From Motherhood Penalties to Husband Premia: The New Challenge for Gender Equality and Family Policy, Lessons from Norway*

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Title

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Abstract

A key obstacle to workplace gender equality are the processes that occur in the family, and thus a target of family policies. We examine how family status affects the gender wage gap using longitudinal matched employer-employee data from Norway, 1979–1996, a period with extensive expansion of family policies. The motherhood penalty dropped dramatically from 1979 to 1996. Among men the premia for marriage and fatherhood remained constant. In 1979, the wage gap was primarily due to the motherhood penalty, by 1996 it was primarily due to husband premia and the penalty to being female irrespective of family situation.

Keywords: gender, family, public policy, inequalities, stratification

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1 Introduction

By the end of the twentieth century it had become abundantly clear that the processes unfolding in the family are a core, if not the core, obstacle to achieving gender equality in the workplace (Williams 2010). For men, marriage and to some extent children have positive effects on wages and careers (Rodgers and Stratton 2010). For women, the reverse is the case, there are small differentials for marital status but large penalties to having children (Budig and England 2001). Family thus pulls in opposite directions for men and women: Helping wages and careers for one sex, detrimental for the other, and jointly increasing the gap between men and women.

Analyses of gender equality in the workplace today therefore should account for the processes that occur in the family and their interrelationship with the workplace (e.g., Williams 2010). This claim has been a staple of feminist writings for 40 years, succinctly summarized by Gerson (1985, p. 231): "The conflicts and dilemmas women face will not diminish, despite women's changing social position, until the costs and rewards of working and parenting are more equally distributed by gender." Or as Hewlett (2002, p. 136) comments almost 20 years later: "Increasingly, women earn less than men because of the unequal impact of family responsibilities."

Against this background we address three puzzles. Our first puzzle concerns the extent to which the family gap arises from differential treatment by employers, possibly favoring married men and fathers, while discriminating against mothers (e.g., Correll, Benard, and Paik 2007). We assess whether employers pay differentially according to marital and parenthood status (i.e., unequal pay for equal work). A leading hypothesis would be that unequal pay for equal work by family status would not be a key source of wage differences, simply because there appears to be close to equal pay for equal work by gender status in the U.S. and in at least Scandinavia (e.g., Groshen 1991; Petersen, Snartland, Becken, and Olsen 1997).

Our second puzzle concerns the role of sorting of employees by family status on occupations and establishments for the size of wage penalties (and premia). The leading hypothesis here follows as a corollary to our first puzzle. If there is equal pay for equal work but still large overall pay differentials by family status, then it is the sorting on occupations and establishments that account for the differentials.

Our third puzzle concerns the role of family policies in ameliorating the family gap. The central policies are paid parental leave (with a portion reserved for fathers), subsidized child care, tax and cash benefits for children, and availability of flexible hours and access to part-time employment. These policies can shift the incentives and the feasibility for being active in market work for both men and women, and thus the

bargains that are struck within the family. We assess how the premia and penalties have evolved during a period in which significant family policies were unrolled. As we elaborate on below, there is much disagreement between scholars on the effects of such policies, and no generally agreed-upon hypothesis can easily be put forward.

To address these puzzles we use matched employer-employee data from Norway in the period 1979–1996, a country in the family-friendly corner of the world at the forefront of family policies. The matched aspect of the data allows us to address the first two puzzles, providing novel and crucial empirical angles, by documenting where the premia and penalties arise, at the level of the employer or in how employees are sorted on employers and occupations. The longitudinal aspect of the data from a Scandinavian country allows us to address the third puzzle, the potential role of family policies for changes in the premia and penalties during a period in which many new policies were introduced. The case thus offers an instructive research site.

The answers to these puzzles have significant public policy implications. If the core problem is differential treatment by employers, then more vigorous enforcement of existing anti-discrimination legislation would be the appropriate policy tool. In contrast, if employers are not the main culprit, but the core problem is rather the adaptations men and women make between the family sphere and work (e.g., from differential household-division of labor and preferences for different lifestyles), the policy implications are different. The appropriate response would be to expand family policies and aim for further cultural changes in the way families function, both of which pose more complex challenges in that families and family cultures are harder to regulate than employers. The question then arises as to whether family policies have had effects in settings where they have been tried on a large scale. Nowhere has this been more the case than in Scandinavia: Major policies to reinvent the family and its relationship to work were rolled out over the last 20–30 years. They aimed principally at making it easier to combine family and career, but aimed also at the internal organization of the family, hoping to create a more equal division of household labor and caring for children. But have the policies worked? Have they led to one of their goals, to facilitate employment and careers for both parents?

The answer to the question of policy success is far from obvious, and scholars disagree on the extent to which Scandinavian-style family policies are desirable in the first place and whether they have had their intended effects. Some scholars argue that the Scandinavian countries offer the "blue-print" for gender-equalizing family policies (e.g., Gornick and Myers 2009, p. 18), a position found among many U.S. feminists who argue for policies aimed at achieving equality between men and women in how they allocate time to market, household, and child-care work. Other scholars

are skeptical. Bergmann (2009, p. 70) argues that Scandinavian-style policies have many negative impacts on female careers. Orloff (2009, p. 131) questions the goal of gender symmetry in market and housework, and does so especially in the U.S. context (p. 148) where there may be too much diversity in life styles for such goals to be plausible. Hakim (2000, p. 240) in an extensive analysis concludes that Scandinavian women have not achieved labor equality in access to top jobs, authority at work, or pay, noting that "Some scholars are now concluding that Nordic egalitarian policies have failed..."(p. 243).

We intervene in these debates by focusing on whether Scandinavian-style family policies have succeeded in one of their stated goals, to lessen the economic penalties to women from having children and hence contributed to reducing the gender wage gap. Assessing the broader desirability of the policies is a task beyond our goals and in the end better suited for normative than empirical analysis.

A caveat is in order. Ultimately it is probably impossible to discern the precise effects of family policies on the rewards and penalties to family status, simply because policies work out over many years and come bundled with other changes. Policies impact fertility, the work-family interface, and employer adaptations, each of which adjusts over several years. But then there have been concurrent changes in family culture and decline in discrimination against women more generally, which we will discuss but not directly address in the empirical analyses. These have affected the household division of labor and influenced the norms surrounding fatherhood and how families operate during the last 30 years. Employers have also been affected and are undoubtedly more willing today to accommodate constraints arising from family obligations than in 1970. Empirically one thus faces an entire constellation of changes. But to the extent that declines have occurred in the economic rewards and penalties to family over the last 20–30 years, family policies likely have been a major contributing cause, though its precise impact may be impossible to disentangle.

2 Unequal Treatment and Sorting

A considerable body of research examines the effects of family on the wages of men, and an equally extensive, though largely separate, literature documents the effects of family on the wages of women. For men the marital premium can be substantial, in the United States up to 15% (see Rodgers and Stratton 2009), but lower in Scandinavia, 6% or less (see Datta Gupta, Smith, and Stratton 2007). The children premia for men tend to be low, of at most 2%, 5%, and 6% for 1, 2, or 3+ children (see Stratton 2002; Datta Gupta, Smith, and Stratton 2007). For women in the United

States there are relatively small marital premia, mostly close to zero and up to 4–6% at most (e.g., Hundley 2000). The wage penalties for having children are substantial, up to 15–20% for two or more children (e.g., Budig and England 2001; Anderson, Binder, and Krause 2002). Women's marital premia and children penalties are lower in Scandinavia, around 2–10% for two or more children (Davies and Pierre 2005; Harkness and Waldfogel 2003), and even lower in the Danish case (e.g., Datta Gupta and Smith 2002).

The patterns of family premia and penalties have obvious implications for the gender wage gap. Even from a hypothetical initial position of gender wage parity while single and childless, the result is that a substantial wage gap develops as men and women marry and have children. Waldfogel (1998*b*, p. 533) reports that about 40–50% of the gender wage gap in the UK and the U.S. is due to family status, and that another 30–40% of the wage gap is due to the loss of labor force experience. Harkness and Waldfogel (2003) report gender wage gaps by parenthood status in seven industrialized countries, finding that the impact of motherhood on the gender wage gap is largest in the U.S. and UK, the countries with the least extensive family policies.

One key question that has not been addressed in this research is the degree to which differences in wages arise from employers paying unequal wages for the same work depending on family status, or whether family status results in employees working in different types of jobs. The few pieces of research that compare men and women in the same job find differences in hiring and promotions. Correll, Benard, and Paik (2007) in an audit study report a negative impact of motherhood status on hiring. Neumark and Korenman (1991, p. 302) in a study of a single company find that married men are promoted at a higher rate than single men, but that the difference disappears once performance rating is controlled. There is as yet no study using broad data examining the degree to which there also is unequal pay for equal work by family status.

Examining equal pay for equal work requires access to matched employer-employee data, where we can compare the wages of employees working in the same occupation in the same establishment. Such data have been used to study the gender wage gap (for the U.S. see Groshen 1991), but yet not for the role of family for the gap. With such data one can ascertain whether there is different pay for the same work for the same employer, that is, whether productivity differences and/or discrimination could have arisen at that level. To the extent that there is unequal pay for equal work, we should find wage gaps even when we compare employees in the same occupation in the same establishment. The absence of a gap at the occupation-establishment level

would establish that differential pay at that level is not the source of the family gaps in wages, and that the source instead is differential sorting of employees by family status into high- and low-paying occupations and occupation-establishment units.

In thinking about the mechanisms behind the the family gap, a leading explanation for why employers would pay parents and married employees differently from nonparent and single employees proposes that this is due to discrimination (Williams 2010, chap. 2). The claim is that employers consciously favor married men, either as a reflection of societal norms, which stress the value of marriage (taste discrimination), or due to statistical (or error) discrimination, where married men are correctly (or erroneously) seen to be better employees on average, and where it is difficult or costly to assess which married and which single men are more productive (Blau, Farber, and Winkler 2010, Chap. 7). For women, the effects of marriage are also seen to be positive, whereas motherhood may lead employers to pay them less, and hire and promote them at lower rates. Williams (2010, p. 28) claims that "bias against mothers is the strongest form of gender bias in today's workplace." Additionally there may be nonconscious sources of discrimination, as stressed in much recent psychological, legal, and sociological scholarship (e.g., Greenwald and Krieger 2006), with same effects as the conscious taste and statistical discrimination. We refer to these collectively as the *discrimination* hypothesis.

Two additional hypotheses have been put forth to explain the premia and penalties to marriage and parenthood (Korenman and Neumark 1991), and have been applied to both sexes, but with different implications. They focus on employees, their characteristics, and their adaptations in response to changes in family status.

According to the *selection* hypothesis those who get married and become parents are different from those who do not, and would earn different wages and have different careers even in absence of marriage and children. The idea is that men who get married and have children may be more productive than those who do not, while women who become mothers may be less career oriented than women who choose to remain childless or have few children.

According to the *treatment* hypothesis, men and women change their workplace behavior upon marriage and parenthood, resulting in changes in productivity (increased for men, decreased for women), which subsequently affects wages and careers. One source of this change is the gendered division of household labor and caring for children, with men putting in more effort at paid work and women more at home.

While the discrimination hypothesis is central to understanding the need for additional anti-discrimination legislation and measures, the selection and treatment hypotheses are important for understanding the potential role of family policies and

family culture in changing the gaps.

3 Sources of Change

3.1 Family Policies

How the family operates and the relationship between family and work are amenable to change from two important sources, family policy and cultural change. We first review four family policies and institutional arrangements that have been identified as important for the family gap (Waldfogel 1998*a*, pp. 141–145; Dex and Joshi 1999, pp. 655–656; Gornick and Meyers 2003, chap. 8). In doing so we comment on their role in the Norwegian context, where family policies have been considerably more elaborate than in most other countries, though not at the level of Swedish policies.

The *first* major public policy is paid parental leave—maternity and paternity—preferably with a portion reserved for fathers. In many countries, including those in Scandinavia, this is financed through social insurance (tax contributions paid by all employers and employees regardless of whether they employ parents or are parents). The central cost borne by employers is the prolonged absence of their employees after childbirth; practically all mothers take the leave and increasingly fathers do the same (Gornick and Meyers 2009, p. 39).

Maternity leave allows women to keep their jobs while they take time off to care for children and to keep a portion of their salary. Attractive job matches can be maintained and permanent employment secured. However, lengthy maternity leave can lessen human capital accumulation, through loss of work experience and training (for the case of Sweden, see Albrecht, Edin, and Sundström 1999). Paternity leave provides many of the same benefits for fathers and may lead to a more equal distribution of work in the household and thus lessen some of the workload on the mother.

In Norway, parental leave was available for 18, 20, 22 weeks in 1977, 1987, and 1988, with 100% pay since 1978. Since 1977 fathers could share the leave, with the exception of the first six weeks, which were reserved for the mother. Between 1988 and 1993, parental leave was increased by a few weeks every year from 22 to 52 weeks at 80% pay (or 42 weeks at 100% pay), up to a maximum amount (Rønsen and Sundström 2002). Four of those weeks are reserved for the father and six weeks for the mother (Leira 2002, pp. 89, 95). In 1996, 69% of fathers took paid parental leave and used about 7% of the parental leave days (Leira 2002, pp. 86, 91). One goal of parental leave has been to strengthen the bond between fathers and children, thereby creating entirely new norms for fatherhood (Leira 2002, chap. 4).

The *second* major policy is subsidized child care, often publicly provided. This allows mothers to return to work soon after child birth, and leads to less loss of human capital. In the U.S., child care facilities can be open for long hours, which may help the highly educated in careers and earnings. In Scandinavia hours at child care facilities are short, in Norway they are typically open only between 7–7:30am and 5pm. This is probably good for children and most parents, but does not help careers of parents in many high-paying professional jobs.[1]

In Norway, 5% of preschoolers had access to publicly funded child care in 1973, 25% in 1983, and 32% in 1988. By 1995, 22% of 0–3 and 61% of 3–6 year olds attended publicly supported child care in Norway (Leira 2002, p. 62). The cost of child care is relatively low in Norway, where it is 13 percent of average female earnings (compared to 22 in the U.S.) and single parents pay lower fees (Waldfogel 1998*a*, Table 2).[2] Unlike other Scandinavian countries, access to child care is not a social right in Norway.

A *third* policy involves the provision of cash benefits and tax breaks for children. These make it easier to have children and may have pronatal effects. Whether they do much for the family gap is less clear. Their impact may in fact be negative, as they may encourage lengthy career breaks. Norway provides both cash and tax benefits.

A *fourth* major policy arises in the realm of employment regulation and organizational practices, namely the availability of part-time jobs and jobs with flexible hours and schedules. Such jobs may facilitate labor-force attachments for mothers, especially of small children. These policies are implemented by employers, but they can be influenced by public policy as well. The tax system is particularly important. Part-time work is often cheaper to provide in Scandinavia than the U.S. since benefits such as medical insurance are paid for on a pro-rated basis, are compulsory, and cover everyone. Employers thus pay a fixed percent of the employee's received wages, as opposed to paying a fixed premium for a health insurance plan. In the case of Norway, part-time work and flexible hours are almost universally available, and there is no wage penalty to being employed part time.

The two first policies—parental leave and childcare—are important around the period of childbirth and up until school age. The third and fourth policies—financial incentives and flexible employment—have consequences for a longer period. Tax

[1]Hours are similar in Finland (7am to 5pm) but longer in Denmark (7am to 6pm) and Sweden (6:30am to 6pm). See Gornick and Meyers (2003, Tab. 7.9, pp. 230–231).

[2]Esping-Andersen (1999, p. 66, Tab. 4.4), however, argues that net costs for child care in the U.S. are among the lowest internationally, stating that even in the absence of publicly provided child care "the United States offers a superior cost-subsidy mix"; as a percent of family income with costs equal to those in Denmark and France and lower than in Sweden.

breaks and cash benefits are often given up until age 18 for each child. Flexible hours may also be attractive for families with teenage children living at home. The policies are primarily targeted at employees who combine parenthood with full- or part-time careers, but are less sensitive to the family adaptations of stay-at-home mothers (see Hakim 2000, Chap. 1).[3]

In Norway during the period of our data, changes in family policies divide into three periods: (1) 1979–1987, eight years with relatively stable policies, including the first year (1979) the Norwegian Gender Equality Law of 1978 was effective, (2) 1988–1993, six years when policies were expanded (especially parental leave, but also publicly subsidized child care), and (3) 1994–1996, the years following the expansion, with fewer changes in policies.

Although most Scandinavian family policies are gender neutral, their first-order impact is primarily on mothers, making it easier to combine family and career; female labor-force participation rates are now close to male rates, though with higher rates of part-time work for women. The second-order impact is on the adjustments fathers make. In passing Norwegian family legislation a goal expressed during parliamentary debates was to redefine the family institution, by shifting the culture around how families operate to create gender equality within the family (Leira 2002, pp. 94–95). Internationally, Norway—along with Sweden, Canada and the U.S.—has one of the most equal divisions of household labor (Hook 2006, Fig. 1, p. 650; see also Fuwa 2004, Tab. 2, p. 757), and along with Sweden scores at the top of the Gender Empowerment Measure of the *Human Development Report* (Fuwa 2004, Tab. 2).

3.2 Cultural Transformations

A second source of change in the family gap comes from broad-scale cultural transformations over the last thirty years concerning the role men take in the family in both household work and caring for children. Cultural changes may also result in pressures to legislate new policies, and policies in turn may lead to changes in culture and hence the relationship between family and work. While not the focus in our empirical analysis, it is nevertheless instructive to reflect on these cultural processes, as they were concurrent with changes in family policies, and thus are relevant to the interpretation of any changes in family gaps over time.

The *first* major change is in the distribution of household labor (Bianchi, Robin-

[3]There are also externalities of such policies, principally for children, their most important target. Parental leave results in parents spending more time with children, while publicly supported child care results in the opposite. The needs and interests of children can conflict with achieving gender equality (e.g., Presser 1995). But policies can also be beneficial to children, to the extent that it is in their best interest to be cared for by both parents (see, e.g., Gornick and Meyers 2003, Chap. 5).

son, and Milkie 2006). Over the last thirty years in many Western societies—including the U.S., Norway and Scandinavia more generally—men have increased the number of hours they spend doing household chores. Women have conversely decreased their hours. The net effect is that the gender gap in household hours has decreased sharply, as has the total number of household hours. Much of the closing of the gap must be due to cultural changes, but some of it is likely also brought about by necessity through rising female labor-force participation rates.

The *second* major change is in the institution of fatherhood. Fathers spend more time taking care of children today than thirty years ago (Bianchi et al. 2006). Here the trend in many countries has been the opposite of that in housework: total parental time devoted to children has gone up. The role of family policies in causing these changes is difficult to assess, but some portion of changes is clearly unrelated to family policies since changes have occurred at a significant scale also in countries with limited family policies.

The remarkable cultural transformations are well documented by time-use statistics. In the U.S., average household work for married mothers decreased from 34.5 to 19.4 hours per week between 1965 and 2000, while among married fathers it increased from 4.4 to 9.7 hours, an increase in the share done by men from 13 to 33% (Bianchi et al. 2006, p. 93, Tab. 5.1). In the same period men more than doubled the time spent on child care and women increased it by about 20%, with similar changes in many other rich countries (Bianchi et al. 2006, p. 64, Tab. 4.1, pp. 159–160, Figs. 9.1–9.2). With respect to total hours spent on household tasks and caring for children, the percent of hours done by men increased from 20 to 28 to 38 from 1975 to 1985 to 2000, with similar increases in Norway, from 30 to 35 to 38 percent from 1980 to 1990 to 2000 (Hook 2006, Fig. 1B, p. 650). A central reason for the more equal distribution of domestic tasks in the U.S. and Scandinavia is that the amount of household work done by women is lower there than in most other countries. Parity in housework and taking care of children has yet to be achieved, but the changes are substantial, and the number of total hours on paid and unpaid work in the U.S. is now almost identical for men and women among married parents, but with men doing more paid and women more unpaid work (Bianchi et al. 2006, pp. 116–117, Tab. 6.1). There are however significant variations between families in how they adapt.

4 Data

To address the questions outlined above we use matched employer-employee data on all white-collar employees in central sectors of the Norwegian economy in the

period 1979–1996. The data were collected from individual-level records kept by the establishments and compiled by the Norwegian Central Bureau of Statistics and the main employer's association in Norway, the Confederation of Business and Employers (NHO). 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 and should be more reliable than information from survey respondents on pay rates, hours worked, and occupation, but as explained below, less reliable for the measurement of labor force experience and cohabitation status.[4]

During the period for our study (1979–1996) Norway had a gender wage gap comparable to the other Scandinavian countries; among private sector employees women earned about 16% less than men in 1996. In the data we use, women earned 27% less than men at beginning of the period (1979) and 20% less at the end (1996).

The matched employer–employee over a 17-year period data allow us to (1) compare employees working in the same occupation for the same employer, where comparisons are made between single, married, previously married, and those with and without children, (2) assess the role of sorting on occupations and occupation-establishment units, and (3) trace changes over time as family policies were unrolled.

We follow the establishments and their employees from year-to-year, and have information on 3.9 million person-years. We restricted the analysis to employees 20–50 years old, yielding about 2.8 million person-years. On an annual basis, we use information on 147,027 to 193,197 employees, 11,364 to 19,500 establishments, 488 to 577 occupations, and 59,042 to 78,091 occupation-establishment units. For each employee we have information on sex, occupation, age, part- versus full-time status, contractual hours worked, and monthly earnings from work on contracted hours, which excludes wages on overtime hours. The data have been matched to register data from the Central Bureau of Statistics, providing detailed information on educational attainment (length and type, 4 digit code), family or civil status (8 statuses), number and ages of biological and adopted children. This provides complete educational, marital, and parental histories for the period studied.

These data on white-collar employees cover all occupational groups, such as technical, professional, administrative, and managerial employees, with a few exceptions: CEOs, top editors of newspapers, secretaries to the editors of newspapers, and journalists. The occupational code is detailed, with 488, 511, and 577 occupations in 1981, 1989, and 1996. The restriction of analyses to white-collar employees probably leads to results with somewhat larger penalties than if additional blue-collar

[4]The 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.

employees had been included (see Petersen, Snartland, Becken, and Olsen 1997).

The analysis includes five broad sectors of the Norwegian economy (in the private sector): (a) manufacturing, oil extraction, mining, quarrying, transportation, storage, communication, and various other industries; (b) business services; (c) retail and wholesale trade; (d) banking; and (e) insurance. The sectors are broadly representative and account for roughly 25% of all employees in the Norwegian economy.

From the contractual monthly earnings and contractual hours worked we computed the hourly wage, which then refers to hourly wages paid on regular work hours, hence not mixing pay on regular and overtime hours. This is important since a central goal of the analysis is to assess whether employers pay mothers and non-mothers differently, in which case we need to measure the pay rate on regular hours. Five marital statuses are distinguished: single, married, separated, divorced, and widowed. Among the married, separated, and divorced, we include a few hundred employees in same-sex unions that were still intact ("married"), "separated", and "divorced"; these are legal categories in Norway. Excluding these cases does not affect the results. We coded three dummy variables for number of children aged 20 or younger: for one, two, or three or more such children. We experimented with a number of different codings for the children variables, such as number of children below age 6, between 6 and 15, and so forth. The alternative codings make no substantive difference for the conclusions arrived at in the analyses.

Table 1 provides descriptive statistics for our variables. To simplify presentation, we report the annual averages (for wages deflated) within the three family policy periods identified in Section 3: (1) 1979–1987, (2) 1988–1993, and (3) 1994–1996.

About 50% of the women were married in any given year (with higher percentages for men), and 40% were single. The percent men with no children stayed relatively stable from 1979 to 1996 (increased from 31.3 to 34.4), while for women it declined from 56.3 to 47.8. About 34% of the women were single with no children and 6% were single with children (numbers not reported in the table).[5] On average male and female employees are observed for nine and eight years respectively.

(Table 1 About Here)

In addition to changes in legislation and policies, the historical period analyzed saw great changes in female employment. Of particular importance are changes in the selection and representation of women in the workforce, and among women, of

[5]The percentages of women who were mothers and/or married were the same in our data as in other sectors, although the percent female was 35% in our data versus 43% among all employees in the Norwegian economy.

mothers and married women. This raises concerns over whether women and mothers have become more or less select over the period. If the composition of mothers and nonmothers in our data changed over the period this could by itself account for changes in the motherhood wage penalty. About 25% of the women in our data left every year for other sectors or for non-employment (with about 20% of the men doing so). Early in the period, mothers were more likely to leave than nonmothers, by 1–5 percentage points. Later in the period, mothers were less likely to leave than nonmothers, by 1–5 percentage points. We found similar differences and changes in differences by marital status. The differences in years of education of mothers relative to nonmothers were also very small over the period. It thus appears that the mothers did not become more select during the period; if anything they became less so.

Our data suffer from one significant weakness. We do not know which employees are cohabiting. For the employees who are recorded as single (i.e. not yet married), some are truly single, others are cohabiting. Cohabitation is important in Norway, especially among younger cohorts, and increased over the period 1980–2000 (Noack 2001). In 1990, about 58% of Norwegian men aged 20–66 were married and another 6% were cohabiting, with the remaining 36% being single, with similar percentages for women. Assuming that the ratio of singles to cohabitors is the same in our data as in the population, the 29.4% of men recorded as single (in 1994–1996) really consists of 25% single and 4% cohabitors, while for women 32% would be single and 5% would be cohabiting. While we are not aware of any Norwegian studies investigating wage premia for cohabitors, there are such male premia in Sweden of about 3% and in Denmark of 2% (Richardson 2002; Datta Gupta and Smith 2002), while the female premium in Denmark is about 1% (Datta Gupta and Smith 2002).[6]

Some biases arise from this misclassification, as documented by Cohen (2002) for men using U.S. data. If cohabitors enjoy wage premia similar to married employees, we will overestimate the wages of single employees, while still correctly estimating the wages of married employees, and thus underestimating the wage differential, that is, the marital premium. To the extent that cohabiting employees are more like single employees in their economic success, there is no problem.[7]

[6]Given that the role of cohabitation, and as a corollary, the role of marriage is different in Scandinavia and the United States, the estimates of marital premia are not always comparable across the settings.

[7]In our analysis, the marital premia for men and women are about 6% and 2% respectively (see below). To take an extreme case, if one in three of single employees are cohabiting, and they earn the same premium as married employees, the bias will be 3.2% for men and 1% for women: We will estimate the marital premium for men to be 6% rather than the correct 9.2% and for women to be 2% rather than the correct 3%. See Light (2004) for cohabitation and marital premia for men and women in the United States.

5 Methods

The data have a unique multilevel structure. The key feature for our purposes is that in a given year we can account for the clustering of employees into establishments, occupations, and occupation-establishment units, using fixed-effects models.

We report a sequence of four regression equations predicting the hourly wage. Each equation includes independent variables for education and imputed labor force experience plus dummy variables for both marital status and the number of children below age 20. The first equation does not control for the establishment where employees work nor their occupations, the second controls for the establishment (workplace), the third for the occupation, and the fourth for the occupation-establishment unit (i.e., job). The four specifications will be referred to as the *Population, Establishment, Occupation*, and *Occupation-Establishment* estimators.

The subscripts used are as follows: i for individuals, o for occupations, e for establishments, and t for years. The dependent variable is the logarithm of wages ($\ln w_{it}$) for individual i in year t, and the independent variables are collected in the vector x_{it}, which includes the constant 1. Separately for each year t we regress the logarithm of wages $\ln w_{it}$ on explanatory variables x_{it}, using four different specifications:

$$\ln w_{it} = \alpha_{P,t} x_{it} + \varepsilon_{it}, \qquad \text{(Population)} \tag{1}$$

$$\ln w_{it} = \alpha_{E,t} x_{it} + \eta_{et} + \varepsilon_{iet}, \qquad \text{(Establishment)} \tag{2}$$

$$\ln w_{it} = \alpha_{O,t} x_{it} + \eta_{ot} + \varepsilon_{iot}, \qquad \text{(Occupation)} \tag{3}$$

$$\ln w_{it} = \alpha_{OE,t} x_{it} + \eta_{oet} + \varepsilon_{ioet}, \qquad \text{(Occupation-Establishment)} \tag{4}$$

where η_{et}, η_{ot}, and η_{oet} are fixed effects (i.e., of dummy variables) capturing establishment e, occupation o, and occupation-establishment unit oe, and ϵ_{it}, ϵ_{iet}, ϵ_{iot}, and ϵ_{ioet} are error terms. The subscripts to the α parameters indicate the four different sets of coefficients, pertaining to different levels, population, establishment, etc. The fixed effect [in (2), (3), or (4)] in each year (t) pertains to an establishment, an occupation, or an occupation-establishment unit and is the same for all the employees who work in each of these.[8]

Our first empirical puzzle—about equal pay for equal work by family status—is answered by the occupation-establishment coefficients. Our second empirical puzzle—about the role of sorting on establishments, occupations, and occupation-establishment units—is answered by comparing the changes in estimates from the population to

[8]In panel data one often includes a fixed effect for each individual, thereby assessing intra-individual differences between years, while above we include fixed effects for the various levels (e.g., occupation-establishment), thereby assessing intra-level (e.g., occupation-establishment) differences between employees (e.g., married versus single).

establishment, to occupation and to occupation-establishment level coefficients. Our third empirical puzzle—about the role of family policies—is answered by assessing changes over time in the coefficients, at each of the four levels (population, etc.).

The equations are estimated separately for each of the 18 years in the data. We can thus trace changes over time. As explained in the sections on family policies and the data, to simplify presentation, we report the averages of the coefficients within each of three distinct family policy periods.

We include both men and women in the analysis, and include interaction terms between sex and the other variables: marital status, children, education (measured as years of education above 9th grade), and imputed experience. We center the constant term in each year at the overall mean level of education and experience for the 18-year period. The coefficient for being female can then be interpreted as the net sex difference among single and childless employees evaluated at the mean level of education and experience, controlling for the other variables. At each of the relevant levels—establishment, occupation, and occupation-establishment levels—we restrict the analyses to units that are sex integrated at the level.

The annual coefficients for men being married and for women having children are all significantly different from zero, often with t-statistics of 40–50 and significance levels of .000001. No point is served in focusing on these significance levels; they reflect the large number of observations each year. For some of the other variables, the number of observations gets small (e.g., for widowed) or the coefficients are very small in magnitude and are neither substantively nor statistically significant. For changes over time, each of the 36 comparisons for changes in the motherhood penalty are statistically significant, as are almost all other tests of changes over time, even where substantive sizes of coefficient are stable. The statistical significance of coefficients is reported in the note to the regression table.

The dependent variable is the natural logarithm of the hourly wage. When small (e.g., less than .10 in absolute value), a coefficient can be interpreted as giving the relative change in the unlogged dependent variable from a one-unit increase in the independent variable, holding the other variables constant. We implicitly interpret this as the relative change in the mean of the unlogged wages, but as it reports the absolute change in the mean of logarithms of wages, it is correctly interpreted as the relative change in the geometric mean of unlogged wages.

How should one then think about the various estimates we report? It is tempting to assume that the estimates including the most detailed set of fixed effects are the better ones. That is not necessarily the case. A more fruitful way to think about the estimates is that they report on different aspects of the data. No esti-

mates are then necessarily better, they just answer different questions. By comparing changes in coefficients as one goes from the population-level estimates to the occupation- to the occupation-establishment-level estimates one can assess at what levels differences between groups arise: From differential wages at say the occupation-establishment level, or from differential sorting of the groups on occupations and occupation-establishment units.

6 The Gender Wage Gap By Marital Status and Children

Table 2 reports the regression 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 three different periods for family policies and four different levels, adjusting for education and experience. Panel D presents the predicted gender wage gaps for five groups: single, married, and married with 1, 2, and 3+ children, evaluated at the mean level of education and experience.

(Table 2 About Here)

Our *first* empirical puzzle concerns whether there is equal pay for equal work by family status. The answer to this puzzle is given in the fourth column within each of the three periods, the occupation-establishment estimates (called 'Occ-Est'). For men (in Panel A), for being married there are stable premia over time of 1.8–2.5%, and stable but smaller premia for post-marital states. For children, the premia are smaller and also stable over time ranging from 0.5 to 1.1% for 1, 2, and 3+ children. There is hence close to equal pay for equal work: small premia for being married or previously married, and even smaller premia for children.

For women (in Panel B), in contrast to men, there are sizeable declines in penalties and premia over time. The premium to being married in the first period (1979–1987) is at 1.3%, half the male marital premium, and by the last period it was reduced to 0.6%. There are no premia for post-marital states (unlike for men). For children there are sizeable penalties of 1.4, 4.1, and 6.4% for 1, 2, and 3+ children in the first period, which is unequal pay for equal work by motherhood status. These penalties were strongly reduced by the second period (1988–1993) and had for all practical purposes vanished by the third (1994–1996), with penalties of 0.4, 0.4, and 0.8%, a situation of practically equal pay for equal work by motherhood status. It is especially the penalties for having 2 and 3+ children that have declined.

Turning to Panel C, comparing men and women, since men gain more from marriage than women, the gender gap increases by being married with 1.2–1.4%, and

also from post-marital states, with 0.8–2.1%. From being a parent, men receive minor and stable premia over the entire period, whereas the penalties for women decline. In the first period, having 1, 2, and 3+ children increases the gender wage gap by 2.0, 5.1, and 7.2% for 1, 2, and 3+ children, whereas in the last period these differentials are 1.1, 1.4, and 1.9%, dramatically smaller.

Perhaps most surprisingly, among single and childless employees, there is a gender wage gap at the occupation-establishment level of 2.0, 2.7, and 2.9% in the first, second and third periods, amounting to unequal pay for equal work. In the first period, this penalty was much smaller than the differentials induced by parenthood status for 2 and 3+ children, but in the last period, the penalty to being female is larger than the differentials induced by marital status and by having 1, 2, and 3+ children. It is of course possible that this penalty reflects unmeasured variables.

The impact of these differentials on the gender wage gap is given in Panel D. 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. The gaps for having one child is stable over time, whereas the gaps from 2 and 3+ children got reduced from 91.6 to 94.5 and from 89.5 to 94.0% between the first and last period. In the last period, the differential in the marital premium does as much to the gender wage gap as the differential in premia and penalties to children, and the penalty to being female increases the gap more than marital and parental status do. The problem in the last period is not that women lose from having children, as the penalties are small at the occupation-establishment level. The problem is that men gain first from being men (most important), second from marriage, and third slightly from fatherhood (least important).

In summary then, for women there is by the end of the period of our data for all practical purposes equal pay for equal work by motherhood and by marital status (differentials are less than 1%). For men there is a small premium to being married, and even smaller premia for children, also close to equal pay for equal work. The sex differentials in premia for marriage adds about 1.0% to the gender wage gap, and the sex differential in premia and penalties for children add 1.1–1.9% to the gaps. With respect to equal pay for equal work, by the end of the period, it is the penalty to being female that is the key factor in the gender wage gap, as this penalty is clearly larger than any differentials induced by marital or parental status.

Our *second* puzzle concerns the role of sorting of men and women on establishments, occupations, and occupation-establishment units by family status for the gender wage gap. The answer to this puzzle is obtained by comparing the population estimates to the establishment, occupation, and occupation-establishment estimates

(in Table 2, referred to as 'Pop', 'Est', 'Occ', and 'Occ-est', in columns 1–4 within each period). If the population estimates are larger than the other three, then sorting plays a role for the gender wage gap; that is, the larger gap found at the population level is due to the sorting of employees on the three other levels.

For men (in Panel A), with stable premia over time at all levels, the marital premia observed at the population level are 50–75% due to sorting into higher-paying occupations and occupation-establishment units (with premia of 1.8–2.5%), while sorting on establishments is not as important. For fatherhood the premia at the population level are already small (0.0–1.8%), and little or even none of this is due to sorting on occupations and occupation-establishment units (with similar premia of 0.6–1.1%). The parenthood premia at the establishment level are however larger than at the other levels, indicating that within establishments, fathers are sorted into the better-paying occupations.

For women (in Panel B), the role of sorting on establishments, occupations, and occupation-establishment units is important for both the marital premia and motherhood penalties: About 50–90% is due to sorting on occupations and occupation-establishment units and about 30–50% on establishments.

Comparing the coefficients of women to those of men (Panel C), sorting on establishments accounts for relatively little of the differences ('Pop' and 'Est' estimates are similar), whereas again sorting on occupations and occupation-establishment units accounts for a significant amount of the differences, around 50% of the differential in coefficients for children in the first period, and an entire 75–100% in the last period. Thus we conclude that sorting plays an important role for the motherhood penalty, but is less salient for the premia for marital status and fatherhood.

Our *third* puzzle concerns the potential role of family policies for the premia and penalties. It gets answered by tracing changes in coefficients across the three periods (for the four levels 'Pop', 'Est', 'Occ', and 'Occ-est´'). The two key columns are the population level and the occupation-establishment level, addressing respectively wage differences in the market and whether there is equal pay for equal work.

As already noted, for men (Panel A) there is stability in premia at each of the four levels across the three periods (small for being married, even smaller for fatherhood status), hence there is no discernable impact of policies. For women (Panel B), in contrast, there are sizeable changes over the period, small declines in the premia to marriage and major declines in the penalties to children. The marital premia declined at each of the four levels; for being married from 2.9% to 2.0% at the population and from 1.3 to 0.6% at the occupation-establishment level. The children penalties were stable in two periods (1980–1987 and 1994–1996), but declined the first year after

the Gender Equality legislation was made effective (from 1979 to 1980), and then declined precipitously in the second period (1988–1993). These changes for women bear elaborating. Table 3 reports the annual coefficients for the children penalties for women. During the second period in the data, the six years 1988–1993, the population level penalties were reduced by 50% for 1 child and 66% for 2 and 3+ children, for the latter two dropping annually by about 1 and 1.4 percentage points. These were precisely the years during which family policies were extensively expanded, and the drops in penalties were dramatic. At the occupation-establishment level the penalties were stable in the years 1979–1987 and 1994–1996, but then dropped strongly in the years 1988–1993: The penalties for 1, 2, and 3+ children dropped from 1.0, 3.3, and 5.3% in 1987 to 0.3, 0.6, 1.0% to 1994.

(Table 3 About Here)

The key lesson then is that the period with extensive expansion of family policies did practically nothing to change husband and fatherhood premia. However, it clearly reduced the premium to being a wife, and reduced in a perhaps unprecedented manner the penalty to motherhood. The decline in the motherhood penalties—at all levels—over a short period is close to sensational.

For the gender wage gap, then, the role of being married increases slightly over the period, since male premia are unchanged while female premia have declined, increasing the difference between men and women in this regard (Panel C). As can be seen from Panel D, the wage gap among married and childless men and women is relatively stable across the periods, but the relative role of marriage has increased due to the decreased effects of having children. It is thus for the role of children that the major changes occurred. From Panel C, we see that there is a precipitous drop in the difference between fatherhood premia and motherhood penalties from the first to the last period. This is especially pronounced for 2 and 3+ children. In 1979–1987, adding 1, 2, or 3+ children, at the population level men increased their wages with 0.0, 1.4, and 0.5%, women decreased their's with 3.6, 8.9, and 14.4%, thus increasing the gap to 83.6, 76.9, and 72.3%. But by 1994–1996, the sizeable gaps due to 2 and 3+ children had improved by almost 10 percentage points, to 84.5 and 81.9%, a remarkable change.

In conclusion, at the end of the period, the penalty to being female (i.e., the difference between unmarried childless men and women) is larger than the penalty to being a mother, and the sex differences in returns to marital status are at the same magnitude as the sex differences in returns to having children. One may conjecture that family policies had the desired effects on removing the motherhood penalty, but

they had no effect on premia for husbands and fathers.

7 Conclusion and Discussion

Summary

The processes that occur in the family are today probably the largest obstacles to continued progress in gender equality in the workplace, with women suffering significant wage and career penalties from motherhood, and men reaping substantial premia to marriage, two diverging processes that combine to increase the wage gap between women and men. For understanding how to ameliorate these processes, one needs to identify both where they arise and the potential role of public policies.

Corresponding to three empirical puzzles, we investigated whether the premia and penalties to family status (1) arose from differential pay by employers, (2) arose alternatively from differential sorting of employees on occupations and establishments, and (3) changed over a period when extensive family policies were introduced. Data came from Norway from the years 1979–1996, a country and period where public policy has made it easier to combine family and career, with the clearest first-order impact on mothers, but with possibly attendant increased pressures on fathers to be more active in the family sphere.

We have three main conclusions. For our *first* puzzle concerning whether there is equal pay for equal work by family status: By the end of the period (mid-1990s), when the same work was done for the same employer (at the occupation-establishment level) there was no wage penalty for mothers relative to nonmothers. Employers, for all practical purposes, paid the same wages to both groups, mothers were not subject to wage discrimination. At the beginning of the period, the years immediately following the passing of Norwegian gender equality legislation (1978), differential pay at that level was pronounced for 2 and 3+ children. The premia for husbands and fathers were small at the occupation-establishment level throughout the entire period.

For our *second* puzzle (a corollary to the first) concerning the role of sorting of men and women on establishments, occupations, and occupation-establishment units by family status: Sorting on occupations and occupation-establishment units accounted for 50–75% male marital premia and 50–90% motherhood penalties.

For our *third* puzzle concerning the potential role of family policies for the premia and penalties: There was a major drop in the motherhood penalty from 1979 to the mid-1990s, at all levels (population, establishment, occupation, and occupation-establishment), a dramatic change over a relatively short period, during which extensive family policies were introduced. At the end of the period, for 1, 2, and 3+

children, the penalties (controlling only for years of education and experience) were 1.4, 2.5, and 3.9% at the population level and practically zero (0.4, 0.4, 0.8%) at the occupation-establishment level. The premia for husbands and fathers remained unchanged at all levels.

Finally, as implied by the third conclusion, by the end of the period the wage gap between men and women from family situation did not principally arise from mothers being penalized. The main causes were the substantial rewards men received first from being male and second from marriage and fatherhood.[9] These rewards have been stable over time, while female penalties to children have dropped. The net effect is a drop in the gap between men and women from children, a gap that now is almost unrelated to motherhood status.

Discussion

It seems prudent then to conclude that family policies over a remarkably short historical period have eradicated the motherhood penalty at the occupation-establishment level, where there no longer is evidence of discrimination against mothers, and reduced it with 75% at the population level, in short, spectacular changes in the motherhood penalty. The declines in penalties were extensive in the six years 1988–1993, years that coincided with extensive expansion of family policies. It is unlikely that we can ever decisively establish how tight the causal link is between the expanded policies and the vanishing penalties, as there undoubtedly were concurrent changes in family culture and discrimination against women, but the correlation is in all likelihood not entirely coincidental. And since similar changes in family culture occurred also in the U.S. during this period, but with no comparable change in family policies, and no comparable decline in motherhood penalties, our confidence in the claim that family policies in part caused the declines is strengthened. Returning to Hakim's (2000, p. 240) discussion cited in the introduction that "Nordic egalitarian policies have failed" our conclusions are more optimistic, at least with respect to the wage costs to being a mother.[10] But family policies have not eradicated the male premia to marriage and children. Nor are they likely to do so in the future. These premia come in part from selection, but we may speculate that they to a large extent are due to increased career aspirations and economic pressures induced by family situation, which in turn may be tied to rational adaptations in the family.

[9]It is possible that the premium for being male, or conversely the penalty to being female, arises due to expectations from employers that women will become mothers.

[10]We provide no analyses of the impact of family policies on labor force participation (which is high in Scandinavia), nor on changes in occupational sex segregation or on the glass ceiling, both of which appear to be marked in the Scandinavian countries.

Countries with extensive family-work policies now therefore face a new and probably more intransigent challenge to gender equality: the advantages to husbands and fathers. To the extent that this challenge is solvable—that is, whether the advantages can be lessened—it requires changes in how families are run, not in how employers reward mothers and nonmothers. Whether this is a task for public policy can be questioned, and regardless of the answer, will likely engender much disagreement. It is also far from obvious what can be done: One pushes against the limits of governmental intervention, even in highly regulated social democratic societies. A core concern is that household specialization may sometimes be good for families and children, though detrimental to gender equality in careers. But were public policy to address more directly the internal adjustments in the family, two places to start would be the division of parental leave between parents and the tax system. Parental leave could be split more evenly between parents, for, example, by allocating a third or more of the total leave to fathers. Likewise, perhaps incomes of fathers of small children could be taxed at a higher rate than incomes of mothers? Or perhaps payroll taxes levied on employers could be higher for employing fathers than mothers? A variant of the now practically defunct institution known as protective legislation (Wikander, Kessler-Harris, and Lewis 1995), such policies would immediately change the internal bargains in the family. As with many policies, they would likely have myriads of unintended consequences, and while plausible in the Scandinavian context, would run counter to the universal character of U.S. policies (e.g., Orloff 2009).

Can we draw any lessons for the prospects of eradicating the family gap in the U.S., which along with the UK has the largest gap? While resources to enact extensive family legislation are plentiful in the U.S., political will is lacking, having instead instituted stronger equality legislation enforcement than most other countries. But even with extensive family policies there are features of contemporary U.S. worklife that leads one to a cautious assessment of their possible impact on the family gap.

The first feature is that Americans work longer hours than almost anywhere else, while Norwegians and many Europeans work fewer hours: On average 2,000 hours per year in the U.S. versus 1,500 in Norway. The time pressures on careers are less pronounced in Scandinavia than elsewhere. This makes it easier for women to come out on par with men. It also affects men, who often are culturally constrained in terms of how engaged they are expected to be in work and who may also have preferences for lower hours. Moreover, in the U.S. the long hours intersects with its system of employer-provided benefits and services and creates additional dilemmas. The organizations that provide extensive family benefits—such as reduced and/or flexible hours and parental leave—also often employ highly-educated and high-earning employees,

and these in turn may face penalties in terms of career and wage advancement if they avail themselves of the benefits, due to the pressures on putting in extensive hours at many workplaces (e.g., Glass 2004).

The second feature is that there is more wage inequality in the U.S. than Scandinavia, along with lower income taxes. This makes any wage gaps—between the sexes, educational groups, etc.—larger in the U.S. (Blau and Kahn 1996). The current U.S. system of tax breaks that subsidize child care again creates dilemmas, since it is much more affordable to high- than low-income families, thus ending up benefiting the most the groups the least in need.

These two institutional facts—long hours and high wage inequality—are closely interrelated. Since the economic payoff to being in the upper part of the wage distribution is lower in Scandinavia than elsewhere, the incentives for putting in many work hours are also lower, and since the payoff is large at the upper part in the U.S. and quite low at the bottom, employees at both ends tend to put in many hours of work, at the top because it is so lucrative, at the bottom to make ends meet. The two institutional facts combine to create a lower gender gap for both hours worked and earnings among full-time employees in Scandinavia. This has nothing to do with less discrimination from employers, but arises from the wage compression in the Scandinavian context.

The institutional facts can work in many directions. On the one hand, high pay or the prospect of high pay provides more incentives for mothers to become professionally successful, as illustrated by the relative lack of women in high occupational positions in Scandinavia compared to the U.S. (Wright, Baxter, and Birkelund 1995). On the other hand, high pay rarely comes without putting in the requisite hours, and for mothers that can work in the opposite direction, they may opt out of those jobs. In the U.S. the former effect seems to dominate. With respect to the role of publicly provided child care, parents in the high-paying jobs are the least in need of it, being able to afford the costs, leaving less room for the impact of family policies. For parents in the lower-paying occupations such policies could, however, do wonders.

As a conjecture, an economic system with lower wage inequality, lower work effort and especially fewer hours, may be the most conducive to solving the family gap in pay. These systems are found today in Scandinavia, to a lesser extent in continental Europe, and not at all in the UK and U.S. These institutional features, combined with extensive family policies, contribute to creating equality of treatment (in wages) by motherhood status. In this sense the vanguard for gender equality in labor market outcomes has now shifted from the U.S. to Northern Europe, where the stalled gender revolution may now be becoming unstalled.

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Table 1. Descriptive Statistics for the Three Periods, Separately for Men and Women

	1979-1987		1988-1993		1994-1996	
	Men	Women	Men	Women	Men	Women
Marital status (%)						
Single	24.0	41.1	28.1	39.2	31.3	36.6
Married	70.7	48.0	64.9	47.8	60.7	49.5
Divorced	3.4	7.4	4.7	9.4	5.7	10.6
Widowed	0.2	0.9	0.2	0.7	0.2	0.7
Separated	1.8	2.6	2.1	2.9	2.0	2.7
Ever married	90.3	83.9	86.0	80.5	81.7	77.9
Parental status (%)						
No children	31.3	56.3	33.7	52.4	34.4	47.8
First child	21.3	22.3	23.4	25.9	23.0	25.6
Second child	33.7	16.8	30.8	18.4	29.5	22.0
Third+ child	13.7	4.7	12.1	3.3	13.2	4.6
Ever have children	88.5	82.1	87.0	83.2	84.3	81.8
Wages						
Mean	55.9	38.9	106.0	78.5	147.2	117.8
Std. Dev.	17.2	8.8	34.3	20.4	47.9	32.0
Experience						
Mean	15.6	14.1	16.5	15.4	16.9	16.7
Std. Dev.	8.4	9.4	8.5	9.5	8.5	9.3
Education						
Mean	3.6	2.0	4.2	2.8	4.7	3.4
Std. Dev.	3.5	2.1	3.6	2.8	3.7	3.1
N person-years	858774	446942	705943	394434	340208	186086
N individuals	228951	160900	200244	126291	158951	91048
N occupations	581	538	608	564	593	548
N establishments	28484	29867	25781	24867	17565	16431
N occ-est	158929	96152	127441	83026	78503	50688

Note: The statistics above have been computed separately for each year within each of three periods (1979–1987, 1988–1993, and 1994–1996). We computed the distributions (in percent) on marital status and parenthood status and also means and standard deviations for educational attainment and experience. For wages, we computed the averages and standard deviations for the first year in the first and second periods (1979 and 1988), and for the last year in the third period (1996). On average male and female employees are observed for 9 and 8 years respectively. The last five lines of the table give for each of the three periods (1) the number of individual-years, (2) the number of distinct individuals, (3) the number of occupations, (4) the number of establishments, and (5) the number of occupation-establishment units. The total number of individual-years (=2,932,387), occupation-years (=9,188), establishment-years (=284,771), and occupation-establishment years (=1,172,810). Excluding the years 1979, 1980, 1982 (the three years when our data are not complete), the average, the minimum and maximum number of observations per year are for individuals (Mean=175,330, Min= 147,027, Max=193,197), occupations (Mean=546, Min=488, Max=608), establishments (Mean=17,067, Min=11,364, Max=19,500), occupation-establishments (Mean=70,150, Min=59,941, Max=78,091).

Table 2: Effects of Marital Status and Children on Logarithm of Wage. Controls for Education and Experience. Men and Women Combined.

	1979-1987				1988-1993				1994-1996			
	Pop	Est	Occ	Occ-Est	Pop	Est	Occ	Occ-Est	Pop	Est	Occ	Occ-Est
Men compared to men												
Married	.067	.054	.033	.025	.069	.055	.028	.019	.069	.056	.026	.018
Divorced	.041	.015	.030	.013	.046	.022	.025	.009	.037	.019	.017	.007
Widowed	.036	.026	.022	.015	.050	.037	.025	.016	.053	.046	.020	.015
Separated	.062	.033	.036	.016	.063	.037	.032	.014	.057	.037	.026	.011
One under 20	.000	.011	.002	.006	.003	.011	.002	.005	.006	.013	.004	.007
Two under 20	.014	.029	.004	.010	.010	.022	.003	.009	.016	.022	.008	.010
Three under 20	.005	.028	-.004	.009	.008	.024	.000	.010	.018	.026	.007	.011
Women compared to women												
Married	.029	.017	.014	.013	.021	.013	.007	.005	.020	.011	.007	.006
Divorced	.039	.000	.021	.003	.028	.002	.014	.000	.017	.000	.006	-.001
Widowed	.011	-.003	.004	-.003	.001	-.005	-.003	-.004	.003	-.006	.002	-.004
Separated	.032	.000	.019	.002	.022	.000	.014	.000	.015	-.002	.009	.003
One under 20	-.035	-.024	-.022	-.014	-.023	-.016	-.013	-.006	-.014	-.012	-.007	-.004
Two under 20	-.089	-.065	-.055	-.041	-.050	-.036	-.028	-.015	-.025	-.020	-.010	-.004
Three under 20	-.144	-.104	-.086	-.064	-.082	-.057	-.042	-.026	-.039	-.028	-.014	-.008
Women compared to men												
Female	-.090	-.101	-.039	-.020	-.076	-.097	-.035	-.027	-.065	-.091	-.030	-.029
Married	-.039	-.037	-.019	-.012	-.048	-.042	-.021	-.014	-.049	-.045	-.019	-.012
Divorced	-.002	-.016	-.009	-.010	-.019	-.020	-.011	-.009	-.020	-.019	-.011	-.008
Widowed	-.024	-.029	-.019	-.017	-.049	-.042	-.027	-.021	-.050	-.053	-.018	-.018
Separated	-.030	-.033	-.017	-.014	-.041	-.037	-.018	-.013	-.043	-.039	-.017	-.009
One under 20	-.036	-.035	-.024	-.020	-.026	-.027	-.015	-.011	-.020	-.025	-.011	-.011
Two under 20	-.103	-.094	-.059	-.051	-.060	-.058	-.030	-.024	-.041	-.042	-.017	-.014
Three under 20	-.149	-.132	-.081	-.072	-.090	-.081	-.042	-.036	-.057	-.053	-.020	-.019
Estimated female wages as a proportion of male wages for 5 groups of men and women												
Single	.910	.899	.961	.980	.924	.903	.965	.973	.935	.909	.970	.971
Married	.872	.861	.942	.967	.876	.860	.944	.959	.886	.865	.951	.960
Married +												
One child	.836	.826	.918	.948	.850	.833	.929	.948	.866	.840	.940	.949
Two children	.769	.767	.883	.916	.815	.803	.913	.935	.845	.823	.934	.945
Three children	.723	.729	.860	.895	.786	.779	.902	.923	.829	.811	.931	.940

Note: In these analyses we control for education and experience and include interaction terms between female and each of those two variables. The regressions are estimated for men and women combined, with interaction terms between sex and marital status and between sex and children. Panel A gives the effects for men, Panel B for women (as the male effects plus the interaction effects), Panel C the interaction effects, and Panel D the estimate of female wages as percent of male wages for 5 groups of employees. Analyses are restricted to employees 20-50 years old. In Panel A, for men, 48 of 48 marital coefficients are statistically significantly different from zero at the .001 level, while for the children variables 33 of 36 coefficients reach statistical significance at the .001 level, 1 at the .05 level, and 2 do not reach significance at the .10 level . In Panel B, for women, for marital status, 12 of 12 coefficients for being married are significant at the .001 level, while for the 36 post-marital states, 12 are significant at the .001 level, 2 at the .01 level, 2 at the .10 level, while 20 are not significant at the .10 level. For the children coefficients for women, 36 of 36 coefficients are significant at the .001 level. In Panel C, for the interaction effects, 92 of 96 coefficients (including 36 of the 36 children coefficients) are significant at the .001 level, 3 at the .01 level, while 1 coefficient fails to reach significance at the .10 level (for divorced in 1979-1987). With respect to changes over time, we test for changes in coefficients between period 1 and 2, period 1 and 3, and period 2 and 3. For men, where there is stability over time, 36 of 84 over-time comparisons for marital status and children are statistically significant at the .05 level or better. For women, for the marital status coefficients, 21 of 48 over-time comparisons are statistically significant at the .05 level or better, whereas for the children coefficients 34 of 36 over-time comparisons reach significance at the .001 level, and 1 at the .01 level and 1 at the .05 level (for 1 child at the establishment and occupation-establishment levels between Periods 2 and 3).

Table 3. Annual effects of children for women at the population, establishment, occupation, and occupation-establishment levels

	Population				Establishment				Occupation				Occupation-Establishment			
	Female	Children			Female	Children			Female	Children			Female	Children		
		1	2	3+		1	2	3+		1	2	3+		1	2	3+
1979	-.119	-.048	-.108	-.174	-.117	-.031	-.070	-.111	-.083	-.026	-.058	-.097	-.038	-.017	-.045	-.078
1980	-.104	-.034	-.088	-.136	-.120	-.026	-.075	-.114	-.035	-.025	-.062	-.095	-.019	-.016	-.047	-.073
1981	-.092	-.029	-.083	-.141	-.103	-.021	-.061	-.099	-.040	-.021	-.054	-.085	-.020	-.013	-.044	-.063
1982	-.086	-.033	-.081	-.130	-.101	-.022	-.064	-.109	-.020	-.020	-.054	-.080	-.012	-.015	-.045	-.067
1983	-.081	-.035	-.083	-.144	-.100	-.024	-.061	-.101	-.035	-.022	-.054	-.084	-.021	-.016	-.040	-.064
1984	-.079	-.033	-.085	-.141	-.096	-.022	-.063	-.098	-.032	-.021	-.051	-.079	-.014	-.014	-.039	-.059
1985	-.080	-.033	-.089	-.149	-.092	-.024	-.065	-.105	-.033	-.022	-.056	-.092	-.017	-.012	-.039	-.062
1986	-.079	-.035	-.089	-.145	-.091	-.023	-.064	-.104	-.032	-.019	-.054	-.081	-.020	-.011	-.036	-.055
1987	-.086	-.039	-.089	-.140	-.092	-.022	-.063	-.098	-.039	-.022	-.051	-.080	-.022	-.010	-.033	-.053
1988	-.085	-.033	-.080	-.126	-.098	-.020	-.056	-.087	-.039	-.017	-.044	-.067	-.028	-.007	-.024	-.041
1989	-.082	-.028	-.067	-.102	-.098	-.017	-.045	-.073	-.041	-.015	-.036	-.055	-.029	-.006	-.019	-.036
1990	-.071	-.023	-.051	-.090	-.094	-.016	-.035	-.059	-.035	-.014	-.030	-.049	-.026	-.008	-.018	-.032
1991	-.072	-.022	-.041	-.071	-.098	-.017	-.032	-.052	-.032	-.013	-.023	-.037	-.027	-.008	-.012	-.022
1992	-.073	-.016	-.034	-.056	-.098	-.013	-.026	-.038	-.033	-.009	-.018	-.025	-.028	-.005	-.009	-.013
1993	-.072	-.015	-.029	-.044	-.097	-.011	-.021	-.034	-.031	-.009	-.014	-.018	-.027	-.004	-.006	-.012
1994	-.069	-.013	-.025	-.039	-.094	-.012	-.020	-.029	-.028	-.007	-.010	-.015	-.028	-.003	-.006	-.010
1995	-.062	-.014	-.026	-.040	-.090	-.012	-.021	-.025	-.030	-.008	-.011	-.013	-.029	-.005	-.005	-.006
1996	-.065	-.014	-.023	-.038	-.087	-.012	-.019	-.028	-.032	-.006	-.008	-.013	-.028	-.004	-.001	-.008