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THE ECONOMIC AND SOCIAL CONTEXT OF SPECIAL POPULATIONS

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INTRODUCTION

In theory, the characteristics of work (wages, job tenure and security, skill levels, and working conditions) are driven by supply and demand factors of the labor market. Supply factors include the skills and availability of labor, and the willingness of labor to work. Demand is producer- and consumer-derived from the production and distribution system of goods and services in the industrial and agricultural economy. In practice, however, because the factors that influence the supply of labor change relatively slowly, and because demand-side factors tend to be more volatile, demand drives the market—both within and among nations.

Literature focusing on the impressive performance of industrial economies in this century has argued that "technological innovation is the engine of economic growth."[20,27] We now increasingly hear that "trade is the engine of growth."[30] In truth, changes in both technology and international trade are altering the world economy and hence are affecting the demand and supply of labor, the nature of work, and working conditions. Sometimes these two forces—technological innovation and international trade— amplify the effects of each other on workers and jobs; they also may work in opposite directions.

Of one thing we can be sure: the nature of production and services in industrial economies is in a great state of flux. New materials, faster and more powerful computers, electronic and mobile communications, alternative energy systems, miniaturization, robotics, and biotechnology pose new opportunities, problems, and challenges.[9,17] Tremendously expanded investment

in the information-based technologies of both manufacturing and services has caused impressive increases in productivity.[16,24]

However, these changes also brought about the displacement and de-skilling of some labor by capital;[16,26] rising demand for new skills, in some instances;[2] and the increase of contingent, part-time, and temporary work.[22,23] In the United States, changes in the last two decades have resulted in a 10–15% decrease in the average real wages of production and nonsupervisory workers (the lower 80% of wage earners) from 1973 levels.[19] In addition to effects caused by factors within nations, international trading regimes increasingly are affecting both labor[18] and environmental conditions[21] in both exporting and importing countries as the globalization of the world's economies accelerates.

Labor, as a factor of production, of course is not monolithic. The particular nature and mix of people making up the workforce is defined by economic, social, and technological forces and trends. The important characteristics of the workforce are:

1. Age (with special concern for older, younger, and child labor)
2. Gender
3. Ethnic or racial makeup
4. Legal status (permanent resident, immigrant, or illegal workers)
5. Skill level (skilled industrial, skilled service, agricultural, and nonagricultural, unskilled workers)
6. The nature of employment (full-time, part-time, and contingent)
7. The extent and nature of disability, including formerly injured workers seeking to return to work
8. Sensitivity and susceptibility[5]
9. The locus of employment (i.e., in developed or developing nations).

Workers in these categories or with these characteristics—what this volume refers to as "special populations"—may be differentially impacted in terms of wages, working conditions, the nature of their employment, medical care available to them, and disability or workers' compensation.

One additional issue must be addressed. Traditional labor market theory holds that the most important feature of labor that determines whether a worker at a given wage is hired, retained, or dismissed is the match of his/her skills and abilities to the production (or service-related) needs of the employer. However, this view was challenged more than two decades ago by economist Michael Piore at the Massachusetts Institute of Technology, who argued that "dual labor markets" exist for the same job.[12] The workers that make up the so-called **primary labor market** classically are white, non-minority men, while the workers who make up the **secondary labor market** are blacks, other minorities, and women. Piore suggested that employment and higher wages went first to workers in the primary labor queue, while secondary workers often were hired later and at lower wages for the same work. Since Piore's classic work, we have witnessed many examples of preferential and prejudicial treatment of workers, as reflected in such terms as "the glass ceiling" and "the token Hispanic."

In *Crisis in the Workplace*,[1] this author suggested that a corollary of the dual labor market would be manifest in (1) lower hazard pay for secondary workers and/or (2) secondary workers having the more hazardous jobs. Indeed, a study of wage differentials in dangerous jobs, when stratified by dividing workers in any particular job category by their primary or secondary nature, revealed a finite wage premium or hazard pay for those in the primary labor group and no wage premium for secondary workers.[28] Secondary workers valued wages and an opportunity for employment relative to decent working conditions considerably higher than primary

workers, with the result that they did not demand wage premiums for dangerous jobs. Furthermore, these special populations exhibit higher than usual injury and fatality rates.[22] Despite advances made in affirmative action, fairer treatment of workers, and antidiscrimination laws, special populations continue to be more adversely impacted in the workplace, particularly in the areas of remuneration and employment security. In addition, a structural shift to a more temporary, contingent, and otherwise insecure workforce increases the numbers of workers at higher risk.

This chapter addresses some of the salient factors, traceable to trends in the technological development of industrial economies and the increased globalization of the world economy, as well as the impacts on these special populations.

THE SHIFT FROM AGRICULTURE TO MANUFACTURING TO SERVICE

Much has been written about the industrial revolution, the transformation of the developed nations from agricultural to manufacturing economies, and the "postindustrial service economy." These changes brought new materials, machinery and equipment, skills, and work organization that are well-known; they also heralded changes in the structure of labor markets.[3] The changes and trends in the last two decades are of particular importance, because (1) they are profound in their own right, (2) they have resulted in a reduced economic importance of labor as a factor of production *as a whole*, from the prospective of the industrial firm and agricultural industry, and (3) they threaten social stability within both developed and developing nations. Nor is the shift to a service economy without adverse health and safety consequences.[9,11,31]

Economic and Technologic Trends

The postwar economic advances of the United States and Europe and the emergence of developed economies in Asia are generally credited to unprecedented technological innovation as the engine of growth. Capital replaced labor in every traditional economic sphere of activity, thereby increasing labor productivity while reducing the price of food, basic commodities, and consumer goods; these changes led to sufficiently increased demand and sales so that the hiring of workers could continue. Everyone benefited from technology-driven economic "trickle down." There seemed no end to the consumption-driven, production-fed, good economic times.

Sometime in the 1970s, however, various industrial countries began to experience an economic slowdown. The origins of this slowdown were complex, but were related in part to the saturation of demand (sometimes euphemistically referred to as overcapacity in production), reflecting the reduced ability of the employed labor force to keep consuming (in the United States) and the decreased number of consumers due to the rise in unemployment (in Western Europe). In the U.S., real wages fell about 18% in 18 years,[16] while Western Europe experienced double-digit unemployment. Awareness that something was wrong resulted in Jeremy Rifkin's controversial book entitled *The End of Work*[26] and informative essays such as "The Ruthless Economy"[16] in the New York Review of Books. In Europe, the situation was so acute that the European Union (EU) produced a white paper entitled *Growth, Competitiveness, and Employment*,[14] arguing that jobs had to be the centerpiece of European economic policy and explicitly rejecting the "American solution" that resulted in a downward trend in real wages. However, as discussed later, the EU report did not offer any realistic solutions.

Seldom mentioned is that the root cause of labor problems in the last two decades on both sides of the Atlantic was the gradual and continual **replacement of**

labor by capital. The labor market behaved in a quite predictable fashion to declining consumer demand and the diminished importance of labor as a factor of production—resulting in either a loss in real wages (U.S.) or a loss of employment (Western Europe). Industrial nations with excess production capacity increasingly are turning their attention to expanding foreign trade in hopes of increasing revenues, holding out prospects of creating new employment. Just what effects on employment and the consequential effects on health and safety increased reliance on foreign trade will herald are discussed in the next section.

Five interrelated factors shape the conditions and experience of work:[3]

- The **technology** used in a given job or workplace—and the *scale, scope,* and *speed of technological change*—are major determinants of the level of complexity, productivity, employee satisfaction, security, and risks to health and safety associated with that work.
- The **structure of industry and of occupations** determines what kinds of jobs and in what kinds of environments we are likely to spend our working lives. Technology trends influence industrial structure and occupations.
- The **organization of work** also shapes the way we experience and relate to our jobs. If the workplace hierarchy is steep and rigid, and employee initiative is discouraged, job satisfaction (and worker productiveness) is likely to be lower than if creativity and initiative are encouraged. Employment in small firms is likely to be very different than in large firms. Here, too, technology affects the organization of work or, perhaps more correctly, technology consists of the hardware, materials, and scope of production—plus the organization of work. Human and nonhuman factors of production jointly determine the nature of work.
- **Labor-management relations**, including the role of trade unions, influence how people interact in an industrial system. This system is shaped by internal dynamics but also by technological change, historical patterns of work organization, and the kinds of industries and occupations that are growing and contracting. One's experience of work is deeply affected by patterns of labor-management relations at the workplace—how employers treat employees and how workers react.
- **Workplace health and safety** is a critical determinant of job satisfaction and worker commitment. Moreover, the level of concern for health and safety in the workplace is an important indicator of a society's commitment to the well-being of its workers.

In the past two decades, and particularly since the mid-1970s, a new era of technological development based on the development and diffusion of microelectronic-based products and processes has begun. New electromechanical and information technologies have had widespread impact on the structure of industry and occupations and on the nature of work.[24] They have led to dramatic changes in the organization of production, making it possible to reorganize manufacturing away from the dominant standardized, long-run production systems toward more flexible, shorter-run, customized niche strategies. We are seeing the disintegration of mass production as the dominant form of work organization. These technologies also have had a dramatic effect in the service sector, which now employs 80% of American workers[16] and more than 50% of workers in the European Union as a whole.[31]

New technologies also are having an important, though sometimes contradictory, impact on the organization of work. Computer technologies can raise or lower the level of skill required, as well as change the kind of skills needed. Taken together, trends in technology and product markets and intensified competition are placing new demands on American firms. Almost all new jobs today are being created in

the service industries. It is important to distinguish low-skill employment in fast-food, retail, maintenance, hazardous waste handling, and home care from high-skill, information system–based jobs, although all are part of the service sector. A report from the U.S. Council of Economic Advisers[10] presents an interesting picture of the U.S. economy for the period February 1994 to February 1996. Two-thirds of the new growth in (mostly) full-time employment was due to the creation of jobs in a part of the service sector paying above-medium wages, namely in the high-paid managerial and professional specialty occupations. At the same time, the number of workers holding multiple jobs (6%) and the aggregate wage level stayed about the same. Older, white-collar workers were considerably more at risk of displacement in 1991–1992 than in the previous economic recession. Blue-collar and less-educated workers were more likely to be displaced than others. The partly good news of some higher-wage job creation could be explained by the fact that the information-based economy is gearing up in the service sector. Whether this part of the service sector will maintain employment or grow remains to be seen.

Although many occupational groups with an increasing share of employment require some post-secondary education, the large service sector is an exception. Most service workers still do not have post-secondary education, including those employed in the rapidly-growing fields of health services, home care, and business services (e.g., temporary agencies, building maintenance). While women, blacks, and other racial and ethnic groups have entered the workforce in growing numbers since the end of World War II, and their participation rates are setting new records,[19] they are still disadvantaged as workers. Blacks and Hispanics are more likely to be employed in occupations that pay relatively low wages. Job segregation by sex in the labor market remains substantial, with negative effects on earnings and career mobility. Youth, especially black youth, have the highest unemployment rate. One commentator observes that "the willingness of people to work longer hours is stark evidence not of a new prosperity but of the inability of most Americans to make ends meet after years of lagging wages."[19]

A significant trend is the dramatic increase in the number of people who comprise the "contingent workforce" of part-time, temporary, and contract employees. More than a decade of corporate restructuring (outsourcing, franchising, and downsizing) has led many firms to re-engineer, shift to lean production, and seek flexibility (and lower labor costs) through hiring on a part-time or temporary basis, rather than creating new permanent jobs. Groups at the bottom of the employment hierarchy—women, minorities, youth, and the elderly—are over-represented in the contingent workforce.

As these changes have occurred in the structure of industry and in the nature of work, membership in trade unions has declined significantly, especially in industries with high injury experience. Unions are practically absent in the service sector.[16] Inasmuch as unions can play an important role as protectors of worker health and safety,[32] this decline could have a significant effect on occupational injury and disease. Five long-recognized areas of concern related to the proliferation of microelectronics-based technologies are: chemical hazards, musculoskeletal problems, video display hazards, stress, and job loss and fear of job loss.[11] The nature of occupational injuries has changed dramatically. The category of repetitive strain injuries has the highest incidence and fastest growth. Chemical exposures are a continuing concern, from both a classic toxicological perspective and based on a new appreciation for low-level chemical sensitivity, probably initiated by neurotoxins in the industrial workplace and office as well as in the home and general environment.[4]

Effects on Special Populations

Quinlan and Mayhew[22] have provided the most thorough and contemporary analysis of changes in labor market structuring and the adverse consequences for health and safety in industrialized economies. This author is indebted to them for their impressive research and insightful analysis, which forms the basis for the following discussion. They document the dramatic increase in the proportion of workers holding temporary jobs, with the most pronounced effect amongst younger workers; the increased participation of women in the workforce; and the aging of the population/workforce. The totality of changes observed in industrialized economies are:[23]

- Growth in female workforce participation rates
- Growth in youth labor force participation rates
- Increasing use of shift/night work arrangements
- Aging of the population and workforce
- Decline of the male workforce participation rate
- Increased outsourcing, downsizing, and work restructuring in large organizations
- Growth of employment share of small business and franchise agreements
- Increased self-employment as well as casual, part-time, and other contingent forms of work
- Decline in the employed proportion of the (available) workforce
- Decline in the average/median job tenure

The combined effect of some of these trends raises concerns about worker health and safety for different populations. Young (inexperienced) workers increasingly occupying temporary/part-time jobs presents opportunities for more injuries. Decline of job tenure means an increase in more inexperienced workers in specific jobs. Increased participation of women and an aging workforce in shift/night work invites problems for both. Self-employed workers are more than twice as likely as employed workers to suffer a fatal injury.[7,8] The outsourcing of maintenance in the U.S. petrochemical industry increased major occupational health and safety problems and perhaps was the indirect cause of several catastrophic explosions.[25] Labor shedding (downsizing) generally leads to employment shifts to smaller, independent, less-experienced firms, which often are nonunionized and less safety-wise. A study of work-related fatalities in the chemical industry found that the fatality rate in small firms was twice that of large firms.[29]

These trends, coupled with a dual labor market, produce an outcome in which special populations are desperate enough to accept lower wages and unsafe working conditions in exchange for a job; and employers seek financial advantage by hiring special populations as part-time, temporary, or otherwise contingent workers without providing workers' compensation and other labor protection safeguards. Additionally, the plight of agricultural work, known for decades to result in a disproportionate share of injuries and fatalities from farm machinery, pesticides, and substandard living conditions in the fields, continues.[1] Increased participation of illegal immigrants further exacerbates the already weak bargaining position of farm workers in obtaining decent and safe working conditions.

GLOBALIZED TRADE AND ITS EFFECTS ON SPECIAL POPULATIONS

The increased emphasis on trade expansion among both industrialized and less-industrialized nations is expected to have both direct and indirect effects on the nature of work and labor standards. The major trading regimes—the General Agreement on Tariffs and Trade administered by the World Trade Organization, the North American Free Trade Agreement (NAFTA), and the Association of South East Asian Nations Agreement—are particularly important for U.S. workers. Only NAFTA, through its side agreement on labor, officially recognizes the potentially adverse effects of trade on labor standards and working conditions and provides at least some legal machinery to prevent or redress those concerns.[15] However, while NAFTA allows affected parties in any of the three trading country partners to sue any government for the failure to enforce to its own labor laws and standards, it does not require harmonization of labor standards and practices as a matter of law.

Although for two decades we have witnessed falling wages in the U.S., increasing unemployment in Europe, and widening wage gaps in all industrialized countries, there seems to be little *causal* evidence associating these changes with trade liberalization.[18] However, the reader is cautioned to focus on the term "causal evidence." The *absence of evidence* (because the issue has not been adequately researched or because the effects are not yet manifest) is not the same as the *evidence of absence* of the effect. Furthermore, the baseline for analysis and the effects of increased trade are moving targets because technological changes, industrial restructuring, and trade liberalization are all going on at the same time.

Apprehension concerning trade liberalization is focused on several interrelated potential effects, for which the strength of the evidence varies. Changes in U.S. jobs and working conditions may arise from:

- The threat of moving, or actual shift of, jobs to production centers in countries with lower wages or less protective labor standards, creating downward pressures on employment security and wages, especially among unskilled workers, so that workers demand less protection
- A widening gap between the wages, job security, and working conditions of skilled, special-niche workers and their unskilled counterparts
- The weakening of the regulatory willingness and capacity of governments to enforce existing labor standards or adopt new ones (such as for ergonomics) in the face of heightened international economic competition
- Heightened competition leading to cost-minimization strategies on the part of the firms, which have potentially adverse effects on the conditions of employment through the reduction of investments in safety and health and in the maintenance of equipment and good working conditions
- Heightened competition leading to cost-saving measures to lower labor costs, which exacerbate the already existing trends to outsource, use part-time and contingent workers, and hire immigrant and illegal workers (especially in agriculture)
- A shift of production to smaller, independent, nonunionized workplaces, which often are less safety-wise
- Outflows of direct investment to create centers of production in other countries that are likely to have less stringent labor standards and union protection.

It has been suggested that these threats can be countered by taking the "high road": raising labor productivity through investments in skill development; exploiting the productivity-raising potential of high labor standards and cooperative work organization; and making productivity-augmenting investments in infrastructure and research and development. Many believe that "[n]ational policies are still paramount in determining levels of employment and labour standards."[18] Robert Reich, former U.S. Secretary of Labor, echoed the same sentiments, and the European Union also placed faith in investing in its workers to reduce unemployment without resorting to the "American solution."[14]

However, this optimism fails to include a survey of the history—two decades of technological changes, displacement of labor by capital, and corresponding restructuring of industry—which is unlikely to produce a future that includes enough jobs to reverse the trends well underway. Of clear benefit would be international harmonization of labor standards, the inclusion of a "social clause" in trade regimes and international labor agreements,[13] and a commitment to placing jobs—safe, decent, well-paying jobs—at the center of national industrial policy. But more may be needed. Either a reversal or slowing of labor-displacing trends to encourage increased labor intensiveness of production and services,[2] or the provision of access to investment capital so that workers can become the new capitalists[6] may be what is required to prevent an erosion of the importance of labor and worker health and safety.

REFERENCES

1. Ashford NA: Crisis in the Workplace: Occupational Disease and Injury. Cambridge, MA, MIT Press, 1976.
2. Ashford NA: The role of labour in choosing and implementing information-based technologies. In Rantanen J (ed): Work in the Information Society. Proceedings of the International Symposium, Helsinki, Finnish Institute of Occupational Health, 20–22 May 1996, pp 56–63.
3. Ashford NA, Caldart CC: Technology, Law, and the Working Environment. 2nd ed. Washington DC, Island Press, 1996.
4. Ashford NA, Miller CS: Chemical Exposures: Low Levels and High Stakes. New York, John Wiley Press, 1998.
5. Ashford NA, Spadafor C, Hattis D, Caldart C: Monitoring the Worker for Exposure and Disease: Scientific, Legal, and Ethical Considerations in the Use of Biomarkers. Baltimore, John Hopkins University Press, 1990.
6. Ashford R: A new market paradigm for sustainable growth: Financing capital ownership with Louis Kelso's binary economics. In: The Challenge of Financing Development. Praxis: Fletcher J Develop Studies 14:25–43.
7. BLS (U.S. Bureau of Labor Statistics): National Census of Fatal Occupational Injuries. Washington DC, U.S. Department of Labor, 1996.
8. BLS (U.S. Bureau of Labor Statistics): National Census of Fatal Occupational Injuries. Washington DC, U.S. Department of Labor, 1997.
9. Brown M, Froines J (eds): Technological Change in the Workplace: Health Impacts for Workers. Los Angeles, CA, UCLA Institute of Industrial Relations, 1993.
10. Council on Economic Advisors: Job Creation and Employment Opportunities: The United States Labor Market, 1993–1996. Washington DC, 1996.
11. Deutsch S: New Technology and the Work Environment: Problems and Solutions. In: Labor Occupational Health Program Monitor. Los Angeles, CA, University of California, 1988, pp 5–8.
12. Doeringer P, Piore M: Internal Labor Markets and Manpower Analysis. Lexington, MA, Lexington Books, 1971.
13. Ehrenberg D: From Intention to Action: An ILO-GATT/WTO enforcement regime for international labor rights. In Compa L, Diamond S (eds): Human Rights, Labor Rights, and International Trade. Philadelphia, University of Pennsylvania Press, 1996, pp 163–180.
14. The European Union: White Paper on Growth, Competitiveness, and Employment: The Challenges and Ways Forward into the 21st Century. Brussels-Luxembourg, The European Commission, ESSC-EC-EAEC, 1994.
15. Folsom R, Gordon M, Spanogle J: NAFTA. In: International Trade in a Nutshell. St. Paul, MN, West Publishing, 1996, pp 365–388.
16. Head S: The ruthless economy. The New York Review of Books, February 29, 1996, pp 47–52.
17. Health and Safety Executive: Trends in technology and their implications for health and safety. Health and Safety Executive, C15 5/98, 1998.
18. Lee E: Globalization and employment: Is anxiety justified? International Labour Review 485–497, 1996.
19. Madrick J: The treadmill economy. The American Prospect November-December 1998, pp 56–60.
20. Niehans J: A History of Economic Theory: Classic Contributions 1720–1980. Baltimore, Johns Hopkins University Press, 1990.
21. The Organization for Economic Cooperation and Development: Economic Globalisation and the Environment. Paris, OECD, 1997.

22. Quinlan M, Mayhew: Knowledge to date on occupational health and safety problems and the contingent workforce. Presented to the International Society for Employment and Occupational Health 1998 Post-Congress Workshop D: Health and Safety Problems in the Contingent Workforce. Helsinki, Finland, Finnish Institute of Occupational Health, 26 September 1998.
23. Quinlan M: Labour market restructuring in industrialized societies: An overview. Economic and Labour Relations Review 9(1):1–30, 1998.
24. Rantanen J (ed): Work in the Information Society. Proceedings of the International Symposium, Helsinki, Finnish Institute of Occupational Health, 20–22 May 1996.
25. Rebitzer J: Job safety and contract workers in the petrochemical industry. Industrial Relations 34(1): 40–57, 1995.
26. Rifkin J: The End of Work. G. J. Putnam's Sons, 1995.
27. Schumpeter J: Business Cycles: A Theoretical, Historical, and Statistical Analysis of the Capitalist Process, 1939. Discussed on pages 444–445 in Niehans J (see reference 20).
28. Shakow D, Graham J: Compensating wage differentials and labor market segmentation. Unpublished manuscript. Worcester, MA, Clark University, 1981.
29. Suruda A, Wallace D: Fatal work-related injuries in the U.S. chemical industry, 1984–1989. Int Arch Occup Environ Health 68:425–428, 1996.
30. Todaro M: Trade theory and development experience. In: Economic Development in the Third World. New York, Longman, 1989, pp 365–400.
31. Walters D: The Identification and Assessment of Occupational Health and Safety Strategies in Europe. Dublin, The European Foundation for the Improvement of Living and Working Conditions (EF/96/33/EN), 1996.
32. Weil D: Enforcing OSHA: The role of labor unions. Industrial Relations 30(1):20–36, 1991.