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The Collapse of Low-Skill Wages

by

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Working Paper No. 178

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The Collapse of Low-Skill Wages

No recent development in the U.S. labor market has been more dramatic and troubling than the collapse in the buying power of worker's paychecks. After rising for almost three decades, average real weekly earnings among production and nonsupervisory workers fell by 7.5 percent between 1973 and 1979, and by another 12.6 percent between 1979 and 1990. This translated into a decline in weekly pay from \$303 in 1979 to \$277 in 1982, and further to \$265 in 1990 (in 1982 dollars).¹ According to Lynn Karoly's (1994) calculations, the bottom 25th percentile of all male wage and salary workers average weekly earnings fall from \$259 in 1973 to \$242 in 1979, drop to just \$209 by 1984, and then rebound slightly to \$218 in 1989 (in 1986 dollars).

This drop in the value of wages coincided with a sharp increase in earnings inequality.² Perhaps the most highly publicized characteristic of recent earnings trends has been the widening gap between highly educated and poorly educated workers. Two wage trends stand out in the 1980s (see Table 1). First, the real earnings of college educated female workers grew rapidly (14 percent), and second, the earnings of poorly educated men declined substantially (20 percent for those with less than a high school degree and 11 percent for those with just a high school degree). Although real earnings among low-skill men, as measured by educational attainment, also fell in the 1970s, the percentage declines were three to four times larger in the 1980s, a decade in which the average earnings of male college educated workers increased modestly.³

These data indicate that the growth in male earnings inequality across education groups in the 1980s was due mainly to the sharp drop in the earnings of low-skilled men. More importantly, over the course of this decade there was a huge decline in the share of low-skilled workers able to rely on wage earnings to keep a family out of poverty. Acs and Danziger (1993) report that between 1979 and 1989 the incidence of "low earnings," defined as earnings less than the poverty line for a family of four, rose from 8 to 15 percent for employed male high school graduates, and increased from 13 to 30 percent for men with only some high school. The problem of low earnings was substantially worse for black and Hispanic men: 25 percent of all employed black

men and 41 percent of all employed Hispanic men with less than a high school degree earned poverty-level incomes in 1989, far above their 1979 levels (Acs and Danziger 1993).

Although supply-side changes appear to provide a reasonable explanation for the modest wage growth experienced by the most well-educated men in the 1980s,⁴ this collapse at the bottom of the earnings ladder is almost universally attributed to downward shifts in the demand for low-skill workers. According to this view it was the growing mismatch between the skills demanded by firms and those supplied by the workforce that was mainly responsible for reducing wages among the low-skilled. Reflecting this skill mismatch perspective, Secretary of Labor Robert Reich has recently attributed rising shares of poverty-wage workers and growing wage inequality to the "mismatch between the skill Americans have and the skills the economy requires. . . . The long-term crisis in advanced industrial nations reflects in part a shift in relative labor demand against less-educated workers and those doing routine tasks and toward workers with problem-solving skills" (Reich 1993).

The most widely accepted explanation among economists for the presumed skill mismatch is technological change in the workplace.⁵ Although controversial, it has also been argued that another factor contributing to the shift in the demand for skills is growing import competition from low-wage developing countries, which has reduced the demand for low-skill workers, particularly in trade sensitive industries. At least part of the popularity of the technology-trade story can be found in its apparent consistency with the empirical evidence on the skill upgrading effects of computer-based workplace technologies and the growth in the share of imports in the 1980s.

But the technology-trade story is also attractive because of its consistency with the simple neoclassical (demand and supply) model of the labor market.⁶ Assuming that there have been no major changes in the supply of low-skill workers, a decline in the relative wage is just what economists would expect to happen if new production technologies and growing imports have driven down the demand for low-skill labor. Without changes in labor supply, a decline in demand

for low-skilled workers should lower both their wages and employment. The implications of this view are obvious: public policies should attempt to raise the skills of the low-skilled workforce.

Unlike the simple textbook model of the labor market, which provides the intellectual framework for the skill mismatch story, the institutionalist tradition sets wages not only by the forces of supply and demand but by bargaining power in the context of wage-setting institutions and social norms. From this perspective, an alternative explanation emerges, one that puts at center stage the new confrontational approach of employers and a fundamental shift toward laissez-faire public policies that can be clearly seen in the late 1970's, in the midst of a nationwide productivity slowdown, high inflation, and growing trade competition. But this shift from social well-being and public choices to individual well-being and market outcomes reflected more than just changing business conditions. Since other developed nations faced similar economic challenges without resorting to a dismantling of public and private institutions designed to protect the living standards of low-skill workers, the distinguishing feature of the wage collapse in the U.S. must be sought in the political and ideological realms.

In a political environment in which government policies have been far more favorable to employers (and hostile to workers) than in previous decades (see for example Phillips, 1991), and spurred by the success of confrontational labor practices by some highly visible large firms in trade-sensitive industries, long-accepted practices designed to shield workers from the full force of labor market competition were abandoned by employers. "Effective" management became synonymous with "low-road" wage and employment policies, which included challenging the legitimacy of labor unions and collective bargaining, demands for wage and benefits concessions, plant relocation to low wage sites, outsourcing to low wage firms, and an increased reliance on low wage part-time and temporary workers. These low-road employment practices reflect, in part, increasing pressure from the financial sector on management to maximize short-run profits. Government policy also greatly facilitated the low-road strategy by placing the priority on fighting inflation rather than unemployment, deregulating key industries, weakening the enforcement of labor laws and anti-trust enforcement, and by allowing the minimum wage to decline sharply in

value, which undermined the wage floor that had propped up the entire lower end of the wage structure.

This paper assesses the empirical support for the skill mismatch story, outlines an institutionalist alternative, and contrasts their policy implications. The first part of the paper considers the empirical support for the underlying premise of the skill mismatch explanation for the earnings collapse: Has there, in fact, been a strong shift in demand away from low-skill workers? Does the timing of employment shifts by skill group across industries match trends in computerization? Have there been observable declines in low-wage employment shares and substantial increases in low-skill joblessness, as the neoclassical model would predict if there is skill mismatch? I find that the answer to each of these questions is no and conclude that it is necessary to look beyond supply and demand shifts to explain the wage collapse. The second part of the paper represents a tentative first attempt to do this. And as befits a Policy Brief, the paper concludes with a discussion of the policy implications of the two explanations.

Empirical Evidence of a Skill Mismatch

Computerization and Shifts in the Demand for Skills

A critical factor raising demand for more skilled workers relative to less skilled workers is technological change that favors higher skills. In the 1980s, the increased use of microcomputers and computer-based technologies shifted demand toward more educated workers. . . . Whether because of computerization or other causes, the pace of relative demand shifts favoring more skilled workers *accelerated* within sectors (Freeman and Katz 1994).

There has been an across the board increase in the ratio of skilled to unskilled workers employed within each industry, in spite of the rise in relative wages of the skilled (Krugman 1994).

As these passages suggest, it is widely accepted among economists that a large and accelerating shift in demand away from low-skill workers characterized the decade of 1980s. Undoubtedly,

part of the attractiveness of the skill-shift story is the seeming plausibility of skill-biased technological change as the source of the demand shifts. The rapid diffusion of computer-based production technologies and an increasingly competitive environment since the early 1980s has made popular the view that the old regime of large, integrated, capital-intensive plants relying on low-skill manual labor is being transformed into a new production system made up of small, flexible, technologically advanced firms dependent on an elite cadre of highly educated workers. Unlike the traditional “Taylorist” model, the new “high-performance” workplace requires workers who must possess the cognitive and diagnostic skills necessary to perform a broad range of frequently changing tasks. Workers with obsolete or insufficient skills will get paid less and ultimately lose their jobs, leaving behind a more skilled workforce.

But there are some problems with this story. Harrison (1994) has convincingly argued that small firms tend to be the least technologically advanced and to employ workers at the lowest wages. Recent research has consistently shown that high-performance workplaces tend to be in large establishments. A 1993 survey by the U.S. Department of Labor gathered information on the presence of six possible “alternative work practices” in establishments commonly cited as the hallmarks of high-performance workplaces. The results show that in only about 20 percent of large establishments (defined as having more than 50 employees) was there evidence of just two of these practices, and only 6 percent of these establishments reported having implemented as many as four alternative practices (Gittleman, Horrigan, and Joyce 1995). These figures suggest that even by the early 1990s only a very small share of establishments had been transformed into high-performance, and, presumably, high-skill workplaces.

Yet, it is widely accepted that skill-biased technological change has produced a collapse in the demand for low-skill workers. Two studies are often cited to provide empirical support for this “fact” (Katz and Murphy 1992; Berman, Bound, and Griliches 1994). A common feature of both studies is a focus on changes between business cycle peaks (1979 and 1989) rather than on annual trends. While this methodology is appropriate for detecting long-run trends and for analyzing data whose movements are extremely sensitive to the cycle, focusing on endpoints can submerge

important information about overall trends.

Examining manufacturing industries and defining the skill mix of employment as the share of nonproduction employees in total employment, Berman, Bound, and Griliches (1994) point out that there was a large increase in the nonproduction share of manufacturing employment in the 1980s: "Between 1979 and 1989 the employment of production workers in U.S. manufacturing dropped by a dramatic 15 percent from 14.5 to 12.3 million, while non-production employment rose 3 percent from 6.5 to 6.7 million." The authors interpret these trends as evidence that the manufacturing sector experienced substantial skill upgrading over this decade and conclude that "biased technological change is an important part of the explanation" (Berman, Bound, and Griliches 1994).

Since the diffusion and effective use of computer-based technologies is rapidly increasing, a technology-based explanation for skill restructuring implies that the decline in demand for low-skill jobs should have become progressively greater throughout the decade. Indeed, Berman, Bound, and Griliches report a rapid increase in the rate of growth of computer investments as a share of total investment in manufacturing, rising from 2.79 percent in 1977 to 3.92 percent in 1982 to 7.49 percent in 1987. Figure 1 shows that the real investment in office, computing, and accounting machinery per full-time equivalent worker took off after 1983 in both manufacturing and service industries, increasing from less than \$200 per full-time worker in 1982 to between \$600 and \$700 per worker in 1989. By 1992 computer spending ranged from \$900 per worker in services to over \$1,000 in manufacturing.

Yet, the employment trends presented by Berman, Bound, and Griliches show that virtually all of their observed skill upgrading took place in 1980, 1981, and 1982—well before computer spending took off.⁷ Indeed, their data indicate that the nonproduction share of employment in 1989 was identical to the share six years earlier. It is worth noting that real production worker wages fell *continuously* from 1979 to 1993 (Mishel and Bernstein 1994a).

Figure 2 provides data on the nonproduction employment shares for durable, nondurable, and total manufacturing between 1970 and 1992. The graph shows that the change in this measure of the skill mix in manufacturing can be traced largely to developments in the most trade-sensitive sector—durable goods manufacturing—between 1980 and 1982. The share of nonproduction workers in this sector increased sharply, from 28.6 percent in 1979 to 33.8 percent in 1982, and then fluctuated between 33.2 and 34.1 percent over the next 10 years. Although Berman, Bound, and Griliches note that employers use recessions to restructure, there is no evidence that there was a substantial shift in skill mix in the 1990–1991 downturn. If biased technological change explains skill shifts, why would the use of new workplace technologies cause a sharp skill restructuring between 1980 and 1982 but not between 1983 and 1992, when the latter period was characterized by a far higher rate of investment in computer-based equipment?⁸

Table 2 provides additional evidence on the stability of the skill mix in manufacturing after the recessions of 1980 and 1982. Between 1983 and 1988 the ratios of craft to semi-skilled workers, technicians to clerical workers, and professionals to managers remained virtually unchanged. But as the first row shows, the ratio of craft workers to laborers declined steadily from about 4 in 1983 to 3.4 in 1987 (it then rose slightly to 3.5 in 1988). These figures do not suggest a technological transformation of the workplace, nor the magnitude of skill restructuring that would be necessary to explain the enormous earnings declines suffered by low-skill workers over this period.

To provide a more detailed portrait of shifts in skill composition, skilled and unskilled occupations can be distinguished within both white-collar and blue-collar occupations separately for the manufacturing and services sectors. Skilled white-collar workers can be defined as those employed in managerial, professional, and technical occupations, while low-skilled white-collar workers are in administrative support occupations.⁹ Skilled blue-collar jobs include mechanics and repairers, construction and extractive trades, and precision production occupations, while low-skilled blue-collar jobs refer to operators and assemblers, transportation and material moving occupations, and laborers and guards (Howell and Wieler 1996). As in the Berman, Bound, and

Griliches study, skill shifts are measured by changes in occupational employment. Although skill upgrading may be taking place within occupations, if the mismatch story is right, a large movement away from low-skill occupations should be observed throughout the decade reflecting the rapid increase in computer intensity after 1982.

Figures 3a and 3b show the changes in the low-skill shares of total employment per low-skill worker in both blue-collar and white-collar occupations and the real value of investment in office, computing, and accounting machinery (primarily computers) per worker for manufacturing and service industries between 1978 and 1990. Although sharp increases in computer spending per worker can be observed after 1982, shares of low-skill blue-collar employment remained stable and low-skill white-collar employment experienced only modest declines. In manufacturing, the low-skill blue-collar share fell sharply between 1978 and 1982 (from 45.1 percent to about 40 percent) and remained stable for the rest of the decade, while the share of low-skilled white-collar workers declined fairly steadily between 1982 and 1990 (from 12.6 percent to 10.6 percent). Consistent with the growth in computer intensity, almost all of the change in the clerical share of employment occurred after 1986.

These figures indicate that there was significant restructuring away from low-skilled blue-collar jobs between 1978 and the early 1980s and away from low-skilled white-collar jobs at the end of the 1980s in both services and manufacturing. These employment trends do not suggest that computerization had a strong effect on low-skill male employment shares. This is the case even in so-called 'high-tech' manufacturing industries, such as machinery, electrical machinery, instruments, and transportation equipment), which show similar.

Another primary source of evidence for strong shifts in labor demand against low-skill workers is Katz and Murphy (1992), who conclude that "rapid secular growth in the relative demand for 'more-skilled' workers is a key component of any consistent explanation for rising inequality and changes in the wage structure over the last 25 years." But again, the employment data indicate that the skill mix of jobs has been remarkably stable since 1983. The real question for our

purposes is somewhat different: Do demand and supply shifts alone offer a convincing explanation for the collapse in real earnings among less-skilled workers?

Table 3 presents estimates by Katz and Murphy of changes in wages, changes in the supply of labor and changes in the demand for labor in the 1970s and 1980s.¹⁰ Their estimates indicate that although there was a downward shift in demand for low-skill workers in the 1980s, it was modest and similar in size to the shift in the 1970s. If technological change has indeed caused downward shifts in demand, the Katz/Murphy evidence indicates that these shifts were no larger than the demand shifts in the 1970s, before computerization could have played any important role.

Supply, on the other hand, shows a huge decline (−40.9 percent) after increasing in the 1970s (+18.7 percent). But despite far larger declines in supply than demand, wages fell sharply in the 1980s (−15.8 percent for high school dropouts, −19.8 percent for high school graduates). Within a simple demand and supply framework, it is hard to reconcile the wage collapse in the 1980s with these demand and supply numbers—the large decline in supply relative to the decline in demand should have *raised* low-skill wages in the 1980s relative to the 1970s. In sum, the evidence does not provide strong support for the mismatch view that shifts in labor demand explain the wage collapse.

Joblessness and Low-Wage Employment Trends

If the 1980s were characterized by a strong “twist” in labor demand—that is, a sharp downward shift in the demand for low-skill workers and an upward shift in the demand for high-skill workers—for a given workforce, the simple demand and supply model predicts that we should observe growing joblessness among low-skilled workers and a declining share of employed low-skill workers in total employment.¹¹ Moreover, if the pool of low-skill jobs declines relative to total jobs, the share of workers employed in them and paid lower wages should be smaller. This section examines the evidence for these two predictions - rising joblessness and declining shares of workers employed at low-wages.

Skill Mismatch and Joblessness

The skill mismatch explanation predicts an increase in joblessness as the demand for low-skill work declines: there is a growing mismatch between the number of low-skill jobs and the number of low-skill workers. Indeed, high unemployment and nonparticipation rates have been frequently cited as evidence of a decline in demand for low-skill workers. Chinchui Juhn (1992), for example, infers from declining real wage and labor force participation trends that “job market opportunities have . . . deteriorated significantly for less-skilled workers.” Similarly, Juhn, Murphy, and Pierce (1993) write that the “fall in wages for the least skilled is symptomatic of a fall in demand for low-wage workers” and conclude that “there are simply too few low-wage jobs . . .”

But were joblessness rates, in fact, higher in the 1980s than in earlier decades, and did they rise over the course of the decade? Robert Topel (1993) has shown that joblessness increased between the late 1960s and late 1980s. But according to the skill-biased technological change story the relevant time period was the 1980s, and specifically the post-1982 period. However, his data show a clear upward trend in joblessness only through the recession years of 1980 and 1982.

Changes in the employment-to-population ratio do not suggest that there was a sharp contraction in job opportunities during the 1980s for those with the lowest cognitive skills. For nonwhite workers the employment rate rose from 55.2 percent to 58.2 percent between 1979 and 1989. For youth aged 16 to 19 years, the employment rate dropped during the decade by only 1 percentage point (U.S. Department of Labor 1994). For black males aged 20 to 24 years—a demographic group as likely as any to be negatively affected by a declining demand for low skill workers—the employed share of the population fell sharply from 72.6 percent in 1973 to 53.9 percent in 1982, but then rose steadily to 63.9 percent in 1988. Thus, the employment rate for young black men at the end of the 1980s was about what it was in 1979. The data for other male groups show similar trends (U.S. Department of Labor 1989).

For all 25 to 34 year-olds, the unemployment rate was 5.2 percent in both 1979 and 1989.

Unemployment rates for high school graduates were about the same in these two years. The rates for teenagers and black workers, however, both were lower in 1989 than in 1979. Only those with less than four years of high school (about 15 percent of the workforce in the mid-1980s) show a higher unemployment rate in 1989 than 1979 (U.S. Department of Labor 1994).

It can be argued that joblessness among the low skilled was too high in the 1980s, and that this surplus pool of workers was a necessary condition for the success of the confrontational strategy adopted by employers to reduce costs and raise profits in this decade. But the data do not show higher levels of joblessness in the 1980s than in the 1970s, and there is no evidence of rising rates over the course of the decade. We can ask, then, if the problem is that there are simply not enough jobs due to the increasing skill requirements of new workplace technologies (and perhaps also due to trade patterns) in the 1980s, why did joblessness and unemployment increase sharply in the 1970s but show little or no increase between 1979 and 1989?

Skill Mismatch and Low-Wage Employment

The simple labor market model assumes a close, if not perfect, correspondence between the skill and wage distributions: higher skilled workers are paid higher wages.¹² If it is true that technological change and trade resulted in reduced low-skill job opportunities, as the skill mismatch story claims, fewer workers should have been paid low wages (as joblessness increased).¹³

To examine this prediction, I calculated the share of young (16-39) workers earning low wages and the share with low educational attainment.¹⁴ Low earnings are defined as 1.5 times the poverty level for an urban family of three, which, for a full-time full-year worker, amounts to an hourly wage of \$8.09 in 1988. Low-wage workers are defined as those making less than this hourly wage (adjusted for changes in costs of living for each of the four years examined). Low skill is defined as educational attainment that does not go beyond high school. While this is by no means an adequate measure of the skills required in the workplace (see Howell and Wolff, 1991),

it does offer a convenient and familiar measure of cognitive skills and may do a reasonable job of capturing relative changes in skill requirements. Since the purpose was to provide insight into current labor market conditions, only those in the first half of their careers (ages 16 to 39) were included in the analysis.

The results show that the share of employed young workers with low educational attainment declined throughout the 15-year period, from 62.8 percent in 1975 to 55.5 percent in 1990, a decline that is consistent with the figures presented by Katz and Murphy (1992). Although the technological change explanation would suggest that the greatest rate of decline should have taken place in the second half of the 1980s when the demand for skills presumably accelerated and those without adequate skills dropped out of the labor market, the data indicate that the most rapid decline actually took place in the early 1980s.

In contrast, the low-wage share of the young workforce increased from 50.6 percent to 55.8 percent from 1975 to 1990, with the largest jump again occurring in the early 1980s, findings that are consistent with those of Acs and Danziger (1993) on the growing incidence of low-wage employment.

While it might be argued that these shifts simply reflect changes in the composition of employment, the same trends appear at the industry level, particularly for goods producing industries. For example, between 1975 and 1990 restructuring in the stone, clay, glass, and primary metals industry (which includes steel) resulted in a 9 percent decline in the share of low-skill employment (from 77 percent to 70 percent) but a 76 percent increase in the share paid low hourly wages (from 23 percent to 40 percent). The communications industry saw its low-skill share decline by 33 percent (from 58 percent to 39 percent) and its low-wage share increase by 33 percent (from 22 to 29 percent). Even more dramatic, the automobile industry's low-skill employment share declined by 6 percent (from 76 percent to 71 percent) but its low-wage share grew by 142 percent (from 17 percent to 40 percent).¹⁵ Goods industries with a high-wage, low-skill workforce appear to have restructured in the 1980s by radically lowering wages and

gradually raising skill requirements—in short, by moving in the direction of the typical service sector workplace.

In sum, these data do not provide strong support for the skill-shift story. The mismatch assumption of strong declines in labor demand should lead to sharp declines in low-skill (and low-wage) employment, an effect that is compounded if the supply of low-skill workers also declines, as the data suggest has happened. Similarly, the upward shift in demand for high-skill workers should lead to an increase in high-skill (high-wage) employment. If both shifts occur simultaneously, as the skill-shift story contends, we should observe declining low-skill (and low-wage) shares of the workforce and accelerating joblessness among the least skilled. But what we actually observe is stability in the skill distribution after 1982, strong increases in the low-wage share of employment throughout the decade, and little evidence of deterioration in unemployment, employment rates or joblessness between 1979 and 1989.

Computerization and Earnings

Workers in the U.S., particularly those with low education, experienced a collapse in wages in the 1980s, but there is little evidence of skill shifts, rising joblessness, or declining shares of workers paid low wages. Is there evidence suggesting a direct link between skill-biased technological change - such as computerization - and earnings? What has been established is a statistical link between earnings and the use of computers on the job. In an extremely influential paper, Krueger (1993) concludes that “the expansion of computer use in the 1980s can account for one-third to one-half of the increase in the rate of return to education.” Although it is hard to argue with the statistical analysis, it seems fair—and appropriate—to challenge the substantive meaning of the statistical association that is found between computer use and wages. Indeed, a new study that tests this relationship with U.S. and German data comes to the striking conclusion that, while Krueger’s results are replicated, there are “similar wage differentials for the use of pencils at work as for computers” (DiNardo and Pischke undated). They interpret their results to imply that the payoff to computer use does not reflect “an actual productivity differential. Instead, the results

taken together seem to suggest that computer users possess unobserved skills that are rewarded in the labor market, or that computers were first introduced in higher paying occupations or jobs. We argue that all the results in Krueger (1993) can be interpreted in this light.” It is worth noting that among the largest low-skill jobs showing the largest declines in real earnings are truck drivers and construction laborers, who do not use computers, as well as cashiers and retail sales clerks, who do.

Further doubts over a substantial role for technology in the wage collapse for low-skill workers are raised by two additional studies. According to Steven Allen (1993), the main effect of technological change, which he measured by a proxy for R&D activity, is on the earnings growth of the most highly skilled workers. As he puts it, “rising R&D activity is associated with higher wages for college graduates, but is completely unrelated to wages of other educational groups. This implies that the correlation between R&D and returns to schooling . . . reflects greater wage growth for college graduates in R&D-intensive industries, rather than a negative demand shock for high school graduates employed in those industries.”

Mishel and Bernstein (1994b) find that technology (as measured by investment in equipment and computers and the share of scientists and engineers in employment) had no greater, and perhaps a lesser, effect on wage inequality in the 1980s than in the 1970s. Indeed, as the example of the use of scanning devices by cashiers suggests, there is evidence that the use of computer technologies in production can reduce the skill requirements of many jobs and increase job opportunities for the least skilled.

Just as there is no evidence showing an exceptionally large shift in the demand for skills in the 1980s, a convincing causal link between computers and changes in the wage structure has yet to be established. We need to turn elsewhere for a convincing explanation of the wage collapse.

An Alternative Story: The Political Economy of the Wage Collapse

Our findings call into question the standard model of the labor market that has dominated economists' thinking for the past half century (Card and Krueger 1995).

I am convinced there has been a shift on the part of the business community toward confrontation, rather than cooperation . . . I believe leaders in the business community, with few exceptions, have chosen to wage a one-sided class war on this country (Fraser 1978).

An Institutional Framework

There is no simple way to accommodate the evidence presented above within a conventional demand-and-supply framework in which the distribution of wages reflects the distribution of skills. As the Card and Krueger passage quoted just above demonstrates, there is an increasing willingness to challenge the framework. Indeed, there is a long tradition among labor economists and labor relations specialists that rejects the simple competitive model of the labor market. In this institutionalist tradition, the forces of supply and demand set only the boundaries within which wages are set; within these boundaries, wage ranges are set for each job and individual pay is set within each job. In this view, wages are not a simple determinant outcome reflecting the current state of supply and demand, but an indeterminate outcome that reflects a complex process of explicit or implicit collective and individual bargaining between workers and management. As the prominent “neo-institutionalist” Clark Kerr (1988) puts it, “economists, or at least labor economists, should be less concerned with studying solutions exactly determined (and thus subject to being known in advance) and more concerned with ranges of possible solutions, as Edgeworth and Pigou and Lester (1952) have argued . . .” Supply and demand matter, but so do management strategies, worker militance and organization, and perceptions of fairness and community values.

This alternative perspective builds on the work completed during the early post-war period by “neoinstitutionalists” such as Dunlop, Slichter, Kerr, and Lester (see Kaufman, 1988).¹⁶ Within a certain range, employers may, for strategic reasons, choose high or low starting wages and a particular wage-tenure profile. There are a variety of reasons to suppose that employer choice and collective bargaining agreements within a particular wage-setting environment better captures the reality of how wages are determined than the conventional demand-and-supply model's set of

unique wage-employment equilibria. The availability of information about worker performance, the extent of idiosyncratic and firm-specific skills, the role of teamwork in production, the degree of price-making behavior in product markets, and the share of labor in total costs varies widely across workplaces. Where the marginal product of a particular worker is unknown, where variation in effort has a substantial impact on marginal productivity, and where the product and/or labor market do not closely resemble the competitive prototype, fairness and morale will be important for the overall productivity of the workplace and wage-setting will reflect social norms of fairness (Akerlof 1992; Bewley 1995). If this diversity accurately describes the environment within which wages are set, substantial differences in wages can be predicted for a given level of skills across establishments, firms and locations.

Research has consistently lent strong support for the view that there exist wide variations in wages for workers with similar skills with no tendency to narrow over time. John Dunlop (1957), for example, found that the hourly wages of male truck drivers organized by the same union in Boston ranged from \$1.20 for wholesale laundry to \$2.25 for magazines. About three decades later, Katz and Summers (1989) calculated noncompetitive the wage differentials that remained after controlling for all the individual characteristics that might affect a worker's productivity. The results showed extremely large differences, ranging from a 21.1 percent premium for transportation equipment workers to a 15.3 percent penalty for apparel workers. In an earlier paper, Krueger and Summers conclude that “the inter-industry wage structure cannot possibly be interpreted as a competitive outcome.

Taking the Low-Road

In an institutionalist story, changes in ideology, politics, notions of fairness, and labor market institutions join the “economic” forces of supply and demand to determine wage and employment outcomes; as a result, changes in the wage distribution can take place independently of changes in the skill distribution. Although we sacrifice the elegant simplicity of the neoclassical skill mismatch story, a “political economy” story that is founded on institutionalist perspectives is

necessary to adequately explain the collapse in the economic well-being of low-skill workers since the late 1970s.

There is considerable evidence of a fundamental shift in wage-setting norms and institutions toward confrontation in the late 1970s. Not surprisingly, labor union leaders and industrial relations experts were among the first to recognize the shift. In 1978 the president of the United Automobile Workers (UAW), Douglas Fraser, wrote that

The leaders of industry, commerce and finance in the United States have broken and discarded the fragile, unwritten compact previously existing during a past period of growth and progress . . . today, I am convinced there has been a shift on the part of the business community toward confrontation, rather than cooperation . . . I believe leaders on the business community, with few exceptions, have chosen to wage a one-sided class war on this country . . . (quoted by Gordon 1996).

Academic research in the early 1980s lends support to Fraser's view that a profound shift by employers towards confrontation over wages was underway. According to Daniel B. Mitchell, a new balance of power had developed:

The longevity of the (wage) concession movement and its spread to less-than-dire situations suggest that the initial concessions have encouraged other employers to try their luck in demanding similar settlements . . . Management, cheered by what is perceived as a shift in the balance of power, has changed its bargaining goals . . . The political and legal climate change has been reflected in a greater willingness of management to take actions in labor disputes that might not have been publicly or politically acceptable in the past... Even firms with a long history of unionization are using nonunion labor (Mitchell 1985).

Other industrial relations experts have confirmed that management's approach to the workforce shifted dramatically in the early 1980s. Kochan, Katz, and McKersie (1994) write that "now more than ever, the U.S. labor market is a place where anything and everything goes." While some firms adopted high-road employment policies and maintained or increased real wage levels, most appear to have taken the low-road, adopting employment policies aimed at reducing short-run labor costs. As the authors put it, this new management approach reflects a "managerial autocracy

common to the early twentieth century.” Similarly, according to former Labor Secretary Ray Marshall, rather than invest in the technology and training necessary to create “high performance” workplaces, “. . . U.S. companies have been competing mainly through reducing domestic wages and by shifting productive facilities to low wage countries” (Marshall 1992).

What caused this shift to the low-road by employers? Recent economic research on earnings inequality has focused on a variety of possible culprits: technology, unionization, trade, immigration and the minimum wage. The problem with this literature is that it is difficult to generate a coherent story since most of the research consists of the impact of one or another of these factors on wage differentials. Regression-based studies that attempt to “do it all” run into the problem of inadequate and interdependent measures.¹⁷

Diagram 1 represents an effort to outline an institutional explanation of the wage collapse. This “political economy” approach places the role of wage-setting institutions in a larger political and economic context, drawing attention to the importance of, first, the political and ideological shifts that began to appear in the 1970s (which produced laissez-faire public policies and growing hostility towards labor by public and private sector policy makers), and second, the globalization of product and labor markets. These were mutually supporting developments, and both served to increase competitive pressures—price competition among employers and wage competition among workers.

The effects of globalization are reflected in two key developments shown in the top right-hand corner of the diagram: economic growth among less developed countries and the convergence of all nations toward U.S. standards of living (Baumol, Blackman, and Wolff 1989), and technological advances in communications and transportation, which has facilitated international information and trade flows. While both developments characterize the entire post-World War II period, with the 1970s, European and Japanese competitors had caught up and a major upward shift in the technical ability and incentive to move production to developing countries took place. Faced with a growing threat from imports at the same time that opportunities to realize lower

labor costs through outsourcing and plant relocation were increasing, many U.S. firms responded by making wage and benefits cuts their top priority. But as the diagram indicates, other developed nations have faced these same pressures and opportunities. Only in the United States, however, did the outcome of adjustment to globalization generate collapsing real wages for low- and moderately-skilled workers.

The distinguishing feature of the U.S. experience has been the massive political and ideological shift in public opinion, management beliefs, and government policy, which facilitated and actively encouraged an assault on the wages of those with the least bargaining power—the low-skilled—by employers. This new political context is identified at the top left of the diagram. It is widely recognized that throughout this century there has been a “public-private cycle” (Schlesinger 1986): the 1920s, 1950s and 1980s stand out as periods in which public ideology and government policy have shifted strongly away from government toward market solutions. There are, as Hirschman (1982) puts it, “oscillations between periods of intense preoccupation with public issues and of almost total concentration on individual improvement and private welfare goals.” Reflecting such a change in national preferences, policies initiated during the Carter administration set the stage for the Reagan years and what Kevin Phillips (1991) has called “one of America’s ‘capitalist blowouts.’” Phillips points to the ideological underpinnings of the radical redirection of government policy and the predictable consequences for the distribution of income:

In each of the three great U.S. capitalist eras . . . genuine (*laissez-faire*) philosophic and cultural conviction expanded, elevated, and prolonged the wave of capitalist expansion . . . the resemblance between the policy framework of the 1980s, the Coolidge era and the Gilded Age was not a coincidence. Striking similarities existed in fiscal, monetary, deregulatory, and reduced-government approaches—and led to similar inequalities of wealth and income distribution. The new economics of the 1980s had gained momentum, to be sure, because of a *preexisting*, broader national conservative trend and coalition, reinforced in the late 1970s by a larger wave of inflation and popular frustration with big government. Yet it was absolutely critical that reemergent capitalism also enjoyed something more: a missionary spirit—and dedicated missionaries (Phillips 1991).

The political swing from public action to private interest has been manifested in government

policies that actively promote or facilitate market solutions and employer interests. Deregulation has contributed to greater competition in product markets, particularly in trucking, airlines, bus transportation, and telecommunications—all formerly high-wage industries. The decline in anti-trust enforcement encouraged the mergers and acquisitions that led to the restructuring of many firms, often at the expense of well-paid workers. President Reagan’s highly publicized attack on the air traffic controllers in 1981 set the stage for changes that weakened both labor law and its enforcement, and allowed a 30 percent decline in the value of the legal minimum wage. A radical change in the composition and leadership of the National Labor Relations Board also had profound effects on the balance of power between management and workers.¹⁸

Equally important, pressure from the financial sector on firms to adopt short-run profit-maximizing strategies increased dramatically in the 1970s and 1980s.¹⁹ A good example is provided by Albert Dunlap, the former CEO of Scott Paper, who, in an article in *Harper’s*, explains that “the responsibility of the CEO is to deliver shareholder value. Period. It’s the shareholders who own the corporation. They take all the risk. And how does the CEO maximize value? He does that by focusing on profit. . . . sometimes you have to get rid of people” (Clara and Noer 1996). Dunlap was successful. According to *Harper’s*, “during his two-year[s] at Scott paper] he increased the company’s stock price by 225 percent, laid off 11,000 workers, and arranged for the company to be purchased by Kimberly-Clark, one of its biggest competitors.” This exclusive concern with maximizing shareholder value in the short-run represents a new development in the 1980s, a concern that would have been socially unacceptable to articulate, much less put into practice, in earlier decades.

Employers responded to these competitive pressures and opportunities with labor practices that reflected the prevailing laissez-faire thinking. The new business-friendly political environment encouraged “low-road” management strategies by employers. By the end of the decade there had been a fundamental shift in the human resource policies of firms and the legal rules governing employment practices. As Wachter and Carter (1989) explain,

Until the late 1970s or 1980s, firms rarely made use of their rights under *Mackay Radio* to hire permanent replacements. Instead, firms used managers to replace striking workers temporarily. When replacement workers *were* hired, they were seldom offered permanent jobs. When strikes occur today, replacement workers are more likely to be offered permanent jobs. . . . The rules governing plant closings and relocation are based on newer decisions . . . In simple terms, the rules mean that management decisions to implement partial plant closing, work relocation, asset sales, and even some types of subcontracting are not mandatory topics (for bargaining).

Concession bargaining became widespread by the mid 1980s. Mitchell (1985) shows that the proportion of workers subject to major private union settlements whose wages were frozen or cut ranged from 0 percent to 5 percent from 1964 to 1980, rose to 8 percent in 1981, and jumped to 44 percent in 1982. The rate then fell to 37 percent in 1983, 23 percent in 1984, and 26 percent in 1985. Just 2 percent of settlements had no first-year wage increase in 1981, but this figure rose to 12 percent in 1982 and ranged from 25 to 37 percent between 1983 and 1988 (Mitchell 1989). These data clearly indicate a strong shift towards confrontation by employers in the early 1980s.

The relocation of operations to low-wage sites has also had a downward effect on the relative earnings of many low-skill workers. Although statistical evidence is hard to come by, the anecdotal evidence is overwhelming. For example, according to spokespersons of Pratt and Whitney, the firm's decision to relocate as many as 9,000 high-paying production jobs from a high-skill state (Connecticut) to lower-skill states (Maine and Georgia) was expressly designed to reduce labor costs (Judson 1993). Employers such as Pratt and Whitney have evidently not relocated as a result of shifts in their demand for skills and the introduction of new workplace technologies but, rather, because they have revealed a preference for paying much lower wages to the same workers doing similar tasks.²⁰

Another tactic used to reduce labor costs was to substitute part-time and temporary workers for permanent, full-time workers. The temporary help industry grew eight times faster than employment in all nonagricultural industries between 1978 and 1985 and increased from 620,500 workers in 1984 to 1,031,500 workers in 1989 (Carre 1992). Based on Katharine Abraham's

estimate from an employer survey that there were 1.5 million temporary help workers, short-term hires, and on-call workers in 1986, Carre estimates that there were over 2 million “contingent” workers by 1989. Relying largely on the work of Osterman (1988) and Golden and Appelbaum (1990), Carre (1992) concludes that it is “changes in firm demand for labor rather than changes in workers' preferences (that) have driven the rapid growth of contingent labor in the 1980s.” She also points out that not only do contingent workers offer lower labor costs, but they add flexibility—management gains greater control over work schedules and the way tasks are performed.

Government social policy has also contributed to the undermining of traditional wage-setting norms in the private sector. The United States continues to rely heavily on employers to provide health insurance, pensions, child care, and other fundamental benefits—benefits that represent labor costs to employers. These costs are assumed by the public sector in most other developed countries. As the costs of benefits rise, our “privatized” benefits system encourages employers to substitute part-time and temporary low-wage jobs, increasing both the share of low-wage earners and wage inequality.

To fundamentally alter traditional employment and wage-setting practices within the firm, various institutional changes were necessary. Blackburn, Bloom, and Freeman (1990) have shown that changes in union density and the value of the minimum wage both help explain the decline in the relative wages of low-skilled men. DiNardo, Fortin, and Lemieux (1993) present striking evidence on the central role played by the declining value of the minimum wage on the collapse of wages at the bottom of the wage distribution. They conclude that “labor market institutions are at least as important as supply and demand considerations in explaining changes in the U.S. distribution of wages from 1973 to 1992” (1993).

The undermining of traditional wage-setting institutions may also help to explain the increase in wage inequality within industry, gender, education, and experience groups. Wage norms appear to have broken down within firms, as internal labor markets are opened up to external competition),

within industries, as increasing competition causes differences among firms to become a more critical factor in wage outcomes, and among communities, as transportation and telecommunications facilitate the relocation of some, but not all, firms to lower wage areas. In short, the “law of one price” may have been undermined, not promoted, by the recent wage restructuring. Take, for example, the airline industry. With deregulation “employees at smaller carriers like Republic actually saw their pay go up when bigger airlines, like Northwest, took them over and brought in higher wage scales. But many have felt the pain as the competition set off by deregulation put relentless pressures on costs . . . (Bryant 1993).

The consequence of low-road employment policies—the war on labor unions, demands for wage concessions, plant relocation, outsourcing and an increased reliance on contingent workers—has been declining real wages for those with the least skills, and, as Bennett Harrison (1994) has described it, a job structure that is being transformed from one with a diamond shape (lots of good, relatively low-skilled jobs) to one with an hourglass shape (only the best and worst jobs are expanding). Similarly, Levy and Murnane (1992) conclude that “the male earnings distribution has ‘hollowed out,’ leaving larger percentages of workers at the top and bottom of the distribution, and a smaller percentage in the middle.”

Increasing Supply: The Crowding of Secondary Labor Markets

A necessary condition for effective low-road management strategies is a large pool of willing (or desperate) and able low-skill workers. Traditional measures of labor supply—the number of workers in a particular age-gender-education group—suggests that there was no significant increase in the low-skill labor supply in the 1980s (Katz and Murphy 1993). However, part of the decline in bargaining power that contributed to the wage collapse may be traceable to “unmeasured” increases in the supply of workers willing (or required) to compete for low-wage jobs.

As the middle of the earnings structure narrowed, low-skill workers have crowded into a pool of

“secondary” jobs that remained a fairly constant share of total jobs throughout the 1980s (Gittleman and Howell 1995), tending to lower the wages of what were already the worst jobs in the labor market. According to a recent Department of Labor study (Herz 1991), more than 4.3 million workers were displaced during the boom years of 1985–89.²¹ Only 72 percent had been re-employed by January 1990 and of these, about 10 percent worked part-time. Among those reemployed full-time, about 40 percent earned less in current dollars than on their previous job. Not surprisingly, those least successful in the labor market after displacement were high-wage blue-collar men. According to Herz, “six of every 10 displaced workers in this industry (transportation equipment) earned less on their new jobs than on their old one, and more than half of this group suffered declines of 20 percent or more.”

The downward effect of displaced high-wage low-skill workers on the wages at the bottom of the earnings distribution can also be inferred from research by Robert Topel (1993). Between 1979 and 1988, he finds that “nearly one-third of the unemployed had predisplacement wages above the 60th percentile, and only 14 percent are from the bottom decile. . . . Among displaced workers with prior earnings from the upper four deciles, current wages are about half of their predisplacement level.” Defining the unskilled as those with low wages, Topel interprets his results as showing that “many of the ‘unskilled’ who are unemployed or out of the labor force appear to have been high-wage workers whose specialized skills have become obsolete.”²²

Despite the rising average premium for a college degree relative to a high school degree in the 1980s, a weak job market has forced many lower-level white-collar workers with college degrees to compete for relatively low-skilled jobs. This became particularly pronounced at the end of decade, in the “white-collar recession” of 1990–91. Like the displacement of high-wage blue-collar workers earlier in the decade, this weakening in the middle of the earnings distribution added to the supply of workers competing in the low-skill job market.²³ There is some evidence that computer-based technologies and corporate restructuring have made large numbers of middle-level managers redundant. Howell and Wolff found (1992) that the use of new technologies had a downward effect on the share of both managers and clerical workers between

1970 and 1985. Consistent with this finding, Kuster's (1993) case study of the commercial banking industry found that between 1987 and 1990 there was a 13 percent decline (from 45,000 to 39,000) in general managers, a decline from 2.9 percent to 2.5 percent of total industry employment.

In support of this twist in the skill mismatch story, data from the Panel Study of Income Dynamics (PSID) show that in the late 1970s about 40 percent of the sample reported themselves to be "over-educated" for their jobs (Sicherman 1989). According to recent reports by economists from the U.S. Labor Department, throughout the 1980s about 20 percent of college graduates were working at jobs that don't normally require a degree, and this is expected to increase to 30 percent at the end this decade (Hecker 1992, Shelley 1992). Declining opportunities in the middle of the job ladder might be expected to have the greatest negative impact on minority workers. In fact, the share of black and Hispanic college graduates with poverty-level wages rose dramatically in this decade, from about 9 percent to just under 15 percent. If the unemployed and those who had stopped looking for work are included, the incidence of low earnings among college graduates rose from 14.6 percent to 21.4 percent for black men and from 11 percent to 19.4 percent for Hispanic men (Acs and Danziger 1993). It seems reasonable to assume that one consequence of declining opportunities for moderately skilled white-collar jobs has been to force those with training for white-collar jobs to compete for jobs with low cognitive skill requirements, contributing a downward pressure on their wages.

Immigration patterns compounded the downward effect that displaced high-wage workers had on the wage rates of low cognitive skill jobs. As Vernon Briggs (1993) has documented, there was an unprecedented increase in the flow of low skill foreign workers into the U.S. in the 1980s, both legal and illegal. The foreign-born share of the workforce increased from 6.4 percent in 1980 to 9.7 percent in 1994 (Borgas, Freeman, and Katz 1996). Significantly, this recent wave of immigrants is far less skilled, at least in terms of educational attainment, than earlier waves of immigrants in the post-war period. Friedberg and Hunt (1995) report that 43 percent of new immigrants do not possess the equivalent of a high school degree. And according to a recent

study by David Jaeger (1995), employed male immigrants were about 16 percent of the civilian workforce with less than a high school degree in the nation's 50 largest metropolitan areas in 1980; by 1990 this figure was over 30 percent. For women the growth in this low-skill immigrant share was almost as spectacular, rising from 17 percent to almost 28 percent.

Although the econometric evidence on the effects of immigrants is mixed and controversial, a recent paper by Borgas, Freeman and Katz (1996) concludes that "immigrants contributed more to the decline in the relative earnings of high-school dropouts than trade, while both modestly reduced the earnings of high-school workers relative to college workers." Indeed, it is hard to imagine how a large influx of low-skill workers during a period in which demand for them was stagnant or declining would not have a downward effect on workers wages, since these workers compete in the most unsheltered parts of the labor market. Not surprisingly, therefore, case study evidence supports this common-sense view. In his study of the Los Angeles restaurant and hotel industry, Waldinger (1992) concluded that "the story of black displacement in restaurants and hotels can be traced not to skill upgrading, but rather to competition with a rapidly growing immigrant population." Similarly, a General Accounting Office study cited by Jack Miles (1992) found that "Janitorial firms serving downtown Los Angeles have almost entirely replaced their unionized black workforce with non-unionized immigrants." Again, it appears to have been the drive to lower labor costs that explains this result.

A Political-Economy Explanation

The difficulties posed by the measurement and the interdependence of the key determinants make this institutionalist story easier to diagram than to statistically test. But the importance of changes in trade patterns, unionization rates, and the value of the minimum wage on relative wages in recent empirical studies supports this approach, as does the anecdotal evidence on wage concessions, outsourcing, plant relocation, and the use of contingent and part-time workers. For purposes of both coherence and policy making regarding the wage collapse, it is crucial that these proximate determinants be understood in the larger context of a new, more competitive business

environment in which political and ideological shifts have lifted the constraints on the adoption of the “low-road” management strategies.

Other nations have chosen to operate under different labor market rules. As Freeman (1994b) points out, “the United States represents the decentralized extreme in wage setting.” Still, since the late 1970s, political choices have been made to move further in this decentralized direction, and wage-setting institutions that had once provided some protection of the forces of labor market competition have been undermined or dismantled. It was no coincidence that among developed countries, only Great Britain—also relatively decentralized—experienced a comparable increase in inequality. But the U.K. experience was unlike that in the United States in one crucial respect: real earnings among the least skilled increased. The collapse of wages for those with low educational attainment was a uniquely American experience.

Policy Implications

The policy implications of these alternative explanations are profoundly different. If the rising incidence of low wages and the growth of earnings inequality over the last two decades can be attributed to declining job opportunities for low-skill workers due to technological change, a sensible policy would be to reduce the share of workers with low-skills. The solution to the wage collapse is more and better education and training, and perhaps a tougher approach to legal and illegal immigration. In sharp contrast, the institutionalist explanation suggests reversing the trend of declining real (and relative) wages of low-skilled workers through public policies that address not just worker characteristics, but the way wage-setting institutions work, both inside and outside the firm.

Can we solve the earnings problem through skill upgrading? Even assuming the politically feasibility of what would be an expensive program (see below), there are a number of key problems with attempting to address a problem caused largely by a decline in bargaining power due to changes in labor market institutions and shifts in social norms with a massive program of

skill upgrading for the least skilled. First, the payoff to investments in “hard” skills like literacy takes time. It is hard to imagine much impact on the wage structure in less than one generation. Second, many of the skills employers demand are “soft” skills that concern work habits, attitudes, and responsibility—traits that are developed in childhood in families, schools, and communities. Attempting to significantly upgrade the soft skills of adults through government programs is likely to be even more challenging than improving their hard skills.

And finally, labor market forces will tend to undermine the objectives of skill upgrading. Close to two-thirds of all jobs are currently being done by those with a high school degree or less. Successful skill upgrading for the workers now filling those jobs is only part of the task. We would also need to supply jobs to those workers that require higher skills and pay them higher wages. Without such job creation, a higher supply of moderately skilled workers will tend to bid down the wages of moderately skilled jobs. And who would now do all the unskilled jobs? Without tougher enforcement policies, a skill upgrading program runs the risk of increasing the incentive for illegal immigration. A program that succeeded in substantially increasing the skills of large numbers of workers currently paid low wages might result, therefore, in a more highly skilled native-born workforce that experiences declining real wages at the same time that the number and share of low-skill foreign born workers increases—a replay of our experience in the 1980s.

If we were to be more optimistic and suppose that high-end estimates of the marginal return to investment in education and training for individuals (say 10 percent) can be applied to the entire low-skill workforce, the cost to the public sector of providing the kind of education and training necessary to counteract recent earnings trends would be enormous. Heckman (1994) has shown that a 10 percent return on investment in human capital would require an investment of \$214 billion (1989 dollars) to restore the earnings of male high school dropouts to their 1979 real levels. A further \$212 billion would be required to restore the earnings of all high school graduates to their real 1979 levels. To restore the earnings ratio between earnings of college graduates and earnings of less educated workers to the 1979 mark would cost more than \$1.66

trillion.

Few will, or should, oppose public sector efforts to raise the skill level of the workforce, but the ability of workers to perform the functions required in technologically advanced workplaces has had little to do with the startling growth in poverty-wage jobs, the drop in real earnings, and the growth of earnings inequality in the 1980s. We need to improve our education and training system, but making workers smarter will not, by itself, have much effect on the distribution of earnings, and certainly not within the next decade. Besides, most jobs will continue to require less than a college degree, and a labor market that increasingly offers poverty-wage jobs to these workers provides them with little incentive to invest in education and training, no matter how well we design and implement such programs.

Alternatively, a popular policy that can raise the after-tax incomes of low-wage workers is the earned income tax credit (EITC), which offers a reduced tax bill or a rebate check based on a family's level of earnings and number of children. The EITC has been an effective means of modestly raising the take-home incomes of some low-wage families. But in an era of heightened concern over the budget deficit and strong resistance to redistribution through the tax code, it seems unlikely that the EITC can be greatly expanded. The wage collapse has simply been too massive for a redistributive tax program of this sort to offset more than a small part of the losses experienced by those with less than a college degree. Furthermore, heavy reliance on the EITC has the perverse effect of ratifying, and even encouraging, the very practices by employers that produced the need for the credit in the first place, namely, "low-road" competitive strategies that reduce costs by targeting the wages and benefits of those with the least bargaining power.

An effective public policy response must address the roots of the earnings problem. We have come to rely too heavily on competition in labor markets to set wages and employment conditions. The wage-setting institutions that sheltered low-skill workers from the worst excesses of labor market competition and encouraged management-labor cooperation need to be reestablished and the development of new institutions that can more effectively serve this purpose

should be explored. While the details of such a program require careful debate, the direction to take is clear. Strengthening the ability of workers to bargain collectively and reversing the 35 percent decline in value of the minimum wage since the 1960s would be a good place to start. While collective bargaining agreements set wage and employment conditions for 18 percent of American workers, they covered more than 80 percent of workers in Sweden, Germany, Belgium, France, and Austria (Freeman 1995). The minimum wage in France is set at 60 percent of the average wage, almost twice as high as that in the United States.²⁴

Indeed, strong labor market institutions currently prevail in varying forms in all of our developed country competitors, and yet these nations face the same competitive pressures from the same global marketplace. But unlike the United States these nations did not allow their labor unions to be crushed in the 1980s. The legal minimum wage was not allowed to plummet in value. The balance of trade in durable goods was not allowed to collapse. And in these nations the public social safety net was not dismantled. We should take the advice of Richard Freeman (1994c), who, after summing up the lessons learned from a major study of labor markets from around the developed world, concluded that “the declining position of American workers relative to those in other advanced countries shows clearly that it is appropriate to reconsider our labor institutions in light of experiences elsewhere.”

Faced with an increasingly competitive world, U.S. policy makers and employers made choices that reshaped the way the U.S. labor market works, making the most decentralized labor market among developed countries even more so. Low-skill workers have paid the price for those choices in the form of sharply declining living standards, while higher-income consumers have benefited. This massive redistribution of economic well-being cannot be maintained for long: it undermines living standards and morale and, hence, the productivity of the current workforce. It also undermines our ability to prepare the next generation for productive work and citizenship. The low-road of wage cuts and employment insecurity will not create a high-performance economy in the long-run and it is not the path being taken by most of our industrialized competitors. It is time to reclaim control over the way our labor markets function.

Notes

1. Average weekly earning were deflated by the CPI-U index (Council of Economic Advisers, 1991, Tables B-44 and B-58).
2. "Overall, the gap in weekly wages between men at the 10th and 90th percentiles has grown about 35 percent since 1967. In the recent period (since 1979), this growing gap is the result of substantial declines in real wages at the bottom of the distribution and more modest gains at the top" Karoly 1994, p. 56)
3. The increase in earnings among workers near the top of the earnings ladder appears to be due exclusively to the increased earnings of those with post-graduate schooling (Mishel and Bernstein 1995). From another perspective, the growth in pay at the top appears not to be a function of whether or not one has a college degree, but to an increase in earnings among the top 1 percent of earners (Gramlich, Kasten, and Sammartino 1994).
4. Citing the work of Blackburn, Bloom, and Freeman (1990) and Kosters (1992), Burtless (1992) states that "the supply of highly skilled workers more than kept pace with demand through the 1970s, when the wage premium for schooling shrank slightly. But the anemic growth of a highly skilled labor supply in the 1980s led to a sharp rise in the premium for education and skill."
5. In an influential paper, Bound and Johnson (1992) assert that the "major cause [of relative wage changes in the 1980s] was a shift in the skill structure of labor demand brought about by biased technological change." Similarly, Acs and Danziger (1993) conclude that since most of the decline in earnings is found within industries for workers with the same education and experience levels and cannot be accounted for by the standard measures used in earnings studies, "changes in technology, whether autonomous or in response to foreign competition, provide the most plausible explanation for the fall in mean earnings."
6. Davis and Haltiwanger (1991) are quite explicit about the reasons for the recent attention to computerization by labor economists: "Skill-biased technical change will play a major role in any satisfactory *neoclassical* explanation for recent changes in the wage structure" (emphasis added).
7. Although they do not seem to think that the timing of restructuring matters for their story, the authors do recognize that employment shifts were concentrated in the 1980 to 1982 period. "Roughly 70 percent of the within-industry and over 80 percent of the between-industry shifts . . . that occurred between 1979 and 1987 did so between 1979 and 1982" (Berman, Bound, and Griliches 1994).
8. The timing of these employment and investment trends is also relevant to the interpretation of the regression results presented in the Berman, Bound, and Griliches study. They regress the 1979 to 1987 change in the nonproduction share of employment across industries on the level and change in the share of computers in total investment. Their estimated coefficients are positive. They conclude that this measure of technological change accounts for "one-quarter to one-half of the within-industry move away from production labor that occurred over the 1980s" (Berman, Bound, and Griliches

1994). Is it plausible that investments in computers, which took place almost entirely after 1982, can explain up to half of the shift away from production labor, which occurred entirely before 1983? Interestingly, they note that their 1977 to 1987 computer variables as well as their 1974 measure of R&D are also powerful predictors of nonproduction employment trends for 1959 to 1973, a period with virtually no computer investment.

9. Because sales jobs range from low- to high-skilled (from cashiers to insurance agents), those jobs were considered as a separate category. Private household and farm occupations were omitted from the analysis.

10. These figures are taken from three different tables. The wage and supply estimates are for workers with one to five years of experience while the demand estimates are for workers at all experience levels. My interpretation of these results requires an assumption that the change in demand for all low-skill workers is not dramatically different from the change in demand for those with one to five years of experience.

11. Since the simple demand-and-supply model assumes that the wage distribution mirrors the skill distribution, changes in the wage distribution should reflect changes in the skill distribution. In this case, we should observe a decline in the share of those employed at low wages. While a surplus pool of low-skill workers will push the wage down, the mismatch (skill twist) story posits declining low-skill job opportunities so that the pool of jobs for which these low-skill workers are competing is shrinking.

12. This assumption is made explicit and relied upon in many empirical studies. For example, Topel (1993) writes that “I will define relative marketable ‘skills’ in terms of a person’s position in the overall distribution of wages.”

13. Those with low skills lucky enough to get the increasingly scarce jobs may see their wages bid down, but there should be fewer workers employed in this low-skill job pool and more jobless workers. On the other hand, the presence of too many low-skilled workers should not directly affect the wages for higher skilled jobs since the low-skilled are not, presumably, easily substitutable for higher skilled workers.

14. These values were calculated for four years: 1975 (the earliest year for which hourly earnings can be calculated from the *Current Population Survey*), 1979, 1984 and 1990. Two of these years, 1975 and 1990, are recession years. Replacing these with 1976 and 1989 has no effect on the trends presented here.

15. These estimates are conservative since temporary workers, whose share of employment greatly expanded in the 1980s, are defined as service sector workers and are not included in the data.

16. Kaufman (1988) writes that “as DKLR [Dunlop, Kerr, Lester, and Reynolds] intuited, and Walter Oi (1962) and Gary Becker (1964) later showed more rigorously, firm-specific training creates its own area of indeterminacy in wage rates—competition places upper and lower limits to the wage bargain, but within these limits the wage is indeterminate until explicitly set by unilateral management decision, individual bargaining, or collective bargaining.”

17. For a survey of the literature on the effects of trade, see Burtless (1995). For the effects on unions and the minimum wage, see Blackburn, Bloom, and Freeman (1990); Freeman (1994a); and DiNardo, Fortin, and Lemieux (1994). For a comprehensive treatment of the effects of minimum wage on employment and relative wages, see Card and Krueger (1995). Focusing on the effects of unions and the minimum wage on relative wages, DiNardo, Fortin, and Lemieux find that “labor market institutions are at least as important as supply and demand considerations in explaining changes in the U.S. distribution of wages from 1973 to 1992.”

18. Summarizing research by Ferguson and Rogers, David Gordon (1996) writes that “In 1975–76, an average of 84 percent of unfair labor practice complaints against corporations were sustained in whole or substantial part, favoring the union side of the complaint. By 1984–85, that average had dropped to 52 percent. In 1975–76, similarly, 65 percent of “representation” cases . . . were decided in favor of the union position. By 1984–85 that percentage had declined to 35 percent.”

19. Summarizing research by Michael Porter, Bennett Harrison (1992) writes that “real capital formation in the U.S. since the 1960s has been distorted by rules, procedures, and customs governing private sector allocation of capital. . . . In 1960, big institutional stockholders in the U.S.—the pension and mutual funds—held on to a share on average for seven years. By the 1980s, the average period had fallen to only about two years.”

20. Similarly, as reported by the *New York Times*, Grumman's manufacturing operations were transferred from Long Island to Florida and Louisiana to reduce labor costs (McQuiston 1994). Another recent *New York Times* report documents the substantial demand for extremely low-skilled labor in the 1980s in Saipan and other U.S.-owned islands in the South Pacific where some 20,000 workers, recruited primarily from mainland China, typically put in six days a week for half the minimum wage making American brand-name clothes (Shenon 1994). As this demand for low-skilled workers willing to accept poverty-level wages expanded in these offshore U.S. territories in the 1980s, low-skill but living-wage garment jobs decreased in the continental United States.

21. The study defines displacement as “job loss due to plant closings or moves, slack work, or the abolishment of their positions or shifts.”

22. High-wage, blue-collar workers were certainly hard hit by the 1980s, but there is no evidence that these were workers with specialized skills or that their skills became obsolete at a rate that was substantially greater than in earlier decades.

23. This does not necessarily conflict with the evidence that the return to college education rose sharply in the 1980s. While growth in the “redundant” portion of the college educated labor supply will tend to reduce the absolute value of this return, increasing earnings by the unaffected (higher skill) part of the college educated pool could more than offset this effect. Furthermore, the increasing competition for lower skill jobs by the redundant college educated workforce will also tend to lower the wage of those with low educational attainment. A large part of the growth in the wage gap between college and high school degree holders was due to the decline in the earnings of the latter (see Table 1).

24. It is often claimed that the high unemployment currently experienced by some European nations indicates that a high price would be paid for maintaining traditional shelters from wage competition for low-wage workers. I am unaware of any serious research that has made a compelling case that wage inflexibility accounts for the recent increases in unemployment in these countries. But there is a recent study that challenges it. David Card, Francis Kramarz, and Thomas Lemieux (1995) write that “taking the evidence for the United States, Canada, and France as a whole, we conclude that it is very difficult to maintain the hypothesis that the ‘wage inflexibility’ in Canada and France translated into greater relative employment losses for less-skilled workers in these countries.”

References

- Acs, Gregory, and Sheldon Danziger. 1993. "Educational Attainment, Industrial Structure, and Male Earnings Through the 1980s." *The Journal of Human Resources* 28, 3: 618–648.
- Akerlof, George A. 1982. "Labor Contracts as Patial Gift Exchange." *Quarterly Journal of Economics* 97 (November): 543–569.
- Allen, Steven G. 1993. "Technology and the Wage Structure." Manuscript, October.
- Baumol, William, Sue Anne Batey Blackman, and Edward N. Wolff. 1989. *Productivity and American Leadership: The Long View*. Cambridge: The MIT Press.
- Becker, Gary. 1964. *Human Capital*. New York: National Bureau of Economic Research.
- Berman, Eli, John Bound, and Zvi Griliches. 1994. "Changes in the Demand For Skilled Labor Within U.S. Manufacturing Industries: Evidence From the Annual Survey of Manufacturing." *Quarterly Journal of Economics* 109 (May):367–397.
- Bewley, Truman F. 1995. "A Depressed Labor Market as Explained by Participants." *American Economic Review* 85, 2 (May): 250–254.
- Blackburn, McKinley L., David E. Bloom, and Richard B. Freeman. 1990. "The Declining Economic Position of Less-Skilled American Men." In Gary Burtless, ed., *A Future of Lousy Jobs: The Changing Structure of U.S. Wages* (Washington, D.C.: The Brookings Institution): 31–76.
- Borjas, George J., Richard B. Freeman, and Lawrence F. Katz. 1996. "Searching for the Effect of Immigration on the Labor Market." *American Economic Review* 86, 2 (May): 246–251.

- Bound, John, and George Johnson. 1992. "Changes in the Structure of Wages in the 1980s: An Evaluation of Alternative Explanations." *American Economic Review* 82, 3 (June): 371–392.
- Briggs, Jr., Vernon. M. 1993. *Immigration Policy: A Tool of Labor Economics? Public Policy Brief* No. 7. The Jerome Levy Economics Institute.
- Bryant, Adam. 1993. "Just How Bad Is it for Airline Workers?" *New York Times*, F5.
- Burtless, Gary. 1991. "The Payoff to Education in the Labor Market." In Marvin H. Kusters, ed., *Workers and Their Wages* (Washington D.C: The AEI Press).
- . 1995. "International Trade and the Rise in Earnings Inequality." *Journal of Economic Literature* 33, 3 (June): 800–816.
- Card, David, and Alan B. Krueger. 1995. *Myth and Measurement: The New Economics of the Minimum Wage*. Princeton: Princeton University Press.
- , Francis Kramarz, and Thomas Lemieux. 1995. "Changes in the Relative Structure of Wages and Employment: A Comparison of the United States, Canada and France." Working Paper #355, Industrial Relations Section, Princeton University.
- Carre, Francoise J. 1992. "Temporary Employment in the Eighties." In Virginia L. duRivage, ed., *New Policies for the Part-Time and Contingent Workforce* (Armonk, N.Y.: M.E. Sharpe).
- Clara, Jeffery, and David M. Noer. 1996. "Does America Still Work? On the Turbulent Energies of the New Capitalism." *Harper's Magazine* 292, 1752 (May).
- Davis, Steve J., and John Haltiwanger. 1991. "Wage Dispersion Between and Within U.S.

Manufacturing Plants, 1963-86.” *Brookings Papers on Economic Activity: Macroeconomics* 1: 115–200.

DiNardo, John, Nicole Fortin, and Thomas Lemieux. 1994. “Labor Market Institutions and the Distribution of Wages, 1973-1992: A Semi-parametric Approach.” Unpublished paper, University of California at Irvine (March).

———, and Jorn-Steffen Pischke. Undated. “The Returns to Computer Use Revisited: Have Pencils Changed the Wage Structure Too?” Unpublished manuscript, University of California - Irvine.

Dunlop, John. 1957. “The Task of Contemporary Wage Theory.” In George Taylor and Frank Pierson, eds., *New Concepts in Wage Determination*. (New York: McGraw-Hill): 117–139.

Freeman, Richard B. 1994a. “How Much Has De-Unionization Contributed to the Rise in Male Earnings Inequality?” In Sheldon Danziger and Peter Gottschalk, eds., *Uneven Tides: Rising Inequality in America* (New York: Russell Sage): 133–163.

———. 1994b. “How Labor Fares In Advanced Economies.” In Richard B. Freeman, ed., *Working Under Different Rules* (New York: Russell Sage Foundation).

———. 1994c. “Lessons for the United States.” In Richard B. Freeman, ed., *Working Under Different Rules* (New York: Russell Sage Foundation).

———. 1995. “Labor Market Institutions and Earnings Inequality.” Boston Federal Reserve Bank (November 17).

———, and Lawrence F. Katz. 1994. “Rising Wage Inequality: the United States Vs. Other

- Advanced Countries.” In Richard B. Freeman, ed., *Working Under Different Rules* (New York: Russell Sage Foundation).
- Friedberg, Rachel M., and Jennifer Hunt. 1995. “The Impact of Immigrants on Host Country Wages, Employment and Growth.” *Journal of Economic Perspectives* 9, 2 (Spring): 23–44.
- Gittleman, Maury, and David R. Howell. 1995. “Changes in the Structure and Quality of Jobs in the United States: Effects by Race and Gender, 1973–1990.” *Industrial and Labor Relations Review* 48 (April): 420–440.
- Gittleman, Maury, Michael Horrigan, and Mary Joyce. 1995. ““Flexible” Work Organizations: Evidence From the Survey of Employer-Provided Training.” Manuscript, Bureau of Labor Statistics, U.S. Department of Labor, September.
- Golden, Lonnie, and Eileen Appelbaum. 1990. “What is Driving the Boom in Temporary Employment? An Economic Analysis of the Determinants of Temporary Employment.” Report to the U.S. Department of Labor, Women's Bureau, February.
- Gordon, David M. 1996. *Fat and Mean: The Corporate Squeeze of Working Americans and the Myth of Managerial Downsizing*. New York: The Free Press.
- Gramlich, Edward M., Richard Kasten, and Frank Sammartino. 1994. “Growing Inequality in the 1980s: The Role of Federal Taxes and Cash Transfers.” In Danziger and Gottschalk, eds. *Uneven Tides: Rising Inequality in America* (New York: Russell Sage Foundation).
- Harrison, Bennett. 1992. “Where Private Investment Fails.” *The American Prospect* 11 (Fall): 106–114.

- . 1994. *Lean and Mean: The Changing Landscape of Corporate Power in the Age of Flexibility*. New York: Basic Books.
- Heckman, James. 1994. "Is Job Training Oversold?" *The Public Interest* (Spring): 91–115.
- Hecker, Daniel E. 1992. "Reconciling Conflicting Data On Jobs for College Graduates." *Monthly Labor Review* 115 (July): 2–12.
- Herz, Diane E. 1991. "Worker Displacement Still Common in the Late 1980s." *Monthly Labor Review* 114 (May): 3–9.
- Hirschman, Albert O. 1982. *Shifting Involvements: Private Interest and Public Action*. Princeton: Princeton University Press.
- Howell, David R., and Edward N. Wolff. 1991. "Trends in the Growth and Distribution of Skills in the U.S. Workplace, 1960–85." *Industrial and Labor Relations Review* 44, 3 (April): 486–502.
- . 1992. "Technical Change and the Demand for Skills by U.S. Industries." *Cambridge Journal of Economics* 16, 2 (June): 127–146.
- , and Susan Wieler. 1996. "Explaining the Collapse of Low-Skill Earnings: Implications for Education and Training Policy." Manuscript.
- Jaeger, David A. 1995. "Skill Differences and the Effect of Immigrants on the Wages of Natives." Unpublished manuscript, U.S. Bureau of Labor Statistics, November.
- Judson, George. 1993. "Pratt & Whitney threatening to Shut 2 Connecticut Plants." *New York Times*, April 14, A1.

- Juhn, Chinhui. 1992. "Decline of Male Labor Market Participation: The Role of Declining Market Opportunities." *Quarterly Journal of Economics* 107, 79–121.
- , Kevin M. Murphy, and Brooks Pierce. 1993. "Wage Inequality and the Rise in Returns to Skill." *Journal of Political Economy* 101, 3 (June): 410–442.
- Katz, Lawrence F., and Lawrence H. Summers. 1989. "Industry Rents: Evidence and Implications." In Martin Neil Baily and Clifford Winston, eds., *Microeconomics: Brookings Papers on Economic Activity*.
- , and Kevin Murphy. 1992. "Changes in Relative Wages, 1963–1987: Supply and Demand Factors." *Quarterly Journal of Economics* 107, 1 (February): 35–78.
- Kaufman, Bruce, ed., 1988. *How Labor Markets Work*. Lexington, Ky.: Lexington Books.
- Kerr, Clark. 1988. "The Neoclassical Revisionists in Labor Economics (1940–1960)—R.I.P." In Kaufman, ed., *How Labor Markets Work* (Lexington, Ky.: Lexington Books).
- Kochan, Thomas A., Harry C. Katz, and Robert B. McKersie. 1994. *The Transformation of American Industrial Relations*. Ithaca: ILR Press.
- Kosters, Marvin H., ed. 1991. *Workers and Their Wages*. Washington D.C.: AEI Press.
- Krueger, Alan B. 1993. "How Computers Have Changed the Wage Structure: Evidence From Micro Data." *Quarterly Journal of Economics* 108 (February): 33–60.
- Krugman, Paul. 1994. "Past and Prospective Causes of High Unemployment." In *Reducing Unemployment: Current Issues and Policy Options*, Federal Reserve Bank of Kansas City.

- Kuster, Jeffrey C. 1993. "Occupational Employment in Commercial Banking, 1987–90." *Monthly Labor Review* 116 (April): 21–26.
- Lester, Richard A. 1952. "A Range Theory of Wage Differentials." *Industrial and Labor Relations Review* 5, 483–500.
- Levy, Frank, and Richard J. Murnane. 1992. "U.S. Earnings Levels and Earnings Inequality: A review of Recent Trends and Proposed Explanations." *Journal of Economic Literature* 30 (September): 1333–1381.
- Marshall, Ray. 1992. "The Future Role of Government in Industrial Relations." *Industrial Relations* 31, 1 (Winter): 31–49.
- McQuiston, John T. 1994. "Grumm Plans to Lay Off 800 Over Next Two Years." *New York Times*, January 17, B6.
- Miles, Jack. 1992. "Blacks vs. Browns: Competition Between Latinos and Blacks and the L.A. Riots." *Atlantic* 270 (October): 41–45.
- Mishel, Larry, and Jared Bernstein. 1994. "Is the Technology Black Box Empty?: An Empirical Examination of the Impact of Technology on Wage Inequality and the Employment Structure." Manuscript, Economic Policy Institute, April.
- , and Ruy Teixeira. Undated. "The Myth of the Coming Labor Shortage: Jobs, Skills, and Incomes of America's Workforce 2000." Manuscript, Economic Policy Institute.
- Mitchell, Daniel J. B. 1985. "Shifting Norms in Wage Determination." *Brookings Papers on Economic Activity* 2: 575–599.

- . 1989. "Wage Pressures and Labor Shortages: The 1960s and 1980s." *Brookings Papers on Economic Activity* 2: 191–231.
- Oi, Walter. 1962. "Labor as a Quasi-Fixed Factor." *Journal of Political Economy* 70 (December): 538–555.
- Osterman, Paul. 1988. *Employment Futures, Reorganization, Dislocation, and Public Policy*. New York: Oxford University Press.
- Phillips, Kevin. 1993. *The Politics of Rich and Poor*. New York: Harper Perennial.
- Reich, Robert. 1993. "Workers of the World, Get Smart." *New York Times*, July 20.
- Rose, Stephen J. 1995. "Declining Job Security and the Professionalization of Opportunity." Research Report No. 95-04, Washington D.C.: National Commission for Employment Policy, May.
- Schlesinger Jr., Arthur M., 1986. *The Cycles of American History*. Boston: Houghton Mifflin Company.
- Shelley, Kristina J. 1962. "The Future of Jobs For College Graduates." *Monthly Labor Review* (July): 13–21.
- Shenon, Philip. 1993. "Made in the U.S.A.?—Hard Labor on a Pacific Island." *New York Times*, July 18, A1.
- Sicherman, Nachum. 1989. "'Over-Education' in the Labor Market." Technical Paper No. 3, National Center on Education and Employment, April.

Topel, Robert. 1993. "What Have We Learned from Empirical Studies of Unemployment and Turnover?" *American Economic Review* 83 (May): 110–115.

United States Department of Labor. 1989. "Handbook of Labor Statistics." Bulletin 2340, August.

———. 1994. *Report on the American Workforce*. Washington, D.C.: U.S. Government Printing Office.

Wachter, Michael L., and William H. Carter. 1989. "Norm Shifts in Union Wages: Will 1989 Be a Replay of 1969?" *Brookings Papers on Economic Activity* 2: 233–264.

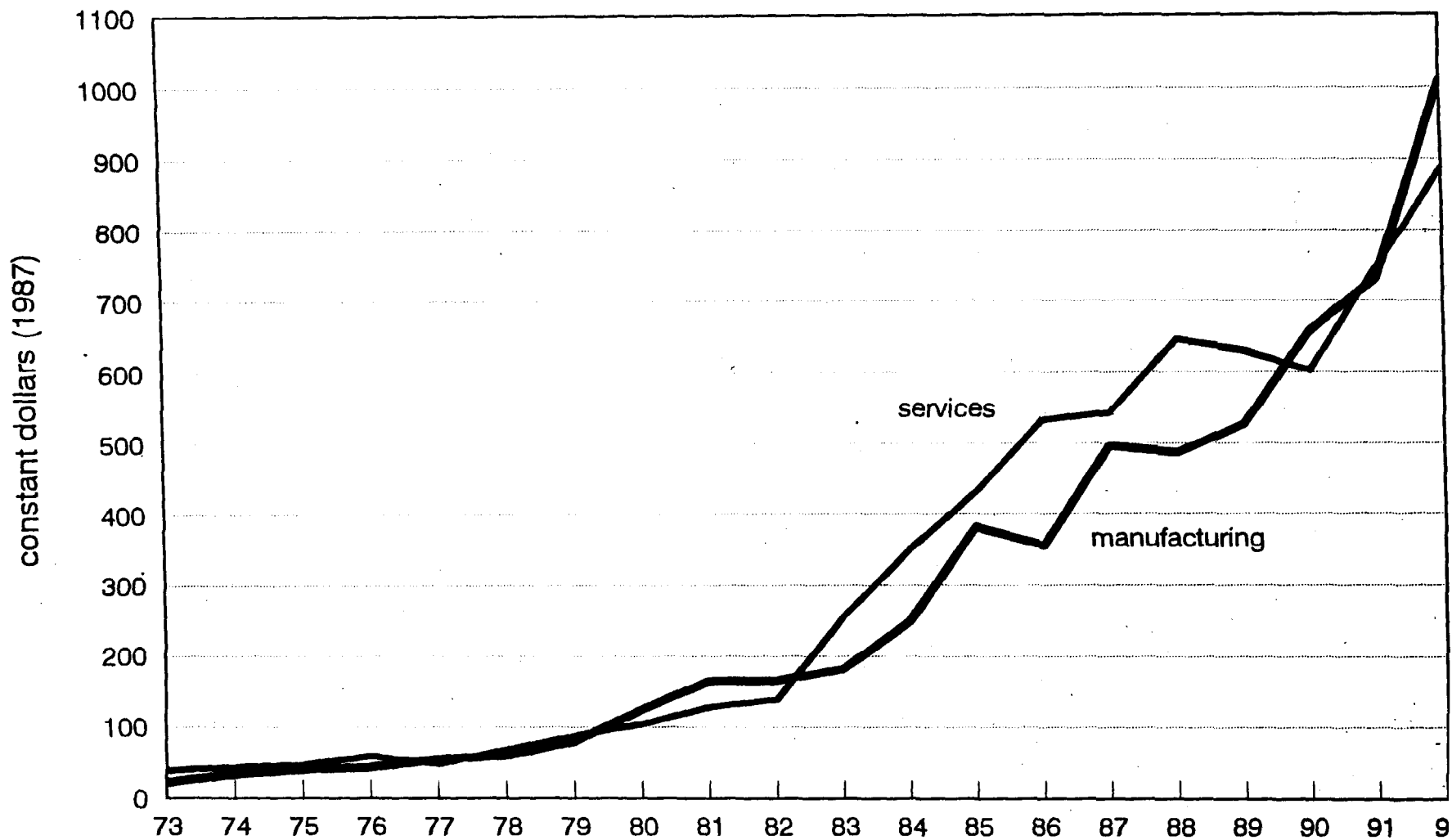
Waldinger, Roger. 1992. "Who Makes the Beds? Who Washes the Dishes? Black/Immigrant Competition Reassessed." Manuscript, Department of Sociology, UCLA (February).

**Table 1 Changes in Real Earnings By Demographic Group, 1973-89
(Full-Time Year-Round Workers)**

Years of Schooling	1973-79	1979-89	1973-89
<i>Men</i>			
0 to 11	-5.1	-19.6	-24.7
12	-4.1	-11.3	-15.5
13 to 15	-4.4	-2.8	-7.1
16 or more	-7.3	4.9	-2.4
<i>Women</i>			
0 to 11	4.1	-5.9	-1.8
12	2.8	1.5	4.2
13 to 15	0.5	7.1	7.6
16 or more	-1.9	14.1	12.2

Source: Maury Gittleman, "Earnings in the 1980s: An Occupational Perspective," *Monthly Labor Review*, July 1994, vol. 17, no.7, Table 1.

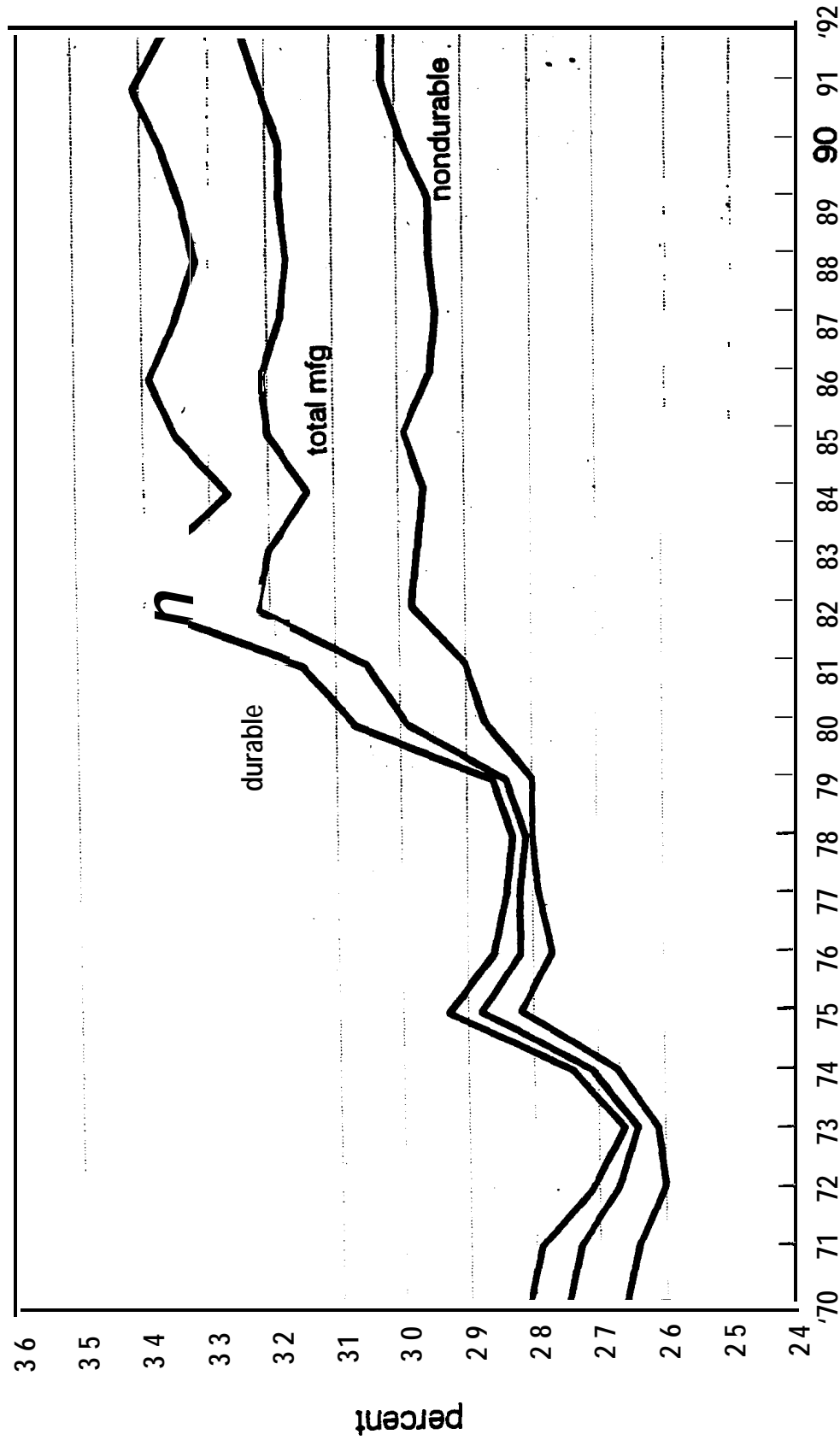
Figure 1
Computer Investment Per Worker, 1973-92



*Office, Computing and Accounting Machinery per full-time equivalent worker. Source: U.S. Bureau of Economic Analysis and the National Income and Product Accounts.

Figure 2

The Nonproduction Share of Manufacturing Employment, 1970-92



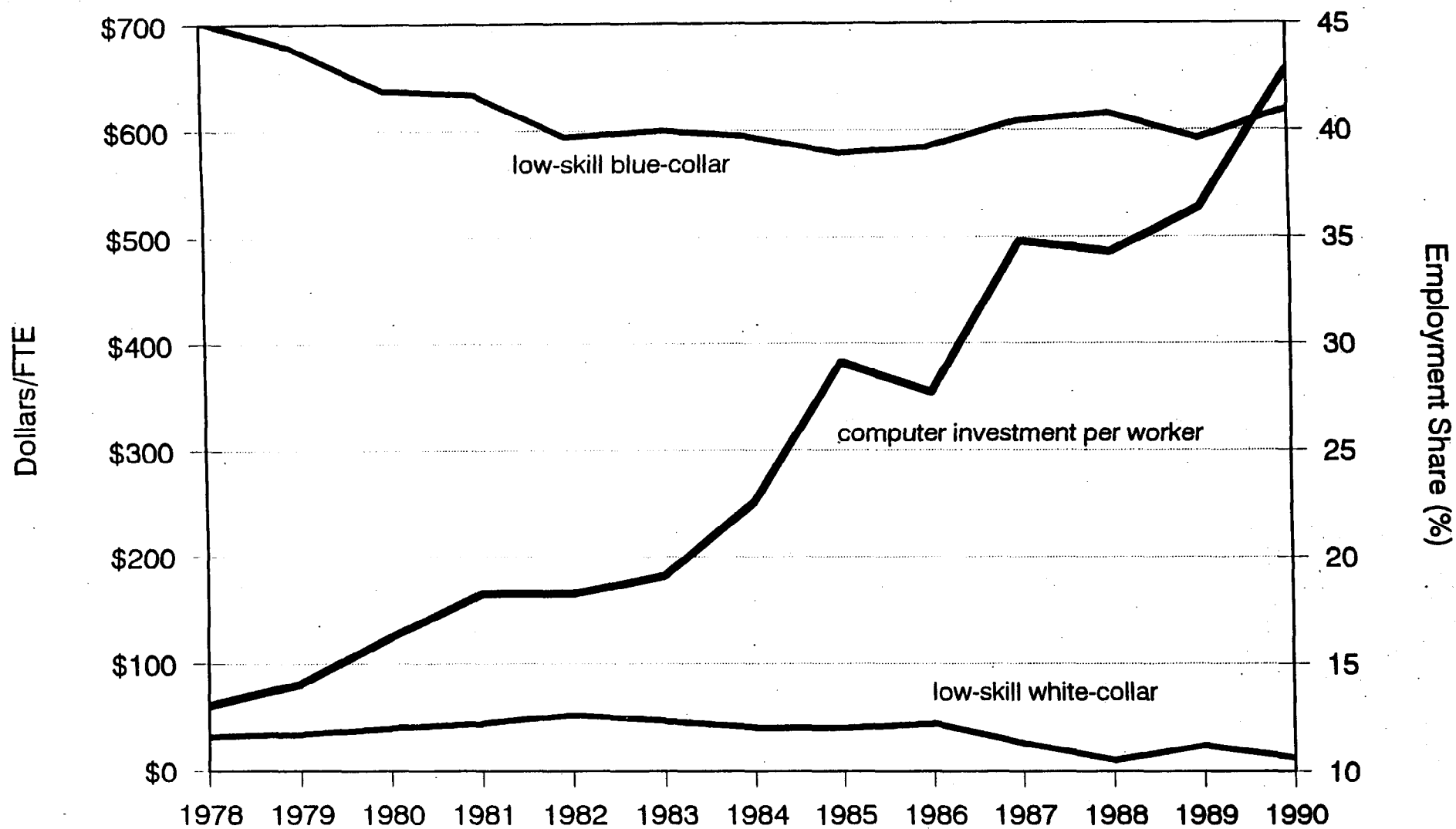
Source: 1970-88: Handbook of Labor Statistics, August 1989, Table 72; 1989-92: Employment, Hours, and Earnings: U.S., 1981-93, Bureau. of Labor Statistics, Bulletin 2429, August, 1993.

Table 2 Occupational Employment Shares In Manufacturing, 1983-88

Occupational Group	1983	1984	1985	1986	1987	1988
Craft/Laborer	3.97	3.75	3.82	3.64	3.38	3.54
Craft/Semi-Skill	0.59	0.60	0.61	0.61	0.60	0.60
Technical/Clerical	0.29	0.29	0.30	0.31	0.28	0.29
Professional/Managerial	0.76	0.71	0.72	0.74	0.73	0.72

Source: U.S. Department of Labor, "Handbook of Labor Statistics" Bulletin 2340, Table 20, 1989.

Figure 3a
Computer Investment and Low-Skill Employment
Shares in Manufacturing

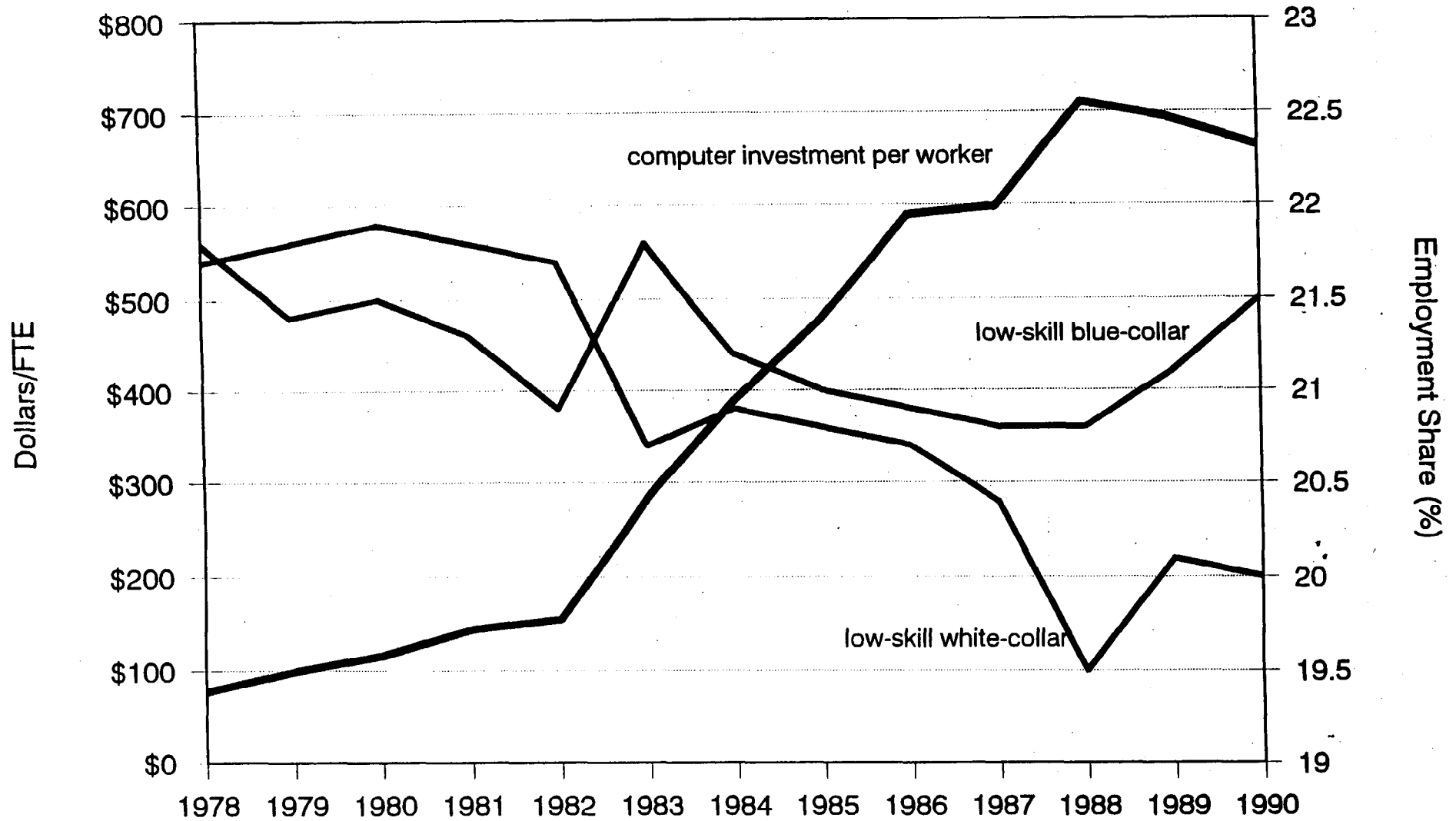


Source:

- (1) Investment in Office, Computing and Accounting Machinery in Constant 1987 Dollars (BEA) per Full-Time Equivalent Employee (NIPA).
- (2) Occupation shares were generated from the March CPS (1979-91) for full-time workers, ages 16+.

Figure 3b

Computer Investment and Low-Skill Employment Shares in Services



Source:

- (1) Investment in Office, Computing and Accounting Machinery in Constant 1987 Dollars (BEA) per Full-Time Equivalent Employee (NIPA).
- (2) Occupation shares were generated from the March CPS (1979-91) for full-time workers, ages 16+.

Table 3 Estimates of Changes in Supply and Demand for Low-Skill Men in the 1970s and 1980s

Schooling	1971–1979	1979–1987
<i>Less than a high school diploma</i>		
Percent change in wage ^a	1.5	–15.8
Percent change in supply ^a	1.5	–53.3
Percent change in demand	–7.2	–8.9
<i>High school graduates</i>		
Percent change in wage ^a	0.8	–19.8
Percent change in supply ^a	18.7	–40.9
Percent change in demand	–4.6	–5.3

^a For a worker with 1 to 5 years of experience.

Source: Lawrence F. Katz and Kevin Murphy, “Changes in Relative Wages, 1963–1987—Supply and Demand Factors,” *Quarterly Journal of Economics* 107, 1 (February): 35–78, Table I (Wage Changes), Table II (Supply Shifts), and Table VI (Demand Shifts).

Diagram 1: The Conventional View - Declining Demand
Generates Declining Wages and Employment

