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4 Wage Policy and Restructuring: The Swedish Labor Market since 1960

Per-Anders Edin and Robert Topel

When applied to the labor market, the "Swedish model" has two key elements. The first is centralized bargaining. For nearly forty years, the main components of Swedish wages and working conditions were determined in central negotiations between the largest labor organization, LO, and the employers' association, SAF. The other is a set of extensive labor market policies formulated by the government, intended to maintain full employment, encourage investments in human capital, and facilitate labor mobility. In its heyday in the early 1970s, the Swedish model was widely praised for promoting growth while eliminating poverty and avoiding widespread unemployment. By 1980, Sweden had combined one of the world's highest living standards with the lowest level of income inequality in the developed world.

But times have changed. Centralized bargaining was largely abandoned during the 1980s, when key employers and unions defected from the process. Wage inequality and the returns to skill have since risen somewhat, although they remain low by world standards. These changes occurred against a background of slow economic growth, which fueled doubts about the efficiency of Sweden's highly structured labor market, huge public sector, and related welfare state institutions.

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The current crisis has only added to those doubts. At this writing, open unemployment is at its highest level since the 1930s, soaring to 18 percent among youths (1993), and real wages have stagnated for over a decade. Critics complain that an ossified labor market is a major contributing factor. They argue that taxes and labor market policies reduce productivity and incentives while Sweden's obsession with equality has discouraged investments in the human capital and skills that drive long-term economic growth (Lindbeck et al. 1993; Henrekson, Jonung, and Stymne 1993).

Our goal in this paper is to understand the allocative effects of labor market institutions and policies in Sweden during the last thirty years. At one level, this involves documenting the "facts" about Swedish labor market institutions and performance, and a large portion of the paper is devoted to this task. How have relative wages evolved in Sweden? How did wage compression affect particular industries? What was the role of the public sector? In the restructuring of the Swedish labor market, who moved from contracting industries, and where did they go? And how did declining returns to skill affect investments in human capital?

Our main findings are as follows:

1. *Centralized Bargaining and Wage Inequality.* Centralized bargaining—which was initiated by employers but later rejected by them—greatly affected wage differentials in Sweden. From the mid-1960s through the 1970s, skill differentials in wages fell along every observable dimension, including age, education, sex, and percentiles of the wage distribution. Our reading of the evidence is that the decline in wage inequality is greater than what would have been generated by market forces alone. There is some evidence that declining returns to skill have reduced investments in human capital and education. Employer attitudes toward centralized bargaining changed in the 1980s, possibly because an artificially compressed wage distribution caused a shortage of skilled workers.

2. *Wage Compression and Employment.* The original advocates of a solidaristic wage policy argued that wage compression would push workers from low- to high-wage sectors and raise overall productivity. Observed labor flows are consistent with this goal. Low-wage industries contracted, and displaced workers were absorbed by growing, high-wage sectors of the labor market. Unlike the experience of other European countries, Sweden's move toward a more compressed wage distribution was not accompanied by rising unemployment.

3. *The Role of Labor Market Policies and the Public Sector.* Sweden maintains an array of government policies designed to maintain full employment. We find that active labor market policies have not had much effect in reducing

unemployment. Further, for men, there is only weak evidence that the rapid expansion of the public sector helped maintain full employment. The story is different for women, however. Virtually all the post-1970 increase in women's employment is accounted for by the growth of public sector jobs. Women's wages have converged toward men's, and female labor force participation has expanded because the public sector hires whatever female labor supply is forthcoming.

4. *The Rising Difference between Individual Productivity and Consumption.* Sweden's redistributive policies go far beyond a compressed wage distribution. Rising payroll taxes, which reached 43 percent in 1989, are used to finance social insurance programs. In the long run, most of this tax is shifted backward onto labor, so real wages have been stagnant or declining in spite of slowly rising productivity. Further, at the margin for skilled workers the payroll tax is a pure wedge. For skilled workers, we estimate that in 1990 the combination of payroll, income, and value added taxes meant that consumable income was only 21 percent of individual productivity.

For students of wage determination, Sweden presents a puzzle. Egalitarian policies that raised the relative wages of the less skilled did not produce widespread unemployment, although these policies did displace large numbers of workers. How was full employment maintained? We close the paper with a new analysis of how wage compression and full employment can occur together. Our analysis shows that a negotiated compression of the wage distribution can *raise* the demand for unskilled labor, with the result that full employment is maintained. But our analysis also predicts that the inefficiencies of centralized bargaining accumulate over time, which may lead to its ultimate demise. Significantly, major industries began to defect from the system in the 1980s, after which negotiations have shifted to the industry and firm levels.

The elimination of extreme poverty in Sweden must be counted as the main achievement of the welfare state. There is no doubt that labor market institutions played a central role in this. Yet egalitarian policies must confront the universal trade-off between equity and efficiency. In the case of Sweden's labor market, it is hard to escape the conclusion that an overriding emphasis on equity carries substantial social costs in terms of misallocated resources and reduced incentives. These costs have probably risen, in part because the inefficiencies of intervening in the labor market tend to accumulate, and also because market forces probably have favored rising income inequality over the past decade. Given the degree of equity that Sweden has achieved, the costs of allowing somewhat more inequality are likely to be small, while the benefits in terms of improved efficiency and welfare may be substantial.

4.1 The Institutional Setting

4.1.1 Collective Bargaining and the Swedish Model

The historical development of centralized bargaining is key to understanding the Swedish labor market.[1] Wages in Sweden are mainly the outcome of collective bargaining, with little or no direct involvement by the government. Union membership figures since 1950 are given in figure 4.1. In stark contrast to the United States, more than 90 percent of Swedish employees belong to labor unions, a figure that has risen from about 75 percent in 1960.[2] Since 1938, there has been more or less formal cooperation in labor relations between the largest labor organization, LO (the Swedish Trade Union Confederation), which represents blue-collar workers, and SAF (the Swedish Employers Federation). LO and SAF were the dominant private parties in the labor market until the 1970s, when unions representing white-collar and professional workers became important.

The unique aspects of the Swedish model evolved after 1950. Before then, the collective-bargaining environment was similar to that in the United States. Industrial unions affiliated with LO negotiated separate agreements with employers, who were affiliated with SAF. Coordination of policies or strategy by the two dominant organizations was limited. Interestingly, SAF was the main proponent of centralized bargaining in the early 1950s, allegedly believing that coordinated wage negotiations would avoid industrial unions' attempts to "leapfrog" each other in wage settlements. Indeed, LO unions were reluctant participants in the first central agreement, which was signed in 1952.

By 1956, however, LO leadership came to view centralized bargaining as a device to achieve a "solidarity" wage policy, which would reduce wage inequality among union members. In its early form, this policy was rooted in ideas of LO economists Gosta Rehn and Rudolf Meidner. They argued that coordinated wage settlements would eliminate pay differences between similarly skilled individuals, thus reducing income inequality, while promoting growth and the restructuring of the economy. One interpretation of this view, which we develop below, is that decentralized collective bargaining produced noncompetitive wage differences among industries. These differences impede the efficient allocation of labor among sectors. Then a coordinated policy of "equal pay for equal work" more closely mimics a competitive wage distribution, with attendant gains in efficiency. On this view, there is no trade-off be-

1. For more detailed descriptions of the institutional setting, see, e.g., Ullenhag (1970), Elvander (1988), and Nilsson (1993).

2. Our estimates of union coverage are ratios of union membership to non-self-employed workers. This makes our estimates larger than those that use the entire labor force as a base. We think the distinction is important, especially in early years, when a large portion of the Swedish workforce worked in agriculture. For an analysis of union growth in Sweden, see D'Agostino (1992).

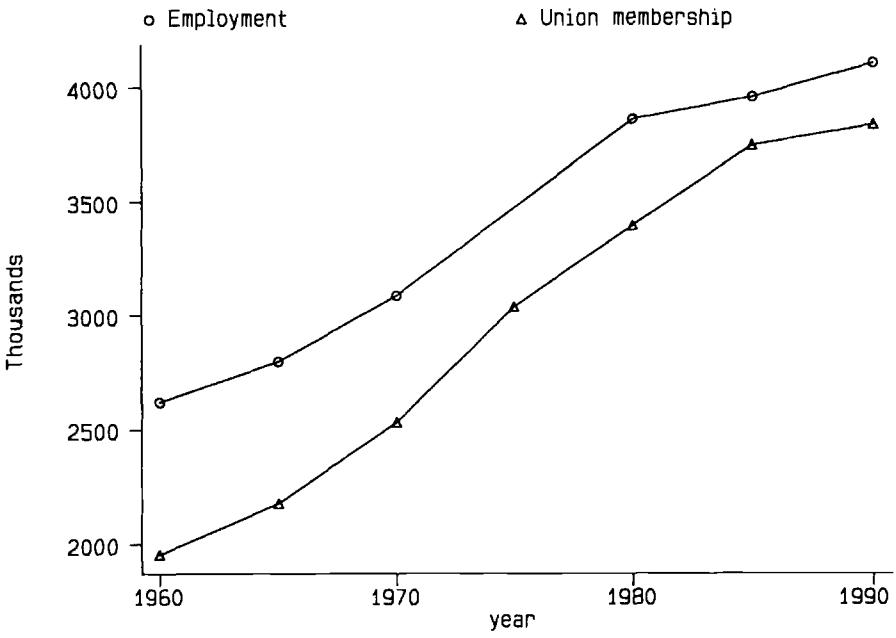

Fig. 4.1 Union membership and total employment, 1960–90
Source: Nilsson (1993).

tween equity and efficiency; instead, they are complements in producing greater social welfare.

Whatever the reasons, egalitarianism became a main ideological force behind LO bargaining policies. Nineteen central frame agreements were concluded between 1956 and 1990, and, at least through the 1970s, they coincided with a vast compression of the blue-collar wage distribution. Wage dispersion between LO and SAF contract areas fell by 66 percent between 1965 and 1972 (Hibbs 1990). From 1970 to 1983, the log wage differential between blue-collar workers in the ninetieth and tenth percentiles was almost halved (see fig. 4.2). Hibbs (1990) argues that LO policy took on an even stronger egalitarian stance around 1969, evolving from a goal of "equal pay for equal work" to just "equal pay." Pay dispersion within firms and across skill groups fell sharply.

LO's dominance of industrial relations has slowly eroded with the secular shift of employment toward white-collar and professional occupations (see fig. 4.3). Unlike in the United States, in Sweden this trend has not reduced overall union coverage because over 80 percent of white-collar workers also belong to unions. Against LO's current membership of 2.2 million, the largest white-collar organization is the Central Organization for Salaried Employees, or TCO, with 1.2 million members, of whom half are women. Workers with uni-

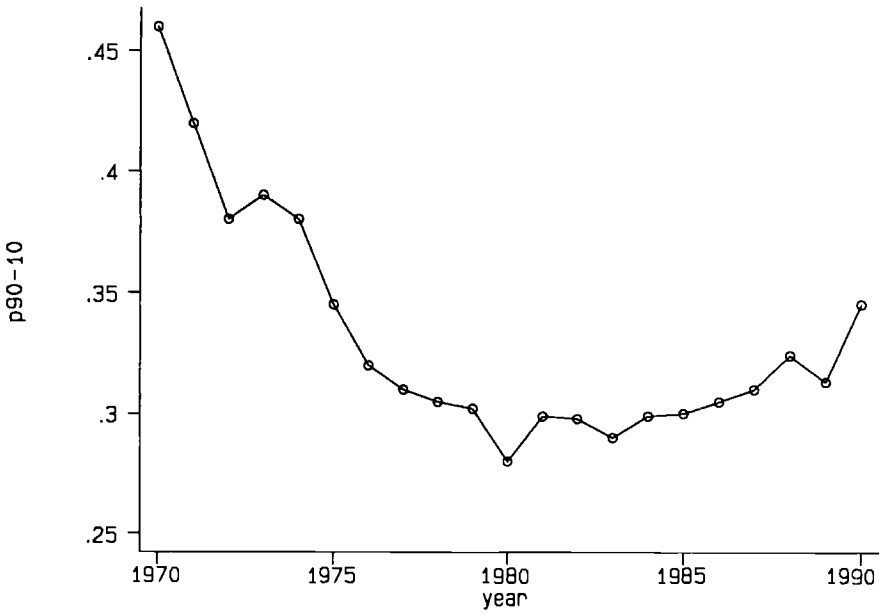

Fig. 4.2 Difference in log wages between the ninetieth and the tenth percentiles, blue-collar workers, 1970–90
Source: Hibbs (1990).

versity degrees are represented by the Swedish Confederation of Professional Associations, SACO, with 330,000 members. Another aspect of the shifting structure of unionism is the rapid increase in the share of union members who work in the public sector (fig. 4.4).

The practical importance of the trends in figs. 4.2 and 4.3 is that an ever larger portion of Swedish wages were determined outside the LO-SAF nexus. In effect, the result was a move back toward the decentralized bargaining of the 1950s. This is one argument for the demise of centralized bargaining in the 1980s: Freeman and Gibbons (1995) argue that LO could no longer deliver coordinated wage restraint, which was the real value of central bargaining. We offer an alternative explanation in section 4.4 below.

A turning point for central bargaining came in 1983. The employers' organization for the engineering industry, Verstadsföreningen—which includes Volvo, Saab, ABB, and other large firms—and the largest industrial union, Metall, went outside the LO/SAF frame and negotiated a separate agreement. Significantly, employers argued that the frame agreements hindered recruiting by underpaying skilled workers. After 1983, the level of bargaining has varied. Central agreements were struck on three occasions during the late 1980s, but a tendency toward more bargaining at industry and company levels seems clear.

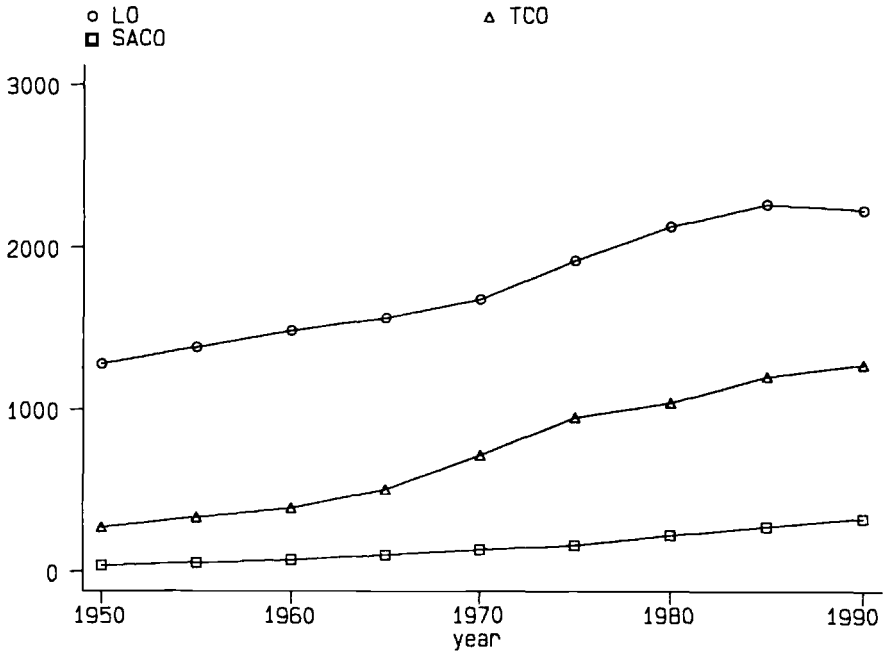

Fig. 4.3 Union membership in LO, TCO, SACO, 1950–90 (1,000s)
Source: Nilsson (1993).

4.2 Labor Market Performance and Policies

4.2.1 Wages, Productivity, and Labor Supply

Figure 4.5 shows the evolution of labor productivity, real wages, and real wage costs since 1960. Wage costs are calculated as wages plus payroll taxes and are deflated by the producer price index, while wages are deflated by the CPI. The series are indexed to 1965, to reflect relative growth rates since that year. The figure shows that productivity roughly doubled, as did wage costs, so labor's share has been roughly constant since 1965. There are substantial short-run deviations, however, reflecting periods of wage inflation and rising payroll taxes.

The 1970s are particularly interesting in this regard. The average payroll tax rose from 18 percent in 1973 to 33 percent in 1976 and 37 percent in 1977! It reached 43.5 percent in 1989. The figure indicates that the incidence of the tax was shifted forward for a while; indeed, real wages were increased in the 1975 bargaining round, in spite of rising taxes and no productivity growth. But demands proved elastic in the longer run, which forced a series of currency devaluations in the late 1970s and early 1980s. These shifted the incidence of the payroll tax back to labor, and real wages fell from 1979 to 1985. By 1990, real

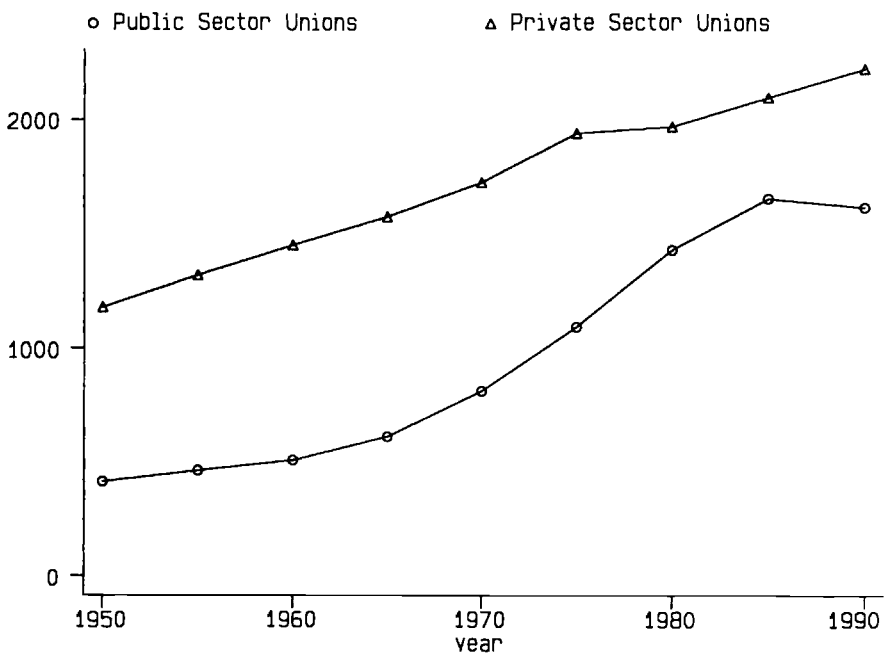

Fig. 4.4 Membership in public and private sector unions, 1950–90 (1,000s)
Source: Nilsson (1993).

wages had returned to their 1979 level, and they have been roughly constant thereafter.

The widening gap between pay and labor cost is not necessarily a tax wedge. Most of the tax finances benefits to individual workers—like sickness insurance and pensions—that are received in proportion to income. But most benefits are also capped, so at the margin for skilled workers the payroll tax is all wedge. For these workers, the combination of payroll, income, and value added taxes meant that consumable income from a marginal dollar earned was only 21 percent of productivity in 1990.[3] For comparison, the corresponding tax wedge in the United States would be about 40 percent.

In spite of high taxes, Swedish labor force participation rates are unusually high (fig. 4.6). By 1990, 85 percent of the population aged sixteen to sixty-four participated in the labor force, and the figures for men (87 percent) and women (82 percent) were trivially different. (During the current recession, these figures have dropped for both sexes.) The figure for women is much higher than in the United States (about 60 percent), which can reflect several factors. One is that social benefits are tied to work, which encourages attach-

3. We assume a payroll tax of 43 percent, a marginal income tax rate of 50 percent, and a value added tax of 25 percent for this calculation.

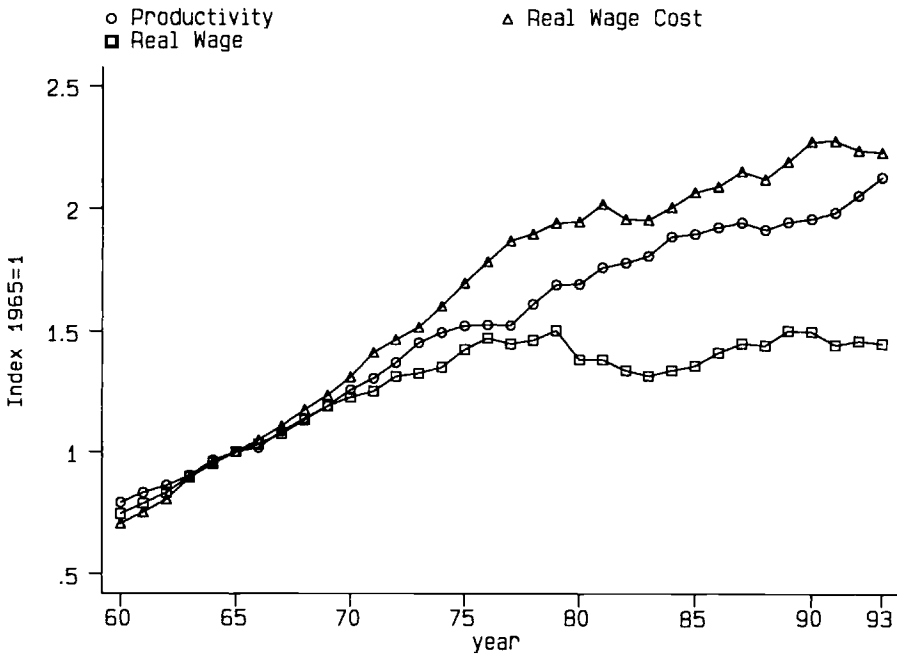

Fig. 4.5 The evolution of real wages, real wage costs, and productivity, 1960–93
Source: NR (National Accounts).

ment to the labor force.[4] Nearly half of women work part-time. Another is that the male-female wage differential is small and declining. As we discuss below, the regression-adjusted differential is slightly over 10 percent, which is far lower than in the United States and other OECD countries.[5]

High labor force participation does not necessarily translate into time worked. As shown by Burtless (1987), although male labor force participation fell by only 5 percent between 1963 and 1984, hours actually worked during the year fell by more than 20 percent.[6] The difference is accounted for by rising absenteeism and declining hours. In Burtless's data, absenteeism accounted for roughly a third of the overall decline in male labor supply, which he attributed to increased generosity of sick leave, vacation, and child-rearing benefits. Thus, in Sweden, the decline of male labor supply is accomplished mainly by

4. For example, parents are eligible for fifteen months of paid parental leave, which encourages women to establish an earnings history before childbearing. Other benefits, like child-care subsidies, require that a woman work but are not tied to earnings. This encourages part-time work.

5. From 1950 to 1960, women's wages averaged about 70 percent of men's. Then LO and SAF agreed to phase out separate wage scales for men and women, and the ratio began to rise. The wage ratio in manufacturing rose monotonically thereafter, reaching about .90 by 1980 (Björklund and Persson-Tanimura 1983).

6. Participation among American men fell by a comparable amount, but their hours fell by only 10 percent.

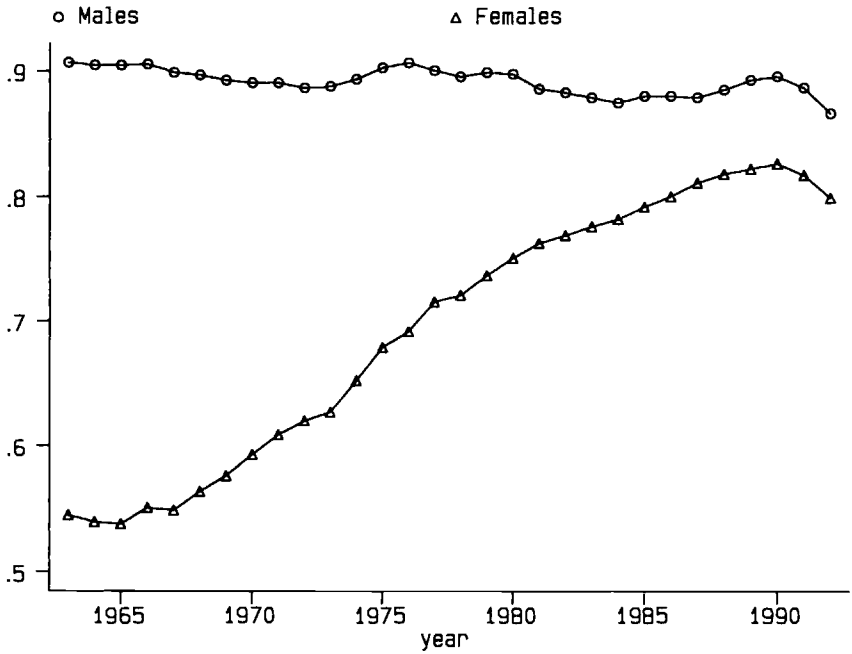

Fig. 4.6 Labor force participation rates of men and women, 1965–90
Source: NR.

reduced work effort among those who participate in the labor market. As shown in figure 4.7, the decline in annual hours worked between 1968 and 1981 was fairly uniform across the wage distribution. Both high- and low-wage men worked less. Exactly the opposite has occurred in the United States, where eligibility for transfer programs is more likely to be contingent on nonparticipation. In the United States, the secular decline in male labor supply is due to permanent labor force withdrawals, not to shortened work weeks or a reduction in weeks worked per year (Juhn, Murphy, and Topel 1991). Further, in the United States, reductions in annual hours and weeks have been concentrated among low-wage workers, who saw their wages fall sharply over this period.[7]

4.2.2 Unemployment and Labor Market Programs

Full employment has been a primary goal of Swedish economic policy and institutions. The outcome of this policy is illustrated in figure 4.8, where we plot the unemployment rate and the labor market program participation rate since 1965. By international standards, the unemployment rate in Sweden is very low. This is true even if we add program participation (training and relief

7. Hours worked among Swedish men have increased slightly (by 6.5 percent) during the 1980s (Rosen, chap. 2 in this volume).

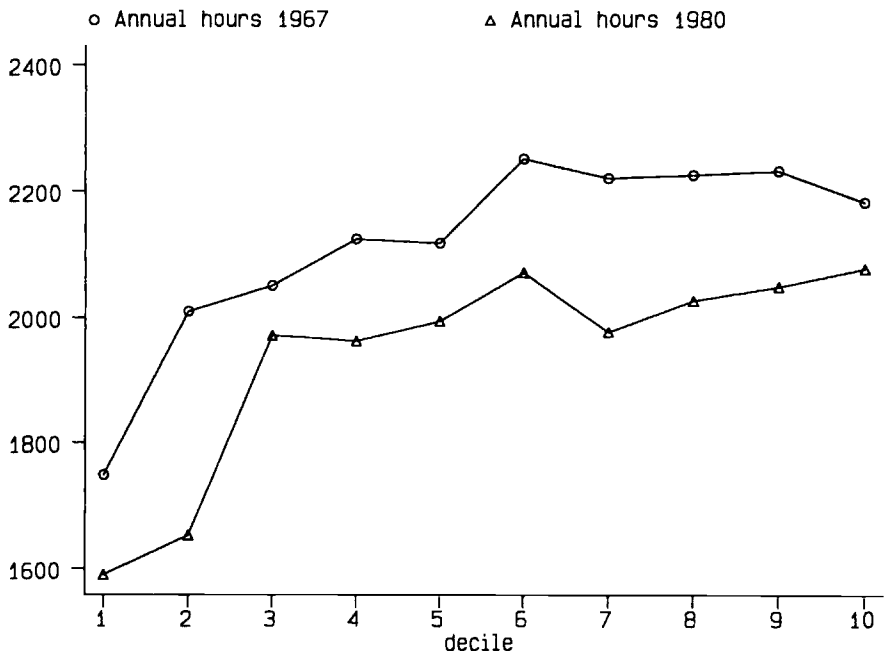

Fig. 4.7 Annual contracted hours by wage decile, 1967 and 1980
Source: LNU (Level of Living Survey).

work) to get a measure of "total" unemployment. In the late 1960s and early 1970s, open unemployment fluctuated around 2 percent. As in the United States, there has been a slight upward trend since that time. In the United States, the secular increase in unemployment is due to both longer and more frequent unemployment spells (Murphy and Topel 1986; Juhn, Murphy, and Topel 1991). In contrast, the secular increase in Swedish unemployment is due entirely to longer spells (Björklund 1993). The difference may be due to the increasing generosity of the Swedish unemployment insurance system, which has liberalized benefit ratios and benefit durations while increasing overall coverage (Björklund and Holmlund 1991; Carling et al. 1996). These changes encouraged longer spells. This is probably not the entire story, however, since the duration of uninsured spells has also increased.

The striking aspect of figure 4.8 is that unemployment stayed so low during the late 1960s and the 1970s, when major changes in the wage structure and sectoral employment occurred. To us, this is the main puzzle. According to the Rehn-Meidner model, full employment should be maintained through active labor market policy, involving among other measures retraining programs and mobility subsidies. While labor market programs have had some effect on measured unemployment, we think that their overall effect on unemployment has been small. We have several reasons for this assessment:

Fig. 4.8 Unemployment and participation in labor market programs as a percentage of the labor force, 1960–93
Source: AKU (Labor Force Surveys); AMS (Labor Market Board).

1. The magnitude of labor market programs is small compared to the major restructuring that took place. Before 1975, the participation rate in retraining programs and relief jobs never exceeded 2 percent. Furthermore, we would think that retraining would be the crucial instrument for moving workers between sectors through upgrading of skills. Relief jobs are more directed at avoiding loss of work habits and skills. The share of training programs in the program participation rate reported in figure 4.8 is roughly half. Thus, the training participation rate is only about 0.5 percent on average between 1965 and 1975.

2. If retraining were an efficient way of transferring labor from low-wage contracting sectors to high-wage expanding sectors, we would expect to see substantial earnings gains for individuals who participate in training programs. According to the survey by Björklund (1991), the evidence on these gains is, at best, mixed. Substantial positive earnings effects have been found in some studies but not in others. We have very limited knowledge about these effects during the late 1960s and early 1970s.

3. Labor market programs are mainly targeted at the unemployed. Consequently, the programs may have acted as a brake on the trend increase in the duration of unemployment, but they would have little effect on rates of entry

into unemployment. In an accounting sense, it is the low inflow rate that makes the Swedish unemployment rate so low (Björklund 1993).

We conclude that labor market programs have only a minor effect on overall unemployment. They do not account for the low levels of Swedish unemployment in the 1960s and 1970s. This interpretation accords with that of Forslund and Krueger (chap. 6 in this volume), who study the effect of relief work programs on regional unemployment.

4.2.3 Inequality and Relative Wages

Changes in relative wages and income inequality are the most interesting and challenging aspect of the Swedish labor market. From the 1960s to the 1980s, every imaginable wage differential declined.[8] The compression of the income and wage distributions was neither small nor gradual. Wage inequality fell in many other countries during the 1970s, but the fall in Sweden was stronger than in most countries. In the most recent decade, there has been a trend toward rising inequality. Here, the increase in Sweden looks modest compared to many other developed countries, especially compared with the United States (Davis 1992).[9] Between 1960 and 1970, the difference in log annual earnings between the ninetieth and the tenth percentiles of the male earnings distribution fell by twenty-five points, from 1.65 to 1.40.[10] Then it fell by another thirty-five points, to 1.05, by 1990. Figures 4.9–4.13 below, along with tables 4.1 and 4.2 below, show the details of this remarkable change.

Using survey data from two comparable sources, figure 4.9 documents changes in the distribution of log hourly wages of Swedish men since 1968.[11] The upper curve shows that, from 1968 to 1984, the 90/10 spread in this distribution fell by twenty-eight log points, from .95 to .68.[12] It is noteworthy that, in 1968, male wage inequality was about the same as in the United States. There, the 90/10 differential in 1970 was about 1.05. But, in the United States, the 90/10 differential in men's wages increased by thirty-five log points, to 1.4, which is about double the corresponding spread in Sweden. This change in

8. The data used here do not reflect nonwage compensation. This may affect our estimates since there is some evidence (LO 1987; Selen and Ståhlberg 1992) that fringe benefits were a substantial part of the compensation package for a large group of workers during the late 1970s and the early 1980s, when marginal tax rates on labor peaked. Unfortunately, there are no good data sources on total nonwage compensation.

9. The trend toward rising inequality was not universal. Inequality also fell in the Netherlands (Freeman and Katz 1994) and in Korea (Kim and Topel 1995). See also OECD (1993).

10. Source: Our calculations from unpublished census data for 1960, 1970, and 1990. The estimates refer to men who worked at least twenty hours in the survey week.

11. The surveys are the Level of Living Survey (LNU), collected by the Institute of Social Research, Stockholm University, and the Household Market and Nonmarket Activities Survey (HUS), collected by the University of Gothenburg. LNU has about thirty-five hundred valid wage observations per year, and HUS has about sixteen hundred. See Erikson and Åberg (1987) and Klevmarken and Olofsson (1993), respectively.

12. In the overall distribution, including females, the 90/10 spread fell by thirty-one log points, from .97 to .66.

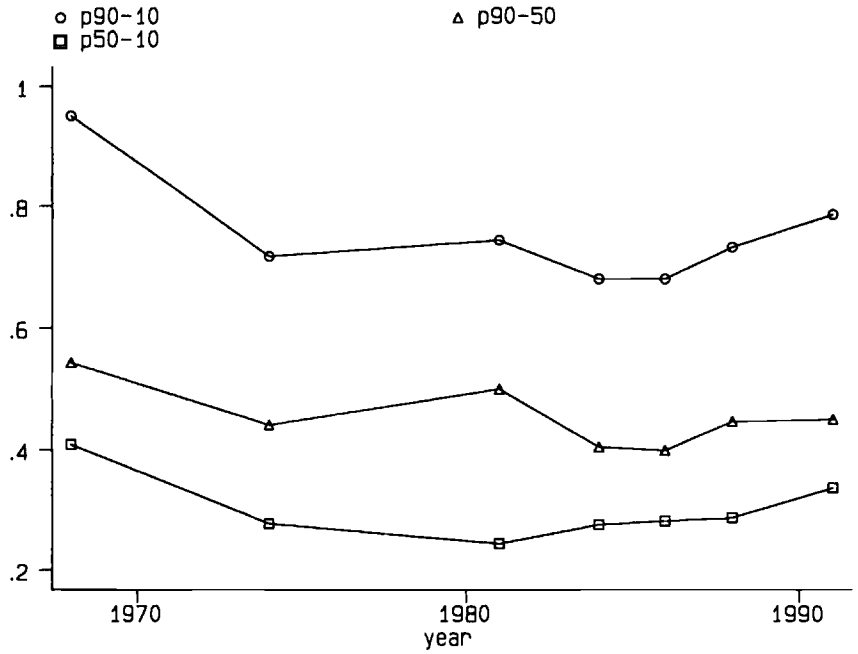

Fig. 4.9 Differences in log wages of Swedish men: ninetieth, fiftieth, and tenth percentiles.
Source: LNU; HUS (Swedish Household Market and Nonmarket Activities Survey).

distributions is even more remarkable when we consider that average living standards were fairly stable in both countries.

The lower two curves in figure 4.9 show that the compression was nearly evenly split between the top and the bottom of the distribution (except for 1981). Both the 90/50 and 50/10 spreads fell by about fourteen log points up to 1984. Then each rose by about five log points from 1984 to 1991. We think it noteworthy that wage inequality increased after 1984, when central bargains between LO and SAF began to unravel.

4.2.4 Male-Female Differentials

Figure 4.10 shows the evolution of the male-female wage gap in Sweden. In 1968, Swedish women earned about 23 percent less than men of comparable age and education. By the 1980s, the gap had narrowed to 11 percent, which is far lower than in any other OECD country (Blau and Kahn 1995). The data also show convergence between the adjusted and the unadjusted wage ratios for women. This is driven by rising relative levels of schooling and experience in the female workforce and, as we will see, by declining returns to these observable dimensions of skill.

Why did the male-female wage gap narrow? There is little doubt that gender differences in human capital—education and experience, for example—have

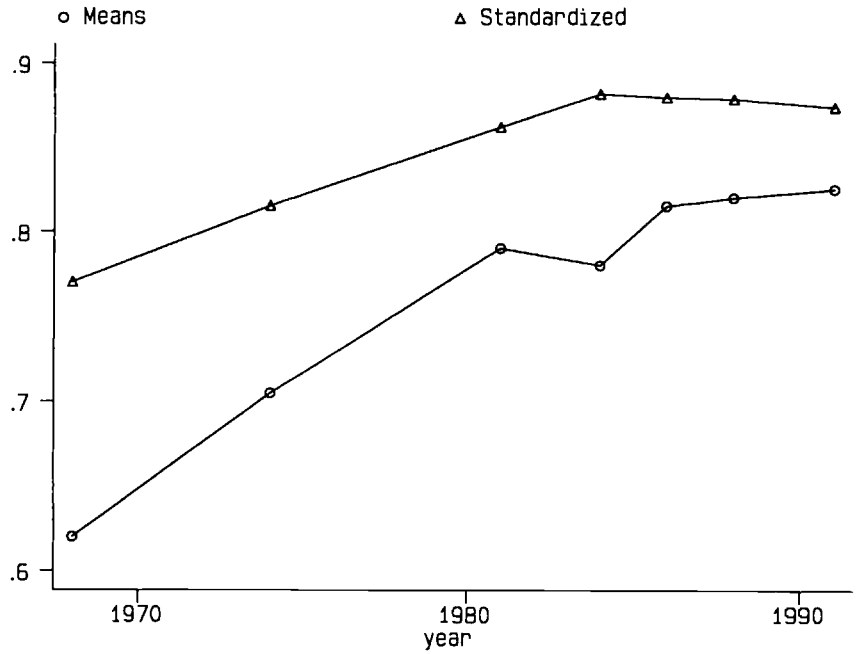

Fig. 4.10 Female/male wage ratios, 1968–91
Source: LNU; HUS.

narrowed over time, as they have in other countries. Reforms in the mid-1960s opened up higher education for women, which produced rapid convergence in educational levels (see Gustafsson and Lantz 1985).[13] But it is difficult to dismiss institutional factors. Before 1960, LO-SAF contracts in the private sector included separate scales for men and women, and the male/female wage ratio in manufacturing had been fairly constant at .70.[14] Then the parties agreed to eliminate the separate scales by 1965, and women's relative wages began to rise. The wage ratio in manufacturing reached .8 in 1970 and .9 by 1980 (Björklund and Persson-Tanimura 1983). This increase in relative prices occurred against a background of public policy that sought to increase female labor supply. Separate taxation of spouses, parental leave, and subsidized child care were all enacted in this period.

These trends suggest that collective bargaining may have forced greater wage convergence for women than would have occurred in an unconstrained market.[15] But, if this is so, what happened to the presumed excess supply of women? Here, the role of the public sector, and its amazing expansion, cannot

13. Edin and Holmlund (1995) show that college enrollment rates for women have exceeded those for men since the mid-1970s, and the gap has been increasing.

14. In the public sector, separate wage scales were eliminated in 1947.

15. Edin (1993) finds that roughly 60 percent of the convergence between 1968 and 1974 is accounted for by the compression of the overall wage distribution.

be denied. Between 1971 and 1984, female employment in Sweden grew by 29 percent, from 1.56 to 2 million. Expansion of the public sector accounted for 96 percent (427,000) of those jobs. As figure 4.11 shows, public sector growth slowed after 1984. This turning point corresponds to the peak of the female/male wage ratio in figure 4.10 above. Thus, the data are consistent with the view that wage convergence is demand driven and market clearing, but the "market" has been made by a burgeoning public sector (see also Edin and Holmlund 1995). In short, the government supported women's wages by hiring them.

4.2.5 Age-Earnings Profiles and the Returns to Job Tenure

The relative wages of new labor force entrants have risen dramatically since 1968. Table 4.1 records the time series of log wage differences for individuals with various amounts of labor market experience, measured relative to peak earners with twenty-one to twenty-five years of experience. We show comparable data for the United States in order to establish a benchmark.

In 1968, new entrants with one to five years of labor market experience had wages that were forty-eight log points lower than peak earners' wages. The comparable estimate for the United States was only thirty-four log points, so

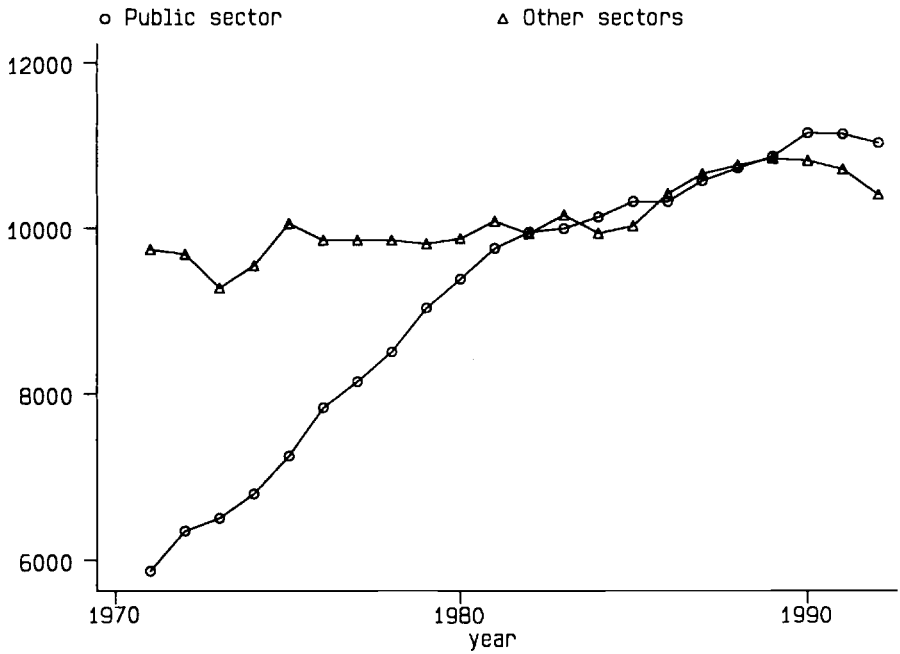

Fig. 4.11 Employment of women in the public and private sectors, 1971–92 (100s)
Source: Labor Force Surveys.

Table 4.1 **Log Wage Differentials of Experience Groups Relative to Peak Earners in the United States and Sweden, 1968–88**

Experience Group	1969	1974	1981	1984	1986	1988
0–5 years:						
United States	−.34	−.44	−.41	−.48	−.49	−.49
Sweden	−.48	−.34	−.31	−.30	−.26	−.21
6–11 years:						
United States	−.14	−.12	−.18	−.19	−.19	−.21
Sweden	−.19	−.10	−.15	−.19	−.14	.17
11–15 years:						
United States	−.04	−.00	−.07	−.05	−.06	−.06
Sweden	−.09	−.05	−.10	−.08	−.06	−.06

Note: Based on regressions including years of schooling and a dummy for gender, using CPS for the United States and LNU-HUS for Sweden.

the experience-wage profile in Sweden was actually steeper than the U.S. profile. Most of the difference was among very recent entrants, however. Over time, relative wages of new entrants in the U.S. fell by fifteen log points, to −.49, which was part of a general trend toward rising skill differences in pay. In Sweden, relative wages of new entrants increased by twenty-seven log points, eliminating more than half the wage differential. By 1988, cross-sectional estimates imply that a new entrant could look forward to only a 20 percent increase in pay over his career.[16]

Evidence on pay profiles within firms also points to flat profiles. Two examples of estimates of the return to job tenure are Edin and Zetterberg (1992) for 1984 and le Grand (1994) for 1991. Both find extremely small effects (see also Björklund and Åkerman 1989). Edin and Zetterberg estimate that ten years of job seniority raises wages by only 3 or 4 percent. Le Grand's estimate is even smaller, less than 2 percent. By comparison, ten years of job seniority yields a return of over 20 percent in American firms (Topel 1991). Tenure profiles in Japanese firms are steeper still.

The effects of flattened experience and tenure profiles on productivity have not been established empirically. But theories abound, and all point toward reduced incentives to invest in human capital and to exert effort (Ben-Porath 1967; Becker 1964; Becker and Stigler 1974; Lazear 1981). For example, if the bargaining process in Sweden forces flat wage profiles within firms, then workers have little incentive to invest in job-specific skills that raise productivity or to strive for advancement and promotion to more responsible positions.[17] Both these effects reduce productivity. It is difficult to argue that American and Japanese firms, which are free to choose whatever wage profile they want,

16. For a discussion of the relative importance of market forces and minimum wages for young workers, see Östros (1994).

17. For an analysis of on-the-job training and wages in Sweden, see Björklund and Regnér (1993).

Table 4.2 **Estimated Effects of an Additional Year of Schooling on Log Wages and College/High School Wage Ratios, Sweden, 1968–91**

	1969	1974	1981	1984	1986	1988	1991
Returns to schooling:							
All workers	.082	.049	.037	.040	.041	.045	.044
0–9 years of experience	.081	.049	.034	.025	.049	.040	.036
College/high school wage:							
Highest degree	1.49	1.48	1.26	1.18	1.25	1.22	1.26
15 vs. 12 years	1.46	1.26	1.14	1.16	1.22	1.18	1.21
16 vs. 12 years	1.82	1.33	1.22	1.22	1.26	1.25	1.29
Males in manufacturing	1.44	1.29	1.19	1.20	1.21	1.30	1.33

Note: Based on LNU and HUS. All regressions include a gender dummy and experience (except the returns to schooling for workers with 0–9 years of experience). Returns to schooling is based on a linear years of schooling variable. The college/high school effect is based on various measures, including highest degree obtained. This measure is not totally comparable over time. Alternatively, we use a specification with dummy variables for individual years of schooling, where we use 15 years and 16 years of schooling for college and 12 years for high school. "Males in manufacturing" refers to mean relative earnings among males in mining, manufacturing, and construction.

would choose steep profiles unless doing so had a substantial effect on productivity. In this sense, Swedish organizations may be hampered by pay compression, unless they are able to provide incentives in other ways.

4.2.6 The Returns to Schooling

As in the United States, the returns to schooling in Sweden fell throughout the 1970s.[18] But Sweden did not experience anything approaching the explosive growth in educational returns that characterized the U.S. labor market in the 1980s. The returns to schooling in Sweden were very low in the early 1980s, and it appears that these low returns have affected human capital investment decisions.

The first panel of table 4.2 records regression estimates of the return to schooling for various years between 1968 and 1991. We report separate estimates for all workers and for those with zero to nine years of experience. The time patterns are fairly similar: starting from a high of over 8 percent per year in 1968, the returns to education fell by more than half by the early 1980s. The sharpest decline occurred between 1968 and 1974, which was the period of the most rapid narrowing in the overall wage distribution (see fig. 4.9 above). Returns increased somewhat after 1984, but they pale next to comparable estimates for the United States. Even at its lowest level in 1979, the effect of an additional year of schooling in the United States never fell below 6 percent, and it peaked at 10 percent in 1987.

18. Here we deal only with the gross wage premium for education. We do not take taxes, stipends, and subsidized loans into account. Including such effects may have nonnegligible effects on the level of returns, but probably not on the basic trends over time. For further discussion, see, e.g., Edin, Fredriksson, and Holmlund (1994).

The second panel shows estimates of the college/high school wage ratio. In 1968, the typical college graduate earned almost 50 percent more than an otherwise comparable high school graduate. That advantage narrowed rapidly, however, falling to just 20 percent in the early 1980s. The rate of return to a year of college was only 4.5 percent. The timing, but not the magnitude, of this decline is roughly coincident with the United States, where the college/high school wage ratio fell from 1.50 in 1968 to 1.35 in 1979. In both countries, the returns to a college education drifted up in the 1980s. By 1991, the wage ratio had reached almost 1.3 in Sweden and a whopping 1.8 in the United States. By this standard, the returns to schooling in Sweden (like in many other countries) remain quite low.

Have low returns affected the incentives to invest in human capital? Enrollment rates suggest that they have.[19] Figure 4.12 simply plots the percentage of Swedish men aged twenty to twenty-four who are enrolled in school against estimates of the current, cross-sectional return to a college education. The correspondence is more than striking. The enrollment rate fell by almost half between 1968 and 1981, while the returns to schooling plummeted. And both recovered slightly in the 1980s.

Why did the returns to schooling fall? There are two obvious explanations. One is that compulsory schooling and the expansion of colleges and universities has increased the number of educated workers. Then factor prices adjust to changes in relative quantities. The very large changes in relative schooling levels, graphed in figure 4.13, suggest that there is some truth to this. The labor force share of compulsory school graduates (up to nine years of schooling) fell by half, to about 30 percent, in only twenty years. At the same time, the share of college graduates doubled. These changes in factor ratios can be expected to reduce the estimated returns to schooling, as has been demonstrated in many countries. Indeed, Edin and Holmlund (1995) make a case that these forces were at work in the Swedish data.

But the decline of returns between 1968 and 1974 appears too large to explain by factor ratios alone.[20] This suggests an institutional explanation grounded in central bargaining and egalitarian wage policies. We believe that the returns to schooling are lower than would occur in an unconstrained market.

4.2.7 Declining Inequality of Contract Wages

In some dimensions, declining wage differences can be partially explained by changing supply and demand factors in the Swedish labor market. For ex-

19. For a more detailed analysis that also considers the rationing of higher education, see Fredriksson (1994).

20. Edin and Holmlund (1995) need estimates of the elasticity of substitution between college and high school labor that are roughly double what is found in the United States. In other words, the elasticity of substitution in Sweden would have to be twice as large as elsewhere in order to explain the decline in the return to schooling with changing factor ratios alone.

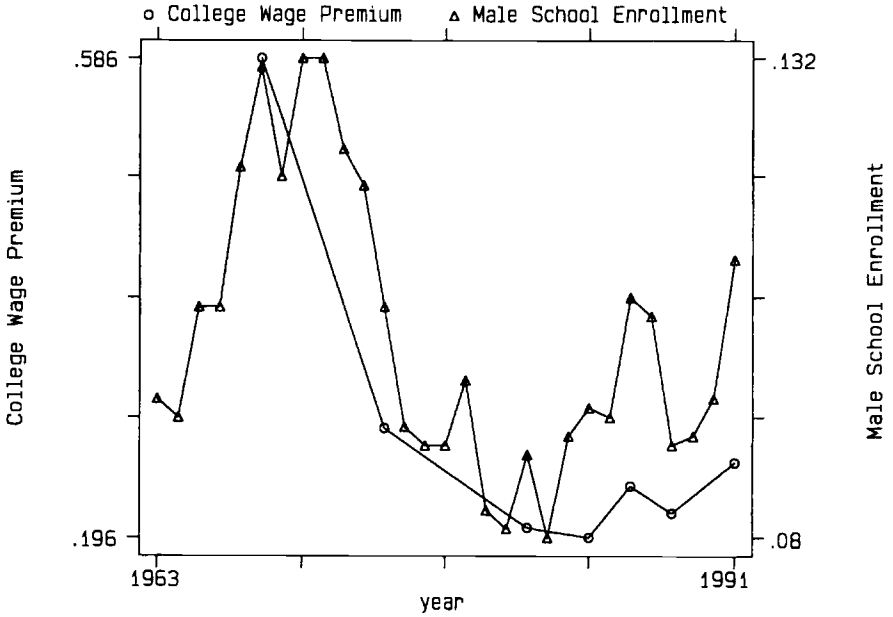

Fig. 4.12 College enrollment rates and the college wage premium, 1963–91
Source: AKU; LNU; HUS.

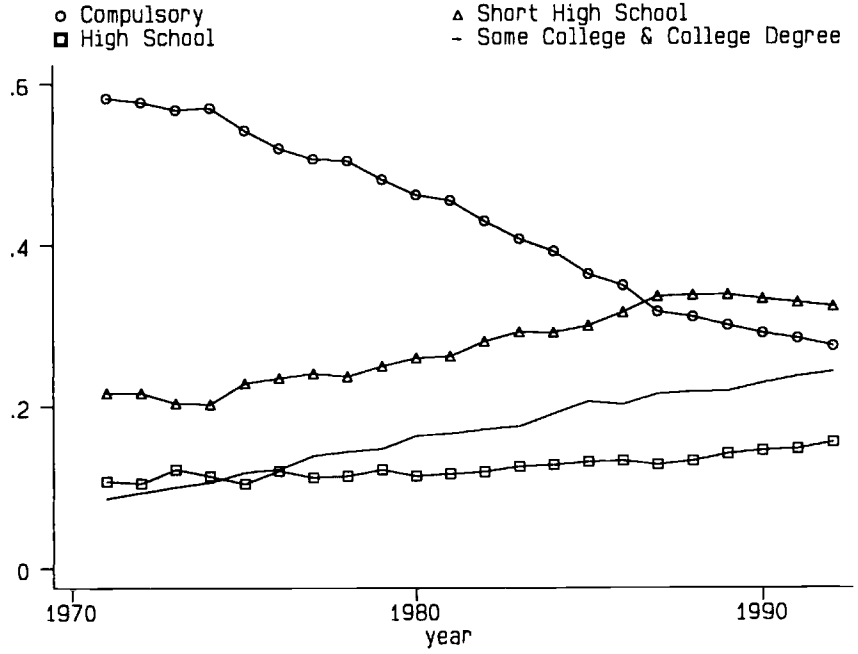

Fig. 4.13 Educational composition of employment, 1971–92
Source: AKU.

ample, declining returns to schooling coincide with a steady increase in the supply of educated workers. Yet, in the unconstrained U.S. market, comparable changes in education yielded much less narrowing of wage differentials. The rapid decline in all wage differentials suggests to us that institutional factors played an important role. The obvious institutional candidate is union wage policy.

We have already mentioned LO's egalitarian goals and "solidarity" wage policy. These goals were operationalized in the 1960s, when negotiated wage increases were given in absolute amounts (*öre*) instead of relative increases (percentage). "Low-wage pots," which were specifically targeted at raising the pay of low-wage workers, were introduced in 1964. Central frame agreements contained both these features until 1983.

Using micro data on blue-collar workers in the LO/SAF contract area, Hibbs (1990) showed that the wage dispersion implied by the central agreements tracks the actual wage dispersion well. Even though this correlation is not a statement about causality, we take it as an indication that union wage policy may have been one of the main reasons for the overall decline in wage inequality. One of the caveats of this interpretation is associated with wage drift, the difference between contracted and actual wage increases, which accounted for 45 percent of overall wage increases over the period, according to Nilsson (1993). As illustrated by Hibbs and Locking (1991), wage drift is more important for high-wage workers in the LO/SAF area. In a decomposition of the 1972–82 mean wage increases by percentile of the wage distribution, they found wage drift to be higher than contracted wage increases for the upper 50 percent of the wage distribution.

4.3 Allocative Effects: Restructuring the Swedish Labor Market

When Rehn and Meidner proposed their model of structural change and solidarity wages, they knew that efforts to raise the pay of low-wage workers would affect employment outcomes. Low-wage industries would be forced to contract, and the workers would have to go elsewhere. Rehn and Meidner thought that they would find work in more productive sectors.

There is abundant evidence that wage compression had allocative effects. For example, low-wage industries like textiles, forestry, and agriculture were concentrated in certain regions. Displacements from those industries called for regional migration as workers sought employment in the expanding regions. Figure 4.14 is consistent with this, showing that regional migration rates were unusually high in the 1960s and early 1970s, when changes in relative wages were largest.

Who moved? Which industries did they leave, and where did they go? In an attempt to answer this, we obtained unpublished tabulations of individual data from the Swedish censuses of 1960, 1970, and 1990. We did not use the 1980

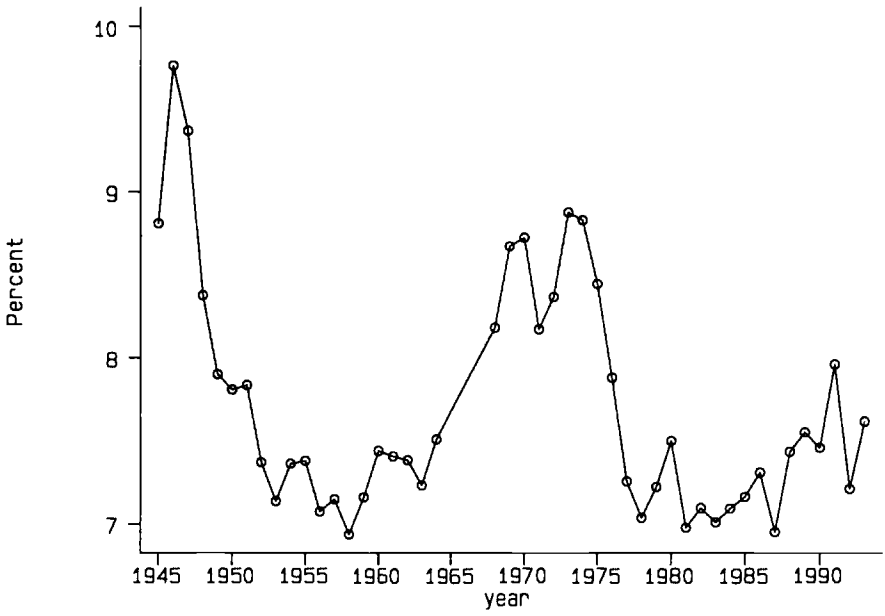

Fig. 4.14 Interparish migration rates, 1945–93
Source: SOS Bef (population statistics, Statistics Sweden).

data because individual earnings were not recorded in that year.[21] The data are organized by two-digit ISIC industry, and they record the number of employees by age, sex, and occupational status (employed vs. self-employed). The data are also stratified to show the number of employees of each type who fall into each of twenty evenly spaced intervals of the overall Swedish earnings distribution for the indicated years. In effect, we know the full earnings distribution for each 2-digit industry in Sweden. The tabulations for 1970 and 1990 are for the total Swedish population, but the 1960 data are a one-thirtieth sample.

If restructuring were consistent with the Rehn-Meidner goals, then it should be the case that low-wage industries contracted and high-wage industries grew.[22] Figures 4.15 and 4.16 show that this was the case in both periods of our data. They plot male employment growth rates for two-digit industries against initial mean earnings in each industry. High-wage industries did have greater growth, apparently absorbing the workers who left low-wage industries. Table 4.3 provides regression estimates of this relation for five-year age

21. We use data on males who are employed and work at least twenty hours per week. The earnings data refer to net taxable income (*sammanräknad inkomst* for 1970 and 1990 and *egen inkomst* for 1960). For 1990, we also have a measure of labor income (*arbetsinkomst*). The results using this measure of income are similar to those presented in the text.

22. For a discussion of wage compression and productive efficiency, see Hibbs and Locking (1996). A critical discussion of the importance of union wage policy is found in Svensson (1996).

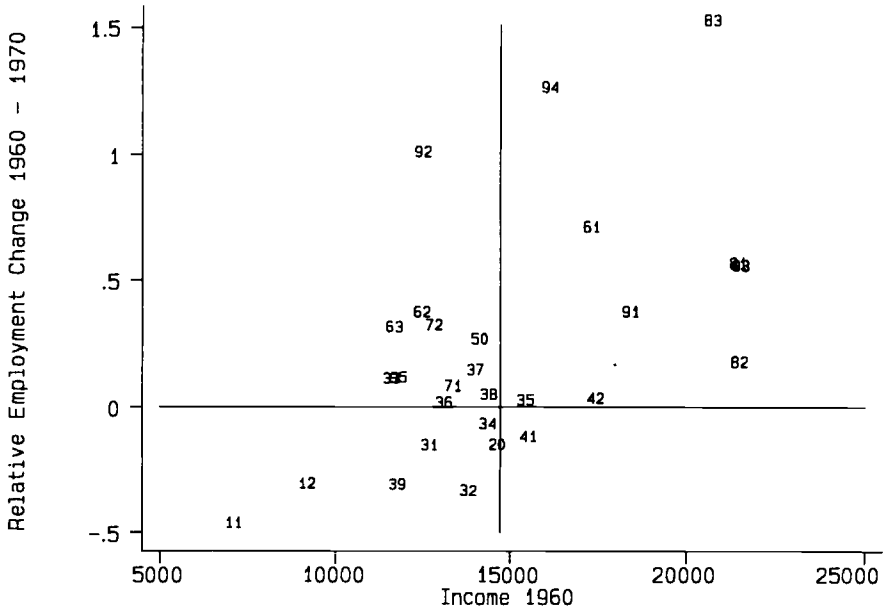

Fig. 4.15 The relation between industry employment growth, 1960–70, and industry income, 1960

Source: Swedish census data.

Note: See the appendix for a list of industry codes.

groups. The effect of mean initial earnings is positive for each group, with somewhat larger effects at younger ages. All age groups migrated toward high-wage industries; expansion was not achieved by simply redirecting the flows of young workers to expanding sectors.

The lack of income data for 1980 is unfortunate since virtually all the compression of the Swedish wage distribution had occurred by then. If employment changes are driven by changing wages, this implies less restructuring of employment after 1980 than before. Census tabulations of industry employment are available for 1980, however, which allowed us to break the 1970–90 employment changes into two parts. The last two columns in table 4.3 show that the relation of employment growth to *1970* initial income was much stronger before 1980 than after.

The identities of the industries shown in figs. 4.15 and 4.16 are of some interest (a complete list of codes is in the appendix). For both periods, the largest proportional reductions in employment occur in agriculture (11), forestry (12), textiles (32), and other manufacturing (39), while public employment in education and health care (93) expands. Similar patterns appear in absolute changes (not shown). The most rapidly expanding sector over the thirty-year period is education and health (93). It is noteworthy that the greatest absolute expansion between 1960 and 1970 was in construction (50), which

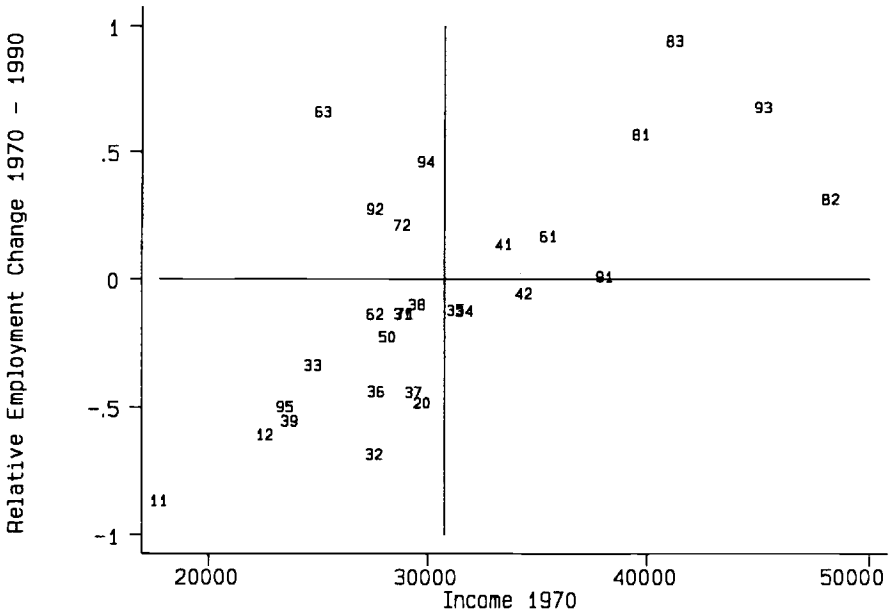

Fig. 4.16 The relation between industry employment growth, 1970–90, and industry income, 1970

Source: Swedish census data.

Note: See the appendix for a list of industry codes.

accords with the migration data shown above. Construction employment fell by about seventy-five thousand between 1970 and 1990, when regional migration slowed.

If wage compression is part of the cause for restructuring, is it not enough that workers are leaving low-wage industries? It has to be the case that wages rose in those industries, which drives the contraction. Figures 4.17 and 4.18 provide evidence that this was the case. They show the relation between industry employment growth and changes in mean industry earnings. On average, shrinking industries had the largest proportional increases in earnings, while expanding industries had the smallest. The relation is especially apparent between 1970 and 1990.[23]

Regression estimates of this relation are shown in table 4.4. We estimate models of the form

$$\ln E_{i,70} - \ln E_{i,60} = a + b(\ln I_{i,70} - \ln I_{i,60}) + e_i,$$

23. There may be two reasons for this. First, the 1960 data are based on a much smaller sample, so sampling error is more important in measuring the 1960–70 changes. Second, Hibbs's (1990) data indicate that the compression of intercontract wage differentials began around 1965. Long-run demands are more elastic, so much of the adjustment to these changes may have occurred after 1970.

Table 4.3 **Relative Employment Change and Income Level (absolute *t*-values in parentheses)**

	Dependent Variable, Independent Variable			
Age Group	$(e_{70} - e_{60})/e_{60}$, Income 1960	$(e_{90} - e_{70})/e_{70}$, Income 1970	$(e_{80} - e_{70})/e_{70}$, Income 1970	$(e_{90} - e_{80})/e_{80}$, Income 1970
All	.064	.046	.025	.018
	(2.67)	(4.86)	(4.12)	(1.34)
21–25	.045	.058		
	(.33)	(1.37)		
26–30	.129	.044		
	(1.70)	(2.43)		
31–35	.048	.047		
	(1.38)	(3.50)		
36–40	.067	.061		
	(3.31)	(5.53)		
41–45	.061	.071		
	(3.17)	(6.08)		
46–50	.052	.051		
	(2.94)	(5.92)		
51–55	.038	.040		
	(2.20)	(6.71)		
56–60	.032	.034		
	(1.62)	(6.99)		
61–65	.004	.028		
	(.15)	(6.55)		

Note: The 1960–70 equation is estimated without ISIC 11, agriculture; the relative employment change for this industry (+50 percent) seems unreasonable. This seems to have to do with the definition of self-employment in agriculture, which decreased dramatically between 1960 and 1970. Using an approximation for the change in agricultural employment, using the 1960 self-employment ratio, yields an estimate of .068 with a *t*-value of 3.18.

where $E_{i,t}$ is employment in industry i, year t, and I is the mean wage (earnings) in the industry. Ignoring capital and other inputs, we can think of b as an "average" of industry-specific labor demand elasticities in response to exogenous changes in the industry wage structure.[24] We treat wages as exogenous in this exercise under the hypothesis that wage compression is the outcome of LO's solidarity wage policy. The same model is estimated for employment changes from 1970 to 1990.

As could be seen from figures 4.15–4.18, the data are much noisier for the 1960–70 changes than they are for 1970–90; the smaller sample in 1960 is one reason for this. The 1960–70 data are even noisier when we break the sample down into age categories, although for prime-aged (thirty-six to fifty-five) workers there is evidence of a negative relation between changes in industry

24. With constant returns to scale, b_i is equal to labor's share in unit cost times the elasticity of demand for industry output. Then let $b_i = b + \beta_i$, where b is the unweighted average of industry labor demand elasticities.

Table 4.4 **Relative Employment Change and Relative Income Change (absolute *t*-values in parentheses)**

	Dependent Variable, Independent Variable			
	$(e1970 - e1960)/e1960$, $(i1960 - i1970)/i1960$		$(e1990 - e1970)/e1970$, $(i1990 - i1970)/e1970$	
Age group	OLS (1)	IV (2)	OLS (3)	IV (4)
All	−1.158	−3.907	−.448	−.668
	(1.76)	(2.45)	(4.72)	(4.50)
21–25	1.352		−.591	
	(.33)		(1.37)	
26–30	−.730		−.436	
	(.78)		(3.58)	
31–35	.759		−.436	
	(1.31)		(3.28)	
36–40	−.259		−.610	
	(.50)		(4.14)	
41–45	−1.159		−.705	
	(2.64)		(3.69)	
46–50	−.820		−.511	
	(1.38)		(3.67)	
51–55	−.433		−.458	
	(.93)		(5.26)	
56–60	−.092		−.268	
	(.26)		(4.86)	
61–65	.385		−.192	
	(.57)		(4.86)	

Note: The 1960–70 equation is estimated without ISIC 11, agriculture; the relative employment change for this industry (+50 percent) seems unreasonable. This seems to have to do with the definition of self-employment in agriculture, which decreased dramatically between 1960 and 1970. Using an approximation for the change in agricultural employment, using the 1960 self-employment ratio, yields an estimate of −1.314 with a *t*-value of 2.35.

wages and changes in employment. The pattern of change for 1970–90 is much more systematic. There is a negative relation between employment growth and wage changes in every age category. Further, the estimates are nearly uniform across age groups. If we interpret the estimates as reflecting labor demand responses, they imply long-run elasticities of about −.5.

The relation of employment changes to changes in mean wages can be biased if the least-skilled workers are the ones who leave contracting industries. Then selection causes average wages to rise as employment falls. To eliminate the selection effect, we constructed an imputed change in average industry earnings from (i) the number of industry i workers in each decile of the income distribution in the base year (say 1960) and (ii) the overall distribution of income in the ending year (say 1970). Then the imputed wage change is caused solely by the change in the overall earnings distribution. Using this variable as

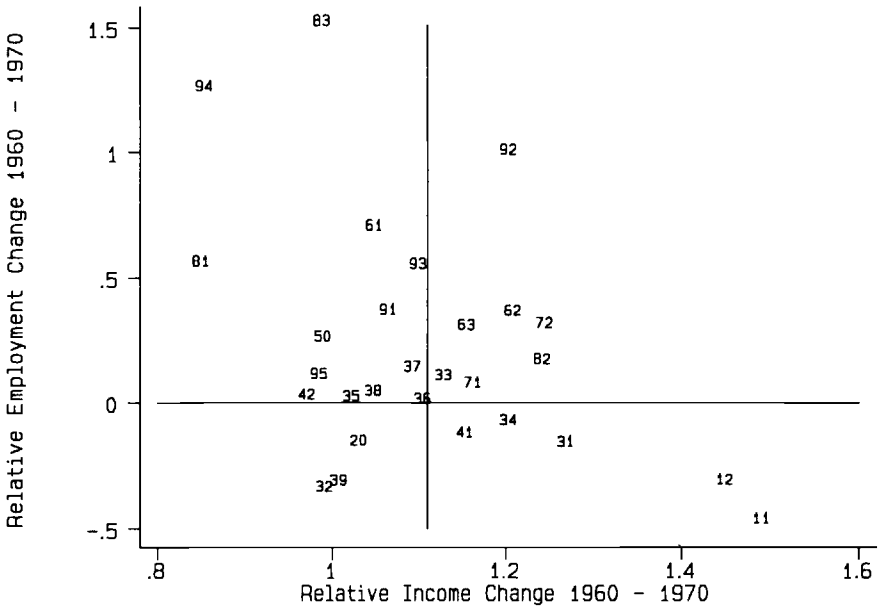

Fig. 4.17 The relation between industry employment growth and the change in industry income, 1960–70

Source: Swedish census data.

Note: See the appendix for a list of industry codes.

an instrument for actual earnings changes in table 4.4 yields stronger results, as shown in columns 2 and 4 of table 4.4. The point estimate for 1960–70 is unreasonably large, although the estimate also has a large standard error. The estimate for 1970–90 (−.67) is much more reasonable.

To get an idea of how these relations work in an unconstrained labor market, we once again use the United States as a counterfactual. In table 4.5, we report regression estimates of changes in relative employment on wage changes and initial wage levels for industries in the manufacturing sector in Sweden and the United States.[25] We find that industries with high wage growth had low employment growth in both countries during the 1960s, the Swedish estimate being higher, however. This relation becomes weaker in later periods in both countries. The main difference between the two countries is found in the relation between initial wages and subsequent employment growth. In Sweden, there is a positive and significant coefficient for initial wages for all subperiods, even if the magnitudes become smaller over time. In the United States, we find no evidence of such a relation. Thus, if we use the United States as an indication of how an unregulated market works, high-wage industries grew much more rapidly than in an unconstrained market.

25. We are grateful to Johnny Zetterberg for providing these data.

Fig. 4.18 The relation between industry employment growth and the change in industry income, 1970–90

Source: Swedish census data.

Note: See the appendix for a list of industry codes.

The uniform adjustment pattern across age groups in the 1970–90 data implies that restructuring was not accomplished by merely redirecting the flow of young workers. Prime-aged men had to leave some industries and go elsewhere. Further evidence on this is presented in tables 4.6 and 4.7. Table 4.6 repeats the regression exercise for within-cohort employment changes. Again focusing on the 1970–90 data, the estimates show significant restructuring within cohorts in response to changes in average industry earnings. Notice that the estimated elasticities are about half as large as those for fixed age groups. This is implied if part of the employment adjustment is achieved by changing the distribution of the inflow of youth.

Table 4.7 extends the cohort analysis, showing the cross-industry distributions of employment for various birth cohorts in 1960, 1970, and 1990. The table leaves no doubt that workers left some industries and entered others. For example, consider the cohort born in 1935–39, who were twenty-one to twenty-six years old in 1960. Workers in this cohort left agriculture and manufacturing, both of which contracted in the aggregate, and entered public administration and the service industry, which nearly doubled in share. Almost all the overall and within-cohort expansion of the latter industry is due to the growth of employment in the public sector. The growth of this sector was not

Table 4.5 **Relative Employment Change in Manufacturing: Sweden and the United States (absolute *t*-values in parentheses)**

Years	Sweden	United States
	Dependent Variable, $(e_{t+1} - e_t)/e_t$; Independent Variable, $(w_{t+1} - w_t)/w_t$	
1963–70	−2.820	−1.728
	(3.479)	(2.79)
1970–75	−.282	−.098
	(.78)	(.43)
1975–80	.186	−.744
	(.34)	(3.51)
1980–85	1.039	.489
	(1.76)	(1.50)
	Dependent Variable, $(e_{t+1}, - e_t)/e_t$; Independent Variable, w_t	
1963–70	.165	.039
	(2.48)	(.64)
1970–75	.051	.0001
	(2.69)	(.00)
1975–80	.037	−.007
	(3.61)	(.31)
1980–85	.015	.0005
	(2.23)	(.04)

Note: The employment data refer to annual hours worked within each three-digit ISIC industry within manufacturing (twenty-eight industries).

accomplished merely by hiring ever-larger proportions of new entrants. Rather, every cohort gravitated toward the public sector, and in roughly equal proportions.

Does this mean that public employment is the sponge that soaked up the excess supply of low-wage workers? The evidence points in this direction, but this may not be the only factor at work. Other industries also grew, and some might have declined by more if wage compression had not occurred. For example, most observers would agree that fabricated metals is the type of "high-wage" industry that the Rehn-Meidner program and associated public policies were meant to expand. This industry accounted for 16.5 percent of male employment in 1970 and exactly the same proportion in 1990. But the comparable industry in the United States accounted for 16 percent of employment in 1970 and only 8 percent in 1990, a relative decline of 50 percent. With the United States as a counterfactual, fabricated metals "grew" as a source of employment.

We close this section with evidence on changes in the relative skill composition of some key industries. We index *relative skill* by each person's position in the overall wage distribution for each year: 1960, 1970, and 1990. Six indus-

Table 4.6 **Cohort Relative Employment Change and Relative Income Change (absolute *t*-values in parentheses)**

Age 1960	Dependent Variable, $(e_{70} - e_{60})/e_{60}$; Independent Variable, $(i_{60} - i_{70})/i_{60}$	Age 1970	Dependent Variable, $(e_{90} - e_{70})/e_{70}$; Independent Variable, $(i_{90} - i_{70})/i_{70}$
11–15	. . .	21–25	.126
			(.97)
16–21	. . .	26–30	−.071
			(.68)
21–25	.945	31–35	−.229
	(3.09)		(2.68)
26–30	−.020	36–40	−.287
	(.04)		(4.65)
31–35	.831	41–45	−.173
	(2.06)		(4.36)
36–40	−.155	46–50	−.046
	(.37)		(1.38)
41–45	−.732	51–55	. . .
	(2.18)		
46–50	−.677	56–60	. . .
	(2.03)		
51–55	−.805	61–65	. . .
	(2.42)		

Note: The 1960–70 equation is estimated without ISIC 11, agriculture.

tries are shown in figures 4.19–24. The figures show a slight increase in skills in low-wage agriculture, especially from 1970 to 1990, as we would expect from a compression of the wage distribution. At the other extreme, relative skills declined in fabricated metals and machinery, where the share of workers in the first and second quintiles grew steadily over time. Similar declines in relative skill levels appear in the growing public sector. In public administration, the decline is gradual, but, in education and health, there is an abrupt decline. From a distribution that was heavily concentrated in the top quintile in 1970, the 1990 distribution of income roughly matches the distribution for the overall population.

4.4 Driving Forces in the Swedish Labor Market

What factors have driven the performance of the Swedish labor market? Writing in the 1940s, Rehn and Meidner offered a radical agenda for managing the wage distribution and transforming employment in Sweden. While vague on details, they backed up their policy prescriptions with bold predictions (even for economists) of what the outcomes would be. They thought that egalitarian wage policies, implemented through central bargaining, would push la-

Table 4.7 **Industry Distribution of Employment by Birth Cohort and Year: Males**

	Birth Cohort								
Year	1895–99	1905–9	1915–19	1925–29	1935–39	1945–49	1955–59	1965–69	Total
	Agriculture, Forestry, and Fishing (ISIC 1)								
1960	13.5	9.9	8.2	8.9	10.0				10.4
1970		5.4	12.6	10.0	6.6	5.4			10.2
1990				2.9	2.1	1.6	2.1	2.1	2.0
	Mining (ISIC 2)								
1960	1.2	1.2	1.2	1.3	1.5				1.2
1970		.9	.8	.9	.9	.9			.9
1990				.2	.7	.5	.4	.4	.5
	Manufacturing (ISIC 3)								
1960	43.6	39.8	40.9	39.3	43.7				41.5
1970		35.7	34.0	33.7	34.6	37.2			34.9
1990				32.3	31.8	28.1	29.4	34.3	30.7
	Thereof Textiles (ISIC 32)								
1960	3.7	3.2	3.0	2.5	2.2				2.9
1970		2.5	1.8	1.5	1.2	1.2			1.6
1990				1.0	.6	.5	.4	.5	.5
	And Fabricated Metal Products (ISIC 38)								
1960	14.1	15.3	19.3	19.6	20.6				18.6
1970		13.1	15.4	16.1	17.5	19.5			16.5
1990				16.4	16.6	15.1	16.2	19.2	16.5
	Electricity, Gas, and Water (ISIC 4)								
1960	2.0	1.2	1.8	1.5	.8				1.5
1970		1.0	1.5	1.2	1.0	.8			1.1
1990				1.9	2.6	1.7	1.4	.7	1.4
	Construction (ISIC 5)								
1960	14.8	18.1	14.9	12.6	12.9				14.1
1970		14.2	14.1	13.5	15.4	18.3			15.0
1990				10.2	11.5	12.2	11.7	16.1	12.9
	Trade (ISIC 6)								
1960	6.7	6.4	7.3	9.4	9.8				8.7
1970		10.0	9.7	11.3	11.5	12.0			11.1
1990				12.3	11.2	11.5	13.4	17.0	12.3

(*continued*)

Table 4.7 (continued)

Year	Birth Cohort 1895–99	1905–9	1915–19	1925–29	1935–39	1945–49	1955–59	1965–69	Total
				Communication (ISIC 7)					
1960	5.0	8.5	11.5	11.2	9.8				9.8
1970		5.0	10.5	10.1	9.4	9.9			9.3
1990				7.0	9.5	10.3	11.2	8.9	9.7
				FIRE (ISIC 8)					
1960	3.6	2.2	2.6	3.0	1.3				2.6
1970		3.7	3.7	4.4	1.8	4.7			4.5
1990				9.1	9.1	10.3	9.6	7.2	9.0
				Public Administration and Other Services (ISIC 9)					
1960	9.2	11.2	11.4	12.4	8.5				10.2
1970		11.7	12.8	14.9	15.1	10.8			13.0
1990				23.8	21.6	25.3	20.0	12.5	19.7
				Thereof Public Sector (ISIC 31, 33)					
1960	7.3	9.4	10.1	11.1	7.0				8.9
1970		9.2	10.8	12.6	12.9	8.6			11.8
1990				20.9	18.9	19.8	16.8	9.8	16.7

bor into more productive uses and promote economic growth. By raising labor costs in low-wage sectors, they argued, low-wage employers would be driven out of business. Labor would then flow to high-wage sectors, which are more productive. To them, equity and efficiency were complements in the development process.

Even with fifty years of hindsight, it is hard to quibble with the broad outlines of what Rehn and Meidner predicted. From 1960 to the early 1970s, LO's egalitarian strategy compressed wage differentials along virtually every observable dimension. Industry and regional differences were the first to fall, which reduced employment in low-wage industries and forced migration from the north. Labor market programs were implemented to deal with the displacements, as Rehn and Meidner had advocated, but the remarkable thing to us is that they seem to have played such a minor role. The sum of open unemployment and participation in labor market programs remained low throughout the process, while average wages and productivity grew rapidly. At this level, even Rehn and Meidner must have been surprised.

While the story after 1970 is less sanguine, these facts present an important puzzle. How was full employment maintained in the face of interventions that sharply raised the relative price of low-wage workers? It does no good to argue that labor demands were inelastic—low-wage industries contracted as their labor costs rose. Instead, the demand for these workers was apparently rising

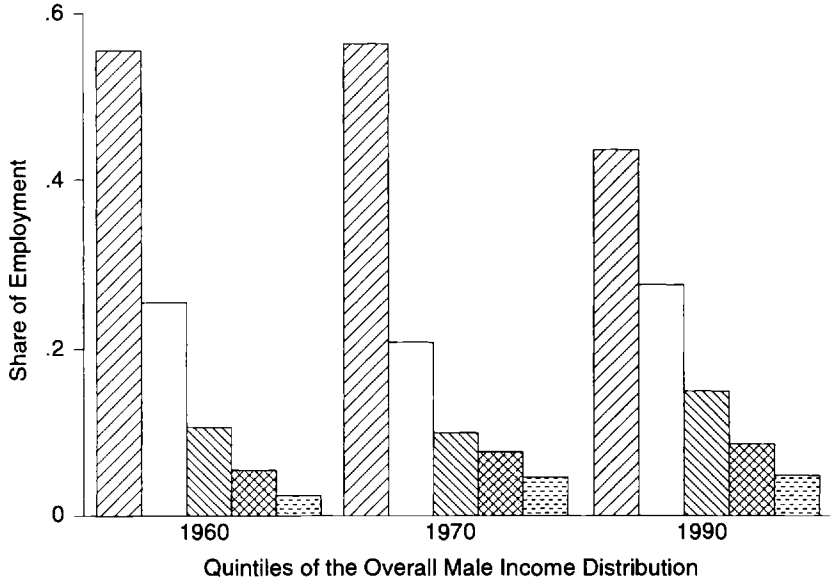

Fig. 4.19 Male income distribution in selected industries, 1960, 1970, 1990: agriculture

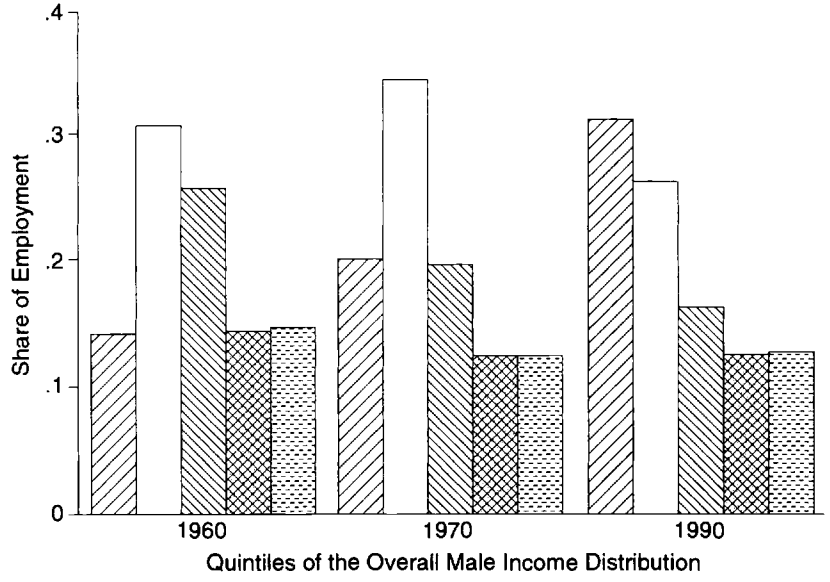

Fig. 4.20 Male income distribution in selected industries, 1960, 1970, 1990: textile

Fig. 4.21 Male income distribution in selected industries, 1960, 1970, 1990: machinery

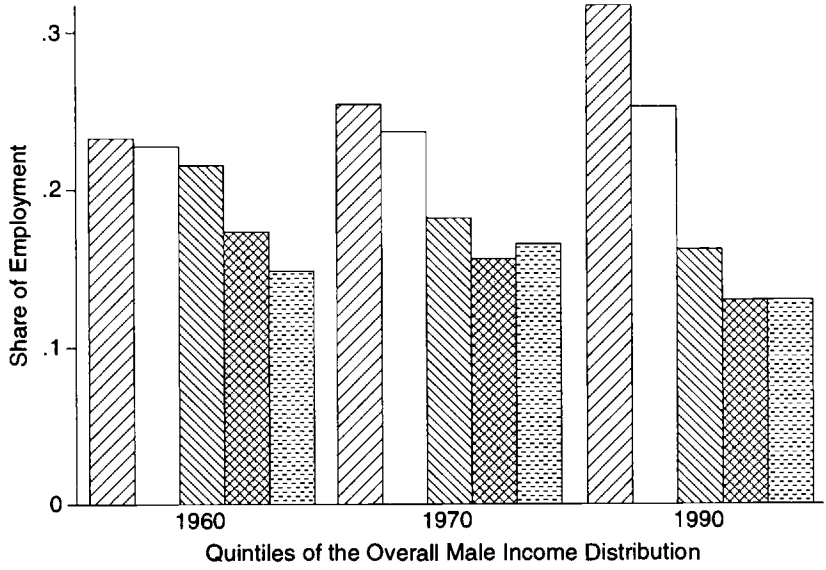

Fig. 4.22 Male income distribution in selected industries, 1960, 1970, 1990: retail trade

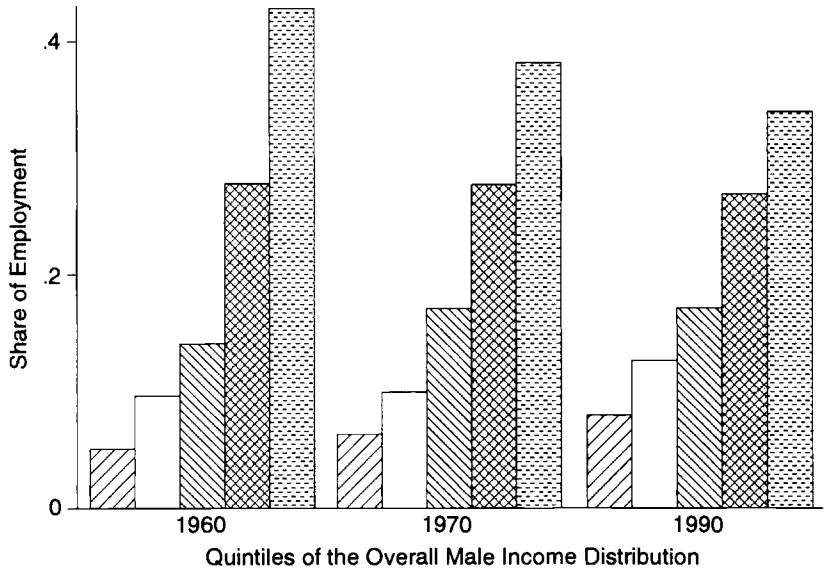

Fig. 4.23 Male income distribution in selected industries, 1960, 1970, 1990: public administration

Fig. 4.24 Male income distribution in selected industries, 1960, 1970, 1990: education and health care

in other sectors. What drove the increase in demand? Several theories are possible, and all may contain a grain of truth.

The most obvious explanation is the growth of the public sector, which accelerated after 1970. The government may have supported the price of low-wage workers by simply hiring them, soaking up the excess of supply over private demand. As we indicated above, this is broadly consistent with the facts for women, for whom the public sector accounts for virtually all increased employment and labor force participation. But only 15 percent of men held public sector jobs in 1990, up five points from 1970. Men and women must be good substitutes in low-wage occupations if the public sector is to have an important effect on male earnings. At least for men, we do not think that expansion of the public sector is the whole story (see also Edin and Holmlund 1994).

Another explanation is that negotiated wage settlements simply tracked market equilibrium outcomes. With regard to skill groups, this implies either (i) rising relative demand for products produced by less-skilled workers or (ii) declining relative supplies of the less skilled. Edin and Holmlund (1995) find little evidence in favor of implication (i), but changes in relative shares of workers with different levels of education do favor implication (ii). Their evidence that returns to schooling move with relative supplies of education groups (see figs. 4.11 and 4.12 above) suggests that at least some of the move toward wage equality was "swimming with the tide."

It seems obvious that wage inequality would have declined even without a solidarity wage policy on the part of LO. The reduction in the market share of low-skill workers, driven by increased schooling levels, was huge. This would reduce inequality directly by reducing the share of the low-wage workers and also indirectly by changing relative prices, as Edin and Holmlund show. But it also seems obvious that inequality fell by more, and more quickly, than can be explained by market forces alone. Hibbs's (1990) estimate that wage differences between contract areas fell by more than half in a period of six years (1966–72) is too large to explain as an outcome of slowly changing factor proportions. The similarly large and rapid contraction of within-firm and between-occupation differentials, which continued through the 1970s, also appears to indicate "overshooting" of what would have occurred in a competitive market.

Thus, the overall compression of wages in Sweden must exaggerate the effect of central bargaining and LO policies. Some of it would have occurred anyway. But, in our view, LO also achieved its egalitarian goals. Wage differentials and inequality fell by more than can be explained by market forces alone.

These conclusions mean that central bargaining did constrain the Swedish wage structure. Yet there is little evidence of excess supply. There are at least three theories that are consistent with these facts. Each relies on expanding labor demand, driven by declining wages in high-wage industries, to soak up displaced workers. A common theme is that the LO-SAF bargains delivered cheap labor to high-wage employers in SAF. LO and SAF were more clever

than simply to impose a wage floor and watch unemployment rise. We outline the models in turn.

4.4.1 Model 1: Decentralized Bargaining and Industry Rents

Sweden was already heavily unionized in 1950, with about 75 percent of the non-self-employed workforce belonging to labor unions. Bargaining took place at the company and industry level, and there were significant interunion wage differences. It was in this environment that SAF—the employers federation—pushed for central bargaining. Most explanations of this fact point to SAF's fears of "leapfrogging" in wage negotiations with separate unions. We think that it is equally plausible that high-wage employers—who allegedly dominated SAF—recognized their gains from compressing the interindustry wage distribution. They counted on LO to deliver cheap labor and expand the "modern" sector of the labor market.[26]

In this model, the costs of a solidarity wage policy are small. Indeed, central bargaining and the compression of interindustry wage differences may be efficient. High wages in some sectors can reflect unions' success in extracting rents in bilateral negotiations, with the result that equally productive workers are paid differently across sectors. In traditional models of monopoly unionism, the resulting distribution of workers will be inefficient, and high-wage sectors of the labor market will be "too small."

Central bargaining can internalize these costs in the same way that it internalizes tendencies toward wage inflation (Olson 1982). With near-universal union coverage, a central bargain can more closely replicate a Walrasian wage distribution. Wage levels in high-wage industries will fall and their demand for labor expand. Low-wage sectors contract, but there is full employment during restructuring because underlying market forces are pulling workers toward expanding industries. Labor market programs would therefore play a minor role. In its broad outline, these movements are consistent with the industrial restructuring of the 1960s and early 1970s, when between-contract wage differences were greatly reduced (Hibbs 1990; Holmlund and Zetterberg 1991).

4.4.2 Model 2: Equalizing Wage Differences

The "rationale" just given posits voluntary and efficient mobility from low- to high-wage sectors. But some discussions of the process, and of Rehn and Meidner's proposals, emphasize involuntary mobility. Wage differences between sectors were "too large," in the sense of being inconsistent with egalitarian ideals, but not large enough to induce workers to move. Then the point of raising wages in low-wage sectors was to force people to seek work at a higher wage.

This scenario can make sense if some wage differentials reflect differences

26. Moene and Wallerstein (1993) contains similar ideas in a political model of winners and losers from central bargaining.

in amenities across sectors rather than differences in skills. Imagine two sectors, one high wage (H) and the other low (L). Jobs in the two sectors offer amenities a_H and a_L. In equilibrium, the marginal worker's welfare is equalized across sectors, so $u(w_L, a_L) = u(w_H, a_H)$ and $w_H > w_L$ if $a_H < a_L$. Now suppose that an egalitarian wage policy sets a wage floor above w_L. Higher wages force some workers to leave sector L, which contracts, raising labor supply and reducing relative wages in sector H. The equilibrium outcome entails contraction of the low-wage sector, migration from L to H, full employment, and declining wage inequality. Mobility is involuntary in the sense that workers who move are worse off than before, as are all workers in sector H, who now work for a lower wage. Intramarginal workers in L gain—their wage is higher—as do owners of capital in H.

This model is consistent with key features of the Swedish restructuring. Induced migration from the low-wage north to the high-wage south was part of the Rehn-Meidner program for economic growth. Nilsson (1993) and Henrekson, Jonung, and Stymne (1993) report growing resentment against these "moving van" policies by the early 1970s, resulting in a policy shift that favored the maintenance of full employment within regions over forced restructuring. Unlike the previous model, the outcome is inefficient, although income redistribution benefits some low-wage workers and all high-wage employers.[27]

4.4.3 Model 3: Compressed Skill Differentials

The models just presented make opposite assumptions about the initial wage distribution that is compressed by central bargaining. Under the rents hypothesis, the initial distribution was inefficient because of differences in bargaining power across sectors. Wage compression was Pareto improving. With equalizing differences, wage differences represent efficient compensation for amenities. Wage compression reduced welfare. We believe that both have application to the Swedish experience, but even their combination is not the complete story. It is difficult to argue that the compression of wage differences across industries eliminated only union rents or that intersectoral differences in pay reflected only amenities.[28] And neither model applies to the large compressions of pay that occurred within firms or between occupations and educational groups. These changes reduced the relative price of skill.

Other factors were at work. In thinking about what they were, we believe that it is relevant that SAF, not LO, was the initiator of central bargaining in

27. A related growth model is discussed in Agell and Lommerud (1993). In their analysis, the expanding high-wage sector creates growth externalities along the lines of Lucas (1988) or Romer (1986). Then a case can be made that forced restructuring enhances growth as a form of "industrial policy." Welfare is lower today, but it may be higher in the future.

28. In the United States, where only 12 percent of the private sector workforce is unionized, interindustry wage dispersion is much larger than in Sweden. These differences do not reflect union rents. This is another case where using the United States as a benchmark suggests that the wage distribution is constrained relative to competitive outcomes.

the 1950s and tended to support the process for the next thirty years. The dominant faction in SAF saw that it had something to gain. But, in 1983, it was Verstadsföreningen and Metall—the largest private-bargaining pair in Sweden—that first abandoned central bargaining. They claimed that skilled workers were underpaid in the central frame agreements. For the employers in Verstadsföreningen, the costs of compressed skill differentials had come to outweigh the benefits, whatever those might be, so they left the coalition. Central bargaining began to crumble, and skill differentials in pay began to rise.

These points suggest that a reduced price of skilled labor was an important element of central bargaining, which kept SAF involved in the short run but which eventually led to the demise of frame agreements. On this interpretation, frame agreements did not just raise the compensation of low-wage workers; they also reduced the absolute wage of skilled workers. We build a simple two-sector, three-factor model to illustrate the forces at work.[29]

We assume three factors of production: unskilled labor (U), skilled labor (S), and capital (K). Factor prices are W_u, W_s, and r. Skilled and unskilled labor are inelastically supplied in the short run, while capital is in perfectly elastic supply on the world market. Both types of labor have rising supply price in the long run.

Sector 1, the low-skill sector, is U intensive. Think of it as retail trade. We take this to the extreme and assume that sector 1 output depends only on employment of unskilled labor: $y_1 = F(U_1)$. Sector 2 is skill and capital intensive; think of it as manufacturing. Output is $Y_2 = G(U_2, S, K)$, which embodies the simplifying assumption that all skilled labor is employed in sector 2. We assume that the price of sector 2 output is $p(Y_2)$ with $p'(\cdot) < 0$, and we normalize the price in sector 1 to unity. Then competitive equilibrium implies

$$F_u(U_1) = W_u, \tag{1}$$

$$pG_u(U_2, S, K) = W_u, \tag{2a}$$

$$pG_s(U_2, S, K) = W_s, \tag{2b}$$

$$pG_k(U_2, S, K) = r, \tag{2c}$$

$$U_1 + U_2 = U. \tag{3}$$

Now assume that a central bargain caps the wage of skilled workers at $W < W_s$. Sector 2 employers earn rents because the contract effectively cartelizes the market for skilled labor. At the old allocation of resources, (2b) no longer holds as an equilibrium condition. Skill has a positive shadow price, as in figure 4.25, because there is excess demand.

How is a new equilibrium attained? In the short run, rents accrue to the owners of capital in sector 2, so we expect capital to enter the industry. This means that (2c) no longer holds; instead, it is replaced by the condition that capital flows to sector 2 until there are zero profits:

29. For a related model, see Flam (1987).

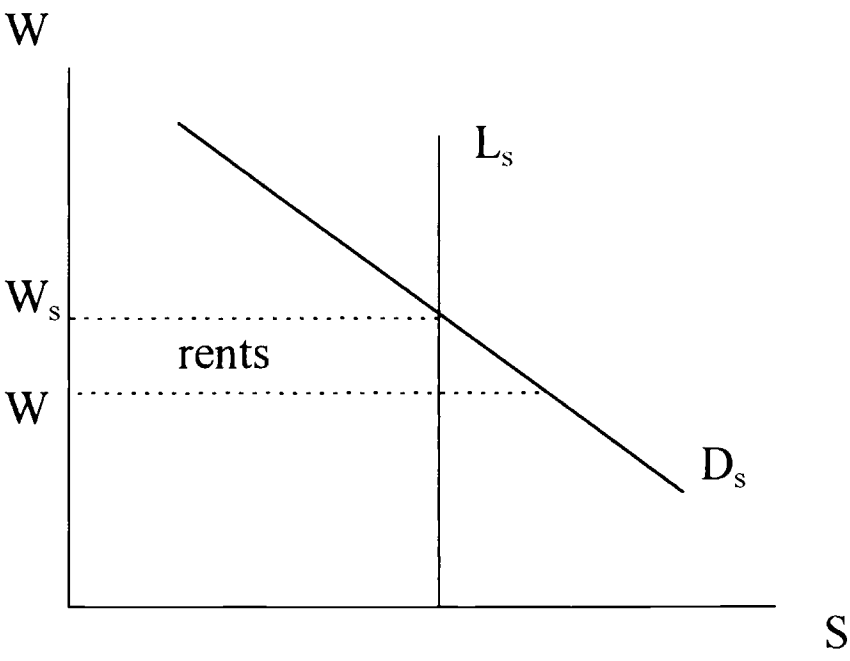

Fig. 4.25 Positive shadow price of skilled labor

$$pG(U_2, S, K) - W_u U_2 - WS - rK = 0. \tag{4}$$

Sector 2 becomes inefficiently large and capital intensive.

Displacement of (1), (2), and (4) yields the allocative effects of a price ceiling on skilled labor. These are

$$dk/dW_s \propto -S < 0, \tag{5}$$

$$dU_1/dW_s = -dU_2/dW_s \propto -S(pG_{uk} + G_u G_k p'), \tag{6}$$

$$dW_u/dW_s \propto -S(pG_{uk} + G_u G_k p'). \tag{7}$$

Equation (5) indicates that the wage cap ($dW_s < 0$) attracts capital to sector 2 and that the effect is proportional to the utilization of skilled labor in that sector.[30] In turn, rising capital intensity increases the demand for unskilled labor in sector 2 so long as capital and labor are sufficiently strong gross comple-

30. The model assumes that capital is in perfectly elastic supply, although this is inessential. With a closed capital market, investment is the outcome of domestic saving, which implies rising supply price. The model then implies that saving and investment increase with a wage cap, so that capital grows over time to a new long-run equilibrium, while intertemporal consumption decisions are distorted.

ments ($G_{uk} > 0$).[31] Unskilled labor migrates from sector 1 to sector 2, which is what occurred. This change in demand is also the condition for the unskilled wage to rise in (3), further reducing wage inequality. Notice that the market for unskilled labor always clears—there is no induced unemployment in the model because the egalitarian policy actually increased the demand for unskilled labor. The market that does not clear is for skilled labor, where there is excess demand.

This point takes on added relevance in the long run, when the assumption of inelastic supplies of skill groups is less appropriate. Lindbeck et al. (1993), Henrekson, Jonung, and Stymne (1993), and others have argued that the distortionary effects of egalitarian policies are large because participants will eventually adjust to changed incentives. Lindbeck is especially forceful on this, pointing out that long-run distortions are likely to be much more serious because patterns of behavior adjust slowly.

Our model has this flavor and produces additional implications. With endogenous investment in human capital, the long-run supply of skilled workers will depend on the skill premium, $W_s - W_u$. A higher wage premium encourages investment and raises overall productivity. Wage compression causes the relative supply of skilled labor to fall over time, much as we found for the returns to schooling in table 4.2 above. By raising the marginal product of skilled labor, a declining share of skilled labor increases the wedge between the social value of skill and its price. The welfare costs of wage compression cumulate because incentives to invest in skill are distorted. Inefficiencies are small in the short run, when stocks of skill are fairly fixed, but they loom large in the long run, when the supply of skill is elastic.

This fact is consistent with the ultimate unraveling of centralized bargaining. As the shadow price of skill rises, the gains to defecting from the central agreement also rise. Firms that hire skilled labor are tempted to compete to get it, and the skilled unions they deal with also have more to gain from defection. This is our interpretation of why Verstadsföreningen and Metall eventually dropped out of the central frame. In the short run, central bargaining effectively cartelized the market for skilled workers and artificially increased the demand for unskilled ones. Skill-intensive firms gained. But the cost of maintaining narrow skill differentials rises through time because human capital investments are discouraged. As skilled labor becomes more scarce, the gains from cooperation are eventually swamped by the benefits of defection, which spells the demise of central bargaining.

To provide some empirical information on this hypothesis, we report a measure of the relative scarcity of skilled workers in figure 4.26. Our admittedly imperfect measure of scarcity is obtained from survey data on firms. We use the proportion of firms that report difficulties in recruiting skilled workers rela-

31. Complementarity is sufficient if Sweden is a price taker on world markets for sector 2 output, so $p'(Y_2) = 0$.

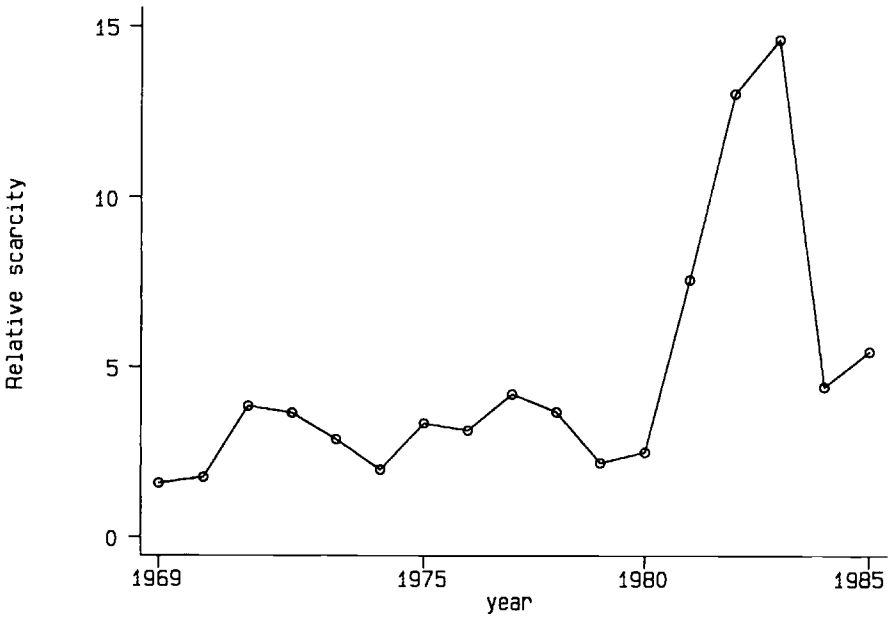

Fig. 4.26 Relative scarcity of skilled blue-collar labor
Source: KI (National Institute of Economic Research).

tive to the proportion of firms that report difficulties in recruiting other (unskilled) workers.[32] This measure shows a dramatic increase in the relative scarcity of skilled workers in the early 1980s. This picture seems consistent with the hypothesis that excess demand for skilled labor contributed to the breakdown of centralized bargaining. The question, however, is to what extent this excess supply was due to a reduced supply of skills. It seems reasonable that compressed skill differentials should produce a trend decline in the supply of skills. Our measure of scarcity does not show a strong trend prior to 1980. Together with the very sharp increase in the early 1980s, it seems that other factors than a gradual decline in the supply of skills were also at work.

In this model, a complete breakdown of central bargaining spells the collapse of the market for unskilled workers (and of investment). In fact, if markets are allowed to clear, there will be even more wage inequality than would have occurred without egalitarian policies. The reason is that long-run factor ratios adjusted to the egalitarian wage structure, so the ratio of unskilled to skilled workers is artificially high. If unions try to stem the tide and keep the unskilled wage high, the result will be unemployment.

We do not believe that the end of central bargaining caused a reversion to market wages; skill premiums and inequality have widened, but not dramati-

32. We are grateful to Bertil Holmlund for making us aware of, and providing, these data.

cally. But it is true that the burden of the current crisis has fallen more heavily on fewer workers than in any earlier contraction, with unemployment rates not seen since the 1930s. In our model, this is a consequence of the end of wage compression.

4.5 Conclusions

Our reading of the evidence is that Swedish labor market institutions matter. Centralized bargaining, which was first initiated by employers but later rejected by them, played an important role in compressing wage differences. Compared to market outcomes, egalitarian wage policies reduced pay differences along virtually every dimension of skill, to different degrees. This was an important component, perhaps the important component, of Sweden's sharp decline in income inequality.

Our evidence indicates that pay compression had important effects in shifting the allocation of labor across sectors. Low-wage industries were forced to contract, as one would expect from an increase in the pay of low-wage workers. The puzzle is that wage compression did not generate high unemployment: Swedish unemployment rates were unusually low during the period of declining inequality. We find that public policies had little role in maintaining low unemployment. Expansion of the public sector helped bolster demand for low-wage workers, especially for women. Yet it appears that the relative private demand for less-skilled labor was rising. The labor market cleared at negotiated wage levels.

Despite evident market clearing for unskilled labor, we do not believe that wage bargains simply tracked what would have occurred in an unconstrained market. Wage compression occurred much too quickly for that. Instead, negotiated wage bargains may have bolstered the demand for less-skilled workers while delivering "cheap" skilled labor to large employers. This policy achieves redistribution at low cost in the short run, but distorted incentives can cause large inefficiencies in the long run.

Appendix
Industry Codes

The following is a list of ISIC industry codes used in the analysis of 1960, 1970, and 1990 census data. A limited number of industries were excluded owing to difficulties in linking the 1960 industry code to the ISIC code used in 1970 and 1990.

11 Farming, hunting
12 Forestry

13	Fishing
20	Mining and quarrying
31	Manufacture of food, beverages, and tobacco
32	Textile, wearing apparel, and leather industries
33	Manufacture of wood and wood products, including furniture
34	Manufacture of paper and paper products, printing and publishing
35	Manufacture of chemicals, petroleum, coal, rubber, and plastic products
36	Manufacture of nonmetallic mineral products, except products of petroleum and coal
37	Basic metal industries
38	Manufacture of fabricated metal products, machinery, and equipment
39	Other manufacturing industries
41	Electricity, gas, and heating services
42	Water services
50	Construction
61	Wholesale trade
62	Retail trade
63	Restaurants and hotels
71	Transport and storage
72	Communication
81	Banking and financial services
82	Insurance
83	Real estate
91	Public administration, defense, police and fire departments
92	Sanitary services
93	Education, research, health care
94	Recreational and cultural services
95	Domestic services

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