

MEMORANDUM

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THE FAMILY GAP IN WAGES AND CAREERS

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Abstract: The Family Gap in Wages and Careers

The report investigates how family and children affect female and male wages and careers. We analyze wages of men and women, their wage increases, promotions, changes to part-time work, choice of occupations, choice of employers, and exits from employment. How do these outcomes depend on family status, the presence of children, number of children and their age? The main objective is to assess whether there is a reward to fatherhood and/or penalty to motherhood and to what extent effects vary over time. The analyses are based on large-scale data from employees within firms, which are members of the Confederation of Norwegian Business and Industry (NHO). The data cover the period 1980-1997. The main findings are the following:

First, the role of marriage and children for wages varies over time. At the beginning of the period male wages increased with marriage and children while they were decreasing for females. At the end of the period, in 1995-97, the effects of marriage and children were more similar for men and women with less of a negative impact for women's wages.

Secondly, concerning the wage gap between men and women, it is larger for those with children than those who are single or without children. At the population level the wage gap at the end of the period (1995-97) was at the level of around 20% among those married with children. This significant gap, however, to a large extent is due to different sorting of men and women on occupations. That is, once men and women work in the same occupation and for the same employer the penalty for married women with children is much lower, less than 5% compared to men.

Thirdly, concerning the impact of marriage and children on wage changes, there are no effects for men. There is, however, a clear negative effect of wage growth of being female. At the same time, for women there are small positive effects of children to begin with, but at the end of the period the presence of children had little impact. By and large, the gross effect is that women receive lower wage increases than men, but that there is no additional negative effect of having children at the end of the period.

Fourthly, women are promoted at a significantly lower rate than men. The difference is declining toward the end of the period, but still the differences are substantial. In the early period, having children helped the promotion rate for women, but in the last period it was detrimental. This is in contrast to the results concerning marital status, children and wage gaps.

The report also investigates various adaptations to family status and children. The question was what impact family status and children have on exiting the private sector, on changing from full-time to part-time work, on changing establishment, career ladder, occupation, and moving to a lower-ranked occupation. Here the findings are that for men, family status and children made little difference for these adaptations, while for women the effects were often major.

The most significant sex differences were observed in relation to exiting the sector and changing to part-time work. Women did so at a much higher rate. None of these processes were much modified when switching to the different levels of analyses; establishment, occupation, and occupation-establishment. The lack of such modification is not surprising given the climate for and practice of parental leave and part-time work in Norway. The main conclusion is that it seems to have become easier for women to combine family, children and career over the 18-year period. It is still, however, the case that women withdraw from the sector at a higher rate than men, and more frequently change to part-time employment whereas men rarely do. This difference may result in women losing ground relative to men in competition for promotions, better assignments, and larger wage increases. Their position relative to men in their adaptive behaviour in exiting the sector has improved

but the gap is still there and is large. One may speculate whether the declining gap in exiting the sector, and the still remaining gap, can account for part of the decline in but continued presence of the gender gaps in wages and promotions.

Sammendrag av rapporten "The Family Gap in Wages and Careers"

Rapporten undersøker hvordan familie og barn påvirker kvinner og menns lønn og karriereutvikling. Vi analyserer lønnsnivå for kvinner og menn, hva slags lønnsutvikling de opplever, opprykk i stillinger, endringer til deltidsarbeid, valg av yrker, valg av arbeidsgiver, samt avgang i yrkeslivet. Spørsmålet vi forsøker å besvare er hvordan slike utfall avhenger av familiestatus, forekomst av barn, antall barn og deres alder. Hovedmålet er å få fastslått om og i hvilken grad det er en belønning for farskap og/eller en straff for morskap, samt hvordan slike ting varierer over tid.

Analysene er basert på omfattende data for arbeidstakere i bedrifter som er medlem av Næringslivets Hovedorganisasjon (NHO) i perioden 1980-1997. Hovedfunnene i rapporten er de følgende:

For det første varierer betydningen av ekteskap og barn på lønn ut fra hvor i perioden vi befinner oss. På begynnelsen av perioden økte menns lønn som følge av ekteskap og barn, mens lønna ble redusert for kvinner av samme grunner. På slutten av perioden, i 1995-97, var betydningen av ekteskap og barn mer lik for kvinner og menn, med en svakere negativ effekt av ekteskap og barn for kvinner.

For det andre i forhold til lønnsforskjeller mellom kjønnene er de større for ansatte med barn sammenlignet med ugifte eller ansatte uten barn. Blant gifte ansatte med barn var den totale lønnsforskjellen mellom kvinner og menn på hele 20% på slutten av perioden (1995-97). Denne lønnsforskjellen skyldtes imidlertid i stor grad at kvinner og menn var ansatt i ulike yrker. For ansatte i samme yrke hos samme arbeidsgiver var straffen for gifte kvinner med barn mye lavere eller mindre enn 5% i forhold til menn.

For det tredje i forhold til spørsmålet om betydningen av ekteskap og barn for endring i lønn, var det ingen effekt for menn. Det er derimot en klar negativ effekt på lønnsvekst av å være kvinne. Men samtidig var det på begynnelsen av perioden for kvinner en svak positiv effekt av å ha barn, men denne forsvant i stor grad på slutten av perioden. I det store og hele kan det konkluderes med at kvinner oppnår svakere lønnsutvikling enn menn, men at det ikke er noen ytterligere negativ effekt av å ha barn for kvinner på slutten av perioden.

For det fjerde oppnår kvinner forfremmelse sjeldnere enn menn. Den negative effekten av å være kvinne reduseres mot slutten av perioden, men er fremdeles betydelig. På begynnelsen av perioden var betydningen av å ha barn på opprykk positiv for kvinner, men på slutten er denne effekten ubetydelig. Denne tendensen er den motsatte av de resultatene vi fant med hensyn til ekteskapelig status, barn og lønnsforskjeller.

Rapporten undersøker også ulike tilpasninger til arbeidsmarkedet ut fra ekteskapelig status og barn. Spørsmålet vi ønsket å besvare var hva slags betydning ekteskap og barn hadde på å forlate arbeidsmarkedet, eventuelt går over fra fulltidsarbeid til deltidsarbeid, på bytte av yrke og arbeidsgiver eller skifte til en lavere stilling. Funnene her er at ekteskap og barn har liten betydning for menn i forhold til slike endringer, mens effektene for kvinner ofte var betydelige.

Den klareste forskjellen mellom kjønnene fant vi i forhold til å slutte i bedriften og forlate NHO-området, samt å gå over på deltid. Kvinner gjorde dette mye oftere enn menn. Ingen av disse endringene ble særlig påvirket av å se nærmere på de ulike analysenivåene; virksomhet, stilling og stilling-virksomhet. Dette er slett ikke overraskende tatt i betraktning det klimaet som eksisterer i Norge i forhold til fødselspermisjoner og omfanget av deltidsarbeid.

Hovedkonklusjonen er at det i løpet av perioden 1980-1997 har blitt lettere for kvinner å kombinere barn og arbeid. Det er imidlertid fremdeles slik at kvinner oftere enn menn beveger seg ut av arbeidsmarkedet eller går over i deltid når de får ansvar for barn. Denne

forskjellen kan i neste omgang lede til at kvinner taper i forhold til menn når det gjelder opprykk og bedre stillinger, samt taper i forhold til størrelsen på lønnstillegg. Når det gjelder å gå ut av yrkeslivet har forskjellene mellom kjønnene minket, men de er fremdeles betydelige. Det er mulig at dette er hovedforklaringen på den fortsatte eksistens av betydelige forskjeller i opprykk og lønn mellom kvinner og menn.

Rapporten er Del I for prosjektet "Betydningen av familie og barn for ansattes karrierer og lønn i norske arbeidsliv", ved Institutt for sosiologi og samfunnsgeografi (ISS), med støtte fra Barne- og likestillingsdepartementet, prosjektnummer 200475.

1 FAMILY, WAGES, AND CAREERS

The purpose of this report is to investigate how family and children affect wages and career success for men and women. It analyzes wages, wage increases, promotions, exits from employment, changes to part-time work, and choice of occupations and employers. It assesses how these outcomes depend on sex, family status, presence of children and their ages. In particular it assesses how the presence of children affects female and male wages and careers differently, documenting how the processes vary within and between the sexes. Finally, it addresses the impact of these differences on the gender wage and career gap.

A central goal for the research is to investigate whether the reward to fatherhood and the penalty to motherhood occur also when employees do the same work for the same employer. If it does, then the penalty observed in the market could in part be due to differential treatment from employers, not only to differential employment choices from mothers. Although a difficult question to research, it can partially be assessed using large-scale data with establishment-level information on all employees and their family and parental histories.

Norway is a country with extensive family policies, with reasonable and high-quality child care, and extensive leave policies for mothers and fathers. The results will inform one on the impact of family situations on careers and wages in an environment where it is comparatively easy to combine family and career.

We use matched employee-employer data from Norway in the period 1980–1997. For each year we have access to information on each employee, which firm he or she works in, wages, occupation, hours worked, age, education, family status, and number of children, including when they were born.

The analyses pertain to the part of the private sector with the largest gender wage gap in 1990, the sector organized by the Main Employer’s Association (Petersen et al 1997). The sector is and was likely to be less family friendly than especially the public

sector. If there is an impact of family and children, this is a sector where one should expect to find it. It is of interest to investigate changes in the impacts over time.

The three central questions to be analyzed are:

1. What is the wage gap at the occupation-establishment level, once employees do the same work for the same employer, between mothers and non-mothers, between fathers and non-fathers, and between the sexes net of parental status?
2. What is the promotion and wage growth gap at the occupation-establishment level, once employees do the same work for the same employer, between mothers and non-mothers, between fathers and non-fathers, and between the sexes net of parental status?
3. What are the adaptations in terms of exits from employment, shifts to part-time employment, and of employer and occupational changes resulting from mother- and fatherhood? Are adaptations made with the same employer in same occupation or by change of employers and occupation?

1.1 WHY ASK THESE QUESTIONS?

In a retrospective on the 20th century the economic historian Eric Hobsbawm (2000, p. 136) reflects: “There can be no doubt that the emancipation of women has been one of the great historical events of the twentieth century. The problem for the twenty-first is to establish what still has to be done, and what will probably happen.” He continues (p. 136): “There is, however, a serious problem, and it has become increasingly serious: the extraordinary difficulties for women of combining high professional posts with being mothers.” And then concludes: “This has nothing to do with discrimination, but with the natural law that women are the ones who give birth.

Much research over the last half decade has come to the same conclusion. It has become evident that family and children play a major role in creating a family and gender wage gap. This is well documented for Britain, the U.S., Denmark, Norway, Germany, and other countries (Waldfogel 1998*a*; Datta Gupta and Smith 2002; Hardoy and Schøne 2004; Harkness and Waldfogel 2003). For example, in the UK at age 30, among women

with children, the wage gap relative to men is about 30 percent, while among women without children, the gap is about 5–10 percent (Waldfogel 1998a). Nielsen, Simonsen, and Verner (2004, p. 722) go as far as to claim that with respect to the gender wage gap “the family gap is the main component.”

In short, men benefit economically and careerwise from family and children. Women in contrast suffer penalties in wages and careers from family and children. These two divergent processes may result in large wage and career gaps between men and women.

The penalties for mothers can come about through several mechanisms. A *first* mechanism is differential treatment from employers. They may view mothers as less productive, as putting in fewer hours, as less promising for assignments that may increase later promotion opportunities, and so forth. Those are processes that occur in the workplace, resulting potentially from differential treatment unrelated to performance. A *second* mechanism is differential employment choices from mothers, through career withdrawals resulting in less experience, through different kinds of work, perhaps by accepting work that make it easier to combine career and family, and especially through more part-time employment. These in turn may depend on the division of labor in the household, the presence or absence of the father, and more. These are gaps induced by adaptations to family situations (e.g. Phipps, Burton, and Lethbridge 2001). A *third* mechanism may be that mothers are different than non-mothers. Career-oriented women may at a lower rate decide to become mothers or may decide to delay parenthood in order first to build careers and have children later (e.g., Goldin 1997), which may show up as lower wages among mothers than non-mothers. These are gaps caused by selection mechanisms, where employees who have children are different before and after entry into parenthood. And clearly these three mechanisms may all operate at the same time.

The mechanisms for men are entirely parallel, but with opposite effects. *First*, employers may view married men and fathers as more productive than single men and non-fathers. *Second*, men may increase their work effort upon marriage and fatherhood, thus resulting in higher productivity. *Third*, men who marry and become fathers may be

different from men who do not, and may be more productive even before entering into marriage and fatherhood.

It is difficult to identify the relative importance of these mechanisms. Doing so requires unusual data. Not only does one need individual-level data on wages, careers, and family adaptations, one also needs to compare employees doing the same work for same employer. Such data arise from matched employee-employer data. Additionally, one should follow individuals over time so that one may assess changes in wages and employment outcomes before and after having children.

Assessing these differences is of relevance both to how we understand the relationship between family, children, and career for men and women and for how we will think about potential policies to facilitate achieving both career and family. Policies in these realms are many and varied, they need to be carried out by different governmental agencies, and they affect various groups differentially. To the extent that the main problem for women, and the main advantage for men, arises from treatment from employers, then policies will call for further regulation or increased vigilance in enforcing equal opportunity legislation. The primary target of policies will be employers. To the extent the main problem arises from the adaptations men and women make to family and children, then another set of policies is called for, namely those that aim at helping families and even policies that regulate the everyday organization of the family, including perhaps changes in how family are taxed. The primary targets are then fathers and mothers, and the ministries that focus on social and family policies will be the ones initiating and implementing changes.

1.2 RESEARCH EVIDENCE

What Is Known?

A considerable literature addresses the impact of family and father- and motherhood status on wage outcomes. The central and generally agreed-upon results are as follows.

For men, marital status and having children positively impact wages (e.g., Koren-

man and Neumark 1991; Hersch and Stratton 2000; Hundley 2000). This holds for self-employed as well (Hundley 2000). Again there may be many mechanisms. Fathers may receive positive differential treatment from employers, they may increase their productivity upon fatherhood, and men who become fathers may be different from those who do not and may even have been more productive prior to entry into fatherhood.

For women, having children negatively impacts wages, leading to a substantial gap between mothers and non-mothers and relative to men (e.g., Waldfogel 1998*a*). Only one U.S. study has found a positive effect of children on female wages (Hersch 1991, p. 357). The mechanisms producing the children penalties may be the same as those producing children premia among men.

These results hold across different data sets, using different methods, and across countries (e.g., Waldfogel 1998*a*). The perhaps most robust findings come from panel designs. There one compares the wages of women before and after having children (e.g., Korenman and Neumark 1992). Overall, this literature must be considered to be of high quality and to have produced convincing results with policy relevance.

There are however some significant variations with respect to these results. Some of these variations can best be explored by cross-national comparisons.

One significant variation concerns the role of maternity leave. Waldfogel (1998*b*) in a study of the U.S. and UK finds that among mothers who are covered by and use maternity leave, there is a positive effect of children on wages. She argues (p. 512) that maternity leave allows these women to maintain good job matches and that firms use such schemes to attract and keep qualified women. This points to how maternity leave may help women maintain and build careers.

For countries with universal and often generous maternity leaves it has however been argued that these may have rather different effects. The central claim is that becoming a mother in such countries will neither negatively nor positively affect wages relative to non-mothers (Rosenfeld and Kalleberg 1991). But the existence of universal maternity leave will negatively affect wages of all women relative to men. Employers expect all

young female employees eventually to have children and take out the entire maternity leave. This may in turn lead them to statistically discriminate against women and place them into different kinds of jobs (Rosenfeld and Kalleberg 1991). Such an interpretation would be consistent with the high levels of occupational sex segregation found in the Scandinavian countries.

There is evidence for this argument. For Denmark the penalties to motherhood are rather negligible, of the order 1% for 1 child and 2% for 2+ children. But when intra-individual analyses are done, comparing an individual's wages before and after motherhood, then there are even small positive effects of having children of less than 0.5%, controlling for other variables, but effects that do not reach statistical significance (Datta Gupta and Smith 2002, Table 2, p. 618). Using the same data, Nielsen, Simonsen, and Verner (2004) refine these findings. They demonstrate that in the family-friendly public sector of the economy there are negative effects of being a mother, a penalty of about 2.4%, but that in the private sector there are no such effects, a penalty of about 2.4%. However, once they correct for selection effects of women into the two sectors, using a more complex model of sample selection, the results are reversed; a clear positive effect of being a mother in the public sector of about 3% and a strong negative effect of about 6% in the private sector. Which set of results to put most emphasis on depends on the researcher's level of confidence in results produced by simple versus those produced by more complex procedures. From a straightforward descriptive viewpoint, the results showing a small negative effect of motherhood in the public sector and an effect of less than 1% in the private are most believable, but the descriptively transparent results clearly do not account for the potentially complex selection mechanisms into the two sectors. They also investigate how many women upon childbirth self-elect into the public sector. For example, 52% of women employed in the private sector have no children, while this is the case for only 38.5% of those in the public sector (Table 1, p. 727). Rosholm and Smith (1996) find similarly small effects of motherhood in Denmark in 1980–1990. Albrecht, Edin, Sundström, and Vroman (1999) report similar types of analyses for Sweden, finding that

women are penalized neither in the public nor private sector for taking maternity leave. As in Denmark, there is, after controlling for career interruptions, even a premium for having children. The single study done of these issues in Norway does however find wage penalties to motherhood, but they don't perform the same kind of within-individual analysis of wages as in Datta Gupta and Smith (2002). As in the Danish study, these penalties are higher in the private than public sector (Hardoy and Schøne 2004).

The second set of refinements of the central and agreed-upon results concerns what happens at the individual level as men and women transition between various statuses, single to married, no children to 1, 2, or more children. As already mentioned above for the Danish data, within a women's life as transitions are made to having children there appears to be wage premia (Datta Gupta and Smith 2002). A recent study from the U.S., using data from the Panel Study of Income Dynamics (PSID), reports that among wives who work continuously after childbirth there are no negative effects of having children. But husbands in these households both work fewer hours after childbirths and earn higher wages (p. 707). Similar results were obtained by Korenman and Neumark (1992). Waldfogel (1997*a*, 1977*b*) using similar data and techniques still finds a penalty to motherhood.

What Is Not Known?

The results thus document variations across countries, and especially that maternity leave may have a positive impact on female careers in countries without universal and extensive maternity-leave provisions, but perhaps no effect in countries where these policies are widespread. The results also show that within an individual's life the impact of family and children may be negligible, both in the U.S. and Scandinavia.

One central question left entirely unresolved by this literature is the following. To which extent is any wage penalty induced by motherhood, or any wage gain induced by fatherhood, due to different pay for same work for same employer, then possibly due to differential treatment from employers, versus due to employee choices of different

firms, occupations, and hours worked, or from some combination of the two? Hersch and Stratton (2000, p. 93) conclude on the male marriage premium: “Married men may get preferential treatment from employers, such as more training and promotions. Or men may become better workers because of the stability induced by marriage.”

To answer such a question, one needs not only longitudinal data on men, women, and their family situations. One also needs such data at the workplace level: when same work for same employer is done. To assess possible differential treatment, one needs to compare employees with and without children working for the same employer, and how the two groups do when none had children and how they do after some of them did. This calls for employee-employer matched data.¹

The present study will yield a relatively precise answer to this question, the role of employee choices versus differential treatment once same work for same employer is done. Do women with children receive lower wages and do they experience lower promotion rates than those without children, once they work in the same establishment and occupation? Or conversely for men, do married men get higher wages and better career progress within the same organizations and occupations? Not only can we compare these groups, we can also compare employees to themselves, before and after entrance into parenthood.

If we find equality of outcomes at the occupation-establishment level, then that suggests that the marriage and children penalties or gains observed in the market are caused by differential sorting into occupations and firms upon marriage and parenthood, not by differential treatment from employers.

Another central question that has not been answered by research is whether the penalties and premia for family status and children have changed over time. The presumption is that the lack of or strong presence of such penalties and premia may depend on what type of public policy is available in the family arena. This was carefully discussed with a comparative focus by Dex and Joshi (1999). In Scandinavia there has been significant

¹To our knowledge, only one study has used such data (Korenman and Neumark 1991). In a large manufacturing company in the U.S. around 1980, they find at a small positive impact of marriage for men but this disappears once control variables are introduced. The result is limited to one single organization.

expansions of such policies over the 20-year period 1980–2000. One should accordingly be able also to trace changes in the impact on wages of family status and children. If the policies have had one of their intended effects, it should be possible to document these. Documentation of such within-country findings can be essential for improving our understanding of and approach to the role of family policies aimed at facilitating family and careers. The present research will investigate whether such changes have occurred.

1.3 NORWEGIAN FAMILY POLICIES

Since the 1970s Norway has had extensive and broad family policies. They include paid parental leave, with some portion currently reserved for fathers, with the goal, among others, to strengthen the bond between fathers and children, thereby creating entirely new norms for fatherhood (Leira 2002, chap. 4). They include cash benefits for families with children. And they especially include publicly supported childcare at relatively low cost and high quality.²

Unpaid parental leave of 52 weeks has been available since 1978. Paid parental leave was available for 18 weeks in 1977, 20 weeks in 1987, and 22 weeks in 1988, with 100% pay since 1978, with several later extensions. Since 1977 fathers could share the leave except for the first six weeks reserved for mothers.³

Regarding public provision of childcare services, Norway has relatively extensive policies (see Kamerman 1991*a*, 1991*b*): 5% of preschoolers had access to public child care

²Korpi (2000), in an analysis of how the welfare state relates to family and gender equality, ranks 18 welfare states with respect to their support for the dual-earner family (Leira 2002, p. 28). Most supportive are the Nordic countries, in this order: Sweden, Denmark, Finland, and Norway. While Norway thus ranks near the top with respect to policies facilitating employment for mothers, it ranks at the bottom within Scandinavia. Korpi ranks the UK, Canada, Japan, Australia, Switzerland, New Zealand, and the U.S. at the very bottom among the 18 countries, (Leira 2002, p. 29). Meyers, Gornick, and Ross (1999, Table 4.3, p. 130) report that among 14 countries the UK, Australia, and the USA rank at the bottom with respect to policies aimed at facilitating family and career, based on their policies with respect to maternity leave, tax relief for childcare, percent in publicly funded childcare, and more.

³Sweden also had several changes in parental-leave policies and child-care provisions over the period 1970–1990. For example, the total leave period after childbirth was 7 months at 90% pay in 1975, increased to nine months in 1978, with fathers being able to share leave periods since 1974. In 1973, 11% of preschoolers had access to public child care, 38% in 1983, and 49% in 1988, at a subsidized rate (see Rønsen and Sundström 1996). Fathers accounted for 7% of leaves taken in 1988 (OECD 1995*b*; see also Haas 1991), with much lower numbers in other European countries.

in 1973, 25% in 1983, and 32% in 1988.⁴ Single parents pay lower fees in both Norway and Sweden.

Norway provides direct monetary child support to all families with children under the age of 18. Parents choose how to spend it.

Norway provides almost universal access to part-time work.⁵ Part-time work facilitates combining family and career. In 1991, female labor-force participation rates were the same in Norway and the U.S., 68 and 67 percent respectively. Among women, an entire 46 percent were part-time employed in Norway, while only 20 percent in the U.S.

The Norwegian and Scandinavian family policies had many goals (Leira 2002, pp. 84, 94). They were designed in part to involve fathers more in child care. The central policy was the period of leave for fathers. This was considered to be good for both fathers and children, but also for gender equality, by rearranging the internal organization of everyday life in the family (Leira 2002 p. 76). In part they were designed to make it easier for women to combine family and career, to the advantage of children, mothers, and gender equality in the workplace. The policies were thus viewed to improve the situation of both mothers and fathers, by generally making it easier for women simultaneously both to stay economically active and experience a less stressed family life, and for fathers by increasing their involvement with their children. Improving the situation for children may however conflict with creating more gender equality. To the extent women spend more time at work, and men don't increase their hours at home with at least as much as women decrease theirs, the situation for children may deteriorate. Some of the family policies may in fact have restored a balance and situation for children that existed prior to changes in the role of motherhood, in that the policies mostly reacted to changes in employment and motherhood patterns for women (Leira 2002, p. 65).

As Leira (2002, p. 87) states, one should be careful not to overestimate the impact on

⁴In Sweden, 11% of preschoolers had access to public child care in 1973, 38% in 1983, and 49% in 1988, at a highly subsidized rate (see Rønsen and Sundström 1996).

⁵It is often cheaper for employers to offer this than in the U.S. since most benefits are publicly provided with costs shared between employees and employers on a pro-rated basis as a percent of wages.

gender equality of parental leave. Such policies undoubtedly benefit children and parents but need not increase gender equality in the workplace. Leira is in fact quite pessimistic in her conclusions with respect to existing policies and their impacts on gender equality in the workplace: “Efforts at promoting gender equality in society at large might come to a stop if the responsibility for prolonged childcare and family care is not shared more equally among women and men” (Leira 2002, p. 148). And she concludes that “A profound redistribution of the paid and unpaid work and care is called for, one that goes well beyond the largely symbolic support entailed in promoting parental choice” (Leira 2002, p. 149, calling for a focus on the parent-worker model for the modern citizen.⁶

We can assess the extent to which there is a gap in attainment between mothers and fathers in such a family-friendly country, and whether any gap has changed over time. This provides information on the promises and limitations of family policies for achieving gender equality in the workplace.

1.4 OUTLINE OF REPORT

Chapter 2 describes the data and briefly the methods. Many of the relevant descriptive statistics are given in Appendix A. Appendix B describes the methods further.

Chapter 3 addresses research question 1: The impact of family and children on wages of men, of women, and the gender wage gap, done in that order. This forms the central part of the report.

Chapter 4–5 addresses research question 2: The impact of family and children on wage changes and promotions for men, for women, and the gender gap in wage changes and promotions, done in that order.

Chapter 6 addresses research question 3: What are the adaptations to marital status and parenthood in terms of exiting the sector worked in, changing to part-time, and other

⁶For example, Hakim (2000, p. 240) concludes: “In sum, Nordic women have not achieved any significant degree of equality with men in market work, in terms of access to the top jobs, occupations with authority, or higher pay.” She continues (p. 243), “Some scholars are now concluding that Nordic egalitarian policies have failed, ...” and that “National policies that offer mothers substantial periods of paid and unpaid maternity leave, the right to work shorter hours, and other benefits to help reconcile work with family do have unintended side-effects.”

adaptations in work arrangements.

Chapter 7 summarizes the findings and provides implications of these.

2 DATA

We use matched employee-employer data on entire populations of white-collar employees in central sectors of the Norwegian economy in the period 1980–97. The data were collected and compiled by the Norwegian Central Bureau of Statistics and the main employer’s association in Norway, the Confederation of Business and Employers (NHO). They are based on establishment records and Norwegian employers are bound by law to collect and report the data (e.g., Central Bureau of Statistics 1991, pp. 120–123). The data are used in wage bargaining and economic planning. They should be reliable compared to information from sample surveys with personal reports of pay rates, hours worked, and occupation or position.

The data on firms and on individuals within firms are available on an annual basis from 1980 to 1997. We can follow establishments and their employees from year-to-year. In addition to wages, we know hours worked, part- versus full-time status, occupation and hierarchical position, age, and more. The data have been matched to register data from the Central Bureau of Statistics on detailed educational attainment (length and type), family or civil status (8 statuses), number, ages, and sexes of children and adoptions. This gives annual educational, marital, and parental histories. The matched employee-employer information allows us specifically to compare employees working in the same occupation for the same employer (Petersen et al 1997), and to make the comparisons among married and single, those with and without children, and so forth.

2.1 SUMMARY OF DATA

The statistics are based on individual-level records for about 100,000 white-collar workers per year. They include data on a variety of industries: white-collar workers in manufacturing, oil extraction, mining, quarrying, transportation, storage, communication, and various other industries. Most of the industries outside the manufacturing sector are relatively small, but the hotel and research sectors count 2,201 and 4,771 employee re-

spectively in our data. This particular grouping of industries is the one used by the Norwegian Central Bureau of Statistics, and it is important in the Norwegian economy, as these industries are central in setting wages for other sectors, and is always the first sector to carry out wage negotiations.¹ It is quite typical of other sectors in the economy. For our purposes it is the most strategic site of the economy to study. Of the seven sectors from which wage gaps were computed for 1990, it had the highest gender wage gap at all levels (Petersen et al 1997). This ensures variation in the dependent variable especially at the occupation-establishment level.

The data cover all occupational groups with a few exceptions: CEOs, working supervisors, top editors of newspapers, secretary to the editor of newspapers, and journalists. While working supervisors are excluded, supervisors in administrative positions are included.

Among important sectoral exclusions are employment in the public and primary sectors. In the public sector there is practically no wage gap at the occupation-establishment level (Myrvold 1989), and women do well relative to men careerwise, while in the primary sector wages are either hard to record or self-employment is widespread.

For each employee, we have information on sex, occupation, detailed educational code, age, monthly wage earned on ordinary (i.e., contracted) hours, which excludes wages on overtime hours, and contractual hours worked. On the bases on monthly earnings and contractual hours we computed the hourly wage. We used age together with the educational information to compute labor force experience, as age minus 16 minus years of education beyond age 16. The occupational code is quite detailed, with 201, 210, and 209 occupations in 1980, 1990, and 1997. As is explained in Appendix A, of these 210 occupations, we used data on employees in only about 155 occupations.

¹The data are quite complete. For example, for the year 1992, we have complete data on 84% of the establishments and 94% of their white-collar employees.

2.2 DEPENDENT AND INDEPENDENT VARIABLES

We report a sequence of three analyses with associated dependent variables. Our first analysis uses the hourly wage as the dependent variable. Our second analysis addresses changes between years, first for wages and second for increases in occupational rank. Our third analysis concerns a series of labor force adaptations: leaving the sector, changing firm, and so on.

Our core independent variables are family status and number of children below age 20. We also control for education and labor force experience.

The dependent and independent variables are explained in detail in Appendix A.

2.3 METHODS

We use linear regression analysis to analyze the various dependent variables. The methods are explained in some detail in Appendix B.

3 FAMILY AND WAGES FOR MEN AND WOMEN

We first address the impact of family status and children on wages for men. Our baseline analysis gives the estimated impact on wages with no control variables beyond marital status and children. Then we add control variables, to assess the extent to which the impacts of marriage and children reflect differences in these. The same type of analysis is next done for women. Finally, we address the implications of the male and female patterns for the gender wage gap.

The analyses are done at four different levels: The total, where only the individual-level characteristics are taken into account, the establishment, occupation, and occupation-establishment levels. We here investigate whether the differences observed in the “market” or population also are present at the establishment, occupation, and especially occupation-establishment level, where the same work is done for the same employer.

What is the potential relevance of these analyses? They demonstrate in an unambiguous manner what the male and female premia to marriage and children are about: Are they about sorting into different establishments, occupations, and occupation-establishment units? Are they about differences in experience and education? Ultimately, the answers to these questions identify the agents behind the premia: Employers, in how they reward different groups, or employees, in the private choices they make in entering into marriagehood and having children?

3.1 FAMILY AND WAGES FOR MEN

Table 3.1 gives the impact on wages of marital status and number of children below age 20. Each regression is estimated separately by year, for 18 years. But to make presentation more compact, we have averaged the coefficients across years within four separate periods: 1980–84, 1985–89, 1990–94, and 1995–97.

(Table 3.1 about here)

In Panel A there are no individual-level control variables beyond those reported. In

Panel B we control in addition for education and imputed work experience. We have access to a very detailed educational code, knowing not only the level, but also the type, such as the undergraduate major. But we use only five broad categories. We also estimated the models using 21 educational categories, of which the five categories is an aggregation. The finer educational variable gives somewhat smaller effects, but does not alter the pattern of results.

Each coefficient is significantly different from zero usually at a very high level, often with z- or t-statistics of 40–50. Therefore we don't report the significance levels, which typically would be .000001 or better. The gigantic z-statistics reflect the large number of observations each year, often about 70,000, but not necessarily any special virtue of the estimated models.

DIFFERENCES WITH NO OTHER CONTROL VARIABLES

Total Effects

Starting with the total effect, or what we also refer to as the effect in the population, with no control for occupation or establishment, we find in Panel A of Table 3.1 strong positive effects of marital status and of children on wages in each of the four periods. The premium for being married is of the order 12.8–13.5 percent. There is also a clear premium for being divorced, separated, and widowed, of about 10 percent in 1980–1989, and about 8–10 percent in 1990–1997.

For having children under the age of 20, we see the same results. The first child gives an added wage of about 2%, the second child an additional 5.2–7.4%, and the third or even more children another 1.9–3.4%.

To make this more concrete, in 1995–1997, married men with 1 child under age 20, on average earned 16.4% ($=\exp[.128 + .024]-1$) more than unmarried men with no children. With 2 children, another 6.4% premium is added, and with 3 or more children an additional 3.4% is earned, bringing the wage premium relative to unmarried men with

no children to 26.2%. The additional money earned is surely needed, and the premium is economically nontrivial. An illustration of these results is given in Table 3.2.

(Table 3.2 about here)

Establishment, Occupation, and Occupation-Establishment Effects

But what become of the differences when we make comparisons at the establishment, occupation, and occupation-establishment levels? Do they remain, or do they become smaller, or perhaps even larger? The results are reported in Table 3.1, Panel A, columns 2–4 within each time period.

At the establishment level, the effects are still there, but considerably smaller. For marital status, the effects are about a fourth to a third of their original size. There is still a wage advantage to being married or previously married, but it is now of the order 2–4%, not 10–14%. There is also a wage advantage to children, of 1–2% for first child, another 2–3% for second child, and a final addition of less than 1% for 3 or more children. In 1995–1997, married men with 1 child on average made 6% more than single with no children, while married men with 3 or more children made about 9% more than unmarried men with no children, as reported in Table 3.2, Panel A.

So going from the total to the establishment-level effect, the wage advantage of being married with 3 or more children drops from 26.2 to 9.0%. This is still a premium, but no longer a major one.

But the dramatic changes in results we get at the occupation and occupation-establishment levels. At the occupation level, controlling for 21 occupational groups, the marriage premium is of the order 2–3% in 1980–1989, and 0.7–2.5% in 1990–1997. The premium for children is correspondingly small. Across the four time periods, it is negative of about half a percent for first and third child, and positive of about half a percent for second child. At the occupation-establishment level, the differences are even smaller. The marriage premium is 0.5–1.8%, and in 1995–1997 down to 0.6–1.2% and even negative for widowed

of -0.5% . The same results hold for children, premiums of $0.1-0.8\%$. In 1995–1997, the premium for first child is 0.3% , for second 0.5% , and for three or more children 0.2% .

Summary

We can unquestionably conclude as follows. In the entire sector, at the population level, there is a major impact on wages of marital status and children under 20. This impact gets strongly reduced when comparisons are done at the establishment level. Married men and men with children thus tend to work in high-paying establishments. About two-thirds of the marriage premium observed in the population is due to sorting on establishments. The remaining one-third occurs also within establishments.

But within occupations, with only 21 occupational groups, the premia practically disappear. There is a small marriage premium, but virtually none for children. This is even more so the case at the occupation-establishment level.

The marriage and children premia observed in the population, without controls for education and experience, from the total regressions, are thus $66-75\%$ due to sorting on establishments, and for all practical purposes, $95-100\%$ due to sorting on occupations and occupation-establishments. Within these units, there are few meaningful differences between married and non-married men and between those with and without children.

The implication is simple: Once the same work is done for the same employer, there is no differential pay due to marriage and children under the age of 20. This is the case even without additional control variables.

DIFFERENCES WITH ADDITIONAL CONTROL VARIABLES

But what happens to these differences when we control for additional individual-level variables: imputed labor force experience and five broad educational groups? We need to assess whether the marriage premium could be due to married employees on average being older and further along in their careers and having different educations.

The results are given in Panel B of Table 3.1. To facilitate discussion, Panel C gives

the ratio of the coefficients in Panel B to those in A, that is, the Panel B coefficients as proportions of the coefficients obtained without control for the additional individual-level variables.

Starting with the total effect, in each of the four time periods, the marital and children effects drop dramatically. For marital status, the effect is about half or less. But for the effect of children, the drop in effects is much more dramatic. As Panel C shows, they get reduced by 80–90%.

Without any hesitation we can conclude: About half of the marriage premium observed in the total estimator in Panel A is due to differences in experience and education. Almost the entire child premium is due to the same variables.

In Panel B, the establishment level effects are very similar to the total effects. Therefore, the sorting effect we observed in Panel A, when going from the total to the establishment level, is almost entirely due to differences in experience and education, not by family status and children. Once these variables are controlled there is no sorting effect on establishments.

Finally, when focusing on the occupation and occupation-establishment levels, the effects are similar to those observed in Panel A. There is still an effect of marital status, but a small one; in 1995–1997 of about 0.6–1.3% at the occupation-establishment level.

Summing up the sequence of results so far, experience and education explain half the marriage premium and almost all of the children premium we observe in the population. Controlling for these variables, sorting on establishments does not change the effects. Sorting on occupation and occupation-establishment explains the remainder of the marriage premium, and, once this sorting has occurred, differences in education and experience do not reduce the marriage or children effects further. Married men, and men with children, work in different occupations and occupation-establishment units than unmarried and childless men. But once these groups work side-by-side, they receive the same pay.

3.2 FAMILY AND WAGES FOR WOMEN

We now address the impact of family status and children on wages for women by reporting the same sequence of analyses as we did for men. We investigate the impact of marital status and children with and without control for education and experience, and we do so at four different levels: the total, where only the individual-level characteristics are taken into account, the establishment, occupation, and occupation-establishment levels.

As for men, the analyses answer questions about the sources of premia and penalties: Are they due to how employers treat women according to marital status and parenthood, or are they due to choices women make once they get married and have children?

The patterns for women were somewhat simpler than for men, and less text is needed in order to explicate these. The procedures and their justifications as well as the framing of the questions were laid out already in the analysis that addressed men, with no need for repetition here, which also leads to some saving in text.

DIFFERENCES WITH NO OTHER CONTROL VARIABLES

Total Effects

Panel A of Table 3.3 gives the results with no controls for education and experience. It shows that at the population or market level there are clear positive effects of marital status, of 5–8% for being married, and in 1980–1989 larger effects of divorced and widowed, but these were down to the level of the marriage effect by 1990–1997. For children there are small negative effects in 1980–1994, and then a mixed set of effects in 1995–97: small negative for 1 child, zero for 2 children, and small positive for 3+ children. The relative impacts are illustrated further in Table 3.4.

(Table 3.3 about here)

(Table 3.4 about here)

When compared to the results for men, the impact of marital status and of children

are not as strong among women.

Establishment, Occupation, and Occupation-Establishment Effects

These effects generally get smaller once controls are made for establishment, but not that much smaller, especially not for the marital effects. A further drop is found at the occupation and occupation-establishment levels: the premia for married, divorced, and separated employees are 3–5% in 1980–89 and 2–4% in 1990–97, while for children the penalties at these levels are negligible, of less than 1 percent.

Although the premia at the population or market level for marital status are substantially smaller for women than men, at the occupation and occupation-establishment levels the premia are rather similar for the sexes, about 2–3%.

DIFFERENCES WITH ADDITIONAL CONTROL VARIABLES

Once one controls for education and experience, quite remarkable, interesting, and substantively meaningful changes occur.

At the market level, or the total effects, the marriage premia become considerably smaller: in 1980–89, they drop from about 6–9% to about 2–3%, in 1990–97 from about 4–5% to about 2–3%. This is quite comparable to the changes in effects that occurred for men when controls were made for education and experience.

For the children effects we do however see dramatic changes. From rather small and almost negligible effects when not accounting for education and experience, we now see relatively large negative effects of children: in 1980–89 penalties of about 3, 7, and 10% for 1, 2, and 3+ children, while in 1990–97 of about 2, 4, and 5–6%.

But what happen to these differences when we control for establishment, occupation, and occupation-establishment?

At the establishment and occupation levels, the marriage premia go down further, to 1–2% for being married, in all years, with somewhat smaller effects for the other marital statuses. At the occupation-establishment level, the effects of marital status for

all practical purposes disappear: Once women do the same work for the same employer, there are no premia to marital status, they are less than 1%.

For the children effects the situation is however different. In 1980–89, there are clear negative effects of having children at the occupation and occupation-establishment levels, of about 2, 5, and 6% for 1, 2, and 3+ children, somewhat smaller at occupation-establishment than occupation level. These effects drop further by 1990–94 and for all practical purposes vanish by 1995–97.

The historical change over this short time period is remarkable. At the occupation and occupation-establishment levels the penalties to children dropped every five-year period and had by 1995–97 practically evaporated, hitting a low level of 0.1–0.5%.

At the beginning of the 18-year period, the penalty for children was very different for men and women: At the occupation and occupation-establishment levels, no penalty for men, a substantial one for women. At the end of the period, neither men nor women were penalized at the occupation and occupation-establishment levels for having children.

3.3 ROLE OF FAMILY AND CHILDREN FOR THE GENDER WAGE GAP

The previous analyses showed how family status and children worked differently for men and women. We documented the wage gaps between various groups of women according to marital status and number of children and did the same for men. We also showed how these relationships had changed over time, with significantly lessened impact on wages of marriage and children over the 18-year period, especially for women, potentially indicating that combining family and career has become easier.

We now turn to an analysis of the role of family and children for another and central outcome implied by the analyses just completed: the gender wage gap at various levels, population, establishment, occupation, and occupation-establishment. This addresses directly how marital status and children may lead to a divergence in male and female wages, and for our purposes, more specifically, from where the sources of this divergence stem.

That there is a family-induced gender wage gap in the U.S. and UK is beyond question

(e.g., Waldfogel 1998*a*, 1998*b*; Budig and England 2001), and for Norway specifically, it has so far been documented that among women mothers earn less than non-mothers (Hardoy and Schøne 2004). The precise mechanisms behind the gaps have yet to be explored, whether the gaps arise from differential treatment from employers, from self-selection, adaptations, and sorting of employees, or from other sources.

Reaching an understanding of these mechanisms is essential for discussing policy options. Should policies aim at regulating potentially differential treatment from employers, should they aim at facilitating combining family and careers, or should they even aim at influencing the choices men and women make in sorting themselves into occupations and establishment? We clearly cannot decisively answer all these concerns, nor can we assess which options are preferable, but we can most certainly gain some insight into what may be feasible and perhaps at least assess the relative importance and even absence of importance for some of the mechanisms.

We estimate the same models as in Table 3.1, but include women in the estimation, and include interaction terms between sex and the other variables, marital status and children. We restrict the analyses here to units that are sex integrated at the relevant levels, at the establishment, occupation, and occupation-establishment levels. The actual set of employees analyzed may in some cases therefore differ somewhat from that used in the analysis of men alone and of women alone, because in these no restriction was imposed that units had to be sex integrated at the various levels.

IMPACT ON THE GENDER WAGE GAP

Gender Wage Gap With Control Variables

Table 3.5 reports the coefficients for marital status and children first for men in Panel A, for women in Panel B, and the differences in coefficients in Panel C, for the four different periods and for four different levels, in each regression controlling for education and experience. Panel D gives the implications of these coefficients for the gender wage

gap in the same four periods and at the same four levels. It gives the estimated female wages as proportion of estimated male wages after control for relevant variables for five different groups of women and men: single, married, and married with 1, 2, and 3+ children.

(Table 3.5 about here)

Starting with Panel D, with controls for education and experience, we see that among singles, at the population level women earned 91%–93.3% of what men did during this period. But at the occupation and establishment levels they earned 94.2 and 95.0% of men’s wages in 1980–84 and then an entire 97.4 and 97.5% in 1995–97. Marital status and children induce further gaps at all levels, but less so at the occupation and occupation-establishment levels.

To illustrate, consider two groups of women and men, both of whom are single and childless, but who then go on first to get married, followed by 1, 2, and 3+ children. Prior to marriage women earn 91.1% of men’s wages. Upon marriage, at the population level, women lose a significant amount relative to men: In 1980–1984 men increased their wages with 7.0%, women decreased their’s by 0.8%, with the net result that the wage gap became larger, women earning 84.9% of men’s wages. That relationship is entirely stable over the 18-year period: At the population level married women earn about 15% less than men.

At the occupation and occupation-establishment levels these differences are however much smaller, of 5–6% in 1980–84 and 3–4% in 1995–97.

But what happen to these differences as the married men and women get 1, 2, and 3+ children? At the population level, the gap increases to 20, 27 an 31% in 1980–84 and 18, 20, and 21% in 1995–97.

At the occupation and occupation-establishment levels these differences are again much smaller: for 1, 2, and 3+ children of 10–11, 12–13, and 14% in 1980–84, while down to 4–5% in 1995–97.

At the population level, there is still a large penalty for women relative to men of having 1, 2, and 3+ children in 1995–97, though it has gone down since 1980–84. However, at the occupation and occupation-establishment levels, these penalties have not only gone dramatically down over the period but are relative small by 1995–97, of 4–5%.

Gender Wage Gap Without Control Variables

Continuing with Table 3.6, which reports the same analyses, but without control for education and experience, it is clear that the gaps at the population level, for all five groups, are much bigger than when controls were introduced. At the population level, we see for single and childless employees a wage gap of 14.2 rather than 6.7%, and for married employees with 3+ children a gap of 29.2 rather 21.1%. But at the occupation and occupation-establishment levels, the gaps are similar to those found with controls for experience and education, being about 1 percent larger. This demonstrates decisively first the central role of education and experience in sorting employees on especially occupation, and second the limited role of same variables for determining wages once sorting has occurred.

(Table 3.6 about here)

The implication is straightforward and powerful. Sorting of employees on occupations is very important. This sorting is to a large extent determined by education and experience, but also by marital status and children. Once sorting has occurred, the role of education and experience is limited, but marital status and children still play some role.

3.4 CONCLUSION AND DISCUSSION

SUMMARY OF PROCESSES FOR MEN AND WOMEN

The role of marriage and children for wages was very different for men and women at the beginning of the period, in 1980–84. But by the end of the period, in 1995–97, the effects of marriage and children on wages were similar for men and women.

For men, over the entire period, the marriage and children premia were to a large extent due to differences in education and experience and to sorting on establishments, occupations, and occupation-establishments. For women, in the earlier part of the period, the penalty to having children increased once control was made for education and experience, and was clearly present at the establishment, occupation, and occupation-establishment levels. But over time, while controlling for education and experience, the penalty to having children disappeared, women with and without children earned about the same wages, overall, and at the establishment, occupation, and occupation-establishment levels. The role of children was thus quite dissimilar between men and women in 1980–84, but was rather similar by 1995–97.

One may here clearly speculate whether the enacted family legislation and public policy for families and children in Norway over the period had one of their intended effects: To lessen the role of marriage and children for the wage processes for men and women and the gaps between them. These speculations we leave to later.

SUMMARY OF IMPLICATIONS FOR GENDER WAGE GAP

As the previous chapters showed, there is little question that family and children matter in different ways for male and female wages. Both have strong and positive effects for men, while mostly small effects for women. As men get married and have children their wages increase, as women do the same, wages decrease or stay the same. The net result is that the wage gap between men and women is larger for those married and with children than those single and without children. At the population level in 1995–97, after controls for education and experience, among married employees with 1, 2, and 3+ children, women earn 18, 20, and 21% less than men. The penalty to having 3+ children has gone down over time, but the penalty to 1 or 2 children is stable from 1980–84 to 1995–97.

Early in the period, there was even a sizeable gap at the occupation and occupation-establishment level among those married and with children, of 14–15% among those with 3+ children. By 1995–97 the penalty at these levels was down to 4–5%.

These sizeable penalties at the population level are to large extent due to differential sorting of women and men on occupation. Women and men, married and with children, work in different occupations and different occupation-establishment units. Once they work in the same occupation and same occupation-establishment unit, the penalties are much lower. In 1995–97, the population-level penalties were some 75% due to sorting on occupation and occupation-establishment.

DISCUSSION

Are the gaps we still observe at the population level due to discrimination from employers or due to changes in effort at work and choice of tasks by men and women who have children, with intensified work effort for men, while reduced for women? This we cannot determine from our data. But we can nevertheless reason and speculate.

As a point of departure, take the small increases in wages that men experienced at the occupation-establishment level for 1, 2, and 3+ children, of 0.6, 1.0, and 1.3 percentage points. It is unlikely that employers treat men with children more favorable just by virtue of them having children. These small positive increments to their wages are most likely due to increased effort at work, where the fathers, with need for higher wages to pay increased expenses due to children—such as child care, larger living spaces, clothes, food, and more—decide also to work harder. For women, at the occupation-establishment level in 1995–97,ⁿ there is as such no or only negligible penalty to having children under 20, for 1, 2, and 3+ children a penalty of –0.1%, a bonus of 0.1%, and a penalty of –0.3%. This cannot be seen as differential treatment of mothers relative to non-mothers.

The implication of these two facts—small wage increases for men of children at the occupation-establishment level and no change for women—is that the entire increase in the gender wage gap from having 1 to 2 to 3+ children is due to the added wages men earn from having children, not due to reduced wages for mothers. And as discussed, it is unlikely that employers discriminate positively men with children. In sum, the gender wage gap induced by children in all likelihood is due to men with children working harder,

thus earning more, while women with children neither are getting a penalty or a bonus for having children.

Results on hours worked, not reported here, support the contention that fathers may put in more work effort than mothers. For each child 0–20 years old, women reduce their contractual weekly hours worked with 1–2 hours, while men on average do not change their contracted hours worked. The result is that among employees with 1, 2, and 3+ children, women’s work contracts stipulate 2.5, 4, and 5.5 hours less per week than men’s. This gap in contractual hours gets exacerbated by the higher number of overtime hours worked by men. Over time this could lead to higher hourly wage increases for men than women, simply because employees who are more around to do the work may also reap the higher wage increases.

The large gender wage gap we thus see in the population as induced from children does not have its source in differential treatment in terms of wages of men and women from employers at the occupation-establishment. It arises almost entirely from sorting on occupations and occupation-establishment units. Indeed, it is sorting on occupations that is most consequential. Sorting on establishment does not matter at all for these gender wage gaps. Whether the differential sorting is due to discrimination in hiring and promotion, due to choice of where to work and which field to work in induced from family and children, or perhaps from a combination of these two factors, we cannot determine entirely from these data. We shall however soon look into wage changes and promotions.

If a conclusion is to be drawn then, there is little to be gained in trying to regulate how employers pay men and women, with and without children, at the occupation-establishment level. To achieve progress, there are two places where gains can be had and where policies thus may have a role. One is in lessening the amount of sorting that occurs on occupation. To the extent this is due to hiring or promotion discrimination, increased vigilance in regulating employers is needed. To the extent it is due to self selection and differential choices made by men and women, either through educational choice or through adaptations to family circumstances or from preferences, an entirely different set

of policies is called for. The other place where policies may lead to gains is by facilitating combining family and career for women, which may increase work effort and reduce the role of potential self selection, thereby also reducing occupational segregation. At the occupation-establishment level this could induce women to work harder so as to reap the same wage bonus as men get from having children. Norwegian women face clear obstacles here in that child care rarely is available later than 4 or 5pm from regular child-care providers. This can be solved by hiring help in the home, but that is often more expensive in terms of both direct monetary outlays of wages and the size of home needed if live-in child-care workers are hired. With the compressed wage distribution in Norway, where even employees in the high-paying professions do not make spectacularly high salaries compared to various service sectors employees, unlike the U.S., this is however a solution available to a small percent of wage earners. Alternatively, and with the same result for the gender wage gap, policies can be aimed at fathers, attempting to make them work less hard so as to remove the bonus they currently receive. Such policies would alleviate the part of the gender wage gap induced by children, partly through equalizing work effort between men and women at the occupation and occupation-establishment levels, partly by reducing sorting on occupations and occupation-establishment units. Increasing the involvement of fathers has been one of the explicit goals of Norwegian family policies (Leira 2002, p. 84, 94).

Both aims can be achieved by a variety of mechanisms. The simplest, however, would be differential taxation of mothers and fathers, with tax break given for earnings of mothers, and tax increases given for earnings of fathers. The effects of such policies could be strengthened, or could alternatively be achieved, by imposing corresponding tax breaks and penalties in the payroll taxes employers pay when employing mothers and fathers. Whether the policies are desirable is another issue. And the aims of the policies, together with their costs, will also have to be weighed against the interest of children and the preferences men and women have with respect to how they want to organize the relationship between family and career.

Table 3.1

Effects of Marital Status and Children Under Age 20 on Logarithm of Hourly Wage in Four Time Periods and for Four Different Levels: Population, Establishment, Occupation, and Occupation-Establishment, Without (Panel A) and With (Panel B) Controls for Education and Experience. For Men.

	1980-1984				1985-1989				1990-1994				1995-1997			
	Pop	Est	Occ	Occ-Est	Pop	Est	Occ	Occ-Est	Pop	Est	Occ	Occ-Est	Pop	Est	Occ	Occ-Est
Without controls																
Married	.130	.123	.051	.041	.140	.134	.045	.039	.133	.125	.037	.031	.135	.116	.032	.027
Divorced	.113	.100	.062	.043	.112	.104	.053	.039	.097	.099	.040	.032	.092	.086	.033	.024
Widowed	.124	.134	.057	.045	.143	.149	.063	.044	.120	.135	.040	.046	.127	.123	.018	.020
Separated	.115	.100	.053	.036	.133	.121	.052	.038	.107	.105	.044	.035	.098	.097	.030	.027
First child	.017	.034	.006	.013	.008	.026	.001	.009	.012	.026	.002	.007	.012	.026	.003	.008
Second child	.080	.098	.024	.033	.058	.076	.015	.023	.051	.060	.012	.017	.062	.060	.013	.015
Third child	.093	.120	.027	.043	.072	.094	.018	.031	.075	.079	.016	.022	.088	.079	.017	.020
With controls																
Married	.062	.053	.027	.020	.070	.058	.027	.019	.075	.059	.025	.015	.073	.059	.022	.016
Divorced	.039	.018	.028	.010	.045	.020	.027	.008	.046	.028	.024	.009	.041	.026	.019	.008
Widowed	.035	.034	.017	.008	.061	.043	.035	.012	.051	.046	.020	.020	.046	.042	.002	.002
Separated	.054	.032	.027	.010	.067	.044	.031	.013	.062	.043	.031	.017	.053	.042	.019	.013
First child	.001	.012	-.001	.006	-.003	.006	-.005	.002	.001	.010	-.002	.002	.003	.010	-.001	.004
Second child	.022	.034	.005	.013	.008	.019	-.002	.006	.008	.019	.000	.006	.019	.023	.003	.007
Third child	.020	.035	.000	.014	.009	.022	-.003	.010	.015	.024	.001	.009	.028	.029	.003	.009
Proportion of effect remaining after controls																
Married	.477	.431	.529	.488	.500	.433	.600	.487	.564	.472	.676	.484	.541	.509	.688	.593
Divorced	.345	.180	.452	.233	.402	.192	.509	.205	.474	.283	.600	.281	.446	.302	.576	.333
Widowed	.282	.254	.298	.178	.427	.289	.556	.273	.425	.341	.500	.435	.362	.341	.111	.100
Separated	.470	.320	.509	.278	.504	.364	.596	.342	.579	.410	.705	.486	.541	.433	.633	.481
First child	.059	.353	-.167	.462	-.375	.231	-5.000	.222	.083	.385	-1.000	.286	.250	.385	-.333	.500
Second child	.275	.347	.208	.394	.138	.250	-.133	.261	.157	.317	.000	.353	.306	.383	.231	.467
Third child	.215	.292	.000	.326	.125	.234	-.167	.323	.200	.304	.063	.409	.318	.367	.176	.450

Note: In Panel A, there are no individual-level control variables beyond those listed in table. In Panel B, there are control variables for experience, as experience and experience-squared, and for 5 educational groups represented by dummy variables. Panel C gives the coefficient in Panel B as a proportion of the coefficient in Panel A; the number .477 in line 1 in column 1 of Panel C obtains as $.062/.130=.477$. The reference group is single and no children under age 20.

The dummy variables for children are for having 1 child under age 20, 2 children under 20, or 3 or more children under 20. In the column denoted "Pop", no further controls are introduced. In the columns denoted "Est", "Occ", and "Occ-Est", we control by dummy variables, as so-called fixed effects, for the establishment the employee worked in, for the occupation worked in, and for the occupation-establishment unit worked in. The estimates are obtained separately for each of 18 years in the period 1980-1997. The table reports the average of the yearly coefficients for four subperiods, 1980-1984, 1985-1989, 1990-1995, and 1995-1997. Each yearly coefficient, with some minor exceptions, is statistically significantly different from zero at a very high significance level, usually with z- or t-statistics in the 40-50 range. The analysis is restricted to employees 20-50 years old.

Table 3.2

The Relative Impact of Being Married and Being Married With One, With Two, and With Three or More Children. Computed From Coefficients in Table 3.1. For Men.

	1980-1984				1985-1989				1990-1994				1995-1997			
	Pop	Est	Occ	Occ-Est	Pop	Est	Occ	Occ-Est	Pop	Est	Occ	Occ-Est	Pop	Est	Occ	Occ-Est
Without controls																
Married and	.139	.131	.052	.042	.150	.143	.046	.040	.142	.133	.038	.031	.145	.123	.033	.027
First child	.158	.170	.059	.055	.160	.174	.047	.049	.156	.163	.040	.039	.158	.153	.036	.036
Second child	.234	.247	.078	.077	.219	.234	.062	.064	.202	.203	.050	.049	.218	.192	.046	.043
Third child	.250	.275	.081	.088	.236	.256	.065	.073	.231	.226	.054	.054	.250	.215	.050	.048
With controls																
Married and	.064	.054	.027	.020	.073	.060	.027	.019	.078	.061	.025	.015	.076	.061	.022	.016
First child	.065	.067	.026	.026	.069	.066	.022	.021	.079	.071	.023	.017	.079	.071	.021	.020
Second child	.088	.091	.033	.034	.081	.080	.025	.025	.087	.081	.025	.021	.096	.085	.025	.023
Third child	.085	.092	.027	.035	.082	.083	.024	.029	.094	.087	.026	.024	.106	.092	.025	.025
Proportion of effect remaining after controls																
Married	.461	.416	.523	.483	.483	.416	.595	.482	.548	.456	.672	.480	.524	.494	.684	.589
First child	.411	.395	.449	.475	.434	.381	.473	.432	.506	.438	.585	.443	.499	.468	.596	.567
Second child	.375	.368	.418	.437	.370	.343	.409	.396	.428	.399	.504	.432	.443	.444	.550	.542
Third child	.342	.334	.337	.395	.348	.325	.374	.406	.407	.382	.484	.446	.425	.427	.504	.526

Note: The numbers are computed from the coefficients in Table 3.1. For example, the numbers in column 1 of Panel A obtain as: $\exp(.130)-1=.139$, $\exp(.130+.017)-1=.158$, $\exp(.130+.080)-1=.234$, $\exp(.130+.093)-1=.250$.

Table 3.3

Effects of Marital Status and Children Under Age 20 on Logarithm of Hourly Wage in Four Time Periods and for Four Different Levels: Population, Establishment, Occupation, and Occupation-Establishment, Without (Panel A) and With (Panel B) Controls for Education and Experience. For Women.

	1980-1984				1985-1989				1990-1994				1995-1997			
	Pop	Est	Occ	Occ-Est	Pop	Est	Occ	Occ-Est	Pop	Est	Occ	Occ-Est	Pop	Est	Occ	Occ-Est
Without controls																
Married	.065	.055	.035	.028	.078	.068	.036	.032	.052	.047	.029	.027	.050	.038	.027	.022
Divorced	.093	.066	.061	.045	.094	.073	.056	.043	.056	.045	.036	.030	.033	.022	.025	.018
Widowed	.089	.078	.057	.037	.096	.087	.051	.052	.053	.053	.046	.039	.045	.020	.050	.035
Separated	.065	.050	.043	.032	.073	.053	.044	.033	.054	.036	.039	.026	.031	.025	.021	.014
First child	-.005	.006	-.002	.004	-.001	.011	.001	.006	-.016	-.007	-.002	.002	-.013	-.009	.003	.002
Second child	-.009	.009	-.004	.006	-.009	.009	-.001	.009	-.003	.003	.006	.006	.002	.002	.010	.009
Third child	-.031	-.008	-.008	.003	-.035	-.011	-.012	.001	-.001	.006	.011	.006	.023	.016	.016	.008
With controls																
Married	.023	.016	.012	.007	.026	.019	.011	.007	.021	.014	.011	.006	.027	.017	.014	.009
Divorced	.025	.005	.017	.004	.026	.007	.017	.001	.021	.006	.008	-.001	.020	.004	.007	-.001
Widowed	.019	.007	.006	-.011	.026	.014	.009	.004	.023	.012	.016	.003	.025	.002	.027	.009
Separated	.012	.002	.011	.001	.024	.005	.015	.002	.028	.008	.018	.002	.021	.011	.008	.001
First child	-.035	-.026	-.023	-.017	-.027	-.019	-.016	-.012	-.025	-.017	-.010	-.005	-.023	-.017	-.004	-.003
Second child	-.076	-.059	-.050	-.041	-.065	-.050	-.036	-.027	-.043	-.031	-.014	-.008	-.040	-.027	-.005	-.001
Third child	-.107	-.090	-.063	-.055	-.103	-.089	-.054	-.046	-.063	-.050	-.016	-.016	-.049	-.036	-.005	-.005
Proportion of effect remaining after controls																
Married	.354	.291	.343	.250	.333	.279	.306	.219	.404	.298	.379	.222	.540	.447	.519	.409
Divorced	.269	.076	.279	.089	.277	.096	.304	.023	.375	.133	.222	-.033	.606	.182	.280	-.056
Widowed	.213	.090	.105	-.297	.271	.161	.176	.077	.434	.226	.348	.077	.556	.100	.540	.257
Separated	.185	.040	.256	.031	.329	.094	.341	.061	.519	.222	.462	.077	.677	.440	.381	.071
First child	7.000	-4.333	11.500	-4.250	27.000	-1.727	-16.000	-2.000	1.563	2.429	5.000	-2.500	1.769	1.889	-1.333	-1.500
Second child	8.444	-6.556	12.500	-6.833	7.222	-5.556	36.000	-3.000	14.333	-10.333	-2.333	-1.333	-20.000	-13.500	-.500	-.111
Third child	3.452	11.250	7.875	-18.333	2.943	8.091	4.500	-46.000	63.000	-8.333	-1.455	-2.667	-2.130	-2.250	-.313	-.625

Note: In Panel A, there are no individual-level control variables beyond those listed in table. In Panel B, there are control variables for experience, as experience and experience-squared, and for 5 educational groups represented by dummy variables. Panel C gives the coefficient in Panel B as a proportion of the coefficient in Panel A; the number .354 in line 1 in column 1 of Panel C obtains as $.023/.065=.354$. The reference group is single and no children under age 20.

The dummy variables for children are for having 1 child under age 20, 2 children under 20, or 3 or more children under 20. In the column denoted "Pop", no further controls are introduced. In the columns denoted "Est", "Occ", and "Occ-Est", we control by dummy variables, as so-called fixed effects, for the establishment the employee worked in, for the occupation worked in, and for the occupation-establishment unit worked in. The estimates are obtained separately for each of 18 years in the period 1980-1997. The table reports the average of the yearly coefficients for four subperiods, 1980-1984, 1985-1989, 1990-1995, and 1995-1997. Each yearly coefficient, with some minor exceptions, is statistically significantly different from zero at a very high significance level, usually with z- or t-statistics in the 40-50 range. The analysis restricted to employees 20-50 years old.

Table 3.4

The Relative Impact of Being Married and Being Married With One, With Two, and With Three or More Children. Computed From Coefficients in Table 3.3. For Women.

	1980-1984				1985-1989				1990-1994				1995-1997			
	Pop	Est	Occ	Occ-Est	Pop	Est	Occ	Occ-Est	Pop	Est	Occ	Occ-Est	Pop	Est	Occ	Occ-Est
Without controls																
Married and	.067	.057	.036	.028	.081	.070	.037	.033	.053	.048	.029	.027	.051	.039	.027	.022
First child	.062	.063	.034	.033	.080	.082	.038	.039	.037	.041	.027	.029	.038	.029	.030	.024
Second child	.058	.066	.031	.035	.071	.080	.036	.042	.050	.051	.036	.034	.053	.041	.038	.031
Third child	.035	.048	.027	.031	.044	.059	.024	.034	.052	.054	.041	.034	.076	.055	.044	.030
With controls																
Married and	.023	.016	.012	.007	.026	.019	.011	.007	.021	.014	.011	.006	.027	.017	.014	.009
First child	-.012	-.010	-.011	-.010	-.001	.000	-.005	-.005	-.004	-.003	.001	.001	.004	.000	.010	.006
Second child	-.052	-.042	-.037	-.033	-.038	-.031	-.025	-.020	-.022	-.017	-.003	-.002	-.013	-.010	.009	.008
Third child	-.081	-.071	-.050	-.047	-.074	-.068	-.042	-.038	-.041	-.035	-.005	-.010	-.022	-.019	.009	.004
Proportion of effect remaining after controls																
Married	.346	.285	.339	.247	.325	.273	.302	.216	.398	.293	.376	.220	.534	.443	.515	.406
First child	-.193	-.158	-.326	-.306	-.012	.000	-.132	-.129	-.109	-.073	.037	.034	.106	.000	.330	.248
Second child	-.896	-.637	-1.184	-.967	-.535	-.381	-.693	-.473	-.433	-.329	-.084	-.060	-.242	-.244	.240	.255
Third child	-2.330	-1.482	-1.817	-1.489	-1.687	-1.153	-1.733	-1.140	-.786	-.650	-.122	-.297	-.287	-.339	.206	.132

Note: The numbers are computed from the coefficients in Table 3.3. For example, the numbers in column 1 of Panel A obtain as: $\exp(.065)-1=.067$, $\exp(.065-.005)-1=.062$, $\exp(.065-.009)-1=.058$, $\exp(.065-0.031)-1=.035$.

Table 3.5: Effects of Marital Status and Children on Logarithm of Wage. Controls for Education and Experience. Men and Women Combined.

	1980-1984				1985-1989				1990-1994				1995-1997			
	Pop	Est	Occ	Occ-Est	Pop	Est	Occ	Occ-Est	Pop	Est	Occ	Occ-Est	Pop	Est	Occ	Occ-Est
Men compared to men																
Married	.070	.063	.029	.023	.079	.070	.028	.022	.088	.075	.027	.019	.088	.073	.024	.018
Divorced	.051	.032	.030	.009	.056	.035	.029	.011	.065	.047	.027	.013	.062	.045	.023	.010
Widowed	.050	.048	.020	.012	.074	.062	.037	.010	.072	.068	.024	.026	.068	.061	.005	.012
Separated	.063	.044	.028	.014	.077	.056	.032	.017	.078	.061	.034	.020	.071	.059	.022	.014
One under 20	.003	.013	-.001	.008	.000	.008	-.004	.002	.003	.012	-.002	.002	.006	.014	-.001	.006
Two under 20	.027	.039	.005	.016	.013	.024	-.002	.006	.010	.022	.000	.007	.019	.026	.003	.010
Three under 20	.027	.043	.001	.017	.014	.029	-.002	.013	.016	.028	.001	.009	.027	.032	.003	.013
Women compared to women																
Married	.008	-.003	.009	.003	.011	-.002	.011	.005	-.001	-.010	.008	.003	.002	-.007	.010	.005
Divorced	-.004	-.031	.012	-.005	.000	-.026	.013	-.004	-.013	-.031	.003	-.010	-.019	-.032	.000	-.010
Widowed	-.025	-.037	-.004	-.020	-.008	-.026	.007	-.001	-.019	-.030	.008	-.004	-.023	-.035	.017	.012
Separated	-.008	-.021	.007	.000	.004	-.018	.013	-.003	.001	-.023	.012	-.003	-.009	-.018	.002	-.005
One under 20	-.043	-.032	-.023	-.014	-.033	-.025	-.016	-.011	-.025	-.019	-.010	-.005	-.021	-.017	-.004	-.001
Two under 20	-.094	-.078	-.050	-.038	-.076	-.063	-.036	-.025	-.039	-.029	-.011	-.007	-.027	-.020	-.001	.001
Three under 20	-.131	-.115	-.067	-.052	-.116	-.104	-.055	-.040	.016	.028	.001	.009	-.031	-.024	-.001	-.003
Women compared to women																
Female	-.089	-.096	-.058	-.050	-.085	-.097	-.049	-.043	-.074	-.090	-.032	-.030	-.067	-.079	-.026	-.025
Married	-.062	-.066	-.020	-.020	-.068	-.072	-.017	-.017	-.090	-.084	-.020	-.017	-.086	-.080	-.015	-.013
Divorced	-.055	-.063	-.018	-.015	-.057	-.060	-.015	-.015	-.078	-.077	-.024	-.022	-.081	-.077	-.023	-.020
Widowed	-.075	-.085	-.024	-.032	-.083	-.089	-.030	-.011	-.091	-.099	-.016	-.030	-.091	-.095	.012	.000
Separated	-.072	-.065	-.022	-.014	-.073	-.074	-.019	-.020	-.077	-.083	-.022	-.023	-.079	-.077	-.020	-.018
One under 20	-.046	-.046	-.022	-.022	-.032	-.033	-.012	-.012	-.028	-.031	-.008	-.007	-.027	-.031	-.003	-.008
Two under 20	-.121	-.118	-.056	-.054	-.088	-.087	-.035	-.032	-.049	-.051	-.010	-.013	-.046	-.046	-.004	-.009
Three under 20	-.158	-.158	-.067	-.069	-.131	-.133	-.052	-.052	.000	.000	.000	.000	-.058	-.056	-.004	-.017
Estimated female wages as a proportion of male wages for 5 groups of men and women																
Single	.911	.904	.942	.950	.915	.903	.951	.957	.926	.910	.968	.970	.933	.921	.974	.975
Married	.849	.838	.922	.930	.847	.831	.934	.940	.836	.826	.948	.953	.847	.841	.959	.962
Married +																
One child	.803	.792	.900	.908	.815	.798	.922	.928	.808	.795	.940	.946	.820	.810	.956	.954
Two children	.728	.720	.866	.876	.759	.744	.899	.908	.787	.775	.938	.940	.801	.795	.955	.953
Three children	.691	.680	.855	.861	.716	.698	.882	.888	.836	.826	.948	.953	.789	.785	.955	.945

Note: In these analyses there are controls for education and experience. The regressions are estimated for men and women combined, with interaction terms between sex and marital status and between sex and children. Panel A give the effects for men. Panel B gives the effects for women, as the male effects plus the interaction effects. Panel C gives the interaction effects. Panel D gives the estimate of the female wages as percent of male wages. Analyses restricted to employees 20-50 years old.

Table 3.6: Effects of Marital Status and Children on Logarithm of Wage. No Controls for Education and Experience. Men and Women Combined

Age restrictions, interacted models, dependent variable is ln of wages, no controls, for men

	1980-1984				1985-1989				1990-1994				1995-1997			
	Pop	Est	Occ	Occ-Est	Pop	Est	Occ	Occ-Est	Pop	Est	Occ	Occ-Est	Pop	Est	Occ	Occ-Est
Men compared to men																
Married	.130	.125	.051	.044	.140	.137	.045	.042	.133	.127	.037	.034	.135	.119	.032	.027
Divorced	.113	.100	.062	.045	.112	.104	.053	.043	.097	.098	.041	.036	.092	.086	.033	.025
Widowed	.124	.131	.057	.041	.143	.152	.063	.044	.120	.137	.041	.051	.127	.125	.019	.031
Separated	.115	.101	.053	.039	.133	.122	.052	.042	.107	.105	.044	.038	.098	.099	.030	.027
One under 20	.017	.033	.006	.017	.008	.025	.001	.009	.012	.026	.002	.007	.012	.026	.003	.010
Two under 20	.080	.098	.024	.043	.058	.076	.015	.026	.051	.061	.012	.018	.062	.061	.013	.019
Three under 20	.093	.119	.027	.052	.072	.095	.018	.037	.075	.081	.016	.025	.088	.081	.017	.025
Women compared to women																
Married	.065	.051	.035	.026	.078	.065	.036	.030	.052	.047	.029	.025	.050	.037	.026	.020
Divorced	.093	.063	.060	.039	.094	.074	.055	.039	.056	.048	.035	.025	.033	.023	.023	.012
Widowed	.089	.082	.057	.035	.096	.092	.052	.048	.053	.058	.043	.036	.045	.030	.046	.039
Separated	.065	.048	.042	.032	.073	.055	.043	.029	.054	.035	.037	.024	.031	.023	.019	.011
One under 20	-.005	.012	-.002	.007	-.001	.013	.001	.006	-.016	-.007	-.002	.001	-.013	-.011	.003	.004
Two under 20	-.009	.017	-.004	.009	-.009	.012	-.002	.009	-.003	.002	.006	.007	.002	.000	.011	.009
Three under 20	-.031	.000	-.010	.006	-.035	-.011	-.013	.005	.075	.081	.016	.025	.023	.014	.016	.010
Women compared to men																
Female	-.214	-.198	-.081	-.065	-.205	-.198	-.071	-.059	-.170	-.165	-.048	-.042	-.142	-.132	-.035	-.032
Married	-.065	-.074	-.016	-.018	-.063	-.072	-.009	-.012	-.081	-.080	-.008	-.010	-.085	-.082	-.006	-.008
Divorced	-.020	-.037	-.002	-.006	-.018	-.030	.002	-.004	-.040	-.050	-.006	-.010	-.059	-.063	-.010	-.012
Widowed	-.035	-.049	.000	-.006	-.048	-.060	-.011	.004	-.067	-.079	.002	-.014	-.083	-.095	.028	.008
Separated	-.049	-.053	-.011	-.007	-.060	-.067	-.009	-.014	-.052	-.070	-.008	-.015	-.067	-.076	-.011	-.016
One under 20	-.023	-.021	-.007	-.010	-.009	-.011	-.001	-.003	-.028	-.033	-.004	-.006	-.025	-.037	.000	-.006
Two under 20	-.088	-.081	-.028	-.034	-.067	-.064	-.016	-.017	-.055	-.058	-.006	-.011	-.060	-.061	-.002	-.010
Three under 20	-.125	-.120	-.037	-.046	-.106	-.106	-.031	-.032	.000	.000	.000	.000	-.065	-.067	-.001	-.016
Estimated female wages as a proportion of male wages for 5 groups of men and women																
Single	.786	.802	.919	.935	.795	.802	.929	.941	.830	.835	.952	.958	.858	.868	.965	.968
Married	.721	.728	.903	.917	.732	.730	.920	.929	.749	.755	.944	.948	.773	.786	.959	.960
Married +																
One child	.698	.707	.896	.907	.723	.719	.919	.926	.721	.722	.940	.942	.748	.749	.959	.954
Two children	.633	.647	.875	.883	.665	.666	.904	.912	.694	.697	.938	.937	.713	.725	.957	.950
Three children	.596	.608	.866	.871	.626	.624	.889	.897	.749	.755	.944	.948	.708	.719	.958	.944

Note: In these analyses there are no controls for education and experience. The table follows same format as Table 3.5. Analyses restricted to employees 20-50 years old.

4 HOW DO THE WAGE DIFFERENCES COME ABOUT?

Wage levels together with hours worked may be the single most important outcome for employees. Wage levels were addressed in chapter 3. The conclusion was that the main mechanism creating sex and family differences was segregation on occupations and establishments. Once the same work is done, and especially when it is done in the same establishment, then there is a limited gap between men and women and by family status.

But this does not necessarily imply that there is no reason for concern. It may just be that its source lies elsewhere. Once men and women do the same work for the same employer, yes, then there is limited grounds for concern. But the problem may rather be that men and women don't always do the same work for the same employer. That is exactly what sex segregation and sorting on occupations and occupation-establishment units result in.

Such sex segregation may occur for a number of reasons. On the employer side, they include sex differentials in hiring, promotions, and firing. This may result from discrimination, from oversight of qualified women, and from other employer choices.

But sex segregation may also arise from the actions of employees, both in education and employment. The role of sex segregation in education was documented in chapter 2, showing strong segregation by educational field, with major underrepresentation of women in some of the central and visible technical fields, but also among economists. Employment adaptations include, especially among women, exits from the labor force, which results in reduced build-up of human capital, shifting to part-time employment, which may lead to lower visibility at work and lower availability for taking on difficult assignments, and change of establishment, occupation, career ladder, and even shifting to less demanding work.

In the next two chapters we will first, in chapter 5, explore the role of family and children for wage growth and promotion, that is, the dynamics of wages and occupational position over time, following the same format as chapter 3. This should establish the

extent to which for example promotion differentials induce sex segregation on occupations. As we have no information on applicant pools for positions in our data, we cannot address the hiring process.

We will next, in chapter 6, investigate the labor force adaptations men and women make. Here the empirical analysis are slightly different from those in chapters 3 and 5, since the central variables are likely to operate in a different manner.

Combined, these two sets of analyses will partially document how the sex segregation on occupation and establishment that caused the large wage gap came about, by differences in promotions, exits from the labor force, shift to part-time, and more. It may be the case that while there are limited problems arising from the setting of wages for the same work, as shown in chapter 3, there may be substantial problems in how men and women get allocated to doing different kinds of work.

The exact mechanisms in operation here have implications for policy. The variations are many, but three clearcut situations emerge with respect to what is the central problem behind occupational sex segregation: (1) Sex segregation in education, (2) promotion differentials that cannot be justified by differentials in experience and work effort, and finally (3) differences in labor force adaptations, such as leaving the labor force or reducing hours.

Suppose the central problem with respect occupational sex segregation arises from educational sex segregation. To the extent one wants to change this, as one has in Norway, it requires interventions in middle- and high school with the hope of influencing the kinds of educational tracks girls and boys follow, technical versus humanities and the social sciences. It may also require incentives in higher education for women to major in specific fields, and subsequently perhaps incentives to keep them pursuing careers in those fields. It could even call for affirmative action and outright quotas in admissions to some educations, as Norway has experimented with in the computer sciences field (Teigen 2003).

Suppose the central problem arises from promotion differentials that cannot be justi-

fied. Then one needs to look for a mechanism to lessen such differences. These mechanisms are however different from those one would find for setting of wages. In Norway and Scandinavia unions and collective bargaining play a major role in the wage setting process, and can be decisive for improving the relative wages of different groups. The same bodies have less say in promotions and hiring decisions. They need not be entirely absent, but unions and their representatives operate with less power when someone is being hired and promoted, and probably rightly so. One is forced to look elsewhere for mechanisms to achieve equality. Plausible alternatives can be found in gender equality ombudspersons and affirmative action boards that would monitor and even interfere when there is suspicion of wrongdoing.

But suppose instead that the main problem arises from differential exits from employment and higher part-time employment among women and sometimes even refusal to take on work with more responsibility, authority, and so on. Then policy remedies are rather different, pushing one in the direction of family policies aimed at easing the combination of family and work, perhaps by changes in tax codes for families, mothers, fathers, and employers.

The potential policies here are thus varied, some residing with the bodies that make decisions in primary schooling, others with those that regulate universities, others again that are concerned with workplace regulations, including the legal system, and finally several in the area of family and social and even fiscal policies as when the tax system needs to be modified. The policies also impact very different phases of the life-cycle, starting with ages 12–18 for primary schooling, continuing with the ages 20–25 typical for higher education, then for all ages about 18–70 as far as regulation of the workplace is concerned, and finally for the age groups in which men and women typically rear children.

No single set of solutions is available for these problems. And no policy is likely to have discernable short-term effects, perhaps with the exception for regulating the workplace, requiring instead 10–25 years to see the eventual impact of any change. For example, if a policy succeeds in changing the sex composition among engineering graduates, it will

still take 15–25 years before these graduates are ready to take on significant positions of leadership in industry, and only then should one expect to see more women in upper management in those industries, hoping they in the meantime don't exit the labor force or change to part-time employment, both of which would make them less appointable to top positions.

And by the time policy makers and researchers are ready to attempt assessing the impact of policy changes, a number of other, unrelated, and often entirely unexpected changes may have occurred, such as a decline in the demand for some educations, increases in the demand for other educations, changes in family patterns, fertility behavior, and more, sometimes making the original policies obsolete or inadequate. It is a reasonable assumption that people will react to incentives offered. But there is no guarantee that the incentives offered today will match the constraints and needs 20 years from now. All of this makes planning, policy, and regulations with long-term implications difficult and with results that inherently may be uncontrollable. The workplace clearly faces issues in the equal employment arena that are permanent and stable, such as fairness in hiring and promotion, and in such arenas, policies which proactively attempt to influence outcomes and practices both in the short and long term may meet with considerable success. But outside the workplace, policies may as often be reactive by responding to changes in society rather than proactive in trying to induce changes, as Leira (2002, p. 65, 136) has stressed in the area of family policy, and regardless of reactive or proactive, their eventual impacts will be difficult to predict.

5 ROLE OF FAMILY AND CHILDREN FOR THE GENDER GAP IN WAGE CHANGES AND PROMOTIONS

We now address how marital status and children impact wage growth and promotions and differences between men and women in these.

There is to the best of our knowledge no similar analysis done of how wage changes and promotions depend on family status and children. Reaching an understanding of these processes can be important, and is probably more important for policy questions than understanding the role of family and children for the wage gap. In modern economies differences induced by career development over the life cycle are often decisive for resultant inequality. Men and women may start out equally in attainment upon completion of education, but may through changes of firms, occupations, and especially promotions end up in entirely different places. So one needs to ask new questions. Are there differences in career attainment by sex and marital status and children? Is there evidence of differential treatment from employers here, or can inequalities best be understood as resulting from unequal choices and adaptations?

5.1 OVERALL WAGE CHANGE AND PROMOTION RATES FOR MEN AND WOMEN

Before proceeding to the multivariate analyses, it is useful to give a baseline with respect to wage changes and promotion patterns. Table 5.1 provides the relevant statistics for and by various categories of movement, between versus within same establishment, between versus within same ladder, and for the latter, whether rank is lower, same, or higher.

(Table 5.1 about here)

For men, on average 19.6% of the employees leave the sector between adjacent years. Among those who remain in the sector, 7% change establishment while 93% remain in the same establishment. Of the employees who stay in the sector, an entire 80.8% make no movement at all: they remain in the same ladder, same rank, and same establishment. Some 2.2% and 0.4% of employees are demoted in rank within respectively same and

different establishment, while 5.3% are promoted within same establishment and 0.9% are promoted between establishments. The average wage increase is 7.3%, with highest increases for these three groups: (1) 15.2% for those who change establishment, stay within same ladder, and are promoted in rank; (2) 12.7% for those who are promoted within same establishment; and (3) 11.2% for those who change establishment and ladder. Even those who experience a demotion in rank, either within or between establishments, on average increase their wages between adjacent years, of 5.1 and 6.4%, but experience about 1.5% lower increases than those who do not change rank.

The percent wage increases are similar for men and women, regardless of the particular pattern of employment changes, that is, within versus between establishments, occupations, etc. The overall promotion rates in occupational rank are also rather similar.

5.2 IMPACT ON GENDER GAP IN WAGE CHANGE

Gender Gap in Wage Change With Control Variables

Table 5.2 reports the coefficients for marital status and children for men in Panel A, for women in Panel B, and the differences in coefficients in Panel C, for the four different periods and for four different levels, with controlling for education and experience. We do not report the analysis without controls for education and experience. Men and women are combined in the analysis. We include interaction terms between sex and the other variables, marital status and children. We restrict the analyses here to units that are sex integrated at the relevant levels, at the establishment, occupation, and occupation-establishment levels. The actual set of employees analyzed may in some cases therefore differ somewhat from that used in the analysis of men alone and of women alone, because in these no restriction was imposed that units had to be sex integrated at the various levels.

(Table 5.2 about here)

For men, there are no effects of marital status and no effects of children on wage growth in any of the years at any of the four levels: The effects are small mostly at 0.1–0.2%, some positive and some negative, with the exception of widowed and separated men in 1995–97 where there is a penalty of 0.5–1.0%. This is a small group, so the penalties affect very few.

For women, there are small positive effects of marital status of about 0.5% in all years and at all levels. There are positive effects of 2 and 3+ children of about 1.0–1.5% in 1980–89 at each of the four levels but then practically no effects in 1990–97.

Compared to men, there is however a clear negative effect on wage growth of being female. This holds in all years at all levels and is of the order of 0.4–0.9%. For example, in 1995–97 single women experience wage growth that is 0.7–0.9% lower than men. This will over a 10-year period add up to a substantial differential. Once occupation or occupation-establishment is taken into account, then in 1995–97 among married employees with 2 children women experience a wage change that is 0.4 and 0.5% less than men, with similar differences for those with 1 or 3+ children.

Gender Gap in Wage Change Among Employees Who Stayed in Same Establishment

The previous analyses looked at wage changes among all employees present in at least two adjacent years, including employees who stayed in same and those who changed establishment. For identifying differential treatment by employers, the most relevant set of analyses is for the subset of employees who stayed in the same establishment in two adjacent years. The results, both without and with controls for education and experience, are similar to those obtained for all employees in Tables 5.2 and 5.3. The evidence then is that women receive lower wage increases even when they start out in same occupational group and stay in same establishment as men.

5.3 IMPACT ON THE GENDER PROMOTION GAP

Gender Promotion Gap Without Control Variables

Table 5.3 reports the coefficients for marital status and children first for men in Panel A, for women in Panel B, and the differences in coefficients in Panel C, for the four different periods and for four different levels, with controls for education and experience.

(Table 5.3 about here)

For men, there are positive effects of being married and divorced at almost all levels in all years. There are small negative effects of children early in the period, but effects that are almost absent at the occupation and occupation-establishment levels. By 1990–95 and 1995–97 there are positive effects of 0.5–1.0% of children at the occupation and occupation-establishment levels.

For women, there are positive effects of marital status in all years and all levels, opposite of what was the case in absence of control for education and experience. There are also mostly positive effects of having children at the population level, but then mostly negative effects at the occupation and occupation-establishment levels in 1990–97.

Comparing women to men, there are still, after control for education and experience, strong negative effects of being female. As late as 1995–97, single women are promoted at a lower rate than single men, with 2–3 percentage points, at the occupation-establishment level with 3.1 percentage points, almost half the male promotion rate. These differentials become higher with children. Among married employees with 1, 2, or 3+ children the promotion rate at the occupation-establishment level is for women 4.1, 5.2, and 4.4 percentage points lower than for men.

Gender Promotion Gap Among Employees Who Stayed in Same Establishment

As with the wage change analyses, for identifying differential treatment by employers, the most relevant set of analyses is for the subset of employees who stayed in the same establishment in two adjacent years. The results are almost identical to those we got when analyzing both establishment stayers and changers. We can conclude then that the differences between men and women found at the occupation-establishment level are due

to differential outcomes among employees who remained in the same establishment.

5.4 CONCLUSION AND DISCUSSION

Summary

For the gender gap in wage changes we have two simple conclusions.

1. Controlling for education and experience, among single and childless employees, women receive wage increases that are 0.5–0.9% lower than men. This is the case in all years and at all levels.
2. Women with children received higher wage increases of about 0.5% than men at all levels in 1980–89, but by 1995–97 presence of children made little difference for the percentage wage increases received. Being female still made a difference, with women receiving lower wage increases than men, but with no additional negative impact of having children.

For the gender gap in promotions we also have two simple conclusions.

1. Controlling for education and experience, among single and childless employees, women are promoted at a lower rate than men in all years and at all levels, with as much as 3.4–6.0 percentage points in 1980–84 but down to about 2–3 percentage points in 1995–97, at the occupation-establishment level lower with 3.1 percentage points. This is quite substantial when the overall promotion rates hover around 7%.
2. Among married and divorced employees, women with 2 or 3+ children had higher promotion rates of about 1.0–1.5 percentage points in 1980–89 at the population level, but had lower promotion rates at the occupation and occupation-establishment levels. By 1995–97, at the occupation and occupation-establishment levels, promotion rates among married employees with 1, 2, or 3+ children were 4.1, 5.2, and 4.4 percentage points lower for women than men. In the later period, at the occupation and occupation-establishment levels, children thus induce promotion differentials.

Discussion

Despite the plethora of numbers, we have a consistent story to conclude the analyses. Women receive lower wage increases than men with about 0.4-0.9% at all levels and all years. Children matter little for the size of wage increases. Women are promoted at a substantially lower rate than men even at the occupation-establishment level. In the early period, having children helped the promotion rate for women, in the last period it was detrimental.

We can contrast these results to the wage gap analyses. A main conclusion there was that at the occupation and especially occupation-establishment levels there are rather small differences between men and women, with and without children, and the differences observed were unlikely to be caused by differential treatment. For promotions, in contrast, the differences are substantial.

Combining these analyses—for wage gaps and promotions—we can make additional sense of the relatively large wage gaps observed at the population level, the level without controls for occupation and occupation-establishment. These gaps come about, as already concluded, not by differential treatment in pay in the same occupation and occupation-establishment, but through differential sorting of men and women on occupations and establishments. And then, as the present analyses have shown, part of that differential sorting occurs through differences in promotion rates where men to a higher degree than women get access to high paying occupations.

Are the gender gaps in wage increases and promotions we then observe due to differential treatment from employers? One need be careful in drawing conclusions here. But we are cautiously led to conclude that there may be evidence of significant differential treatment of men and women in promotions at the occupation-establishment level and moreover that this differential treatment becomes even stronger when the employees have children.

One may ask: Why is there on the one hand so little evidence of differential treatment

of men and women with respect to wages in the same broadly defined occupational group within same establishment and on the other hand such substantial differences in promotion rates between the occupational groups? How can it be that employers possibly engage in no or minimal differential treatment in one realm and substantial differential treatment in another?

One plausible answer to this question points to variations in the opportunity structure for discrimination in these two areas (Petersen and Saporta 2004). Setting of wages for the same work for the same employer is probably the node in the employment relationship that is most transparent to employees and that may be the most routinized and most scrutinized by various parties. Decisions about promotions, in contrast, involve subjective decisions to a larger degree, involve fewer employees, and are more difficult to investigate for those passed over for promotion or for outside parties. This difference potentially provides better opportunities for differential treatment in promotion than in setting wages for same work for same employer.

There is however clearly at least one alternative and strongly plausible interpretation of the finding with respect to the negative impact of children on promotion for women relative to men. Women with children may invest less time and effort at work and find it harder than men with children to combine career and family. Such a contention is in part born out by separate analyses of hours worked (tables not reported here). Among employees with no children 0–20 years old, women on average have a work contract stipulating that they work one hour less per week than men, which over a year amounts to an employment difference of about 1.5 weeks, hardly grounds for the substantial sex differential in promotions observed even among single employees. But for each child 0–20 years old, women reduce their contractual weekly hours worked with 1–2 hours, so that among employees with 1, 2, and 3+ children, women work 2.5, 4, and 5.5 hours less per week than men. With a work year of 46 weeks, this amounts to a differential in work time between men and women with 1, 2, and 3+ children of respectively 3 weeks, 1.2 months, and 1.6 months. It is easy to imagine, and perhaps difficult not to imagine, that this

could result in higher promotion rates for men. To the extent that employers can extract more contractual work hours out of men, it need not be unfair that men also to a higher extent are promoted to higher positions, simply because such positions typically require more presence at work. In addition comes the here unmeasured differences in over-time work in Norway. Men, on average work, more over-time hours than women, and men with children work even more such hours than men without. This increases the sex differential in hours worked substantially. And these differences in hours worked may here in fact account for a substantial portion of the promotion differential between men and women.

We cannot settle these conundrums. The differences between men and women in wage increases and especially promotions are unquestionably there. What exactly produced these differences has yet to be decided and is not decidable without bringing additional evidence on the table.

Table 5.1: Changes in Wages by Type of Transition Defined by Changes in Firm, Career Ladder, and Occupational Rank. Distribution on Types of Transitions in Line 1. For All and by Sex.

	Same Establishment				Different Establishment				Out of	Total
	1	2	3	4	5	6	7	8	Sample	
Career Ladder	Same	Same	Same	Different	Same	Same	Same	Different	N/A	10
Occupational Rank	Lower	Same	Higher	N/A	Lower	Same	Higher	N/A	N/A	
Panel A: All										
1 %	1.77	62.63	4.87	2.67	.30	4.86	.81	.58	21.51	1348825
2 % among stayers	2.25	79.79	6.21	3.40	.39	6.19	1.03	.74	-	1058660
3 Change in wage	105.50	107.13	113.07	109.55	106.46	108.52	115.64	112.00	-	107.75
4 Wagechange negative	88.47	91.61	92.09	90.80	90.46	92.75	93.61	90.71	-	91.43
5 Wagechange zero	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	-	100.00
6 Wagechange positive	107.24	107.78	113.49	110.74	109.93	109.45	116.29	114.67	-	108.48
7 % Negative change	6.36	1.67	.89	3.62	15.93	3.44	2.12	9.41	-	2.02
8 % Zero change	7.52	4.79	1.68	4.35	3.72	3.85	1.02	2.86	-	4.53
9 % Positive change	86.12	93.54	97.42	92.03	80.35	92.71	96.86	87.74	-	93.45
Panel B: Male										
1 %	1.75	63.19	5.06	3.07	.33	5.12	.88	.69	19.91	960953
2 % among stayers	2.19	78.91	6.31	3.83	.41	6.39	1.09	.87	-	769581
3 Change in wage	105.57	107.20	113.15	109.56	106.87	108.53	115.83	112.12	-	107.85
4 Wagechange negative	89.49	92.06	92.28	90.70	91.11	92.88	93.44	90.67	-	91.82
5 Wagechange zero	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	-	100.00
6 Wagechange positive	107.06	107.81	113.57	110.76	110.30	109.48	116.52	114.86	-	108.56
7 % Negative change	5.41	1.46	.83	3.53	15.85	3.38	2.24	9.47	-	1.84
8 % Zero change	7.71	4.95	1.78	4.55	3.72	4.09	1.06	3.03	-	4.68
9 % Positive change	86.88	93.59	97.40	91.92	80.43	92.54	96.70	87.51	-	93.48
Panel C: Female										
1 %	1.80	61.22	4.41	1.68	.25	4.21	.65	.30	25.47	387872
2 % among stayers	2.41	82.14	5.92	2.26	.34	5.65	.87	.40	-	289079
3 Change in wage	105.35	106.97	112.83	109.51	105.13	108.46	115.03	111.28	-	107.50
4 Wagechange negative	86.93	90.86	91.68	91.18	88.38	92.40	94.37	90.92	-	90.66
5 Wagechange zero	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	-	100.00
6 Wagechange positive	107.70	107.68	113.25	110.66	108.74	109.37	115.53	113.59	-	108.28
7 % Negative change	8.67	2.22	1.08	4.07	16.17	3.64	1.71	9.07	-	2.50
8 % Zero change	7.04	4.38	1.43	3.41	3.71	3.14	.91	1.88	-	4.14
9 % Positive change	84.29	93.39	97.49	92.52	80.12	93.23	97.38	89.05	-	93.36

Note: For employees who change career ladder between two adjacent years, we cannot determine whether they shifted to a lower, same or higher occupational rank. Changes in ranks can be defined within but not between the 5 career ladders. Therefore, the entry N/A for change in rank among those who changed ladder.

Table 5.2: Effects of Marital Status and Children on Changes in Logarithm of Wage Between Two Adjacent Years. With Controls for Education and Experience. Men and Women Combined.

	1980-1984				1985-1989				1990-1994				1995-1997			
	Pop	Est	Occ	Occ-Est	Pop	Est	Occ	Occ-Est	Pop	Est	Occ	Occ-Est	Pop	Est	Occ	Occ-Est
Men compared to men																
Married	.001	.002	.000	.001	.001	.001	.002	.002	.001	.001	.001	.001	-.001	-.001	-.001	.000
Divorced	-.002	-.002	-.002	-.002	-.001	-.001	-.001	-.001	-.001	-.001	.000	.000	-.001	-.001	-.001	-.001
Widowed	.000	.001	-.002	-.001	.001	.001	.000	.001	-.001	-.003	-.001	-.002	-.008	-.008	-.007	-.014
Separated	-.002	-.002	-.003	-.004	-.002	-.002	.000	-.001	-.003	-.003	-.003	-.003	-.004	-.005	-.001	-.002
One under 20	-.002	-.001	-.001	.000	.000	.000	.000	-.001	.000	.000	.000	.000	.000	.000	-.001	.000
Two under 20	-.002	-.001	-.001	-.002	.000	-.001	.000	-.002	.000	.000	.000	.000	.001	.001	.001	.001
Three under 20	-.003	-.002	-.002	-.002	.000	-.001	.000	-.002	.000	.000	.000	-.001	.000	-.001	.000	.000
Women compared to women																
Married	.002	.001	.001	.000	.002	.003	.002	.002	.003	.003	.003	.002	.003	.002	.003	.002
Divorced	.004	.003	.004	.003	.004	.005	.004	.004	.004	.003	.004	.003	.005	.004	.005	.004
Widowed	.007	.006	.006	.005	.006	.007	.006	.007	.008	.007	.006	.005	.004	.005	.004	.005
Separated	.004	.002	.004	.000	.003	.003	.003	.001	.004	.003	.003	.002	.005	.005	.004	.001
One under 20	.002	.003	.002	.003	.002	.002	.002	.003	.000	-.001	.000	.000	-.002	-.002	-.002	-.002
Two under 20	.012	.013	.013	.013	.009	.009	.009	.009	.003	.003	.003	.002	.002	.002	.002	.002
Three under 20	.012	.013	.013	.015	.013	.012	.012	.011	.000	.000	.000	-.001	.001	.002	.001	.000
Women compared to men																
Female	-.006	-.005	-.007	-.007	-.005	-.007	-.008	-.008	-.004	-.004	-.005	-.005	-.007	-.008	-.009	-.009
Married	.001	-.001	.001	-.001	.001	.001	.000	-.001	.002	.002	.002	.001	.004	.003	.003	.003
Divorced	.006	.004	.006	.005	.005	.006	.005	.005	.004	.005	.004	.003	.006	.006	.006	.005
Widowed	.007	.004	.008	.007	.006	.006	.006	.006	.008	.010	.007	.007	.012	.013	.011	.018
Separated	.006	.005	.007	.004	.005	.005	.003	.003	.007	.007	.006	.005	.009	.009	.005	.003
One under 20	.004	.005	.003	.004	.002	.002	.002	.003	.000	-.001	.000	-.001	-.002	-.002	-.001	-.002
Two under 20	.014	.014	.013	.015	.010	.010	.010	.011	.004	.003	.004	.002	.001	.001	.002	.001
Three under 20	.014	.015	.015	.017	.013	.013	.012	.013	.000	.000	.000	.000	.001	.002	.001	.000

Note: In these analyses there are controls for education and experience. The regressions are estimated for men and women combined, with interaction terms between sex and marital status and between sex and children. Panel A give the effects for men. Panel B gives the effects for women, as the male effects plus the interaction effects. Panel C gives the interaction effects. Analyses restricted to employees 20-50 years old.

Table 5.3: Effects of Marital Status and Children on Promotion in Occupational Rank Between Two Adjacent Years. With Controls for Education and Experience. For Employees Who Stayed in Same Career Ladder Between Two Adjacent Years. Men and Women Combined.

	1980-1984				1985-1989				1990-1994				1995-1997			
	Pop	Est	Occ	Occ-Est	Pop	Est	Occ	Occ-Est	Pop	Est	Occ	Occ-Est	Pop	Est	Occ	Occ-Est
Men compared to men																
Married	.012	.011	.023	.031	.014	.011	.021	.024	.004	.003	.014	.017	.000	-.003	.012	.011
Divorced	.008	.004	.016	.022	.008	.003	.013	.006	.000	-.001	.007	.009	.004	.001	.014	.012
Widowed	.012	.021	.026	.043	-.003	-.004	.006	.025	-.001	-.010	.008	.000	.013	.007	.025	-.001
Separated	.008	.005	.017	.011	.014	.009	.021	.018	-.005	-.006	.002	.007	-.001	-.003	.011	.003
One under 20	-.005	-.003	-.001	.000	-.003	-.002	-.002	-.001	.004	.004	.005	.007	-.003	.000	-.001	.004
Two under 20	-.007	-.006	.001	-.002	-.003	-.002	.000	.000	.000	-.001	.003	.005	.002	.004	.006	.012
Three under 20	-.009	-.007	.002	.002	-.004	-.004	.000	.002	.004	.001	.008	.008	-.001	-.003	.004	.007
Women compared to women																
Married	.017	.015	.018	.012	.021	.018	.025	.017	.016	.014	.015	.008	.015	.012	.012	.012
Divorced	.027	.023	.022	.014	.027	.023	.027	.013	.016	.014	.015	.004	.022	.022	.019	.014
Widowed	.043	.039	.036	.009	.022	.023	.021	.011	.019	.013	.018	.011	.003	.004	-.001	-.015
Separated	.032	.024	.032	.008	.025	.022	.027	.015	.019	.018	.018	.003	.015	.016	.014	.017
One under 20	.018	.015	.012	.008	.003	.004	.000	-.004	-.002	-.003	-.007	-.007	-.005	-.004	-.009	-.007
Two under 20	.030	.030	.018	.006	.014	.015	.005	-.003	.004	.004	-.002	-.003	.003	.001	-.004	-.009
Three under 20	.034	.029	.015	-.011	.012	.009	-.005	-.022	.004	.001	.008	.008	.000	.002	-.007	-.008
Women compared to men																
Female	-.035	-.035	-.060	-.060	-.014	-.019	-.039	-.041	-.018	-.017	-.026	-.023	-.026	-.023	-.032	-.031
Married	.005	.003	-.006	-.018	.007	.007	.003	-.007	.012	.011	.001	-.009	.015	.015	.000	.001
Divorced	.019	.019	.006	-.008	.018	.020	.014	.008	.016	.016	.007	-.005	.018	.020	.005	.002
Widowed	.031	.017	.010	-.034	.025	.027	.016	-.014	.020	.023	.010	.011	-.010	-.002	-.026	-.014
Separated	.024	.020	.015	-.004	.011	.013	.007	-.003	.024	.024	.015	-.004	.016	.019	.003	.013
One under 20	.023	.018	.013	.008	.006	.006	.002	-.002	-.006	-.007	-.011	-.014	-.002	-.004	-.009	-.011
Two under 20	.038	.036	.018	.008	.018	.017	.006	-.003	.005	.004	-.005	-.007	.001	-.002	-.011	-.022
Three under 20	.044	.036	.013	-.013	.016	.012	-.005	-.024	.000	.000	.000	.000	.001	.005	-.011	-.014

Note: In these analyses there are controls for education and experience. The regressions are estimated for men and women combined, with interaction terms between sex and marital status and between sex and children. Panel A give the effects for men. Panel B gives the effects for women, as the male effects plus the interaction effects. Panel C gives the interaction effects. For Employees Who Stayed in Same Career Ladder Between Two Adjacent Years. Analyses restricted to employees 20-50 years old.

6 ADAPTATIONS TO FAMILY AND CHILDREN: MEN AND WOMEN

We have documented the role of family and children for wage levels, wage changes, and promotions. These are central rewards, and each depends in some measure on family behavior, and especially through how employees are differentially sorted on occupations and occupation-establishment units by family status and children. For answering the central concerns in the current research—the role of employers in creating differences between men and women and the impact of family on these differences—those analyses provide the answers. But from the viewpoint of the individual, and also from employers, perhaps as important are other adaptive behaviors potentially induced from family situations. It is to these that we now turn.

The two most central adaptive behaviors from changed family situations are changing to part-time work and even more decisively dropping out of the labor force. These adaptations are especially made by women. They result from a variety of preferences, goals, and constraints, such as desires to be with children when they are young, to be a home-maker, perhaps a realization that simultaneously managing children and careers results in time constraints that are difficult to fulfill, or dissatisfaction with work and careers. Hakim (2000) has argued that there is a distribution of preferences across women and that a variety of adaptations are to be expected in modern economies, even when constraints faced are the same, simply as a result of variations in preferences, which may lead to equal opportunity unequally taken. In the Norwegian contexts, the choice of part-time employment is especially attractive. It is widely available and there is no loss in benefits, such as health care benefits. Norwegian and Swedish women currently have the highest part-time participation rates in the world (e.g., Blau and Kahn 1996). Exiting the labor force may also be attractive. One has the right to return to one's job after maternity or paternity leave of close to 12 months.

A number of other types of adaptations are also feasible. Employees may, for example, change establishment, career ladder, occupation, and even change to a less demanding

occupation or decline a promotion. While less dramatic than leaving the labor force, these behaviors may also be the result of accommodations to changed family situations.

These other types of changes are likely to be more dramatic than changes in wage levels and promotions in occupational rank. And the processes and circumstances prompting changes might also be very different.

As for how to approach studying these adaptations, the analytic challenges were also different. While the previous analyses involved some amount of trial and error in settling on a final formulation, especially in how the variables for children were defined, they nevertheless predominantly followed a format where model specification was defined in advance of looking at the data.

For the types of changes analyzed in this chapter, our approach was rather different. We assumed that the processes likely were different from those determining wage levels, wage changes, and promotions, and especially that the role of children could be different when studying exits and transitions to part-time work. For example, in terms of exiting the labor force between two years, whether an employee has children and especially young children in the base year will clearly be important. But perhaps equally important will be whether they expect children in the following year. Having a child younger than 1 year in the current year, or expecting a child in next year, are likely to impact whether one leaves the labor force or not. But such variables should have no or very limited impact on the level of one's wages, given the occupation and workplace. These differences in processes forces the researcher to structure the independent variables in the analysis differently when looking at exits rather than wage levels.

We approached the issues by first accounting for the marriage and children variables from entirely a priori considerations. From that baseline we experimented with various models to detect main patterns in the data, especially whether the role of family and children changes over time and in how the children variables should best be coded. Given the large number of observations each year, it is entirely feasible to extract in an exploratory manner the relevant patterns in the data. Through strategic trial and error, we

converged on the models reported below.

6.1 EXITING

Before discussing results for exit rates we need to point out a change in who is included in the data in the period 1980–1990 and 1991–1997. In the earlier period the data pertain almost exclusively to full-time employees. In the later period the data contain information on both full- and part-time employees. Women who switched from full- to part-time between 1989 and 1990, and who were still employed in the sector, are in our data recorded as no longer being employed in the sector, since data were collected almost exclusively on full timers in 1980–1990. But women who switched from full- to part-time employment between 1990 and 1991, and were still employed in the sector in 1991, are recorded in our data as being employed in the sector. Some percentage of the women who we record as exiting the data in 1980–1990 thus in fact changed to part-time between two adjacent years. In the exit analysis from 1990 to 1991 and between later years the women who transitioned to part time are still in the data, and are recorded as not exiting the sector. For that reason there is a sharp decline in exit rates for women with newborn children between 1989–1990 and 1990–1991.

Table 6.1 gives three sets of analyses: impact on the exit rate for only men, for only women, and the difference in impacts of variables on exit rates for men and women. Within each sex, column 1 gives the exit rate for single employees, followed in columns 2–5 by the exit differentials due to being married, of expecting (i.e., having) a child next year, of having a child younger than 1 year, and of having 1 or more children between the ages 1–20. The regressions control for experience and education. They are estimated in a single regression including the relevant interaction terms. These are population-level estimates, not controlling for establishment, occupation, or occupation-establishment. The latter will be discussed below. Panel A contains no controls for education and experience, while Panel B does so. The results without control variables are also of interest. They describe the patterns of differences between men and women prior to adjusting for other variables.

(Table 6.1 about here)

Starting with men, focusing on Panel A, without controls for experience and education, we see that married men exit the sector at a rate that is 2–4 percentage points lower than single men, while those expecting a child next year or who have children less than 1 year old this year, leave at a rate about 1–2 percentage points higher than others. Having 1 or more children in the age group 1–20 does not influence the exit rate. Once controls are made for education and experience, in Panel B, the marital effect drops sharply, to about 0 to –1.0%, and so do the effects of expecting a child and having children 1 year or younger, to a negative effect of about 1%.

Turning to women, also starting with Panel A, with no controls for education and experience, we see first that the exit rate for single women with no children dropped from 22.6% in 1980 to 18.6% in 1989 and then stayed stable at about 15–19% in 1990–1996. The impact of being married on the exit rate has gone from about –0.8% to about –4.4%. Married women exit at a lower rate than single women.

The main results are however found with respect to having children. Expecting a child in the next year, resulted in an increase in the exit rate of 31.7 percentage points in 1980, but then the impact dropped sharply over the period, and stabilized at a level of 16–19 percentage points in 1991–1996. There is thus a big impact of expecting a child next year on exit behavior.

Similarly, having a child 1 year or younger resulted in an increase in the exit rate of 37.5 percentage points in 1980, also an impact that dropped sharply over the period, and stabilized at a level of 4–6 percentage points in 1991–1996. This is an enormous change in the impact of having a young child on exit behavior.

It is important to understand what these two results mean. The impact of expecting a child on exits shows that women who are employed in say 1980 and then have a child in 1981, are 31.7 percentage points more likely to exit between 1980 and 1981 than women who do not get a child in 1981. This percentage then declines strongly over time. The

impact of having a child 1 years or younger in 1981 on exits implies that women who had a child in say 1980, were still employed in 1981, were 37.5 percentage points more likely to exit between 1981 and 1982 than women who did not have a child 1 years or younger in 1981.

Comparing the two effects and their decline over time, one can draw the following conclusions. The impact of expecting a child on exits has declined over time, with an impact of 31.7 percentage points in 1980 or with about 1 in 2 ($=.543=.226+.317$) expecting women exiting in 1980, down to an impact of 18.7 percentage points in 1996, or with about 1 in 3 ($=.350=.168+.187$) doing so in 1996. In spite of a major decline, the impact of expecting a child is still substantial in 1996. However, for the women who had a child, say between 1979 and 1980, and decided to stay employed in 1980, the impact on exiting between 1980 and 1981 while the child is still young, is 37.5 percentage points. But by 1991–1997, for those women who have children 1 year or younger, decided to remain employed during the child's first year, the impact on exiting after the child's first year has gone dramatically down. In 1981, 1 of 3 women who stayed employed during the child's first year, exited the year after, while in 1991–1996 only 1 in 20 such women did so. This is a dramatic change.

The implications are as these. Women who expect children continue to exit in large percentages, though the percentage has gone down steadily over the years. With young children, many of them still choose motherhood over careers. However, for the women who choose to combine motherhood and careers while the child is young, this particular choice or bargain has become much easier to strike in the later period of the data, where very few exit if they decide to try combining children and career from the time the child is young.

The last column shows that having 1 or more children in the age group 1–20 years has a small impact on exiting, a positive effect of 2.7% in 1980 and a negative of 1.0%. The effect has gone down, but it was never of big magnitude.

Once controls are made for education and experience, the actual effects change so-

mewhat, though not strongly, but the pattern of coefficients over time remain the same. No further comment is needed.

The last set of results in Table 6.1 gives the differential impact of being female relative to male of the various variables, that is, the interaction effect of female and all the other variables. They obtain as the female minus male coefficients. Since the male effects are mostly rather small, while several of the female effects are large, we see that for each group of employees, the females are more likely to exit than males. The sex differences in exit rates for singles have remained stable or gone down over years. But the differences between married men and women have changed, with married women more like to exit early in the period and less likely by the end. The differential impact by sex of expecting a child, having children less than 1 year, or having children 1–20 years old, have gone down over the years, by as much as the female main effects have gone down.

One particular aspect of the changes over time needs comment. Focus on the effect of having children 1 years or younger among females. The impact on exiting between 1989 and 1990 is 17.9%, while between 1990 and 1991 it is 6.3%. This big drop in exit rates results from a change in who is included in the data in the period 1980–1990 and 1991–1997, as discussed at the beginning of this section.

Establishment, Occupation, and Occupation-Establishment Effects

Once controls are made for establishment, occupation, and occupation-establishment, these effects remain more or less the same.

6.2 TRANSITIONING TO PART-TIME

While many women exit the sector as a result of expecting a child or having young children, there are other but perhaps less dramatic adaptations that can be made to having children. The probably most important such additional adaptation is switching from full-to part-time employment. Given the nature of the data, where part-time employees were only included in a comprehensive manner starting in 1991, we restrict analysis of tran-

sitions to part-time to 1991–1997. We select employees who were full-time employed in the base year and then investigate the impact of the relevant variables on transitioning to part-time employment the next year. Table 6.2 gives the result on such transitions from 1990 to 1991, 1991 to 1992, through 1996 to 1997. These are results for employees who remain employed in the sector in two adjacent years, that is, employees who do not exit the sector. To give a baseline, the percent part-time among men is 4.4, while among women it is 24.1, defined as working less than 35 hours a week.

(Table 6.2 about here)

For men there are hardly any effects on transitioning to part-time employment of the marital and children variables, they are mostly zero, with single men most likely to make such transitions. For women there are however strong effects. Single women are not particularly likely to transition from full- to part-time employment. There is a small positive impact of being married. There are clear effects on switching to part time of expecting a child, increasing the transition rate by 3–7 percentage points. There are even stronger effects of having children younger than 1 year, of 10–12 percentage points. For women who are full-time employed, the transition rate to part-time employment is 10–12 percentage points higher for those with children 1 year or younger than those without. And seen in a 2-year perspective, when full-time women expect children, the transition rate to part time increases with about 5 percentage points. Among the women who had children, remained full-time employed during their first year, the transition to part-time employment within the next year is even higher, increasing with an additional 10 percentage points. So roughly 15 percent of the full-time employed women in the sector who have children transition to part-time employment within 2 years.

The last set of results in Panel C of Table 6.2 give the differential impact of the variables between men and women. Since the male effects are mostly zero, the differential impact is mostly equal to the female impact.

Once controls are made for establishment, occupation, and occupation-establishment,

these effects remain more or less the same.

6.3 OTHER ADAPTATIONS: CHANGE ESTABLISHMENT, CAREER LADDER, OCCUPATION, DEMOTION

There are other adaptations employees can make to changes in family situation. Among them are changing place of work (i.e., establishment), career ladder, occupation, and even transitioning to a lower ranked and probably less demanding occupation.

For these kinds of changes we initially performed the same type of analyses as done for exiting the sector and for transitions to part-time. On the basis of the results it became clear that having children below 1 year and expecting children still mattered for behavior. But there were interestingly for the four dependent variables now in focus no longer the dramatic changes over time in the behavior of women that we found for exiting the sector. Hence we report a simplified analysis from a more compact and parsimonious specification of the model, no longer including the interaction terms between calendar year and the variables of interest. Table 6.3 gives the results for each of the four dependent variables. At the bottom of the table, the proportions experiences the change are given for all and by sex.

(Table 6.3 about here)

With respect to changing establishment, 8.8 of the men and 7.3% of the women do so per year. Single and married women are slightly less likely to do so than single and married men, but only with about 1 percentage point. There are no effects of having 1, 2, or 3 children 1–20 years old. There are however for women clear negative effects of expecting a child and of having children younger than 1 year, of 2.5 and 1.3 percentage points, both effects being highly significant. Perhaps the women who do so seek employment where it is easier to combine family and work? These variables have small effects among men.

With respect to changing career ladder, 4.7 of the men and 2.7% of the women do so per year. Women of all marital statuses are 1.7–2.5 percentage points less likely to do so

than men. There are small to negligible effects of having 1, 2, or 3+ children 1–20 years old, positive of about 0.2% for men, negative of 0.0–0.2% for women. There is for women a negative effect of expecting a child of 0.6% (.001–.007) and no effects of having children 1 year or younger. The sex differences in changing career ladders are not reducible to how children impact behavior.

With respect to changing occupation, 14.7 of the men and 12.2% of the women do so per year. Women of all marital statuses are 1.9–2.7 percentage points less likely to do so than men. There are small to negligible effects of having 1, 2, or 3+ children 1–20 years old: negative of about 0.2% for men, and negative to positive of 0.4, 0.8, and 1.3% for women. There is for women a clear negative effect of 2.9% (.007–.036) for expecting a child and a smaller negative effect of 0.8% for having children 1 year or younger, with rather small positive effects for men of the same variables. In this case, expecting a child accounts for some portion of the overall difference between men and women. It is difficult to know what these differences may reflect. It seems plausible that women may put on hold changing career track when expecting children, while for men this makes little difference.

Finally we address a change to a lower occupational rank, which 2.6% of the men and 2.7% of the women do per year. This can be due to a demotion, initiated by the employer, or it can be due to a requested transfer to a less demanding occupation. Women of all marital statuses are 0.3–0.4 percentage points more likely to do so than men. There are no effects of having 1, 2, or 3+ children 1–20 years old. There is for women clear positive effects of 0.7 and 0.6 percentage points of expecting a child and of having children 1 year or younger, with no effects (i.e., 0.0–0.1%) for men of the same variables, but none of these coefficients reaches traditional significance levels. Expecting a child, for women, thus appears to result in seeking an easier occupational assignment. It could also reflect that a demotion initiated by the employer. The latter seems unlikely, given that it would be illegal to demote, that there is a clear concern in Norway for allowing mothers to combine family and career.

6.4 CONCLUSION AND DISCUSSION

This chapter addressed the role of marriage and children for exiting the sector, for changing to part-time work within the sector, for changing establishment, career ladder, occupation, and changing to a lower-ranked occupation. The analyses were for substantive reasons done in a way somewhat different from those performed for wage levels, wage changes, and promotions.

We have six conclusions regarding the role of marriage and children for adaptations to family circumstances.

1. For men, there is a small negative effect of being married on leaving the sector between two adjacent years, an exit rate that is 2–4 percentage points lower, while an exit rate that is 1–2 percentage points higher from having children 1 years or younger or expecting a child next year.
2. For women there is a small negative effect of marital status on the exit rate in 1980 of 0.8 percentage points which increased to –4.4% in 1997. But for both expecting a child and having children 1 years or younger the effects are major and have also seen major changes over the period. Women expecting children next year had exit rates that were higher with 31.7 and 18.6 percentage points in respectively 1980 and 1997. Women having children 1 years or younger had exit rates that were higher with 37.5 percentage points in 1980 but the impact dropped dramatically to 4–6 percentage points in 1991–1996. When women expect children, they are more likely to exit the sector, both in 1980 and 1996, but less so in 1996. But for the women who decide to remain employed during the child’s first year, the exit rate dropped from a very high level in 1980 to a rather small level in 1991–96. This suggests that combining family and career has become easier over the period.
3. For men, there are small and negligible effects of marital status and children on transitioning from full- to part-time employment.

4. For women there is a small positive effect of being married on switching to part time, but big positive effects of expecting a child, and even stronger positive effects of having children 1 years or younger.
5. For men there are few effects of marital status and children on changing establishment, career ladder, occupation, or changing to a lower-ranked occupations.
6. For women there are clear negative effects of expecting and having children 1 year or younger on changing establishment, and there are clear negative effects of expecting children on changing career ladder. Women of all marital statuses are less likely to change occupation than men, with 1.9 to 2.7 percentage points, and a clear negative effect of expecting children. Finally, there is for women a clear positive effect of expecting a child or having children 1 year or younger on changing to a lower-ranked occupation.

In summary, for women, there was a remarkable historical change over the period with respect to exiting the sector. The impact, in terms of the exit rate differential from expecting a child decreased from about 32 to 18 percentage points. Similarly, the exit differential from having children 1 year or younger dropped from 37.5 to 4–6 percentage points. For the other adaptive behaviors there were differences between men and women resulting from expecting children and having children 1 year or younger, especially with respect to transitioning from full- to part-time employment, but not strong declines over time. Expecting children and having children 1 year or younger are the variables accounting for differences between men and women.

Table 6.1: Impact of Marital Status (Being Married) and Children on Exiting From the Sector Between Adjacent years

Without Control Variables for Education and Experience

	Panel A: Men					Panel B: Women					Panel C: Women Compared to Men				
	Year	Married	Expecting	Newborn	Kid	Year	Married	Expecting	Newborn	Kid	Year	Married	Expecting	Newborn	Kid
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
1980	.192	-.046	.032	.020	-.014	.226	-.008	.317	.375	.027	.034	.038	.285	.354	.040
1981	.196	-.038	.019	.010	-.012	.223	-.019	.261	.315	.020	.027	.020	.242	.305	.033
1982	.157	-.041	.017	.018	.000	.187	-.019	.245	.334	.039	.030	.022	.228	.316	.039
1983	.175	-.043	.011	.022	.002	.194	-.013	.245	.300	.022	.019	.030	.234	.278	.019
1984	.208	-.037	.024	.024	-.018	.217	-.029	.210	.285	.009	.009	.008	.187	.261	.028
1985	.195	-.041	.019	.024	-.005	.225	-.026	.177	.276	.007	.030	.015	.158	.252	.012
1988	.180	-.039	.005	.004	-.007	.201	-.027	.110	.213	.015	.021	.011	.106	.209	.022
1989	.161	-.031	-.009	.009	.000	.186	-.035	.116	.179	.006	.025	-.005	.125	.170	.006
1990	.150	-.024	-.002	.009	.006	.166	-.040	.137	.063	-.010	.016	-.016	.139	.054	-.015
1991	.135	-.023	.011	.005	.000	.148	-.032	.157	.045	-.004	.013	-.009	.146	.039	-.003
1992	.129	-.021	.004	.005	.000	.155	-.039	.192	.058	-.006	.026	-.018	.188	.052	-.005
1993	.139	-.030	.016	.015	.001	.166	-.046	.173	.050	-.012	.027	-.016	.157	.035	-.013
1994	.153	-.033	.013	.015	-.001	.174	-.049	.161	.055	-.006	.020	-.016	.147	.040	-.005
1995	.160	-.036	.002	.020	-.003	.183	-.050	.167	.047	-.021	.023	-.013	.165	.027	-.018
1996	.160	-.038	.010	.015	-.010	.168	-.044	.187	.042	-.010	.008	-.007	.177	.028	.000

With Control Variables for Education and Experience

	Panel A: Men					Panel B: Women					Panel C: Women Compared to Men				
	Year	Married	Expecting	Newborn	Kid	Year	Married	Expecting	Newborn	Kid	Year	Married	Expecting	Newborn	Kid
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
1980	.263	-.016	.010	.009	.000	.274	.019	.289	.359	.049	.011	.035	.279	.350	.050
1981	.265	-.010	-.001	-.003	.002	.270	.007	.236	.298	.044	.005	.017	.238	.300	.042
1982	.227	-.011	-.002	.007	.012	.233	.012	.226	.320	.062	.006	.023	.228	.314	.050
1983	.246	-.015	-.008	.011	.018	.242	.014	.222	.284	.045	-.005	.029	.230	.273	.027
1984	.279	-.008	.002	.016	-.004	.266	.001	.185	.269	.031	-.013	.009	.183	.253	.035
1985	.270	-.014	.002	.013	.010	.277	.000	.159	.260	.030	.007	.014	.157	.247	.020
1988	.258	-.011	-.013	-.009	.007	.256	.001	.087	.199	.038	-.002	.012	.100	.208	.031
1989	.243	-.002	-.027	-.004	.010	.246	-.006	.096	.165	.024	.002	-.004	.123	.169	.014
1990	.236	.004	-.022	-.005	.014	.231	-.011	.114	.048	.004	-.005	-.015	.136	.054	-.010
1991	.224	.005	-.007	-.009	.006	.216	-.002	.135	.026	.006	-.007	-.007	.142	.035	-.001
1992	.218	.006	-.014	-.008	.008	.226	-.009	.168	.038	.001	.008	-.015	.182	.046	-.006
1993	.230	-.004	-.002	.003	.008	.239	-.017	.153	.033	-.008	.009	-.013	.155	.030	-.016
1994	.246	-.006	-.005	.002	.006	.250	-.020	.141	.037	-.004	.004	-.014	.146	.034	-.009
1995	.252	-.010	-.015	.009	.003	.261	-.022	.149	.032	-.018	.009	-.012	.163	.023	-.021
1996	.249	-.012	-.009	.003	-.002	.244	-.017	.168	.028	-.007	-.006	-.005	.176	.025	-.005

Note: Only employees 20-50 years old are included. Within each panel, the effects are of year (col. 1), of being married (col. 2), of expecting a child next year (col. 3), of having a child born the current or previous year (col. 4), and of having one or more children 1-20 years old (col. 5). Panel A are the results for men, Panel B for women, and Panel C gives the difference in coefficients between men and women. Results are estimated jointly for men and women.

Table 6.2: Impact of year, Marital Status (Being Married), and Children on Changing From Working Full- to Working Part-Time Between Two Adjacent Years

Without Control Variables for Education and Experience

	Panel A: Men					Panel B: Women					Panel C: Women Compared to Men				
	Year	Married	Expecting	Newborn	Kid	Year	Married	Expecting	Newborn	Kid	Year	Married	Expecting	Newborn	Kid
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
1990	.006	.001	.000	.005	-.002	.012	.006	.032	.124	.009	.006	.005	.031	.120	.012
1991	.004	.001	.002	.004	.000	.014	.020	.045	.111	.013	.010	.019	.042	.108	.014
1992	.005	-.001	-.001	.002	.000	.010	.011	.060	.080	.021	.004	.012	.061	.078	.020
1993	.003	.001	.002	.004	-.002	.012	.007	.059	.100	.015	.008	.007	.056	.096	.017
1994	.004	.001	-.001	.002	.000	.015	.011	.067	.115	.016	.011	.010	.068	.113	.016
1995	.008	-.002	.000	.007	-.001	.018	.000	.047	.107	.020	.011	.002	.047	.100	.021
1996	.006	.000	.000	.006	.001	.018	.009	.075	.108	.023	.012	.009	.075	.103	.022

With Control Variables for Education and Experience

	Panel A: Men					Panel B: Women					Panel C: Women Compared to Men				
	Year	Married	Expecting	Newborn	Kid	Year	Married	Expecting	Newborn	Kid	Year	Married	Expecting	Newborn	Kid
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
1990	.012	.003	-.002	.002	-.002	.017	.009	.029	.122	.011	.005	.005	.031	.120	.012
1991	.010	.003	.001	.002	.001	.019	.022	.042	.109	.014	.009	.019	.041	.107	.014
1992	.011	.001	-.002	.000	.001	.015	.014	.059	.078	.021	.004	.012	.061	.078	.021
1993	.009	.003	.001	.002	-.001	.017	.010	.057	.099	.016	.007	.007	.056	.097	.017
1994	.010	.003	-.003	.000	.001	.020	.013	.064	.114	.017	.010	.010	.067	.114	.016
1995	.014	.000	-.002	.005	.000	.023	.003	.042	.105	.021	.010	.003	.045	.100	.021
1996	.012	.002	-.002	.004	.001	.023	.011	.073	.107	.023	.011	.009	.075	.103	.022
Baseline:	Men					Women					Overall				
Flow											.017				
Stock											.109				

Note: The analysis pertains to employees present in years 1990-1997. The dependent variable is whether the employee transitioned from working full-time in the base year (t) to working part-time the following year (t+1). Only employees working full-time in a base year are included in the analysis. Within each of the three panels, the first column gives the effect of the year itself, in order to see if there are changes over time between years. The second column gives the effect of being married. The third column gives the effect of expecting a child in the next year. The fourth column gives the effect of having a newborn child, born either the current year or the previous year. The fifth column gives the effect of having any child aged 1-20.

Table 6.3: Impact of Marital Status (Being Married) and Children on Other Adaptive Behaviors Between Adjacent Years Among Employees Who Stayed in Sector Between Adjacent years

Without Control Variables for Education and Experience																				
	Panel A: Change of Career Ladder					Panel B: Change of Establishment					Panel C: Demotion					Panel D: Change of Occupation				
	Year	Married	Expecting	Newborn	Kid	Year	Married	Expecting	Newborn	Kid	Year	Married	Expecting	Newborn	Kid	Year	Married	Expecting	Newborn	Kid
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
1980	-.021	-.007	-.012	.011	-.005	-.009	-.001	-.029	-.033	.000	-.003	.004	-.006	.002	.007	-.050	.000	-.068	-.069	.023
1981	-.020	-.008	-.009	.004	-.007	-.009	-.011	-.023	-.032	.013	.001	.003	-.002	.002	.001	-.051	.010	-.054	-.037	.030
1982	-.021	-.005	.000	.011	-.002	-.006	.002	-.004	-.016	-.002	.006	-.005	.009	-.003	.004	-.039	.009	-.024	-.009	.012
1983	-.017	.000	-.015	.010	-.010	-.004	.000	-.025	-.011	.008	-.008	.001	.014	.018	-.003	-.068	.014	-.046	-.019	.026
1984	-.022	-.006	.001	-.007	-.002	-.012	-.003	-.031	-.035	-.013	-.006	.005	-.014	-.007	.005	-.058	.016	-.066	-.046	.020
1985	-.012	-.010	-.006	.003	.000	.014	.005	-.007	.055	.014	.001	-.004	-.002	.001	.005	-.029	.000	-.065	-.018	.024
1988	-.016	-.010	.005	.006	.005	-.019	-.002	-.021	-.003	.000	-.003	-.003	.006	.000	.002	-.028	.007	-.035	.001	.007
1989	-.012	-.001	-.013	.003	-.006	-.032	.005	-.019	-.026	.009	-.006	-.001	.014	-.004	.004	-.025	.003	.008	-.014	-.001
1990	-.007	-.014	-.009	.004	-.006	-.032	.003	-.019	-.008	.005	.001	-.001	-.002	.005	-.005	-.013	-.004	-.037	-.001	-.006
1991	-.011	-.011	-.011	.001	.003	-.011	.004	-.033	-.004	-.012	.017	.013	.009	.017	-.005	-.002	.009	-.021	.000	-.002
1992	-.016	-.005	.000	.000	-.004	-.032	-.008	-.007	-.002	.007	.006	-.004	.012	.016	-.009	-.030	.001	-.032	-.026	.003
1993	-.011	-.011	-.011	.003	-.003	-.010	-.011	-.033	-.010	.000	.002	-.002	.012	.007	.000	-.021	-.012	-.019	-.007	-.003
1994	-.007	-.010	-.011	.005	-.005	.005	-.004	-.038	-.009	-.013	-.002	.000	.013	.007	.001	-.027	.006	-.029	-.015	.003
1995	-.012	-.006	-.002	.004	-.001	-.016	.001	-.010	.001	-.002	.001	-.001	.007	.010	.002	-.019	.006	-.026	-.005	-.003
1996	-.011	-.007	-.001	.005	.000	-.013	.000	-.049	-.018	.003	.004	.003	.003	.006	-.003	-.016	.009	-.015	.005	-.004

With Control Variables for Education and Experience																				
	Panel A: Change of Career Ladder					Panel B: Change of Establishment					Panel C: Demotion					Panel D: Change of Occupation				
	Year	Married	Expecting	Newborn	Kid	Year	Married	Expecting	Newborn	Kid	Year	Married	Expecting	Newborn	Kid	Year	Married	Expecting	Newborn	Kid
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
1980	-.026	-.007	-.012	.007	-.003	-.003	-.005	-.025	-.034	.003	.000	.004	-.005	.004	.006	-.046	-.005	-.062	-.077	.029
1981	-.024	-.009	-.013	.004	-.006	-.003	-.016	-.020	-.033	.016	.003	.005	-.001	.004	-.002	-.048	.006	-.050	-.042	.036
1982	-.026	-.005	.000	.009	-.001	.000	-.001	-.004	-.015	.000	.011	-.006	.009	-.004	.003	-.036	.005	-.020	-.018	.020
1983	-.022	.000	-.017	.009	-.009	.003	-.002	-.022	-.012	.009	-.004	.000	.014	.021	-.004	-.067	.012	-.043	-.020	.034
1984	-.027	-.006	-.001	-.009	-.002	-.007	-.004	-.028	-.038	-.012	-.002	.005	-.011	-.006	.005	-.054	.012	-.068	-.054	.026
1985	-.016	-.011	-.005	.002	.001	.021	-.003	-.003	.054	.017	.004	-.005	-.001	-.001	.005	-.026	-.005	-.062	-.023	.028
1988	-.022	-.011	.004	.006	.007	-.014	-.004	-.021	-.008	.003	.000	-.003	.007	.001	.001	-.028	.005	-.033	-.004	.014
1989	-.016	-.002	-.015	.002	-.005	-.028	.005	-.017	-.024	.010	-.002	-.001	.015	-.003	.003	-.022	.002	.006	-.018	.003
1990	-.011	-.013	-.008	.004	-.005	-.028	.003	-.016	-.010	.007	.003	-.001	-.001	.003	-.006	-.013	-.005	-.034	-.013	.000
1991	-.015	-.011	-.011	.001	.004	-.007	.005	-.033	-.008	-.012	.020	.012	.010	.020	-.006	-.002	.009	-.021	-.004	.003
1992	-.021	-.004	-.001	.001	-.004	-.027	-.009	-.007	-.004	.009	.008	-.005	.011	.016	-.009	-.029	.001	-.035	-.030	.008
1993	-.015	-.010	-.012	.002	-.004	-.005	-.011	-.033	-.011	.000	.004	-.003	.013	.007	.000	-.018	-.010	-.021	-.011	-.002
1994	-.011	-.010	-.011	.004	-.005	.009	-.004	-.039	-.010	-.012	.001	-.001	.013	.007	.001	-.024	.007	-.034	-.018	.004
1995	-.016	-.006	-.002	.004	-.002	-.011	.001	-.012	.001	-.002	.004	-.001	.007	.010	.003	-.015	.007	-.029	-.007	-.004
1996	-.014	-.006	-.002	.005	-.002	-.008	.000	-.052	-.018	.003	.006	.002	.004	.006	-.003	-.010	.010	-.018	.004	-.007

Note: Only employees 20-50 years old are included. Within each panel, the effects are of year (col. 1), of being married (col. 2), of expecting a child next year (col. 3), of having a child born the current or previous year (col. 4), and of having one or more children 1-20 years old (col. 5). Panel A are the results for men, Panel B for women, and Panel C gives the difference in coefficients between men and women. Results are estimated jointly for men and women.

7 CONCLUSIONS AND IMPLICATIONS

The present research has addressed the role of family status and children for wages and careers among men and women. We investigated three interrelated phenomena. The first set of analyses focused on how wage levels depend on family and children, and how these dependencies varied by sex and what the implications were for the gender wage gap. The second set of analyses addressed wage changes and promotions over time and, again, how these depended on family status and children and variations by sex. The third set of analyses addressed how family and children impacted adaptive behaviors from employees in terms of exiting the economic sector studied, switching from full- to part-time employment, changing establishment, occupation, career ladder, and changing to a lower-ranked occupation.

The background for these investigations was the by now well-documented fact that there is a child penalty in terms of wages for women in the U.S., UK, and other countries. Understanding the gender wage gap and differences in promotions and other outcomes thus necessitates documenting the role of family status and children. Of specific interest is the potential role of employers in creating such differences. Do they arise from potentially discriminatory actions of employers? Or do they arise from choices and adaptations made by employees and their families?

The current research addressed specifically, and in ways we believe to be entirely novel, the role of employers in creating such differences. Using unique employee-employer based data over an 18-year period, where individuals and establishments could be followed from year to year, we were able to address quite precisely the role of processes at the workplace in creating differences, that is, the extent to which differences also occur at the workplace and thus can be attributed to what employers do.

The national setting for the empirical case was Norway. It has implemented stronger family-work policies than the U.S., especially in the realms of maternity/paternity leave and in public provision of subsidized child care. It provides however an intermediate case

between the more well-known Swedish case and the U.S. It has more extensive family policies than the U.S., but less extensive ones than Sweden.

After summarizing the findings, we conclude by providing policy implications and with a more general discussion.

7.1 SUMMARY OF FINDINGS

Wage Levels

The role of marriage and children for wages was very different for men and women at the beginning of the period, in 1980–84, increasing male wages while decreasing female wages. But by the end of the period, in 1995–97, the effects of marriage and children on wages were more similar for men and women with less of a negative impact for women.

For men, over the entire period, the marriage and children premia were to a large extent due to differences in education and experience and to sorting on establishments, occupations, and occupation-establishments.

For women, in the earlier part of the period, the penalty to having children increased once control was made for education and experience, and was clearly present at the establishment, occupation, and occupation-establishment levels. But over time, while controlling for education and experience, the penalty to having children disappeared, women with and without children earned about the same wages, overall, and at the establishment, occupation, and occupation-establishment levels. The role of children was thus quite dissimilar between men and women in 1980–84, but was more similar by 1995–97.

For women, unlike men, there has been remarkable historical changes in the effects over the 18-year period. Controlling of education and experience, but not for occupation, establishment, or occupation-establishment, the marriage premium has been stable and negligible at about 1%. But the children penalty has dropped in every period, from 10% for three children in 1980–89, to 6.3% in 1990–94, and to 4.9% in 1995–97.

These results were further documented in a combined analysis for men and women where the implications for the gender wage gap were developed. Also these analyses show that there is little question that family and children matter in different ways for male and female wages. Both have strong and positive effects for men, while mostly negative effects for women early in the period and then no or negligible effects at the end. As men get married and have children their wages increase, as women do the same, wages decrease or stay the same. The net result is that the wage gap between men and women is larger for those married and with children than those single and without children. At the population level in 1995–97, after controls for education and experience, among married with 1, 2, and 3+ children, women earn 18, 20, and 21% less than men. The penalty to having 3+ children has gone down over time, but the penalty to 1 or 2 children is stable from 1980–84 to 1995–97.

Early in the period, there was even a sizeable gap at the occupation and occupation-establishment level among those married and with children, of 14–15% among those with 3+ children. By 1995–97 the penalty at these levels was down to 4–5%.

The sizeable penalties at the population level are to a large extent due to differential sorting of women and men on occupation. Women and men, married and with children, work in different occupations and different occupation-establishment units. Once they work in the same occupation and same occupation-establishment unit, the penalties are much lower. In 1995–97, the population-level penalties were some 75% due to sorting on occupation and occupation-establishment.

One may conclude then that at especially the end of the period, the role of employers in creating differences in wages among men and women according to marital status and children was quite limited. Men increased their wages with children, women's wages were mostly unaffected by presence of children once focus was on the occupation-establishment level. The male increase in wages probably is due to higher work effort among men with children 20 years or younger, not due to any specific differential action taken by employers. Quite strikingly, as employees have 1, 2, or 3+ children 20 years or younger, men do not

change their contractual hours worked, whereas women decrease the contracted work hours with 1–2 hours per child. Even at the occupation-establishment level there could then be grounds for a gender wage gap induced by children. As documented, that gap is still small even among employees with 3+ children, of 4–5% in 1990–97.

Wage Changes and Promotions

Having established the impact of family status and children for wage levels and their implications for the gender wage gap, we moved to an analysis of the impact of the same variables on wage changes and promotions and on the gender gap in these. It was especially with respect to gender gaps in promotion that striking results were found.

Controlling for education and experience, among single and childless employees, women receive wage increases that are 0.5–0.9% lower than men. This was the case in all years and at all levels. Women with children received higher wage increases of about 0.5% than men at all levels in 1980–89, but by 1995–97 presence of children made little difference for the percentage wage increases received. Being female still made a difference, with women receiving lower wage increases than men, but with no additional negative impact of having children.

Controlling for education and experience, among single and childless employees, women are promoted at a lower rate than men in all years and at all levels, with as much as 3.4–6.0 percentage points in 1980–84 but down to about 2–3 percentage points in 1995–97; at the occupation-establishment level lower with 3.1 percentage points. This is quite substantial when the overall promotion rates hover around 7%. Among married and divorced employees, women with 2 or 3+ children had higher promotion rates of about 1.0–1.5 percentage points in 1980–89 at the population level, but had lower promotion rates at the occupation and occupation-establishment levels. By 1995–97, at the occupation and occupation-establishment levels, promotion rates among married employees with 1, 2, or 3+ children were 4.1, 5.2, and 4.4 percentage points lower for women than men. In the later period, at the occupation and occupation-establishment levels, children

thus induce promotion differentials.

Women thus receive lower wage increases than men with about 0.4–0.9% at all levels and all years. Children matter little for the size of wage increases. Women are promoted at a substantially lower rate than men even at the occupation-establishment level. In the early period, having children helped the promotion rate for women, in the last period it was detrimental.

These results contrast to those for the wage gaps. A main conclusion there was that at the occupation and especially occupation-establishment levels there are rather small differences between men and women, with and without children, and the differences observed were unlikely to be caused by differential treatment. For promotions, in contrast, the differences are substantial. One may speculate whether they are due to differential treatment from employers.

Other Employment Adaptations

We also investigated various adaptations to family status and children, namely their impact on exiting the sector, on changing from full- to part-time employment, on changing establishment, career ladder, occupation, and moving to a lower-ranked occupation. These adaptations can be induced by changed family situation and can vary by sex and may influence subsequent career attainment.

There were large sex differences here and for women also major historical changes. For men, family status and children made little difference for these adaptations, for women the effects were often major.

The most significant sex differences were with respect to exiting the sector and changing to part-time employment, both of which women did at much higher rates than men. For women, there was a remarkable historical change over the period with respect to exiting the sector. The impact, in terms of the exit rate differential among women from expecting a child decreased from about 32 to 18 percentage points. And the exit differential among women of having children 1 year or younger dropped from 37.5 to 4–6

percentage points.

For the other adaptive behaviors there were differences between men and women that resulted from expecting children and having children 1 year or younger, but there were no strong declines in effects over time. The sex differences, and the impact of the two variables, were especially large with respect to transitioning from full- to part-time employment.

None of these processes were much modified when switching to the different levels, establishment, occupation, and occupation-establishment. They played out in the same way as reported above. The major sex differences, and the major impacts among women of expecting a child and having children 1 year or younger, were thus not due to differential sorting on establishments, occupations, and occupation-establishment. This is not surprising. Most women have children, and many of them need to make adaptations to these, and there is little reason to expect that these adaptations vary greatly by occupation and establishment. Given the climate for and practice of parental leave and part-time work in Norway, it is unlikely that these adaptations should depend systematically on occupation and establishment.

The historical changes in the impact of children on exiting the sector, with tremendous declines in the effects of children, may lead one to speculate that combining family and career has become easier for women over the 18-year period. It is still however the case that women withdraw from the sector at a higher rate than men, and more frequently change to part-time employment whereas men rarely do so. This differential may result in women still losing ground relative to men in competitions for promotions, better assignments, and larger wage increases. Their position relative to men in the adaptive behavior of exiting the sector has improved, but the gap is still there and is large. One may speculate whether the declining gap in exiting the sector, and the still remaining such gap, can account for part of the decline in but continued presence of the gender gaps in wages and promotions.

7.2 POLICY IMPLICATIONS

It is quite clear from these analyses that the distance between men and women in the difficulty of combining family and career has become shorter over the 18-year period studied. We see it in the lower wage gaps according to number of children, in reduced promotion gaps, and in the reduced gap in exiting employment. There are still major gaps between men and women, especially with respect to wage changes and promotions and in exiting the sector and shifting to part-time employment.

These results suggest that the various policies in the family arena may have had some of their intended impacts. They were introduced for several reasons: One to further gender equality in the workplace by making it easier for women and men to combine family and career; another to make life better for children, by having less stressed parents; and a third to make fathers more involved with their children, to shift some of the balance of taking care of children from women to men. The policies seem to have worked at least with respect to the first reason.

But what can now be done? What additional policies are available for the three arenas we have analyzed, wage levels, promotions, and adaptive behaviors?

For wage levels, there is little to be gained in trying to regulate how employers pay men and women, with and without children, at the occupation-establishment level. This is not an area where much progress can be had. The weight of the evidence is that there is little differential treatment of men and women with respect to wages once same work is done for the same employer.

To achieve progress, of central importance are policies aimed at lessening occupational sex segregation. Such segregation may occur through hiring differentials, which we did not investigate, and through promotion differentials, which we did investigate, and where we found major differences between men and women even at the occupation-establishment level. But they may also arise through self-selection and the choices men and women make in education and in occupation and where to work. There is overwhelming sex

segregation with respect to educational field among the employees. Women are especially underrepresented in engineering and economics, important educations in the sector, both at the beginning and end of the period, though with declining segregation over time.

Perhaps of equally central importance is lessening the gap in various adaptive behaviors between men and women, especially in exiting and in switching to part-time employment. Also here there are, as we have demonstrated, stark sex differences, and such differences may induce gaps in wages and promotions.

How can one lessen the amount of sorting that occurs on occupation? To the extent this is due to hiring or promotion discrimination, increased vigilance in regulating employers is needed. To the extent it is due to self selection and differential choices made by men and women, either through educational choice or through adaptations to family circumstances or from preferences, an entirely different set of policies is called for. Our results cannot settle this. But they clearly point to the possibility of differential treatment from employers at the occupation-establishment level.

How can one lessen the adaptive behaviors induced by family status and children? Policies may here lead to gains by facilitating combining family and career for women, which may increase work effort and reduce the role of potential self selection. At the occupation-establishment level this could induce women to work harder so as to reap the same wage bonus as men get from having children. Norwegian women face clear obstacles here in that childcare rarely is available later than 4 or 5pm from regular child-care providers. This can be solved by hiring help in the home, but that is often more expensive in terms of both direct monetary outlays of wages and the size of home needed if live-in child-care workers are hired. With the compressed wage distribution in Norway, where even employees in the high-paying professions do not make spectacularly high salaries compared to various service sectors employees, unlike the situation in the U.S., this is however a solution available to a small percent of wage earners. Alternatively, and with the same result for the gender wage gap, policies can be aimed at fathers, attempting to make them work less hard so as to remove the bonus they currently receive. Such policies would

alleviate the part of the gender wage gap induced by children, partly through equalizing work effort between men and women at the occupation and occupation-establishment levels, partly by reducing sorting on occupations and occupation-establishment units.

As discussed in chapter 7, both aims can be achieved by a variety of mechanisms. The simplest, however, would be differential taxation of mothers and fathers, with tax breaks given for earnings of mothers, and tax increases given for earnings of fathers. The effects of such policies could be strengthened, or could alternatively be achieved, by imposing corresponding tax breaks and penalties in the payroll taxes employers pay when employing mothers and fathers. Whether the policies are desirable is another issue. And the aims of the policies, together with their costs, will also have to be weighed against the interest of children and the preferences men and women have with respect to how they want to organize the relationship between family and career. The specific goals of the Norwegian family policies in fact often run into conflict.

Dilemmas in Managerial and Professional Employment

Some aspects of Norwegian family policies may also hinder achievement of gender equality. Long periods of maternity leave result in loss of experience for women. This may be especially detrimental in managerial and professional positions, where absence from work for say two years can make a difference for promotion and other opportunities, especially as pivotal years in building a career often coincide with childbearing years.

As alluded to above, the Norwegian wage distribution, which by international standards is quite compressed, with high wages for those at the bottom and comparatively low wages for those at the top, may also be an impediment to gender equality in the higher rungs of occupational hierarchies. The incentive to move up is lower than in societies with steeper wage hierarchies. Relatively flat wage distributions also means that the cost of buying many of the services that routinely are purchased by managerial and professional employees in the U.S. are higher in both absolute and relative terms. This makes outsourcing of home tasks more expensive, and with the uneven distribution of

housework and childcare, the result is a more difficult situation for women at the top. This of course is exactly offset by a more advantageous position for women at the bottom of the wage distribution in Norway than say the U.S.

Esping-Andersen (1999, Tab. 6.6, p. 113) supplies an acute illustration of the national differences in costs of some of the services that families could outsource. The cost in 1996 of ironing a man's shirt were highest in Denmark and Sweden at \$5.20 and \$4.25 while lowest in the U.S. at \$1.50, with the ratio of laundry workers to working population being 1 to 3,500 in Denmark, 1 to 727 in Sweden, and 1 to 391 in the U.S. For laundry services the cost is dramatically lower and the availability much higher in the U.S. than in other countries, with the result that running that aspect of a family is easier in the U.S.

As also already alluded to above, an added difficulty arises from the restricted hours in public and private childcare facilities. They often close at 4pm, and are rarely open after 5pm. This may be in the best interest of children, but it restricts work effort from parents, and may restrict female more than male hours, especially for divorced mothers. The obvious policy implication here is to provide childcare facilities with longer hours, which may help increase gender equality in managerial and professional positions. But this then runs into conflict with another goal of family policies, to protect the interests of children. Perhaps the only way to achieve both goals is to restrict hours worked by fathers of young children. Children will gain in welfare, and employed mothers will gain in careers relative to employed fathers. Fathers will clearly lose some ground careerwise relative to mothers and relative to men without children. But the welfare gained from the increased involvement with children may offset the loss from career. While reduced hours for fathers will function well for some families, it is not a policy that will work for all families, in particular, it would be unfair to traditional families where the mother has elected to be a homemaker or to work reduced hours and the father conversely needs to work longer hours to compensate for the lost income. Some women clearly prefer reduced hours and hence more time with children to full-time work, and would prefer their husbands or partners to work correspondingly longer hours. There is and there will

continue to be heterogeneity among families in preferences over time spent at work and at home. Policy can create the constraints under which the preferences get implemented, and may over the long run also help shape preferences, but cannot in the short run create constraints that are such that everyone will end up making the same choice. Heterogeneity in preferences may result in gender inequality in wages and promotions.

7.3 DISCUSSION

A main conclusion is that at the occupation and especially occupation-establishment levels there are rather small wage differences between men and women, with and without children, and the differences observed were unlikely to be caused by differential treatment. For promotions, in contrast, the differences are substantial.

Combining these analyses—for wage gaps and promotions—we can make additional sense of the relatively large wage gaps observed at the population level, the level without controls for occupation and occupation-establishment. These gaps come about, as already concluded, not by differential treatment in pay in the same occupation and occupation-establishment, but through differential sorting of men and women on occupations and establishments. And then, as the present analyses have shown, part of that differential sorting occurs through differences in promotion rates where men to a higher degree than women get access to high paying occupations.

Are the gender gaps in wage increases and promotions we then observe due to differential treatment from employers? One need be careful in drawing conclusions here. But we are cautiously led to conclude that there may be evidence of significant differential treatment of men and women in promotions at the occupation-establishment level and moreover that this differential treatment becomes even stronger when the employees have children.

One may ask: Why is there on the one hand so little evidence of differential treatment of men and women with respect to wages in the same broadly defined occupational group within same establishment and on the other hand such substantial differences in

promotion rates between the occupational groups? How can it be that employers possibly engage in no or minimal differential treatment in one realm and substantial differential treatment in another?

One plausible answer to this question points to variations in the opportunity structure for discrimination in these two areas (Petersen and Saporta 2004). Setting of wages for the same work for the same employer is probably the node in the employment relationship that is most transparent to employees and that may be the most routinized and most scrutinized by various parties. Decisions about promotions, in contrast, involve subjective decisions to a larger degree, involve fewer employees, and are more difficult to investigate for those passed over for promotion or for outside parties. This difference potentially provides better opportunities for differential treatment in promotion than in setting wages for same work for same employer. And that is what the pattern in our data also may reflect.

But there is also the possibility that the gaps were caused by differences in work effort. Women with children work fewer hours than men with children, and this may induce a gap in wage growth and promotions.

We cannot settle these conundrums. The differences between men and women in wage increases and especially promotions are unquestionably there. What exactly produced these differences has yet to be decided and is not decidable without bringing additional evidence on the table.

APPENDIX A: FURTHER DESCRIPTION OF DEPENDENT AND INDEPENDENT VARIABLES

We gave a short description of the data used in Chapter 2. Here we describe further the dependent and independent variables used in the analyses.

A.1 DATA SUMMARY

Table A.1 describes the data. Columns 1–5 shows the number of persons, women, and men, the percent women, and the number of occupations. Column 6 shows a more aggregated occupational code where we distinguish 21 occupational groups. This is an aggregation of the roughly 210 occupations. Columns 7–10 shows the average wage for everyone, for women, and for men.

(Table A.1 about here)

The percent female has increased in the period, from 20.7 to 31.2%, with a marked increase from 1990 to 1991. This was due to two factors, first that new establishments were included in 1991, but second, and more important, part-time employees were included in a systematic manner starting in 1991. For 1987 we have incomplete information only on employees present in both 1987 and 1988. The number of employees for which we have information is thus lower in 1987 than in both 1986 and 1988. The number of white-collar employees increased from 83,252 in 1980 to 114,868 in 1986, but since we exclude 54 occupations from our analysis it will be based on respectively 76,592 and 103,243 employees in 1980 and 1996. The decline in number of employees between 1996 and 1997 occurred due to a major change in data collection procedures that year, where data on a subset of the employees were not collected. The number of occupations used in this analysis has varied from 155 to 158.

The wage has about tripled over the period. Wage growth has been better for women than men with the result that women's average wage as percentage of men's increased from 66 in 1980 to 75% in 1997, a reduction in the wage gap from 34 to 25%.

A.2 DEPENDENT VARIABLES 1 AND 2: WAGE LEVEL AND CHANGE IN WAGE LEVEL

Our first central dependent variable is the individual-level wages and the second is the change in the wages between years. Both derive from the same underlying variables and are described here.

The wage data refer to hourly wages earned on regular hours. We have information on contractual monthly pay and contractual hours worked per week. From this we compute the hourly wage rate paid by dividing monthly pay with hours worked per month.

Pay from overtime hours or later shift or other non-regular compensation is not included. This is very important as far as assessing whether employers treat groups in differential ways as far as pay rates are concerned. We underline specifically that we do not mix wages earned on regular with those earned on overtime hours. Overtime work is paid at a rate that is 50 percent higher than work on regular hours. If men work more overtime hours than women, but we in the computation of hourly wages don't distinguish the regular and overtime components, we will artificially inflate the male wages.¹

A.3 DEPENDENT VARIABLE 3: OCCUPATIONS, OCCUPATIONAL GROUPS, AND CAREER LADDERS

Our second central dependent variable is promotion in occupational rank between years. The occupational codes also enter as independent variables in almost all of the analysis of wage levels and changes in wage levels.

There are a total of about 210 occupations each year. We use data on only about 155 occupations, since these 155 by the employing firms are organized into a hierarchy. For this hierarchy we can define promotions in occupational rank. We thus lose 54 occupations each year, the ones that are not easily organized into a hierarchy. The remaining about 155 occupations are then organized into 21 occupational group, each group consisting of 2 to

¹To give an example, if all full-time employee women work 40 hours a week at an hourly pay of \$10 whereas all full-time men work the same regular 40 hours at the same pay but then also work 10 overtime hours at a pay of \$15 per hour, then the average hourly wage for women would be \$10 while it for men, when the regular and overtime components are not separated, would be \$11, leading the researched to conclude that men on average earn 10% more per hour.

9 occupations. The 21 occupational groups are in turn organized into five career ladders: white-collar workers in technical fields, supervisory positions, office settings, retail jobs, and warehouse jobs. Within each of these career ladders the occupational groups are organized in a hierarchy, so that a higher occupational group corresponds to a higher salary, more autonomy, authority, and prestige. The career ladder for technical white-collar workers has 9 ranks or occupational groups, stretching from directors of companies or large units of a company (group 1) to laboratory assistant, planning assistant, etc (group 9). The supervisory career ladder consists of 3 ranks or occupational groups, which stretches from positions of significant leadership (group 10) to direct supervisors of work groups (group 12). The career ladder for office white-collar workers has 5 ranks or occupational groups, while the ladders for retail store and for warehouse employees have only 2 ranks or occupational groups each. In addition comes, as mentioned, the 54 occupations that do not fit into this scheme of 21 occupational groups.

Summing up, the most detailed level is the about 210 occupations. Of the about 210 occupations, there are 54 that do not belong to one of the 21 occupation groups. Employees in these 54 occupations are dropped from the analysis. We thus use information on a subset of the employees. The 21 occupational groups is an aggregation of the remaining 155 occupations. The 5 career ladders are a further aggregation of the 21 occupational groups. Within each career ladder, the occupational groups are organized into a hierarchy. We cannot compare occupational groups across the five career ladders.

Note that it makes a very marginal difference for our results whether we use the full 210 occupations or the subset of about 155 occupations. We lose some 10% of employees and the relevant wage gaps are unchanged by this.

Statistical Description of Occupations, Occupation Groups, and Career Ladders

It is useful to describe in detail the occupational groups we use. Table A.2 shows first the relative wage difference between career ladders (in bold font), next the relative increase in average wages from one occupational rank to the next separately within each of the five

ladders, and finally the relative increase from the lowest rank to each of the higher ranks within each ladder. We have not previously seen such description of wage differences between ranks for the Norwegian or other economy.

(Table A.2 about here)

With respect to the relative wage differences between the 5 career ladders, where the warehouse white-collar employees are the base (=100), the table shows (cols. 1–4) that these differences have been relatively stable during the period. Also the differences between the ranks within a career ladder have been relatively stable. The Technical White-Collar employees receive the highest wages. For the years 1995–97, the number 151 shows that the technical white-collar employees on average earn 51 percent more than the warehouse white-collar employees. The retail store employees earn the lowest wages, 93% of what the warehouse employees make in the years 1995–97. Supervisory employees and office employees on average make 28 and 27 more than warehouse employees.

With respect to wage increases from one rank to the next, the numbers are also given in columns 1–4. In 1995–97, the number 127 for occupational group 1 among the technical white-collar employees means that those in occupational group 1 on average earn 27 percent more than those in occupational group 2, respectively the highest and next highest occupational group in that career ladder. With the exception of the technical employees, the percentage difference in average wages between ranks goes up with the rank. For example, among the office employees, the percentage average wage differences from one rank to next are 17, 32, 37, and 42, as one goes from lowest to next lowest, next lowest to the one above, and so on. For the supervisory employees with three ranks, the increases from one to next rank are 17% from lowest to middle and 35% from middle to highest rank.

The table further shows that there are no systematic changes over time, neither up nor down, in the wage differences within the career ladders. For the technical employees there is reduction in wage differences from the early 1980s to the middle of the 1990s.

The average wage at the highest levels in the hierarchy as percent of that at the bottom declined from 301 to 283. This means that in 1980 employees at the top on average earned 3.01 times more than those at the bottom, but that by 1997 this ratio declined to 2.83. We find a similar decline among the office employees, from 312 to 301 percent. Among the supervisory employees there was however an increase in wage differences, from 136 to 158, an increase of 22 percentage points. For the retail store and warehouse employees there is stability in relative wages over the period.

The absence of major increases in wage inequality is a feature of the Norwegian economy in the period. It was one of the few Western economies that did not experience significant increases in wage inequality over the last 25 years.

The wage differences are clearly the largest in the career ladders for the office and technical employees, with those at the top on average earning three times as much as those at the bottom. For the other three career ladders, the wage differences are much smaller, from about 26 to 58 percent differences between lowest and top ranks.

In summary, there are several noteworthy aspects of this description of the career ladders. The relative wage differences between the ladders are not very high, at the most of 50–60 percent. But the relative wage differences between ranks within a ladder can be quite substantial, with a factor of 3. For 4 of the 5 ladders, the percentage wage increase between ranks goes up with the rank, so that both the absolute and the relative payoff from climbing the ladder increases with the rank.

It is also instructive to see the distribution of employees on the occupational groups, given in Table A.3. Columns 1–4 give the percent female first in each of the five career ladders (bold print), and then in each of the occupational groups for grouped periods in the data, 1980–84, 1985–89, 1990–94, and 1995–97. The percent female is quite low in the ladder for technical white-collar employees, but increased strongly over the period, from 5.2 to 13.6. The percent female is highest in the career ladder for office employees and for retail employees, around 50 percent in 1995–97. The higher the rank within a ladder, the lower the percent female. Among technical employees, the percent female in

the three top ranks was 1% in 1980–84 but then went up to 6.5% in 1995–97, a strong increase, but these positions are still overwhelmingly sex segregated. In the career ladder for office workers, the percent female in the two top ranks was 2.6% in 1980–84, but was then up to 9.5% in 1995–97. The lack of women at the top, and the change in percent female at the top, was similar for the three other career ladders.

(Table A.3 about here)

Columns 5–8 give the distribution of men on the occupational groups and columns 9–12 give the same distribution for women. While the percent of employees in top ranks are low for both sexes, we see clearly that men are better represented at the top than women. The percent of women in top positions is most skewed, relative to men, in the career ladder for office employees.

A.4 OTHER DEPENDENT VARIABLES: PART-TIME EMPLOYMENT AND MORE

Above we described central feature of two of our dependent variables, wage levels and occupational rank. Our central analyses focus on the level of wages, changes in wage levels between years, and promotions in occupational rank between years, and how these relate to marital status and children. But we also analyze the role of marriage and children for other dependent variables: exiting the sector and, for those who stay in the sector, for changing to part-time work and for changing establishment, career ladder, occupation, and to a lower-ranked occupation. Of these, the part-time variable requires a short further description.

We define part-time employment as working 35 hours or less per week. We only have access to good data on part-time employees from 1991. In the earlier period the data pertain almost exclusively to full-time employees. In the later period the data contain information on both full- and part-time employees. Table A.4 describes the percent part-time employed, and the percent switching from full to part-time employment for the years 1991–97.

(Table A.4 about here)

On average 4.4% of men and 24.1% of women are part-time employed in the period 1991–97. On average, the annual transition percentages or rates from full- to part-time employment are 0.6% for men and 4.4% for women. As one would expect, there are major sex differences with respect to part-time employment. Married and previously married women work lower hours than single women, and women with 3+ children 0–20 years work the lowest hours; where the average number of hours worked declines with about 1–2 hours per child 0–20 years old. For men there are no relationships between contractual hours worked and number of children or marital status.

A.5 INDEPENDENT VARIABLE 1: MARITAL STATUS

Our two central independent variables are marital status and children. We describe each in the next two sections.

The distribution on marital status for each of the year is described in Table A.5, in Panel A for all, and then Panel B and C for men and women separately. The percent single has gone up from 19 in 1980 to 26 in 1997, while the percent married declined from 75 to 63, and the percent divorced increased from 4 to 8. About 2 percent gets married each year, and another 1 percent gets divorced each year. The increase in percent single and the decrease in percent married reflect in part changes in the marriage institution over this period, where some percent of men and women who previously would have become married now co-habitate. There is clearly enough variation in marital status in the data to allow us to estimate accurately its impact on wages, wage changes, promotions, and the other dependent variables.

(Table A.5 about here)

The percent single is considerably higher for women than men in each of the years, around 40% in 1980–84, but then down to about 30% in 1991–97, while for men singlehood has gone up from about 13 to 25%. Conversely, the percent married has increased for

women and gone down for men. This may indicate that being married and having a career in this sector is more difficult for women than men. But it also reflects a rather different age distribution of men and women at the beginning of the period but which had close to vanished by the end, as will be documented below.

The Norwegian Central Bureau of Statistics now attempts to measure more accurately co-habitation in its register data. But at the time these data were collected, its procedures for distinguishing those co-habiting from single people were incomplete. The exception were among registered same-sex couples, which they had separate codes for toward the end of the period. This is a small number of employees in our data, amounting to a few hundred in the 1991–97 period.

A.6 INDEPENDENT VARIABLE 2: CHILDREN

Table A.6 gives the distribution by year of number of children, in Panel A for all, and then Panel B and C for men and women separately. In a given year, about 66 percent of the employees have at least 1 child below age 20, a percent that is very stable across the years, and conversely, about 32 percent had no children under 20. In 1997, 67.9% of employees have at least 1 such child, with 22.6, 31.5, and 13.9 percent having 1, 2, and 3+ children respectively. In a given year, about 10 percent of employees had a child during the last year or during the current year, and about 5 percent were expecting a child next year. The percent with children above 20 years of age increased over the period from 9.9 in 1980 to 17.9 in 1997. So the percent with any children, below or above 20 years old, is about 78 percent. There is also here clearly enough variation in the data in having children to allow us to estimate accurately its impact on wages, wage changes, promotions, and the other dependent variables.

(Table A.6 about here)

As was the case with marital status, there are also some significant sex differences with respect to children. The percent without children 0–20 years old is much higher for

women, an entire 60% in 1980 but down to 38.3% in 1997, with a sharp decline from 1990 to 1991, as one should expect as part-time employees were included systematically in 1991. For men, the percent without children 0–20 years old was stable over the years at a much lower level of about 25–30%. In the same way as for marriage, this may indicate that having children 0–20 years old and having a career in this sector is more difficult for women than men. The percent with children 21 years or older is about the same for men and women and increasing over time from about 10 to 18%.

For most of the analyses, our central measures of children come from the variables having 1, 2, or 3+ children aged 20 years or younger, which are used in the wage level, wage changes, and promotion analyses. But in the exit, changes to part-time and the analyses for other dependent variables, we also use information on whether a person had a child less than 1 year old or was expecting a child next year. These choices came about through a mixture of substantive considerations and experimentation with various specifications. These led us to settle on a subset of specifications yielding conceptually and substantively meaningful results.

The vast majority of those with children 20 years or younger are also married. But over the period from 1980 to 1997, the percent of those single who had one or more children 20 years or younger increased from 6 to 32. Again, this reflects major changes in the family institution over the period. Most of those with children younger than 20 and single are co-habiting with the other parent, but some non-trivial percentage also raise the children as single parents.

A.7 INDEPENDENT VARIABLE 3: THE LEVELS, ESTABLISHMENT, OCCUPATION, AND OCCUPATION-ESTABLISHMENT

In addition to the two central independent variables marital status and children, we control in several of the analyses for the establishment, the occupation, and the occupation-establishment unit in which an employee works. We refer to these independent variables as levels, and the goal is to see what the role of marital status and children are at each

of four different levels.

At the population level we only control for marital status and children. Here, no other variables, occupation or establishment, are controlled, and the results resemble those we would get using data on individual employees without the matched employee-employer feature of the data we use.

At the establishment level, we control in addition for the establishment in which the employee works. In the regression analyses, we introduce one dummy variable for each establishment in the data, as explained in the chapter on methods. We can then see whether the impact of marital status and children also play out at the establishment level, when single and married, and those with and without children, work in the same establishment. There are several thousand establishments in the data.

At the occupation level, we control for the occupation in which the employee works. We here use the aggregated occupational code described above with 21 occupational groups. As with establishment, we assess whether the impact of marital status and children also are present when employee work in the same occupation.

At the occupation-establishment level we control for the occupation-establishment unit in which the employee works, with one dummy variable per occupation-establishment unit with observations in the data. For example, for employees working in the company *Hydro* in occupation group 9, as laboratory assistant, planning assistant, etc., we introduce a dummy variable indicating that this is the occupation and establishment in which the employee works. This allows us to assess whether the processes for marital status and children also occur at the occupation-establishment level, that is, when employees do the same work for the same employer.

In the analyses, we control for these various levels, but we never present the estimates of the effects of occupation, establishment, or occupation-establishment. But we see how the effects of marital status and children change as controls are introduced for these levels.

A.8 CONTROL VARIABLE 1: EDUCATION

We also control for education and labor force experience. But we don't report the coefficients for these variables, as they here are not in focus. A description of these is still useful.

We have access to a detailed 6-digit code for education. It gives length of education, type of education, degree, major within degree, and more. We experimented with a number of different measures for education, starting with years of education, followed by a measure which captures years as well as type of education, and then followed by further refinements. Our next to final measure distinguishes 21 educational groups, based on length and type. In large measure it mirrors important distinctions among white-collar employees in the Norwegian labor market. The 21 group scheme was for the purposes of the present analyses further simplified into one consisting of 5 groups. The distribution of employees on this educational code is described in Table A.7 for selected years in the period, while the distribution on the entire 21 educational groups is given in Table A.8 for two years. These groupings of education, while perhaps not standard for use in sample surveys, do reflect meaningful distinctions in the economy, sector, and industry we study, and are without question substantively superior to measures based solely on years of education or degree obtained, such as High School, BA, MA, and PhD. This we have verified in separate analyses. They indicate that the payoff to for example an MA degree varies considerably by which field it is in.

(Table A.7 and A.8 about here)

Table A.7 shows large differences between men and women in each of the six years (1980, 1985, 1990, 1995, 1996, and 1997). In 1980, 4.9% of the women had education at college level, while 29.8% of men did so. These percentages had changed to 24.9 for women and 43.5 for men by 1997. From Table A.8 we see that women are especially underrepresented in the six professional educations (groups 15–20). In 1997, 3.5 and 3.5

percent of the women were educated as engineer and civil engineer, whereas an entire 10.7 and 15.0 percent of the men had these backgrounds. While there still is a major gender gap in educational field in 1997, the change from 1980 is here nevertheless dramatic: respectively 0.3 and 1.0 percent of the women had educations as engineers and civil engineers in 1980, whereas 5.4 and 14.1 percent of men did so. Seen from the viewpoint of the percent of the employees in these two educational fields who are female, the percent women among civil engineers and engineers were were 1.5 and 1.7 percent in 1980 (Table A.5, col. 7), but up to 13.0 and 9.6 percent in 1997. Similar dramatic changes we find for other groups. In 1980, 3 of every 100 Civil economist (a degree in Norway) were female, while in 1997 23 out of 100 were. This is social change on a large scale over a short period. But there is a long distance from educational parity by sex among the employees in the sector.

The distribution on education of the employees reflects the flow of graduates out of educational institutions over a longer period. In the year 1975, for every female graduate in Civil Engineering there were about 18 male graduates (Petersen and Teigen 1997). In our data in 1997, for every female Civil Engineer there were about 8 male engineers. This is clearly a better sex representation of Civil Engineers in the sector than their flow out of educational institutions 20 year earlier.

A.9 CONTROL VARIABLE 2: EXPERIENCE, AGE

We measured labor force experience in several ways: (1) age, (2) years since highest education was completed, (3) imputed experience, without taking into account childbirths, and (4) imputed experience but with adjustment for children. The two first measures are very simple to compute. The third obtains by taking the person's age, then subtracting 16, and finally subtracting the number of years with education beyond that obtained by age 16. For the women who had children, this measure will give a too high imputed experience. The fourth measure obtains by subtracting, from the third measure, one year for each child a women had. This does not exactly reflect practices in Norway in the period, but

it approximates the impact of children on work experience among women. The period of paid child-leave was shorter than one year in the 1980s. But this was a period where access to child care also was limited. So many mothers were forced to stay home to take care of children, and could easily lose one year per child.

In the analyses we end up reporting results using the third measure. But it makes a very small difference with respect to results which measure one uses.

Table A.9 gives means, medians, minimum and maximum values for imputed labor force experience for all and by sex.

(Table A.9 about here)

The average age has gone up with about 3 years from 35.4 to 38.7 years. The average imputed labor force experience has also gone up from 16.0 to 18.1 years. There are some clear sex differences. Around 1980, women were on average 5 years younger than the men and had on average 3 years less labor force experience. By the end of the period these differences had diminished, with average differences of 2 years in age and 1 year in labor force experience. These are significant changes.

A.10 DIFFERENCES IN RESULTS ACCORDING TO WHICH MEASURES ARE USED

Irrespective of which measure we use for education or which measure we use for labor force experience, the results are fairly similar. For that reason, we report results using the educational measure consisting of 5 groups and the labor force experience variable as age minus 16 minus the number of years of education completed after age 16. There are already a considerable number of tables to report, and reporting in addition versions using alternative measures of these independent variables would multiply the tables to report and numbers to discuss by a big factor, but with little added insight.

As mentioned, for the occupational information, we use an aggregation of 21 occupational groups, extracted from about 155 more detailed occupations, while dropping from the analysis about 54 occupations that do not fit into an occupational hierarchy.

Using 21 occupational groups rather than the 155 more detailed occupations leads to somewhat higher wage gaps at the occupation and occupation-establishment levels, by 0.5 to at most 1.0 percent. But for our purposes this amounts to a limited loss in terms of what is learned. Our focus is primarily on the pattern of the wage gaps by marital status and children, not whether the gap, at say the occupation-establishment level, is 2 versus 3 percent. Using the aggregation of 21 occupational groups, allows us to identify more occupations and occupation-establishment units with variation among employees in marital status and children. The more detailed the occupational variable, the fewer employees will be found in each occupation, and the less likely it is that there is variation in our central independent variables marital status and children at the relevant occupation and occupation-establishment levels. This advantage of the coarser occupational groups, that we can retain more employees for analysis, thus more than offsets the disadvantage induced from having to report slightly higher wage gaps.

Table A.1: Number of observations included in the analysis by year. The share of women, mean wages and wage-gap.

Year	Persons	Women	Men	%Women	Industries	Establish- ments	Occupation- Establish- ments	Occupational groups	Occupation- Establish- ment groups	Wage	Women- wage	Men- wage	Wage - gap	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1980	83252	17247	66005	20.7		2888	201	31749	21	17566	52.42	37.72	56.26	67.04
1981	86214	17794	68420	20.6		2916	201	32539	21	17817	58.68	42.87	62.79	68.28
1982	90743	19179	71564	21.1		2872	204	32825	21	17729	66.01	48.82	70.62	69.13
1983	92402	19584	72818	21.2		2864	205	33133	21	17701	71.12	52.95	76.00	69.66
1984	94225	20390	73835	21.6		2765	203	32144	21	17048	77.94	58.47	83.32	70.17
1985	94933	21607	73326	22.8		2730	205	32018	21	16881	84.22	63.62	90.28	70.47
1986	98887	23368	75519	23.6		2745	203	32235	21	16864	93.42	71.33	100.25	71.15
1987	79073	18231	60842	23.1		2362	207	26322	21	13921	103.69	79.51	110.93	71.68
1988	100924	25442	75482	25.2		2814	211	32979	21	17326	105.59	81.80	113.61	72.00
1989	97701	24597	73104	25.2		2801	210	32604	21	17148	110.90	87.18	118.87	73.34
1990	96066	24349	71717	25.3		2677	210	31705	21	16463	118.74	94.42	127.00	74.34
1991	109336	33928	75408	31.0	113	2741	211	34424	21	17619	123.63	99.02	134.71	73.51
1992	109912	34293	75619	31.2	116	2844	210	34652	21	17907	127.72	102.96	138.95	74.10
1993	109464	34174	75290	31.2	116	2795	209	33673	21	17359	132.33	107.12	143.77	74.51
1994	110925	34971	75954	31.5	117	2903	209	34296	21	17854	136.57	110.84	148.41	74.68
1995	112680	35463	77217	31.5	118	3022	209	34708	21	18242	141.40	115.23	153.42	75.11
1996	114868	36237	78631	31.5	119	3121	208	35380	21	18662	147.91	121.38	160.14	75.80
1997	104762	32715	72047	31.2	115	3140	208	32673	21	17513	158.18	129.44	171.23	75.60
Sum	1786367	473569	1312798		814	51000	3724	590059	378	311620				

Note: Table based on individuals with complete available information on wage, contractual working hours, and which occupation and establishment they belong to. Data for 1987 are based on white-collar workers present in 1986 and 1988. Thus the number of persons, establishments etc. are lower in 1987 than in 1986 and 1988. Information on industry is only available for 1991 through 1997. The mean wages in column 11-13 are based on wage during ordinary working hours.

Table A.2: Relative Wages (in bold type) Between Warehouse (=100) and other Career Ladders (cols. 1-4), Relative Increase in Wages From One Rank to a Higher Rank Within Each Career Ladder (cols. 1-4), and Relative Wages Between Each of Higher Ranks and Lowest Rank Within Each Ladder (cols. 5-8), for Four Groupings of Years.

	Number of Occupations	1980-84	1985-89	1990-94	1995-97	1980-84	1985-89	1990-94	1995-97
		1	2	3	4	5	6	7	8
Technical positions		149	150	149	151				
1 Company director	1	123	124	127	127	301	289	280	283
2 Chief engineers	4	121	119	119	118	245	233	221	224
3 Managing positions	10	118	117	117	117	202	195	185	189
4 Responsibility with leadership	10	105	107	105	105	170	166	158	162
5 Responsibility without leadership	10	113	115	115	116	161	155	151	154
6 Autonomous with leadership	9	105	105	105	105	142	135	131	133
7 Autonomous without leadership	10	113	112	113	114	135	129	124	126
8 Qualified routine-work	9	119	115	110	111	119	115	110	111
9 Routine-work	8	100	100	100	100	100	100	100	100
Supervisory positions		123	124	125	127				
10 Position of leadership	8	124	127	129	135	136	147	149	158
11 Workshop – managers	10	110	115	116	117	110	115	116	117
12 Supervisor with Direct Control	10	100	100	100	100	100	100	100	100
Office positions		123	125	126	128				
13 Assistant Director	8	149	144	143	142	312	309	295	301
14 Subdirectors	10	130	133	134	137	209	215	207	212
15 Autonomous work	9	130	132	132	132	161	162	154	155
16 Qualified	10	123	123	117	117	123	123	117	117
17 Routine –work	10	100	100	100	100	100	100	100	100
Retail positions		88	94	96	93				
18 Shopmanager/Executive	3	134	133	131	135	134	133	131	135
19 Salesclerk/Shop Assistant	1	100	100	100	100	100	100	100	100
Warehouse positions		100	100	100	100				
20 Manager/Executive	3	123	125	124	126	123	125	124	126
21 Clerk	2	100	100	100	100	100	100	100	100

Note: In columns 1-4, within each of the 5 career ladders, the first line (bold type) shows its mean wage as percent of mean wage in the career ladder for warehouse employees, which is set to 100. For example, in the first column, in the first line, among those in the career ladder for technical white-collar workers, 149 means that these on average earn 49 percent more than is the mean wage among the warehouse-employees. In Columns 1-4, within each of the 5 career ladders, the wage for each rank is given as a percent of the wage in the rank below. For example, in the period 1995 to 1997, for technical positions, the wage for occupational group 7 is Nkr 136,0 and wage for occupational group 8 is Nkr 119,3. The percentage increase from occupational group 8 to 7 is then 14 (1,14=136/119,3). In occupational group 9 the mean wage is Nkr 107,7. The percentage increase from level 9 to level 8 is then 11 (1,11=119,3/107,7). In columns 5 – 8, within each of the five career ladders, the wage, at each rank, is given as percent of wage at the lowest rank in the career ladder. The lowest rank in each career ladder is set to 100

Table A.3: Percent Female in Each Careers Ladder (Bold Type) and in Each Occupation Group (cols. 1-4), and Distribution of Men (Cols. 5-8) and of Women (Cols. 9-12) for Four Groupings of Years.

	1980-84	1985-89	1990-94	1995-97	1980-84	1985-89	1990-94	1995-97	1980-84	1985-89	1990-94	1995-97
	1	2	3	4	5	6	7	8	9	10	11	12
Technical White-Collar Employees	5.2	8.0	11.9	13.6								
1 Company Director	0.1	0.3	0.8	2.1	1.3	1.3	1.5	1.4	0.0	0.2	0.1	0.3
2 Chief Engineers	0.2	0.5	0.7	0.9	7.4	8.3	10.3	11.2	0.4	0.8	2.5	3.6
3 Managing positions	0.7	1.4	2.5	3.5	15.3	18.4	19.2	18.6	2.8	6.3	8.2	9.8
4 Responsibility and leadership	0.8	1.8	3.1	4.0	14.4	15.4	13.4	12.9	3.1	6.2	6.7	7.3
5 Responsibility without leadership	1.2	2.0	4.5	7.0	17.4	18.4	22.1	21.3	4.8	12.5	17.3	18.2
6 Autonomous and leadership	2.9	4.5	9.2	10.8	4.0	3.9	3.4	3.2	2.5	4.9	4.9	4.5
7 Autonomous without leadership	2.9	4.3	7.7	9.9	23.4	19.9	18.0	19.8	14.8	21.4	23.0	24.8
8 Qualified routine-work	8.0	11.2	14.4	16.2	13.8	11.7	9.5	9.8	25.2	24.1	19.4	19.2
9 Routine-work	44.3	46.1	46.7	40.1	3.1	2.6	2.6	1.9	46.4	23.6	17.8	12.4
Supervision Management	2.0	3.0	4.8	5.0								
10 Positions of leadership	0.4	0.6	1.1	1.9	5.3	5.3	7.6	9.3	1.2	2.5	3.4	4.7
11 Workshop-managers	1.2	1.4	2.3	2.7	19.1	20.2	22.2	23.5	12.2	16.6	15.0	13.7
12 Supervisors with direct control	2.2	2.5	3.1	3.5	75.6	74.5	70.3	67.2	86.6	80.9	81.6	81.6
Office Work	42.5	46.7	52.8	54.0								
13 Assistant Director	0.0	0.5	1.6	3.8	3.6	4.3	4.8	5.2	0.0	0.1	0.2	0.2
14 Subdirector	2.6	3.2	4.4	5.7	27.7	29.0	31.6	29.7	1.1	1.8	3.0	3.6
15 Autonomous	14.3	16.5	20.2	22.7	34.2	35.5	36.6	38.3	8.3	11.1	13.4	14.7
16 Qualified	51.5	55.5	60.0	64.0	26.7	25.7	22.8	22.6	40.9	47.9	48.7	46.8
17 Routine-work	81.8	83.5	85.3	87.0	7.8	5.5	4.2	4.2	49.7	39.0	34.8	34.7
Retail positions	32.6	27.4	47.4	57.5								
18 Shopmanager/Executive	10.6	10.3	10.4	14.4	31.7	33.3	32.9	27.7	7.7	12.3	6.4	3.5
19 Salesclerk/Shop Assistant	42.1	35.6	33.5	33.0	68.4	66.7	67.1	72.3	92.3	87.8	93.6	96.5
Warehouse positions	5.4	6.5	9.0	8.7								
20 Manager/Executive	0.6	0.9	1.4	2.3	38.4	37.0	36.7	33.4	4.8	9.3	12.1	12.9
21 Clerk	8.1	8.0	8.7	10.1	61.6	63.0	63.3	66.6	95.2	90.7	88.0	87.1

Note: Columns 1 – 4 show the percent women first in each career ladder (bold type) and next in each occupation group. Columns 5-8 and 9-12 give the distributions of respectively men and women on the occupational groups. For each of the five career ladders, the smaller the number for occupational group the higher in the occupational hierarchy. Example of interpretation: Among the technical white-collar employees, at the company director level (occupational group 1), the share of women was 0,1 percent in 1980 –1984 and 2,1 percent in 1995-1997. In line 1, for managers, in column 5 for 1980 –1984, the number 1.3 tells us that among those in technical positions 1.3 of the men are to be found at the highest level.

Table A.4: Part-Time and Hours Worked for All Employees and by Sex, Children, and Marital Status

	% Part time	% Shifted	Hours	Hours by Children's Ages and Number of Them:						Hours by Marital status:		
				0-20 Years			0-1 Ys.			Single	Married	Other
				0	1	2	3+	1+	9	10	11	
All	1	2	3	4	5	6	7	8	9	10	11	
1991	11.0%	1.5%	36.2	36.6	36.1	36	36.1	36.3	36.7	36.1	36.2	
1992	10.7%	1.7%	36.3	36.7	36.2	36	36.2	36.3	36.7	36.1	36.3	
1993	10.4%	1.5%	36.3	36.6	36.3	36	36.2	36.4	36.7	36.2	36.3	
1994	10.8%	1.4%	36.3	36.6	36.3	36	36.2	36.4	36.6	36.2	36.3	
1995	11.3%	1.7%	36.2	36.5	36.3	35.9	36.1	36.3	36.5	36.1	36.2	
1996	11.2%	1.8%	36.2	36.5	36.3	36	36.2	36.4	36.4	36.1	36.3	
1997	11.3%	2.1%	36.3	36.6	36.3	36	36.2	36.3	36.5	36.2	36.4	
Women	1	2	3	4	5	6	7	8	9	10	11	
1991	24.0%	3.70%	34.4	36	34.3	32.4	30.5	34	36.2	33.2	35.1	
1992	23.3%	4.80%	34.5	36	34.5	32.7	30.7	34.2	36.2	33.4	35.2	
1993	23.3%	4.00%	34.5	35.9	34.7	32.8	30.9	34.4	36.1	33.5	35.2	
1994	23.9%	4.00%	34.6	35.8	34.8	33	31.2	34.5	35.9	33.6	35.2	
1995	24.4%	4.80%	34.5	35.7	34.7	33	31.3	34.4	35.7	33.6	35.1	
1996	24.8%	4.70%	34.4	35.6	34.7	33.1	31.6	34.6	35.5	33.6	35.2	
1997	25.1%	5.40%	34.5	35.9	34.8	33.2	31.9	34.5	35.6	33.7	35.4	
Men	1	2	3	4	5	6	7	8	9	10	11	
1991	4.5%	0.6%	37.2	37.1	37.2	37.2	37.1	37.2	37.1	37.2	37.1	
1992	4.5%	0.6%	37.2	37.1	37.2	37.2	37.1	37.2	37.1	37.2	37.1	
1993	4.1%	0.6%	37.2	37.1	37.2	37.2	37.2	37.2	37.1	37.2	37.1	
1994	4.3%	0.4%	37.1	37.1	37.2	37.2	37.2	37.2	37	37.2	37.1	
1995	4.7%	0.5%	37.1	37	37.2	37.2	37.1	37.2	37	37.2	37.1	
1996	4.3%	0.7%	37.1	37	37.2	37.2	37.2	37.2	36.9	37.2	37.2	
1997	4.4%	0.8%	37.1	37.1	37.2	37.2	37.1	37.1	37.1	37.2	37.1	

Note: For employees 20-50 years old. Column 1 gives the percent that works part-time in a given year. Column 2 gives the percent that shifted into part-time from the previous to the given year. Column 3 gives the average of the contractual hours worked per week. Columns 4-11 give the average hours worked by number (0,1,2, or 3+) of children 0-20 years old (cols. 4-7), for those with children 0-1 years old (col. 8), and by marital status (9-11). Information on part-time employees was not available in a systematic manner in 1980-1990.

Table A.5: Distribution on Marital Status for All Employees and by Sex

Panel A: All Employees

	This Year:					Next Year:			
	Single	Married	Widowed	Divorced	Separated	Marries	Divorces	Separates	
1980	0.19	0.75	0	0.04	0.02	0	0	0	
1981	0.2	0.74	0	0.04	0.02	0.02	0	0.01	
1982	0.23	0.71	0	0.04	0.02	0	0	0	
1983	0.21	0.71	0	0.05	0.02	0.04	0.01	0.01	
1984	0.22	0.7	0	0.05	0.02	0.02	0.01	0.01	
1985	0.24	0.69	0	0.05	0.02	0.02	0.01	0.01	
1986	0.25	0.67	0	0.05	0.02	0.02	0	0.01	
1987	0.25	0.67	0	0.06	0.02	0.02	0.01	0.01	
1988	0.26	0.65	0	0.06	0.02	0.02	0.01	0.01	
1989	0.25	0.66	0	0.06	0.02	0.02	0.01	0.01	
1990	0.25	0.66	0	0.06	0.03	0.02	0.01	0.01	
1991	0.24	0.66	0	0.07	0.02	0.02	0.01	0.01	
1992	0.25	0.65	0	0.07	0.02	0.02	0.01	0.01	
1993	0.25	0.65	0	0.07	0.02	0.02	0.01	0.01	
1994	0.26	0.64	0	0.07	0.02	0.02	0.01	0.01	
1995	0.27	0.63	0	0.08	0.02	0.02	0.01	0.01	
1996	0.28	0.62	0	0.08	0.02	0.02	0.01	0.01	
1997	0.26	0.63	0	0.08	0.02	0.02	0.01	0.01	

Panel B: For Women

	This Year:					Next Year:			
	Single	Married	Widowed	Divorced	Separated	Marries	Divorces	Separates	
1981	0.393	0.481	0.01	0.085	0.03	0.029	0.007	0.005	
1982	0.439	0.444	0.008	0.079	0.029	0	0	0	
1983	0.402	0.47	0.009	0.09	0.03	0.058	0.017	0.014	
1984	0.394	0.474	0.008	0.094	0.03	0.03	0.009	0.008	
1985	0.396	0.469	0.009	0.095	0.03	0.027	0.009	0.009	
1986	0.404	0.46	0.009	0.096	0.032	0.026	0.007	0.009	
1987	0.394	0.463	0.009	0.105	0.029	0.024	0.01	0.006	
1988	0.395	0.465	0.008	0.102	0.029	0.027	0.009	0.009	
1989	0.379	0.476	0.009	0.106	0.031	0.026	0.009	0.009	
1990	0.364	0.489	0.009	0.108	0.03	0.026	0.01	0.01	
1991	0.305	0.559	0.009	0.098	0.029	0.019	0.007	0.007	
1992	0.308	0.555	0.008	0.098	0.03	0.02	0.009	0.011	
1993	0.308	0.555	0.008	0.102	0.027	0.019	0.01	0.009	
1994	0.307	0.553	0.008	0.106	0.027	0.018	0.008	0.01	
1995	0.312	0.549	0.008	0.106	0.025	0.02	0.009	0.008	
1996	0.319	0.543	0.007	0.106	0.024	0.019	0.008	0.008	
1997	0.302	0.558	0.007	0.107	0.025	0.022	0.009	0.009	

Panel C: For Men

	This Year:					Next Year:			
	Single	Married	Widowed	Divorced	Separated	Marries	Divorces	Separates	
1980	0.133	0.82	0.003	0.028	0.017	0	0	0	
1981	0.141	0.808	0.003	0.03	0.018	0.012	0.004	0.005	
1982	0.168	0.785	0.002	0.028	0.017	0	0	0	
1983	0.154	0.789	0.003	0.035	0.019	0.03	0.009	0.012	
1984	0.167	0.775	0.003	0.037	0.018	0.013	0.005	0.007	
1985	0.182	0.758	0.003	0.039	0.018	0.014	0.005	0.007	
1986	0.196	0.741	0.003	0.04	0.02	0.013	0.004	0.006	
1987	0.195	0.742	0.003	0.042	0.018	0.014	0.005	0.006	
1988	0.208	0.724	0.003	0.044	0.021	0.015	0.005	0.007	
1989	0.202	0.727	0.003	0.046	0.022	0.016	0.006	0.009	
1990	0.202	0.723	0.003	0.048	0.024	0.017	0.006	0.009	
1991	0.213	0.711	0.003	0.05	0.022	0.014	0.006	0.007	
1992	0.221	0.701	0.003	0.053	0.023	0.015	0.006	0.009	
1993	0.226	0.693	0.003	0.056	0.022	0.016	0.007	0.008	
1994	0.232	0.685	0.003	0.059	0.021	0.017	0.007	0.008	
1995	0.246	0.67	0.003	0.06	0.02	0.017	0.007	0.008	
1996	0.263	0.654	0.003	0.061	0.02	0.017	0.007	0.007	
1997	0.246	0.667	0.003	0.064	0.02	0.02	0.008	0.009	

Note: Restricted to employees 20-50 years old.

Table 3.6: Distribution on Children, Their Ages and Numbers for All Employees and By Sex

Panel A: For All

Year	Ages:	0-20	0-20	0-20	0-20	21+	0-1	Expecting
Number:	0	1	2	3+	1+	1+	1+	1+
1980	0.32	0.2	0.32	0.16	0.1	0.1	0.05	
1981	0.33	0.2	0.32	0.15	0.1	0.1	0.05	
1982	0.34	0.2	0.32	0.14	0.1	0.1	0.05	
1983	0.34	0.2	0.32	0.14	0.1	0.1	0.05	
1984	0.34	0.2	0.32	0.14	0.11	0.1	0.05	
1985	0.36	0.2	0.31	0.13	0.11	0.09	0.05	
1986	0.37	0.21	0.31	0.12	0.11	0.1	0.06	
1987	0.34	0.21	0.32	0.12	0.13	0.09	0.06	
1988	0.37	0.22	0.3	0.11	0.13	0.1	0.06	
1989	0.36	0.23	0.3	0.11	0.14	0.11	0.06	
1990	0.35	0.24	0.3	0.11	0.15	0.12	0.06	
1991	0.34	0.24	0.3	0.11	0.16	0.12	0.06	
1992	0.34	0.24	0.3	0.11	0.17	0.12	0.06	
1993	0.34	0.24	0.3	0.12	0.18	0.12	0.06	
1994	0.34	0.24	0.3	0.12	0.18	0.12	0.06	
1995	0.34	0.23	0.3	0.12	0.18	0.12	0.06	
1996	0.35	0.23	0.3	0.13	0.17	0.12	0.06	
1997	0.32	0.23	0.31	0.14	0.18	0.12	0.06	

Panel B: For Women

Year	Ages:	0-20	0-20	0-20	0-20	21+	0-1	Expecting
Number:	0	1	2	3+	1+	1+	1+	1+
1980	0.599	0.204	0.147	0.051	0.091	0.057	0.065	
1981	0.603	0.196	0.15	0.051	0.098	0.052	0.062	
1982	0.598	0.199	0.154	0.048	0.099	0.058	0.06	
1983	0.594	0.207	0.155	0.044	0.102	0.06	0.059	
1984	0.579	0.213	0.166	0.042	0.108	0.062	0.06	
1985	0.574	0.217	0.169	0.04	0.11	0.061	0.063	
1986	0.571	0.221	0.171	0.037	0.117	0.065	0.064	
1987	0.549	0.225	0.187	0.038	0.143	0.052	0.055	
1988	0.546	0.236	0.182	0.036	0.14	0.077	0.067	
1989	0.531	0.251	0.184	0.034	0.151	0.092	0.071	
1990	0.511	0.264	0.192	0.034	0.163	0.102	0.073	
1991	0.435	0.274	0.242	0.049	0.178	0.111	0.07	
1992	0.432	0.274	0.243	0.051	0.185	0.114	0.069	
1993	0.429	0.271	0.248	0.052	0.192	0.111	0.071	
1994	0.42	0.266	0.256	0.057	0.197	0.114	0.07	
1995	0.418	0.256	0.264	0.063	0.194	0.113	0.07	
1996	0.415	0.248	0.27	0.068	0.188	0.109	0.068	
1997	0.383	0.25	0.29	0.077	0.193	0.114	0.062	

Panel C: For Men

Year	Ages:	0-20	0-20	0-20	0-20	21+	0-1	Expecting
Number:	0	1	2	3+	1+	1+	1+	1+
1981	0.249	0.195	0.375	0.18	0.102	0.113	0.05	
1982	0.258	0.194	0.374	0.173	0.101	0.113	0.05	
1983	0.259	0.195	0.376	0.17	0.103	0.107	0.051	
1984	0.266	0.196	0.372	0.166	0.107	0.108	0.051	
1985	0.281	0.199	0.362	0.158	0.109	0.106	0.052	
1986	0.296	0.201	0.353	0.15	0.112	0.109	0.052	
1987	0.274	0.21	0.363	0.152	0.128	0.11	0.057	
1988	0.3	0.211	0.345	0.144	0.128	0.114	0.056	
1989	0.293	0.22	0.343	0.144	0.141	0.117	0.059	
1990	0.291	0.224	0.341	0.143	0.152	0.122	0.059	
1991	0.3	0.224	0.335	0.142	0.154	0.127	0.061	
1992	0.3	0.227	0.33	0.143	0.166	0.129	0.06	
1993	0.299	0.229	0.325	0.147	0.171	0.127	0.059	
1994	0.301	0.226	0.322	0.15	0.174	0.126	0.059	
1995	0.308	0.222	0.317	0.153	0.175	0.126	0.058	
1996	0.319	0.215	0.31	0.156	0.166	0.126	0.058	
1997	0.289	0.214	0.327	0.17	0.171	0.125	0.056	

Note: Restricted to employees 20-50 years old.

Table A.7: Distribution on Five Larger Educational Groups, for All and by Sex, and percent Female in Different Educational Groups, for Selected Years.

	All		Women		Men		Percent Female
	Percent	N	Percent	N	Percent	N	(%)
	1	2	3	4	5	6	7
1980							
Unknown, not answered	3.15	2594	3.31	563	3.11	2031	21.70
Basic education	72.11	59413	91.76	15625	66.99	43788	26.30
College	6.28	5176	3.15	537	7.10	4639	10.37
Graduate	1.24	1024	0.29	50	1.49	974	4.88
Professional education	17.22	14190	1.49	254	21.32	13936	1.79
Sum	100.00	82397	100.00	17029	100.00	65368	20.67
1985							
Unknown, not answered	3.01	2792	3.30	696	2.92	2096	24.93
Basic education	68.69	63737	85.47	18005	63.76	45732	28.25
College	7.49	6947	6.79	1430	7.69	5517	20.58
Graduate education	1.88	1740	0.84	176	2.18	1564	10.11
Professional education	18.94	17579	3.60	759	23.45	16820	4.32
Sum	100.00	92795	100.00	21066	100.00	71729	22.70
1990							
Unknown, not answered	2.98	2811	2.61	622	3.11	2189	22.13
Basic education	65.22	61460	79.78	19021	60.30	42439	30.95
College	8.80	8296	9.53	2273	8.56	6023	27.40
Graduate education	3.30	3106	2.08	495	3.71	2611	15.94
Professional education	19.69	18555	6.01	1432	24.33	17123	7.72
Sum	100.00	94228	100.00	23843	100.00	70385	25.30
1995							
Unknown, not answered	2.71	3002	2.74	956	2.70	2046	31.85
Basic education	61.11	67682	73.79	25723	55.29	41959	38.01
College	11.02	12206	12.99	4529	10.12	7677	37.10
Graduate education	4.44	4919	2.87	1000	5.16	3919	20.33
Professional education	20.72	22947	7.61	2653	26.74	20294	11.56
Sum	100.00	110756	100.00	34861	100.00	75895	31.48
1996							
Unknown, not answered	4.07	4656	4.13	1492	4.04	3164	32.04
Basic education	59.33	67922	71.33	25759	53.80	42163	37.92
College	11.10	12702	13.22	4775	10.12	7927	37.59
Graduate education	4.58	5239	3.20	1157	5.21	4082	22.08
Professional education	20.93	23956	8.11	2929	26.83	21027	12.23
Sum	100.00	114475	100.00	36112	100.00	78363	31.55
1997							
Unknown, not answered	2.87	2993	2.83	924	2.88	2069	30.87
Basic education	59.49	62105	72.38	23596	53.64	38509	37.99
College	11.08	11569	13.05	4255	10.19	7314	36.78
Graduate education	4.65	4850	3.26	1064	5.27	3786	21.94
Professional education	21.91	22872	8.47	2760	28.02	20112	12.07
Sum	100.00	104389	100.00	32599	100.00	71790	31.23

Note: Grouping of the educations has been done based on the 6-digit educational code from the Norwegian Central Bureau of Statistics. Column 7 shows percent female in each educational group. Basic Education includes employees with education equal to High School diploma or less. The professional educations consists of 6 different groups, among them civil engineers, civil economists etc. For further details on the educations see Table 3.8.

Table A.8: Distribution on 21 Educational Groups for All and by Sex, for the years 1980 and 1997

Panel A: Distribution on Education in 1980

	All		Women		Men		Percent Female (%)
	Percent	N	Percent	N	Percent	N	
	1	2	3	4	5	6	7
0 Unknown, not answered	3.15	2594	3.31	563	3.11	2031	21.70
Basic education							
1 Middle-school/junior high-school	15.76	12986	16.12	2745	15.67	10241	21.14
2 High-school drop-out	36.15	29785	55.24	9407	31.17	20378	31.58
3 Finished High-school	17.01	14016	14.33	2440	17.71	11576	17.41
4 High-school plus some college	3.19	2626	6.07	1033	2.44	1593	39.34
College Degree							
5 Humanities/Human sciences	0.59	487	1.29	220	0.41	267	45.17
6 Social Sciences	0.18	145	0.07	12	0.20	133	8.28
7 Economics, Administration	2.23	1840	0.84	143	2.60	1697	7.77
8 Natural sciences	2.64	2172	0.19	32	3.27	2140	1.47
9 Other subjects	0.65	532	0.76	130	0.61	402	24.44
Masters and higher							
10 Humanities/Human sciences	0.02	14	0.04	6	0.01	8	42.86
11 Social Sciences	0.01	11	0.01	1	0.02	10	9.09
12 Economics, administration	0.06	48	0.01	1	0.07	47	2.08
13 Natural Sciences	0.74	613	0.09	15	0.91	598	2.45
14 Other subjects	0.41	338	0.16	27	0.48	311	7.99
Professional education							
15 Civil engineer	4.36	3593	0.31	53	5.42	3540	1.48
16 Civil economist	1.05	863	0.16	28	1.28	835	3.24
17 Social economist	0.08	66	0.01	1	0.10	65	1.52
18 Lawyer	0.13	107	0.01	2	0.16	105	1.87
19 Accountant	0.23	191	0.04	7	0.28	184	3.66
20 Engineer	11.37	9370	0.96	163	14.08	9207	1.74
Sum	100.00	82397	100.00	17029	100.00	65368	20.67

Panel B: Distribution on Education in 1997

	All		Women		Men		Percent
	Percent	N	Percent	N	Percent	N	Female (%)
	1	2	3	4	5	6	7
0 Unknown, not answered	2.87	2993	2.83	924	2.88	2069	30.87
Basic education							
1 Middleschool/junior High-school	7.90	8247	8.39	2735	7.68	5512	33.16
2 High-school dropout	25.19	26293	36.60	11931	20.01	14362	45.38
3 Finished High-school	20.86	21776	21.08	6873	20.76	14903	31.56
4 High-school plus some college	5.55	5789	6.31	2057	5.20	3732	35.53
College Degree							
5 Humanities/Human sciences	1.61	1676	3.28	1070	0.84	606	63.84
6 Social sciences	0.52	541	0.75	244	0.41	297	45.10
7 Economics, Administration	4.88	5090	5.98	1948	4.38	3142	38.27
8 Natural sciences	2.28	2378	0.91	297	2.90	2081	12.49
9 Other subjects	1.80	1884	2.14	696	1.65	1188	36.94
Masters and higher							
10 Humanities	0.11	120	0.16	51	0.10	69	42.50
11 Social sciences	0.27	283	0.29	96	0.26	187	33.92
12 Economy , Administration	0.20	206	0.18	58	0.21	148	28.16
13 Natural sciences	3.31	3457	2.04	665	3.89	2792	19.24
14 Other subjects	0.75	784	0.60	194	0.82	590	24.74
Professional education							
15 Civil Engineer	8.48	8857	3.52	1147	10.74	7710	12.95
16 Civil Economist	1.44	1503	1.05	342	1.62	1161	22.75
17 Social Economist	0.15	154	0.05	16	0.19	138	10.39
18 Jurist	0.19	201	0.11	35	0.23	166	17.41
19 Accountant	0.24	248	0.25	82	0.23	166	33.06
20 Engineer	11.41	11909	3.49	1138	15.00	10771	9.56
Sum	100.00	104389	100.00	32599	100.00	71790	31.23

Note: The grouping of the different educations is based on the 6-digit educational code from Norwegian Central Bureau of Statistics. The grouping of educations used here reflects distinctions that are important among the white-collar workers. Column 7 shows the percent female in each education group.

Table A.9: Age and Experience for All Employees and by Sex

Panel A: For All Employees

	Age					Labor Force Experience				
	mean	std dev	median	min	max	mean	std dev	median	min	max
1980	35.43	8.05	35	20	50	15.98	8.55	16	0	34
1981	35.48	7.98	35	20	50	16.07	8.51	16	0	34
1982	35.45	7.95	36	20	50	15.93	8.50	16	0	34
1983	35.64	7.87	36	20	50	16.06	8.45	16	0	34
1984	35.75	7.83	36	20	50	16.01	8.47	16	0	34
1985	35.78	7.88	36	20	50	16.00	8.54	16	0	34
1986	35.72	7.94	36	20	50	15.93	8.60	16	0	34
1987	36.43	7.84	37	20	50	16.36	8.59	17	0	34
1988	36.22	7.91	37	20	50	16.30	8.61	16	0	34
1989	36.71	7.75	37	20	50	16.73	8.48	17	0	34
1990	37.12	7.61	37	20	50	17.00	8.38	17	0	34
1991	37.32	7.53	37	20	50	17.17	8.34	17	0	34
1992	37.55	7.51	38	20	50	17.31	8.36	17	0	34
1993	37.82	7.45	38	20	50	17.48	8.34	17	0	34
1994	38.04	7.39	38	20	50	17.64	8.31	18	0	34
1995	38.09	7.36	38	20	50	17.64	8.30	18	0	34
1996	38.01	7.38	38	20	50	17.53	8.33	17	0	34
1997	38.75	6.98	39	20	50	18.13	7.96	18	0	34

Panel B: Age and Experience for Women

	Age					Labor Force Experience				
	mean	std dev	median	min	max	mean	std dev	median	min	max
1980	31.35	8.73	30	20	50	13.07	9.07	11	0	34
1981	31.58	8.73	30	20	50	13.25	9.11	11	0	34
1982	31.59	8.67	30	20	50	13.17	9.07	11	0	34
1983	31.79	8.62	30	20	50	13.26	9.06	11	0	34
1984	32.13	8.54	30	20	50	13.4	9.06	12	0	34
1985	32.34	8.53	31	20	50	13.51	9.09	12	0	34
1986	32.43	8.56	31	20	50	13.49	9.15	12	0	34
1987	33.51	8.66	33	20	50	14.38	9.31	13	0	34
1988	33.29	8.64	32	20	50	14.18	9.27	13	0	34
1989	33.91	8.48	33	20	50	14.69	9.15	13	0	34
1990	34.51	8.29	33	20	50	15.15	9.01	14	0	34
1991	35.45	8.08	35	20	50	16.14	8.87	15	0	34
1992	35.71	7.97	35	20	50	16.25	8.84	15	0	34
1993	36.08	7.86	35	20	50	16.53	8.8	16	0	34
1994	36.4	7.75	36	20	50	16.77	8.72	16	0	34
1995	36.57	7.65	36	20	50	16.85	8.66	16	0	34
1996	36.63	7.59	36	20	50	16.86	8.63	16	0	34
1997	37.42	7.19	37	20	50	17.55	8.26	17	0	34

Panel C: Age and Experience for Men

	Age					Labor Force Experience				
	mean	std dev	median	min	max	mean	std dev	median	min	max
1980	36.61	7.44	36	20	50	16.82	8.2	16	0	34
1981	36.6	7.37	36	20	50	16.88	8.15	17	0	34
1982	36.62	7.33	36	20	50	16.77	8.13	17	0	34
1983	36.82	7.23	37	20	50	16.93	8.06	17	0	34
1984	36.9	7.22	37	20	50	16.84	8.1	17	0	34
1985	36.94	7.29	37	20	50	16.84	8.18	17	0	34
1986	36.89	7.37	37	20	50	16.8	8.23	17	0	34
1987	37.43	7.27	38	20	50	17.04	8.22	17	0	34
1988	37.36	7.3	38	20	50	17.12	8.19	17	0	34
1989	37.79	7.16	38	20	50	17.52	8.07	18	0	34
1990	38.12	7.07	38	20	50	17.71	8.01	18	0	34
1991	38.24	7.07	38	20	50	17.68	8.01	18	0	34
1992	38.46	7.1	39	20	50	17.83	8.05	18	0	34
1993	38.68	7.08	39	20	50	17.95	8.07	18	0	34
1994	38.86	7.06	39	20	50	18.08	8.05	18	0	34
1995	38.85	7.09	39	20	50	18.03	8.09	18	0	34
1996	38.71	7.17	39	20	50	17.87	8.15	18	0	34
1997	39.41	6.77	40	20	50	18.42	7.79	19	0	34

Note: For employees 20-50 years old.

APPENDIX B: METHODS

We use several quantitative methods, linear regression, logit and probit, panel data , and discrete-time event-history methods. We here outline the procedures and then discuss these only verbally when presenting the relevant analyses.

The data have a unique multilevel structure. One level arises from the across-time dimension, and other levels, at a given time point, arises from occupations and establishments. These give opportunities for new types of analyses, but also lead us to conduct more complex analyses than is common with cross-sectional data.

The complexity of the data structure requires attention in terms of data handling and choice of methods. Most individuals are observed at several points in time, for some as much as every year in 1980–1997. This gives a standard panel data set-up (e.g. Hsiao 1985). Similarly, each establishment is observed at several points in time, as much as every year in 1980–1997. This matching of individuals and establishments leads to an additional complexity: At each point in time, there are several individuals working in the same establishment, being exposed to the same organizational arrangements. One thus needs to account not only for the fact that one follows individuals (and establishments) over time but also for the fact that several individuals at a given point in time work in the same establishment, and within the given establishment in the same occupation.

The complexity of the data allows us to answer questions not previously addressed. For example, in the cross-section one may analyze the impact of motherhood in the same workplace, comparing mothers to non-mothers while they work in the same occupation in the same establishment. But one may also utilize the across-time dimension and compare women who became mothers before and after they had children.

Here we outline the central aspects of the methods we will use, without being complete.

B.1 METHODS FOR ANALYZING WAGES

The subscripts used are as follows: i for individuals, o for occupations, e for establishments, and t for years. So, the subscript $ioet$ denotes individual i in occupation o in establishment e in year t . The dependent variable is the logarithm of wages for individual i , $\ln w_{oeit}$, and the independent variables are collected in the vector x_{it} , which includes the constant 1.

We start with a cross-sectional analysis, regressing the logarithm of wages $\ln w_{ioet}$ on explanatory variables x_{ioet} , using four different specifications:

$$\ln w_{oeit} = \alpha_{P,t}x_{ioet} + \varepsilon_{ioet}, \quad (\text{B1})$$

$$\ln w_{oeit} = \alpha_{E,t}x_{ioet} + \eta_e + \varepsilon_{ioet}, \quad (\text{B2})$$

$$\ln w_{oeit} = \alpha_{O,t}x_{ioet} + \eta_o + \varepsilon_{ioet}, \quad (\text{B3})$$

$$\ln w_{oeit} = \alpha_{OE,t}x_{ioet} + \eta_{oe} + \varepsilon_{ioet}, \quad (\text{B4})$$

where η_E , η_O , and η_{oe} are fixed effects (i.e., dummy variables) capturing establishment e , occupation o , and occupation-establishment unit oe , and ε_{ioet} is the error term. The subscripts to the α parameters indicate that these are different coefficients, pertaining to different levels, population, establishment, etc.

These models can be estimated separately for men and women, and can also be estimated for the two sexes together. Included among the variables will be education and labor force experience plus marital status and various measures of children, for example, the number of children below age 20, and so forth.

The four equations will be referred as the *Population*, *Establishment*, *Occupation*, and *Occupation-Establishment* estimators. The first does not take into account where the employees work nor their occupations, the second controls for the workplace (establishment), the third for the occupation, and the fourth for the occupation-establishment unit. For example, in an equation controlling for the occupation-establishment unit, if the coefficient for being female is negative, then it says that when men and women work in the

same occupation-establishment unit, controlling for the other variables, then women on average earn less.

The estimates from the occupation-establishment analysis will answer the question of whether the parenthood penalty in wages is present when same work is done for the same employer. This gives an indication of whether employers treat women with children differently from those without once they work for the same employer in the same occupation.

We can also investigate changes over time. We may estimate the relationship for each of the 18 years in the data. We also estimate one common equation and include interaction terms between parenthood variables and calendar year (1–18).

This analysis will be done both with and without fixed effects. One can then assess how the employee outcomes within firms and occupations differ from those occurring across firms and occupations.

Interpretation of Coefficients

The dependent variable is the natural logarithm of wages, often referred to as the semi-logarithmic specification. The most common interpretation of coefficients from the semi-logarithmic specification is that they give estimates of relative differences. A coefficient of $-.10$ for being female on wages gets interpreted as women earning 10% less than men, understood that this is on average. This is the interpretation that will be given here. This is however a *misinterpretation*. There are however two correct interpretations of the coefficients.

One is that they give the impact on the average of the logarithms (i.e., of $\ln w_i$). Note that this is different from the impact on the logarithm of the average of the untransformed variable (i.e., $\ln \bar{w}$). With a coefficient of $-.10$, it would be correct to write that the average of the logarithm of wages is $.10$ or 10 log points lower for women than men. This interpretation is sometimes made. The other correct interpretation transforms the results back to the unlogged metric. The coefficients then give the impact on the relative

geometric mean. It is correct to say that a coefficient of $-.10$ implies that the geometric mean is about 10% lower for women [$\exp(-.10)-1=-.0951$]. When the coefficient is big, it needs to be exponentiated to give the relative difference. This interpretation is rarely made. None of the 16 articles surveyed in note 3 does so.

Sometimes, but not always, differences in geometric means are close to differences in arithmetic means. It still is a misinterpretation to write that the coefficients give relative differences in arithmetic means.¹

We will assess the extent to which the semilogarithmic specification gives results that deviate in major ways from results in terms of relative differences in arithmetic means. Instead of regressing the logarithm of wages $\ln w_i$ on a linear function $\alpha x_i + \varepsilon_i$ we regress the unlogged wages w_i on a non-linear function $\exp(\delta x_i + \varepsilon_i)$. While mathematically indistinguishable before estimation, the two can give rather different results after least squares and non-linear least squares estimation have been performed. The former gives relative differences in geometric means, the latter gives relative differences in arithmetic means, and the two kinds of means can be quite different. Comparing the two identical mathematical forms is thus a poor guide to what the statistical estimates may be. Mathematical equivalence does not imply statistical equivalence. But if estimates of the two specifications give rather similar results, then, although not strictly correct, it seems acceptable to interpret the semi-logarithmic specification as giving relative differences in arithmetic means.

How to Think About the Various Sets of Coefficients

As explained above, we will report a series of different coefficients, at the population, establishment, occupation, and occupation-establishment levels, and then within each of these, even at the individual level. How is one then to think about the various estimates we report? It is tempting to assume that the estimates including the most detailed set of

¹Already Prais and Houthakker (1955, p. 50) pointed out that there is no linear least squares estimator of δ in $y_i = \exp(\delta x_i + \varepsilon_i)$ that is unbiased, when it is to be interpreted in terms of the mean value of y_i .

fixed effects are the better ones.

We underline instead that it is not necessarily the case that one estimator is better than another, for example, that the occupation-establishment estimator is superior to the population estimator. A more fruitful way to think about the estimators is that they report on different aspects of the data. No estimator is then necessarily better, they just answer different questions. The occupation-establishment estimator reports what on average is the case at the occupation-establishment level. The population-level estimator reports what on average is the case when all individuals are compared, without making distinctions about where they work and what kinds of work they do, both of which, in contrast, are taken into account in the occupation-establishment estimator. For example, one may find in the population-level estimator that there for women is a big negative effect on wages of having children younger than 20, whereas at the occupation-establishment level there is no such effect. This indicates, correctly, that women with children younger than 20 earn lower wages than those without, but that once women, with and without children, are employed in the same occupation in the same workplace, then there are no differences in their wages. The reason for the difference between these groups of women in the population-level estimator is that women with children below age 20 tend to work in other occupation-establishment units than those without children.

By comparing changes in coefficients as one goes from the population-level estimator to the occupation- to the occupation-establishment-level estimators one will be able to assess at what levels differences between groups arise: In differential treatment at say the occupation-establishment level, or in differential sorting of the groups on occupations and occupation-establishment units. Such comparisons will be central to our analysis.

Similarly, when we take into account individual-level fixed effects, then we assess how transitions at the individual level from being single to married, from having 0 to 1 child, etc., on average impact the individual's wages. We no longer make comparisons between individuals, comparing say single to married, we rather make comparisons of wages at the within-individual level between when they were single and when they were married.

Both types of comparisons are relevant to make, and none is better than the other. They just address entirely different kinds of questions, and we need to focus on the estimator that best answers the corresponding question.

B.2 METHODS FOR ANALYZING INDIVIDUAL CAREER DYNAMICS

Here we account for some of the methods to be used in analyzing wage growth and promotions.

We start by analyzing changes in wages from one year to the next among those employees who stayed in the sector in at least two adjacent years. The dependent variable is now the change in logarithm of wages from year t to $t + 1$, that is, $\ln w_{ioe,t+1} - \ln w_{ioe,t}$. The same set of models as for the wage levels are estimated, discussed above, including the same set of fixed-effects analyses. We can compare employees with and without children. We can also assess pre- and post-children effects among those who had children. We can further distinguish within- from between-firm processes, by including and excluding fixed effects.

The second analysis to be completed is of promotions in occupational rank, both for all employees and for those who stayed within the same organization between two years. Define then the variable D_{ioet} which equals 1 if the individual gets promoted within the firm between year t and $t + 1$ and equal to 0 otherwise. We can analyze the determinants of such promotions between year t and $t + 1$ by means of a logit analysis. For example, at the occupation-establishment level we could specify the probability of promotion as

$$P(D_{ioet} = 1 \mid x_{ioet}) = \frac{\exp(\beta x_{ioet} + \zeta_{oe})}{1 + \exp(\beta x_{ioet} + \zeta_{oe})}, \quad (\text{B5})$$

where ζ_{oe} is a fixed effect for occupation-establishment unit oe . A so-called discrete-time event-history framework will be used (Petersen 1995).

Given the large number of occupation-establishment units, we decided, for computational reasons, to estimate the fixed-effects linear probability model. For this, we report the same set of models as in the case of wage changes. The difference is that the depen-

dent variable now is binary, equal to 1 if a promotion occurred in two adjacent years and equal to 0 if not. The set of equations hence become:

$$D_{oeit} = \beta_{P,t}x_{it} + \varepsilon_{ioet}, \quad (\text{B6})$$

$$D_{oeit} = \beta_{E,t}x_{it} + \eta_e + \varepsilon_{ioet}, \quad (\text{B7})$$

$$D_{oeit} = \beta_{O,t}x_{it} + \eta_o + \varepsilon_{ioet}, \quad (\text{B8})$$

$$D_{oeit} = \beta_{OE,t}x_{it} + \eta_{oe} + \varepsilon_{ioet}, \quad (\text{B9})$$

This analysis is elaborated by considering more outcomes, such as promotion within firm, promotion with change of firm, and change of firm but no promotion.

B.3 ADAPTATIONS TO MARRIAGE AND PARENTHOOD

We also address the effects of marital status and parenthood on exiting the sector, of changing from part- to full-time employment, and four other types of changes: changing employer, career ladder, occupation, and shifting to a lower-ranked occupation.

We use event-history models in the same manner as we did for the promotion analyses, using both discrete-time linear probability models and discrete-time logit models, but reporting the former as those work better in the case of fixed-effects for occupation, occupation-establishment etc.

The analyses will follow the same pattern as described for promotions. Some additional data restrictions will be imposed. We will also specify some of the independent variables in a different way. The role of children is likely to be different for wage increases and promotions than for exiting the sector or switching to part-time employment, and this will be reflected in how we conduct the analyses. These differences are explained in the chapter addressing these transitions.

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