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Swimming With the Tide:

Solidarity Wage Policy and the Gender Earnings Gap[†]

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and

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Abstract

The purpose of this paper is to examine the role of wage compression for the gender wage gap in Sweden during the period 1968-1991. We find that the effects of changes in the wage structure on women's wages have varied over time and have had partly counteracting effects. Changes in industry wage differentials have systematically worked against women, while the changes in the returns to human capital and unobserved characteristics have contributed to reductions in the gender wage gap. Changes in the wage structure were particularly important between 1968 and 1974 when the reduction of overall wage inequality was dramatic. In 1981, however, the wage compression effect accounted only for a minor proportion of women's relative wage gains, as compared to 1974. At this time, women gained in relative wages mainly because discrimination was mitigated and/or the gender gap in unobserved skills was reduced. Between 1981 and 1991 there is a small increase in the gender wage gap. This small increase seems to have been driven by changed inter-industry wage differentials.

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1. Introduction

From the 1960's to the early 1980's the Swedish gender earnings gap was reduced dramatically. This put Swedish women into a top position in international comparisons of female relative pay. Since the mid 1980's, however, the trend increase in female relative earnings has halted. Similarly, overall wage inequality decreased very rapidly during the late 1960's, continued to fall during the 1970's. Since the mid-1980's, however, wage inequality has started to increase again. Still, in international comparisons, the Swedish wage structure stands out as being one of the most compressed among the industrialized countries.

One of the obvious explanations to the increasing relative wages of women up to the early 1980's in Sweden is that the compression of the overall wage structure was particularly important for women, who tended to be located in the lower part of the wage distribution. A combination of union wage policy and demand/supply factors raised the price of less skilled labor. For example, decreasing returns to work experience tended to reduced the gender pay gap since women tend to have less work experience.

Other mechanisms were at work as well, though. A number of political reforms were carried out in order to improve women's position in the labor market. More generous parental leave benefits, subsidized child care and the introduction of separate taxation of spouses are examples of reforms that may potentially have increased women's incentives for human capital investments and strengthened labor force attachment.

The purpose of this paper is to take a closer look at the connection between overall wage dispersion and the gender gap in Sweden. As noted above, the gender wage gap has moved with changes in wage dispersion. This has been interpreted as union wage policy being one of the foremost explanations to the decreasing gender gap. Here we will try to disentangle the effect of wage compression on the gender gap from other effects. This will also enable us to take a closer look at the related question of whether the increasing relative wages for women really means that the relative position of women in the wage distribution has changed. The method used to analyze the relationship between wage dispersion and wage differentials was proposed by Juhn, Murphy and Pierce (1991), and was applied to international differences in gender wage gaps by Blau and Kahn (1996).

The rest of the paper is organized as follows. In section 2 the institutional background is briefly described, both regarding the overall wage setting framework and changes in gender specific institutions. Section 3 describes some basic facts about the economic position of females since the late 1960s. In section 4 the method to decompose gender wage differentials is presented along with the empirical estimates of the decomposition of the gender gap. The analysis is based on four representative samples of the Swedish population; the Level of Living Surveys (LNU) for 1968, 1974, 1981, and 1991. Section 5 concludes the paper with a summary and a discussion of the results.

2. Institutional background

The history and details about Swedish industrial relations are well described elsewhere.[1] Suffice here to mention three key characteristics of the Swedish labor market up to the mid 1980's. First, union density is high by international standards. According to the labor force surveys, 81 percent of the employees were union members in 1991, and unionization rates show negligible variations across broad educational and occupational groups. Second, wage setting was highly centralized. Initially, two large player, the blue-collar trade union confederation (LO) and the employers' federation (SAF) dominated the arena. Centralization was a pre-requisite for the third key element - solidarity wage policy. In its early implementation solidarity wage policy was mainly aiming at "equal pay for equal work". Later on, based on strong ideological convictions among the union leaders and the membership at large, the aim of the policy turned to overall wage equalization.

During the late 1970's this stable environment started to crumble. In 1983, one of the leading unions, the metal workers' union, and their employer counterpart broke out of the centralized agreements and struck a separate agreement. This "break-down" of centralization marked a new era in Swedish wage setting, with more varying degree of centralization and increasing importance of industry-level agreements. The exact shape of Sweden's future wage bargaining system is however very much an open question.

Apart from the general changes in the Swedish institutional setting described above, there have been numerous institutional changes affecting women's position in the

[1] See e.g. Elvander (1988) or Nilsson (1993).

labor market since the early 1960s.[2] These changes, that occurred through both collective bargaining and legislation, can be categorized in two broad groups; First, "demand-side" changes may have a direct influence on the male/female wage gap, e.g. anti-discrimination legislation. Second, "supply-side" changes will affect wages through changing incentives for labor market behavior, e.g. parental leave policies. This categorization is, of course, simplified and crude, but may nevertheless serve as a guideline for this presentation.

The perhaps most important change on the demand-side was the central agreement on gender wage equality between LO and SAF in 1960. This agreement stipulated the gradual removal of the separate wage-schedules for females to be completed in 1965. This agreement can be said to be a result of the work of a LO-SAF committee on gender wage equality initiated in 1948, but the public debate on this issue has a much longer history. The separate female wage-schedules in government were abolished in 1947, long before the LO-SAF agreement.

In terms of direct legal regulation of equal pay, Sweden was very late compared to many other Western countries; see e.g. Blau and Kahn (1992). The Act on Equality between Men and Women at Work was passed as late as 1980, even if anti-discriminatory regulations had been present since 1974; see e.g. Gustafsson and Lantz (1985). The 1980 Equality Act was preceded by the 1977 central agreement on equal treatment of men and women between LO/PTK and SAF for the private sector. The effects of these changes on female relative pay are not well established empirically, though; see e.g. Löfström (1989).

The main thrust of Swedish policy to improve women's position in the labor market has been directed towards the supply-side. Educational reforms during the 1960s have opened up higher education for women, resulting in a rapid catch-up of women's educational level relative to men's; Gustafsson and Lantz (1985). Actually, since the mid-1970s, the school enrollment rate of women aged 20-24 years have exceeded that of men, and this difference has increased over time; Edin and Holmlund (1995). Separate taxation of spouses was introduced gradually as a voluntary option in 1966 and made mandatory in 1971. Given the high marginal tax rates in Sweden during this time, this reform provided large supply incentives for many married women through substantial increases in hourly take home pay.

[2] For further discussion, see e.g. Gustafsson and Lantz (1985), Löfström (1989) and Jonung and Persson

The perhaps most far-reaching Swedish reforms in an international perspective concern the treatment of women with children. The combination of maternity/parental leave, subsidized public day-care, and employment security is probably a major explanation to the high labor force participation rates in Sweden. Unpaid maternity leave dates back to the early part of this century, but the modern form started to take shape in 1955 when parental leave benefits were introduced. The present system for parental leave benefits, with compensation rules that depend on previous work and earnings, can be viewed as a major incentive for labor force participation and human capital accumulation among younger women; Albrecht *et al.* (1999). These incentives are reinforced by employment security regulations. In 1939 a law was passed to prevent employers to fire women due to marriage and child-bearing. These regulation were strengthened with the passing of the Employment Security Act in 1974, when strict rules for "just cause" of dismissals were introduced. The public day-care system has been gradually expanded during the 1970s and 1980s. The high subsidization rate (about 90 percent) have reduced the costs of labor market participation for women with children substantially; Gustafsson and Stafford (1992).

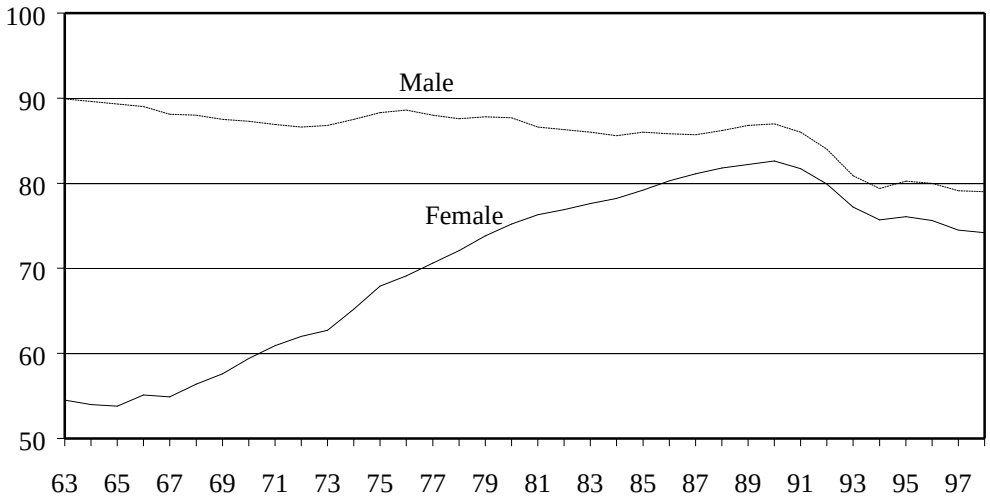
3. The economic position of women in Sweden

The previous section indicates some major changes in the institutional framework concerning women in the labor market. This section turns to the outcome of these changes in terms of providing some basic facts of the economic position of women. This brief presentation is organized around three issues: supply changes, wage changes, and demand changes. [3]

By international standards, Sweden has a very high labor force participation rate among women. In the mid 1980s, the Swedish female participation rate was the highest among the OECD-countries; OECD (1988). Participation rates calculated from the Labour Force Surveys for the period 1963 - 1998 by gender are shown in Figure 1. The figure shows a trend increase in female participation up until the recession in the 1990's. Since the late 1980s, the female participation rates have actually been very close to male participation rates. During the economic downturn in the 1990's both men and women exhibit falling participation rates, and there are still no signs of a recovery.

(1990).

Figure 1 Labor Force Participation Rates for Males and Females Aged 18 to 64, (percent)

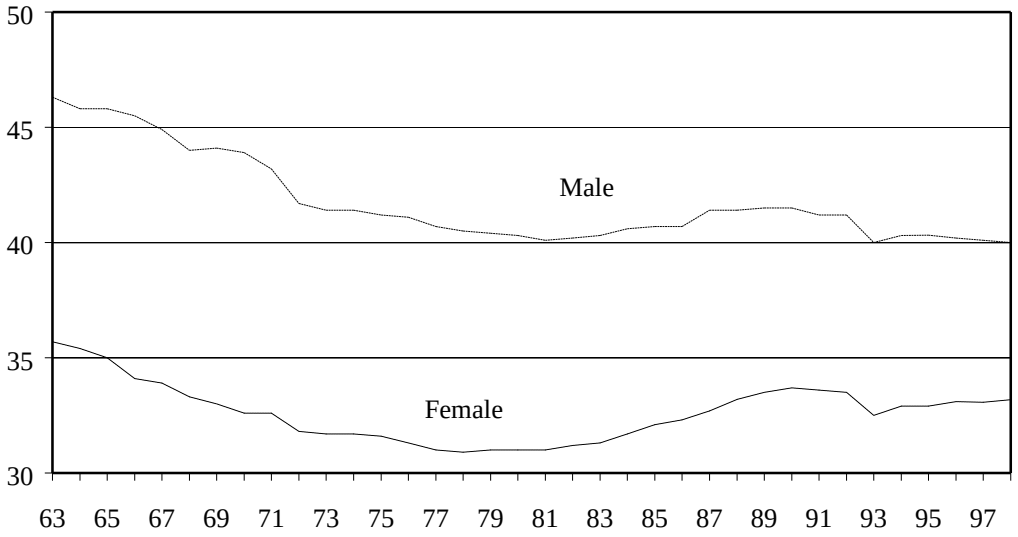


Source: Labour Force Surveys (AKU)

A major component of these high participation rates is part-time employment. The share of part-time workers in employment was increasing during the 1960s and 1970s for both men and women, though the levels were very different. In the early 1980s more than 50 percent of female employment was part-time, while the corresponding figure for men was about 15 percent. During the 1980s there is a tendency to a decreasing rate of part-time work among women. These changes are also evident in data on average weekly hours worked in Figure 2.

[3] For further details see e.g. Jonung and Persson (1990) and SOU 1997.136.

Figure 2 Average Weekly Hours of Work for Employed Males and Females Aged 18 to 64.

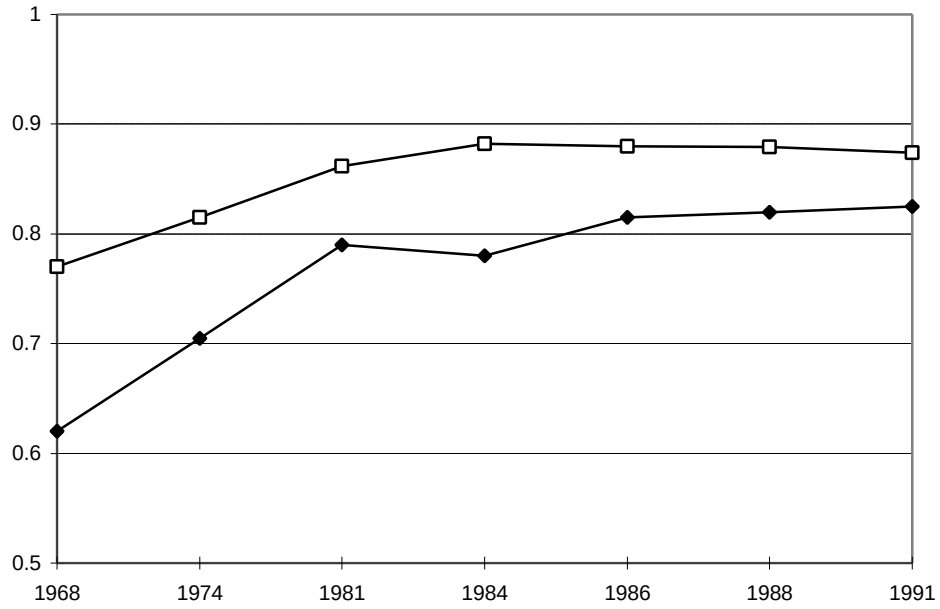


Source: Labour Force Survey (AKU)

By international standards, the gender wage gap in Sweden is very small; Blau and Kahn (1996). This does not mean that they are negligible though, and there are numerous papers investigating the reason for the gap.[4] The time-series development of the gender gap is illustrated in Figure 3 using data representative for the Swedish population. The lower graph gives the female average hourly earnings relative average male earnings. The figure indicates that even if female relative earnings are still increasing, the rate of increase has been much lower after 1980 than during the 1960s and 1970s. The upper graph shows the gender wage differential standardized for differences in work experience and education using a simple dummy variable representation.[5] This graph shows that female relative earnings have risen to almost 90 percent of male earnings in the early 1980s. However, the graph also indicates that the unexplained wage differential has increased in recent years. The standardized female/male wage ratio is actually decreasing after 1984. Thus, to the extent that the unexplained wage differential reflects discrimination, the recent development does not rule out increasing discrimination in recent years.

[4] Some examples are Gustafsson (1981), LeGrand (1992), Löfström (1989), Ståhlberg (1990), Svensson (1992), and Zetterberg (1994). For further references, see SOU 1997:136.
[5] The estimates are reported in Edin and Holmlund (1995).

Figure 3 Females/Male Wage Ratios (LNU, HUS)



Source: Edin and Holmlund (1995)

The large increases in women's relative pay occurred simultaneously with increasing female labor market participation. There may be several reasons to this, but one obvious candidate is the demand for female labor. Direct measures of demand shifts are difficult to obtain, so here we will have to settle with measures of sectoral shifts in employment. Edin and Holmlund (1995) applied the "fixed manpower requirements" model using data on seven sectors covering the entire economy and calculated the relative demand for female labor at time t as

$$N_{ft} = \sum_j a_{fj} \left(E_j / E \right)_t \qquad (1)$$

where E is total employment , E_j is employment in sector j, , and $a_{fj} = E_{fj} / E_j$ is the fixed female requirement coefficient calculated as the proportion female workers to total employment in industry j. Three years - 1971, 1984 and 1991 – were used to calculate the requirement coefficient. The calculated demand shifts are reported in Table 1. Measured relative demand for females increased sharply between 1968 and 1981. During the 1980s, in contrast, there were virtually no changes in relative demand. This development is partly driven by the rapid growth of public sector employment during the 1970s, and the subsequent deceleration of public sector expansion during the 1980s.

The demand pattern is strikingly similar to the relative wage pattern of females. Clearly relative demand shifts for female labor is a factor that cannot be overlooked in an investigation of gender wage differential in Sweden.

Table 1 Changes in Female Relative Wages, Relative Demand and Supply

Years	$\Delta\ln(W_f/W_m)$	$\Delta\ \ln N_f$	$\Delta\ \ln(L_f/L_m)$
1968 - 1974	0.057	0.084	0.152
1974 - 1981	0.057	0.069	0.170
1981 - 1984	0.023	0.018	0.039
1984 - 1991	-0.010	-0.012	0.041

Note: $\Delta\ln(W_f/W_m)$ is the change in the standardized female relative wage, $\Delta\ln N_f$ is the change in relative demand according to Eq. (1), and $\Delta\ \ln(L_f/L_m)$ is the change in female/male shares of the labor force. Source: Edin and Holmlund (1995).

4. The wage structure and the gender wage gap

In this section we analyze the evolution of the gender wage gap between 1968 and 1991. Factors affecting the gender wage gap can divided into those that are gender specific and those that are related to the wage structure in general. Gender specific factors include women's relative levels of labor market qualifications and discrimination. The wage structure describes the array of returns to observed and unobserved skills, and the rent received for employment in particular sectors in the economy. In order to disentangle gender specific changes and changes in the wage structure, we utilize a method developed by Juhn, Murphy and Pierce (1991) hereafter JMP, which is an extension of the Oaxaca-Blinder decomposition. More specifically, the JMP-technique enables us to decompose changes in the unexplained gender wage gap into one part that is due to changes in the wage structure and one part that is due to changes in gender specific differences. We start this section by briefly discussing the JMP-decomposition before we go into the results. For comprehensive discussions of the JMP-decomposition, see JMP (1991, 1993), Blau and Kahn (1997), Suen (1997) and Richardson (1997).

4.1 The JMP-decomposition

Suppose that the log hourly wage of a male worker *i* in year *t*, y_{it}, can be described by:

$$y_{it} = X_{it}\beta_t + \sigma_t \theta_{it} \quad \text{where} \quad \theta_{it} \sim (0,1), \tag{2}$$

where X_{it} is a vector of observed characteristics, and β_t gives the returns to these characteristics. Instead of using a conventional notation for the error term, we let θ_{it} be a "standardized" residual with zero mean and unit variance, and σ_t be the residual standard deviation, i.e. the level of male residual wage inequality. This wage equation can be used to calculate the gender (log) wage gap at time *t*: [6]

$$D_t = y_{mt} - y_{ft} = (X_{mt} - X_{ft})\beta_t + \sigma_t(\theta_{mt} - \theta_{ft}) = \Delta X_t \beta_t + \sigma_t \Delta \theta_t \tag{3}$$

where subscripts *mt* and *ft* denote the averages of male and female values respectively, and Δ denotes male-female average difference of the variable immediately following. This is the standard Oaxaca-Blinder decomposition. The first term on the right-hand-side is the part of the wage gap that is "explained" by a gender difference in the average level of observed characteristics. The second term is the part of the gender wage gap that cannot be explained by differences in observed characteristics. This part is usually attributed to differences in unobserved skills and discrimination. The unexplained wage gap is here written as the gender difference in the standardized residual multiplied by the money value per unit difference in the standardized residual (σ_t).

The change in the gender wage gap between two years (*s* and *t*, *s* > *t*) can be decomposed using (3) to:

$$D_s - D_t = (\Delta X_s - \Delta X_t)\beta_t + \Delta X_s(\beta_S - \beta_t) + \sigma_t(\Delta\theta_s - \Delta\theta_t) + \Delta\theta_s(\sigma_s - \sigma_t) \tag{4}$$

This is the JMP-decomposition which consists of four parts. The first term, the "observed-X's effect", reflects the contribution of a changing gender difference in observed labor market qualifications. Second, the "observed prices effect" reflects the contribution of changing prices of observed labor market qualifications for males. Third, the "gap effect" captures whether women are moving up or down in the male residual distribution (i.e. whether women rank higher or lower within the male residual wage

[6] As usual, the choice of the male, instead of the female, wage equation is not obvious since the presence of wage discrimination may affect both.

distribution). Women would, for example, move up in the male residual distribution if they improve their level of unobserved skills relative men, or if labor market discrimination of women is mitigated over time. Fourth, a change in the male residual distribution (σ_t) will affect the unexplained wage gap even if women maintain the same relative position in the male residual distribution. If we interpret a change in residual inequality among men as a rise in the market premium for skills, then this effect represent a general relative price effect. This effect is denominated the "unobserved prices effect".

To estimate the decomposition we follow JMP (1991).[7] We start by estimating the male wage equation for each year. Secondly, we predict what wage each woman would have had if she was paid according to the estimated male wage equation. The first two components are straightforward to calculate using the estimated coefficients and sample means by gender. The average difference between women's actual wages and the average of the predicted wages, is the unexplained gender wage gap, $s_t Dq_t$. (Note that men's average wage residual is always zero.)

A change in the unexplained gender wage gap is the sum of the "gap effect" and the "unobserved prices effect." The "gap effect" is found by using each woman's wage residual in year *s* to calculate her percentile ranking in the male wage residual distribution for that year. We then impute the wage residual she would have had in *time period t* given her percentile ranking in *time period s*.[8] The difference between the average of the imputed wage residuals in time period *s* and the average residual in time period *t* is used to compute the "gap effect" $s_t(Dq_s - Dq_t)$. Consequently, the "gap effect" measures the average wage effect due to changed positions of women within the same male residual distribution (the time period *t* distribution). The "unobserved prices effect" is found as the difference $Dq_s(s_s - s_t)$. Here the percentile location (each woman's position) is held fixed, and the effect reflects changes in residual inequality for men.

The possibility of labor market discrimination of women complicates the interpretation of the "unobserved prices effect," see discussions by JMP (1991) and Blau and Kahn (1997). JMP discusses a case where the wage loss of women due to discrimination is sensitive to changes in the wage structure. To see this, assume that the

[7] See Richardson (1997) for an alternative estimator.

[8] A woman's percentile location indicates her relative level of unobserved skills (assuming no discrimination). Because the percentile ranking is calculated on residual wages, and not on the quantity of unobserved skills, it is important that the returns to unobserved skills increase monotonously with the level of skills.

residual equals: $s_t q_{it} = s_t(d_{it} - d_{it})$, where d_{it} reflects individual *i*'s relative level of unobserved skills and d_{it} reflect labor market discrimination, so that $d_{it} = d_t < 0$ if *i* is a woman and $d_{it} = 0$ if *i* is a man. The unobserved prices effect will in this case in part reflect the interaction between year *s*'s level of discrimination and the change in the residual distribution, namely $d_s(s_{it} - s_{is})$. This interaction effect determines how large the penalty is for that lower position in the distribution. Hence as the wage differentials among men increases, the cost to women rises for being moved down a given amount in men's distribution.[9] It seems reasonable to consider this effect to be gender specific since it is a consequence of market-specific treatment of women.

Suen (1997) discusses the JMP-decomposition and a different type of discrimination which is independent of the wage structure. To see this, assume instead that the residual equals: $s_t q_{it} = s_t \, d_{it} - d_{it}$. In this case the empirical decomposition using percentile rankings to identify the "gap effect" produces biased estimates. The intuition is easily understood in the following example. Suppose there is only one woman with an, compared to men, average level of unobserved skills. However, due to discrimination she earns a *d* percent lower wage than comparable men (irrespective of wage inequality). An increase in the returns to unobserved skills will improve her position in the male residual distribution. The reason is that more men, with a below average level of unobserved skills, will be paid a lower wage than this woman. Hence, although neither her relative level of unobserved skills nor the degree of discrimination have changed, her position in male residual distribution has improved. To sum up, when the returns to unobserved skills increases (decreases) the estimation procedure will tend to produce, to women, beneficial (detrimental) "gap effects."

This estimation problem, pointed out by Suen, will not arise if the level of discrimination is sensitive to changes in the wage structure. In this latter case changes in the positions of women reflect either changes in the relative level of unobserved skills or changes in the level of discrimination. Empirically it is still an unsolved question to what extent discrimination is sensitive to changes in the wage structure. In this paper we find that the decline in the overall wage inequality in the sixties and seventies is accompanied by a decline in the unexplained part of the gender wage gap. Further, when we decompose the changes in unexplained gender wage gap we find substantial positive

[9] This would, for example, be the case when women do not have access to higher positions to the same extent as men and the wage premiums to higher positions change over time.

gap effects on women's relative wages. To the extent that discrimination against women is independent of changes in the wage structure we underestimate the beneficial gap effect and the true beneficial gap effects are probably larger than our estimates. Our qualitative conclusions are however not affected by this problem.

4.2 Results

We use data from the Swedish Level of Living Survey 1968, 1974, 1981 and 1991, see Erikson and Åberg (1987). In 1968 a representative sample of the Swedish population aged between 15 and 75 were interviewed about, among other things, education, work experience and job characteristics. In 1974, 1981 and 1991 the same individuals were interviewed again and complementary samples of young persons and immigrants were collected in order to keep the sample representative in these years too. A summary description of the data used is given in Table A1 for employed[10] men and women aged 18 to 65.

The estimated male wage equations which are used to calculate the JMP-decompositions are reported in Table A2a. (The corresponding female wage equations are reported in Table A2b for comparison.) The dependent variable is the log hourly wage and the explanatory variables are years of work experience[11] and it's square, a set of dummy-variables for educational groups and 26 dummy variables indicating industry.

The estimated male coefficients of the human capital variables in Table A2a reflect the pronounced wage compression during the 1960s and 1970s. The change between 1981 and 1991 in of the estimated coefficients does not indicate such a clear-cut pattern. This time-pattern, a decrease up to the mid-eighties and then a slight increase in wage differentials, is consistent with trade union wage policy as discussed in section 2. However, also alternative interpretations in terms of supply shifts are consistent with this pattern, see Edin and Holmlund (1995).

Table 3, which provides some basic information on each sample of workers, shows that the gender wage gap declined by approximately 40 per cent between 1968 and 1981. This improvement in women's relative wage is mainly due to the large decline in the unexplained gender wage gap ($-s_t Dq_t$). An increasing part of the gender

[10] Part-time workers are included. However, our results are not affected when we exclude part-time workers from the samples.

wage gap can therefore be explained by either gender differences in observed characteristics or by the returns to these observed skills. However, between 1981 and 1991 the closing of the gender wage gap seems to have halted and the unexplained gender wage gap even increased somewhat.

If we taker a closer look at the change in the unexplained gender wage gap an interesting pattern emerges. The mean percentile ranking of women in the residual distribution of male wages increased sharply from 1968 to 1981, from the 27*th* to the 36*th* percentile, and decreased somewhat between 1981 and 1991. A woman's percentile ranking indicates her level of unobserved skills relative men and possible labor market discrimination of women, see also discussion in the previous section. Table 3 also shows residual wage inequality declined up to and including 1981 for both men and women. Between 1981 and 1991 this decline continued for women.

[11] The variable is based on the interview person's answer to the question: How many years of work experience do you have? We have not corrected for possibility that the interview person worked part-time.

Table 3 The gender wage gap 1968 to 1991. Employed men and women aged 18-65.

	1968	1974	1981	1991
Log male wage	7.03	7.58	8.28	9.04
	(0.423)	(0.318)	(0.30)	(0.305)
Log female wage	6.71	7.31	8.09	8.85
	(0.437)	0.347)	(0.263)	(0.237)
Gender wage gap, D_t	0.321	0.266	0.187	0.195
Unexpl. gender wage gap $(-s_t Dq_t)$	0.252	0.190	0.119	0.124
Mean female percentile in male wage distr.*	26.9	29.6	35.7	34.4
Male res. wage ineq.**	0.319	0.263	0.248	0.245
Female res. wage ineq.***	0.354	0.278	0.229	0.199

* Computed by assigning each woman a percentile ranking in the indicated year's male residual distribution and calculating the female mean of these percentiles.
** Estimated using male wage regressions, see Table A2a.
*** Estimated using female wage regressions, see Table A2b.

Table 4 shows the decline in the gender wage gap decomposed into gender specific and wage structure effects. The negative value in the last row indicates, for example in the 1968-74 column, that the gender wage gap narrowed by 5.47 log points.[12] The most important effect among the gender specific factors is the "gap effect" which accounted for 39 per cent (=0.0214/0.0547) of the decline in the gender wage gap. Another important factor is the change in relative industrial representation of male and female workers. Between 1968 and 1974 the fraction of female employees in the social and community sector increased and since this sector was relatively well paid in 1968, this change in industrial representation was beneficial to women. The gender wage gap is also somewhat reduced by the fact that women increase their work experience relative to men, but this effect is counteracted by a reduction on the relative level of education form women.

If we instead we turn to changes in the wage structure we see a large detrimental effect of changed inter industry wage differentials on female relative wages. For

[12] This means that women's relative wage increased by approximately 5.47 per cent. The exact change in women's relative wage is found by calculating $1-e^{0.05747})*100=5.62$ per cent, where e denotes the natural logarithm.

example, employees in the social and community services earned 9 per cent more than employees in the manufacturing industry in 1968, but 4 per cent less in 1974 (see Table A2a). This large detrimental change in wage structure was compensated by a beneficial "unobserved prices effect" which accounted for approximately 74 per cent of the closing of the gender wage gap. The overall effect of changes in the wage structure is therefore rather small.

Between 1974 and 1981 the gender specific factors accounted for approximately 96 per cent of the change in gender wage gap. In Table 4, we see that women improve their relative level of work experience and, in particular, they improved their relative position in male residual wage distribution; the "gap effect" is -6.23 log points. Another important factor is the continued improvement of women's relative amount of work experience. The industry representation of women is of minor importance during this time period. However, the gender difference in education increased slightly. Concerning the wage structure effects, the results show that the effects of changing returns to education and experience are small. The "unobserved prices" effect is small too. Changed inter industry wage differentials, however, widened the gender wage gap by 1.39 log points, ceteris paribus.

Between 1981 and 1991 the change in the gender wage gap is small. This is also true for the individual components. Women improved their relative level of education and work experience but this effect is (once again) counterbalanced by changed industry wage differentials.

The results indicate that during the investigated period the closing of the gender wage gap is mainly due to gender specific factors. In particular, women have improved their relative level of unobserved skills and/or have experienced a reduction in labor market discrimination. Men and women have also converged in the average level of work experience.[13] Changes in the wage structure did not contribute to the decline in the gender wage gap to any larger extent. However, when we decompose the wage structure effects, we see a large detrimental effect on the gender wage gap of changes in inter industry wage differentials throughout the period.[14] Between 1968 and 1974, the

[13] We also run estimations using predicted work experience, defined as age minus years of education minus seven. Compared to the results in Table 4, men and women converged less in predicted work experience. This result is of course expected because women have increased their average level of actual level of work experience since 1968. Further, substituting actual for predicted work experience did only have minor effect on the estimates of the gap and unobserved prices effects.

[14] We also estimated the JMP-decomposition using human capital variables only but the results did not change much, see Table A4 in appendix. However the composed effects of the industry variables showed

"unobserved prices effect" was also very large and completely offset the (to women) unfavorable inter industry wage structure effect.

During the investigated period women's labor force participation increased very sharply as shown in Figure 1. It is possible that the large inflow of women consisted of relatively low skilled women, which may have slowed down the closing of the gender wage gap and the skill convergence between men and women. In this case our results may be affected by selectivity bias. Palme and Wright (1992) correct for sample selection bias in an analysis of the Swedish gender wage gap using in part the same data as we are. Their results indicate that only a minor part of the gender wage gap is explained by sample selection bias.

Here, we perform a very crude test of this possibility by, adding a dummy variable to each cross section wage equation indicating whether the woman was employed in two consecutive sample years. In 1968 and 1974 these women earned significantly more (approximately 8 per cent more) than other women. However, in the 1974-81 and 1981-91 samples this was not the case. We also computed the JMP-decomposition for women employed in two consecutive sample years. This group of women closed the gender wage gap more than other women mainly because they increased their relative level of work experience more than women in general.

up as expected in the gap effect. In the 1968-74 and the 1981-91 sample the gap effect became positive, and in the 1974-81 sample less negative than the estimate in Table 4.

Table 4 JMP-decomposition of the change in the gender wage gap. Men and women aged 18 to 65.

	1968 – 1974	1974 - 1981	1981 - 1991
Changes in gender specific factors:			
Education variables	0.0134	0.0087	-0.0040
Work experience variables	-0.0128	-0.0216	-0.0135
Industry variables	-0.0201	-0.0006	0.0019
Unobserved skills and discrimination	-0.0214	-0.0623	0.0024
Changes in wage structure:			
Education variables	-0.0040	-0.0086	0.0004
Work experience variables	-0.0087	0.0013	0.0004
Industry variables	0.0397	0.0139	0.0165
Unobserved prices	-0.0407	-0.0095	0.0031
Total change in gender specific factors	-0.0409	-0.0758	-0.0134
Total change in wage structure	-0.0138	-0.0030	0.0203
Total change in wage gap	-0.0547	-0.0789	0.0069

The pattern changes quite dramatically if we instead focus on low paid women. We define low paid women as those that have the 50 per cent lowest predicted wages according to men's wage equations.[15] We compare these women to all men. The gender wage gap declined more for low-paid women than for women on average between 1968-74 and 1974-81, by 12.50 log points and 10.85 log points respectively, and increased somewhat between 1981 and 1991.

The wage structure effects were more important for low-paid women than for women on average, especially between 1968 and 1974 when this effect contributed by over 46 per cent to the decline in the gender wage gap. Returns to education, work experience, and unobserved prices improved women's relative wages up to 1981. However, changes in inter industry wage differentials worked against low paid women throughout the period. However, this effect seems somewhat smaller than for women on

[15] This means that the characteristics of the low paid women vary between sample years, because the returns to human capital and the rents received in different sectors partly determine who is low paid and these coefficients change over time. In Table A5 in appendix we report the average level of the human

average, see Table 4. The perhaps most remarkable result in Table 5 is the large beneficial gap effect between 1974 and 1981 which alone contributed to a decline in the gender wage gap of 8.52 log points.

Between 1981 and 1991 the change in the gender wage gap for low paid women is similar to the change in gender wage gap for women in general. The wage gap widened somewhat and the individual components are rather small. However, once again we observe that the industry wage structure changed unfavorably to women relative men.

Table 5 JMP-decomposition of the change in the gender wage gap. Less skilled women (50 per cent with lowest predicted wage) compared to all men aged 18 to 65.

	1968 - 1974	1974 - 1981	1981 - 1991
Changes in gender specific factors:			
Education variables	0.0030	0.0302	0.0033
Work experience variables	0.0033	-0.0418	-0.0110
Industry variables	-0.0443	-0.0013	-0.0021
Unobserved skills and discrimination	-0.0294	-0.0852	-0.0050
Changes in wage structure:			
Education and work experience	-0.0337	-0.0162	-0.0015
Work experience variables	-0.0303	-0.0064	0.0024
Industry variables	0.0367	0.0196	0.0302
Unobserved prices	-0.0303	-0.0075	0.0021
Total change in gender specific factors	-0.0674	-0.0980	-0.0149
Total change in prices	-0.0576	-0.0105	0.0334
Total change in wage gap	-0.1250	-0.1085	0.0184

The analysis so far shows that women on average have improved their position in the labor market. During the investigated time period several political reforms were undertaken in order to increase women's incentives for human capital accumulation and labor force participation, see section 3 for further discussion. To the extent that these reforms have had an effect, we suspect young women to have been more responsive to these reforms. The reason is that young women have made their decisions on human

capital variables for low paid women in each sample year. We also calculated the JMP-decomposition for

capital and labor force attachment after some of the major reforms came into force. Information on how the younger women fare in the labor market over time may also help in predicting how women will perform in the future.

In Table 6 we report an analysis of the gender wage gap between young men and women, aged 18 to 34. Comparing Table 4 and 6 we see that young women have indeed improved their relative position more than women on average, in particular between 1974 and 1981. Three other interesting patterns also emerge in Table 6. First of all, the gender wage gap between young men and women declined over the entire investigated period, although only by 0.65 log points between 1981 and 1991. Second, the results indicate that gender specific factors are important driving forces behind this decline. In particular, young men and women converged in unobserved skills throughout the period. Young women also improved their relative level of work experience up to 1981. Third, changes in inter industry wage differentials had particularly strong unfavorable effects for young women between 1968 and 1974. This effect is much larger for young women and men than for women and men in general.[16]

the 50 per cent women with the lowest actual wages, see results in Table A3.

[16] We also compared young women to all men and in this comparison young women improved their relative wage even more up to and including 1981, and thereafter their relative wage deteriorated.

Table 6 JMP-decomposition of the change in the gender wage gap. Young men and women aged 18 to 34.

	1968 - 1974	1974 – 1981	1981 - 1991
Changes in gender specific factors:			
Education variables	0.0206	-0.0002	-0.0120
Work experience variables	-0.0262	-0.0289	0.0145
Industry variables	-0.0288	-0.0128	0.0107
Unobserved skills and discrimination	-0.0393	-0.0503	-0.0390
Changes in wage structure:			
Education variables	-0.0101	-0.0041	-0.0034
Work experience variables	-0.0190	-0.0054	0.0003
Industry variables	0.0754	0.0111	0.0234
Unobserved prices	-0.0229	-0.0237	-0.0010
Total change in gender specific factors	-0.0737	-0.0921	-0.0259
Total change in wage structure	0.0234	-0.0219	0.0194
Total change in wage gap	-0.0503	-0.1140	-0.0065

5. Conclusions

The main purpose of this paper was to analyze the role of wage compression for the rapid increase of women's relative wages during the 1960s and 1970s. Such a relationship was important between 1968 and 1974 when the reduction of overall wage inequality was dramatic. In 1981, however, the wage compression effect accounted only for a minor proportion of women's relative wage gains, as compared to 1974. Now, the gap effect, the average woman moving up the male residual wage distribution was the totally dominating effect. This effect may be due to either decreased gender discrimination in the labor market, or to women closing the gap in acquired unobserved productive characteristics. The latter explanation would be parallel to the increases in women's relative observed characteristics. Between 1981 and 1991 there is a small increase in the gender wage gap. This small increase seems to have been driven by changed inter-industry wage differentials.

If one was to interpret our results in terms of the effects of union wage policy, a somewhat bold exercise, the following tentative conclusions emerge. Solidarity wage policy may, through reducing residual wage inequality, have played an important role in the decreasing gender wage gap in the late 1960s and early 1970s. In the late 1970s, however, wage compression does not seem to be a major factor. However, throughout the period, changes in the inter-industry wage structure have systematically worked in the direction of increasing the gender wage gap. To the extent industry wage differentials actually have been driven by union wage policy, this policy actually seems to have partly offset some of the gains made by women in other dimensions of the wage structure. For low-wage women, though, the compression of the wage structure has been a very important part of their increasing relative wages up to the mid 1980's.

A particularly interesting issue to study is the relative wages of young women. These women have experienced increasing relative wages throughout the period. In particular, they have improved their observed and unobserved skills relative to young men. This may indicate that the political reforms, providing strong incentives for human capital accumulation and labor force attachment, have had an effect. The continuing improvement of the relative position of young women provides perhaps a hint of how the future position of women in the Swedish labor market will develop.

References

Albrecht, J.W., P-A. Edin, M. Sundström and S.B. Vroman (1999), "Career Interruptions and Subsequent Earnings: A Reexamination Using Swedish Data", *Journal of Human Resources*, 34(2), Spring, 294-311.

Blau, F.D. and L.M. Kahn (1992), "Gender Wage Gap: Learning from International Comparisons", *American Economic Review*, 82(2),May, 522-38.

Blau, F.D. and L.M. Kahn (1996), "Wage Structure and Gender Earnings Differentials: An International Comparison", *Economica*, 63, S29-S62.

Blau, F.D. and L.M. Kahn (1997), "Swimming Upstream: Trends in the Gender Wage Differential in the 1980s", *Journal of Labor Economics*, 15(1), 1-42.

Edin, P-A. and B. Holmlund (1995), "The Swedish Wage Structure: The Rise and Fall of Solidarity Wage Policy", in *Differences and Changes in Wage Structures*, Richard Freeman & Lawrence Katz (ed.), Chicago: University of Chicago Press.

Elvander, N. (1988), *Den svenska modellen* (The Swedish Model), Allmänna förlaget, Stockholm.

Erikson, R. and Y. Åberg (1987), *Welfare in Transition – Living Conditions 1968-1981. Oxford: Clarendon Press.*

Gustafsson, S. (1981), "Male-Female Lifetime Earnings Differentials and Labor Force History", in G. Eliasson, B. Holmlund and F.P. Stafford (eds.) *Studies in Labor Market Behavior: Sweden and the United States*, The Industrial Institute for Economic and Social Research, Stockholm.

Gustafsson, S and P. Lantz (1985), *Arbete och löner: ekonomiska teorier och fakta kring skillnaden mellan män och kvinnor*, Stockholm: Industriens utredningsinstitut och Arbetslivscentrum.

Gustafsson, S. and F.P. Stafford (1992), "Child Care Subsidies and Labor Supply in Sweden", *Journal of Human Resources 27*, 204-230.

Juhn, C., K.M. Murphy and B. Pierce (1993), "Wage Inequality and the Rise in Returns to Skill", *Journal of Political Economy* 101(3), 410-442.

Juhn, C., K.M. Murphy and B. Pierce (1991), "Accounting for the Slowdown in Black-White Wage Convergence", in M.H. Kosters (ed.) *Workers and Their Wages*, AEI Press, Washington D.C.

Jonung, C. and I. Persson (1990), "Hushållsproduktion, marknadsproduktion och jämställdhet", in *Kvinnors roll i ekonomin*, Bilaga 23, LU90, Allmänna Förlaget, Stockholm.

LeGrand, C. (1992), "Explaining the Male-Female Wage Gap: Job Segregation and Solidarity Wage Bargaining in Sweden", *Acta Sociologica* 34, 261-278.

Löfström, Å. (1989), *Diskriminering på svensk arbetsmarknad* (Discrimination in the Swedish Labor Market), Umeå Economic Studies No. 196, University of Umeå, 1989.

Nilsson, C. (1993), ”The Swedish Model: Labour Market Institutions and Contracts”, in J. Hartog and J. Theeuwes (eds.), *Labour Market Contracts and Institutions,* Elsevier Science, Amsterdam.

Palme, M.O. and R. E. Wright (1992), “Gender Discrimination and compensating Differentials in Sweden”, *Applied Economics* 24, 751-59.

Richardson, K. (1997), *Essays on Family and Labor Economics,* Dissertation series no 28. Swedish Institute for Social Research, Stockholm University.

SOU 1997:136, *Kvinnors och mäns löner – varför så olika?* Bilaga till Kvinnomaktutredningen. Fritzes, Stockholm.

Ståhlberg, A-C. (1990), "Skillnader i försäkringsförmåner eller icke-kontanta löneskillnader mellan kvinnor och män", in *Kvinnors roll i ekonomin*, Bilaga 23, LU90, Allmänna Förlaget, Stockholm.

Svensson, L. (1992), "Ekonomisk strukturförändring och kvinnolöner. En diskussion om orsaker till variationerna i kvinnliga privattjänstemäns relativa löner 1955-1990", Lund Papers in Economic History No. 16, Department of Economic History, Lund University, 1992.

Suen, W. (1997), ”Decomposing Wage Residuals: Unmeasured Skill or Statistical Artifact?”, *Journal of Labor Economics*, vol 15(3), 555-566.

Zetterberg, J. (1994), "Effects of Changed Wage Setting Conditions on Male-Female Wage Differentials in the Swedish Public Sector", *Publlic Administration Quarterly*, Vol. 18, 342-358.

Table A1 Male mean values of explanatory variables. Note that education variables and industry representation variables are dummy variables and the mean values indicate the proportion of the sample in each category.

	1968	1974	1981	1991
Human capital variables				
Work exp. (years)	22.60	21.79	20.81	20.41
ED1	0.572	0.435	0.334	0.208
ED2	0.173	0.19	0.240	0.295
ED3	0.084	0.059	0.058	0.0898
ED4	0.077	0.14	0.120	0.115
ED5	0.022	0.048	0.051	0.066
ED6	0.031	0.054	0.096	0.117
ED7	0.039	0.070	0.102	0.108
Industry representation				
Agriculture and hunting	0.036	0.016	0.020	0.010
Forestry and logging	0.022	0.027	0.018	0.014
Iron ore and non-ferrous ore mine	0.002	0.002	0.004	0.007
Food, beverages, and tobacco	0.038	0.028	0.026	0.028
Textile, wearing apparel and leather	0.024	0.018	0.009	0.004
Wood and wood products	0.035	0.031	0.027	0.030
Paper, paper products, and printing	0.047	0.044	0.050	0.047
Chemical	0.024	0.024	0.020	0.019
Stone, clay, and glass	0.020	0.017	0.016	0.0059
Basic metal	0.033	0.028	0.026	0.020
Fabricated metal prod., machinery and equipment	0.206	0.203	0.179	0.176
Other manufacturing	0.010	0.006	0.002	0.003
Electricity and gas	0.010	0.014	0.015	0.011
Construction	0.140	0.14	0.107	0.129
Wholesale trade	0.042	0.034	0.033	0.038
Retail trade	0.038	0.032	0.045	0.042
Restaurants and hotels	0.004	0.005	0.007	0.013
Transport and storage	0.066	0.061	0.068	0.070
Communication	0.029	0.026	0.030	0.032
Financial institutions	0.011	0.012	0.016	0.022
Insurance	0.006	0.006	0.010	0.011
Real estate and business service	0.026	0.036	0.051	0.047
Public administration and defense	0.054	0.056	0.055	0.052
Sanitary services	0.025	0.010	0.013	0.011
Social and related community services	0.043	0.088	0.121	0.127
Recreational and cultural services	0.005	0.010	0.017	0.017
Personal and household services	0.005	0.025	0.015	0.016

Table A1b Female mean values of explanatory variables. Note that education variables and industry representation variables are dummy variables and the mean values indicate the proportion of the sample in each category.

	1968	1974	1981	1991
Human capital variables				
Work exp. (years)	14.86	14.65	15.55	17.10
ED1	0.552	0.422	0.341	0.204
ED2	0.120	0.133	0.187	0.280
ED3	0.124	0.126	0.101	0.114
ED4	0.148	0.199	0.196	0.144
ED5	0.010	0.031	0.034	0.068
ED6	0.032	0.058	0.092	0.122
ED7	0.015	0.031	0.049	0.068
Industry representation				
Agriculture and hunting	0.019	0.004	0.005	0.003
Forestry and logging	0.004	0.005	0.002	0.002
Iron ore and non-ferrous ore mine	0.002	0.003	0.001	0.001
Food, beverages, and tobacco	0.041	0.021	0.019	0.014
Textile, wearing apparel and leather	0.041	0.033	0.0167	0.012
Wood and wood products	0.010	0.007	0.011	0.008
Paper, paper products, and printing	0.023	0.017	0.017	0.022
Chemical	0.013	0.013	0.015	0.008
Stone, clay, and glass	0.006	0.007	0.004	0.002
Basic metal	0.005	0.005	0.005	0.005
Fabricated metal prod., machinery and equipment	0.046	0.057	0.049	0.041
Other manufacturing	0.008	0.002	0.002	0.005
Electricity and gas	0.003	0.003	0.001	0.001
Construction	0.012	0.011	0.013	0.010
Wholesale trade	0.032	0.031	0.019	0.021
Retail trade	0.106	0.098	0.084	0.073
Restaurants and hotels	0.034	0.015	0.021	0.026
Transport and storage	0.018	0.015	0.019	0.029
Communication	0.035	0.029	0.030	0.025
Financial institutions	0.025	0.025	0.021	0.030
Insurance	0.013	0.015	0.020	0.022
Real estate and business service	0.036	0.031	0.024	0.043
Public administration and defense	0.056	0.063	0.047	0.048
Sanitary services	0.105	0.014	0.009	0.010
Social and related community services	0.253	0.431	0.520	0.515
Recreational and cultural services	0.004	0.015	0.014	0.015
Personal and household services	0.049	0.031	0.013	0.007

Table A2a Estimated wage equations for employed men 18-65 years old. Dependent variable is the logarithm of hourly wage.

	1968	1974	1981	1991
intercept	6.478	7.140	7.870	8.564
	(0.029)	(0.026)	(0.025)	(0.028)
Human capital variables				
experience (years)	0.041	0.031	0.025	0.026
	(0.002)	(0.002)	(0.002)	(0.002)
experience sqrd. /1000	-0.689	-0.505	-0.387	-0.404
	(0.042)	(0.036)	(0.035	(0.040)
ED2	0.148	0.089	0.090	0.105
	(0.021)	(0.018)	(0.017)	(0.019)
ED3	0.172	0.079	0.163	0.142
	(0.029)	(0.030)	(0.029)	(0.026)
ED4	0.373	0.223	0.184	0.183
	(0.030)	(0.021)	(0.021)	(0.024)
ED5	0.564	0.277	0.222	0.248
	(0.053)	(0.033)	(0.031)	(0.030)
ED6	0.653	0.353	0.326	0.331
	(0.047)	(0.032)	(0.025)	(0.025)
ED7	0.907	0.599	0.465	0.457
	(0.045)	(0.032)	(0.026)	(0.027)
Dummy-variables for two-digit industry				
Agriculture and hunting	-0.454	-0.161	-0.266	-0.120
	(0.043)	(0.053)	(0.045)	(0.065)
Forestry and logging	-0.108	-0.090	-0.116	0.004
	(0.054)	(0.041)	(0.048)	(0.056)
Iron ore and nonferrous ore min.	0.027	0.148	0.136	0.112
	(0.160)	(0.133)	(0.103)	(0.079)
Food, beverages, and tobacco	-0.056	-0.023	0.027	0.036
	(0.042)	(0.041)	(0.040)	(0.040)
Textile, wearing apparel and leather	0.003	-0.031	0.043	-0.166
	(0.052)	(0.050)	(0.066)	(0.101)
Wood and wood products	-0.085	-0.101	-0.155	-0.088
	(0.044)	(0.039)	(0.040)	(0.039)
Paper, paper products, and printing	0.048	-0.042	0.046	0.026
	(0.039)	(0.034)	(0.031)	(0.033)
Chemical	-0.055	-0.041	-0.014	0.027
	(0.052)	(0.044)	(0.046)	(0.048)
Stone, clay, and glass	-0.026	-0.050	-0.047	0.040
	(0.057)	(0.052)	(0.050)	(0.083)

Table A2a, continued from previous page

Dummy-variables for two-digit industry	1968	1974	1981	1991
Basic metal	-0.041	0.038	-0.059	0.072
	(0.045)	(0.041)	(0.040)	(0.047)
Other manufacturing	-0.107	-0.166	-0.072	-0.203
	(0.079)	(0.081)	(0.144)	(0.124)
Electricity and gas	0.053	0.040	0.023	0.094
	(0.079)	(0.057)	(0.052)	(0.062)
Construction	0.057	0.021	0.084	0.141
	(0.026)	(0.022)	(0.024)	(0.023)
Wholesale trade	0.067	0.082	-0.036	0.096
	(0.040)	(0.038)	(0.037)	(0.036)
Retail trade	-0.062	-0.090	-0.079	0.002
	(0.042)	(0.039)	(0.032)	(0.034)
Restaurants and hotels	-0.144	-0.080	-0.008	-0.038
	(0.122)	(0.094)	(0.073)	(0.057)
Transport and storage	0.003	-0.006	0.005	0.004
	(0.034)	(0.029)	(0.028)	(0.028)
Communication	-0.044	-0.080	-0.012	-0.000
	(0.048)	(0.042)	(0.038)	(0.039)
Financial institutions	0.028	0.021	-0.020	0.199
	(0.076)	(0.060)	(0.051)	(0.046)
Insurance	0.104	0.107	0.113	0.243
	(0.098)	(0.081)	(0.064)	(0.062)
Real estate and business service	0.144	-0.022	0.070	0.024
	(0.050)	(0.037)	(0.031)	(0.033)
Public administration and defense	0.018	-0.024	-0.018	-0.010
	(0.037)	(0.031)	(0.030)	(0.032)
Sanitary services	-0.058	-0.041	-0.062	-0.130
	(0.052)	(0.064)	(0.056)	(0.063)
Social and related community services	0.085	-0.036	-0.063	-0.074
	(0.045)	(0.029)	(0.024)	(0.025)
Recreational and cultural services	-0.098	-0.019	-0.199	-0.149
	(0.108)	(0.064)	(0.049)	(0.050)
Personal and household services	-0.133	-0.101	-0.057	-0.075
	(0.108)	(0.043)	(0.052)	(0.052)
Number of observations	1 781	1 695	1 661	1 551
Standard deviation (σ)	0.319	0.230	0.248	0.245
R^2	0.442	0.331	0.333	0.369

Note. Standard error in parenthesis. The variable *experience* measures years of work experience. Self-employed are excluded. Educational dummies are: 1-(reference group) old compulsory school, 2-old compulsory school + vocational school, 3-new compulsory school and old *realexamen*, 4-*realexamen*+vocational school, 6-three year high school (*gymnasium*), 6-high school+vocational school, 7-university degree. Source: Swedish Level of Living survey.

Table A2b Estimated wage equations for employed women 18-65 years old. Dependent variable is the logarithm of hourly wage.

	1968	1974	1981	1991
intercept	6.359	7.047	7.836	8.547
	(0.049)	(0.040)	(0.032)	(0.031)
Human capital variables				
experience (years)	0.034	0.026	0.018	0.016
	(0.003)	(0.002)	(0.002)	(0.002)
experience sqrd. /1000	-0.604	-0.449	-0.273	-0.270
	(0.072)	(0.059)	(0.044)	(0.040)
ED2	0.086	0.103	0.091	0.080
	(0.034)	(0.026)	(0.017)	(0.016)
ED3	0.161	0.071	0.075	0.092
	(0.035)	(0.027)	(0.021)	(0.020)
ED4	0.311	0.187	0.163	0.169
	(0.033)	(0.024)	(0.017)	(0.018)
ED5	0.455	0.095	0.161	0.124
	(0.110)	(0.049)	(0.034)	(0.025)
ED6	0.643	0.364	0.268	0.277
	(0.062)	(0.037)	(0.023)	(0.020)
ED7	0.960	0.633	0.435	0.378
	(0.088)	(0.048)	(0.029)	(0.024)
Dummy-variables for two-digit industry				
Agriculture and hunting	-0.216	-0.162	-0.205	0.051
	(0.086)	(0.134)	(0.086)	(0.093)
Forestry and logging	0.136	-0.061	0.162	0.014
	(0.164)	(0.115)	(0.135)	(0.118)
Iron ore and nonferrous ore min.	-0.378	-0.072	-0.051	0.054
	(0.254)	(0.149)	(0.164)	(0.143)
Food, beverages, and tobacco	-0.101	-0.047	-0.036	-0.059
	(0.067)	(0.065)	(0.050)	(0.051)
Textile, wearing apparel and leather	-0.098	-0.169	-0.117	-0.044
	(0.066)	(0.056)	(0.052)	(0.055)
Wood and wood products	-0.095	-0.166	0.009	0.011
	(0.115)	(0.103)	(0.062)	(0.063)
Paper, paper products, and printing	0.019	-0.005	-0.107	0.077
	(0.081)	(0.071)	(0.051)	(0.044)
Chemical	-0.069	-0.039	-0.042	0.027
	(0.101)	(0.078)	(0.055)	(0.063)
Stone, clay, and glass	-0.081	-0.075	-0.028	-0.084
	(0.141)	(0.102)	(0.097)	(0.118)

Table A2b, continued from previous page.

Dummy-variables for two-digit industry	1968	1974	1981	1991
Basic metal	0.114	-0.007	-0.075	-0.054
	(0.151)	(0.115)	(0.091)	(0.075)
Other manufacturing	-0.572	-0.135	-0.046	0.050
	(0.125)	(0.171)	(0.135)	(0.080)
Electricity and gas	0.129	0.169	0.595	0.268
	(0.210)	(0.150)	(0.231)	(0.143)
Construction	0.033	0.052	-0.093	0.036
	(0.104)	(0.085)	(0.058)	(0.059)
Wholesale trade	0.048	-0.028	-0.109	-0.026
	(0.073)	(0.057)	(0.050)	(0.044)
Retail trade	-0.109	-0.105	-0.071	-0.026
	(0.055)	(0.043)	(0.033)	(0.032)
Restaurants and hotels	-0.199	-0.166	-0.157	-0.024
	(0.070)	(0.073)	(0.048)	(0.041)
Transport and storage	-0.057	-0.063	0.011	0.132
	(0.088)	(0.073)	(0.050)	(0.040)
Communication	-0.016	0.046	0.025	0.052
	(0.070)	(0.058)	(0.043)	(0.042)
Financial institutions	0.023	0.056	-0.002	0.125
	(0.079)	(0.061)	(0.049)	(0.040)
Insurance	0.009	0.074	0.027	0.047
	(0.101)	(0.075)	(0.049)	(0.043)
Real estate and business service	-0.059	0.016	-0.001	0.098
	(0.070)	(0.057)	(0.046)	(0.036)
Public administration and defense	0.038	-0.045	-0.026	0.006
	(0.062)	(0.047)	(0.038)	(0.035)
Sanitary services	-0.076	-0.113	-0.068	-0.062
	(0.053)	(0.076)	(0.067)	(0.059)
Social and related community services	0.049	-0.042	-0.028	-0.009
	(0.047)	(0.036)	(0.028)	(0.027)
Recreational and cultural services	-0.191	-0.141	-0.107	-0.015
	(0.182)	(0.073)	(0.056)	(0.050)
Personal and household services	-0.405	-0.058	-0.132	-0.087
	(0.063)	(0.057)	(0.058)	(0.065)
Number of observations	1 141	1 308	1 553	1 471
Standard deviation (σ)	0.354	0.290	0.230	0.199
R^2	0.343	0.321	0.258	0.300

Notes: see Table A2a.

Table A3 JMP-decomposition of the change in the gender wage gap. Low-paid women compared to all men aged 18 to 65.

	1968 - 1974	1974 - 1981	1981 - 1991
Changes in gender specific factors:			
Education variables	0.0136	0.0169	-0.0040
Work experience variables	-0.0216	-0.0220	-0.0103
Industry variables	-0.0268	-0.0025	0.0054
Unobs. skills and discrimination	0.0163	-0.0999	-0.0174
Changes in wage structure:			
Education variables	-0.0301	-0.0174	-0.0011
Work experience variables	-0.0161	-0.0027	0.0014
Industry variables	0.0319	0.0109	0.0195
Unobserved prices	-0.0768	-0.0230	0.0047
Total change in gender specific factors	-0.0186	-0.1074	-0.0263
Total change in wage structure	-0.0912	-0.0321	0.0244
Total change in wage gap	-0.1098	-0.1399	-0.0018

Table A4 JMP-decomposition of the change in the gender wage gap. Employed men and women aged 18 to 65. Human capital variables only.

	1968 - 1974	1974 - 1981	1981 - 1991
Changes in gender specific factors:			
Education variables	0.0140	0.0087	-0.0040
Work experience variables	-0.0133	-0.0221	-0.0141
Unobs. skills and discrimination	0.0098	-0.0521	0.0186
Changes in wage structure:			
Education variables	-0.0058	-0.0090	-0.0007
Work experience variables	-0.0086	0.0024	0.0007
Unobserved prices	-0.0508	-0.0068	0.0065
Total change in gender specific factors	0.0105	-0.0655	0.0005
Total change in wage structure	-0.0652	-0.0133	0.0064
Total change in wage gap	-0.0547	-0.0789	0.00069

Table A5 Average level of work experience and education among low-paid women.

	1968	1974	1981	1991
Work exp.	10.91	9.32	11.40	12.76
Ed1	0.7387	0.5382	0.5103	0.3391
Ed2	0.1098	0.1254	0.2397	0.3881
Ed3	0.1219	0.1453	0.0615	0.1018
Ed4	0.0296	0.1483	0.1346	0.0787
Ed5	0.0000	0.0321	0.0385	0.0651
Ed6	0.0000	0.0107	0.0141	0.0258
Ed7	0.0000	0.0000	0.0013	0.0014