of observing relationships that are, in fact, statistically significant non-findings. The decision for accepting a particular magnitude for a beta coefficient to determine substantive relationships, like the decision for choosing a significance level, is essentially an arbitrary decision on the part of the researcher. In this analysis, I am going to select a magnitude of .2 (in either direction) as a substantive relationship among two variables. This decision is based on the aggregate nature of the data. Two tenths of a change in one standard deviation of the seven occupational groups, in all likelihood, is a change of a thousand persons, or more, employed in a particular occupational group. Sociologically, a change of this magnitude has tremendous implications for society and for the people affected.

Description of Regression Procedures

The model hypothesizes that workers' collective action leads to changes in the capitalization of

technology, concentration of capital, and the bureaucratization of production. The model then hypothesizes that changes in the three labor process variables, together with the level of collective action, lead to changes in the seven occupational groups. Finally, the model hypothesizes that changes in the three labor process variables and the seven occupational groups lead to changes in collective action.

Taking the 1950 to 1960 time period as an example, I describe the three regression procedures for each time period (the variable labels in parentheses are the labels that appear in the tables describing the regression results for each time period). First, the changes in the capitalization of technology (CAP56), concentration of capital (CON56), and the bureaucratization of production (BUR56) were regressed on the average annual strike volume from 1947 to 1954 (VOLS1). Next, the changes in the seven occupational groups -- professionals (PROF56), managers (MAN56), clerical workers (CLER56), sales workers (SALE56), craftsmen (CRAFT56), operatives (OPER56), and laborers (LAB56) -- were regressed on the appropriate change measures for capitalization (CAP56), concentration (CON56), bureaucratization (BUR56), and the average annual strike volume from 1947 to 1954 (VOLS1). Finally, change in the volume of strikes (CVOLST56 = VOLS2-VOLS1) was

regressed on changes in the three labor process variables and the seven occupational groups.

The same procedures are followed for the other three time periods and the variable labels in the tables are distinguished by (67), (78), and (58) respectively for the seven occupational groups and changes in the three labor process variables. For the 1960 to 1970 time period, the average annual strike volume from 1955 to 1963 (VOLS2) is used to predict changes in the labor process and the seven occupational groups, while change in the volume of strikes (CVOLST67 = VOLS3-VOLS2) is the dependent variable on the feed-back side of the model. The average annual strike volume from 1964 to 1972 (VOLS3) is used to predict changes in the labor process and the seven occupational groups for the 1970 to 1980 time period, while change in the volume of strikes (CVOLST67 = VOLS4-VOLS3) is the dependent variable on the feed-back side. For the 1950 to 1980 time period, the average annual strike volume from 1947 to 1963 (VOLS5) is used to predict changes in the labor process and the distribution of wage labor, while change in the volume of strikes (CVOLST58 = VOLS6-VOLS5) is the dependent variable on the feed-back side of the model.

In order to test the model it will be necessary to make separate regression analyses for each of the seven

occupational groups for each of the four measurement periods. This will be a cumbersome procedure, however I believe that to do the analysis only once for the entire thirty year period, 1950 to 1980, might result in a distortion of the socio-historical process of capitalist development. Each of the three labor process variables might explain different changes in the distribution of wage labor for each period of measurement. Similarly, changes in the labor process and changes in the distribution of wage labor may have different effects for collective action in each of the three specific time periods. Therefore, it is necessary to analyze specific time periods as well as the general trend.

Bernstein (1978: 233) has suggested that social scientists invoke a dialectic of research that moves from the systematic study of regularities and correlations -- to the necessity of seeking interpretations of the historical forms of social and political reality -- to the critical self-reflection and self-understanding of human agents. This study attempts to begin this procedure by systematically analyzing the relationships among the variables under scrutiny and searching for systematic regularities. Once found, we can then move toward seeking interpretations of the historical forms of political and social reality. This study attempts to uncover the

systematic regularities in the process of capitalist development since World War II in manufacturing industries in the United States and to interpret them in their social and political reality. I turn now to a presentation of the research findings.

CHAPTER III

DATA ANALYSIS

This chapter will be divided into the following three sections: 1) results from the three specific time periods, 2) results from the overall 1950 to 1980 time period, and 3) comparisons of the four time periods by hypotheses. Within each time period, the analysis will be subdivided into four sections: 1) changes in the distribution of wage labor, 2) changes in the labor process, 3) changes in workers' collective action, and 4) summary of that time period. When presenting the results, the "effects" variables have on changes in the distribution of wage labor and changes in collective action are the independent effects, controlling for changes in the other independent variables.

Results from Specific Time Periods

Tables 3 through 11 present the results for each of the three specific time periods. Table 2 presents the means and standard deviations for the thirteen variables used in the analysis for each of the three time periods. I will begin the presentation of the findings with a discussion of this table.

Period One: 1950 to 1960

For the 1950 to 1960 time period, the mean change in the capitalization of technology is an increase of \$108.00 per worker (see Table 2). The mean change in the concentration of capital is a decline of .5%. The mean change in the bureaucratization of production is an increase of 3% in manufacturing industries. The mean changes in the seven occupational groups during this time period are: 1) an increase of 31,515 professionals, 2) an increase of 10,205 managers, 3) an increase of 26,104 clerical workers, 4) an increase of 11,525 sales workers, 5) an increase of 30,663 craftsmen, 6) an increase of 45,083 operatives, and 7) a decline of 11,214 laborers. The mean volume of strikes declined from an annual average of 125,797 from 1947 to 1954 to an annual average of 103,648 from 1955 to 1963. Thus, mean change in strike volume for this time period is a decline of 22,149.

Changes in the Distribution of Wage Labor

Table 3 presents the results of changes between 1950 and 1960 in the number of persons employed in the seven occupational groups regressed on changes in the three labor process variables and the average annual strike volume from 1947 to 1954. The results show that increases in capitalization tend to decrease the ranks of

TABLE 2

Means and Standard Deviations for All Variables Utilized in the Three Ten Year Time Periods

	1950-1960		1960-1970		1970-1980	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
VOLS1	125797.005	108049.651				
VOLS2	103647.730	122916.854				
CVOLST56	-22149.175	52881.353				
VOLS2			103647.730	122916.854		
VOLS3			106251.053	70774.469		
CVOLST67			2663.323	98605.051		
VOLS3					106251.053	70774.469
VOLS4					107056.546	103693.469
CVOLST78					806.594	92656.916
CAP	107.854	160.228	609.152	968.896	1397.919	1883.061
CON	-455	3.780	2.221	3.456	-615	2.004
BUR	2.954	1.773	.004	1.186	1.410	2.062
PROF	31515.300	45363.487	25156.350	39475.185	31181.350	49166.684
MAN	10205.250	12032.946	4983.500	16227.938	34330.250	33556.017
CLER	26103.750	29822.332	9980.150	24344.948	18633.600	33168.739
SALE	11524.850	24109.360	-8252.950	29090.241	2788.600	14110.722
CRAFT	30662.800	37146.980	12839.100	25715.790	26103.600	52226.640
OPER	45082.750	107014.888	22837.100	86281.335	34843.150	83725.636
LAB	-11214.00	23345.526	-9897.500	24013.779	7328.500	15566.072

professionals (beta = $-.420$), managers (beta = $-.259$), clerical workers (beta = $-.388$), and craftsmen (beta = $-.432$) in this time period (see Table 3). Increases in capitalization have a weaker tendency to decrease the ranks of operatives (beta = $-.161$) and laborers (beta = $-.199$). Increases in capitalization tend to increase the ranks of sales workers (beta = $.179$).

Hypothesis one states that increasing capitalization of technology would increase the ranks of white collar occupational groups and decrease the ranks of the blue collar groups. These findings support hypothesis one, directionally and substantively, for craftsmen and laborers, but do not support the hypothesis with the findings for professionals, managers, and clerical workers.

Directionally, hypothesis one is supported by the findings for sales workers and operatives. During this time period then, there is a tendency for increasing capital investment in technology to decrease the ranks of all occupational groups but sales workers. Increasing capital investment in technology increases the ranks of sales workers.

Increases in concentration tend to have little affect on changes in the ranks of professionals (beta = $-.027$), managers (beta = $-.006$), clerical workers (beta = $-.025$),

TABLE 3
Regression Equations for Occupational Groups on Labor Process Variables and Strike Volume (1950-1960)

	PROF56		MAN56		CLER56		SALES56		CRAFT56		OPER56		LAB56	
	b	beta	b	beta	b	beta	b	beta	b	beta	b	beta	b	beta
CAP56	-118.904	-.4204	-21.079	-.259	-72.201	-.388c	26.951	.178	-100.155	-.432d	-107.462	-.161	-29.008	-.199
CONS56	-320.124	-.027	-20.817	-.006	-195.358	-.025	-140.492	-.022	-1781.053	-.181	-1425.473	-.050	-3.646	-.001
BURS56	6450.633	.252	481.344	.045	2095.475	.125	-3881.710	-.285	3344.127	.160	8027.256	.133	-421.000	-.032
VOLS1	.115	.275	.021	.175	.049	.178	-.058	-.260	.107	.310	.089	.090	-.042	-.287
R ²	.283		.076		.170		.191		.291		.057		.170	
INTERCEPT	10419.178		8399.443		21443.005		27313.713		17370.919		21085.989		950.897	
F	1.355		.311		.769		.884		1.537		.226		.771	
Sign. of F	.237		.867		.562		.697		.242		.920		.561	
Significance of t	a < .01		b < .05		c < .10		d < .15		e < .20					

sales workers (beta = $-.022$), operatives (beta = $-.050$), and laborers (beta = $-.001$) in this time period (see Table 3). However, increases in concentration have a somewhat weaker tendency to decrease the ranks of craftsmen (beta = $-.181$).

Hypothesis two states that increases in concentration would increase the ranks of white collar groups but decrease the ranks of blue collar groups. Substantively, these findings do not support hypothesis two for any of the seven occupational groups. Directionally, there is a slight tendency for increased concentration to decrease the ranks of craftsmen which supports the hypothesis. Thus, the dedication of more capital and personnel resources to production by the top four firms in any particular industry compared to other firms in the same industry has a slight tendency to decrease the ranks of craftsmen.

Increases in bureaucratization tend to increase the ranks of professionals (beta = $.252$) and decrease the ranks of sales workers (beta = $-.285$) in this time period (see Table 3). There is a somewhat weaker tendency for increased bureaucratization to increase the ranks of clerical workers (beta = $.125$), craftsmen (beta = $.160$), and operatives (beta = $.133$). Increases in bureaucratization, however, tend to have little impact on

changes in the ranks of managers (beta = .065) and laborers (beta = -.032).

Hypothesis three states that increased bureaucratization would favor growth in the ranks of white collar workers but not blue collar workers. Directionally and substantively, the findings for professionals support the hypothesis while the findings for sales workers do not. Directionally, the findings for clerical workers support hypothesis three, while the findings for craftsmen and operatives do not. Finally, increased bureaucratization appears to have little affect on changes in the ranks of managers and laborers in this time period. Thus, increasing the non-productive component of manufacturing industries, in this time period, increases the ranks of professionals and, to a lesser extent, those of clerical workers, craftsmen, and operatives, but decreases the ranks of sales workers.

The average annual strike volume between 1947 and 1954 tends to increase the ranks of professionals (beta = .275) and craftsmen (beta = .310), but decreases the ranks of sales workers (beta = -.260) and laborers (beta = -.287). Strike volume has a weaker tendency to increase the ranks of managers (beta = .175) and clerical workers (beta = .178). Strike volume appears to have little influence on changes in the ranks of operatives (beta = .090).

According to hypothesis four, collective action should favor growth in the ranks of professionals, managers, and clerical workers, but decrease the ranks of blue collar workers. These findings support hypothesis four directionally and substantively for professionals and laborers but not for craftsmen. Directionally, the findings support hypothesis four with managers and clerical workers. Thus, increases in the ranks of professionals, craftsmen, and, to a smaller extent, managers and clerical workers, are partly determined by the impact of collective action. The impact of collective action tends to decrease the ranks of laborers.

In this time period, the combined effects of capitalization, concentration, bureaucratization, and collective action explain 29% of the variation in changes in the ranks of professionals, 8% of the variation in changes in the ranks of managers, 17% of the variation in changes in the ranks of clerical workers, 19% of the variation in changes in the ranks of sales workers, 29% of the variation in changes in the ranks of craftsmen, 6% of the variation in changes in the ranks of operatives, and 17% of the variation in changes in the ranks of laborers (see Table 3).

Changes in the Labor Process

The class conflict model presented in Chapter I suggests that changes in the three labor process variables would result, in part, from workers' collective action. Table 4 presents the results of changes in capitalization, concentration, and bureaucratization regressed on the average annual strike volume from 1947 to 1954 (bivariate regressions). These findings indicate that the impact of strike volume tends to increase capitalization (beta = .408). Strike volume has a somewhat weaker tendency to increase bureaucratization (beta = .198). Thus, the impact of collective action leads to increased technical and bureaucratic control over the production process. These findings support hypotheses five and seven which state that the impact of collective action would increase capitalization and bureaucratization. Strike volume, however, is inversely related to changes in concentration (beta = -.212), that is the greater the impact of collective action, the greater the decline in the concentration of capital in manufacturing industries. This finding does not support hypothesis six that suggests collective action should increase the concentration of capital. However, this finding does suggest that collective action has a negative impact on the ability of four firms within manufacturing industries to increase their market power in this time period.

TABLE 4
 Regression Equations for Labor Process Variables
 on Strike Volume (1950-1960)

	CAP56		CON56		BUR56	
	b	beta	b	beta	b	beta
VOLS1	<.000	.408c	<.000	-.212	<.000	.198
R ²		.166		.045		.039
Intercept		31.803		.478		2.546
F		3.588		.849		.733
Sign. of F		.074		.369		.403

Significance of t: a < .01 b < .05 c < .10 d < .15 e < .20

Workers' collective action explains 17% of the variation in changes in capitalization, 5% of the variation in changes in concentration, and 4% of the variation in changes in bureaucratization (see Table 4). These findings suggest that the impact of collective action helps to explain transformations in the labor process that in turn contribute to explaining changes in the distribution of wage labor.

Changes in Collective Action

The class conflict model suggests that changes in the labor process and the seven occupational groups feed back on workers' collective action. A series of hypotheses are derived from the Weberian and Marxist perspectives concerning how these changes would impact on changes in strike volume. Table 5 presents the results of changes in the volume of strikes between 1950 and 1960 regressed on changes in the seven occupational groups and the three labor process variables. These findings indicate that increases in the ranks of professionals (beta = .201), clerical workers (beta = .289), and laborers (beta = .493) tend to increase strike volume (see Table 5). However, since the number of laborers declined in fifteen of the twenty industries (see Appendix X), the greater the decline in laborers, the greater the decline in strike volume.

TABLE 5
Regression Equations for Strike Volume on Occupational Groups and Labor Process Variables (1950-1960)

	CVOLST56		CVOLST56		CVOLST56		CVOLST56		CVOLST56		CVOLST56			
	b	beta	b	beta	b	beta	b	beta	b	beta	b	beta		
PROF56	.234	.201												
MAN56			.669	.165										
CLER56					.513	.289e								
SALES56					.298	.136								
CRAFT56							.162	.114						
OPERS56														
LAB56														
CAP56	214.734	-.651a	204.911	.621a	224.494	.680a	192.241	.582b	206.072	.624b	202.499	.614a	1.117	.493b
CON56	-935.573	-.067	-1052.836	-.075	-918.437	-.066	-1161.348	-.083	-764.388	-.055	-960.423	-.069	248.346	.752a
BUR56	-1525.077	-.051	-118.908	-.004	-1056.295	-.035	1888.664	.063	-392.201	-.013	-440.090	-.015	-1425.127	-.102
R ²	.393		.288		.433		.378		.372		.395		2080.137	.070
INTERCEPT			-48607.238		-51208.109		-52423.121		-48532.367		-47293.952		-43202.752	
F			2.425		2.374		2.867		2.222		2.450		5.142	
Sign. of F			.094		.099		.040		.116		.091		.008	

Significance of t: a < .01 b < .05 c < .10 d < .15 e < .20

Directionally, but not substantively, increases in the ranks of managers (beta = .165), sales workers (beta = .136), craftsmen (beta = .114), and operatives (beta = .187) tend to increase strike volume. These findings provide no support for hypothesis eight (Weberian) which suggests increases in the ranks of professionals, managers, and clerical workers will have a negative impact on industrial conflict. The findings do, however, support hypothesis nine (Marxist) which states traditional blue collar workers will intensify their resistance to the expanding ranks of professionals, managers, and clerical collar workers.

Increases in capitalization tend to increase strike volume (beta coefficients consistently above .580 for all occupational groups) in this time period (see Table 5). Increases in concentration (beta coefficients consistently between -.055 and -.102 for all occupational groups) and bureaucratization (beta coefficients consistently between -.051 and .070 for all occupational groups) tend to have little impact on changes in strike volume.

Hypothesis eleven suggests that increases in the three labor process variables would increase collective action while hypothesis ten suggests an inverse relationship. These findings tend to support hypothesis eleven (Marxist) with capitalization, but not with the

effects of concentration and bureaucratization on changes in strike volume. Hypothesis ten (Weberian) receives no support from these findings.

The combined effects of changes in the seven occupational groups and the three labor process variables explain a large proportion of the variation in changes in strike volume (R^2 consistently above .37 for all occupational groups). As can be seen in Table 5, changes in the capitalization of technology account for most of this variation with changes in the seven occupational groups, especially professionals, clerical workers, and laborers, contributing to a lesser extent.

Summary

Returning to the presentation of mean change in the seven occupational groups and strike volume, the general tendency is for all occupational groups to increase except laborers where there is a substantial decline. The general tendency in this time period is for strike volume to decline in most industries (see Appendices IV, V, VI, VII, VIII, IX, X, and XII). There is, however, tremendous variation among the twenty industries for changes in these variables, as can be seen by the size of the standard deviations.

Looking first at professionals, the general tendency is for their ranks to increase. The results in Table 4

show that increasing capitalization of technology does not favor growth in this group, nor in any other group except sales workers. Similarly, increases in concentration have no effect on changes in the ranks of professionals, nor for any other group except craftsmen where there is a small inverse relationship. Growth in the ranks of professionals, during this time period, is explained largely by increased bureaucratization and the impact of workers' collective action. Growth in the ranks of managers is explained almost completely by workers' collective action. Similarly, the expansion of clerical workers is explained largely by collective action and to a smaller extent by increased bureaucratization. Growth in the ranks of sales workers is explained by increased capitalization of technology. The expansion of craft workers is explained largely by the impact of collective action and to a smaller extent by increased bureaucratization. Growth in the ranks of operatives is explained, for the most part, by increased bureaucratization. Finally, the general decline in laborers can best be explained by collective action and increased capitalization of technology. These findings, for the most part, suggest that the Weberian and Structural Marxist perspectives do not adequately explain the expansionary tendencies of white collar workers in

this time period. Increased bureaucratization contributes somewhat to explaining growth in the ranks of professionals and clerical workers. However, the impact of collective action contributes more to explaining growth in the ranks of managers and clerical workers directly, while indirectly collective action helps to explain growth in the ranks of professionals through increased bureaucratization.

The general tendency during this time period is for strike volume to decline in most manufacturing industries. The best predictor of that decline appears to be the decline in the ranks of laborers. However, increases in the capitalization of technology appears to account for most of the variation in changes in strike volume among the twenty manufacturing industries. Increases in the seven occupational groups, to a smaller extent, also help to account for the variations in changes in strike volume among these industries. Thus, it appears as though the greater the capital investment in technology, the more workers will resist technological change via collective action.

Period Two: 1960 to 1970

In the 1960 to 1970 period, the mean change in the capitalization of technology is an increase of \$609.00 per

worker, and the mean change in the concentration of capital is an increase of 2.2%, but there is almost no mean change in the bureaucratization of production, .004% (see Table 2). Mean changes in the seven occupational groups between 1960 and 1970 are: 1) an increase of 25,156 professionals, 2) an increase of 4,984 managers, 3) an increase of 9,989 clerical workers, 4) a decline of 8,253 sales workers, 5) an increase of 12,839 craftsmen, 6) an increase of 22,837 operatives, and 7) a decline of 9,898 laborers. The volume of strikes increased from an annual average of 103,648 between 1955 and 1963 to an average of 106,251 between 1964 and 1972, resulting in a mean increase in the volume of strikes of 2,663 in this time period.

Changes in the Distribution of Wage Labor

Table 6 presents the results of changes between 1960 and 1970 in the seven occupational groups regressed on changes in the three labor process variables and the average annual strike volume between 1955 and 1963. These results show that increases in capitalization tend to decrease the ranks of craftsmen (beta = $-.272$) and to a weaker extent clerical workers (beta = $-.119$) in this time period (see Table 6). Increases in capitalization tend to have little impact on changes in the ranks of professionals (beta = $.079$), managers (beta = $.006$), sales

TABLE 6
Regression Equations for Occupational Groups on Labor Process Variables and Strike Volume (1960-1970)

	PROF67		MAN67		CLERG7		SALE67		CRAFT67		OPER67		LAB67	
	b	beta	b	beta	b	beta	b	beta	b	beta	b	beta	b	beta
CARE7	3.231	.079	.096	.006	-3.002	-.119	2.265	.075	-7.217	-.272	-2.130	-.024	1.109	.045
COMM7	-1010.799	-.090	233.895	.050	635.972	.089	1180.817	.140	2112.198	.284	2685.089	.108	1785.423	.257
BURE7	-23983.259	-.720c	3709.418	-.271	-1668.089	-.081	-924.570	-.038	354.954	.016	-32031.820	-.440	4737.592	.234
VOLS2	.178	.556d	.642	.312	.004	.022	.029	.124	-6.212	-.030	.352	.502a	-.136	-.698c
R ²	.217		.059		.035		.046		.151		.169		.285	
Intercept	7152.097		153.921		9981.586		-15297.273		13186.654		-18192.835		-427.385	
F	1.037		.236		.181		.668		.764		.565		1.492	
Sign. of F	.421		.914		.967		.945		.624		.565		.254	

Significance of t: a < .01 b < .05 c < .10 d < .15 e < .20

workers (beta = .075), operatives (beta = -.024), and laborers (beta = .045).

Hypothesis one suggests that increased capitalization of technology would favor growth in the ranks of white collar workers but not blue collar workers. These findings support hypothesis one, directionally and substantively, with craftsmen. Directionally, the findings for clerical workers do not support the hypothesis. The absence of any relationship between changes in capitalization and changes in the ranks of professionals, managers, sales workers, operatives, and laborers do not support hypothesis one. Thus, increasing capital investment in technology, in this time period, tends to reduce the ranks of craftsmen and to a smaller extent clerical workers, but has no affect on changes in the ranks of the remaining occupational groups.

Increases in concentration tend to increase the ranks of craftsmen (beta = .284) and laborers (beta = .257) in this time period (see Table 6). Increases in concentration have a weaker tendency to increase the ranks of sales workers (beta = .140) and operatives (beta = .108). Increases in concentration tend to have little affect on changes in the ranks of professionals (beta = -.090), managers (beta = .050), and clerical workers (beta = .089).

Increased concentration, according to hypothesis two, should be positively related changes in the white collar groups but not the blue collar groups. Directionally and substantively, the findings do not support the hypothesis with craftsmen and laborers. Directionally, hypothesis two is supported by the findings for sales workers, but not operatives. The lack of any relationships between increased concentration and changes in the ranks of professionals, managers, and clerical workers do not support the hypothesis. Thus, increased concentration, four firms within an industry dedicating more capital and personnel resources to production in any particular industry compared to other firms within the same industry, increases the ranks of craftsmen and laborers, and, to a smaller extent, sales workers and operatives.

Increases in bureaucratization tend to decrease the ranks of professionals (beta = $-.720$), managers (beta = $-.271$), and operatives (beta = $-.440$), but increase the ranks of laborers (beta = $.234$) in this time period (see Table 6). Increases in bureaucratization tend to have little impact on changes in the ranks of clerical workers (beta = $-.081$), sales workers (beta = $-.038$), and craftsmen (beta = $.016$).

Hypothesis three states that increasing bureaucratization favors growth in the ranks of the four

white collar occupational groups and decreases the ranks of the blue collar groups. The findings for professionals, managers, and laborers, directionally and substantively, do not support hypothesis three. In this time period, the bureaucratization of production declined in eleven of the twenty industries so that declining bureaucratization increases the ranks of professionals, managers, and operatives, but decreases the ranks of laborers. Thus, increasing the non-productive component of manufacturing industries, in this time period, tends to decrease the ranks of professionals, managers, and operatives, and increases the ranks of laborers. Decline in the non-productive component of manufacturing industries increases the ranks of professionals, managers, and operatives, and leads to a decline in the ranks of laborers.

The average annual strike volume between 1955 and 1963 tends to increase the ranks of professionals (beta = .554), managers (beta = .312), and operatives (beta = .502), but decreases the ranks of laborers (beta = -.698) between 1960 and 1970 (see Table 6). Strike volume has a weaker tendency to increase the ranks of sales workers (beta = .124). Strike volume tends to have little effect on changes in the ranks of clerical workers (beta = .022) and craftsmen (beta = -.030).

Hypothesis four predicts that strike volume will increase the ranks of professionals, managers, and clerical workers, and decrease the ranks of the three blue collar groups. Directionally and substantively, the findings for professionals, managers, and laborers support the hypothesis while the findings for operatives do not. The lack of any relationship between strike volume and changes in the clerical and craft occupations do not support the hypothesis. In this time period then, the greater the impact of collective action, the greater the increase in the ranks of professionals, managers, and operatives, and the greater the decline in the ranks of laborers.

The combined effects of changes in capitalization, concentration, bureaucratization, and strike volume explain 22% of the variation in changes in the ranks of professionals, 6% of the variation in changes in the ranks of managers, 4% of the variation in changes in the ranks of clerical workers, 5% of the variation in changes in the ranks of sales workers, 15% of the variation in changes in the ranks of craftsmen, 17% of the variation in changes in the ranks of operatives, and 29% of the variation in changes in the ranks of laborers (see Table 6). For five occupational groups, professionals, managers, clerical workers, sales workers, craftsmen, the predictive power of

the model for explaining changes in their ranks declines from the 1950 to 1960 time period. The power of the model to predict changes in two occupational groups, operatives and laborers, increases.

Changes-in-the-Labor-Process

Table 7 presents the results of changes in capitalization, concentration, and bureaucratization regressed on the average annual strike volume between 1955 and 1963. The class conflict model suggests that workers' collective action would be positively related to changes in these variables. The results in Table 7 indicate that the impact of strike volume tends to increase capitalization (beta = .262), concentration (beta = .216), and bureaucratization (beta = .719) in this time period. These findings support hypotheses five through seven directionally and substantively. Thus, the greater the impact of workers' collective action, 1) the greater will be the capital investment in technology, 2) the more the top four firms within an industry will dedicate capital and personnel resources to production in any particular industry compared to other firms within the same industry, and 3) the greater the increase of bureaucratic control by increasing the non-productive component of manufacturing industries.

TABLE 7

Regression Equations for Labor Process Variables
on Strike Volume (1960-1970)

	CAP67		CON67		BUR67	
	b	beta	b	beta	b	beta
VOLS2	.002	.262	<.000	.216	<.000	.719a
R ²		.069		.047		.517
Intercept		394.910		1.592		-.715
F		1.329		.881		19.293
Sign. of F		.264		.361		.000

Significance of t: a < .01 b < .05 c < .10 d < .15 e < .20

Collective action explains 7% of the variation in changes in capitalization, 5% of the variation in changes in concentration, and 52% of the variation in changes in bureaucratization (see Table 7). The power of the model to explain technological development declines somewhat from the 1950 to 1960 time period. The power of the model to explain changes in bureaucratization increases substantially from the previous time period. We turn now to the feed-back side of the model to account for changes in collective action.

Changes in Collective Action

The class conflict model suggests that changes in the labor process and the expansion of white collar workers impact on collective action. Specifically, four hypotheses were derived from the Weberian and Marxist positions. Hypothesis eight (Weberian) suggests that increases in the ranks of professionals, managers, and clerical workers should decrease the impact of collective action while hypothesis nine (Marxist) suggests a positive impact. Similarly, hypothesis ten (Weberian) suggests that changes in the labor process will have a negative impact on collective action while hypothesis eleven (Marxist) suggests a positive impact.

Table 8 presents the results of changes in strike volume regressed on changes in the seven occupational

groups and changes in the three labor process variables. These results show that increases in the ranks of craftsmen (beta = .235) and laborers (beta = .386) tend to increase the impact of strike volume (see Table 8). Increases in the ranks of managers (beta = .156), clerical workers (beta = .102), and operatives (beta = .104) have a weaker tendency to increase the impact of strike volume. Increases in the ranks of professionals (beta = .028) and sales workers (beta = .051) tend to have little influence on strike volume. Directionally only, the findings for managers and clerical workers tend to support hypothesis nine. The general tendency is for laborers to decline in eleven industries during this time period, so that a decline in their ranks has a substantial negative impact on changes in strike volume. Increases in the ranks of craftsmen, laborers, and to a lesser extent, managers and clerical workers tend to increase the impact of collective action.

Increases in capitalization tend to have a somewhat weaker tendency to increase the impact of strike volume (beta coefficients consistently above .160 for all occupational groups) in this time period (see Table 8). These findings directionally support hypothesis eleven but not ten. Increases in concentration tend to slightly decrease the impact of strike volume (beta coefficients

TABLE 8
Regression Equations for Strike Volume on Occupational Groups and Labor Process Variables (1960-1970)

	CVOLST67		CVOLST67		CVOLST67		CVOLST67		CVOLST67		CVOLST67	
	b	beta	b	beta	b	beta	b	beta	b	beta	b	beta
PROF67	-.071	-.028										
MAN67			.951	.156								
CLER67			.413	.102								
SALE67					.174	.051						
CRFT67							.900	-.2354				
OPER67												
LAB67									.118	.104		
CAP67	18.861	-.185	19.119	-.188	16.640	-.183	25.502	.251d	19.474	.191	1.584	-.386a
CON67	-2318.242	-.081	-2846.355	-.100	-2532.033	-.089	-4132.960	-.145	-2963.788	-.104	16.295	-.160e
BUR67	-73136.602	-.880a	-73352.421	-.882a	-74095.813	-.891a	-73749.630	-.887a	-73283.406	-.881a	-3217.974	-.113
R ²	.692		.716		.694		.738		.702		-64724.080	-.778
INTERCEPT	-5198.244		-7145.131		-1381.697		-14989.029		-5064.380		15775.194	
F	8.442		9.442		8.823		10.589		8.823		18.129	
Sign. of F	.001		.001		.001		.000		.001		.000	
Significance of t	a < .01	b < .05	c < .10	d < .15	e < .20							

consistently between $-.081$ and $-.145$ for all occupational groups). Directionally then, these findings tend to support hypothesis ten but not eleven. Increases in bureaucratization tend to decrease the impact of strike volume (beta coefficients consistently below $-.770$ for all occupational groups). These findings tend to support hypothesis ten but not eleven. Declining bureaucratization (eleven industries in this time period) has a substantial positive impact on changes in strike volume. Thus, in this time period, increasing capital investment in technology tends to slightly increase the impact of collective action. Increases in the dedication of more capital and personnel resources by the top four firms in any particular industry compared to other firms within the same industry tends to slightly reduce the impact of collective action. But increases in the non-productive component of manufacturing industries tends to substantively reduce the impact of collective action.

The combined effects of changes in capitalization, concentration, bureaucratization, and the seven occupational groups explain about 70% of the variation in changes in strike volume (R^2 consistently above $.692$ for all occupational groups) in this time period (see Table 8).

Summary

Previous discussion indicated that the general tendency in manufacturing industries, during this time period, is for the ranks of professionals, managers, clerical workers, craftsmen, and operatives to increase. The overall tendency is for the ranks of sales workers and laborers to decline. The factors that appear to contribute most to explaining increases in the ranks of professionals and managers, according to the model, are declining bureaucratization and the impact of collective action. The general tendency is for the ranks of clerical workers to increase, but the results in Table 6 do not show any substantive factors that are explaining this growth. Similarly, the model does not adequately explain the decline in the ranks of sales workers in this time period. Again, no substantial factors emerge that can account for this decline. The general tendency is for the ranks of craftsmen to increase in this time period. The best predictor of the increase in the ranks of craftsmen appears to be increased concentration of capital. For operatives, two factors in the model contribute to understanding the general tendency for their ranks to increase. First, declining bureaucratization contributes substantially to an increase in the ranks of operatives followed by the impact of collective action. The general

tendency in this time period is for the ranks of laborers to decline. Clearly, the impact of collective action is the best predictor of decreases in the ranks of laborers followed by declining bureaucratization of production.

The general tendency in this time period is for collective action to increase in manufacturing industries. The feed-back side of the model indicates that the declining bureaucratization of production is the major factor explaining this increase. To a lesser extent, increases in the capitalization of technology and the growing ranks of managers, clerical workers, craftsmen, and operatives contribute to the general tendency for collective action to increase. The general tendency in this time period is for laborers to decline. Thus, the declining ranks of laborers have a negative impact on collective action. This finding is interesting in that collective action, in both time periods thus far, leads to a decline in the ranks of laborers and this decline has a substantial negative impact on collective action.

Period Three: 1970 to 1980

For the 1970 to 1980 time period, the mean change in capitalization is an increase of \$1,397.00 per worker between 1970 and 1980 (see Table 2). Concentration declined .6% and bureaucratization increased an average of

1.4%. Mean increases in the number of persons employed in each occupational group between 1970 and 1980 are: 1) an increase of 31,181 professionals, 2) an increase of 34,330 managers, 3) an increase of 18,634 clerical workers, 4) an increase of 2,789 sales workers, 5) an increase of 26,104 craftsmen, 6) an increase of 34,843 operatives, and 7) an increase of 7,329 laborers. The mean volume of strikes increased from an annual average of 106,251 between 1964 and 1973 to an annual average of 107,057 between 1973 and 1980, resulting in a mean increase in the volume of strikes of 1,883.

Changes in the Distribution of Wage Labor

Table 9 presents the results of changes between 1970 and 1980 in the seven occupational groups regressed on changes in the three labor process variables and the average annual strike volume between 1964 and 1972. These results show that increases in capitalization have a somewhat weak tendency to decrease the ranks of professionals (beta = $-.160$), managers ($-.160$), clerical workers (beta = $-.187$), sales workers (beta = $-.111$), and craftsmen (beta = $-.143$) in this time period (see Table 9). Increases in capitalization have a slight tendency to increase the ranks of laborers (beta = $.103$), but have little affect on changes in the ranks of operatives (beta = $-.092$).

TABLE 9
Regression Equations for Occupational Groups on Labor Process Variables and Strike Volume (1970-1980)

	PROP78		MAN78		CLER78		SALE78		CRAFT78		OPER78		LAB78	
	b	beta	b	beta	b	beta	b	beta	b	beta	b	beta	b	beta
CAP78	-4.187	-.160	-2.845	-.160	-3.288	-.187	-0.830	-.111	-3.970	-.143	-4.072	-.092	-.853	-.103
CON78	-9786.428	-.399c	-3583.031	-.214	-7649.606	-.462c	-398.347	-.037	-11847.457	-.655c	-13249.731	-.317	-627.948	-.081
BUR78	270.038	.011	-545.381	-.034	184.606	.011	1416.826	.207	-1976.359	-.078	-7189.368	-.177	-2981.965	-.395c
VOLS3	.245	.352c	.108	.228	.031	.066	-.017	-.086	.179	.243	.190	.161	-.068	-.311e
R ²	.272		.098		.199		.050		.266		.164		.312	
Intercept	4627.034		25408.499		14993.604		3519.886		8104.947		22293.659		17225.511	
F	1.399		.405		.930		.196		1.359		.763		1.703	
Sign. of F	.282		.802		.473		.937		.294		.582		.202	

Significance of t: a < .01 b < .05 c < .10 d < .15 e < .20

Hypothesis one suggests that increasing capitalization of technology would increase the ranks of the four white collar occupational groups and decrease the ranks of blue collar workers. These findings directionally and substantively do not support the hypothesis for any of the seven occupational groups. Directionally only, the hypothesis is supported by the findings for craftsmen and not supported with the findings for professionals, managers, clerical workers, sales workers, and laborers. The lack of any relationship between capitalization and changes in the ranks of operatives also does not support the hypothesis. Thus, increasing capital investment in technology tends to slightly decrease the ranks of professionals, managers, clerical workers, sales workers, and craftsmen in this time period, but increases the ranks of laborers.

Increases in concentration tend to decrease the ranks of professionals (beta = $-.399$), managers (beta = $-.214$), clerical workers (beta = $-.462$), craftsmen (beta = $-.455$), and operatives (beta = $-.317$) between 1970 and 1980 (see Table 9). Increases in concentration tend to have little influence on changes in the ranks of sales workers (beta = $-.057$) and laborers (beta = $-.081$).

Hypothesis two predicted that increased concentration would increase the ranks of the four white collar

occupational groups and decrease the ranks of the blue collar groups. The findings for craftsmen and operatives, directionally and substantively, support the hypothesis while the findings for professionals, managers, and clerical workers do not. The lack of any relationships between increased concentration and changes in the ranks of sales workers and laborers also do not support the hypothesis. As the four largest firms within an industry become larger in the size and scale of their operations compared to other firms within the same industry then, there is a decline in the ranks of professionals, managers, clerical workers, craftsmen, and operatives. The concentration of capital declined in thirteen of the twenty industries (see Appendix III), so that declining concentration increases the ranks of these five occupational groups.

Increases in bureaucratization tend to increase the ranks of sales workers (beta = .207) and decrease the ranks of laborers (beta = -.395) in this time period (see Table 9). There is a somewhat weaker tendency for increases in bureaucratization to decrease the ranks of operatives (beta = -.177). Increases in bureaucratization tend to have little impact on changes in the ranks of professionals (beta = .011), managers (beta = -.034), clerical workers (beta = .011), and craftsmen (beta = -.078).

Hypothesis three suggests that increased bureaucratization would favor growth in the four white collar occupational groups and decrease the ranks of blue collar workers. Directionally and substantively, hypothesis three is supported by the findings for sales workers and laborers, and directionally only with operatives. The lack of any relationships between increased bureaucratization and changes in the ranks of professionals, managers, clerical workers, and craftsmen do not support the hypothesis. Increasing the non-productive component of manufacturing industries increases the ranks of sales workers and tends to decrease the ranks of operatives and laborers in this time period.

The average annual strike volume between 1964 and 1972 tends to increase the ranks of professionals (beta = .352), managers (beta = .228), and craftsmen (beta = .243), but decreases the ranks of laborers (beta = -.311) in this time period (see Table 9). There is a weaker tendency for strike volume to increase the ranks of operatives (beta = .160). Strike volume tends to have little impact on changes in the ranks of clerical workers (beta = .066) and sales workers (beta = -.086).

Hypothesis four suggests that collective action would increase the ranks of professionals, managers, and clerical workers, and decrease the ranks of blue collar

workers. The findings for professionals, managers, and laborers, directionally and substantively, support hypothesis four.

Directionally only, hypothesis four is not supported with the findings for craftsmen and operatives. The greater the impact of collective action then, the greater will be the increase in the ranks of professionals and managers, and the greater will be the decrease in the ranks of laborers. However, collective action also increases the ranks of craftsmen and operatives. Possibly, craftsmen and operatives, much more so than laborers, are able to win job security and control job classification systems and work rules, via collective action, that protects their jobs and leads to more of these workers being hired.

The combined effects of changes in capitalization, concentration, bureaucratization, and strike volume explain 27% of the variation in changes in the ranks of professionals, 10% of the variation in changes in the ranks of managers, 20% of the variation in changes in the ranks of clerical workers, 5% of the variation in changes in the ranks of sales workers, 27% of the variation in changes in the ranks of craftsmen, 16% of the variation in changes in the ranks of operatives, and 31% of the variation in changes in the ranks of laborers in this time

period (see Table 9). In all three specific time periods, the power of the model to explain changes in the ranks of professionals, craftsmen, and laborers has been quite good. Except for one time period, the model has also adequately explained changes in the ranks of clerical workers and operatives. However, the power of the model to explain changes in the ranks of sales workers has been fair in only one time period and consistently weak for managers in all three time periods.

Changes in the Labor Process

The class conflict model suggests that the impact of workers' collective action can help to explain changes in the three labor process variables. Hypotheses five through seven suggest that the impact of workers' collective action would increase capitalization, concentration, and bureaucratization in that order. The results in Table 10 show that strike volume tends to increase capitalization ($\beta = .209$) and bureaucratization ($\beta = .202$) in this time period. Strike volume, however, tends to have little impact on concentration ($\beta = -.092$). Directionally and substantively then, the findings support hypotheses five and seven, but do not support hypothesis six. Thus, the greater the impact of collective action, the greater will be the increase in capital investment in technology and in

TABLE 10

Regression Equations for Labor Process Variables
on Strike Volume (1970-1980)

	CAP78		CON78		BUR78	
	b	beta	b	beta	b	beta
VOLS3	.006	.209	<.000	-.092	<.000	.202
R ²		.044		.008		.041
Intercept		805.783		-.341		.784
F		.826		.151		.767
Sign. of F		.376		.703		.393

Significance of t: a < .01 b < .05 c < .10 d < .15 e < .20

the size of the non-productive personnel in manufacturing industries.

Strike volume, however, explains only a small proportion of the variation in changes in capitalization (4%), concentration (1%), and bureaucratization (4%) in this time period (see Table 10). Workers' collective action begins to explain a smaller portion of the variation in changes in the three labor process variables than in previous time frames. But the findings for all three specific time periods suggest that the omission of collective action for explaining changes in the methods and organization of production may result in both a theoretical and empirical hiatus.

Changes in Collective Action

The class conflict model suggests that changes in the distribution of wage labor and the labor process influence collective action. Four hypotheses were developed from the Weberian and Marxist perspectives. Hypothesis eight (Weberian) suggests that increases in the ranks of professionals, managers, and clerical workers will negatively impact on collective action. Similarly, hypothesis ten (Weberian) suggests that capitalization, concentration, and bureaucratization represent the only rational and efficient production system and workers will not resist these changes in the methods and organization

of production. Hypothesis nine and eleven (Marxist), on the other hand, suggest the opposite.

Table 11 presents the results of changes in the volume of strikes regressed on the seven occupational groups and the three labor process variables. These results show that increases in the ranks of professionals (beta = $-.296$) tend to decrease strike volume (see Table 11). There is a somewhat weaker tendency for increases in the ranks of managers (beta = $-.182$), clerical workers (beta = $-.144$), craftsmen (beta = $-.153$), and operatives (beta = $-.126$) to decrease strike volume. Increases in the ranks of sales workers (beta = $.024$) and laborers (beta = $-.052$) tend to have little impact on changes in strike volume. These findings tend to support hypothesis eight (Weberian) directionally and substantively for professionals and do not support hypothesis nine (Marxist) in this time period. Directionally only, the findings for managers and clerical workers support hypothesis eight but not nine. In this time period, growth in the ranks of professionals, managers, clerical workers, craftsmen, and operatives tends to decrease the impact of collective action.

Increases in capitalization tend to increase strike volume (beta coefficients consistently above $.640$ for all occupational groups) in this time period (see Table 11).

TABLE II
Regression Equations for Strike Volume on Occupational Groups and Labor Process Variables (1970-1980)

	CVOLST78		CVOLST78		CVOLST78		CVOLST78		CVOLST78		CVOLST78		
	b	beta	b	beta	b	beta	b	beta	b	beta	b	beta	
PROF78	-1.550	-.296d											
MAN78			-1.498	-.182									
CLER78					-.397	-.144							
SALE78							.157	.024					
CRAF78									-.268	-.153			
OPER78													
LAB78													
CNF78	32.261	.643a	31.634	.651a	31.479	.648a	32.855	.676a	31.950	.657a	32.314	.665a	
CON78	-4313.119	-.099	-686.807	-.015	-1829.040	-.040	1299.478	.028	-2063.629	-.045	-654.095	-.014	
BUR78	-8213.559	-.185	-9199.304	-.207	-9144.130	-.206	-9506.059	-.214	-9497.060	-.214	-10110.546	-.228	
R ²		.535		.493		.478		.462		.480		.475	
INTERCEPT			-16933.675		-1785.893		-24029.878		-31358.773		-26746.721		-25713.484
F			4.431		3.647		3.435		3.220		3.459		3.394
Sign. of F			.016		.029		.035		.043		.034		.036

Significance of t a < .01 b < .05 c < .10 d < .15 e < .20

This finding supports hypothesis eleven with regard to capitalization and suggests that the greater the capital investment in technology, the greater will be the increase in workers resistance to these changes. Increases in concentration tend to have little influence on strike volume (beta coefficients consistently between $-.099$ and $.024$ for all occupational groups). These findings do not support either hypothesis ten or eleven. Increases in bureaucratization have a somewhat weaker tendency to decrease strike volume (beta coefficients consistently below $-.185$ for all occupational groups). These findings support hypothesis ten directionally with regard to bureaucratization but not hypothesis eleven. Increasing the non-productive component of manufacturing industries, in this time period, tends to have a negative impact on collective action. Or, increasing bureaucratic control over the labor process decreases worker resistance.

The combined effects of changes in the seven occupational groups and the three labor process variables explain approximately 50% of the variation in changes in the volume of strikes (R^2 consistently above $.46$ for all occupational groups) in this time period (see Table 11). In all three specific time periods, the power of the model to explain variations in changes in strike volume has been exceptionally good.

Summary

The general tendency in this time period is for the ranks of all occupational groups to expand. Similarly, the general tendency is for strike volume to increase in most industries (see Appendices IV through XII). Looking at the results in Table 9, the factors which contribute most to the expansionary tendencies of professionals and managers in this time period are the impact of collective action and the declining concentration of capital (thirteen industries). These findings suggest that the class conflict model, not the technoqenic thesis, explains a large part of the growth in these two occupational groups. Growth in the ranks of clerical workers is best explained by the declining concentration of capital. Growth in the number of sales workers can best be attributed to increased bureaucratization, however the model is relatively weak in explaining changes in this occupational group. The expansionary tendencies of craftsmen and operatives, in this time period, can best be explained by the declining concentration of capital and the impact of collective action. Growth in the ranks of laborers can best be explained by increased capitalization.

The general tendency for strike volume to increase in this time period can best be explained by changes in

capitalization. In all three specific time periods, increasing capital investment in technology has a positive impact on collective action. Workers are struggling to resist technological development that threatens their means of subsistence and devalues their labor.

Results from 1950 to 1980

In this section, I will address the eleven hypotheses utilizing the results of the model with 1950 and 1980 as the historical parameters for each variable.¹⁵ Table 12 presents the means and standard deviations for all variables employed in the analysis of the full model. For manufacturing industries in general, mean change in the capitalization of technology is an increase of \$2,542.00 per worker (see Table 12). The mean concentration of capital declined 3.6% between 1950 and 1980 for manufacturing industries in general, while the mean bureaucratization of production increased by 4.6% in the same time period. The mean changes in the number of

¹⁵One precautionary note may be in order. The two measurement points used for measuring strike volume tends to have a leveling effect on strike volume. Strike volume rises and falls at various times and the use of only two measurement points may level out these peaks and valleys. Thus, the effects that strike volume has for changes in the distribution of wage labor and the labor process may be smaller than in the specific time periods. Similarly, the effects that changes in the distribution of wage labor and the labor process have for changes in strike volume may be smaller.

TABLE 12

Means and Standard Deviations for All Variables Utilized
in the 1950 to 1980 Time Period

	Mean Change	Std. Dev.	Involvement % Mean Change
VOLS5	111817.405	112434.961	
VOLS6	102344.364	71708.920	
CVOLST58	-9473.041	95865.753	
CON58	-3.606	10.106	
CAP58	2542.330	2796.137	
BUR58	4.603	2.614	
PROF58	87853.000	118864.133	6%
MAN58	49519.000	51992.075	3%
CLER58	54717.500	69222.167	1%
SALE58	6060.500	14310.312	0%
CRAFT58	69605.500	78205.732	-1%
OPER58	102763.000	214056.130	-6%
LAB58	-13783.000	45984.302	-4%

persons employed in each occupational group are: 1) an increase of 87,853 professionals, 2) an increase of 49,519 managers, 3) an increase of 54,718 clerical workers, 4) an increase of 6,061 sales workers, 5) an increase of 69,606 craftsmen, 6) an increase of 102,763 operatives, and 7) a decline of 13,783 laborers. Strike volume declined from an annual average of 111,817 between 1947 and 1963 to an annual average of 102,344 between 1964 and 1980, resulting in a mean decline in strike volume of 9,473.

The occupational composition of the manufacturing workforce has changed in the post war era. The mean percentage involvement of professionals as part of the total manufacturing work force has increased 6% between 1950 and 1980 (see Table 12). The mean percentage involvement of managers has increased 3% and clerical workers 1%. The mean percentage involvement of sales workers has not changed in the post-war era. The mean percentage involvement of craftsmen has declined 1% despite their ranks increasing in an absolute sense. Similarly, the mean percentage involvement of operatives has declined by 6% despite a general increase in their ranks. The mean percentage involvement of laborers has declined 4%.

Changes in the Distribution of Wage Labor

Table 13 presents the results of changes in the seven occupational groups regressed on changes in the three labor process variables and the average annual strike volume between 1947 and 1963. These results show that increases in capitalization tend to decrease the ranks of professionals (beta = $-.214$), managers (beta = $-.225$), clerical workers (beta = $-.292$), and craftsmen (beta = $-.257$) in the overall time period (see Table 13). Increases in capitalization have a somewhat weaker tendency to decrease the ranks of sales workers (beta = $-.167$), and operatives (beta = $-.154$). Increases in capitalization tend to have little impact on changes in the ranks of laborers (beta = $-.017$).

Hypothesis one suggests that increased capitalization of technology would increase the ranks of the four white collar occupational groups and decrease the ranks of the three blue collar groups. Directionally and substantively, the findings for craftsmen support hypothesis one and the findings for professionals, managers, and clerical workers do not support the hypothesis.

Directionally, the findings for operatives support the hypothesis while the findings for sales workers do not. The lack of any relationship between increased

capitalization and changes in the ranks of laborers does not support the hypothesis. The general tendency between 1950 and 1980 has been for increasing capital investment in technology to decrease the ranks of all occupational groups but laborers.

Increases in concentration tend to decrease the ranks of professionals (beta = $-.283$), managers (beta = $-.332$), clerical workers (beta = $-.297$), sales workers (beta = $-.227$), craftsmen (beta = $-.406$), and operatives (beta = $-.563$). Increases in concentration have a weaker tendency to decrease the ranks of laborers (beta = $-.111$)

Hypothesis two suggests that increased concentration would increase the ranks of white collar workers and decrease the ranks of blue collar workers. Directionally and substantively, the findings for craftsmen and operatives support hypothesis two while the findings for professionals, managers, clerical workers, and sales workers do not. Directionally, the findings for laborers support the hypothesis. Thus, the dedication of more capital and personnel resources to production in any particular industry by the top four producers compared to other firms within the same industry tends to decrease the ranks of all occupational groups. The general tendency, however, is for the concentration of capital to decline in twelve of the twenty industries in this time period. And

TABLE 13
Regression Equations for Occupational Groups on Labor Process Variables and Strike Volume (1950-1980)

	PROF58		MAN58		CLER58		SALES58		CRAFT58		OPER58		LAB58	
	b	beta	b	beta	b	beta	b	beta	b	beta	b	beta	b	beta
CAP58	-9.088	-.214	-4.190	-.225	-7.228	-.282	-.654	-.167	-7.201	-.257	-11.734	-.154	-.781	-.107
CUM58	3325.740	-.283	1654.671	-.322a	-2033.936	-.287	320.918	-.227	-3140.091	-.404c	-11932.860	-.563b	-505.617	-.111
BUR58	22081.194	.462c	7033.361	-.355a	10977.687	.415c	2725.042	.490b	9887.060	.331a	10294.287	-.126	9.910	.001
VOLS5	.011	.010	-.023	.051	.072	-.117	.017	-.132	-.016	-.023	-.170	.089	-.248	-.605a
R ²		.266		.225		.271		.234		.279		.317		.341
Intercept	5304.037		25351.431		23291.214		3583.748		32867.605		61279.003		12743.407	
F		1.361		1.091		1.385		1.491		1.453		1.742		1.038
Sign. of F		.284		.396		.283		.254		.266		.193		.156

Significance of t: a < .01 b < .05 c < .10 d < .15 e < .20

declining concentration tends to increase the ranks of all occupational groups.

Increases in bureaucratization tend to increase the ranks of professionals (beta = .442), managers (beta = .355), clerical workers (beta = .415), sales worker (beta = .498), and craftsmen (beta = .331) in this time period (see Table 13). Increases in bureaucratization have a weaker tendency to decrease the ranks of operatives (beta = .126). Increases in bureaucratization tend to have little impact on changes in the ranks of laborers (beta = .001).

Hypothesis three suggests that increased bureaucratization would favor growth in the ranks of the four white collar occupational groups and decrease the ranks of the three blue collar groups. The findings for professionals, managers, clerical workers, and sales workers, directionally and substantively, support hypothesis three. The findings for craftsmen, directionally and substantively, do not support the hypothesis.

Directionally, the findings for operatives do not support hypothesis three. The lack of any relationship between increased bureaucratization and changes in the ranks of laborers also does not support the hypothesis. Thus, in this time period, increasing the non-productive

component of manufacturing industries tends to increase the ranks of all occupational groups but laborers.

The average annual strike volume between 1947 and 1963 tends to decrease the ranks of laborers (beta = $-.605$) in this time period (see Table 13). Strike volume has a somewhat weaker tendency to decrease the ranks of clerical workers (beta = $-.117$) and sales workers (beta = $-.132$). Strike volume tends to have little impact on changes in the ranks of professionals (beta = $.010$), managers (beta = $.051$), craftsmen (beta = $-.023$), and operatives (beta = $.089$).

Hypothesis four suggests that strike volume would increase the ranks of professionals, managers, and clerical workers but decrease the ranks of the three blue collar groups. The findings for laborers, directionally and substantively, support hypothesis four. Directionally only, the findings for clerical workers do not support the hypothesis. The lack of any relationship between strike volume and changes in the ranks of professionals, managers, craftsmen, and operatives do not support the hypothesis. Thus, the impact of workers' collective action tends to decrease the ranks of laborers and, to a smaller extent, clerical workers in this time period.

The combined effects of changes in capitalization, concentration, bureaucratization, and strike volume

explain 27% of the variation in changes in the ranks of professionals, 23% of the variation in changes in the ranks of managers, 27% of the variation in changes in the ranks of clerical workers, 23% of the variation in changes in the ranks of sales workers, 28% of the variation in changes in the ranks of craftsmen, 32% of the variation in changes in the ranks of operatives, and 34% of the variation in changes in the ranks of laborers (see Table 13). The power of the model for explaining changes in the distribution of wage labor during this time period exceeds its power in the specific time periods for almost all occupational groups.

Changes in the Labor Process

The class conflict model suggests that the impact of workers' collective action contributes to explaining changes in the three labor process variables. Hypotheses five through seven suggest that workers' collective action would increase capitalization, concentration, and bureaucratization. The results in Table 14 show that strike volume increases capitalization ($\beta = .207$) and decreases concentration ($\beta = -.314$) in this time period. Strike volume tends to have little influence on changes in bureaucratization ($\beta = .034$). These findings, directionally and substantively, support

TABLE 14

Regression Equations for Labor Process Variables
on Strike Volume (1950-1980)

	CAP58		CON58		BUR58	
	b	beta	b	beta	b	beta
VOLS5	.005	.207	<.000	-.314e	<.000	.034
R ²		.043		.099		.001
Intercept		1966.240		-.451		4.514
F		.807		1.968		.021
Sign. of F		.381		.178		.887

Significance of t: a < .01 b < .05 c < .10 d < .15 e < .20

hypothesis five but do not support hypothesis six. The lack of any relationship between collective action and increased bureaucratization does not support hypothesis seven. Thus, the greater the impact of collective action, the greater will be the increase in the capital investment in technology and the increase in technical control over the labor process. The greater the impact of collective action, the greater will be the decline in capital and personnel resources expended for production by the the top four firms in any particular industry compared to other firms within the same industry.

Strike volume explains 4% of the variation in changes in capitalization, 10% of the variation in changes in concentration, and none of the variation in changes in bureaucratization ($R^2 = .001$) in this time period (see Table 14). These findings indicate that collective action does contribute a little to explaining changes in the labor process, but interestingly enough contributes to understanding changes in specific labor process variables in specific time periods. I turn now to the feed-back side of the model to explain how changes in the seven occupational groups and the three labor process variables impact on workers' collective action.

Changes in Collective Action

Table 15 presents the data analysis results of changes in strike volume between 1950 and 1980 regressed on changes in the seven occupational groups and the three labor process variables. Hypotheses eight through eleven address these relationships. Hypothesis eight (Weberian) suggests increases in the ranks of professionals, managers, and clerical workers would decrease strike volume. Similarly, hypothesis ten (Weberian) suggests that increases in capitalization, concentration, and bureaucratization would decrease strike volume. Hypothesis nine (Marxist) suggests that increases in the ranks of professionals, managers, and clerical workers would increase strike volume. Hypothesis eleven (Marxist) suggests that increases in capitalization, concentration, and bureaucratization would increase strike volume.

The results show that increases in the ranks of clerical workers (beta = .236), craftsmen (beta = .277), operatives (beta = .322), and laborers (beta = .665) tend to increase strike volume (see Table 15). Increases in the ranks of professionals (beta = .182), managers (beta = .191), and sales workers (beta = .134) have a weaker tendency to increase strike volume. Directionally and substantively, the findings for clerical workers support hypothesis nine but not eight. Directionally, the

findings for professionals, managers, and sales workers support hypothesis nine but not eight. Thus, growth in the ranks of all occupational groups tends to increase strike volume.

Increases in capitalization tend to increase strike volume (beta coefficients consistently above .250 for all occupational groups) in this time period (see Table 15). This finding supports hypothesis eleven directionally and substantively, but not hypothesis ten. Increases in concentration tend to have a small positive impact on strike volume (beta coefficients consistently above .130 for all occupational groups except laborers (beta = .059)). This finding supports hypothesis eleven directionally only, but neither hypothesis ten nor eleven substantively. Increases in bureaucratization tend to have little affect on strike volume (beta coefficients consistently between -.012 and .040 for all occupational groups). This finding does not support either hypothesis ten or eleven. Thus, in the overall 1950 to 1980 time period, increasing capital investment in technology tends to increase worker resistance to technological change. Similarly, the top four producers in any particular industry increasing the size and scale of their operations compared to other firms in the same industry tends to increase workers resistance.

The combined effects of changes in the seven occupational groups and the three labor process variables explain approximately 10% of the variation in changes in collective action in the regression equations for all occupational groups (R^2 consistently between .083 and .142 except laborers where 50% of the variation in changes in strike volume is explained (see Table 15). Thus, in the overall time period, there is a marked reduction in the power of the model to explain variations in changes in strike volume from the three specific time periods. However, when laborers are the occupational group in the equation, the power of the model to explain variations in changes strike volume remains quite good.

Summary

The general tendency, in the overall time period, is for the ranks of professionals, managers, clerical workers, sales workers, craftsmen, and operatives to increase and for the ranks of laborers to decline. Growth in the ranks of all occupational groups but laborers is best explained by the declining concentration of capital (twelve of twenty industries and a mean decline of 3.6%) and the increasing bureaucratization of production. The decline in the ranks of laborers between 1950 and 1980 is best explained by the impact of collective action and, to a lesser extent, by increasing concentration of capital.

The general tendency is for strike volume to decline in the overall time period (mean decline of 9,473). Factors that contribute most to this decline are the declining ranks of laborers (mean decline of 13,783) and the declining concentration of capital (mean decline of 3.6%).

Comparisons of the Four Time Periods by Hypotheses

In this section, the eleven hypotheses will be compared across the four time periods looking for relationships among the variables that hold with some systematic regularity. The presentation of these patterns will follow the presentation of the findings for each time period: 1) changes in the distribution of wage labor, 2) changes in the labor process, and 3) changes in collective action.

Changes in the Distribution of Wage Labor

Hypothesis one predicted that increases in the capitalization of technology would increase the ranks of professionals, managers, clerical workers, and sales workers, but decrease the ranks of craftsmen, operatives, and laborers. The findings for the 1950 to 1960 time period showed that increased capitalization increases the ranks of sales workers and decreases the ranks of the six

remaining occupational groups. The findings for professionals, managers, clerical workers, craftsmen, and laborers are substantively significant. In the 1960 to 1970 time period, increases in capitalization decreased the ranks of craftsmen and clerical workers and have little affect on changes in the ranks of the remaining five groups. The findings for craftsmen are substantively significant. In the 1970 to 1980 time period, increases in capitalization decreased the ranks of professionals, managers, clerical workers, sales workers, and craftsmen. Increased capitalization increases the ranks of laborers and has little affect on operatives. None of these findings, however, met the criteria for substantive significance. Finally, in the overall 1950 to 1980 time period, increases in capitalization tend to decrease the ranks of all occupational groups but laborers where there was no relationship. The findings for professionals, managers, clerical workers, and craftsmen met the criteria for substantive significance.

Thus, the following pattern emerges: increased capitalization tends to decrease the ranks of professionals, managers, clerical workers, and craftsmen, and there is a general tendency for increased capitalization to decrease the ranks of sales workers and

operatives. The Weberian and Structural Marxist¹⁶ perspectives argued that increasing capital investment in technology creates a demand for professional and technical workers to operate the new and sophisticated complex production technologies. Similarly, advanced production technologies create a demand for more managers, clerical workers, and sales workers because of the increased supervision and coordination requirements of the new technologies. The findings in this analysis, however, do not support such claims. Increasing capital investment in technology decreases the ranks of all occupational groups but laborers. These findings suggest that technological development in manufacturing industries in the post war era is not creating expansionary tendencies for white collar workers. And the Weberian and Structural Marxist perspectives suggest that increasing capital investment in technology would reduce the ranks of the three blue collar occupational groups. The findings suggest that this is occurring for craftsmen and operatives, but not for laborers, in the post war era.

¹⁶Some Structural Marxists (Edwards, 1979; Aqlietta, 1976; Braverman, 1974) have implied that recent technological developments in the labor process could possibly lead to a decreased demand for particular white collar groups in the industrial enterprise. In particular, they point to completely integrated systems of production decreasing the demand for intermediary levels of management and coordinating functions.

Hypothesis two suggested that increases in the concentration of capital would increase the ranks of professionals, managers, clerical workers, and sales workers, but decrease the ranks of craftsmen, operatives, and laborers. The findings for the 1950 to 1960 time period showed that increased concentration tends to decrease the ranks of craftsmen and has little effect on changes in the ranks of the remaining six occupational groups. This finding does not meet the criteria for substantive significance. In the 1960 to 1970 time period, increases in concentration increase the ranks of craftsmen, laborers, sales workers, and operatives, and have little effect on the remaining three occupational groups. The findings for craftsmen and laborers are substantively significant. In the 1970 to 1980 time period, increases in concentration tend to decrease the ranks of professionals, managers, clerical workers, craftsmen, and operatives, and have little effect on changes in the ranks of sales workers and laborers. The findings for all occupational groups but sales workers and laborers are substantively significant. Finally, in the overall 1950 to 1980 time period, increases in concentration tend to decrease the ranks of all occupational groups and these findings are substantively significant for all groups but laborers. However, for

three of the four time periods, the general tendency was for the concentration of capital to decline in manufacturing industries.

According to the Weberians and Structural Marxists, the concentration of capital should continue to increase in manufacturing industries. Weberians would argue that large scale production is the most rational form of producing because it allows for economies of scale. Structural Marxists would argue that the concentration of capital continues to increase because of the competition among capitalists inherent in the capital accumulation process. Two crucial problems immediately arise with the Weberian and Structural Marxist arguments. First, increasing concentration does not imply an increase in the ranks of the white collar occupational groups as predicted. Second, the notion that the concentration of capital will continue to increase is problematic. Thus, the two perspectives fail to make accurate predictions concerning the expansionary tendencies of white collar workers due to increased concentration and, second, the concentration of capital is not increasing as a general tendency in the post war era.

Hypothesis three predicted that increases in the bureaucratization of production would increase the ranks of professionals, managers, clerical workers, and sales

workers and decrease the ranks of craftsmen, operatives, and laborers. The findings for the 1950 to 1960 time period showed that increased bureaucratization increases the ranks of professionals, clerical workers, craftsmen, and operatives, and decreases the ranks of sales workers. Increased bureaucratization has little affect on changes in the ranks of managers and laborers. These findings are substantively significant for professionals and clerical workers. In the 1960 to 1970 time period, increased bureaucratization tends to decrease the ranks of professionals, managers, and operatives, increases the ranks of laborers, but has little affect on changes in the ranks of clerical workers, sales workers, and craftsmen. These findings are substantively significant for professionals, managers, operatives, and laborers. In the 1970 to 1980 time period, increased bureaucratization tends to increase the ranks of sales workers, decreases the ranks of craftsmen and laborers, and has little affect on changes in the ranks of the remaining four occupational groups. These findings are substantively significant for sales workers and laborers. For the overall 1950 to 1980 time period, increased bureaucratization tends to increase the ranks of professionals, managers, clerical workers, sales workers, craftsmen, and operatives, but has little affect on changes in the ranks of laborers. These

findings are substantively significant for professionals, managers, clerical workers, sales workers, and craftsmen. No consistent patterns emerge across the four time periods. However, the power of the model to explain changes in the distribution of wage labor was greatest in the 1950 to 1980 time period. The findings for the four white collar groups support hypothesis three while the findings for craftsmen and operatives do not. Thus, increasing the non-productive component of manufacturing industries tends to increase the ranks of all occupational groups but laborers. This latter finding is consistent with the Weberian and Structural Marxist explanations concerning the expansionary tendencies of white collar workers created by increased bureaucratization.

Hypothesis four was derived from a Marxist class conflict perspective and suggested that the impact of workers' collective action would increase the ranks of professionals, managers, and clerical workers, but decrease the ranks of craftsmen, operatives, and laborers. For the 1950 to 1960 time period, collective action tends to increase the ranks of professionals, managers, clerical workers, and craftsmen, and decreases the ranks of laborers. In the 1960 to 1970 time period, collective action tends to increase the ranks of professionals, managers, and operatives, and decreases the ranks of

laborers. In the 1970 to 1980 time period, collective action tends to increase the ranks of professionals, managers, craftsmen, and operatives, and decreases the ranks of laborers. For the overall 1950 to 1980 time period, collective action tends to decrease the ranks of clerical workers and laborers. Two systematic relationships emerge in three of the four time periods and one in all four time periods. These are that the impact of collective action tends to increase the ranks of professionals and managers and decreases the ranks of laborers. These findings are consistent with the class conflict model which suggests that, in part, the expansionary tendencies of professionals, managers, and clerical workers can be explained by the impact of workers' collective action. Similarly, in response to collective action, capital will reduce the ranks of craftsmen, operatives, and laborers. The findings for professionals, managers, and laborers, suggest that collective action does have important consequences for changes in the distribution of wage labor. Thus, ignoring the role of collective action for explaining changes in the distribution of wage labor may result in a serious theoretical and empirical hiatus.

Changes in the Labor Process

The class conflict model presented in Chapter I suggested that the impact of workers' collective action would lead to increases in capitalization, concentration, and bureaucratization. Hypotheses five through seven address these changes respectively. Hypothesis five suggested that the impact of collective action would increase capitalization. The findings for all four time periods showed that, directionally and substantively, the hypothesis was supported. Thus, as the impact of collective action increases in manufacturing industries, the amount of capital invested in technology per worker increases.

Hypothesis six suggested that the impact of collective action would increase concentration. This hypothesis was supported only in the 1960 to 1970 time period. In the 1970 to 1980 time period, collective action has a small inverse affect on concentration. For the remaining two time periods, the impact of collective action tends to decrease concentration. These findings are substantively significant in both time periods. Thus, the general tendency in manufacturing industries in the post war era was for the impact of collective action to decrease the dedication of capital and personnel resources to production by the top four firms in any particular industry compared to other firms within the same industry.

Hypothesis seven suggested that the impact of collective action would increase bureaucratization. In all three specific time periods, this hypothesis was supported. In the overall 1950 to 1980 time period, collective action has little affect on changes in bureaucratization. Thus, as the impact of collective action increases in manufacturing industries, the non-productive component of manufacturing industries and bureaucratic control over the labor process increases.

Changes in Collective Action

Hypotheses eight through eleven address the relationships between changes in the ranks of professionals, managers, clerical workers, and changes in strike volume. Hypothesis eight (Weberian) predicted that increases in the ranks of these three occupational groups would decrease collective action. Hypothesis nine (Marxist) suggested that increases in the ranks of professionals, managers, and clerical workers would increase collective action. For the 1950 to 1960 time period, increases in the ranks of all occupational groups tend to increase strike volume. The findings for professionals, clerical workers, and laborers are substantively significant. In the 1960 to 1970 time period, increases in the ranks of managers, clerical

workers, craftsmen, operatives, and laborers tend to increase strike volume. The findings for craftsmen and laborers are substantively significant. In the 1970 to 1980 time period, increases in the ranks of professionals, managers, clerical workers, craftsmen, and operatives tend to decrease strike volume. These findings are substantively significant for professionals only. For the overall 1950 to 1980 time period, increases in the ranks of all occupational groups tend to increase strike volume. These findings are substantively significant for clerical workers, craftsmen, operatives, and laborers. Thus, in three of the four time periods, increases in the ranks of managers, clerical workers, and laborers tend to impact positively on collective action. These relationships are substantively significant only for laborers in the three time periods. However, there is a general tendency for increases in the ranks of managers, clerical workers, craftsmen, and operatives to lead to increases in the impact of collective action. These findings tend to support hypothesis nine (Marxist) for managers and clerical workers, but not hypothesis eight (Weberian). Weberians tend to view administrative hierarchies as ideologically neutral and thus they fail to acknowledge that traditional blue collar workers may intensify their resistance to the increased presence of white collar

workers that fill the positions of control, supervision, monitoring, and inspecting, within the administrative hierarchy.

Hypotheses ten (Weberian) and eleven (Marxist) address the relationships between changes in the three labor process variables and changes in workers' collective action. Hypothesis eleven suggested that increases in capitalization, concentration, and bureaucratization would increase strike volume while hypothesis ten suggested the opposite. For the 1950 to 1960 time period, increases in capitalization tend to increase strike volume. Increases in bureaucratization and concentration tend to have little affect on strike volume. In the 1960 to 1970 time period, increases in capitalization tend to increase collective action and increases in concentration and bureaucratization tend to decrease strike volume. Only the findings for bureaucratization are substantively significant. In the 1970 to 1980 time period, increases in capitalization tend to increase strike volume and increases in bureaucratization tend to decrease strike volume. Both of these findings are substantively significant. Increases in concentration tend to have little affect on collective action in this time period. For the overall 1950 to 1980 time period, increases in capitalization and concentration tend to increase strike

volume. Only the findings for capitalization are substantively significant. Increases in bureaucratization have little effect on collective action in this time period. Only one consistent finding emerges with regularity across the four time periods, increased capitalization tends to increase workers' collective action. This finding supports hypothesis eleven only with regard to capitalization. Thus, workers apparently do not view technological growth as ideologically neutral because the greater the expansion of technology, the greater will be workers' resistance. The findings for the effects of increased bureaucratization and concentration on collective action do not support either the Weberian or Structural Marxist arguments.

Summary

In comparing these findings, some relationships emerge with some degree of regularity across the four time periods. These are: 1) the impact of collective action tends to increase capital investment in technology; 2) the impact of collective action tends to increase the bureaucratization of production; 3) the impact of collective action tends to decrease the concentration of capital; 4) the impact of collective action tends to increase the ranks of professionals and managers and

decrease the ranks of laborers; 5) increased capitalization of technology, for the most part, tends to decrease the ranks of professionals, managers, clerical workers, and craftsmen (and as a general tendency sales workers and operatives); 6) increases in the ranks of managers, clerical workers, craftsmen, operatives, and laborers tend to increase the impact of collective action; and 7) increased capitalization of technology tends to increase the impact of collective action. Two additional findings will be added for discussion purposes in the next chapter. These findings are added because they are quite substantial in the overall 1950 to 1980 time period and the model also had the most predictive power for explaining changes in wage labor in this time period. These additional findings are: 8) increased concentration of capital tends to decrease the ranks of all occupational groups but laborers; and 9) increased bureaucratization of production tends to increase the ranks of all occupational groups but laborers. It would be virtually impossible to attempt to account for all the variations in the findings. Thus, the relationships presented above shape the discussion in the next chapter.

CHAPTER IV

DISCUSSION OF THE RESEARCH FINDINGS

The class conflict model described in Chapter I stressed the notion that workers' collective action, viewed at different points across time, can be seen as a barrier to capital accumulation, as well as a response to changes in the labor process and the distribution of wage labor. As a barrier, collective action must be overcome if capital accumulation is to expand. For example, strikes are a means to bargain for a shorter working day. Once workers have shortened their working time, capitalists must intensify the labor process through organizational and technological changes to regain the lost surplus value. Workers' collective action, then, encourages changes in the labor process. With each change in the labor process, there are changes in the distribution of wage labor in the production process.

But changes in the labor process and the distribution of wage labor feed back and workers resist further changes by engaging in collective action. These continual changes in the labor process threaten the everyday situation of wage labor by dispelling all fixity and security in their lives, by removing the instruments of labor from the workers' hands, by piling human labor with the power of

machines, and by suppressing the detail function of the worker (Marx, 1967: 487). Marx (1967: 429) notes that the first signs of workers' rebellion against the technical means of production was their attacks against machinery such as the Luddite movement.

Class conflict, then, is a process. Workers, via collective action, create barriers to capital accumulation that must be overcome. Barriers to accumulation force capital to transform the labor process and the distribution of wage labor to increase capitalist control over the labor process and worker productivity. Workers, in turn, respond to changes in the labor process and the distribution of wage labor by intensifying their resistance to the domination of capital.

This chapter will spell out the implications of the salient results and in turn assess the relative merits of the class conflict model in relation to the conventional approaches represented by the Weberians and Structural Marxists.¹⁷ Both perspectives tend to utilize the United

¹⁷One modification of the results will be made for discussion purposes. Relationships among the variables that were identified only as general tendencies in Chapter III will now be included in this discussion as major findings. I have chosen to include these general tendencies because the data suggest that an increase or decrease of .100 standard deviation in the ranks of any of the occupational groups typically involves an increase, or decrease, of over 1,000 workers. For example, analysis of the 1970 to 1980 time period showed that changes in capitalization were inversely related to changes in the ranks of all occupational groups but laborers. The betas

States as the main example in their arguments. The twenty Two-Digit manufacturing industries used in the present study, then, constitute the theoretical population generally assumed by Weberians and Structural Marxists. Generalizations of these findings to other advanced industrial societies should be made with caution due to cultural diversity and differences in political and economic structures. Similarly, generalizations to other sectors of the United States economy would be a questionable use of the findings.

for the six groups ranged from $-.093$ for operatives to $-.187$ for clerical workers. A decline of $.100$ standard deviation would mean a decline of 25,000 workers for these six groups. This would be a substantial decline in the labor force and would have tremendous social implications for society and the people who are losing their jobs. Similarly, a change of $.100$ in one standard deviation of change in the volume of strikes is frequently larger than the mean change in strike volume for the twenty industries. Thus, consistent relationships found on the feed-back side of the model with a magnitude of $.100$ will also be included in the discussion. Basically, this means that the inverse effect that increased capitalization has for sales workers and operatives is now included in the discussion along with professionals, managers, clerical workers, and craftsmen. The inverse effect that changes in concentration has on the ranks of laborers will be included along with the other six occupational groups. The positive impact that collective action has on changes in the ranks of managers is now included along with professionals. Finally, the positive impact that changes in the ranks of managers, craftsmen, and operatives have for changes in collective action will be discussed along

Changes in the Distribution of Wage Labor

Four consistent findings emerged in the analysis that contribute to explaining changes in the distribution of wage labor since World War II in U.S. manufacturing industries. First, increases in the capitalization of technology tend to decrease the ranks of all occupational groups but laborers. Second, increases in the concentration of capital tend to decrease the ranks of all occupational groups. Third, increases in the bureaucratization of production tend to increase the ranks of all occupational groups but laborers. Finally, the impact of workers' collective action tends to increase the ranks of professionals and managers but decreases the ranks of laborers. There were, however, no systematic indirect effects of workers' collective action on changes in the distribution of wage labor mediated through changes in the three labor process variables.

Capitalization and Changes in Wage Labor

Increases in the capitalization of technology tend to decrease the ranks of professionals, managers, clerical workers, and craftsmen. The relationship between changes in capitalization and changes in the sales and operative

with clerical workers and laborers.

occupations varied in the specific time periods,¹⁰ but as a general tendency (1950 to 1980) they were negative. Thus, increasing capital investment in technology, controlling for changes in concentration, bureaucratization, and collective action, tends to decrease the ranks of all occupational groups but laborers.

These findings do not support the Weberian and Structural Marxist arguments that technological development and growth creates expansionary tendencies for white collar workers. Following both perspectives, increasing capital investment in technology does tend to reduce the ranks of craftsmen and operatives. Interestingly enough, increased capital investment in technology does not reduce the ranks of laborers with any systematic regularity in the four time periods. A mainstay of the Weberian argument has always been that technological growth eliminates drudgery and repetitive

¹⁰Changes in capitalization may have quite different effects on sales workers than other occupational groups. Traditionally, capitalization has been viewed primarily as technological development that increases the productivity of workers. In the post war era, capitalization in the most general sense means the principle of automation and its application to all aspects of work in the industrial enterprise. Capitalization in new processes of production may generate a demand for sales workers at particular times to market the products made with new processes. In short, they must sell potential buyers on the quality of products made with new technological processes. Once the market is stabilized the demand for sales workers may decrease.

work in the production process. The findings for laborers do not support such a claim. The four occupational groups most negatively affected by increased capitalization are professionals, managers, clerical workers, and craftsmen. With the exception of craftsmen, these workers are considered by Weberians to be the rising forces of the new skilled labor force.

The Structural Marxists typically argue that, in the historical process of capitalist development, technological growth has expanded the bureaucratic organization of production and created expansionary tendencies for white collar workers. This was especially true when the assembly line was the primary form of technical control. Edwards (1979) has argued that computer technology extends the potential for managerial control because hierarchical computer control buttresses administrative hierarchical control. Apparently, advanced technologies are now becoming the middle and lower levels of technical management and the computer hierarchies are replacing the human administrative hierarchies rather than merely reinforcing them. Thus, the findings that the independent effects of increasing capital investment in technology reduces the ranks of all occupational groups does not support the Weberian and Structural Marxist arguments concerning the expansionary tendencies of white collar workers.

Bureaucratization and Changes in Wage Labor

A central component of the Weberian and Structural Marxist explanations for changes in the distribution of wage labor is that increases in the non-productive component of manufacturing firms increase the ranks of white collar workers and decrease the ranks of blue collar workers. Thus, the independent effects of increased bureaucratization should show that, as the non-productive component of manufacturing increases, the ranks of white collar workers increase and the ranks of blue collar workers decrease.

But the relationships between increases in the bureaucratization of production and changes in the distribution of wage labor varied substantially in each of the specific time periods, even when controlling for changes in capitalization, concentration, and collective action. For example, increased bureaucratization increased the ranks of the professional, clerical, craft, and operative occupations in the 1950 to 1960 time period and decreased the ranks of sales workers. In the 1960 to 1970 time period, increases in bureaucratization increased the ranks of laborers but decreased the ranks of professionals managers, and operatives. Moreover, the general tendency was for bureaucratization to decline in

manufacturing industries in this time period which indicates that the development of bureaucracy is not a linear process. In the 1970 to 1980 time period, increases in bureaucratization increased the ranks of sales workers and decreased the ranks of craftsmen. In the overall 1950 to 1980 time period, increases in bureaucratization increased the ranks of all occupational groups but laborers. These findings suggest that the effects of increased bureaucratization are somewhat historically bounded, and that the bureaucratization of production may not have a linear development. Plus, the growth of white collar workers associated with increasing bureaucratization may take place only within a specific socio-historical context.

Only in the overall 1950 to 1980 time period do we find any consistent support for the Weberian and Structural Marxist perspectives concerning the expansion of white collar workers as a direct result of increased bureaucratization. At the same time, however, the two perspectives are not supported by the increases in the ranks of craftsmen and operatives resulting from increased bureaucratization. Thus, increasing the non-productive component of manufacturing industries has expansionary tendencies for all occupational groups but laborers between 1950 and 1980.

Capitalization, Bureaucratization and Changes in Wage Labor

But the Weberian and Structural Marxist perspectives suggest that increased bureaucratization, the growth of white collar workers, and the decline in blue collar workers, should be greatest in industries that are capitalizing most in new productive technologies. Thus, implied by the two perspectives is the notion that there is a positive relationship between changes in capitalization and bureaucratization, i.e. the greater the capital investment in technology, the greater will be the increase in the non-productive component of manufacturing industries.

Correlational analyses of changes in capitalization and bureaucratization across time periods suggest a positive relationship between increases in capital investment in technology and increases in the non-productive component of manufacturing industries. In the 1950 to 1960 time period, there was an inverse relationship between changes in capitalization and bureaucratization ($r = -.197$). Changes in capitalization between 1950 and 1960 have a substantial positive lag impact on changes in bureaucratization between 1960 and 1970 ($r = .745$), and changes in bureaucratization between 1970 and 1980 ($r = .730$). There is a positive

relationship between changes in capitalization and bureaucratization in the 1960 to 1970 time period ($r = .400$), with a small lag affect for changes in capitalization between 1960 and 1970 and changes in bureaucratization between 1970 and 1980 ($r = .124$). In the 1970 to 1980 time period, there is a small positive correlation between changes in capitalization and bureaucratization ($r = .080$). For the overall 1950 to 1980 time period, there is a positive correlation between changes in capitalization and bureaucratization ($r = .300$). These findings suggest that, at least in part, there is a positive relationship between technological growth and the expansion of the non-productive component. But there is no reason to assume that increasing the non-productive component of the work force in industries, which also have large increases in capital investment in technology, automatically leads to the growth of white collar workers in manufacturing industries.

The 1950 to 1980 time period was used to test for the interaction effects of capitalization and bureaucratization on changes in the distribution of wage labor. Table 16 presents the results of changes in concentration, collective action, and the interaction effects of capitalization and bureaucratization on changes in the distribution of wage labor. Changes in

capitalization is a dummy variable consisting of the ten industries with the largest increases in capitalization¹⁹ and the ten industries with the smallest increases in capitalization.²⁰ These results show that low capitalization increases in bureaucratization (LCBUR58) tend to increase the ranks of professionals (beta = .676), managers (beta = .645), clerical workers (beta = .624), sales workers (beta = .351), craftsmen (beta = .598), operatives (beta = .359), and laborers (beta = .104) between 1950 and 1980 (see Table 16).

High capitalization increases in bureaucratization (HCBUR58) tend to increase the ranks of sales workers (beta = .512), decrease the ranks of managers (beta =

¹⁹The ten industries that have the largest increases in the capitalization of technology between 1950 and 1980 in rank order are; petroleum and coal products, chemical, paper, primary metals, tobacco, stone products, food, lumber, transportation equipment, rubber. Four of these, petroleum, paper, chemical, and primary metals, were among the top ten in every time period in the analysis. Of the remaining six, all but rubber, were among the ten industries with the largest changes in capitalization for three of the four time periods, while rubber was in the top ten for two time periods (see Appendix IX). Similarly, many of these industries use continuous process technology and/or are moving toward it.

²⁰The ten industries with the smallest increases in capitalization between 1950 and 1980 in rank order from the least capitalization are; apparel, leather, furniture, miscellaneous manufacturing, printing, textile, fabricated metals, electrical, instruments, and machinery. Machinery and instruments were among the ten industries with the largest increases in capitalization in two of the four time periods, while electrical, textile, and instruments were among the ten with the largest increases in capitalization in one of the four time periods (see

-.141, craftsmen (beta = -.146), operatives (beta = -.251), and laborers (beta = -.158), but have little affect on changes in the ranks of professionals (beta = .025) and clerical workers (beta = -.046). Except for sales workers, the positive combined effects of low capitalization increases in bureaucratization on changes in the six remaining occupational groups is eliminated with high capitalization increases in bureaucratization.

These findings raise some important questions about the organizational structure of capital intensive industries since World War II. At the very least, the findings suggest that bureaucratization in capital intensive industries has different consequences for changes in the distribution of wage labor than in less capital intensive industries. In fact, the findings show that bureaucratization in less capital intensive industries continues to reproduce labor intensity throughout the industry -- a continuing increase in the ranks of all occupational groups in the production process. On the other hand, increases in bureaucratization in capital intensive industries, industries with large increases in capital investment in

Appendix IX). These industries are more apt to produce a wide variety of products with tremendous product complexity. Therefore, it may be that movement in technology is limited in these industries to the mass production of similar products with frequent changeovers in tooling and design set-ups.

TABLE 16
Regression Equations for Occupational Groups on Labor Process Variables and Strike Volume with Interaction Terms (1970-1980)

	PROPS		MANUS		CLERS		SALES		CHAFTS		OPERS		LABS	
	b	beta	b	beta	b	beta	b	beta	b	beta	b	beta	b	beta
LCRUS	30748.592	.674c	12821.409	.645c	-16522.806	-.624c	1922.234	.251	17898.583	-.598c	29426.645	.359	1036.488	.104
RCRUS	5127.578	.025	-706.384	-.141d	1171.754	-.046d	2685.133	.512	-1371.888	-.146d	-13847.856	-.215	-2148.953	-.158
COMS	-3187.284	-.271	-1860.335	-.323d	-2340.685	-.345d	-503.485	-.356d	-2892.130	-.374d	-11731.818	-.354d	-749.047	-.165
VOLRS	.038	.036	-.000	-.000	-.032	-.032	-.008	-.064	-.009	-.013	-.107	-.056	-.217	-.531b
R ²	.385		.446		.505		.367		.293		.437		.637	
LC Intercept	-37844.291		4151.162		6587.563		1517.442		-2613.766		-7944.195		13036.140	
MC Intercept	14046.026		26077.019		10466.310		-12356.996		45303.180		77464.881		3663.718	
F	1.749		2.252		2.854		1.623		1.812		2.171		2.176	
Sign. of F	.188		.106		.056		.216		.175		.116		.116	

Significance of t: a < .01 b < .05 c < .10 d < .15 e < .20

technology, tend to decrease the ranks of managers, craftsmen, operatives, and laborers, increase the ranks of sales workers, and have no effect on changes in the ranks of professionals, and clerical workers. In these industries, human labor is probably being supplemented by machines, wherever possible, and this effect is most dramatic on the blue collar occupational groups.

In sum, the findings suggest that the Weberian and Structural Marxist arguments concerning the interaction of technological growth and increased bureaucratization on changes in the ranks of professionals, managers, and clerical workers are supported only in the less capital intensive industries.

The findings for the direct effects of capitalization and the interaction effects of capitalization and bureaucratization on changes in the distribution of wage labor are two of the most significant findings in the analysis. They question most theoretical formulations of labor process development and industrialization concerning the effects of technological growth on organizational structure and the distribution of wage labor. The Weberians and Structural Marxists may have adequately described these relations and the expansion of white collar workers prior to World War II. But they fail to do so in the post war era.

With some industries greatly expanding their capitalization since World War II, capitalists may have different options for controlling the production process. Numerically controlled, continuous process, and computer controlled technology tend to provide their own monitoring devices through feed-back systems. Similarly, quality control, production output, and the pace of labor are regulated by the technology itself (as Edwards suggests, the pace and direction of production and the evaluation of work performance is embedded in the technology) and, therefore, may afford capital the option of eliminating lower and intermediary levels of supervision, coordination, and monitoring of the production process.²¹ Control over the production process is being localized in

²¹White collar and blue collar occupational categories are not completely analogous to the distinction made between productive and unproductive labor. Amsden (1981), in comparing international data on productive versus unproductive labor, suggests that the category "operative" in International Censuses is analogous to the distinction made between productive and unproductive labor in the Census of Manufactures. Productive labor, or operatives, refers to all employees directly engaged in production or related activities of the establishment. This includes any clerical or supervisory personnel whose function is to record or expedite any step in the production process. Employees engaged in similar activities ancillary to the main activity of the establishment are also considered productive labor (Amsden, 1981: Appendix I). The Census of Manufactures uses the productive worker distinction in comparison to total employed. Thus, the measure of bureaucratization used in the analysis, ratio of non-productive to total employed, would not correspond directly with a ratio of white collar workers to total employed.

machines and decisions are being made in the "front" office, and thus the need for lower and intermediary levels of managerial authority is reduced. The inverse effects that the interaction between large increases in capital investment in technology and increases in the non-productive component of the work-force has on the ranks of managers supports this interpretation.

In less capital intensive industries, the combined effects of capitalization and bureaucratization may not afford capital the same opportunities for controlling the production process, or for substituting machines for human labor. In these industries, small batch work processes may be the central feature of production which may limit the ability of capital to automate and centralize control over the complete production process or large segments of it.

Brecher (1979), in an analysis of the electrical products industry, focuses on some of the problems capital meets with technological development when many work processes still require one-of-a-kind or small batch production. The electrical industry provides a good example for the ten industries with the smallest increases in capital investment in technology because it shows an interesting paradox. The electrical products industry ranked thirteenth for increases in capital investment in

technology and, yet for the overall 1950 to 1980 time period, was fifth in increases in the non-productive component of the work force. In three industries, electrical, machinery, and instruments, the level of capitalization is not large but these industries rank among the top five for increased bureaucratization. Thus, control over the production process is possibly being enhanced through increased bureaucratic control rather than expanding technical control in industries where batch production is still a central feature of the production process.

The findings of this analysis suggest that the growth of technology accompanied by a continual expansion of white collar workers is not an accurate description of manufacturing industries in the post war era.²² The conventional Weberian and Structural Marxist positions need to be reevaluated. Indeed, technological growth in the future may decrease rather than increase the ranks of all occupational groups, but in particular white collar workers are now being eliminated along with blue collar workers.

²²It should be pointed out that although Structural Marxists describe the effects of modern technology on changes in the distribution of wage labor quite similar to the Weberians, they acknowledge that there are limitations to the growth of the new middle class and that these limitations may already be slowing down this process (Burris, 1981; Edwards, 1979).

Concentration and Changes in Wage Labor

The third consistent finding in the analysis is that increases in the concentration of capital tend to decrease the ranks of all occupational groups. The occupational groups most negatively affected by increased concentration are the craft, operative, clerical, manager, and professional groups.

The Weberian and Structural Marxist positions assumed that the concentration of capital would continue to increase in manufacturing industries. Thus, the two theses argued that the increasing concentration of capital suggests the largest four firms in any particular industry would continuously expand the size and scale of their production, marketing, and distribution operations in comparison to other firms within the same industry. It was assumed that as the concentration of capital increased in any particular industry, the ranks of white collar workers engaged in supervising, coordinating, planning, marketing, and distribution functions would also increase. Instead of concentration increasing as the Weberians and Structural Marxists expected, industrial concentration for the twenty manufacturing industries declined in twelve between 1950 and 1980.²³ This suggests that, as a general

²³In the 1950 to 1960 time period, the concentration of capital declined in eight industries. In the 1960 to 1970

tendency, firms within an industry are becoming more similar in the size and scale of their operations and the top four producers are losing ground.

In order to root deeper into these relationships in hopes of finding a cogent explanation for the findings, two additional variables will be introduced into the analysis: changes in the number of establishments within an industry and changes in the number of tax returns. The former taps the changes in the number of new facilities within the industry while the latter may provide a measure of firms moving into or out of the industry. The two variables are not measuring the same phenomena. It is quite possible that already existing firms may open new facilities, a firm moving into the industry may open more than one facility, or that a firm can be bought out and then its operations expanded by opening new facilities.

Changes in the number of establishments and the number of tax returns were computed between 1950 and 1980 and then correlated with changes in the concentration of capital, for the same time period, and with one another. The correlational analyses indicate a somewhat inverse relationship between changes in the concentration of capital, changes in the number of establishments ($r =$

time period, the concentration of capital declined in only three industries. In the 1970 to 1980 time period, the concentration of capital declined in thirteen industries (see Appendix III).

-.337), and changes in the number of tax returns ($r = -.158$). These findings suggest a tendency by the four major producers, in industries where the concentration of capital is increasing, to eliminate market competitors, or force them to close facilities, which in all likelihood tends to decrease the ranks of all occupational groups in those industries.

Conversely, in industries where the concentration of capital is declining, the number of establishments ($r = .337$) and the number of tax returns ($r = .158$) increased. This suggests that new facilities are being opened. There is a positive correlation between changes in the number of establishments and changes in the number of tax returns ($r = .701$). Many of the new establishments, in all likelihood, are being opened by firms moving into the industry, i.e. diversification.

Throughout the post war era, industrial, geographical, and product diversification has been a key feature of the American economy (Bluestone and Harrison, 1982; Winslow, 1973; Spruill, 1982; Sheperd, 1970; Caves, 1973; Gort, 1962). The wave of diversification and conglomerate mergers since World War II exhibit different characteristics than the horizontal and vertical mergers that took place in the late 1800's and from the mid 1920's through the early years of the depression. The horizontal

combinations in the 1890's and early 1900's produced a major product which identified corporations, such as U.S. Steel, American Tobacco, International Harvester, and General Electric. The objective was to eliminate competitors and, in many instances, firms were bought out and then their operations closed down. The second wave of mergers and acquisitions absorbed into the largest firms the companies that either supplied their resources or unfinished goods, and distributed their final products (Bluestone and Harrison, 1982). Both of these processes facilitated the concentration of capital. Diversification, however, implies that large manufacturing firms are no longer just vertically integrated but that business activities and capital investments are being spread into different geographical areas, product lines, and industries.

The combined effects of diversification and/or the expansion of operations by firms other than the top four producers, while simultaneously decreasing the concentration of capital, are generating new facilities and employment opportunities for all occupational groups. This explanation is supported by the positive relationship between the declining concentration of capital and increases in the ranks of all occupational groups.

Collective Action and Changes in Wage Labor

The fourth substantial finding that contributes to an explanation for changes in the distribution of wage labor is the direct effect of workers' collective action. Workers' collective action fluctuates but was positively related to changes in the number of persons employed as professionals and managers in all three specific time periods. Ironically, workers' collective action was inversely related to changes in the number of persons employed as laborers in every time period of the analysis.

Overall (1950 to 1980), increases in the bureaucratization of production contribute more to explaining increases in the ranks of professionals, managers, and clerical workers. Workers' collective action, however, was positively associated with increases in the bureaucratization of production in all three specific time periods. As a response to collective action, capital probably expands the span of control at the point of production by enlarging the supervisory, monitoring, and coordinating functions in direct and indirect production activities. The findings indicate then, that the continuing growth of professionals and managers in manufacturing industries may be dependent on continuing high levels of industrial conflict, not the rationalization-efficiency hypothesis so commonly posited

by Weberian management theory. Rather, the findings are more in line with Marx's class conflict model which suggests the increasing ranks of special wage laborers engaged in controlling the labor process are a direct response to intensified worker resistance (Marx, 1967: 331-332). Similarly, Braverman (1974) and Edwards (1979) suggest that the ranks of professionals, managers, and clerical workers expand in the labor process because of changes in the structures of control. These findings provide some support for these claims at the aggregate level of manufacturing industries.

The inverse effect that collective action has for changes in the ranks of laborers is more difficult to explain. Ironically, the participation of unskilled workers in collective action is having a detrimental effect on their jobs in manufacturing industries. Laborers began to participate more in collective action when the CIO started organizing the ranks of semi-skilled and unskilled workers. These organizing efforts continued after the AFL-CIO merger in the mid 1950's. Laborers, in all likelihood, were struggling to advance their positions and interests within manufacturing industries. Capital, in response to the emergent militancy of unskilled workers in the 1940's and 1950's, may have been radically reorganizing work tasks in the labor process that

drastically reduced their dependence on unskilled workers. Of course, unskilled workers did not achieve long term outcomes that benefited them in the course of collective action. The findings of this analysis suggest that this may be a plausible explanation for the negative effect that the impact of collective action has on changes in the ranks of laborers.

Collective Action and Changes in the Labor Process

The class conflict model in Chapter I stressed the notion that the impact of workers' collective action contributes to explaining changes in the distribution of wage labor directly, and indirectly by partially determining changes in the labor process. Weberians tend to completely ignore collective action as a determinant of the changes that have occurred in the methods and organization of production in the process of industrialization. Structural Marxists, on the other hand, tend to view collective action as a response to changes in the labor process. In neither perspective is sufficient recognition given to the role that workers' collective action plays in shaping the development of the labor process and subsequent changes in wage labor.

The findings suggest that collective action is an important determinant of transformations in the labor

process. The impact of collective action is positively associated with increased capitalization of technology in every time period of the analysis. Similarly, the impact of collective action tends to increase the bureaucratization of production in the three specific time periods. However, the impact of collective action tends to decrease the concentration of capital. This latter finding contradicts the hypothesized relationship anticipated by the class conflict model which suggested that collective action should lead to increased concentration. These findings indicate that the expansion of technical and bureaucratic control over the labor process are as much a response to the barriers to capital accumulation erected via collective action as they are to either the mandates of rational production or competition demands to capitalists.

Three interesting relationships emerge in relation to how workers' collective struggles shape the development of the labor process and subsequent changes in the distribution of wage labor. First, workers, via their collective acts, partially determine the extent to which technical control is expanded over the labor process and the subsequent decline in their own ranks. Thus, by engaging in collective action and typically to obtain short-term outcomes beneficial to their interests, workers

are participating in creating the mechanizing tendency of modern industry and the subsequent elimination of their means of subsistence as a long-term consequence of their collective acts.

Second, workers, via their collective acts, are partially creating the tendency for bureaucratic control to expand over the production process, and increased bureaucratization is a major factor for explaining growth in the ranks of white collar workers. Marx argued that, under capitalist social relations, there is a two-fold nature to capitalist control by reason of the two-fold nature of the process of production itself -- "which, on the one hand, is a social process for producing use-values, on the other, a process for creating surplus-value" (Marx, 1967: 332). A certain amount of control, according to Marx, is made necessary by the co-operative character of the labor process. This control may be exemplified in the development and elaboration of the bureaucratization of production and subsequent increases in the ranks of white collar workers -- and may even be rational from a Weberian standpoint. This control is not identical with the different work of control, Marx reasoned, which is "necessitated by the capitalist character of that process and the antagonism of interests between capitalist and labourer" (Marx, 1967: 332). Thus,

administrative hierarchies of control over the labor process emerge and expand for two reasons. First, the cooperative character of the labor process necessitates a certain amount of control and coordination over production. Second, the intensity of workers' resistance to the domination of capital leads to an expansion of capitalist control because of the necessity for capital to overcome this resistance by counterpressure (Marx, 1967: 331). The findings of this analysis suggest that Marx's position may be accurate. The impact of collective action tends to increase bureaucratic control over the labor process which leads to subsequent increases in the ranks of white collar workers. Thus, the expansionary tendencies of white collar workers, in the post war era, cannot be attributed solely to the rationality bureaucracy brings to the labor process. Rather, these expansionary tendencies can be partly attributed to the need for capitalists to overcome intensified worker resistance and the barriers to capital accumulation erected via collective action.

The final significant finding in relation to how collective action shapes the labor process and subsequent changes in wage labor is the relationship between collective action and the concentration of capital. The impact of workers' collective action tends to decrease the

concentration of capital which subsequently tends to increase the ranks of all occupational groups. The concentration of capital, it would seem, generates contradictory tendencies in the process of capitalist development by fostering trade union development and intensifying worker resistance to the domination of capital.²⁴ In many industries, the emergence of national trade unions, coupled with intensified workers' struggles, may have altered the balance of power between individual capitalist firms and workers within these industries. The large and highly organized trade unions that emerged from World War II had the power to hold individual capitalist firms hostage to their demands via the real and potential impact of collective action. In many industries, large unions, such as the United Automobile Workers (UAW), United Steel Workers (USW), International Union of Electrical Workers (IUE), United Rubber Workers (URW), Oil, Chemical, & Aerospace Workers (OCAW), etc., could shut down an individual capitalist operations nationwide. And, in rare instances, workers in these unions could bring an entire industry to its knees.

²⁴This argument is not new to the Structural Marxist thesis (Edwards, 1979; Burris, 1981) which argues that the concentration of capital fosters labor militancy.

Major industrial producers needed to counter the growing power of national unions and the intensified militancy of workers in large industrial firms. They needed to tip the balance of power between workers and individual capitalist firms within industries back in their favor. Industrial, geographical, and product diversification provided a strategy that could segment and divide workers along numerous lines (Brecher, 1979), as well as restoring the inequality of the collective bargaining situation between national labor unions and multi-national conglomerates (Bluestone and Harrison, 1982; Jennings, 1970; Caves, 1973).

Bluestone and Harrison (1982), for example, argue that capital has differentially expanded and contracted facilities to different parts of the country, and the world, in response to large industrial unions and militant workers. New managerial strategies, especially by large multi-plant and multi-product corporations, involve the operation of multi-state and multi-regional systems of plants and subcontractors. One of the more recent managerial strategies after World War II, according to Bluestone and Harrison, is parallel production. Major firms in the most powerful industries created essentially duplicate production facilities for the same components and even for some assembly operations. This phenomena,

according to Bluestone and Harrison, is especially prevalent when the original facility is a union shop. An anti-union climate is an extremely important factor for management when considering the location for new plants. Bluestone and Harrison (1982: 165) summarize from research on industrial location practices of the Fortune 500 and quotes made by members of the business community. Thus, Bluestone and Harrison argue, when there is a strike at the original facility, capital can redirect more production to the non-union facility.²⁵ This allows capital to not only break strikes, but to effectively use the threat of shifting production to these non-union shops as a bargaining lever at the original facility.

Capital, then, may be attempting to offset limitations to capital accumulation created by the collective action of large militant trade unions by diversifying their operations and /or moving them to different geographical locations. The decline in the concentration of capital, as a general tendency in the post war era, may reflect the diversification process. Diversification, in turn, has positive effects for changes in the ranks of all occupational groups because of new start-ups and/or expanding operations in different

²⁵Bluestone and Harrison argue that unions have only been able to organize one out of every four workers in the new plants.

geographical locations, in different product lines, and in different industries. The findings of this analysis tend to provide additional support for the argument that diversification, in part, is a managerial strategy to segment and divide workers to offset the emergent power of large, militant, trade unions (Bluestone and Harrison, 1983; Brecher, 1979; Jennings, 1970). Thus, the tendency for the concentration of capital to decline in the post war era is partially attributable to the impact of workers' collective action. Declining concentration, subsequently, tends to increase the ranks of all occupational groups. But, according to Bluestone and Harrison (1982), the jobs that are being created tend, for the most part, to be non-union jobs and the power of organized workers is diminishing.

Weberians and Structural Marxists may have misspecified their models of the changing distribution of wage labor. Workers' collective action does play an important role in the development of the labor process and the subsequent changes in wage labor associated with labor process transformations. For Weberians, these findings indicate that the changes in the methods and organization of production that have occurred since World War II are partly attributable to worker resistance and, as such, the changes cannot be seen as ideologically neutral.

Structural Marxists must begin to view collective action as a creative factor in the process of capitalist development. Workers do not just respond to changes in the labor process, but actually participate, within a constellation of contending groups, in creating the changes that occur in the methods and organization of production in the process of capitalist development.

Summary

Several important factors emerged in the discussion. First, the Weberian and Structural Marxist perspectives have not adequately explained the relationships between technological growth, increasing concentration of capital and changes in the ranks of white collar workers in U.S. manufacturing industries between 1950 and 1980. Apparently, increased capitalization and concentration are no longer creating expansionary tendencies for white collar workers. Second, the two perspectives have not adequately explained the relationship between increased bureaucratization and changes in the ranks of craftsmen and operatives. Third, neither thesis has adequately described the interaction effects of technological growth and increased bureaucratization on changes in the ranks of professionals, managers, and clerical workers. Moreover, the two perspectives have ignored an important determinant

of changes in the distribution of wage labor, namely workers' collective action. The findings show that collective action plays an important role in explaining changes in the distribution of wage labor either directly or indirectly through changes in the labor process. The impact of workers' collective action contributes to understanding the uneven development of the technical means of production and subsequent organizational changes within manufacturing industries. This uneven development has important consequences for changes in the distribution of wage labor by inhibiting growth in all occupational groups, excluding sales workers, in capital intensive industries, while fostering a decentralized hierarchical structure of supervision and coordination, and reproducing dependency on labor power, in industries that do not invest heavily in new machinery.

We need to rely more on a class conflict model similar to that presented by Marx to explain changes in the distribution of wage labor since World War II in manufacturing industries. Clearly, Marx's explanation of workers' struggles motivating capital to substitute machinery for human labor in the production process is far more consistent with the findings of increased capitalization on changes in wage labor than the Weberian and Structural Marxist arguments presented in Chapter I.

The struggles of workers are a creative factor in the historical process, that is workers' collective action mediates between labor process development and capital accumulation. It is the mediating factor of the impact of collective action that partially determines the magnitude of changes in the labor process and changes in the distribution of wage labor.

Changes in Workers' Collective Action

Two typically consistent findings emerged in the analysis that contribute to explaining variations in workers' collective action since World War II in manufacturing industries. First, increases in the capitalization of technology tend to increase strike volume in every time period in the analysis. Second, increases in the ranks of managers, clerical workers, craftsmen, operatives, and laborers tend to increase strike volume in three of the four time periods. These relationships can be understood in terms of the processual nature of the model. Collective action leads to changes in the labor process and the distribution of wage labor, and these changes then feed back on collective action.

Capitalization and Changes in Collective Action

The single most important finding concerning the feed-back effects of changes in the labor process on collective action was that increased capital investment in technology increased strike volume. But, in every time period, collective action increased capital investment in technology. Thus, the impact of collective action partially determines the magnitude of capital investment in technology and the magnitude of the decline in the ranks of all occupational groups but laborers. And the magnitude of the increase in capital investment in technology partially determines the magnitude of the increase in collective action.

Throughout the post war era, workers have been resisting technological changes. Beginning in the 1950's with struggles to establish a guaranteed annual wage to offset the effects of automation,²⁶ workers have resisted the onslaught of advanced production technologies and the intensification of work in a variety of ways and, often, in defiance of union leadership and in violation of existing contracts (Aronowitz, 1973; Barbash, 1976; 1970; Brecher, 1972; Edwards, 1981; Herding, 1973; Hyman, 1984).

²⁶See "Labor Briefs" in Business Week and "Chronology of Recent Labor Events" before 1968 and "Recent Developments in Industrial Relations" in Monthly Labor Review from January, 1947 to December, 1980.

Workers struggled for a shorter work week to offset the effects of automation, against work rule changes that intensified work and paved the way for new technologies, and for job security. Collective action to establish job security in the wake of automation became more predominant throughout the post war era (Monthly-Labor-Review: June, 1962: 662; July, 1963: 800; Onanian, 1965: 661-668; Onanian, 1966: 749-753; Fullerton, 1967: 39-42).²⁷ In the years 1961 to 1972 alone, 23% of all strikes and 36.5% of the workers involved in strikes were over job security, plant administration issues, and on-the-job working conditions (Edwards, 1981: 197). Issues that were in many ways directly associated with automation and technological development.

Weberians argue that workers will not resist technological growth because it tends to eliminate drudgery and repetitive work and upgrades the skill level of workers. Apparently, technological growth is not viewed this way by workers. Structural Marxists, on the other hand, argue that the development of technology is

²⁷See also: "Labor Briefs" in Business-Week and "Recent Developments in Industrial Relations" and "Chronology of Recent Labor Events" in Monthly-Labor-Review. There was not a simple increase in strikes over non-economic issues throughout the post-war era. Rather, strikes over non-economic issues varied across time, becoming more pronounced in particular times and falling off at other times. However, strikes over non-economic issues began to encompass a larger proportion of the total strikes and workers involved in the post-war era.

resisted by workers and the findings of this analysis provide additional support for the Structural Marxist argument.

Previous discussion suggested that the impact of collective action in manufacturing industries may contribute to the uneven development of the technical means of production and afford capital different opportunities for structuring the organization of work. In particular, the small impact of collective action in some industries may not motivate capital to transform the technical means of production with the same intensity as in industries where workers exhibit a high degree of labor militancy. Workers in these industries may not experience the same fears as workers in capital intensive industries, especially concerning job redundancy. And workers in these industries also may not be as organized and may never have had any marked degree of control over the production process. Zeisel (1963), for example, argues that about one-fourth of all textile workers are covered by collective bargaining agreements and that control over production is at the complete discretion of management. This may be an accurate reflection of many of the less capital intensive industries such as apparel, leather products, and furniture. Thus, small increases in capital investment in technology (minimal expansion of technical

control) and increases in the non-productive component of the work force (expansion of bureaucratic control) may not lead to intensified worker dissent and capital may not be forced to transform the technical means of production to remain competitive and accumulate capital. Large increases in capital investment in technology and increases in the non-productive component of the work force may lead to intensified worker resistance and capital may have to continually transform the technical means of production to remain competitive and accumulate capital.

Using the 1950 to 1980 time period, the interaction effects of capitalization and bureaucratization on workers' collective action were tested. The results in Table 17 show that in low capitalization industries increased bureaucratization tends, for the most part, to decrease strike volume (beta coefficients consistently between $-.069$ and $-.226$ for all occupational groups). Thus, relatively small increases in capital investment in technology combined with increases in the non-productive component of the work force tend to decrease workers' collective action. On the other hand, in high capitalization industries increases in bureaucratization increase strike volume (beta coefficients consistently above $.263$ for all occupational groups). Large increases

TABLE 17
Regression Equations for Strike Volume on Occupational Groups and Labor Process Variables (1950-1980)

	CVOLST58		CVOLST58		CVOLST58		CVOLST58		CVOLST58		CVOLST58		
	b	beta	b	beta	b	beta	b	beta	b	beta	b	beta	
PROF58	.165	.204											
MAN58		.474	.257										
CLER58			.407	.284									
SALES58				.508	.076								
CRAFT58					.376	.307			.174	.389			
OPER58													
LAB58													
LCWR58	-6682.058	-.182	-7665.639	-.209	-8233.628	-.225	-2539.715	-.069	-8295.523	-.226	-6612.912	-.180	1.654
HCWR58	8526.409	.297	9696.173	.338	8864.272	.313	7990.363	.263	9871.689	.346	11743.514	.398	-2763.407
CON58	801.223	.084	1051.256	.111	1189.571	.123	511.489	-.054	1344.470	.142	2270.267	.239	12349.141
R ²		.067		.077		.084		.044		.098		.126	794.365
LC Intercept		7069.238		-693.126		-765.585		704.437		2427.793		3564.053	-2728.317
HC Intercept		36440.349		-65589.464		-55608.612		-46336.517		-69783.755		-60057.755	-7804.474
F		.200		.235		.256		.130		.304		.304	3.313
Sign. of F		.957		.940		.930		.983		.903		.903	.035

Significance of t a < .01 b < .05 c < .10 d < .15 e < .20

in capital investment in technology combined with increases in the non-productive component of the work force tend to increase workers' collective action. These findings suggest that in capital intensive industries the expansion of technical and bureaucratic control intensifies worker resistance. In less capital intensive industries, relatively small expansions of technical control and the expansion of bureaucratic control tends to decrease worker resistance.

One plausible explanation for these findings may be that bureaucratic control is the primary form of controlling the labor process in less capital intensive industries. Increased bureaucratization, according to Edwards (1979), diminishes workers' collective consciousness which is reflected by the finding that in low capitalization industries increased bureaucratization tends to decrease worker resistance. In capital intensive industries, technical control may be the primary form of controlling the labor process complemented with bureaucratic control. Edwards contends that technical control links workers together in the production process thereby elevating workers' collective consciousness and raising shop floor conflict to plantwide collective action. The findings that high capitalization increased bureaucratization tends to increase worker resistance may be reflective of this process.

Changes in Wage Labor and Changes in Collective Action

The last consistent findings that contribute to explaining variations in workers' collective action in the post-war era are changes in wage labor. Increases in the ranks of managers, clerical workers, craftsmen, operatives, and laborers tend to increase strike volume in three of the four time periods. In the 1970 to 1980 time period, increases in the ranks of professionals, managers, clerical workers, craftsmen, and operatives tend to decrease strike volume.

The Weberian perspective does not adequately explain the feed-back effects that increases in the ranks of managers and clerical workers have on collective action. The Weberians assume that technology and organization do not represent class interests and therefore workers will not resist technological and organizational changes. The findings of this analysis suggest that managers and clerical workers are added in the production process primarily because of the need for capital to increase control over the labor process in response to worker resistance. Thus, workers respond to their increased presence in the labor process.

Structural Marxists (Braverman, 1974; Edwards, 1979; Burris, 1980) tend to view collective action as a response to changes in the labor process and the distribution of

wage labor. Elaborate administrative hierarchies, bureaucratic control, technical control, scientific management are presented as significant transformations in the labor process that facilitate growth in the ranks of professionals, managers, and clerical workers and increase capitalist control over the labor process. Thus, for Structural Marxists, the expansion of white collar workers results, in part, from the need for capitalists to intensify the labor process in response to competition demands inherent in the capital accumulation process. The findings of this analysis tend to provide additional support for the Marxist perspective. Throughout the post war era, capital was changing work rules, speeding up production, redefining work tasks, in ways that intensified the work process. The increased presence of wage laborers who exercised direct control, monitored output and quality control, engaged in time and motion studies with the explicit purpose of speeding up production, and expedited the production process in any way, may intensify the loss of control over the production process by workers. This is evidenced by the willingness of workers in many industries to enter into long and protracted strikes over work rule changes and plant administration issues.²⁸ When workers struggle to control

²⁸See "Labor Briefs" in Business Week and "Recent Developments in Industrial Relations" and "Chronology of

the operation of a factory, the ideological neutrality of organizational structure becomes questionable.

Increases in the ranks of craftsmen, operatives, and laborers tend to increase collective action in the post-war era. Basically, these workers are the traditional working class and we would expect that increases in their ranks would increase collective action. In many of the highly organized mass production industries, closed shops insure that these workers join the union and participate in strikes. The findings for laborers should be interpreted with caution. The general tendency in the post-war era was for the ranks of laborers to decline. Thus, decline in the ranks of laborers tends to decrease collective action.

Summary

Changes in the labor process and the distribution of wage labor have particular consequences for continued worker dissent in U.S. manufacturing industries that are best understood in relation to how the impact of collective action creates these changes to begin with, and what the consequences of these changes are for workers. First and foremost is the capital-labor relation in the labor process. Workers, via the impact of collective

Recent Labor Events" in Monthly Labor Review.

action, contribute to the tendency for the substitution of human labor with machines. Workers struggle to achieve outcomes that provide them with short-term benefits such as wage increases and cost of living escalators. Industrial workers have to begin to recognize the long-term consequences of their collective acts. In industries where the impact of collective action is high, these long-term consequences are the continual transformation of the technical means of production and job redundancy. Workers then have to step up their resistance to these changes but, apparently, they are not able to stop the mechanizing tendencies of modern industry. And these tendencies will be greatest in industries where the impact of collective action is greater.

Capitalization of technology is both a cause and an effect of the impact of workers' collective action. The greater the impact of collective action, the greater will be capital investment in technology, and the more the expansionary tendencies of white collar workers are limited and/or reversed, and the more blue collar workers are replaced by machines. The greater these tendencies the greater will be workers resistance to them.

Finally, the expansion of the professional, manager, and clerical occupations in the post-war era is largely explained by the impact of workers' collective action

directly, and indirectly through increased bureaucratization. The greater the impact of workers' collective action, the greater the increase of white collar workers who serve the direct and indirect functions of controlling and monitoring the labor process. Increases in these occupational groups have positive consequences for intensified workers' struggles.

Marx's processual model of class conflict provides the most consistent explanation of the research findings in this study. The Weberian and Structural Marxist perspectives do not adequately explain the relationships between the capitalization of technology and changes in the distribution of wage labor with regard to professionals, managers, and clerical workers in manufacturing industries. Similarly, the neglect of collective action (Weberians) and/or the treatment of workers' struggles as a universal concept (Structural Marxists) confounds any systematic interpretation of the findings. Workers' collective action is a variable and its impact partially determines the direction and magnitude of changes in the labor process and the distribution of wage labor. The direction and magnitude of these changes, in turn, partially determine the direction and magnitude of continuing worker dissent.

CHAPTER V

CONCLUSIONS

Three important conclusions stand out from this study. First, the Weberians and Structural Marxists have failed almost completely to explain the growth of white collar workers in manufacturing industries in the U.S. between 1950 and 1980. This failure is especially acute given the presence of technological growth and increases in bureaucratic structure, the hypothesized determinants for the expansion of white collar workers. The second important finding of this study is the role of collective action in shaping the development of the labor process and the distribution of wage labor in manufacturing industries in the post war era. The Weberians have ignored collective action altogether whereas the Structural Marxists have treated it as a universal response to changes in the labor process. The class conflict model presented in Chapter I stressed collective action as a specification factor for explaining changes in the labor process and changes in wage labor which then feed back on collective action. Finally, the historical nature of the model has illuminated some important methodological deficiencies with traditional analyses of social

phenomena. The analysis was repeated for three specific time periods and once for the overall 1950 to 1980 time period. The findings for the 1960 to 1970 time period suggest special attention be given to the historical variance of the relationships.

Limitations of the Conventional Theses

The Weberians and Structural Marxists argued that capitalization, concentration, and bureaucratization would increase, and as a result, the ranks of white collar workers would increase while the ranks of blue collar groups would decrease. The findings in this study indicated the general tendency was for increased capitalization to decrease the ranks of all groups but laborers. Similarly, increased concentration decreased the ranks of all occupational groups. Moreover, the general tendency was for concentration to decline in most manufacturing industries between 1950 and 1980. Thus, not only do the Weberians and Structural Marxists fail to describe the relationships between increased concentration and changes in the ranks of white collar workers, but they have also failed to anticipate the general trend of the concentration of capital. Increased bureaucratization increased the ranks of all occupational groups but laborers. This was the only finding that supported the

Weberian and Structural Marxist arguments concerning the effects of changes in the labor process on changes in the distribution of wage labor. These findings also suggest that increased bureaucratization increases the ranks of craftsmen and operatives which contradicts the two perspectives. The interaction effects of increased capitalization and bureaucratization on changes in wage labor were also tested. These findings showed increased bureaucratization in industries that do not invest heavily in technology tends to increase the ranks of all occupational groups. In industries with large capital investments in technology, increased bureaucratization tends to increase only the ranks of sales workers and decreases the ranks of managers, craftsmen, operatives, and laborers. These findings do not support the notion that large capital outlays in technology expand the non-productive component of manufacturing industries which includes white collar workers.

The fact that professionals, managers, and clerical workers have become a larger proportion of the industrial work force in many manufacturing industries cannot be denied in the post war era. But the ranks of these three occupational groups do not merely expand in a continuous linear process. The ranks of professionals have been increasing at a decreasing rate since 1950. The

percentage change in this group declined from 91% between 1950 and 1960 to 38% between 1960 and 1970 to 34% between 1970 and 1980. The ranks of managers have been increasing in a curvilinear manner between 1950 and 1980. The percentage change in this group declined from 30% between 1950 and 1960 to 11% between 1960 and 1970, and then increased to 70% between 1970 and 1980. The ranks of clerical workers have also been increasing at a decreasing rate since 1950. The percentage change in the ranks of clerical workers declined from 38% between 1950 and 1960 to 10% between 1960 and 1970, and then rose slightly to 16% between 1970 and 1980. Thus, we must begin to look for particular factors that are slowing down these expansionary tendencies while simultaneously isolating the factors that help to explain the ebb and flow of increases in their ranks.

The findings of this study suggest that the influence of technological growth has declined as an important factor for explaining increases in the ranks of professionals, managers, and clerical workers since 1950. Advanced production technologies, especially computers, contain many of the control and monitoring functions that were once accomplished by managers, professionals, and clerical workers in the production process. Control over the production process, then, may be increasingly

localized in technology at the point of production in industries where the capital outlays in new technologies are largest. This explanation would account for the findings of this study which indicate that the expansion of white collar workers in manufacturing industries occurs primarily where capital outlay in new technology is relatively small, a contradiction of the Weberian and Structural Marxist arguments.

Technological developments since World War II are altering the distribution of wage labor in manufacturing industries. But the historical trends described by Weberians and Structural Marxists may have reached their limits with the advent of new and more sophisticated "third wave" production technologies. The shift to a white collar labor force at the expense of blue collar workers is apparently reaching its limits too. The ranks of white collar workers and most blue collar workers have been reduced by technological growth in manufacturing industries since World War II. With the exception of laborers, however, blue collar workers are still bearing the brunt of technological expansion.

The literature concerning the effects that advanced production technologies, especially computer technology, will have on the distribution of wage labor and the organizational structure of industrial firms is largely

contradictory. Serious systematic analyses of the effects of technological change on the ranks of wage labor and organizational structure have yet to be accomplished. Such classic works as Woodward (1965) and more recent efforts by Blau et al. (1976) do not analyze industrial firms as their technologies change. Rather, they focus on the types of technology employed at a given moment by a variety of firms and the consequences of these technologies for the organizational structures and the ranks of wage labor. In short, the traditional Weberian studies are static analyses with the implicit assumption that when technological change does occur it is toward continuous process technology. The organizational structure and distribution of wage labor in industrial firms evolve toward employment of continuous process technologies and professional white collar labor. There is little in the way of analysis that would account for these relationships. For example, an industrial firm introduces the most sophisticated production technology available which creates the potential to eliminate intermediary levels of supervision and control. But workers within this particular firm are extremely militant and continuously disrupt production on the shop floor and collectively confront management at the plant level. Management within this firm may choose to maintain a

complex administrative structure because it provides an additional measure of control over workers, when in fact the technology may not require this elaborate bureaucratic structure. Whereas Walker (1968) suggests that the new scientific-technical revolution will lead to the demise of bureaucracy as an organizational form, the militancy of workers and the impact of their collective acts may continue to reproduce the bureaucratic organization of production.

Another central focus of the Weberian thesis for explaining the expansion of white collar workers is the shift to a service society. But there is no reason to assume that advanced technologies, especially information technology, will not begin to reverse these tendencies in service industries. For example, Bachleff (1984) and Harring (1984) have shown that advanced computer and automated technologies are replacing clerks and police officers in the public sector. Harring argues that the public service sector has lagged behind private industry in technological development -- but much police work has to do with information-gathering, surveillance, and communications functions that are particularly prone to automation with new sophisticated production technologies. Levison (1980) argues that service industries will take advantage of new technologies and this will result in

lower labor costs. Mann and Williams (1960) argue that computer technology in offices results in a marked reduction in both the clerical and supervisory work force. Many service industries are characteristic of large offices (Employment Commissions, Financial Services, Business Services) and there is no reason to assume that these industries will not take advantage of computer technology to lower labor costs.

Thus, the expansion of service industries in the future -- and any hypothesized expansion is highly problematic (O'Conner, 1973; Singelman and Browning, 1980) -- may create only a small percentage increase of skilled jobs while creating a much larger percentage of low-skilled, menial, and boring jobs accompanied by low wages (Lucy, 1980).²⁹ Technological growth in service industries may also be contingent on the militancy of workers within these industries. Bachleff (1984: 143), for example, argues that postal management turned to wholesale reorganization, replacing human labor by machines, and the regimentation of remaining labor processes through machines, in the face of growing demands and militancy on the part of postal workers in the late 1960's and early

²⁹Lucy argues that two-thirds of all jobs created since 1950 are low paying jobs which require minimal skills with very little decision making. Lucy further argues that the blue collar jobs that are being eliminated in the manufacturing sector are good jobs.

1970's. Thus, postal management expanded technical control over the labor process because of the impact of collective action by postal workers. Service industries, then, may not be exempt from class analysis and class conflict may provide the key to understanding labor process development in these industries.

The findings of this study also indicated that increasing concentration of capital within an industry tends to decrease the ranks of all occupational groups. Previous discussion suggested that in those industries where the concentration of capital increased, competitors were being eliminated. This may indicate that the top four firms are dedicating more capital resources while enforcing stringent manpower economies to remain competitive and gain advantages in the industry. Edwards (1984), for example, argues that capitalists are pushed by competition to seek new ways to reduce labor costs at the same time that the concentration of capital provides them with the resources to conduct this search. Thus, Structural Marxists may be more attuned than Weberians to the competition demands of capital accumulation and to the difficulties of explaining changes in wage labor. Yet, like the Weberians, they have typically assumed that increased concentration corresponds to an increase in the size and scale of operating firms within an industry. The

increased size of the firm generates a need for departmental specialization and corresponds to an increase in administrative functions and white collar occupational growth.

But contrary to the expected increase in the concentration of capital as formulated by Weberians and Structural Marxists, the general tendency in the post war era was for concentration to decline. Moreover, this decline created expansionary tendencies for all groups of wage labor. The question immediately becomes why have the top four firms in any particular industry decided to reduce the dedication of capital and personnel resources to production and, if the previous discussion concerning this phenomena is correct, invest resources for production in different product lines, different industries, and different geographical areas. Such a question immediately leads back to an analysis of the structural factors that influence capital to deinvest in their primary industries, while investing in another industry. In short, what is the field of social relations within which changes in the labor process and wage labor occur and what factors can account for these changes?

The findings of this study suggest that technological development and increasing concentration of capital do not favor growth in almost all occupational categories. This

may indicate that capitalists are attempting to decrease their dependency on skilled labor, and this includes white collar skilled labor, by developing completely automated and self-controlled technologies to lower unit labor costs in production related activities. Similarly, the ability of firms to increase their market power may be dependent on increasing the productivity of labor while simultaneously lowering labor costs by eliminating high-priced skilled labor. United States manufacturing capital, in order to compete in the international market, may be undergoing radical changes in the organization of work. Elaborate administrative hierarchies of control may be extremely costly to maintain and capital may be searching for alternative structures of control that reduce capital's dependency on white collar, as well as blue collar, skilled labor.

It is primarily in the arena of searching for factors that help to explain transformations in the labor process and changes in the distribution of wage labor that I find the Weberian thesis, as well as the Structural Marxist thesis, particularly limited. The Weberian thesis assumes changes in the methods and organization of production in the process of industrialization follow a path of linear development, guided by the mandates of efficiency and rationalization. These mandates are treated as

historically invariant within the Weberian framework and are supposed to remain undisturbed by the conscious historical intervention of human actors. Efficiency and rationalization are portrayed as mechanical forces that drive social transformations. Structural Marxists meanwhile portray the development of the labor process in much the same manner as Weberians, but this development is guided by the logic of capital accumulation and the imperatives of appropriating surplus labor (Edwards, 1984). Competition demands force capital to mechanize the production process and create multi-level administrative hierarchies to exercise more control over workers and the labor process. The struggle between labor and capital is typically not viewed as a creative factor in this process. In fact, Structural Marxists, at times, leave the impression that organized labor activity is unimportant for changes in the labor process and in the distribution of wage labor.

The Importance of Collective Action

The class conflict model suggests that workers, via their collective acts, create changes in the labor process and the distribution of wage labor. These changes eventually feed back on workers through additional changes in the labor process and the distribution of wage labor.

Thus, workers, via their collective acts, "make their own history but they do not make it as they please, they do not make it under circumstances chosen by themselves, but under circumstances directly found, given, and transmitted from the past" (Marx, 1972: 457).

Several important findings emerged in the analysis that highlight the importance of including collective action as an explanatory variable for labor process development and the changing distribution of wage labor in U.S. manufacturing industries. First, the impact of collective action partially determines the extent to which capital expands technical and bureaucratic control over the labor process. In the process of struggling for outcomes that benefit them, workers have contributed directly to further mechanization and to the bureaucratization of the labor process. Moreover, these processes tend to eliminate workers (except sales workers) in industries where there are large investments for technological expansion. Second, the impact of collective action directly and indirectly through increased bureaucratic control appears to be the primary factor for explaining increases in the ranks of professionals, managers, and clerical workers in manufacturing industries -- not the rationalization-efficiency and technogenic arguments advanced by Weberians. Finally, workers, via

the impact of their collective acts, create a tendency for capital in the four largest firms within any particular industry to reduce the amount of capital and personnel resources dedicated to production. Capital, in an attempt to free itself from the militancy of highly organized workers, may be turning to conflict free environments (Bluestone and Harrison, 1982), and such moves tend to diminish the power of organized workers. Workers, then, are partially responsible for creating the very ills they so frequently struggle to overcome, in particular job security.

Edwards (1984: 141) suggests that the distinctive systems of control in the labor process determine the nature of workers' resistance. In simple control, workers struggle against the effects of the boss's personal despotism while in technical control workers resist the technically imposed production pace and struggle for the expansion and enforcement of collectively bargained rights. Bureaucratic control leads workers to press for workplace democracy. Thus, according to Edwards (1984: 141), "the needs and demands of workers turn out to be quite different because the manner of workers' exploitation also differs."³⁰ Workers may use new

³⁰I have not been able to locate any historical documentation that suggests workers have ever struggled for workplace democracy in manufacturing industries in the post war era. However, workers in many of the highly

repertoires of collective action in response to the different forms of control and seek different objectives depending on the intensification strategy used by management. Workers struggled to win a guaranteed annual wage to offset the effects of automation. In some industries, such as steel, workers have actually demanded some degree of control over technological implementation. In the late 1950's and 1960's, workers struggled to control work rules and job classification systems. By controlling these, workers could exhibit some control over the deskilling tendencies of mechanization, and possibly exert some control over technological development. Beginning in the 1960's, and continuing to the present, workers have tried to establish the principle of job security in many industries in the wake of automation and redundancy. In a sense, these outcomes were not predetermined by structural imperatives of the capitalist accumulation process, but were produced in the course of class conflict itself (Hindess, 1982).

The findings of this study suggest that the omission of collective action for explaining changes in the labor process and wage labor results in a serious theoretical and empirical hiatus. A class conflict model provides a

organized mass production have viewed control over work rules, job classifications, and in some instances control over technological development as collectively bargained rights that they will engage in strikes over to enforce.

better interpretation of the findings and contributes to a greater understanding of the dialectical interaction between structure and action in the process of capitalist development.

Historical Generalization or Aberration?

The deviant 1960 to 1970 time period indicated findings that were not similar to those found in other time periods. At this time, increased bureaucratization decreases the ranks of professionals and managers, but in other time periods bureaucratization favored growth in their ranks. Increased capitalization decreased the ranks of only craftsmen and clerical workers while in other time periods the tendency was for capitalization to decrease the ranks of all occupational groups but laborers. Increased concentration increased the ranks of many occupational groups in this time period while in other time periods the tendency was for increased concentration to decrease the ranks of most occupational groups. Importantly, if the analysis had only been done for this time period, particular conclusions would have been reached which are not compatible with other time periods. We would have concluded that concentration is increasing in most industries and bureaucratization was declining as a general tendency in manufacturing industries.

Generalizing these conclusions across historical space and time would have presented the historical aberration as evidence to support, or not support, hypotheses.

The 1960 to 1970 time period represents a good illustration of historical variation because there were many events occurring that distinguished it from other time periods. There were two wars occurring simultaneously -- Vietnam and the War on Poverty -- that were creating jobs and relieving the unemployment roles. This was also a period of general prosperity in American society. The United States was the number one producer in the world, industries were expanding, and the future looked bright. By 1972, these images had been smashed by a world wide recession, rising inflation, and rapidly rising unemployment. Thus, in the earlier part of the 1960's, capital accumulation was rolling at full speed and workers were reaping the benefits of high profits through wage increases. Workers began to make demands for greater control over the labor process and demanded more meaningful work. This may have been occurring because of the numerous social movements in society at this time, because the new generation of workers were younger (Aronowitz, 1973), or because workers viewed the general prosperity of society as a conducive time to advance new demands. These are empirical questions that remain to be

answered. Similarly, capital may not have been as motivated to transform the technical means of production because the future of accumulation looked bright at this time. Thus, the socio-historical context of the 1960's may have been the mediating factor that contributed to deviations in the findings for the 1960 to 1970 time period.

Comparisons of the findings by hypotheses across the three specific time periods and in comparison to the overall time period indicated both systematic regularities and historical deviations in the findings. The Weberian and Structural Marxist perspectives have identified important changes in the methods and organization of production for explaining changes in the distribution of wage labor. These changes, according to the findings of this study, do not follow the hypothesized directions concerning the expansionary tendencies of white collar workers. Both perspectives also suggested that technological growth, the concentration of capital, and bureaucratization of production develop in a more or less linear process. These assumptions appear to be accurate only when looking at extended periods of time. For example, the general tendency between 1950 and 1980 was for the concentration of capital to decline in manufacturing industries. But in the 1960 to 1970 time

period concentration increased in most industries and the increases favored growth in most occupational groups, just as the two perspectives hypothesized. Similarly, although the general tendency was for the bureaucratization of production to increase in almost all industries, the findings for the 1960 to 1970 time period indicated the bureaucratization of production actually declined in many industries in this time period. Technological growth appears to expand in all industries, however there is an ebb and flow to this process in many industries. That is, an industry may invest heavily in technology in one time period, then reduce capital investment in technology in the next time period, followed by another period of heavy capital investment in technology. These deviant findings suggest that we pay closer attention to the ebb and flow of labor process development, rather than looking at large periods of time searching for general trends.

This conclusion suggests that social researchers systematically analyze social phenomena at three or more points in time. The researcher could then search for and report general tendencies among the findings, but deviations also should be reported and possible explanations advanced for them. Social Science journals should also make this a criteria for publication, or we will continue to fill our journals with conclusions based

on historical aberrations rather than historical generalizations.

Limitations of the Study

The purpose of this study was to examine the viability of the Weberian and Structural Marxist explanations of changes in the distribution of wage labor by analyzing U.S. manufacturing industries between 1950 and 1980. Moreover, the study introduced collective action as an alternative causal variable for explaining changes in the labor process and the distribution of wage labor and found it to be an important factor for explaining labor process development and subsequent changes in wage labor. As a result, the study shows that many of the assumptions commonly held by Weberians and Structural Marxists for explaining changes in wage labor are inappropriate in the post World War II era. It would be premature, however, to conclude that this study has extensively examined all the important determinants of labor process development and the distribution of wage labor. This study is beset with its own apparent limitations which I wish to discuss. In so doing, directions for future research on labor process development and changes in wage labor will be mentioned.

The first apparent limitation is the exclusion of other factors that could possibly contribute to explaining changes in the labor process and wage labor. Foremost among these factors may be the degree of competition within manufacturing industries. Marx explicitly argues that economic competition forces capitalists to intensify the labor process, thereby reducing labor costs, while simultaneously increasing production to remain competitive. Thus, the degree of competition within manufacturing industries may be an important determinant of labor process development.

The measure of capitalization focuses on capital investment in technology with the assumption that these technologies are bought and implemented in the labor process. Once implemented, technological growth creates certain tendencies for changes in the distribution of wage labor such as decreasing the ranks of professionals. But technological research and development within manufacturing industries may tend to increase the ranks of professionals in research and development departments, while the implementation of these technologies are decreasing the ranks of professionals in production related activities. For example, a primary feature of modern capitalism is the complexity of products. To remain competitive, capitalist firms have to offer

something in their product that is unique and creates consumer demand. Many professional workers in manufacturing industries may be involved in what I will call the "creation of complexity." These workers design and create complex features for existing products and design new products that are more complex than those of competitors. Thus, white collar growth in manufacturing industries may be the result of marketing and distribution factors rather than production related activities. Future analyses could focus on changes in the amount of capital invested for research and development, as opposed to the capital invested for technology, to explain changes in the distribution of wage labor.

The second major limitation of the study centers on the alignment of variables and the measurement points utilized in the study. This study focused primarily on the independent effects that changes in capitalization, concentration, and bureaucratization have for changes in the distribution of wage labor. The Structural Marxist and Weberian arguments do not address these factors completely independent of one another. These variables are frequently interacting with one another and to isolate independent effects may not do justice to the theoretical perspectives. Both arguments posit the interaction of technological growth and the changing organizational

structure of the firm for explaining increases in the ranks of white collar workers and decreases in the ranks of blue collar workers. This interaction effect was tested and found wanting concerning white collar workers. But the theoretical perspectives advanced in Chapter I are far too complex to systematically analyze all the possible permutations among relevant variables with only twenty cases. An ideal situation would be to generate the same data for all Four Digit manufacturing industries so that all possible interaction effects could be tested.

Likewise, the measurement points utilized in the analysis and the restriction of analyzing specific time periods may produce misleading findings. In order to analyze the data, time periods were forced on the data that conformed to the measurement points for changes in the seven occupational groups. That is, the 1950 to 1960, 1960 to 1970, 1970 to 1980, and 1950 to 1980 time periods were imposed on partially complementary data gathered from the Census of Manufactures.³¹ Thus, the data analysis

³¹The data were not completely non-complementary but restricted. The data for changes in the three labor process variables were gathered at intervals within the specific ten year time periods for occupational change. That is, changes in the labor process between 1954 and 1958 corresponded to the 1950 to 1960 time period, changes between 1963 and 1967 corresponded to the 1970 to 1980 time period, changes between 1972 and 1977 corresponded to the 1970 to 1980 time period, and changes between 1954 and 1977 corresponded to the 1950 to 1980 time period. This does not imply that the findings are invalid, only that two possible measurement points were omitted.

tends to overlook changes in the three labor process variables that occurred between 1958 and 1963 and between 1967 and 1972. The overall 1950 to 1980 time period looks at the overall changes but cannot address the ebb and flow of labor process development across all measurement points. Thus, changes in the three labor process variables between 1958 and 1963 and between 1967 and 1972 may affect changes in the distribution of wage labor differently.

And the restriction of the analysis to the three specific measurement points tends to overlook any possible lag effects among the variables for explaining changes in wage labor. For example, technological growth may lead to organizational changes at a future point in time. New sophisticated production technologies may be implemented at one point in time, but the consequences these technologies have for changes in organizational structure and wage labor may not become evident until a later point in time. Increased capitalization at time one may lead to organizational changes at time two which then lead to increases or decreases in the ranks of particular occupational groups. Thus, the three labor process variables may interact with one another at different points in time for explaining changes in the distribution of wage labor. There was some evidence that this was, in

fact, the case. Changes in capitalization between 1950 and 1960 had a substantial positive effect on changes in bureraucratization in the following two time periods. This study does not address these possibilities. A possible direction for future research, then, may be to assess the effects of changes in the labor process with one another across time and in relation to the changing distribution of wage labor. This may provide a better understanding of the development of the labor process across time. Similarly, obtaining this data at annual intervals could provide for a more complete structural analysis of the relationships between changes in the labor process, the distribution of wage labor, and collective action across a protracted period of time while simultaneously testing for lag effects.

The third major limitation of the study concerns the aggregate nature of the data. At the aggregate level of manufacturing industries, the findings of this study showed that the class conflict model can explain a fair proportion of the variation in changes in the labor process, distribution of wage labor, and collective action among the Two Digit manufacturing industries. However, would the model have more predictive power if we were looking at Three or Four Digit manufacturing industries? Utilizing data from all the Three or Four Digit industrial

classifications of manufacturing industries may enhance or decrease the predictive power of the model. My intuitive hunch is that these reported relationships would be more pronounced because of the tremendous variations in the variables among industries at the Two Digit level. That is, the variations among industries may decline as the level of analysis declines and relationships may become more pronounced. Shifting the level of analysis to lower industrial classifications would also increase the number of cases substantially. Thus, different aspects of the theoretical perspectives could be tested. For example, Edwards (1979) distinguishes between competitive and monopoly industries which have different labor market characteristics. Within each of these labor markets, particular control structures dominate and each rely on different types of labor. These assumptions could be tested with more cases in the analysis. Classifying industries as either competitive or monopoly would allow for a comparative testing of the hypotheses between the two labor markets.

A final limitation to the study concerns the structural nature of the analysis. Collective action was used as a quasi-structural variable in the analysis and could only tell us about the aggregate impact of collective action on changes in the labor process and wage

labor. Also, the analysis can only tell us that changes in the labor process and wage labor either decrease or increase collective action at the aggregate level of manufacturing industries. This completely leaves untouched what the Tillys' (1981) refer to as the "why" questions in historical analysis. This study does not address the motivational factors for workers and capitalists in their collective acts, and/or the meanings workers attribute to changes in the methods and organization of production that directly affect their lives. Numerous examples can be advanced for these why questions. Why did the steel workers after a resounding victory over work rule changes in 1959 exchange this control at a later time for job security? What were the structural as well as the motivational factors that led to this decision? Why do workers experiencing the same structural changes in the labor process in one manufacturing firm struggle vehemently against these changes while workers in another firm passively accept them? Why are some industries prone to militancy while others are not? These questions cannot be completely answered by structural analyses.

Some Concluding Thoughts

This study was an attempt to show that a class conflict model, similar to that of Marx, contributes to explaining transformations in the labor process and the changing distribution of wage labor in U.S. manufacturing industries between 1950 and 1980. The findings of the study indicated that workers' collective action, conceptualized as an independent variable, adds significantly to our understanding of the process of capitalist development. Workers in manufacturing industries, however, have not been able to stop or reverse technological expansion and continuing redundancy through collective action. Rather, via the impact of their collective acts, workers have accelerated this process.

Yet, the institutionalized collective bargaining structure and managements' right to control the production process limits the repertoires of collective action that workers have available to them. State policies facilitate industrial flight and industrial diversification that reduces the dependency of conglomerates on highly organized union labor (Bluestone and Harrison, 1982). Workers, in these primary industries, do not have a repertoire of collective action available to them to raise their collective struggles to the political arena. As Kessler (1984) points out, American workers do not use

strikes as political tools to influence government policies. If manufacturing workers hope to thwart the effects of technological expansion and redundancy, providing the trends exhibited between 1950 and 1980 continue, they will have to develop a repertoire of collective action that specifically addresses the notion of workplace democracy while simultaneously employing strikes as political tools to influence governmental policy.

Workers in the manufacturing sector will have to begin to be conscious of the long-term consequences of their collective acts and develop repertoires of collective action that facilitate worker control over the labor process -- not capitalist control. This does not imply that workers should quit struggling in order to prevent further transformations of the labor process. The impact of collective action is a determining factor for explaining changes in the labor process and subsequent changes in the distribution of wage labor -- but it is not the only one. Capital will still be under pressure to reduce labor costs due to competition demands, and the position of human labor in manufacturing industries quite possibly will remain precarious.

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APPENDIX A

Rankings by Industry for Changes in Capitalization

Industry	CAP56	CAP67	CAP78	CAP58
Furniture	12	16	17	18
Electrical	19*	7	11	13
Transportation Equip.	20*	8	6	9
Textile	15	9	18	15
Primary Metals	1	4	4	4
Apparel	16	18	20	20
Chemical	2	2	2	2
Food	9	13	5	7
Stone, Clay, Glass	4	11	7	6
Fabricated Metals	17	12	12	14
Machinery	14	6	9	11
Paper	8	3	3	3
Printing	5	14	15	16
Rubber	13	5	14	10
Instruments	10	10	13	12
Misc. Manufacturing	11	15	16	17
Tobacco	6	19	10	5
Petroleum, Coal	3	1	1	1
Leather	18	17	19	19
Lumber	7	20	8	8

* Indicates negative change

APPENDIX B

Rankings by Industry for Changes in Bureaucratization

Industry	BUR56	BUR67	BUR78	BUR58
Furniture	17	13*	16	19
Electrical	7	20*	13	5
Transportation Equip.	2	17*	19*	7
Textile	15	4	15	13
Primary Metals	8	1	1	10
Apparel	12	7	11	15
Chemical	11	10*	10	6
Food	13	19*	20*	20*
Stone, Clay, Glass	6	11*	18	8
Fabricated Metals	4	14*	17	14
Machinery	3	16*	6	3
Paper	16	6	7	9
Printing	20	8	3	11
Rubber	14	12*	14	18
Instruments	5	3	4	1
Misc. Manufacturing	1	15*	5	16
Tobacco	18	5	2	2
Petroleum, Coal	10	2	8	4
Leather	19	9	12	17
Lumber	9	18*	9	12

* Indicates negative change

APPENDIX C

Rankings by Industry for Changes in Concentration

Industry	CON56	CON67	CON78	CON58
Furniture	4	2	1	14*
Electrical	8	12	18*	18*
Transportation Equip.	18*	3	6	9*
Textile	5	4	9*	1
Primary Metals	19*	9	2	15*
Apparel	6	11	4	3
Chemical	3	19*	15*	12*
Food	13*	15	10*	8
Stone, Clay, Glass	16*	10	19*	17*
Fabricated Metals	17*	16	8*	10*
Machinery	9	5	17*	16*
Paper	20*	18*	11*	19*
Printing	10	14	3	5
Rubber	2	1	13*	20*
Instruments	1	13	20*	11*
Misc. Manufacturing	15*	17	5	4
Tobacco	11	20*	14*	7
Petroleum, Coal	12	6	16*	6
Leather	14*	8	7	2
Lumber	7	7	12*	13*

* Indicates negative change

APPENDIX D

Rankings by Industry for Changes in Professionals

Industry	PROF56	PROF67	PROF78	PROF58
Furniture	14	14	14	15
Electrical	1	1	2	2
Transportation Equip.	2	3	5	3
Textile	18	8	20*	16
Primary Metals	8	12	10	8
Apparel	15	13	12	13
Chemical	5	4	3	4
Food	12	7	7	9
Stone, Clay, Glass	11	6	19*	12
Fabricated Metals	3	20*	8	7
Machinery	4	2	1	1
Paper	9	10	9	10
Printing	7	5	4	5
Rubber	10	11	11	11
Instruments	6	15	6	6
Misc. Manufacturing	20*	9	16	14
Tobacco	17	19	15	19
Petroleum, Coal	13	17	18	18
Leather	19*	18	17	20
Lumber	16	16	13	17

* Indicates negative change

APPENDIX E

Rankings by Industry for Changes in Managers

Industry	MAN56	MAN67	MAN78	MAN58
Furniture	13	11	17	14
Electrical	1	1	3	2
Transportation Equip.	5	3	7	5
Textile	18*	12	18	17
Primary Metals	12	10	15	12
Apparel	17*	18*	14	15
Chemical	6	5	4	4
Food	2	20*	5	9
Stone, Clay, Glass	8	15*	9	10
Fabricated Metals	3	14*	6	6
Machinery	4	2	1	1
Paper	11	8	13	11
Printing	7	7	2	3
Rubber	9	6	8	8
Instruments	10	4	12	7
Misc. Manufacturing	19*	9	11	13
Tobacco	15	13*	20	19
Petroleum, Coal	16*	17*	16	16
Leather	14	16*	19	20*
Lumber	20*	19*	10	18*

* Indicates negative change

APPENDIX F

Rankings by Industry for Changes in Clerical Workers

Industry	CLER56	CLER67	CLER78	CLER58
Furniture	14	11	10	12
Electrical	1	3	2	2
Transportation Equip.	2	5	20*	7
Textile	20*	8	19*	18*
Primary Metals	11	12	18*	15
Apparel	12	10	8	8
Chemical	6	4	6	4
Food	8	20*	7	11
Stone, Clay, Glass	9	14	11	13
Fabricated Metals	3	19*	4	5
Machinery	5	2	1	1
Paper	13	7	12	10
Printing	4	1	3	3
Rubber	10	6	13	9
Instruments	7	13	5	6
Misc. Manufacturing	19*	9	15*	14
Tobacco	17	15	14*	17
Petroleum, Coal	15	18*	16*	20*
Leather	16	17*	17*	19*
Lumber	18*	16*	9	16

* Indicates negative change

APPENDIX G

Rankings by Industry for Changes in Sales Workers

Industry	SALE56	SALE67	SALE78	SALE58
Furniture	11	9	11*	11
Electrical	4	3	6	4
Transportation Equip.	15	2	14*	9
Textile	19*	11*	12*	16*
Primary Metals	9	14*	17*	15*
Apparel	5	17*	18*	14
Chemical	3	6	7	3
Food	2	19*	20*	20*
Stone, Clay, Glass	6	12*	4	6
Fabricated Metals	7	16*	15*	10
Machinery	13	1	2	2
Paper	8	7	16*	8
Printing	1	20*	1	1
Rubber	10	8	5	7
Instruments	12	5	3	5
Misc. Manufacturing	20*	4	19*	19*
Tobacco	14	15*	10	13
Petroleum, Coal	17	18*	8	17*
Leather	18*	13*	13*	18*
Lumber	16	10*	9	12

* Indicates negative change

APPENDIX H

Rankings by Industry for Changes in Craftsmen

Industry	CRAFT56	CRAFT67	CRAFT78	CRAFT58
Furniture	13	5	16*	12
Electrical	2	4	5	3
Transportation Equip.	1	1	15*	2
Textile	20*	9	20*	20*
Primary Metals	10	15	17*	14
Apparel	18*	3	19*	15
Chemical	5	13	3	5
Food	4	20*	2	10
Stone, Clay, Glass	11	11	11	11
Fabricated Metals	3	16	4	4
Machinery	6	6	1	1
Paper	7	8	10	8
Printing	8	2	7	6
Rubber	12	7	8	7
Instruments	9	18*	6	9
Misc. Manufacturing	19*	12	14	16
Tobacco	14	17*	13	18
Petroleum, Coal	15	19*	12	19*
Leather	17	10	18*	17
Lumber	16	14	9	13

* Indicates negative change

APPENDIX I

Rankings by Industry for Changes in Operatives

Industry	OPER56	OPER67	OPER78	OPER58
Furniture	13	10	6	10
Electrical	1	1	2	1
Transportation Equip.	5	3	18*	6
Textile	20*	17*	20*	20*
Primary Metals	12	6	17*	14
Apparel	9	4	19*	11
Chemical	6	13	8	7
Food	2	20*	1	4
Stone, Clay, Glass	8	14*	13	13
Fabricated Metals	3	9	4	3
Machinery	4	2	3	2
Paper	11	8	12	12
Printing	14	7	5	9
Rubber	7	5	7	5
Instruments	10	12	9	8
Misc. Manufacturing	18*	11	11	15
Tobacco	16*	15*	16*	17*
Petroleum, Coal	15*	16*	14	16*
Leather	17*	19*	15*	19*
Lumber	19*	18*	10	18*

* Indicates negative change

APPENDIX J

Rankings by Industry for Changes in Laborers

Industry	LAB56	LAB67	LAB78	LAB58
Furniture	9*	10*	9	8
Electrical	1	2	5	1
Transportation Equip.	15*	4	19*	15*
Textile	18*	8	17*	17*
Primary Metals	19*	19*	20*	19*
Apparel	6*	1	6	2
Chemical	17*	16*	3	12*
Food	13*	18*	1	4
Stone, Clay, Glass	10*	17*	18*	18*
Fabricated Metals	3	14*	8	9
Machinery	14*	9	4	6
Paper	12*	13*	13	14*
Printing	4	3	7	3
Rubber	2	5	10	5
Instruments	5	7	12	7
Misc. Manufacturing	11*	6	16*	11*
Tobacco	7*	11*	11	10
Petroleum, Coal	16*	15*	14	16*
Leather	8*	12*	15*	13*
Lumber	20*	20*	2	20*

* Indicates negative change

APPENDIX K

Rankings by Industry for Strike Volume

Industry	VOLS1	VOLS2	VOLS3	VOLS4	VOLS5	VOLS6
Furniture	12	10	12	12	11	13
Electrical	8	8	5	10	9	8
Transportation Equip.	3	5	1	3	5	2
Textile	10	17	19	19	12	19
Primary Metals	1	1	2	5	1	4
Apparel	20	19	20	20	20	20
Chemical	13	11	9	9	14	10
Food	9	15	14	11	13	12
Stone, Clay, Glass	11	6	7	8	8	7
Fabricated Metals	7	7	6	7	7	6
Machinery	5	4	4	4	4	5
Paper	14	14	10	6	15	9
Printing	19	13	13	18	18	15
Rubber	2	2	3	2	2	3
Instruments	15	9	15	16	10	17
Misc. Manufacturing	17	18	16	13	17	14
Tobacco	18	20	11	14	19	11
Petroleum, Coal	4	3	8	1	3	1
Leather	16	16	18	17	16	18
Lumber	6	12	17	15	6	16

Vols1 = Annual averages from 1947 to 1954

Vols2 = Annual averages from 1955 to 1963

Vols3 = Annual averages from 1964 to 1972

Vols4 = Annual averages from 1973 to 1980

Vols5 = Annual averages from 1947 to 1963 (Full Model)

Vols6 = Annual averages from 1964 to 1980 (Full Model)

APPENDIX L

Rankings by Industry for Change in Strike Volume

Industry	CVOLST56	CVOLST67	CVOLST78	CVOLST58
Furniture	7*	13*	11*	13*
Electrical	5	5	18*	6
Transportation Equip.	18*	1	20*	3
Textile	17*	16*	8	18*
Primary Metals	1	20*	19*	20*
Apparel	6	14	6	11
Chemical	8*	4	12*	5
Food	15*	8	3	12
Stone, Clay, Glass	2	12	14*	7
Fabricated Metals	9*	7	16*	10
Machinery	16*	6	13*	15*
Paper	12*	3	2	2
Printing	3	10	15*	9
Rubber	19*	11	5	14*
Instruments	4	19*	10*	17*
Misc. Manufacturing	10*	9	7	8
Tobacco	13*	2	17*	4
Petroleum, Coal	14*	17*	1	1
Leather	11*	15*	8	16*
Lumber	20*	18*	4	19*

* Indicates negative change

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COLLECTIVE ACTION AND CHANGES IN WAGE LABOR

by

Robert L. Johnston

Committee Chairman: Mark L. Wardell

Department of Sociology
(ABSTRACT)

This study attempted to address the relative merits of the Weberian and Structural Marxist perspectives for explaining changes in the distribution of wage labor. The findings of the study suggested that many of the common assumptions held by Weberians and Structural Marxists concerning the effects of technological growth, increasing bureaucratization of production, increasing concentration of capital, and growth in the ranks of white collar workers are not supported with data on manufacturing industries in the post war era. Moreover, this study introduced collective action as an important determinant for explaining changes in the labor process and in the distribution of wage labor. The findings indicate that workers collective action enhances our understanding of labor process development and changes in wage labor. And, the findings suggest that the struggle between workers and capitalists is vital to understanding the process of capitalist development since World War II, contrary to the popularly held beliefs of many post-industrial theorists.