

Sigle-Rushton, Wendy; Waldfogel, Jane

Working Paper

Motherhood and women's earnings in Anglo-American, Continental European, and Nordic countries

LIS Working Paper Series, No. 454

Provided in Cooperation with:

Luxembourg Income Study (LIS)

Suggested Citation: Sigle-Rushton, Wendy; Waldfogel, Jane (2006) : Motherhood and women's earnings in Anglo-American, Continental European, and Nordic countries, LIS Working Paper Series, No. 454, Luxembourg Income Study (LIS), Luxembourg

This Version is available at:

<https://hdl.handle.net/10419/95526>

Standard-Nutzungsbedingungen:

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

Terms of use:

Documents in EconStor may be saved and copied for your personal and scholarly purposes.

You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.

If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.

Luxembourg Income Study Working Paper Series

Working Paper No. 454

**MOTHERHOOD AND WOMEN'S EARNINGS IN
ANGLO-AMERICAN, CONTINENTAL EUROPEAN,
AND NORDIC COUNTRIES**

Wendy Sigle-Rushton and Jane Waldfogel

December 2006



Luxembourg Income Study (LIS), asbl

MOTHERHOOD AND WOMEN'S EARNINGS IN ANGLO-AMERICAN,
CONTINENTAL EUROPEAN, AND NORDIC COUNTRIES

Wendy Sigle-Rushton and Jane Waldfogel

ABSTRACT

The earnings of mothers make up an important, but difficult to quantify, component of parental expenditures on children. This paper compares the long-term earnings of women with children, women without children, and men. The study conducts separate analyses for less educated, moderately educated, and highly educated people in eight Anglo-American, Continental European, and Nordic countries. The study finds that, for the most part, these countries cluster into three groups, with mothers in the Continental European group experiencing the largest earnings differentials, mothers in the Nordic group experiencing the smallest, and mothers in the Anglo-American countries occupying the middle position.

KEYWORDS

Earnings, gender, labor market, motherhood

JEL Codes: J18, J11, J

INTRODUCTION

Gender differences in earnings have been the topic of a great deal of theory and empirical research. Virtually all of this work has noted that women's greater responsibility for children is an important factor in explaining why women earn less than men (see especially Victor Fuchs 1988; Jane Waldfogel 1998a; Francine Blau, Marianne Ferber, and Ann Winkler 2002). Women with children are less likely to work in the labor market than other women or men, and, when they do work, they tend to work fewer hours and earn lower hourly wages. Although each of these specific aspects has been fairly extensively studied, surprisingly few studies have examined the cumulative impact of these three factors on women's long-term earnings. Yet, back-of-the-envelope calculations suggest that these costs may be quite substantial. For instance, in her book, *The Price of Motherhood* (2001), Ann Crittenden estimates that college-educated women in the US sacrifice over \$1,000,000 in lifetime earnings if they have children. In this paper, we use microdata from the Luxembourg Income Study (LIS) to investigate differentials in long-term earnings among women with children, women without children, and men, conducting separate analyses for less educated, moderately educated, and highly educated people in eight industrialized countries.

Using data on British women, Heather Joshi and Hugh Davies have conducted a large body of research on the cumulative effects of children on women's earnings. In this ground-breaking program of work, they used microdata from large longitudinal studies to simulate the lifetime earnings losses associated with having children for women with different types of characteristics. Their early work used data from the 1980 Women and Employment Survey and revealed that a typical woman with two children would give up nearly half of the lifetime earnings that she otherwise might have had, with these lost earnings due to reduced participation in the labor market, shorter hours of work, and lower wages, in roughly equal parts (Heather Joshi 1990; Hugh Davies and Heather Joshi 1992, 1995;

Heather Joshi and Hugh Davies 1992; Heather Joshi, Hugh Davies, and Hilary Land 1996). In subsequent work, Joshi and her colleagues updated these analyses, using data gathered in the 1990s on a more contemporary cohort of women from the British Household Panel Survey. These analyses again showed that the typical woman, with a medium level of education, gave up roughly half the earnings she otherwise would have had upon having children; however, they also indicated that the earnings costs of motherhood were now much lower for highly educated women who had become increasingly likely to return to their jobs after childbirth and on a full-time basis (Hugh Davies and Heather Joshi 1998, 2000; Hugh Davies, Heather Joshi, and Romana Peronaci 2000; Heather Joshi and Hugh Davies 2002).

Other studies have investigated whether the same patterns of foregone earnings are found across different countries. In her 1990 study, Joshi compares her results to findings of similar research carried out in the US (Thomas J. Espenshade and Charles A. Calhoun 1986; Charles A. Calhoun and Thomas J. Espenshade 1988), though the methods are so different that the studies are not entirely comparable. In the one comparative study conducted to date, Hugh Davies and Heather Joshi (1994) compared the earnings foregone by British mothers from the 1980 survey to the earnings foregone by mothers in Germany, Sweden, and France. Their results suggest that there may be important differences across countries: foregone earnings of mothers were comparable in Britain and Germany but not in Sweden and France, where on average mothers had earnings much closer to non-mothers.

Further indirect evidence that earnings gaps may vary by country comes from the comparative literature on motherhood gaps in hourly wages and employment. This body of work finds differences across countries in the propensity of mothers to work and in their working hours and wages if they do work when compared to non-mothers and men (see, for instance, Susan Harkness and Jane Waldfogel [2003]). This work also suggests that there may be large differences across countries in long-term earnings differentials among women with children, women without children, and men. However, with

the exception of Davies and Joshi (1994), no study to date has conducted comparable analyses across countries. In this paper, we fill this gap in the literature, using a large set of countries and recent data.

BACKGROUND

Reasons for the lower long-term earnings of mothers

In an accounting sense, three factors contribute to mothers earning less over their lifetime than non-mothers and men: First, they are less likely to work in the labor market than non-mothers and men. Second, when they do work, they tend to work fewer hours, and finally, they tend to earn lower wages.

The effects of children on women's employment and hours decisions are generally explained in a labor supply framework, in which individuals decide how much of their time to allocate to labor, leisure, and home production. Among the factors that enter into this decision are the wage that the person could earn in the labor market (determined to some extent endogenously, as we discuss below), the costs of working, the income the person could receive if they were not working, and the value of the person's time if not in the labor market. Each of these factors helps explain why women with children tend to be less likely to work and tend to work fewer hours, than other women and men. Theory predicts that mothers would work less than other women and men, to the extent that their wages are lower, their cost of working is higher (due to childcare costs), the value of their income outside of employment is higher (due to higher transfers from other household members or government benefits), and the value of their time in home production is higher.

The third source of mothers' lower earnings is the hourly pay differential between women with

children and otherwise comparable women (and men). A growing body of research has investigated the motherhood gap in pay in the US and has found that women with children have lower wages than women without children (Martha Hill 1979; Fuchs 1988; Sanders Korenman and David Neumark 1992; David Neumark and Sanders Korenman 1994; Jane Waldfogel 1997a, 1997b, 1998a, 1998b; Greg Hundley 2000; Shelly Lundberg and Elaina Rose 2000; Jane Waldfogel and Susan Mayer 2000; Michelle Budig and Paula England 2001; Sarah Avellar 2002; Deborah Anderson, Melissa Binder, and Kate Krause 2003). Pay penalties for mothers have also been found in the UK (Heather Joshi 1991; Jane Waldfogel 1995; Heather Joshi, Pierella Paci, and Jane Waldfogel 1999). Studies of the pay effects of children in Nordic countries have been rarer but have tended to find that children do not have negative effects on women's wages (see James Albrecht, Per-Anders Edin, Marianne Sundstrom, and Susan Vroman [1998] for Sweden and Michael Rosholm and Nina Smith [1996] for Denmark). Studies in the Netherlands tend to find that children have a strong negative effect on women's wages, but this works primarily through reduced work experience and shifts to part-time work (see Cecile Wetzels [2003] for a helpful overview; see also Siv Gustafsson, Eiko Kenjoh, and Cecile Wetzels [2003]).

At least four types of explanations have been put forward to account for the motherhood gap in hourly pay. These explanations are not mutually exclusive; each may play a role in explaining the lower wages of mothers. The first, human capital theory (see, for instance, Jacob Mincer and Solomon Polacheck 1974; Gary Becker 1985; Solomon Polachek 1995), points out that women overall generally have lower wages than men because they have lower levels of wage-enhancing human capital such as education or training; work experience; and job tenure. Women with children tend to earn even lower wages than other women because they take more time out of the labor market when they have children, and are more likely to work part-time, and for a new employer, when they do return to work. Thus, women with children have less work experience and job tenure than other women, and men, and earn lower wages as a result.

A second explanation for the lower wages of women with children has to do with various forms of trade-offs women make between wages and flexibility. For instance, women may choose jobs that offer part-time or convenient hours, and may trade off wages in return for these types of schedules. Or, women may look for other forms of compatibility (for instance, a location close to home). The wage costs of such trade-offs would be exacerbated if employers were monopsonistic and were able to set wages for mothers taking their desire for flexibility into account.

A third explanation for the lower wages of mothers has to do with differences in productivity or effort, whether real or perceived. To the extent that women still retain primary responsibility for children and the “second shift” of work at home, women who are taking care of children may bring less effort to the labor market (or may select jobs that require less effort) and therefore would be paid less. Or, employers may view mothers as being less productive and may pay them lower wages because of that perception.

Fourth, the lower earnings of mothers may be due, at least in part, to selection. That is, women who have children may differ from childless women in important ways that are associated with their lower earnings and earning potential. For example, women who are less successful in the labor market may be more likely to decide to have children, to have larger numbers of children, and to withdraw from the labor market. This explanation suggests that women react to poor employment outcomes by choosing to invest their time in motherhood. In contrast, an explanation drawing from a rational expectations model would predict that those women who anticipate having children and anticipate difficulties in combining work and childcare would invest less in human capital and have lower wages as a consequence. Similarly, women who are on track to be higher earners may choose not to have children. Although their higher opportunity costs suggest higher-wage women would be more likely to work after they have children, something that would mitigate this selection effect on mothers’ earnings, the relatively high rates of childlessness among highly educated mothers in all of our sample countries

(see Appendix Table 3) is consistent with some differential avoidance or postponement of motherhood.

Taken together, there are numerous reasons to believe that women with children would have lower long-term earnings than other women and men. But, are there reasons to believe that these earnings differences would vary across countries? States differ in the policies that offer benefits to families with children and the extent to which the generosity of benefits is tied to employment or non-employment. There is also variation across countries in “family-friendly” policies that help women reconcile their responsibilities at home and at work. The theories reviewed above provide ample reason to suggest that such family-friendly policies could mitigate some of the effects of children on women’s earnings. For instance, job-protected maternity leave could raise women’s participation and also their hourly wages by encouraging earlier returns and protecting against the loss of firm-specific capital. Generous childcare provisions could also boost women’s participation and wages by reducing interruptions in work and periods of part-time work. Policies that induce men to take more responsibility at home, such as extended parental-leave benefits targeted at fathers, could also potentially boost mothers’ earnings if they reduced the demands placed on women at home. Thus, to the extent that these and other policies that affect women’s employment or earnings vary across countries, the magnitude of the motherhood gap in long-term earnings could vary as well.

Welfare state analysts typically divide industrialized countries into three main regime types: Anglo-American, Continental European, and Nordic (Gosta Esping-Anderson [1990]; For a more gendered approach to welfare state regimes, see, for example, Jane Lewis [1992]; Diane Sainsbury [1994]; and Julia Adams and Tasleem Padamese [2001]). The Anglo-American group, which includes Britain and its former colonies, has welfare states that are characterized by a fairly high reliance on means-tested public assistance programs, in contrast with the Continental European or Nordic models that rely to a larger extent on social insurance programs and citizenship-based universal entitlements, respectively. A further point of difference is that Nordic and Continental European countries tend to

have more fully developed family leave and childcare policies than the Anglo-American countries, although these policies are most generous and well-developed in the Nordic countries (Jane Waldfogel 1998a; 2001).

Several studies have used LIS data to study gender differentials in employment and pay across regime types (see, for instance, Janet Gornick 1999; Elena Bardasi and Janet Gornick 2000; Jerry Jacobs and Janet Gornick 2001; Annemette Sørensen 2001). Prior work has found that the ratio of female to male earnings has risen in countries from all three regime types in recent years but that gender pay gaps tend to be smaller in the Nordic countries, higher in the Anglo-American countries, and display a mixed pattern in the Continental European countries (see, for instance, Harkness and Waldfogel [2003]). Some analysts have linked these patterns to differences in the family and equal opportunity policies offered in these countries, arguing for instance that the Scandinavian countries' strong female-male earnings ratios reflect at least in part their strong family and equal opportunity policies while the weak performance of the Anglo-American countries reflects their weak policies (Heather Joshi, Pierella Paci, and Jane Waldfogel, 1998; Waldfogel 1998a).

Of course, differences in policies across countries are not the only reason why the motherhood gaps in women's short- and long-term earnings may vary across countries. Countries differ in many others ways. Differences in gender norms and the "gender order" are likely to be particularly important (Birgit Pfau-Effinger 1998), as are differences in labor markets and overall wage structures. We will not be able to test competing theories as to why the earnings differentials vary across countries. Nor will we be able to decompose differentials in long-run earnings into the separate components that may be due to lower wages, lower work hours, fewer weeks worked, selection into employment, or motherhood. Our aim is more modest: to determine whether such differences exist and whether different countries can be grouped in any meaningful way. In what follows, our main focus will be on the extent to which average earnings differ between mothers and other individuals by country and how

these differences accumulate to create shortfalls in long-term earnings. With this information, we will examine whether the patterns in our data support the clustering of countries into the three regime types.

DATA AND METHODS

Sample countries from LIS

Our data come from the Luxembourg Income Study (LIS), a project in Walferdange, Luxembourg that brings together comparable microdata from a range of industrialized countries in one accessible location. In operation since 1983, LIS places particular emphasis on harmonizing the data, so researchers can estimate models using comparably defined variables. LIS also frequently updates its data, so the data we use are recent. However, since LIS does not gather the data itself, the data sets are sometimes missing specific variables, and sample sizes vary widely.¹

Our sample includes all individuals between the ages of 16 and 45 (the employed, unemployed, and inactive), from eight Western industrialized countries in the LIS database with information on the presence and age of co-resident children and for whom gross annual earnings could be computed. This set of eight countries (and original data source and year) includes at least two representatives of each regime type: Germany (German Social Economic Panel Study 2000) and the Netherlands (Socio-Economic Panel Survey 1999) from Continental Europe; the UK (Family Expenditure Survey 1999), Canada (Survey of Consumer Finances 2000), and the US (March Current Population Survey 2000) from the Anglo-American group; and Norway (Income Distribution Survey 2000), Sweden (Income Distribution Survey 2000) and Finland (Income Distribution Survey 2000) from the Nordic group.

Methods

Our aim in this paper is to calculate the average long-term earnings of women with children and to compare those with women who do not have children and men. To do so, ideally we would want to make period estimates, similar to the calculation of a total fertility rate, where we would choose a stylized life course, pick women who fit this profile, and calculate their average earnings at each age. Note that in doing so, we would calculate the averages, including those individuals with zero earnings, because non-participation in the labor market, as discussed above, is an important source of earnings differentials. The differences in average earnings so calculated would be due to the three factors we have already outlined: differences in participation, hours of work, or hourly wages. However, in most of our countries, the samples are too small to support this approach. For this reason, we opt for a second best approach: estimating an OLS regression for annual earnings for all the women in our samples, regardless of their employment status, and then using the regression parameters to predict the expected value of earnings for women who follow a stylized life course.² This is the best estimate we can make of mean earnings of different groups in each country when sample sizes do not permit us to calculate averages outright.

The regression parameters from a cross-sectional OLS analysis of data allow us to estimate average earnings over the life course where the outcomes of older women with similar characteristics are assumed to provide a good estimate of what younger women with similar characteristics will look like in the future. Because children tend to live with their mothers throughout childhood, we can identify mothers who had children at the same age and control for fertility effects on average earnings over time. For other characteristics, identifying women who had similar experiences at similar ages is not possible because we lack detailed histories and cannot infer them as we can, to some extent, for fertility. As a consequence, important data limitations restrict the level of detail we can confidently

include in our analyses.

We identify mothers by whether they have children resident in their household, but once the children have left the household, we no longer have information on them. This creates a problem in categorizing older women who do not have children residing with them, as we do not know whether they were mothers in the past or were always childless. For this reason, we do not use data on women above the age of 45.³ We can identify from our data whether a woman worked in the past year and how much her earnings were, but we do not know how much she worked in prior years or how long she has been with her current employer. Thus, we cannot control for work experience or job tenure in our models. We also have very limited information on marital status; we know a woman's current marital status but not her past partnership history. As a consequence, we cannot match older women who formed partnerships at similar ages to younger women in our sample. To the extent that partnership status affects not just current employment and earnings but trajectories in employment and earnings, a control for current marital status is insufficient for our purposes.

In spite of their limitations, the LIS data are very well suited to the analysis that we carry out. One important feature of the data is that we have measures of education for each of our countries. If we assume that completed education does not change much during adulthood, the lack of retrospective data is less of a problem. Although the specific details of the education variables vary by country, we are able to use these variables to establish three levels of education for each country: low education level generally refers to those who left school without receiving a qualification that would enable them to enter higher education (e.g., those with less than a high school education in the US); medium education level includes those who completed secondary school and may also have completed some higher education, but without receiving a bachelor's degree or equivalent (e.g. those with a high school degree or some college in the US); and high education level includes those with a bachelor's degree or its equivalent, or higher. Appendix Table 1 shows the distribution of our samples into these three

categories, and we can see that in most countries, at least half of our sample women are classified as moderately educated. The only exception is the UK (25 percent).⁴

A second important feature of the LIS data for our analyses is the information on gross annual earnings, defined as the person's own earnings from employment or self-employment during the prior year, measured in the national currency. We enter actual gross earnings into our models and do not take the natural log of the variable because we are interested in estimating the expected value of earnings for all women with a given set of characteristics and because we wish to include those women with zero earnings. When we estimated models with a logged dependent variable, recoding those with zero earnings to one before taking the natural log, the results were not substantively different. As a consequence, we do not log the variable so that parameter estimates can be more easily interpreted graphically and estimates of cumulative earnings can be more easily calculated. For women with children, women without children, and men, Appendix Table 2 shows the relevant components of annual earnings – the share participating in the labor market, and, where available, information on annual earnings, the level of participation and hourly wages of participants. It is clear from this table that there is a good deal of variation in the raw data across countries and education groups.

Finally, the LIS data contain information on the number and age of children in the household. We use these data to distinguish mothers and non-mothers and to categorize mothers as having one child, two children, three children, or four or more children. We also construct variables for the number of years that has elapsed since the youngest child or children (up to the last four) were born.

Appendix Table 3 shows the means of the number of children by level of education. These mean values indicate that there is some variation across countries in the share of women who are mothers and in the number and ages of their children. Childlessness is relatively rare for less educated women in the Netherlands, the US, and Canada. Childlessness is most common among highly educated women in the Netherlands and the UK. In general, highly educated women have fewer children, while

less educated women have more, but educational gradients differ substantially across countries.

Using these data, we estimate three OLS regressions of annual earnings for women aged 16 to 45 in each country, with separate models for the less educated, moderately educated, and highly educated, as detailed above. We use samples of women aged 45 or younger because of the concern mentioned earlier that many women beyond that age will have adult children whom we cannot identify in the data.⁵ We include women beginning at age 16 because for the least educated group, this is the age when at least some women would enter the labor market. But when it comes to the moderately educated and highly educated group women do not enter employment until they are older. For this reason, when we graph or calculate earnings for the moderately and highly educated groups, we begin with ages 19 and 22, respectively.

We estimate a regression model, which takes the general form:

$$y_i = \alpha + \beta_1(a1_i) + \beta_2(a2_i) + \beta_3(k1_i) + \beta_4(k2_i) + \beta_5(k3_i) + \beta_6(k4_i) + \beta_7(tk1_i) + \beta_8(tk2_i) + \beta_9(tk3_i) + \beta_{10}(tk4_i) + u_i \quad (1)$$

where $a1$ represents age, $a2$ is age squared, kj is a dummy that equals one if woman has j children, tkj represents the time since the j youngest child was born, and y_i is the gross annual earnings measured in the national currency. We assume that age is related to average earnings in a curvilinear fashion, taking into account the well-known lifecycle patterns of employment and earnings, which tend to rise through the prime years and then fall as individuals cut back in anticipation of retirement. We experimented with age dummies, and this specification seemed to fit the data parsimoniously and well.

The OLS models of annual earnings provide the best estimates of average earnings for different groups of the population given our data limitations. Ideally the OLS models would contain variables that control for individual characteristics with dummy variables that identify each combination of age, parity, and age of children. We do not have sample sizes that are large enough to estimate such detailed models, and our models impose some rather strong assumptions about how average earnings differ across groups.

For example, we assume that age is related to average earnings in a way that is independent of fertility effects on average earnings (they do not interact). Despite these restrictive assumptions, the specification allows, but does not require, estimated gaps in average earnings between mothers and non-mothers to decline over time and allows for the rate of convergence with the earnings non-mothers (if there is any) to vary with the age and number of children.

We use the results from our regressions to predict average annual earnings for mothers and non-mothers in each country and at each age up to 45. We focus on two stylized cases of mothers – mothers who had one child at the age of 27 and mothers other who had two children, one at the age of 25 and a second at the age of 27. Finally, we run a similar set of OLS regressions for men from each country, but we exclude the child variables because, as outlined above, parenthood must be inferred by the presence of co-resident children. A non-trivial percentage of men are non-resident fathers, and we cannot identify them in these data. These regressions are specified as follows:

$$y_i = \alpha + \beta_1(a1_i) + \beta_2(a2_i) + u_i \quad (2)$$

where variables are defined as for women above. We use the men's regressions to predict average annual earnings for men at each age up to age 45, as well. These data provide a useful reference point, as arguably the earnings of mothers should be compared not just to non-mothers but to men as well. Indeed, a case might even be made that the earnings of mothers should be compared to fathers. We do not take that approach here, but we note that if we did so, we would expect the average earnings gaps between mothers and men to be even larger than those we report here, since fathers on average earn more than other men.

These regression-based estimates of earnings provide a lot of information about gross annual earnings across different groups of the population. However, it is important to stress that the analyses we present here are primarily descriptive. They indicate the overall magnitude of earnings gaps in each

country among mothers, non-mothers, and men, and the extent to which these gaps vary across countries, but they cannot tell us the reasons for these gaps or for the differences in gaps across countries. As we discussed earlier, there are many possible explanations for earnings differences between mothers and other individuals, and we are not able to distinguish among them. More precise estimates of the causes of these foregone earnings and the shares due to selection, work experience, part-time work, and so on would require more detailed analysis of longitudinal data within countries.

There are many ways that mothers may differ from other women and men that we do not control for in our models. Thus, our findings describe earnings differences but should not be interpreted as the earnings foregone by mothers. It is unlikely that mothers, other women, and men, are fully comparable and would, if not for motherhood, have had the same earnings. If mothers are negatively selected into employment, measured earnings differences between mothers and non-mothers will be biased upward. Conversely, if mothers are positively selected into employment, the differences we identify will understate the actual earnings that would be lost as a direct consequence of motherhood. Isolating the unbiased effect of motherhood on earnings is not, however, the goal of our analysis. Controlling for the selection of mothers into employment would mean controlling for one of the many possible sources of cross-national differences in earnings. We are interested in describing actual earnings differences between mothers and other people cross-nationally whatever their cause, including differential rates of participation. Therefore, a sample selection correction technique (such as the Heckman method) is not appropriate for our analysis.

We should also note that our estimates tell us only about average gross annual earnings across different population groups; they do not tell us about the overall economic well-being of women (or their children). Net incomes are likely to be very different across countries, as is the relationship between gross and net incomes. Income sharing within households is likely to be very important as well: women who, in our data, have low gross annual earnings do not necessarily have low incomes –

they could be receiving some income from other sources, such as government benefits or transfers from a husband or other family member.

RESULTS

Predicted earnings of women with different fertility histories

Figures 1 through 8 plot the predicted average gross annual earnings of women who have a medium level of education but different fertility histories, for each of our eight countries. The three profiles displayed in these figures are: women who have no children; women who have had one child at age 27; and women who have had two children, one at age 25 and one at age 27. Each figure also shows average annual earnings for men, to provide a point of reference; earnings are displayed in the currency of the country to facilitate comparison with previously published work on each country. Although we set the maximum value for each graph to approximately 44,000-46,000 USD (using exchange rates from June 2000), it is important to stress that the scales are slightly different and may affect comparability. In the following section, we show women's earnings as a percentage of other women's and men's earnings, so they can be compared across countries more readily. Similar figures for less educated and highly educated groups are available from the first author upon request.

Looking first at results for the two Continental European countries, Germany and the Netherlands (Figures 1 and 2, respectively), we can see that the average earnings of women drop quite substantially when they have a first child or second child. Although mothers' earnings are at their lowest right after childbirth, differences between mothers and non-mothers persist even at older ages. We can also see that women without children earn more, on average, than those with children, and

although their earnings lag behind those of similarly aged and similarly educated men, gaps between childless women and men are narrower than the gaps between mothers and childless women.

Figure 1 Predicted annual average earnings for women with medium level of education and different fertility histories in Germany

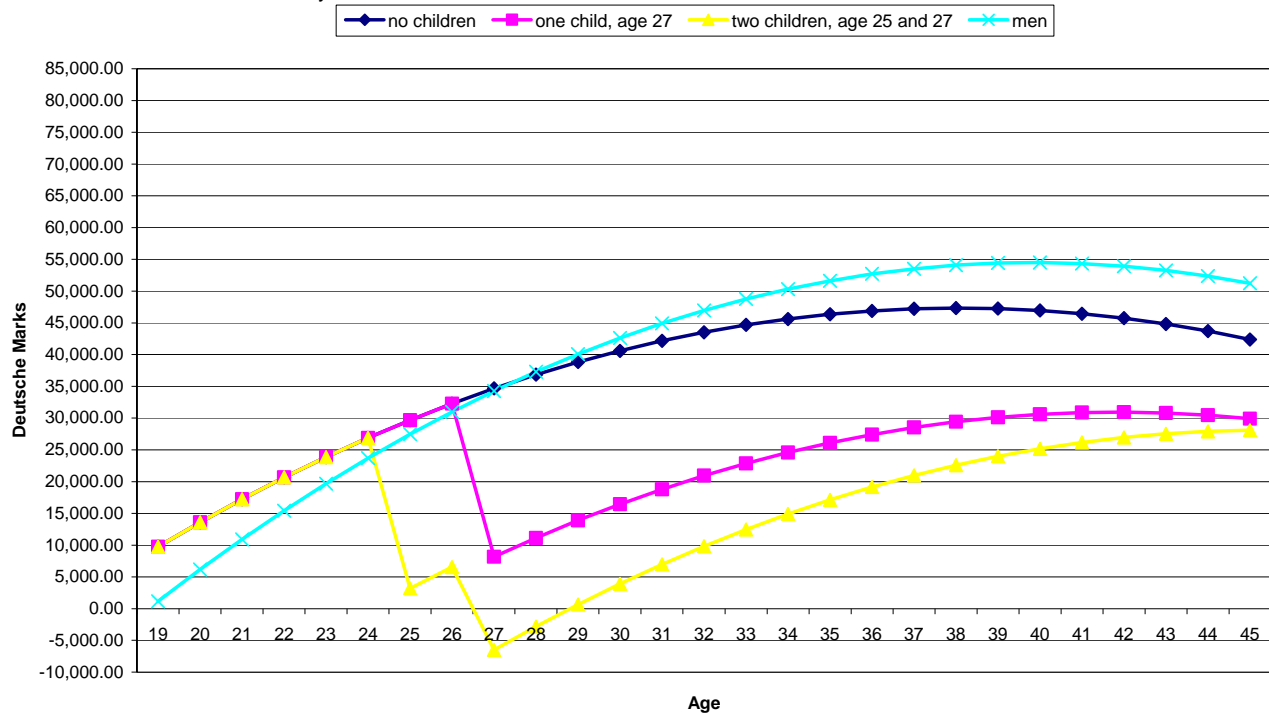
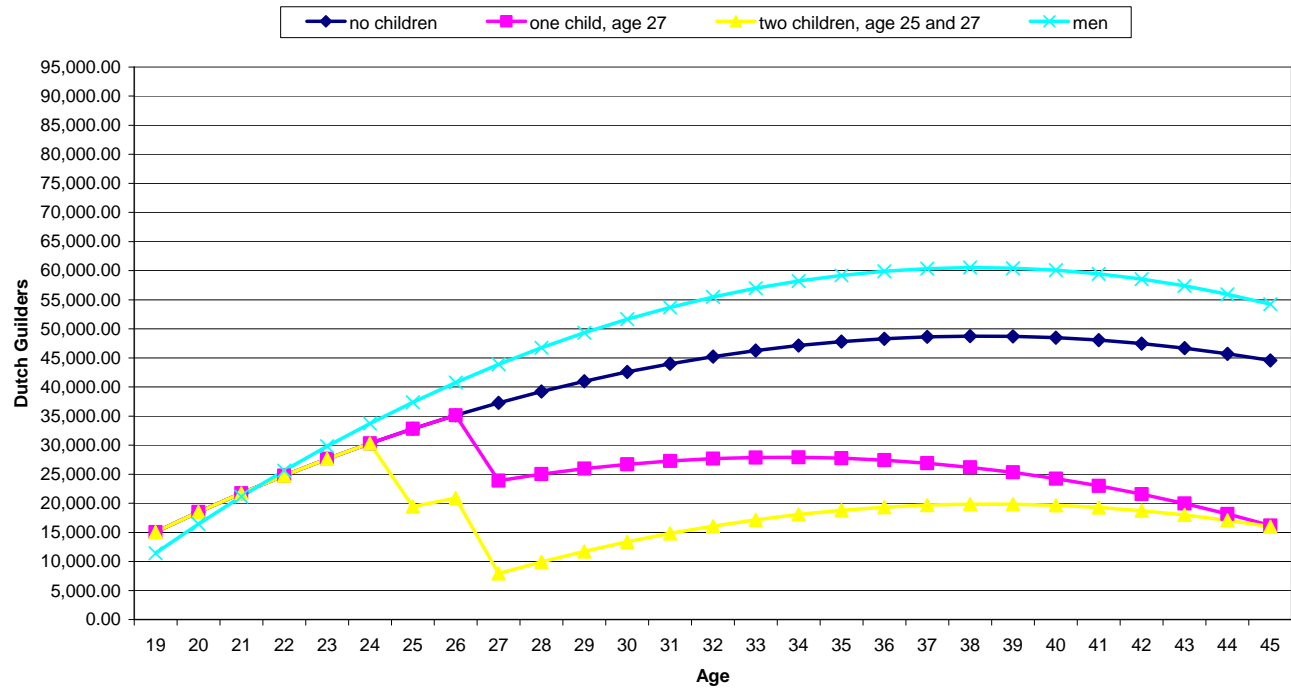
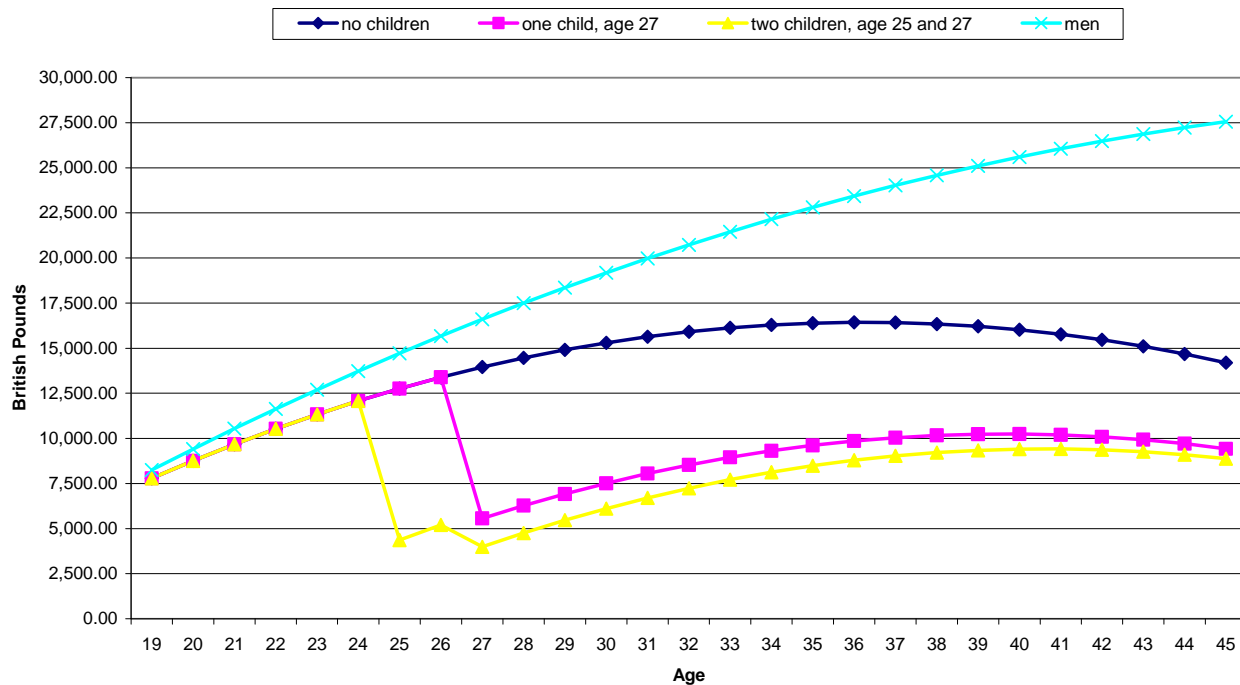


Figure 2 Predicted annual average earnings for women with medium level of education and different fertility histories in the Netherlands



Results for Anglo-American countries are shown in Figures 3 through 5. The earnings of mothers in the UK look similar to the earnings of mothers in the Continental Europe group: women who have one child have lower average earnings and the motherhood gap remains wide as the child ages (Figure 3). One point of difference, however, is that in Germany and the Netherlands, average earnings fall substantially after the first and second birth, while in the UK, there is only a relatively small additional drop in average earnings after the second birth.

Figure 3 Predicted annual average earnings for women with Medium level of education and different fertility histories in the United Kingdom



The results for mothers in the other two Anglo-American countries, Canada and the US (Figures 4 and 5, respectively), are somewhat different. In these countries, women with one child have lower average earnings, but the gap is not as wide as in the other countries examined thus far. Moreover, average earnings of mothers and non-mothers become more similar over time. By the age of 45, average earnings of US mothers are not far below those of non-mothers. The results show that in all three Anglo-American countries, the average earnings of mothers with one child and mothers with two children are very similar. What is striking in the three figures is the position of all women relative to men. Even those who do not have children have average earnings that lag behind men, and by age 45, a very substantial gender gap appears.⁶

Figure 4 Predicted annual average earnings for women with medium level of education and different fertility histories in Canada

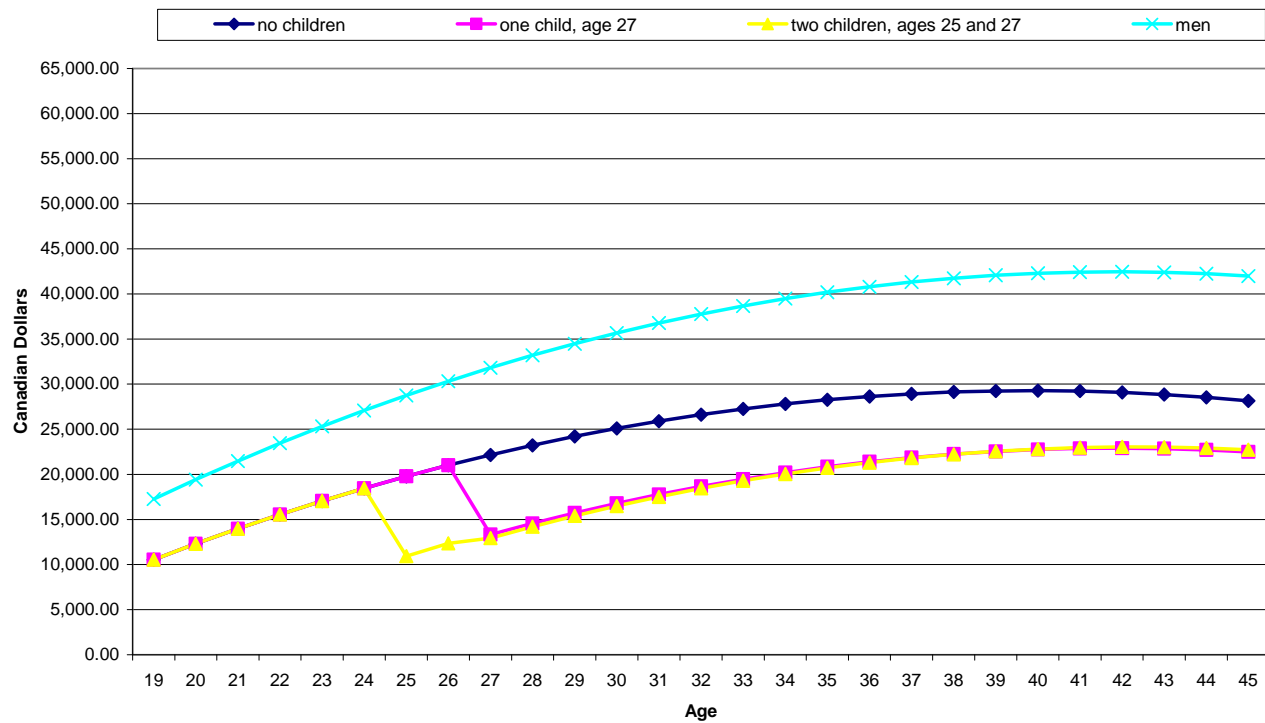
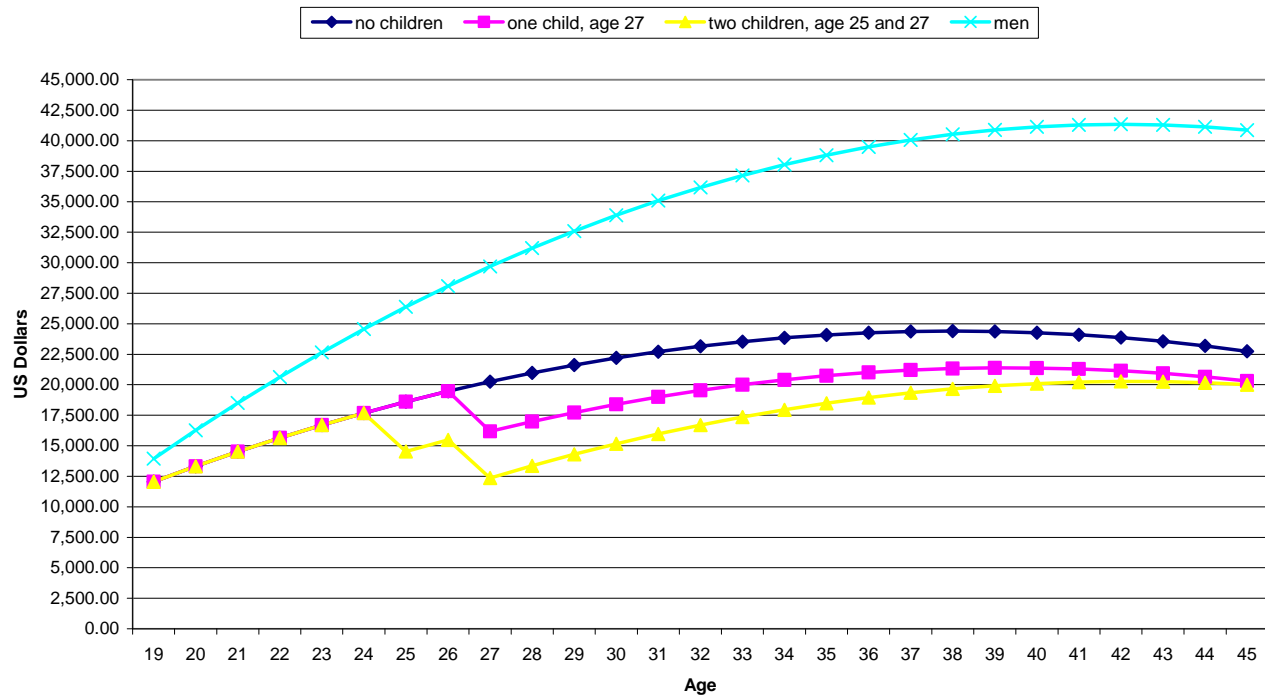


Figure 5 Predicted average annual earnings of women with medium level of education and different fertility histories in the United States



The results for the three Nordic countries, shown in Figures 6 through 8, illustrate yet another pattern. In all three countries, the differences in earnings between mothers and childless women narrow

as children become older. In Norway (Figure 6) the differences in the average earnings of non-mothers, mothers with one child, and mothers with two children are relatively small and the differentials look similar to those found in the US. In Sweden (Figure 7) and Finland (Figure 8), however, average earnings are noticeably lower among women who have recently had their first birth, but the earnings of mothers who have a second child are similar to their counterparts with one child. In fact, at older ages, their average earnings marginally exceed those of mothers with one child. In all three countries, however, regardless of their fertility profile, women's earnings lag behind men's. The gender differences are not as wide as those we estimated for the Anglo-American countries, however.

Figure 6 Predicted annual average earnings of women with medium level of education and different fertility histories in Norway

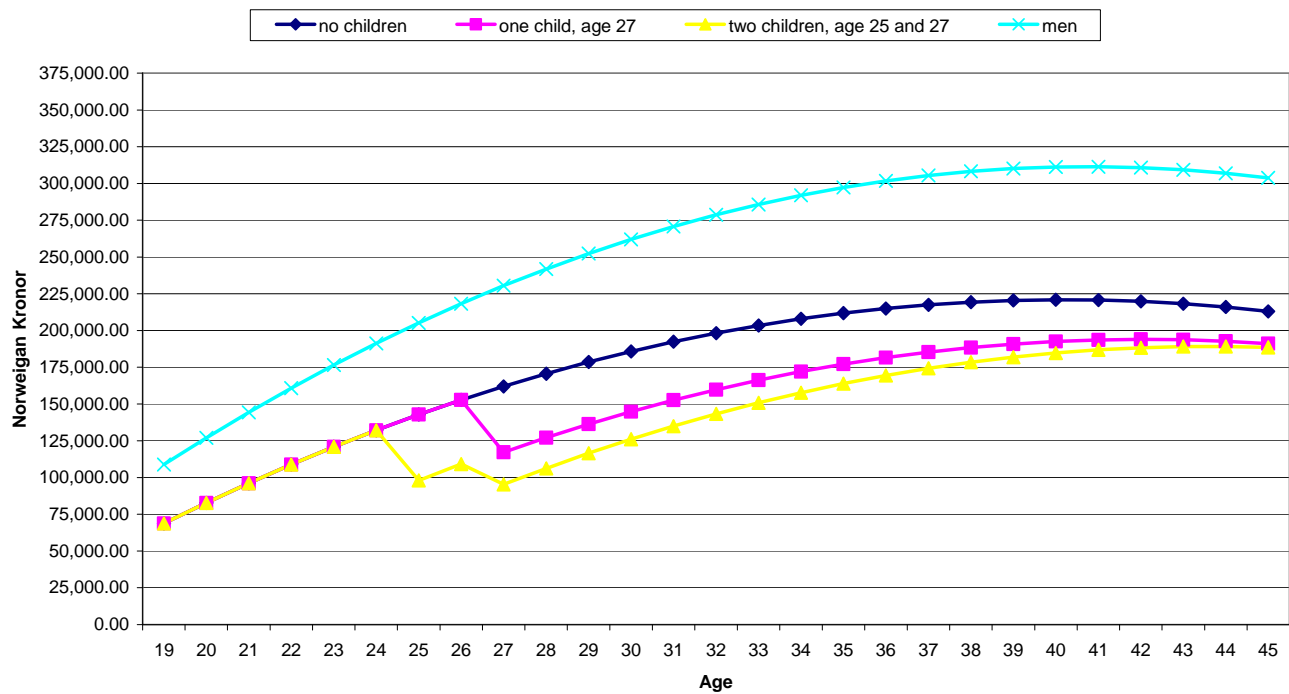


Figure 7 Predicted annual average earnings of women with medium level of education and different fertility histories in Sweden

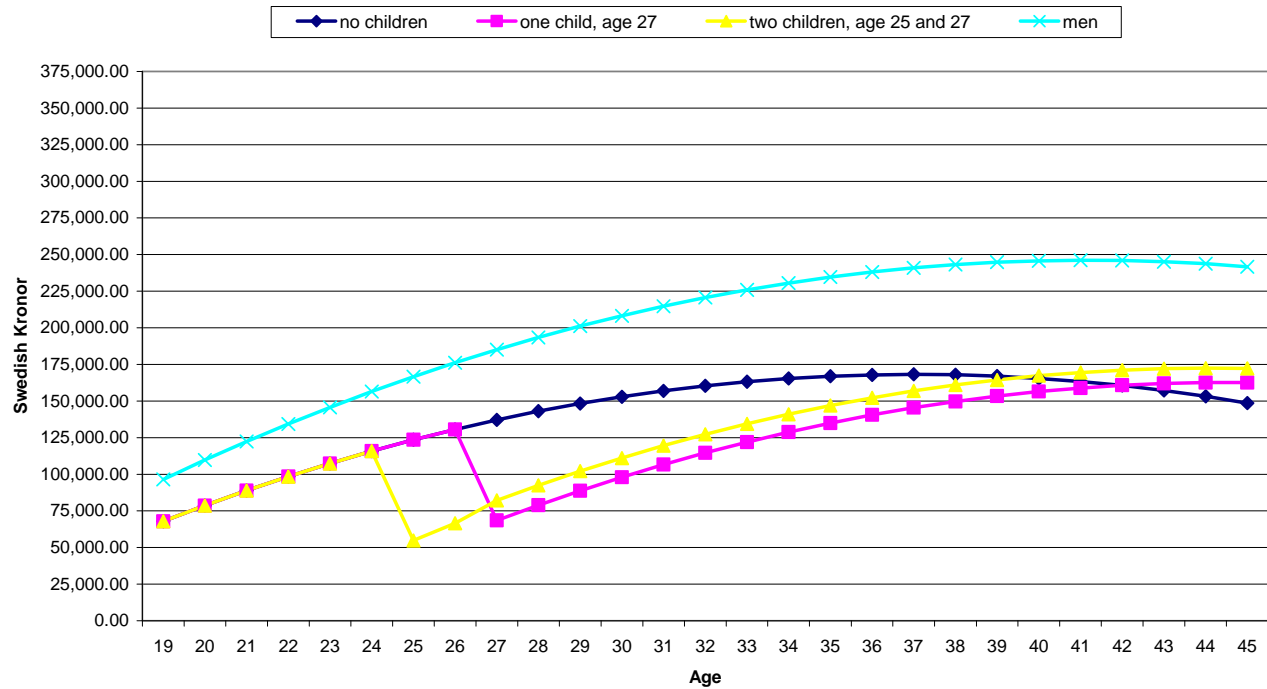
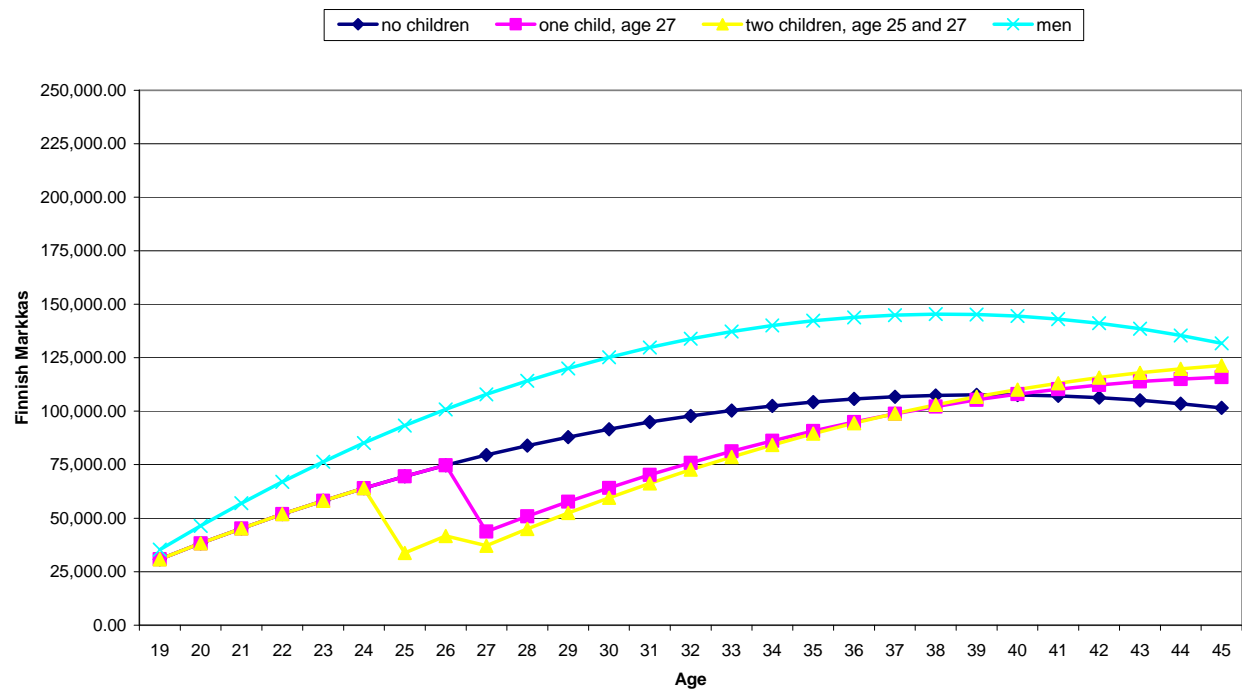


Figure 8 Predicted annual average earnings of women with medium level of education and different fertility histories in Finland



Cumulative earnings of mothers and others to age 45

How do the earnings patterns we have seen thus far translate into cumulative earnings differences across groups? That is, how much have mothers earned, on average, by the age of 45, relative to non-mothers in their country? To answer these questions, we used the regression results to predict annual earnings for each of our stylized groups (women with no children, women with one child born at age 27, and women with two children born at age 25 and 27) at each age and then summed them to produce cumulative gross annual earnings to the age of 45. Here, the assumption that an older woman with the same fertility history is a good proxy for what a young mother today will look like in the future determines the reliability of our results. Period estimates are less reliable when change is taking place (or has taken place) rapidly, and in many countries there have been large social changes in the past two to three decades. Because women, mothers in particular, have become more attached to the labor market over time, actual earnings gaps may prove smaller in the future than we are estimating. Our results should therefore be interpreted with that caveat in mind.

The results displayed in the left hand columns of Table 1 show that mothers in Germany, the Netherlands, and the UK have the lowest cumulative earnings relative to non-mothers. In Germany and the Netherlands, a woman who had one child at age 27 averages only 63 percent of a non-mother's earnings by age 45, and a woman who had two children at ages 25 and 27 has, on average, only 42 to 46 percent of a childless woman's earnings. Mothers in the UK look moderately better, ending up with 67 percent of non-mothers' earnings if they had one child at age 27 and 58 percent if they had two children at ages 25 and 27. But, they do much worse than in the other Anglo-American countries: in Canada, mothers earn 76 to 79 percent of non-mothers' earnings depending on how many children they had, and in the US, mothers earn 81 to 89 percent of non-mother's earnings depending on how many

children they had. Despite its very different policy context, motherhood gaps in the US are similar to those in Nordic countries, where mothers earn between 80 and 91 percent of non-mothers, depending on the country and number of children.

Table 1 Predicted average annual earnings of mothers, aged 19-45, with a medium level of education, expressed as a percentage of the earnings of childless women and men

	Relative to Childless Women		Relative to Men		
	One child age 27	Two children ages 25, 27	No children	One child age 27	Two children ages 25, 27
Germany	0.63	0.42	0.94	0.60	0.40
Netherlands	0.63	0.46	0.84	0.53	0.39
United Kingdom	0.67	0.58	0.72	0.48	0.41
Canada	0.79	0.76	0.69	0.54	0.52
United States	0.89	0.81	0.64	0.57	0.52
Norway	0.87	0.80	0.70	0.61	0.56
Sweden	0.86	0.89	0.70	0.61	0.62
Finland	0.91	0.88	0.75	0.68	0.66

Thus far, we have expressed mothers' average cumulative earnings to age 45 as a percentage of non-mothers' earnings. But this is perhaps not the most useful comparison, particularly since non-mothers' earnings lag behind men's in all our countries, but to a different degree depending on the country. Thus, in the right hand columns of Table 1, we show women's cumulative earnings to age 45 as a percentage of men's in their country. Looking first at the columns for mothers, we see that once again, women in Germany and the Netherlands fare particularly poorly, earning between 39 and 60 percent of men's earnings (depending on the country and number of children they have had). Women with children in the Anglo-American countries fare similarly, earning between 41 and 57 percent of men's earnings (depending on the country and number of children). Women with children in the Nordic countries tend to do better, earning between 56 and 68 percent of men's earnings (again depending on the country and number of children). Comparing mothers to men, we find that our countries are more similar to one another than when we compare mothers to childless women. However, in both sets of comparisons, the Nordic countries stand out as having the smallest earnings

gaps.

When it comes to women without children, there is less evidence of clustering into regime types. Here, Canada and the US fare the poorest, with non-mothers having cumulative earnings of only 64 to 69 percent of men's by age 45. Germany ranks at the top (94 percent) when it comes to childless women's earnings as a share of men's, a surprise given the low relative earnings of mothers in that country. Although the same explanations are often given for both the gender pay and motherhood gaps, our findings suggest that obtaining equality in female earnings by family status will not necessarily result in gender equality.

These results, and in particular the position of Germany, raise the question of differential selection into motherhood and non-motherhood across our countries. Certainly, selection into parenthood varies across countries (John Hobcraft and Kathleen Kiernan 1995). Perhaps childless women in Germany do so well relative to men because they are a select group of particularly enterprising and well-paid women. Looking at Appendix Table 2, we find that moderately educated, childless women in Germany have labor participation rates that are similar to men's, their gap in average hours per week is 3.64 hours (the lowest among the countries for which that data is available), and their hourly pay is 82 percent of men's. In contrast, moderately educated, childless women in the US have lower participation rates (a gap of 7 percent), and earn only 69 percent per hour of what similarly educated men do, even though their gap in hours per week is relatively low (5.17 hours). This suggests that women in Germany either work male patterns prior to motherhood or that women whose work resembles similarly educated males postpone or forgo motherhood in that country.

Differences by level of education

In the results presented thus far, we have focused on the moderately educated group, which represents roughly 25 to 69 percent of the women in our country samples. As noted above, we also calculated separate estimates for the less educated and highly educated in each country. We do not present the full results for these groups here because of space and because sample sizes in some countries, particularly for the less educated, are rather small. However, we find that the gaps in cumulative average earnings between less educated mothers and other women are generally similar to those that we found for moderately educated women. Except for the Netherlands and Germany, less educated women face motherhood gaps in long-term average earnings that are about the same or narrower than those of moderately educated women. Like the moderately educated, less educated mothers in Germany, the Netherlands, and the UK have the lowest cumulative earnings relative to non-mothers. In these countries, a less educated woman who had one child at age 27 has only 54 to 70 percent of a non-mother's earnings by age 45, and a less educated woman who had two children at ages 25 and 27 has only 39 to 57 percent of a non-mother's earnings. Less educated mothers in the UK fare better than those in the Netherlands and Germany but fare much worse than those in the other five countries. In the US, for example, less educated women earn around 88 percent of non-mother's earnings. Less educated mothers in the UK also fare even worse in comparison to the Nordic countries, but sample sizes for less educated women in these countries (as well as Canada) are very small.

Turning to the highly educated, we find patterns similar to those of the moderately educated, but for some countries (Sweden and Finland), motherhood gaps are similar or wider, and for others (Germany, the Netherlands, and Norway), they are narrower. For highly educated women in the Anglo-American countries, the cumulative earnings of mothers relative to childless women are higher for those with one child and lower for those with two. In the Netherlands, Germany, and the UK,

mothers who gave birth to two children earn between 52 and 56 percent, of what similarly educated non-mothers earn. For the other five countries, highly educated women with two children earn between 67 and 83 percent of what non-mothers earn. Highly educated women with two or more children are relatively uncommon, however (see Appendix Table 3). For highly educated women with one child, there is less variation across countries; Germany, the Netherlands, and the UK do not stand out from the others to a great extent. The high earnings of highly educated mothers in some countries are likely due to the fact that they are more likely to be continuously employed (often full-time) than less educated women.⁷

Components of earnings

Our analyses thus far have considered gross annual earnings, which we can measure in a comparable way across each of our sample countries. It might also be of interest to examine the components of earnings – hours of work and hourly wages – and how the contribution of each of these components to the overall earnings gaps varies across countries. We cannot do so, however, because our data only contain information on current labor market variables. Without information on work histories, we cannot match older women to younger women with similar patterns of participation over time. This is important to consider in light of evidence from the UK that women who work part-time face pay penalties not just while they are working part-time but several years after they return to full-time work (Marco Francesconi and Amanda Gosling, 2005). Not being able to control well for work histories means that period estimates of cumulative earnings based on models that control only for current hours worked would be difficult to interpret because we would be imposing a work history that we did not control for in our regressions.⁸ Although we cannot include these variables in our models, an

examination of the available data may be informative and provide some suggestive evidence.

Table 2 shows the extent to which differences in the components of earnings for mothers and childless women vary by level of education and across countries. Among the less and moderately educated, mothers are far less likely to participate in the labor market than childless women in Germany, the Netherlands, and the UK. In all three countries, the participation rates of mothers are at least 19 percentage points lower. Among the highly educated, gaps are still high relative to mothers in the Nordic countries. Compared to less and moderately educated women in the same country, highly educated women in the US have relatively high motherhood gaps in participation. Regardless of education level, in Norway and Sweden, mothers and non-mothers generally have similar rates of participation.

Table 2 Differences in the participation rates, hours, and pay of childless women and mothers, by level of education

	Low Level of Education			Medium Level of Education			High Level of Education		
	Participants			Participants			Participants		
	Participation gap	Weekly hours gap	Hourly pay ratio (mothers: non-mothers)	Participation gap	Weekly hours gap	Hourly pay ratio (mothers: non-mothers)	Participation gap	Weekly hours gap	Hourly pay ratio (mothers: non-mothers)
Germany	0.27	16.16	0.74	0.19	10.23	0.92	0.20	9.67	0.98
Netherlands	0.29	12.25	0.71	0.21	12.62	1.03	0.15	9.86	1.35
United Kingdom	0.21	9.54	0.84	0.22	11.52	0.82	0.19	10.06	0.99
Canada	0.04	0.92	1.00	0.11	4.15	0.99	0.08	4.86	1.00
United States	0.01	0.45	0.99	0.09	2.29	0.99	0.13	6.24	1.09
Norway	-0.08			0.04			0.04		
Sweden	0.00			0.01			0.01		
Finland	0.11			0.06			0.04		

Unfortunately, information on average weekly hours worked is not available for any of our Nordic countries, so we cannot measure motherhood gaps in hours worked for these countries. For the five countries with information on hours worked, however, there is an hours gap between non-mothers and mothers in some countries. Regardless of level of education, hours gaps between childless women and mothers are especially large in Germany, the Netherlands, and the UK. Hours gaps are much narrower in Canada and the US, although for the highly educated, motherhood gaps are largest. Among moderately educated labor market participants, hourly wage ratios are above .90 for four of the five

countries with information, and in the Netherlands, mothers actually earn slightly more per hour, on average, than non-mothers. There is more variation in hourly pay ratios for the less educated, but pay gaps are particularly narrow for less educated women in Canada and the US. For the highly educated, in each of the five countries for which we have data, mothers earn nearly the same or even more per hour than childless women. This is probably due, in part, to the fact that we are covering large age ranges and because, if highly educated women postpone their fertility, they will tend to be older than non-mothers. The results are also consistent with the hypothesis that highly educated women only participate when they can earn high wages.

Taken together, data in Table 2 suggest that a large portion of the motherhood gap in long-term average earnings can be explained by mothers' lower rates of participation and shorter working hours in Germany, the UK, and the Netherlands. Differences in hours worked appear to play less of a role in the US and Canada. Motherhood gaps in the US and Canada remain narrow because mothers, particularly less and moderately educated mothers, tend to work the same long hours that childless women do. In the three other countries for which we have data, there is ample room for longer working hours to narrow gaps. The Netherlands and the UK have both met European Employment Strategy's Lisbon targets for female employment rates of at least 60 percent by 2010, but these findings suggest that focusing on employment rates alone masks other important sources of earnings inequality.

CONCLUSIONS

Differences in the earnings of mothers and non-mothers are an important, but seldom measured, determinant of the economic vulnerability of women not just while they are raising children but, because pensions are often participation- and earnings-linked, well after children leave home (Nancy Folbre 1994). Our purely descriptive analyses provide a first indication of the extent to which the long-

term earnings of mothers differ from those of non-mothers, and men, and how much those earning gaps differ across industrialized countries. In our best-case group, the Nordic countries, mothers with a medium level of education have earned by age 45 between 80 and 91 percent of what non-mothers have earned. It is important to emphasize, however, that these are estimates of what mothers and non-mothers who follow specific stylized life courses would actually earn; we are not presenting causal estimates of the unbiased relationship between motherhood and labor market earnings. If mothers are negatively selected, then the earnings foregone as a consequence motherhood would be even lower. Conversely, if mothers are positively selected, the earnings foregone could be higher than we predict. Selection is likely to drive some of the results we see, and is likely to differ across countries. Correcting for selection into motherhood would, however, remove one source of variation across countries.

At the other extreme, in our worst-case group, moderately educated mothers in the Netherlands and Germany have earned only 42 to 63 percent of non-mothers' earnings by age 45. The story for women in the Anglo-American countries is slightly more complicated. If we compare mothers to non-mothers, women in the UK are similar to women in the Netherlands and Germany, earning between 58 and 67 percent of non-mothers' pay. Mothers in Canada do better, earning only 21 to 24 percent less than childless women. And mothers in the US do even better, earning only 11 to 19 percent less than non-mothers in the long-term. In terms of motherhood gaps, the US is more similar to the Nordic countries than to the other Anglo-American countries.

However, when we compare the earnings of mothers to men, we find that the story changes, particularly for the US, where both mothers' and non-mothers' earnings lag considerably behind men's. Thus, one important direction for future research is to consider more carefully how differences in mothers' and non-mothers' pay relate to overall gender gaps in pay. That we find large gender gaps for childless women in many countries suggests that women's greater responsibility for childcare is only

part of a far more complex story. Unless childless women are less committed to work because they anticipate they will eventually withdraw or reduce their work hours or unless factors than caring responsibilities contribute to the gender pay gap, we would expect their earnings to be more similar to men's.

Another important direction for future research has to do with the extent to which higher education may buffer some of the effects of motherhood on women's earnings. The most recent work for the UK by Joshi and collaborators finds this to be the case. So, too, does recent work by Erin Todd (2001), analyzing hourly wage differences between mothers and non-mothers across a sample of LIS countries. Our analyses by education group provide some support for this, but only for some countries. Nonetheless, given our concerns with the data and our reliance on period rather than longitudinal estimates, further work is needed. So too is further work on selection into parenthood, and how that varies by education level and across countries.

Another topic for future research is the role of policy in accounting for some of the differences across countries that we find here. The fact that we find countries clustering roughly by regime type indicates that such work may be fruitful, but does not point to which specific policies may be playing a role, especially given the similar motherhood gaps in both the US and Nordic countries. Countries differ on a host of policy dimensions, including labor market policies, leave policies, childcare policies, in- and out-of-work benefit levels, child benefit levels, and policies regarding the right to work part-time. In recent years, the Netherlands and the UK have been particularly successful at increasing the participation rates of women and mothers, but our estimates suggest that an emphasis on moving women into part-time jobs leaves them in a relatively inferior economic position. Having addressed participation without addressing the fact that women tend to work short part-time hours and for low wages in these countries, means that mothers' earnings lag well behind those of childless women and men.

But countries also differ in gender norms and the gender order. If we moved Finland's policy regime to Germany, we would not likely get Finnish-like participation rates among German mothers, at least in the short-term. We cannot, on the basis of these estimates, conclude that generous work supports cause high participation rates or narrow motherhood gaps. Moreover, countries differ in terms of overall labor markets and wage structures, which could be particularly important in understanding the type of pay differentials analyzed here. The extremely large part-time pay gap in the UK is likely to contribute to the differences that we estimate because mothers are more likely than other women and men to work part-time (Francesconi and Gosling 2005). In addition, a series of studies by Francine Blau and Lawrence Kahn (1992; 1995; 1996; and 1998) have found that to a large extent, the difference in the gender earnings gap across countries can be explained by the difference in the extent of earnings inequality across countries. Although our findings and those of an earlier study by Harkness and Waldfogel (2003) suggest that this explanation does not fit as well when it comes to explaining differences in motherhood gaps in pay across countries, it is nevertheless worth considering in future research.

Although our work has moved beyond prior work by analyzing the long-term cumulative earnings of mothers, using comparable and recent data from eight industrialized countries, much more remains to be done. Our estimates of long-term earnings rely on the assumption that the earnings of mothers aged x with a child aged y , t years from now, can best be estimated by examining the current situation of mothers aged $x+t$ with a child age $y+t$. Cohort change, particularly changes in rates of participation in higher education and labor market, can make this kind of prediction strategy problematic. Clearly, longitudinal analyses with more detailed information are needed to measure long-term differences in earnings across different groups of women more precisely.

Finally, our results have simply documented differences between groups across countries. We have not modeled earnings equations or sought to understand the extent to which a woman loses

income as a consequence of motherhood. Our findings, however, provide the best estimates of the actual long-term differences across groups that exist in countries today and need to be explained in future work.

*Wendy Sigle-Rushton, London School of Economics,
Department of Social Policy and ESRC Centre for the Analysis of Social Exclusion
Houghton Street, London, WC2A 2AE, UK
e-mail: W.Sigle-Rushton@lse.ac.uk*

*Jane Waldfogel, Columbia University School of Social Work
and ESRC Centre for the Analysis of Social Exclusion, 1255 Amsterdam Avenue, New York, NY 10027,
USA
e-mail: jw205@columbia.edu*

BIOGRAPHIES

Dr. Wendy Sigle-Rushton is a lecturer in the Department of Social Policy in the London School of Economics and is affiliated with the ESRC Center for the Analysis of Social Exclusion.

Jane Waldfogel is Professor of Social Work and Public Affairs at the Columbia University School of Social Work and is affiliated with the ESRC Centre for the Analysis of Social Exclusion.

ACKNOWLEDGMENTS

We are grateful to Heather Joshi for many helpful conversations and suggestions. We received excellent comments and suggestions from colleagues at the Institute for Social and Economic Research at the University of Essex, the ESRC Centre for the Analysis of Social Exclusion, and the Department of Social Policy at the London School of Economics for helpful comments. Finally, our thanks to

three anonymous referees for their valuable input. All remaining errors are our own.

NOTES

¹ For further information on LIS, see Luxembourg Income Study (n.d.); see also Timothy Smeeding (2001).

² Another option would be to conduct microsimulation analyses, as Joshi (1990) do, but we lack the data to do so, since our data are cross-sectional.

³ We also cannot use data on women who are not the head of the household or the spouse or partner of the head, since for those cases we cannot identify whether the children belong to the woman or someone else.

⁴ The UK data only contains information on the age a person left full-time education so the education measure is less precise than for other countries.

⁵ We also experimented with models only to age 40 and found that the results were basically similar to those reported here.

⁶ Although the earnings for US women may look low, they actually are quite comparable to those found in other analyses. For instance, a recent General Accounting Office (2003) study found that women's annual earnings were about 44 percent less than men's, in large part because women had lower participation rates and lower hours of work (as well as lower hourly wages).

⁷ It may also be due to the fact that some highly educated mothers put off having children until later ages, and their earnings are higher as a result of that decision. The fact that our specification is restrictive and we do not interact fertility with age means we cannot test for this possibility, however.

⁸ The same problem arises when we use the results from older women as a proxy for younger women. To the extent that the participation rates of mothers has changed over time, older and younger mothers

may have very different work histories. Younger mothers could then look very different when they get older. Our use of women aged 45 and under helps mitigate this problem. The oldest mothers in our samples were aged 19 in 1980 or 1981 depending on the samples. There would be much more of a problem if we used a sample of women up to age 59 or 60.

REFERENCES

- Adams, Julia and Tasleem Padamsee. 2001. "Signs and Regimes: Rereading Feminist Work on Welfare States." *Social Politics* 8(1): 1–23.
- Albrecht, James, Per-Anders Edin, Marianne Sundstrom, and Susan Vroman. 1998. "Career Interruptions and Subsequent Earnings: A Reexamination Using Swedish Data." Working Paper, Georgetown, Uppsala, and Stockholm Universities.
- Anderson, Deborah, Melissa Binder, and Kate Krause. 2003. "The Motherhood Wage Penalty Revisited: Experience, Heterogeneity, Work Effort, and Work-Schedule Flexibility." *Industrial and Labor Relations Review* 56(2): 273–95.
- Avellar, Sarah. 2002. "The Family Wage? A Cross-Cohort Comparison of the Motherhood Wage Penalty." Mimeo, Population Studies Center, University of Michigan, Ann Arbor.
- Bardasi, Elena and Janet Gornick 2000. "Women and Part-Time Employment: Workers' 'Choices' and Wage Penalties in Five Industrialized Countries." Mimeo, Institute for Social and Economic Research, University of Essex, UK.
- Becker, Gary 1985. "Human Capital, Effort, and the Sexual Division of Labor." *Journal of Labor Economics* 3(1): S33–S58.
- Blau, Francine, Marianne Ferber, and Anne Winkler. 2002. *The Economics of Women, Men, and Work*, 4th Ed. Englewood, NJ: Prentice-Hall.

- Blau, Francine and Lawrence Kahn. 1992. "The Gender Earnings Gap: Learning from International Comparisons." *American Economic Review* 82(2): 533–8.
- . 1995. "The Gender Earnings Gap: Some International Evidence," in Richard Freeman and Lawrence Katz, eds. *Changes and Differences in Wage Structures*, pp. 105–43. Chicago: University of Chicago Press.
- . 1996. "Wage Structure and Gender Earnings Differentials: An International Comparison." *Economica* 63(Supplement): S29–S62.
- . 1998. "The Effect of Wage Inequality and Female Labor Supply on the Gender Pay Gap: A Cross-Country Analysis, 1985 to 1994." Working Paper, Cornell University, Ithaca.
- Budig, Michelle and Paula England. 2001. "The Effects of Motherhood on Wages in Recent Cohorts." *American Sociological Review* 66(2): 204–25.
- Calhoun, Charles A. and Thomas J. Espenshade. 1988. "Childbearing and Wives' Foregone Earnings." *Population Studies* 42(1): 5–38.
- Crittenden, Ann. 2001. *The Price of Motherhood: Why the Most Important Job in the World is Still the Least-Valued*. New York: Henry Holt and Company.
- Davies, Hugh and Heather Joshi. 1992. "Constructing Pensions for Model Couples," in Ruth Hancock and Holly Sutherland, eds. *Microsimulation Models for Public Policy Analysis: New Principles*, pp. 67–96. Occasional Paper 17, Suntory and Toyota International Centres for Economics and Related Disciplines, London School of Economics and Political Science.
- . 1994. "The Foregone Earnings of Europe's Mothers," in O. Eckert, ed. *Standards of Living and Families: Observation and Analysis*, pp. 101–34. Paris: INED John Libbey Eurotext.
- . 1995. "Social and Family Security in the Redress of Unequal Opportunities," in Jane Humphries and Jill Rubery, eds. *The Economics of Equal Opportunity*, pp. 313–44. Manchester: Equal Opportunity Commission.

- . 1999. Measuring the Cost of Children: Estimates for Britain. Paper presented at the annual meeting of the International Association for Feminist Economics, Ottawa.
- Davies, Hugh, Heather Joshi, and Romana Peronaci. 2000. “Foregone Income and Motherhood: What Do Recent British Data Tell Us?” *Population Studies* 54(3): 293–305.
- Espenshade, Thomas J. and Charles A. Calhoun. 1986. “The Dollars and Cents of Parenthood.” *Journal of Policy Analysis and Management* 5(4): 813–71.
- Esping-Anderson, Gosta. 1990. *Three Worlds of Welfare Capitalism*. Princeton: Princeton University Press.
- Folbre, Nancy. 1994. *Who Pays for the Kids? Gender and the Structures of Constraint*. New York and London: Routledge.
- Fuchs, Victor. 1988. *Women’s Quest for Economic Equality*. Cambridge: Harvard University Press.
- Francesconi, Marco and Amanada Gosling. 2005. *Career Paths of Part-time Workers*. Manchester: Equal Opportunities Commission.
- General Accounting Office (GAO). 2003. “Women’s Earnings: Work Patterns Partially Explain Difference between Men’s and Women’s Earnings.” Report GAO-04-35. Washington, DC: General Accounting Office.
- Gornick, Janet. 1999. “Gender Equality in the Labor Market,” in Diane Sainsbury, ed. *Gender Policy Regimes and Welfare States*, pp. 210–42. Oxford, UK: Oxford University Press.
- Gustafsson, Siv, Eiko Kenjoh, and Cecile Wetzels. 2003. “Employment Choices and Pay Differences between Non-Standard and Standard Work in Britain, Germany, Netherlands, and Sweden,” in Susan Houseman and Machiko Osawa, eds. *Nonstandard Work Arrangements in Japan, Europe, and the United States*. Upjohn Institute for Employment Research.
- Harkness, Susan and Jane Waldfogel. 2003. “The Family Gap in Pay: Evidence from Seven Industrialized Countries.” *Research in Labor Economics* 22: 369–414.

- Hill, Martha. 1979. "The Wage Effects of Marital Status and Children." *Journal of Human Resources* 24(4): 579–94.
- Hobcraft, John and Kathleen Kiernan. 1995. "Becoming a Parent in Europe." Welfare State Programme Discussion Paper No. 116, Suntory and Toyota International Centres for Economics and Related Disciplines, London School of Economics and Political Science.
- Hundley, Greg. 2000. "Male/Female Earnings Differences in Self-Employment: The Effects of Marriage, Children, and the Household Division of Labor." *Industrial and Labor Relations Review* 54(1): 95–115.
- Jacobs, Jerry and Janet Gornick. 2001. "Hours of Paid Work in Dual Earner Couples: The U.S. in Cross-National Perspective." Working Paper No. 253, Luxembourg Income Study.
- Joshi, Heather. 1990. "The Cash Opportunity Costs of Childbearing: An Approach to Estimation Using British Data." *Population Studies* 44(1): 41–60.
- . 1991. "Sex and Motherhood as Handicaps in the Labour Market," in Dulcie Groves and Mavis Maclean, eds. *Women's Issues in Social Policy*, pp. 179–93. New York and London: Routledge.
- Joshi, Heather and Hugh Davies. 1992. "Daycare in Europe and Mother's Foregone Earnings." *International Labour Review* 131(6): 561–79.
- . 2002. "Women's Incomes over a Synthetic Lifetime," in Elisabetta Ruspini and Angela Dale, eds. *The Gender Dimension of Social Change*, pp. 111–31. Bristol: The Policy Press.
- Joshi, Heather, Hugh Davies, and Hilary Land. 1996. *The Tale of Mrs. Typical*. London: Family Policy Studies Center.
- Joshi, Heather, Pierella Paci, and Jane Waldfogel. 1998. "What Do We Know about Unequal Pay?" in Heather Joshi and Pierella Paci, with Gerald Makepeace and Jane Waldfogel, eds. *Unequal Pay*

for Women and Men: Evidence from the British Birth Cohort Studies, pp. 1–22. Cambridge, MA: MIT Press.

———. 1999. “The Wages of Motherhood: Better or Worse?” *Cambridge Journal of Economics* 23(5): 543–64.

Korenman, Sanders and David Neumark. 1992. “Marriage, Motherhood, and Wages.” *Journal of Human Resources* 27(2): 233–55.

Lewis, Jane. 1992. “Gender and the Development of Welfare Regimes.” *Journal of European Social Policy* 2(3): 159–73.

Lundberg, Shelly and Elaina Rose. 2000. “Parenthood and the Earnings of Married Men and Women.” *Labour Economics* 7(6): 689–710.

Luxembourg Income Study (LIS). n.d. <http://www.lisproject.org/>. (accessed September 2006)

Mincer, Jacob and Solomon Polachek. 1974. “Family Investments in Human Capital: Earnings of Women.” *Journal of Political Economy* 82(2): S76—S108.

Neumark, David and Sanders Korenman. 1994. “Sources of Bias in Women’s Wage Equations: Results Using Sibling Data.” *Journal of Human Resources* 29(2): 379–405.

Pfau-Effinger, Birgit. 1998. “Culture or Structure as Explanations for Differences in Part-Time Work in Germany, Finland and the Netherlands?” in J. O’Reilly and C. Fagan, eds. *Part-Time Prospects: An International Comparison of Part-Time Work in Europe, North America, and the Pacific Rim*, pp. 177–98. New York and London: Routledge.

Polachek, Solomon. 1995. “Earnings Over the Lifecycle: What Do Human Capital Models Explain?” *Scottish Journal of Political Economy* 42(3): 267–89.

Rosholm, Michael and Nina Smith. 1996. “The Danish Gender Wage Gap in the 1980s: A Panel Data Study.” *Oxford Economic Papers* 48(2): 254–79.

Sainsbury, Diane. 1994. *Gendering Welfare States*. Thousand Oaks, CA: Sage Publications.

- Smeeding, Timothy. 2001. "Procuring Microdata Files for the LIS Project Databank: Progress and Promise." Working Paper 250, Luxembourg Income Study.
- Sørensen, Annemette. 2001. "Gender Equality in Earnings at Work and at Home." Working Paper 251, Luxembourg Income Study.
- Todd, Erin. 2001. "Educational Attainment and Family Gaps in Women's Wages: Evidence from Five Industrialized Countries." Working Paper 246, Luxembourg Income Study.
- Waldfogel, Jane. 1995. "The Price of Motherhood: Family Status and Women's Pay in a Young British Cohort." *Oxford Economic Papers* 47(4): 584–610.
- . 1997a. "Working Mothers Then and Now: A Cross-Cohort Analysis of the Effects of Maternity Leave on Women's Pay," in Francine Blau and Ronald Ehrenberg, eds. *Gender and Family Issues in the Workplace*, pp. 92–126. New York: Russell Sage.
- . 1997b. "The Wage Effects of Children." *American Sociological Review* 62(2): 209–17.
- . 1998a. "Understanding the 'Family Gap' in Pay for Women with Children." *Journal of Economic Perspectives* 12(1): 137–56.
- . 1998b. "The Family Gap for Young Women in the United States and Britain: Can Maternity Leave Make a Difference?" *Journal of Labor Economics* 16(3): 505–45.
- Waldfogel, Jane. 2001. "What Other Nations Do: International Policies Toward Parental Leave and Child Care." *The Future of Children* 11(4): 99–111.
- Waldfogel, Jane and Susan Mayer. 2000. "Gender Differences in the Low-Wage Labor Market," in David Card and Rebecca Blank, eds. *Finding Jobs: Work and Welfare Reform*, pp. 193–232. New York: Russell Sage Foundation.
- Wetzels, Cecile. 2003. "Motherhood and Wages: Reviewing the Effects of Time Out for Childcare, Working Part Time and Children," in *The Rationale of Motherhood Choices: Influence of Employment Conditions and of Public Policies*, report to the European Commission, Directorate

General for Research, Citizens and governance in a knowledge-based society, Brussels.

Appendix Table 1 Education attainment of men and different groups of women, by country

		Men	Women	Non-Mothers	Mothers
Germany	low	0.32	0.26	0.18	0.31
	medium	0.45	0.56	0.61	0.54
	high	0.23	0.18	0.22	0.15
Netherlands	low	0.15	0.21	0.11	0.26
	medium	0.50	0.51	0.48	0.52
	high	0.35	0.29	0.41	0.22
United Kingdom	low	0.56	0.54	0.40	0.60
	medium	0.19	0.25	0.26	0.24
	high	0.25	0.22	0.34	0.15
Canada	low	0.14	0.11	0.08	0.13
	medium	0.66	0.67	0.63	0.69
	high	0.20	0.21	0.28	0.18
United States	low	0.12	0.11	0.08	0.13
	medium	0.59	0.61	0.54	0.64
	high	0.29	0.28	0.38	0.23
Norway	low	0.09	0.09	0.08	0.09
	medium	0.63	0.58	0.55	0.60
	high	0.28	0.33	0.37	0.31
Sweden	low	0.15	0.13	0.11	0.14
	medium	0.66	0.60	0.59	0.61
	high	0.20	0.27	0.30	0.26
Finland	low	0.17	0.15	0.13	0.17
	medium	0.68	0.69	0.70	0.67
	high	0.15	0.17	0.17	0.17

Appendix Table 2 Labor force participation and, among participants, earnings (national currency) and participation, by country for men and different groups of women

		Men	Women	Non-Mothers	Mothers		Men	Women	Non-Mothers	Mothers
	Germany					United States				
low	participants (non-zero wages)	0.88	0.66	0.86	0.59		0.87	0.62	0.63	0.62
	mean earnings of participants	51,969.86	25,600.15	36,007.04	20,456.53		23,621.97	13,208.31	15,238.46	12,627.98
	hours of participants	39.46	25.79	36.59	20.43		41.88	36.34	36.69	36.24
	hourly wage of participants	22.78	15.04	18.21	13.46		10.50	6.88	6.91	6.87
medium	participants (non-zero wages)	0.85	0.76	0.87	0.68		0.95	0.82	0.88	0.79
	mean earnings of participants	53,909.32	34,106.39	41,167.13	28,083.95		37,901.78	22,011.93	23,614.19	21,310.49
	hours of participants	38.87	29.71	35.23	25.00		43.89	37.13	38.72	36.43
	hourly wage of participants	24.31	19.03	19.91	18.27		16.47	11.27	11.37	11.22
high	participants (non-zero wages)	0.86	0.78	0.89	0.69		0.97	0.85	0.92	0.79
	mean earnings of participants	83,335.54	45,710.87	49,011.19	42,190.42		70,670.38	39,488.14	41,656.63	37,559.33
	hours of participants	42.31	32.25	36.92	27.25		46.10	38.81	42.11	35.87
	hourly wage of participants	35.83	23.00	23.26	22.74		28.87	19.39	18.48	20.23
	Netherlands					Norway				
low	participants (non-zero wages)	0.88	0.59	0.83	0.54		0.87	0.76	0.70	0.78
	mean earnings of participants	51,709.80	24,637.90	40,962.66	18,840.79		253,859.80	148,882.60	159,928.50	144,933.20
	hours of participants	39.77	21.64	30.68	18.43		--	--	--	--
	hourly wage of participants	25.08	19.77	25.08	17.88		--	--	--	--
medium	participants (non-zero wages)	0.92	0.79	0.93	0.72		0.96	0.90	0.93	0.89
	mean earnings of participants	58,797.03	32,973.87	41,900.97	27,049.09		277,685.90	162,128.80	158,482.00	163,756.40
	hours of participants	39.64	24.45	32.04	19.42		--	--	--	--
	hourly wage of participants	28.27	24.75	24.31	25.04		--	--	--	--
high	participants (non-zero wages)	0.94	0.86	0.93	0.78		0.97	0.95	0.98	0.94
	mean earnings of participants	71,279.77	45,501.95	46,340.77	44,471.66		383,704.00	238,368.50	232,882.10	241,545.60
	hours of participants	39.07	30.02	34.45	24.59		--	--	--	--
	hourly wage of participants	32.72	28.21	24.34	32.96		--	--	--	--
	United Kingdom					Sweden				
low	participants (non-zero wages)	0.82	0.62	0.78	0.57		0.84	0.73	0.73	0.75
	mean earnings of participants	19,305.81	9,407.82	12,410.76	8,028.73		181,962.00	116,571.10	106,383.20	121,458.50
	hours of participants	46.96	30.54	37.08	27.54		--	--	--	--
	hourly wage of participants	6.85	5.48	6.12	5.19		--	--	--	--
medium	participants (non-zero wages)	0.90	0.74	0.88	0.66		0.94	0.90	0.91	0.90
	mean earnings of participants	23,879.59	13,092.34	16,392.12	10,714.81		225,203.50	138,811.50	141,085.20	137,395.90
	hours of participants	46.31	33.08	39.78	28.26		--	--	--	--
	hourly wage of participants	8.93	7.06	7.88	6.46		--	--	--	--
high	participants (non-zero wages)	0.89	0.78	0.87	0.68		0.96	0.93	0.94	0.93
	mean earnings of participants	31,424.46	19,689.04	21,168.98	17,552.50		319,905.90	176,979.00	177,806.90	176,371.30
	hours of participants	45.92	37.86	41.98	31.92		--	--	--	--
	hourly wage of participants	11.20	8.98	9.01	8.95		--	--	--	--
	Canada					Finland				
low	participants (non-zero wages)	0.89	0.64	0.67	0.63		0.87	0.72	0.79	0.68
	mean earnings of participants	31,662.65	17,065.60	16,998.21	17,086.99		119,779.40	74,849.09	63,095.61	82,426.67
	hours of participants	39.93	27.41	28.11	27.19		--	--	--	--
	hourly wage of participants	12.84	9.13	9.39	9.04		--	--	--	--
medium	participants (non-zero wages)	0.96	0.85	0.93	0.82		0.95	0.88	0.91	0.85
	mean earnings of participants	39,486.48	23,696.66	25,473.95	22,808.01		129,438.10	88,556.17	84,129.57	92,123.17
	hours of participants	39.72	30.09	32.84	28.69		--	--	--	--
	hourly wage of participants	16.19	12.86	12.94	12.82		--	--	--	--
high	participants (non-zero wages)	0.98	0.92	0.97	0.89		0.97	0.96	0.98	0.94
	mean earnings of participants	63,612.02	38,952.03	41,755.34	36,669.59		223,584.80	139,267.70	143,169.40	136,324.80
	hours of participants	38.84	31.92	34.58	29.72		--	--	--	--
	hourly wage of participants	22.28	19.03	19.06	19.00		--	--	--	--

Appendix Table 3 Distribution of children by level of education and country

Education	Number of Children				
	None	One	Two	Three	Four+
Germany					
low	0.25	0.27	0.34	0.10	0.03
medium	0.40	0.27	0.25	0.06	0.01
high	0.45	0.24	0.25	0.05	0.02
all	0.37	0.26	0.28	0.07	0.02
Netherlands					
low	0.19	0.21	0.45	0.10	0.05
medium	0.34	0.18	0.33	0.12	0.03
high	0.51	0.12	0.27	0.08	0.02
all	0.36	0.17	0.33	0.10	0.03
United Kingdom					
low	0.25	0.25	0.31	0.13	0.06
medium	0.35	0.22	0.31	0.09	0.03
high	0.53	0.16	0.23	0.07	0.01
all	0.34	0.22	0.29	0.11	0.04
Canada					
low	0.23	0.25	0.34	0.13	0.06
medium	0.31	0.22	0.32	0.11	0.03
high	0.43	0.19	0.27	0.09	0.03
all	0.32	0.22	0.31	0.11	0.04
United States					
low	0.22	0.23	0.25	0.18	0.12
medium	0.28	0.25	0.30	0.12	0.05
high	0.43	0.20	0.25	0.09	0.02
all	0.32	0.23	0.28	0.12	0.05
Norway					
low	0.29	0.29	0.25	0.11	0.07
medium	0.30	0.23	0.31	0.14	0.03
high	0.36	0.23	0.27	0.12	0.02
all	0.32	0.23	0.29	0.13	0.03
Sweden					
low	0.32	0.25	0.26	0.11	0.06
medium	0.38	0.20	0.28	0.11	0.03
high	0.42	0.16	0.30	0.09	0.02
all	0.38	0.19	0.28	0.11	0.03
Finland					
low	0.36	0.21	0.25	0.13	0.06
medium	0.43	0.19	0.25	0.11	0.03
high	0.42	0.21	0.25	0.08	0.04
all	0.42	0.19	0.25	0.11	0.04

Address for proofs: W.Sigle-Rushton@lse.ac.uk

Contact Numbers

Wendy Sigle-Rushton

Office: +44 20 7955 7358

Home: +44 20 8257 2343

Cell: +44 7843 734 451, +44 7887 728 206

Fax: +44 20 7955 7415

Jane WaldoFgel

Office: (212) 851-2408

Fax: (212) 932-7817