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The motherhood pay gap: A review of the issues, theory and international evidence

Damian Grimshaw
Jill Rubery

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CONDITIONS OF WORK AND EMPLOYMENT SERIES No. 57

INWORK

Inclusive Labour Markets, Labour Relations
and Working Conditions Branch

The motherhood pay gap:

A review of the issues, theory and international evidence

Damian Grimshaw and Jill Rubery
University of Manchester

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ILO Cataloguing in Publication Data

Grimshaw, Damian; Rubery, Jill

The motherhood pay gap : a review of the issues, theory and international evidence / Damian Grimshaw and Jill Rubery ; International Labour Office, Inclusive Labour Markets, Labour Relations and Working Conditions Branch. - Geneva: ILO, 2015

(Conditions of work and employment series ; No. 57, ISSN: 2226-8944 ; 2226-8952 (web pdf))

International Labour Office Inclusive Labour Markets, Labour Relations and Working Conditions Branch.

wage differential / working mother / maternity / men workers / wage determination / wage structure / family responsibilities

13.07

First published 2015

Cover: DTP/Design Unit, ILO

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Printed by the International Labour Office, Geneva, Switzerland

Acknowledgements

This study was prepared by Damian Grimshaw, Professor of Employment Studies, and Jill Rubery, Professor of Comparative Employment Systems, at the European Work and Employment Research Centre (EWERC) of the Manchester Business School, University of Manchester, United Kingdom. It is a joint collaboration between two branches of the Conditions of Work and Equality Department: the Gender, Equality and Diversity Branch (GED) and the Inclusive Labour Markets, Labour Relations and Working Conditions Branch (INWORK).

The authors would like to thank Kristen Sobeck, ILO Economist, and Laura Addati, ILO Maternity Protection and Work–Family Specialist, who coordinated this research and made technical contributions to this review. They also thank Janine Berg, ILO Senior Economist, and Vanessa Gash, Senior Lecturer in Sociology at the City University of London, United Kingdom, who peer-reviewed the study and discussed its findings and conclusions during an ILO research seminar held in June 2014 in Geneva, Switzerland. They additionally express appreciation to May Hofman who edited the paper.

The authors also acknowledge the valuable comments from the following ILO officials: Manuela Tomei, Shauna Olney, Philippe Marcadent, Janine Berg, Patrick Belser, Susan Maybud, Raphael Crowe, Martin Oelz, Adrienne Cruz, David Kucera, Katerine Landuyt, Lisa Wong, Claire Marchand, Naima Pages and Manal Azzi. Thanks also go to Charlotte Beauchamp, José Garcia, Priscille Latchman, Brigitte Honma and Claire Piper for their support in the publication of the paper.

Executive summary

What is the motherhood pay gap?

The motherhood pay gap measures the pay gap between mothers and non-mothers, the latter defined in most econometric studies as women without dependent children. It also measures the pay gap between mothers and fathers. This is different from the gender pay gap, which measures the pay gap between all women and all men in the workforce. While there is a considerable international literature on the motherhood gap, differences both in methodologies and in how mothers, non-mothers and fathers are defined using available data create difficulties in comparing estimates. Moreover, in many countries, the data are often unsuitable for analysis, typically because the questions posed in surveys make it difficult to establish the identity of a child's mother or father (particularly in developing countries where the nuclear family is less common). Nevertheless, many studies draw on international harmonized pay and employment data which provide a useful basis for cross-country comparison, and others provide informative trend analyses for single countries.

Trends in the motherhood pay gap

From the available data it appears that the unadjusted motherhood gap tends to be larger in developing countries than in developed countries. Globally, the motherhood gap increases as the number of children a woman has increases; in many European countries, for example, having one child has only a small negative effect, but women with two and especially three children experience a significant wage penalty. In developing countries, evidence suggests the gender of the child may matter as daughters may be more likely than sons to help with household and caring tasks, thereby reducing the motherhood gap. Whether the wage penalty associated with motherhood is a one-off event or accumulates over time also varies from one country to the next. For example, mothers who have a strong job attachment are found to experience a wage decrease immediately on return to employment but soon catch up with non-mothers. In contrast, mothers taking longer leave periods experience a longer-lasting wage penalty. In short, while the existence of a motherhood gap seems universal, the magnitude and duration of the effect motherhood has on wages varies from country to country.

Explanations for the motherhood pay gap

The main reasons for the motherhood pay gap can be located in one of three analytical frameworks – rationalist economics, sociological and comparative institutionalist.

The rationalist economics approach emphasizes the following factors: (1) reduced “human capital”, or knowledge, subsequent to labour market interruptions or reductions in working time, and subsequent reduced commitment (since women are more likely to face employment interruptions, they are less inclined to seek out training or higher-paid positions with more responsibility); and (2) employment in family-friendly jobs which are lower-paying (after having children women often opt into part-time jobs, and may have little option but to accept jobs with less responsibility).

The sociological approach argues instead that: (1) some employers may build into their hiring and promotion decisions traditional stereotypical expectations of the burdens imposed by families on mothers' time and energy; (2) the absence of child care and other work–family measures is a market failure (women are not promoted because investment in child-care services, flexible working arrangements etc. is missing and vice versa); and (3) undervaluation of women's work means that skill and experience in female-dominated occupations and workplaces tend to be rewarded unfairly.

The comparative institutionalist approach emphasizes the following: (1) countries provide very different opportunities for mothers to access decent wages through specific policies to support care and work (e.g. child-care provision, maternity and paternity leave); (2) a country's tax and benefit system exerts a strong influence on a mother's status as economically dependent (on a spouse) or as an independent citizen; (3) the size of the motherhood wage penalty varies with the degree of inequality in a country's overall wage structure; (4) the cultural and family context matters, especially in countries with less developed formal policy architectures; and (5) implementation gaps are a key area of concern, particularly in developing countries, where women work informally or under precarious contracts in the formal sector which exclude them from statutory provisions related to leave, job protection and so on.

How to address the motherhood pay gap

The magnitude of the motherhood pay gap and the relevance of some of the above-mentioned explanations depend on the constellation of work–family laws, policies and measures, labour market institutions, gender stereotypes and societal expectations in place in a given country. Nonetheless, there are some general policy options which can be used to address it:

- Job-protected parental leave of adequate duration and with income-related pay funded by social insurance or public funds for both women and men, with specific provision for fathers.
- High accessibility of affordable and quality child-care services and flexible working arrangements for all workers.
- Tax and benefit rules which treat mothers as economically independent adults.
- Addressing the implementation gap in work–family and social policies.
- Preventing and eliminating discrimination based on maternity and family responsibilities and creating a family-friendly workplace culture

Right to regulated and flexible working hours, including the upgrading of part-time jobs and promoting access to them for women and men.

Abbreviations

| | |
|-------------|--|
| APW | Average Production Worker |
| BHPS | British Household Panel Survey |
| CPS | Current Population Survey (United States) |
| ECHP | European Community Household Panel |
| EU | European Union |
| G-SOEP..... | German Socio-Economic Panel |
| IAB..... | Institut für Arbeitsmarkt- und Berufsforschung (Germany) |
| IFS..... | Institute for Fiscal Studies (United Kingdom) |
| ILO | International Labour Office /Organization |
| ISSP | International Social Survey Programme |
| LFS..... | Labour Force Survey |
| LIS | Luxembourg Income Study |
| NLSY | National Longitudinal Surveys (United States) |
| OLS | ordinary least squares |

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Introduction

Evidence that mothers suffer a wage penalty over and above the penalty for being a woman raises concerns not only for gender equality but also for the capacity of societies to manage a sustainable balance between their economic aims of active female participation in paid work and the social aims of providing a fair distribution of income to support the reproduction and rearing of children. These concerns underpin ILO Conventions designed to combat inequality in women's position in paid employment, especially associated with motherhood status. In addition to the well-known Equal Remuneration Convention, 1951 (No. 100), two further ILO Conventions set standards for working mothers (and fathers): the Workers with Family Responsibilities Convention, 1981 (No. 156) promotes non-discrimination, work-family balance and access to vocational training among other issues; and the Maternity Protection Convention, 2000 (No. 183) sets minimum standards for maternity protection and benefits including: leave duration, entitlement to maternity pay set at a suitable level, access to health benefits and the right to return to the same or an equivalent position.

A motherhood wage penalty impedes progress towards gender equality in both high-income and middle/low-income countries. One reason is that it may reflect and reinforce the gender stereotype that it is women and not men who must sacrifice earnings for natural interruptions to paid employment caused by the experience of childbirth and the associated period of leave to care for the child. Such stereotypes filter through into the world of work. In particular, some employers may act on the basis of rather caricatured notions of the level of commitment and motivation that young women bring to an organization, and respond by holding down their pay or excluding them from promotions.

A second reason is that the motherhood wage penalty also appears to risk gender inequality in pay extending over the life-course. All studies show that women experience a fall in pay with childbirth, and that this penalty rises in line with the number of children (or with the number of periods of leave), although having daughters who help with housework, rather than sons, turns out to be beneficial for mothers' earnings in low-income countries. Several recent studies also trace the penalty over a mother's life-course, and point to a cumulative and persistent inequality in earnings. Fathers' earnings, by contrast, are unaffected by childbirth. Indeed, the few studies that include evidence for fathers suggest they enjoy a wage premium compared to men without children. Gender wage inequality among parents is thus typically wider than among non-parents.

This raises an issue at the core of our thinking about how to consider and measure the motherhood pay gap. In the context of the rise of dual-earner households and mixed-sex workplaces, the persistence of a high parenthood pay gap appears to depend on a father's ability to make greater displays of commitment and performance at work, and thus improve his earnings. This is in contrast to a mother's weaker capacity to work long hours or respond to last-minute work demands.

The interrelationship between fathers' and mothers' wages suggests that the real motherhood pay gap may better be described as how much mothers lose compared to fathers. Such a comparison would have direct implications for policy recommendations to encourage more equal parenting. These could include obligatory shared leave

arrangements between mothers and fathers, equal rights to benefits while on leave, and compulsory provision of flexible working hours at the point of recruitment for both fathers and mothers. However, all studies restrict their investigation to the pay gap between women with children and women without children (variously defined) and this therefore provides the focus of this state-of-the-art review.

Among the social science research investigations, there are broadly four approaches and while some parts of the study appear to favour one over the other it is hoped that we do justice to all four since each has its value and each ought to inform policy debate. The first is a *rationalist economics approach* that seeks to identify the precise independent effect of selected variables on pay assuming perfect competition in labour markets and relatively unconstrained individual rational choice. The range of statistical techniques has become increasingly sophisticated and these, along with the various definitions and measures, are mostly discussed in Part I of the study. The second approach is a *sociological approach* that considers the role of societal expectations, stereotyping, status and discrimination in shaping pay, as well as the structural constraints and opportunities that influence individual labour market choice. Such issues are difficult, if not impossible, to input into a statistical model and are therefore mostly discussed separately in Part II. The third is a *comparative institutionalist approach* that seeks to identify the societal specific causes of inter-country patterns in motherhood pay gaps with attention to gender relations and intersections with welfare, education and employment institutions; it is addressed in Part IV. Here, the research methods are mixed with many studies using country variables in multivariate models and others analysing the country-specific constellation of institutions and their changing impact on the motherhood pay gap over time. Finally, a fourth strand of work is described by a *development approach* that privileges the specific conditions associated with rural employment, low or no education and alternative forms of informal payments that interact with motherhood status. The evidence and results arising from this approach are incorporated throughout the study.

These four approaches inform the particular decisions in research studies about both how to measure the motherhood pay gap and what factors to identify as possible explanators of the gap. The bulk of research reviewed here predominantly follows the first approach, that of rationalist economics, although a sub-set of these studies seeks to integrate sociological, comparative institutionalist and developmentalist reasoning in order to extend the list of explanatory factors and to enrich the interpretation of results. A key limitation of our review concerns the country and regional focus of the bulk of research undertaken to date. There are many more published studies of the motherhood pay gap in high-income countries – especially Australia, Europe and North America – than in low- and middle-income countries. We have sought to emphasize the results from those studies we have obtained for low- and middle-income regions but inevitably the balance of analysis and recommendations in this study is biased towards the developed world.

The study is organized as follows:

- Part I discusses the measurement issues, especially associated with statistical modelling of the motherhood pay gap, and presents headline results for a range of low-, middle- and high-income countries. It also addresses evidence of a wage premium for fathers.

-
- Part II presents a critical analysis of six core methodological issues drawing on studies from multiple disciplinary approaches.
 - Part III assesses the merits of competing economic and sociological explanations for the motherhood pay gap, with a focus on productivity-related explanations on the one hand and accounts that emphasize the gendered nature of institutions and sex discrimination on the other.
 - Part IV investigates the impact of a country's institutional environment with a particular emphasis on its welfare and family system.
 - Part V sets out six major policy recommendations and considers issues for future research.

Part I: Measurement issues and highlights of the international empirical evidence

In this first part, we identify the key definitional issues and present a selection of headline results from international studies of the motherhood pay gap. This overview sets the backdrop for more detailed analysis and discussion in the rest of the study.

Section 1 deals with definitions and measurement issues. Definitions of motherhood (and non-motherhood) in the empirical research studies are typically shaped by analytical and statistical concerns on the one hand and data availability on the other. Examples of issues include: the treatment of older women who may have no children at home but have had children in the past and therefore confuse the comparison; how to analyse the wage discounting effects encountered by young non-mothers; wide-ranging problems of selection bias; and whether to define appropriate male control groups. A second vital definitional issue concerns the measurement of the pay gap. Most studies report a raw (unadjusted) pay gap and an adjusted pay gap using a particular econometric model. Recent studies extend these generally static comparative analyses by exploring lifetime measures of what might be called the possible “scarring effects” of motherhood interruptions. This section explores these approaches in addition to highlighting how studies address both the heterogeneity of pay gaps among different kinds of mothers (for example by marital/cohabitation status, age of children, non-nuclear family situations, level of education, and so on) and problems of cross-country comparability of indicators and measures.

Section 2 presents a selection of headline results of wage penalties experienced by mothers in a range of country contexts, while section 3 focuses on wage premiums among fathers. The bulk of research focuses on the motherhood pay gap and as such the attention to the fatherhood pay gap (typically characterized by a wage premium) is limited. The results refer to a range of countries including, as far as possible, results for low- and middle-income countries. The aim is to highlight post-2000 trends and patterns and to identify pay gap effects shaped by the number and age of children and duration of time out of work, as well as stratification effects related to labour market status of the mother returner (e.g. full-time, part-time), ethnicity, level of education and occupation.

1. What is the motherhood pay gap? Measurement issues

1.1. How to define mothers and non-mothers?

Estimation of the motherhood pay gap requires the identification of an appropriate control group against which to compare mothers’ pay. Some definition of ‘non-mothers’ in paid employment is therefore required. In principle this could involve all workers who do not satisfy the dual characteristics of being female and having children. In other words, a control group might extend to all male workers and those female workers without children. In practice, all the studies reviewed in this study focus on the pay gap among female workers. The reason is that this controls for gender. However, there are good reasons to think that it is not possible to separate out gender and motherhood (in a context of gender stereotypes and so forth) – an issue we consider in Parts II and III. One

might argue that a more appropriate comparator group is fathers, in light of evidence that there is a very strong division of labour market experience among men and women following parenthood, with important policy implications. Nevertheless, even the limiting of the comparator group to women raises several issues in considering how best to identify and define the two groups of mothers and non-mothers.

First, should mothers who have dependent children at home be treated the same as mothers whose children are older and live in independent housing, or does the aggregation of results for all mothers confuse the comparison with non-mothers? Most studies in fact choose to separate out mothers with dependent children as the focus (although there are studies that focus on all mothers who have ever had children – e.g. Zhang et al., 2008). There are two general methods for doing this (see table 1.1 for details of definitions used in a selection of studies):

- method one which limits the two groups – mothers and non-mothers – to a specific age range so as to exclude older women who may have no children at home but have had children in the past (as well as in some cases to exclude younger women who may be combining education with employment). Examples include Harkness and Waldfogel (2003) where the age range is limited at both ends to 24–44 years old, and other studies where only the top end of the age spectrum is limited, including Felfe (2012) (only women aged 16–46 years) and Zhang (2010) (aged 15–50); and/or
- method two which limits the sample to mothers whose children are younger than a defined age, guided by data on the mean leaving age of children from the family home. For example, Davies and Pierre (2005) in addition to the 30–40 age range restriction for mothers only include mothers who had children before the age of 30.

Even so, in many of the data analyses, the authors admit limitations to their characterization of the control group. For example, both ECHP data (for Europe) and March CPS data (for the United States) only contain information about the number and age of children sharing the household but not about children ever born. As such, the defined group of “non-mothers” is bound to include mothers whose children have left home, as well as mothers whose children aged 18 and over have stayed at home and possibly contribute to household income. The resulting estimates of the motherhood pay gap in such studies are therefore likely to understate the actual gap (Davies and Pierre, 2005; Pal and Waldfogel, 2014).

Second, all studies of the motherhood pay gap are confronted with the issue of selection bias. There are several reasons for concern. For example, if women with higher education and stronger potential to earn higher wages over the life-course are more likely than other women not to have children, or to have smaller families and/or to stay in work longer and return more quickly after childbirth, then regression analyses need to control for selection bias. Also, if women who have children at a younger age are then more likely to drop out of the labour market altogether, some effort needs to be made to control for the resulting bias. Women with declining earnings may “self-select” into motherhood; that is, the causal relationship is reversed – falling earnings lead to motherhood, not the other way round.

There are alternative approaches to correcting for bias in the statistical studies. A commonly used technique is the Heckman (1979) selection model to account for the potential non-random nature of women's labour market participation; the technique is adapted by modelling participation using the usual human capital variables, as well as family factors such as age of youngest child and partner's earnings or other household income (Harkness and Waldfogel, 2003); for example, Davies and Pierre (2005) model participation against the additional variables of age of youngest child, single woman, non-working partner and quartile location of earnings of working partner in the earnings distribution. Selection models do not by any means resolve imperfections in the regression analysis and indeed are typically presented alongside model estimates without selection controls since it is often unclear which produces the more reliable set of results (see, for example, the discussion in Pal and Waldfogel, 2014, pp. 13–14).

Another method is to search for what is referred to as an “instrument” that may account for some of the unobserved interrelationships between the dependent variable (wages) and the independent variable of interest (childbearing). Various instruments are used in the literature. One such is the incidence of miscarriage (Markussen and Strøm, 2013). If miscarriages are exogenous then information about the characteristics of women who would otherwise have become mothers in the next time period, or may go on to become mothers but in a later period, can be fed into modelling and control for part of the selection bias. However, as Wilde et al. (2010) argue, use of this instrument suffers from the problem of small numbers, the modest average delay in eventual childbirth and association with other behavioural characteristics, suggestive of links with wages and employment participation. Other instruments used include infertility (Agüero and Marks, 2011) and modelling of mothers who have twins (Simonsen and Skipper, 2012). Simonsen and Skipper's study is unlikely to be easily replicated since they had access to register data for the entire Danish population, generating a usable sample of 1,147 twin pair mothers (as well as 979 twin pair fathers). The wage of the non-parent twin is used as a counterfactual for the parent twin.

Several studies seek to control for bias caused by unobserved differences between mothers and non-mothers by using fixed effects models. In Waldfogel's (1997) widely cited early study, for example, she controls for unobserved heterogeneity first by using a difference specification and secondly by applying a fixed effects specification. Waldfogel argues that these models are able to partially address the problem that women who are more committed to their job might be less likely to have children and more likely to experience wage rises, which would lead to an over-estimated motherhood pay gap.

Table 1.1. Measures of motherhood and motherhood pay gaps used in selected studies

| Research study | Country coverage | Data source/ year | Mother definition | Non-mother definition | Workforce coverage | Wage definition | Regression analysis/ adjustments for selection bias/longitudinal |
|----------------------------------|---|--|--|---|---|----------------------------------|--|
| Agüero et al. (2011) | 21 developing countries ^a (mostly Africa, Latin America) | Demographic Health Surveys/ 1994–99 | Age 20–44 with children 18 years old or less | Age 20–44 years old without children | | Daily wage | OLS/ infertility instrument |
| Budig and England (2001) | United States | National Longitudinal Survey of Youth/pooled 1982–1993 | Age 17–35 with children | Age 17–35 without children | Women employed at least 2 years during the period | Hourly wage | Fixed effects regression models/ n.a. |
| Budig et al. (2012) | 22 countries ^b (Europe, North America, Russian Federation) | Luxembourg Income Study (LIS) and International Social Survey Programme (ISSP)/ 2000 | Age 25–49 with children at home | Age 25–49 without children at home | | Annual earnings | OLS/Heckman |
| Davies and Pierre (2005) | 11 EU Member States ^c | European Community Household Panel (ECHP)/ 1994–99 | Age 30–40 with children | Age 30–40 without children | | Gross hourly pay | |
| Dupuy and Fernández-Kranz (2011) | 35 countries ^d | International Social Survey Programme (ISSP) (1985–94, 1994–2002) | Younger than 50 years old, with children | Age <50 without children | Full-time and part-time | Mix of gross and net monthly pay | OLS |
| Ejrnæs and Kunze (2013) | West Germany | IAB Employment Register/1975–2001 | At least 1 year full-time employment until birth and return to work within 3.5 years | No employment interruption, no children, age up to 39 years old | Full-time, part-time, self-employed | Daily wages | Regression and post-birth fixed effects/ longitudinal analysis |
| Felfe (2012) | Germany | Socio-Economic Panel/ 1984–2007 | Age 16–46, employed for at least two years, children | Same without children | | Hourly wage | First differences/ longitudinal |
| Gamboa and Zuluaga (2013) | Colombia | Living Standards Survey/ 2008 | Two age groups, 18–45 and 18–65 with children | Same age groups without children | Urban residents | Hourly pay | |
| Gangl and Ziefle (2009) | Germany, United Kingdom, United States | G-SOEP/ 1984–2001, BHPS/ 1991–2002, NLSY/ 1979–1996 | Age early 20s-mid/late 30s, with children | Same age without children | All paid workers | Gross hourly | Fixed effects/ longitudinal |

| Research study | Country coverage | Data source/ year | Mother definition | Non-mother definition | Workforce coverage | Wage definition | Regression analysis/ adjustments for selection bias/longitudinal |
|-------------------------------|---|--|---|--|---|-------------------|--|
| Gash (2009) | Finland, Denmark, France, West Germany, Netherlands, UK | European Social Survey, ECHP | Age 25-45 years with children at home | Same age without children | Full-time and part-time employees | Hourly wage | Pooled OLS and fixed effects models |
| Harkness and Waldfogel (2003) | 7 developed countries ^e | LIS/ 1991 plus wage data for Sweden from Level of Living Survey | Age 24-44 with children | Age 24-44 without children | Full-time and part-time; self-employed excluded | Hourly wage | OLS linear probability models/ Heckman |
| Joshi et al. (1999) | United Kingdom | Two cohort surveys: Medical Research Council, National Child Development Study | Born in 1946, 1958; age 32 (1978), 33 (1991), with children | Same ages without children | | Hourly wage | Multinomial logit/ Heckman |
| Kellokumpu (2007) | Finland | Finnish Longitudinal Employer-Employee Data/ 1995-2002 | Age 20-39/27-46, childless in 1995/96, childbirth 1997-2000 | Same ages without children in 2001/2 | Private sector, employed in 1995/6 | Hourly wage | Heckman |
| Kumlin (2007) | Japan, Sweden | Japanese General Social Survey/2001, Swedish Level of Living Survey/2000 | Age 20-65 with children at home | Age 20-65 without children at home | | Hourly wage | OLS |
| Lundberg and Rose (2000) | United States | Panel Study of Income Dynamics/ 1980-1992 | Married for 5+ years, age 22-45 with children | Same without children | | Hourly wage | Fixed effects models |
| Nestić (2007) | Croatia | Labour Force Survey (LFS)/ 1998, 2005 | Age >15 years old with children <12 years old | All other women | Excludes self-employed | | OLS and quantile regressions |
| Pal and Waldfogel (2014) | United States | Current Population Survey (CPS)/ 1977-2007 | Age 25-44 with children at home aged 0-17 | Age 25-44 with no children aged 0-17 at home | | Gross hourly wage | Inverse Probability of Treatment Weight/ Heckman |
| Simonsen and Skipper (2012) | Denmark | Five sources on fertility, education, employment, pay, income | Twins, aged 20-42, children <18 at home | Twins, aged 20-42 | Employed 200+ hours p.a., not self-employed, not in education | Hourly wage | Twin as instrument, OLS and fixed effects |
| Waldfogel (1997) | United States | National Longitudinal Survey of Young Women/1968-88 | Age 14-44 with children | Age 14-44 without children | Full-time and part-time | Hourly wage | Difference models and fixed effects models |

| Research study | Country coverage | Data source/ year | Mother definition | Non-mother definition | Workforce coverage | Wage definition | Regression analysis/ adjustments for selection bias/longitudinal |
|---------------------|-------------------------------------|---|--|---------------------------------|--------------------|----------------------------------|--|
| Wilde et al. (2010) | United States | NLSY, 1979–2006 | Age 14–49, had children after age 21, completed schooling | Age 14–49 without children | | Hourly wage | Fixed effects/ longitudinal |
| Zhang et al. (2008) | China (5 large cities) ^f | Urban Labour Survey/ Adult Literacy Survey (2001–2) | Ever had children (whether or not still at home) | Never had children | | Monthly income (incl. subsidies) | Logistic regression/ Heckman |
| Zhang (2010) | Canada | Longitudinal Worker File, 1983–2004 | Born 1954–68 (age 15–50), 6 cohorts of mothers: 1 or 2 childbirths in 5-year period, continuous employment | Same age, continuous employment | | Annual earnings | Fixed effects and fixed trends models/ longitudinal |

Note: Details of all countries and territories covered in multi-country studies are as follows: ^a Benin, Bolivia, Central African Republic, Chad, Colombia, Comoros, Dominican Republic, Egypt, Ghana, Guatemala, Jordan, Madagascar, Mali, Mozambique, Nepal, Nicaragua, Nigeria, Peru, Philippines, South Africa, Zambia; ^b Australia, Austria, Belgium, Canada, Czech Republic, Finland, France, Germany (E and W), Hungary, Ireland, Israel, Italy, Luxembourg, Netherlands, Poland, Russian Federation, Slovakia, Spain, Sweden, United Kingdom, United States; ^c Belgium, Denmark, France, Germany, Greece, Ireland, Italy, Netherlands, Portugal, Spain, United Kingdom; ^d Australia, Austria, Brazil, Bulgaria, Chile, Cyprus, Czech Republic, Denmark, Finland, Flanders, France, Germany (E and W), Hungary, Ireland, Israel, Italy, Japan, Latvia, Mexico, New Zealand, Norway, Philippines, Poland, Portugal, Russian Federation, Slovakia, Slovenia, Spain, Sweden, Switzerland, Taiwan (China), Netherlands, United Kingdom, United States; ^e Australia, Canada, Germany, Finland, Sweden, United Kingdom, United States; ^f Fuzhou, Shanghai, Shenyang, Wuhan, Xian.

1.2. How to measure the motherhood pay gap?

Once a suitable comparator group is defined, it is seemingly straightforward to present an estimate of average pay for mothers and for non-mothers and then to compare the pay gap. Many studies report this measure (see section 2). The advantage is its simplicity and apparent ease of interpretation: for example, using European harmonized data, Davies and Pierre (2005) point to the large penalty in the United Kingdom of 28 per cent between mothers with three or more children and non-mothers, compared to a far smaller penalty of just 2 per cent in Denmark. Such headline results raise our attention and serve a purpose in attracting the interests of policy-makers and the wider society and in provoking questions about the reasons for this apparent pay gap. However, presentation of the so-called “raw” or unadjusted pay gap deserves further interrogation.

The rationalist economics approach considers the “raw” motherhood pay gap to be meaningless since it only controls for the presence of dependent children and thus does not account for a string of other variables that are likely to influence productivity and, in turn, pay. The solution, following tried and tested techniques in decomposing the gender pay gap pioneered by Mincer and Polachek (1974) and Oaxaca (1973), is to estimate an adjusted pay gap by controlling for particular worker characteristics assumed to affect productivity. Leaning heavily on the logic developed in Becker’s human capital model (especially Becker, 1985), which assumes investments in education, training and work experience that automatically generate higher productivity and pay, decompositions of the motherhood pay gap input a selection of available human capital variables in order to control for what are usually claimed as “observed productivity differences”, but are more precisely a limited set of variables related to age, years of schooling and years of work experience. Studies adapt a traditional human capital wage equation by including number and age of children, often with partner status, into the usual variables of age, education and work experience.

Variables of employment experience are often attuned to the particularity of women’s labour market experience, particularly whether or not past paid work was part-time or full-time; these variables are now often entered separately into regression models. The first study that controlled for years of full-time employment and years of part-time employment experience was Budig and England (2001). This found that around one-third of the penalty in the United States was explained by past work experience, including whether it was part-time work:

That is, for some women, motherhood leads to employment breaks, part-time employment, and the accumulation of fewer years of experience and seniority, all of which diminish future earnings. (Budig and England, 2001, p. 219)

Deploying a similar human capital approach, development studies extend the range of variables to capture effects specific to less developed country contexts. For example, in Agüero et al.’s (2011) study of 21 developing countries (mostly Africa and Latin America, see table 1.1), there are many differences between mothers and non-mothers other than the presence of children at home: mothers in their sample are significantly less educated, more likely to reside in rural areas and over-represented in agricultural work, more likely to be married, less likely to work continuously the whole year and more likely to be paid in kind (p. 10).

Other studies include a range of additional workplace and job characteristics variables to try and disentangle other differences between mothers' and non-mothers' employment patterns that may have independent effects on earnings. For example, Budig and England's (2001) study includes trade union membership, public/private sector and supervisory/managerial authority, as well as the innovative variables of level of cognitive skill required by the occupation, physical strength required in the job and measures of effort on the job.

However when many variables are included there always remains the risk that significant unobservable differences between the two defined groups of mothers and non-mothers are not contained in the model, as well as other unobservables among mothers with few or many children. As many studies note, mothers may be less career oriented than non-mothers or may defer having children until a period of their career where wage growth has slowed. Such methodological problems are difficult to address (see above) in the absence of something like a random experiment that assigns women to motherhood status (Pal and Waldfogel, 2014).

Accounting for heterogeneity?

While useful as a headline measure, the reported average pay penalty for mothers compared to non-mothers, whether adjusted or unadjusted, needs to be supplemented by evidence of differential experience among mothers to inform policy and practice. The heterogeneity of mothers' situations raises a number of questions:

- Does the number of children or the children's disability status worsen earnings potential?
- Does the penalty subside once children enter school?
- Do the employment status and level of earnings of other household members make a difference?
- Is the experience of single mothers significantly different from that of couple mothers?
- Do lower-educated mothers experience higher penalties?
- Do women from ethnic minorities or with disabilities experience a worse wage penalty due to cumulative labour market biases?
- How do studies account for other non-nuclear family situations that may be more common in low-income countries (e.g. grandparents, parents and children)?
- Does employment in the public sector provide better protection from return-to-work wage penalties for mothers compared to the private sector?

Estimating penalties at a point in time or over the life-course?

The bulk of research studies reviewed in this study estimate the motherhood pay gap at a single point in time. However, there is an interesting sub-set of studies that seeks to understand how mothers' earnings change over time from the years preceding childbirth to the years after, compared to the earnings of non-mothers. Such studies explore a range of issues and generate results that are of great significance for competing explanations.

For example, how do mothers' earnings compare with non-mothers in the period *preceding* childbirth? Lower mothers' earnings (pre-birth) might suggest negative self-selection into motherhood or, by contrast, may be indicative of unobserved employer discrimination against young women perceived as prospective mothers. Also, does

childbirth generate a one-off wage penalty or does it have a cumulative effect lasting over several years? Here, the age of a mother at childbirth may be significant since, for example, later childbirth may interact with better developed careers and a stronger wage profile. Also, longitudinal analysis may seek to model the effects of mothers' length of maternity leave on their wage trajectory, distinguishing between weakly and strongly attached mothers. We consider the significance of these longitudinal analyses in section 2.

2. International empirical evidence of wage penalties for mothers

Most studies of the motherhood pay gap report both the raw estimates of the gap and the adjusted simulations using a range of different statistical techniques and after accounting for various controls of the sort described in section 1. In this section we report a selection of both unadjusted and adjusted pay gaps from the international collection of studies reviewed, including evidence for high-income countries and low-/middle-income countries. While the adjusted measures provide a more convincing measure of the precise impact of motherhood, holding many other observable factors constant, we also know that these other factors of education, prior labour market status, work experience and so on are closely interrelated with motherhood. We discuss this issue in detail in Part II. We report examples of unadjusted pay gap estimates to provide an indication of what can be considered an upper bound to labour market bias faced by mothers.

2.1 Headline unadjusted and adjusted wage penalties

Comparison of wages experienced by mothers and non-mothers in different countries and regions of the world reveals evidence of significant wage penalties. Table 2.1 presents headline results of *unadjusted* penalties from a selection of international studies. A relatively high raw wage penalty is estimated for the 21 less developed countries in Agüero et al's (2011) study – an average country negative penalty of 42 per cent – followed by Zhang et al.'s (2008) research on China, a wage penalty of 37 per cent. Among high-income countries, unadjusted wage penalties appear to be significantly lower although still significant in many cases – a 12 per cent wage penalty among never married mothers in the United States (Budig and England, 2001), a 13 per cent penalty in Germany and 21 per cent in the United Kingdom (Davies and Pierre, 2005). Notably, the raw wage penalty is zero or small in France and Denmark, as well as among married mothers in the United States.

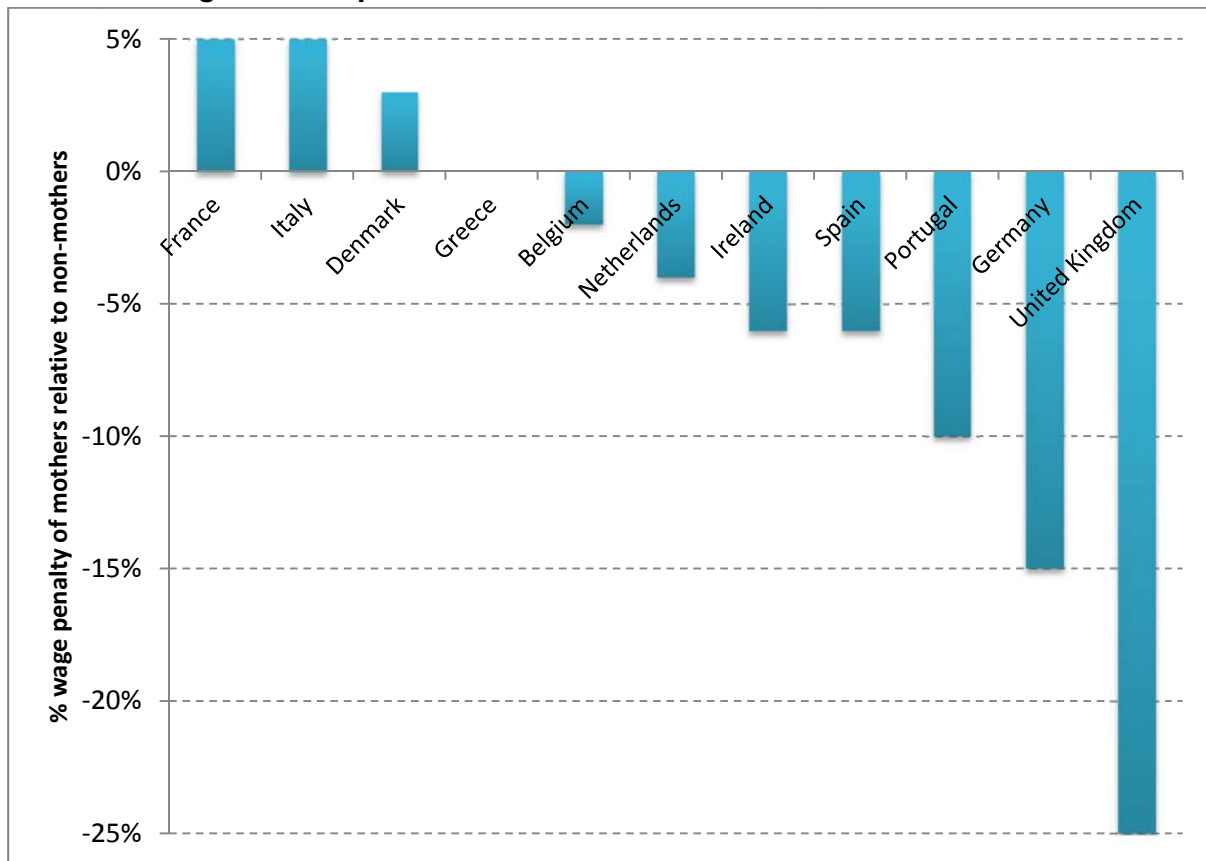
Table 2.1. Selected headline results of unadjusted (raw) estimates of motherhood pay gaps

| Study | Country/region | Mothers' pay | Non-mothers' pay | Pay penalty | Disadvantaged group of mothers' pay penalty | |
|---------------------------------------|-----------------------------|--|------------------|----------------|---|------|
| Agüero et al. (2011) | 21 less developed countries | US\$ 2.37 (daily) | US\$ 4.12 | -42% | With children < 6 years old: -51% | |
| Budig and England (2001) | United States | Married US\$ 6.35 | US\$ 6.48 | -2% | | |
| | | Never-married US\$ 5.29 | US\$ 5.99 | -12% | | |
| Davies and Pierre (2005) ¹ | 11 EU countries | <i>Selected country results in European currency unit (ECU):</i> | | | Mothers <25 years at first birth: | |
| | | Germany: 10.16 | 11.74 | -13% | | -20% |
| | | Denmark: 14.81 | 14.21 | +4% | | -3% |
| | | France: 10.25 | 10.28 | 0% | | -9% |
| | | UK: 7.64 | 9.72 | -21% | -35% | |
| Gamboa and Zuluaga (2013) | Colombia | Log 7.71 | Log 7.86 | -1.8% | Self-employed mothers: -4.3% | |
| Gangl and Ziefle (2009) | 3 countries | Germany (women born 1965-69) | | -16% per child | | |
| | | UK (born 1965-69) | | -13% per child | | |
| | | US (born 1960-64) | | -16% per child | | |
| Pal and Waldfogel (2014) | United States | 1977: US\$ 16.07 | US\$ 17.83 | -10% | With 3+ children: -7.5% (2007) | |
| | | 2007: US\$ 21.46 | US\$ 21.37 | +0.4% | | |
| Zhang et al. (2008) | China | CNY 822.75 | CNY 1304.45 | -37% | | |

Notes: See table 1.1 for details of definitions, country coverage and measures adopted in each study;
¹ Authors' calculation of average pay for all mothers based on details in Davies and Pierre (2005), table 1.

Comparing the results in table 2.1 is not advisable because of the country differences in data, workforce composition, measures and definitions. However, several studies draw on harmonized international data which do facilitate cross-country comparison. In the 11-country analysis of Davies and Pierre (2005), the evidence from European Community Household Panel (ECHP) data shows a range of *unadjusted* wage penalties experienced by mothers across Europe, from a 25 per cent penalty for mothers with two children compared to non-mothers in the United Kingdom to wage premiums in France, Italy and Denmark (figure 2.1).

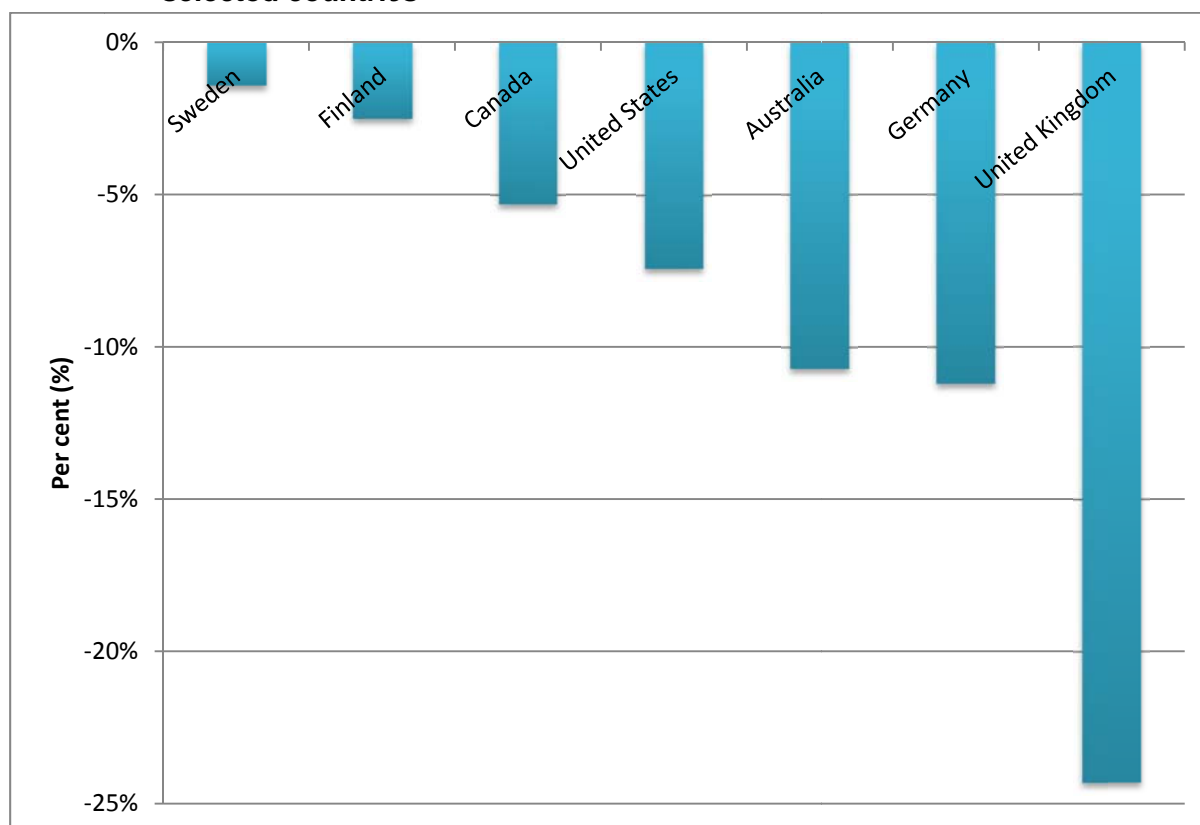
Figure 2.1. Unadjusted estimates of wage penalty effect of *two children on women's wages in European countries*



Source: Adapted from Davies and Pierre (2005), table 1, ECHP data.

We can also draw on a comparison of *adjusted* wage penalties from the seven-country comparative study of Harkness and Waldfogel (2003) and reported in figure 2.2. This shows a considerable range in size of wage penalty experienced by women with two children compared to women without children. The small penalties registered for the two Scandinavian countries are in fact not statistically significant. It is notable that the wage penalty is significantly greater in the United Kingdom than in the ostensibly similar liberal market economies of Canada and the United States.

Figure 2.2. Adjusted wage penalty effect of two children on women’s wages, selected countries



Source: Adapted from data presented in Harkness and Waldfogel (2003), table 4.

Variation in penalties by number, age and gender of children

Motherhood pay penalties vary significantly with the number of children, their age and (mostly in less developed countries) their gender; there are also some studies that investigate the impact of children with disabilities but, as far as we are aware, only on employment participation decisions, not the consequences for pay.¹ The reasons for this are explored in Part III of this study. Most studies report separate estimates for these variables and a selection of findings are reproduced here.

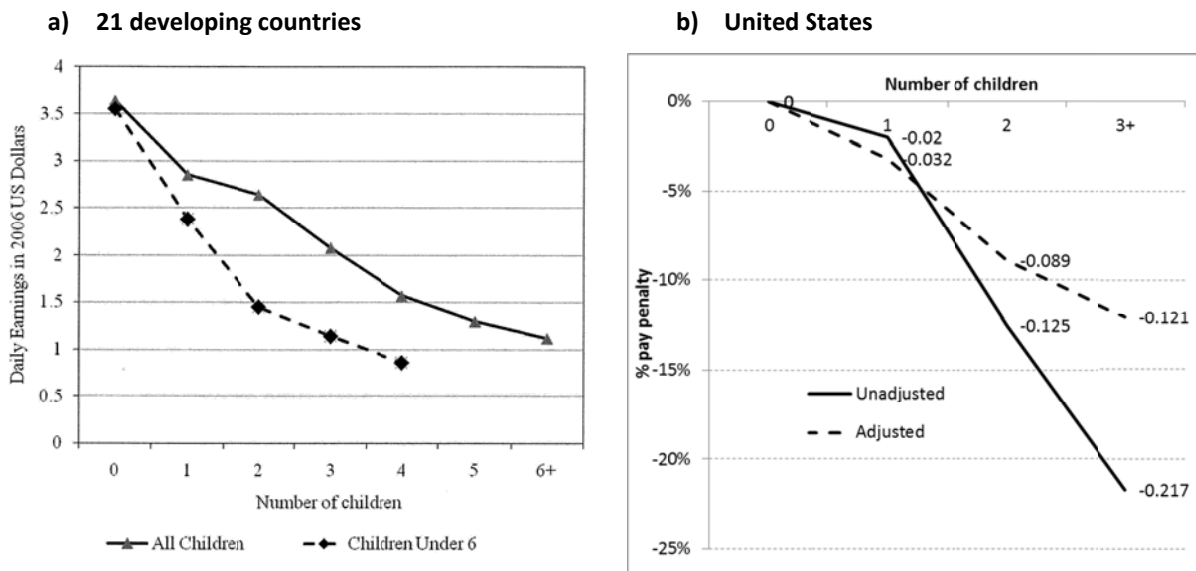
All studies reviewed, both in developed and less developed countries, find that the age of dependent children has a significant effect on the size of the pay gap. As might be expected, the presence of younger children has a larger negative effect on mothers’ earnings than older children and, after a certain age, it is often the case that children no longer exert an observable negative effect on mothers’ pay. In their study of 21 developing countries, Agüero et al. (2011) attribute the presence of infants (under three years old) to the largest pay penalty (adjusted and unadjusted) while children over the age of 13 years old have no significant effect on mothers’ earnings; figure 2.3a shows a significant difference in daily earnings (unadjusted) among mothers with children aged under six years old and all mothers with dependent children.

The number of children has a similarly powerful effect on the size of the wage penalty. Figure 2.3 displays a selection of results for various countries. Drawing again on

¹ See, for example, Porterfield (2002) and Yantzi et al. (2007).

Agüero et al.'s (2011) study of low-income countries, the first chart shows the rapid decline in average daily earnings with each additional child, especially steep when the children are very young. Budig and England (2001) find that the wage penalty in the United States (with no other controls) for each child averages 7 per cent, reduced to 5 per cent after controlling for education and work experience. However, as is a common finding in many studies, the more children a woman has the greater the negative wage effect: Budig and England find wage penalties of 3, 9 and 12 per cent for mothers with one child, two and three or more children, respectively, after controlling for marital status, human capital and job characteristics (figure 2.3b). Davies and Pierre's (2005) use of harmonized European data (ECHP) facilitates inter-country comparison; according to their fixed effects model, they find mothers suffer far higher adjusted wage penalties from having three or more children in the United Kingdom than in France, for example (figure 2.3c).

Figure 2.3. Selected examples of mothers' wage penalties by number of children (unadjusted and adjusted)

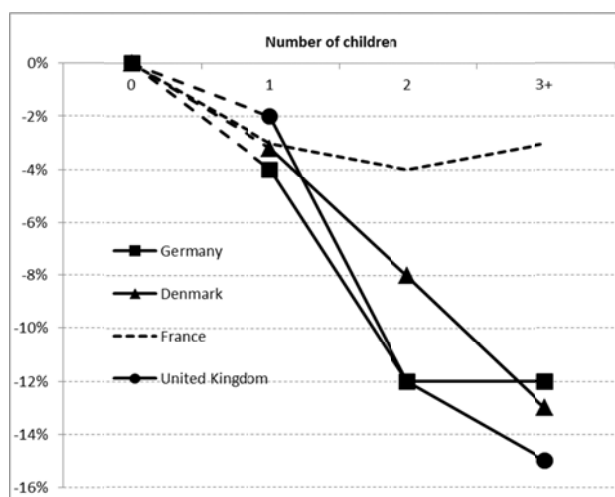


Notes: Unadjusted pay; each point represents the average daily earnings of women with the given number of children. The last point on the dashed line combines women with more than three young children.

Source: Agüero et al. (2011), figure 1.

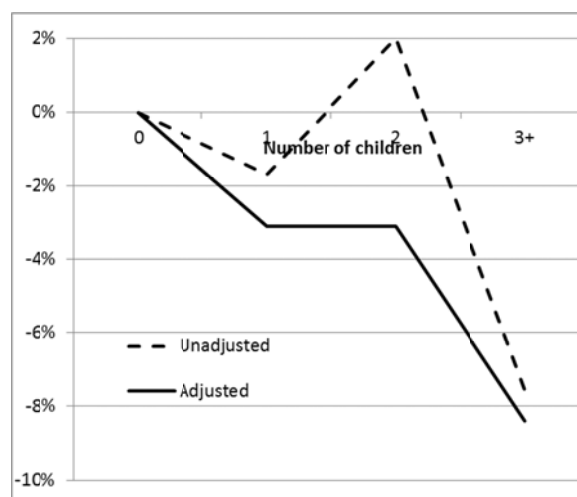
Source: Adapted from Budig and England (2001), table 3.

c) Denmark, France, Germany, United Kingdom



Source: Fixed effects results, adapted from Davies and Pierre (2005), table 2, column 7; dotted lines indicate results are not statistically significant.

d) United States (2007)



Source: Adapted from Pal and Waldfogel (2014), figure 1B and table 1B, model 2, 2007 data.

A finding that appears to be restricted to less developed countries is that the gender of a child may also impact upon a mother's relative earnings due to the greater probability that older daughters assume some of the household tasks and caring duties. Agüero et al. (2011) find that while there is no discernible difference in the decline in pay associated with sons or daughters under the age of three, for the age group 11–13 years, sons have a significantly more deleterious effect than daughters.

2.2. Heterogeneity of mothers

While many studies seek to estimate the overall average wage penalties for mothers, or for each child, an increasing number are sensitive to the need to identify different penalties experienced by different types of mothers. Key differences considered are the mother's age at the birth of the first child, marital status, household type, level of education, length of break from paid employment, part-time or full-time employment and type of workplace.

The age at which a mother had her first child is significant in several studies and has a generally depressing effect on pay relative to mothers who delayed childbirth until later years. Women who began childbirth before the age of 25 years old suffer a larger wage penalty (both adjusted and unadjusted) in all 11 EU Member States included in the Davies and Pierre (2005) study; the severest penalty associated with early life childbirth was registered in Portugal where young mothers suffer a 33 per cent unadjusted wage penalty compared to mothers aged 25–30 who enjoy a premium of 2 per cent relative to non-mothers.

Mother's marital status and household type also tend to be significant factors. Budig and England (2001) present separate adjusted pay penalties for mothers who are married, never married or divorced. Their fixed effects models show that marriage in the United States more than doubles the wage penalty effect of children compared to mothers who were never married; results for divorced mothers are similar to married mothers. These results are to some extent surprising. Marital status is independently associated with a wage premium for women, so the results mean that it only exerts a negative effect when

children are present; in fact, Budig and England subsequently show that the combined child penalty effects and marital premium effects are positive with one child, cancel out with two children and turn negative with three or more children.

Level of education is explored in several studies. Budig and England (2001) find no evidence that higher educated mothers suffer a larger penalty than lower educated mothers in the United States. Moreover, drawing on a wealth of job and workplace characteristics they find that penalties were not significantly different in jobs requiring more on-the-job training, vocational/professional training or higher levels of cognitive skill. By contrast, Wilde et al. (2010) find very strong evidence of differences in penalties by education level among mothers in the United States. Low educated mothers experience a wage penalty of around 6 per cent, which is relatively stable five years and ten years after childbirth. Highly educated mothers suffer a 8 per cent penalty five years after childbirth and this rises to 24 per cent one decade after childbirth. The difference is largely accounted by the fact that Wilde et al.'s analysis is longitudinal and is therefore better able to identify the cumulative effect of childbirth, while Budig and England's study offers a snapshot and is likely to capture only the initial effect of childbirth in its average estimates.

Several studies seek to distinguish the effects of different lengths of maternity leave on mothers' wage penalties. For Germany, Ejrnæs and Kunze (2013) apply a post-birth fixed effects model to estimate the effects on wages experienced by mothers returning to full-time employment after their first child and a period of leave less than 3.5 years. Their analysis finds a wage penalty on return to employment of 3 to 6 per cent for each year of leave, with higher penalties for the more highly skilled. For the United Kingdom, Joshi et al. (1999) find that mothers in full-time employment experience a significant wage penalty compared to childless women only if their break was more than 12 months; they argue that the result "means that mothers can be paid as well as childless women, provided they avoid a career break" (p. 559). Of course, there remains a large discriminatory gender pay gap, namely in comparison with men; mothers in full-time employment with a continuous work experience (that is, maternity leave of less than 12 months) still face a 23 per cent unexplained wage penalty compared to men (op. cit.).

Another factor that can often be very significant in shaping wage trajectories is whether mothers return to reduced hours or part-time employment. This is especially significant in countries with a weak capacity to provide good part-time job opportunities and weak overall family support policies (as we discuss in Part IV). For example, Joshi et al.'s (1999) study of the United Kingdom finds that the major source of the motherhood gap lies in the tendency for women to return to work part-time after child birth. Moreover, in a comparison of two cohorts, they find that the wage penalty experienced by mothers in part-time employment increased during the period 1978 and 1991.

Finally, there is some evidence that type of workplace further segments mothers' experiences of wage penalties. For example, Nestić's (2007) analysis of data for Croatia finds no significant motherhood pay gap among women in the public sector but a significant unadjusted wage penalty (of 5 per cent) in the private sector. In their study of the United States, Budig and England (2001) create a highly innovative category of male-dominated high-level jobs (professional/management jobs with a female share less than 35 per cent) and find that women in these jobs had significantly smaller penalties (one to two percentage points after controlling for human capital and marital status

variables). This is perhaps surprising given the usual assumption that a man's world of work is more likely to penalize behaviour that appears to be less than full commitment. However, the result may reflect a change in the behavioural patterns of mothers through imitation of masculinized behaviour (Wacjman, 1998), or it may be that the results conflate unobservable factors associated with higher pay in these managerial/professional occupations. Glauber (2012) also finds for the United States that mothers employed in female-dominated jobs suffer a larger wage penalty than mothers in male-dominated or mixed jobs, controlling for the usual human capital, demographic factors and working-time factors. Figure 1 in Glauber's analysis suggests that mothers employed in male-dominated and mixed jobs do not pay a penalty for having one or two children, while women in female-dominated jobs have lower pay to begin with and pay larger penalties for each child.

Mothers returning to employment may opt for self-employment, possibly to provide greater flexibility to look after children. Budig and England's (2001) analysis for the United States shows that this is associated with a wage penalty. Budig's (2006) subsequent more detailed investigation for the United States finds that self-employment is associated with a wage penalty for all women compared to men and that the penalty significantly increases with marriage and with number of children. Holding other factors constant, Budig finds that each child reduces a woman's wage in a return to self-employment by 6 per cent. Moreover, the wage penalty is especially strong for women employed in non-professional occupations, among whom some four in ten perform child care for pay.

2.3. Wage trajectories over the life-course

We find mixed evidence of mothers' relative wage trajectories from studies that apply longitudinal analysis. A first set of results suggests that motherhood generates a *one-off discrete penalty* and then within a short period of time mothers return to a similar wage trajectory as non-mothers. Zhang's (2010) analysis of earnings data in Canada provides evidence of *unadjusted* annual earnings that fit this portrait. Zhang shows that both groups of women begin with similar earnings, then mothers outpace non-mothers until childbirth in 1991 when they suffer a 30 per cent drop, but then return within two years albeit at a slightly lower level. Other studies show a similar earnings profile for particular types of mothers – such as mothers who display strong job attachment (observed by short periods of leave) for whom no wage penalty is evident (see for example Lundberg and Rose, 2000).

A second, competing picture is provided by analyses that identify a longer-lasting cumulative wage penalty for mothers. In fact, while Zhang's assessment of unadjusted annual earnings patterns suggests a one-off penalty, the statistical fixed trends analysis identifies a significant cumulative wage penalty of 8 per cent two years after childbirth, 6 per cent four years later and 3 per cent seven years later. In a different study, Lundberg and Rose's (2000) analysis of mothers who made a long interruption to care for their young child finds their simulated wages declined by 23 per cent after childbirth.

There are also mixed results regarding mothers' earnings pre-childbirth compared to women who do not go on to have children during the period studied. Some studies find that women who then become mothers experienced worse wages even before childbirth compared to other women (Lundberg and Rose, 2000), while other analyses reject this

finding (Ejrnæs and Kunze, 2013; Kellokumpu, 2007; Zhang, 2010). Ejrnæs and Kunze (2013) show that non-mothers have lower returns to experience than mothers before birth but that the situation reverses after birth. Their analysis is also sensitive to heterogeneous effects, including postponement of childbirth (higher penalties with early age birth since wage advancement is highest during the early career), length of leave and level of education.

3. Evidence of wage premiums for fathers

Compared to investigations into the motherhood pay gap, there are relatively few studies that focus on wage differences among men with and without children. The general finding among these studies is that fathers earn a wage premium over non-fathers, although studies for the United States find that the premium is significantly smaller now than it used to be in the 1970s and 1980s (Blackburn and Korenman, 1994). There is of course considerable interest in the literature in explaining why fathers earn a wage premium seemingly at the expense of mothers' wage penalty. We consider the main competing explanations in Part III of this study. The aim here is to present some of the headline results.

3.1. Headline adjusted and unadjusted wage premiums

Several studies report headline results for the adjusted effects of parenthood on male earnings and several include a comparison with mothers' earnings. For the United States, for example, Lundberg and Rose (2000) report fixed effects of a 9 per cent adjusted wage premium for married fathers compared to a 5 per cent wage penalty for married mothers. Similarly, using data for the United States for the 1979–2006 period, Hodges and Budig (2010) find that fathers enjoy a wage premium of 11 per cent on annual earnings over non-fathers, after controlling for demographic, human capital and labour supply factors.

There are similar studies for European countries. For Finland, Kellokumpu (2007) finds that parenthood has no significant effect on fathers' earnings but imposes a penalty of 7 per cent for mothers. For France, Meurs et al. (2010) find that having children has a direct and positive effect on fathers' earnings, while there is no significant effect on mothers' earnings; the authors argue that it would be negative for mothers, had the accompanying effects of maternity leave not been separated out in the regression model. Trappe and Rosenfeld (2000) present a very interesting comparison of the effects of children on men's earnings in the former West and the former East Germany. In the former West Germany, each additional child increases men's wages but decreases women's by double the amount. In the former East Germany, fathers again enjoy a wage premium while there is no difference between mothers and non-mothers.

3.2. Heterogeneity of fathers

As with mothers' wage penalties, intersections with key socio-economic categories further illuminate patterns of fathers' wages. A first intersection is with marital status. For example, Hodges and Budig (2010) show that the adjusted wage premium for fathers in the United States is reduced from 11 to 6 per cent after controlling for differences in marital status between fathers and non-fathers.

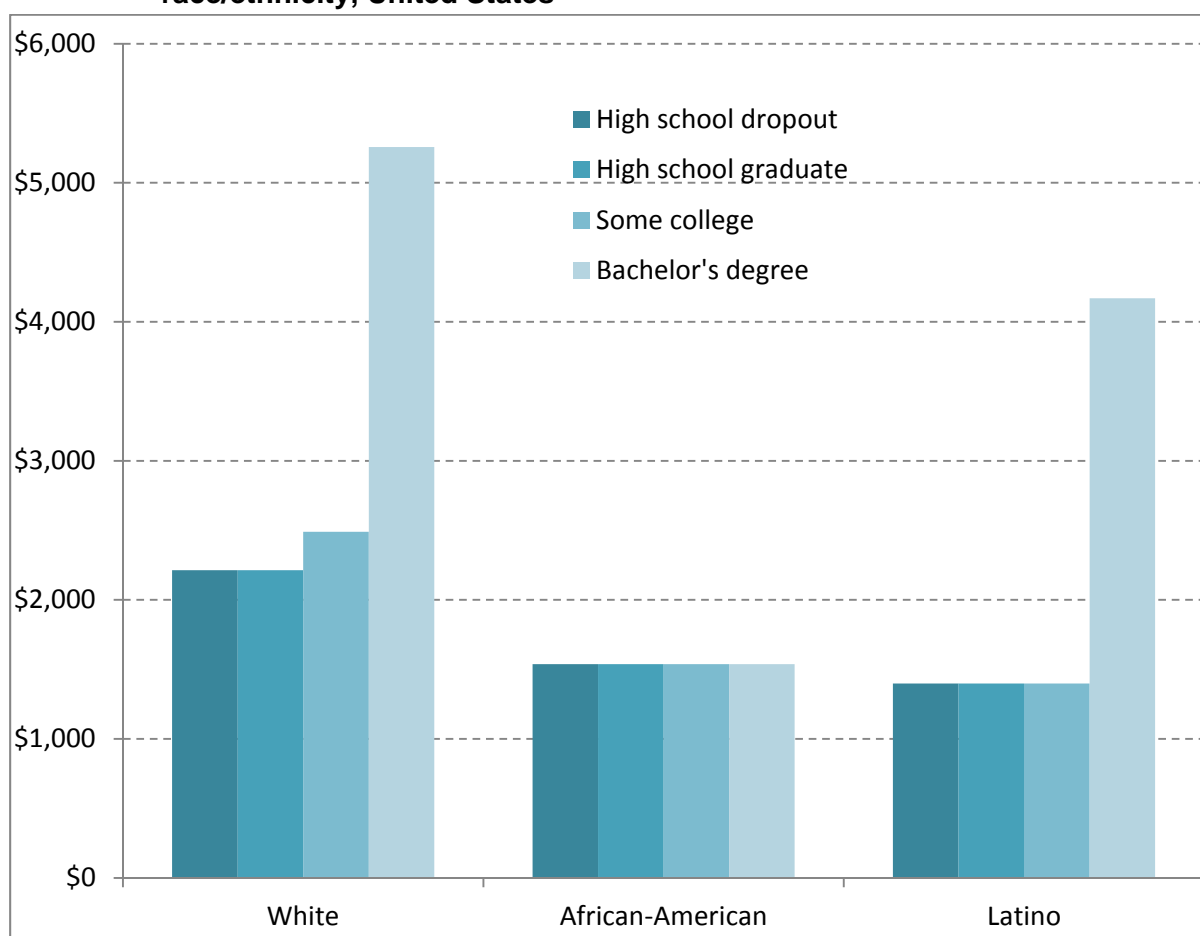
A second intersection is with race and ethnicity. In the United States, there has been some interesting research exploring intersections with race in the context of public

discussions about the commitment of black fathers towards their families. Glauber (2008) finds that the wage premium for black fathers is in fact significantly lower than that for white and Latino fathers: fixed effects regression results for married fathers with two children show statistically significant coefficients of 0.09 for black men, 0.11 for Latino men and 0.14 for white men. Moreover, while white and Latino fathers continue to earn higher wage premiums with three or more children, black fathers do not; married Latino men and married white men with three or more children earn a 15 and 16 per cent wage premium over non-fathers, respectively, while married black men with three or more children earn no differently to married black men with no children. The reason, Glauber shows, is that the difference in earnings and hours worked among married couples widens with increasing numbers of children among Latinos and whites, but not among black couples, for whom the gap increases and then decreases with three or more children. The results in Hodges and Budig (2010) are similar: black fathers earn a 7 per cent wage premium, white fathers 8 per cent and Latinos 9 per cent.

A third critical intersection is with the employment and earnings status of female partners. Studies ask whether or not fathers earn higher wage premiums when coupled with a woman who does not work or works part-time (male-breadwinner households) compared to fathers with a partner who works full-time (dual-earner households). In their analysis for the United States, Hodges and Budig (2010) show that the wage premium does not vary by household type for white and black men, but doubles in size for Latino fathers (30 and 16 per cent wage premiums for male-breadwinner and dual-earner households, respectively). Lundberg and Rose's (2000) analysis for the United States provides simulated earnings over time for married fathers with a continuously employed wife and shows that married fathers in fact experience a wage penalty.

Fourth, wage premiums tend to vary by level of education. In the United States, white and Latino college graduate fathers earn more than twice the wage premium of non-graduate fathers, although there is no statistically significant difference for black fathers by level of education (Hodges and Budig, 2010). Translating these differences into coefficients using average annual earnings (US\$28,000 for whites, US\$22,000 for African-Americans and US\$25,000 for Latinos), figure 3.1 displays the estimated annual wage premiums for different groups of fathers in the United States. This demonstrates the size of the difference in premium enjoyed by white and Latino fathers with a college education over their African-American counterparts.

Figure 3.1. Differences in fathers' wage premiums by level of education and race/ethnicity, United States



Source: adapted from Hodges and Budig (2010), figure 1.

A fifth and under-researched line of intersection concerns the relative experiences of fathers and mothers following marital separation. This line of investigation is of particular interest, given policy concern for the financial conditions of children in countries where there are a significant number of divorces. Most studies concur that women and children suffer more than men in net loss of economic well-being, although there are mixed results as to whether men become better or worse off following separation. For the United States, Bianchi et al. (1999) analyse earnings data for divorced mothers and fathers where mothers retain custody of the children (reflecting the general pattern in the United States). This study finds that economic well-being (a measure of income relative to needs – that is, adjusted per person in the household) reduced for mothers by 36 per cent and for fathers increased by 28 per cent; on average, these results mean the average level of well-being for mothers post-separation is only 56 per cent of the level enjoyed by fathers.

3.3. Cumulative effects over time

Longitudinal effects have also been explored in several studies. In Gupta et al.'s (2007) Danish study, the results suggest that having children has an initial positive impact on men's wages but that this effect wears off after two years or so – suggestive perhaps of men's sharing of family duties once the mother has returned to employment

after maternity leave, or that Danish fathers divert time from on-the-job training (associated with future increases in productivity and pay) towards child care. Also, for the United States Lundberg and Rose (2000) show that while fathers' earnings are lower than non-father counterparts prior to having children, they then earn more than non-fathers until the child is around ten years old.

Part II: Debating the methodological issues

A review of the literature reveals a number of significant methodological issues which need to be taken into account in assessing both the empirical evidence on motherhood gaps and the policy implications which may flow from attempts to explain the existence, the variation and the trends in motherhood gaps. In this second part of the study we address six key methodological issues: i) the impact of "motherhood" on the control group; ii) identifying the role of stereotyping and societal expectations; iii) the relations between fertility, labour supply and child care; iv) identifying differences among mothers; v) comparing motherhood effects across countries (or over time); and vi) identifying the costs of motherhood gaps and who bears these costs.

4. Six core methodological issues for understanding motherhood pay gaps

4.1. The impact of "motherhood" on the control group

To calculate a motherhood pay gap between mothers and non-mothers presupposes that motherhood does not affect the pay of non-mothers. This in turn suggests that gender pay discrimination is separate from and not linked to women's roles as mothers, except when women are actively engaged in motherhood.

The problem of identifying an appropriate control group against which to compare pay to calculate the motherhood gap has already been addressed in Part I. Fixed effects models are now being used to avoid spurious correlations due to women with particular characteristics being more likely to have children and to have more children (Budig and England, 2001; Waldfogel, 1997). Selection adjustments have been found to increase the measured motherhood gap (Gangl and Ziefle, 2009) and restricting the analysis to women without children in a similar age range overcomes at least part of the problem that women whose children are no longer dependent may still be affected by long-term scarring effects. Nevertheless, neither of these methods is in itself sufficient to identify the impact of motherhood on the overall gender pay gap. This is because motherhood has been held to influence both women's own initial education investments and labour market entry choices and employers' attitudes and practices with respect not only to recruitment but also to pay and promotion practices and even work organization and job design.

The application of human capital theory to gender pay gap issues held that women's educational investments and choice of occupation were likely to be strongly influenced by expectations of being the primary carer, which might result in career interruptions and/or reduced hours of work and reduced work commitment. Thus, expected motherhood was held to explain gender differences in educational investments and choice of occupation, and thus segregation at work (Becker, 1964). This analysis was critiqued by England (1982), whose empirical studies found no evidence that:

“women are penalized less for time spent out of the labour force if they choose predominantly female occupations than if they choose occupations more typical for males. Thus, there is no evidence that plans for intermittent employment make women's choice of traditionally female occupations economically rational.” (p. 358)

Educational investments among men and women are now roughly equal in many countries, yet the idea of women's occupational choices being mostly informed by expectations of motherhood still prevails. The concentration of women in female-dominated occupations is often taken as a sign that women are happy with the lower pay because they gain other forms of satisfaction that meet their presumed responsibilities as primary carer. However, this view ignores obstacles in the labour market that may exclude many women from higher-paying sectors or occupations, such as long hours requirements, ability to cope in a highly masculinized environment or a greater risk of discrimination in hiring and promotion practices (Grimshaw and Rubery, 2007). Other studies find that mothers do choose sectors or occupations where combining work and family responsibilities is facilitated but that these choices may not necessarily be made initially; for example Nielsen et al. (2004) found that women who started in the private sector in Sweden were more likely to switch to the public sector when they had children.

Other contributions focus on the role of the employer in shaping pre-children opportunities for women. This role for the employer is held to be particularly intense where the employer is making major investments in the training and development of staff, as they may regard women as a high-risk investment. This approach has led to the proposition that women may have greater opportunities to enter higher-skilled occupations in liberal compared to coordinated market economies (among high-income countries) as in the former the development of skills is carried out primarily within the education system while in the latter it is employers who invest in firm-specific training and who may therefore be more likely to discriminate against women (Estévez-Abe, 2005, 2006; Estévez-Abe et al., 2001). Expectations of interruptions to careers and/or future reduced commitments are also used to explain why there are more limited promotions built in to female-dominated occupations or why women may be bypassed in promotion systems designed to provide a pipeline for future higher level managers (Barnett and Miner, 1992). Analogous arguments can be deployed to “explain” women's apparent concentration in low-skilled work to employer tendencies to design skills and training costs outside the areas associated with women's employment due to risks of turnover.

These different perspectives certainly suggest that the impact of anticipated motherhood on the behaviour and opportunities for female non-mothers is unknown but potentially substantial, such that the pay gap between women divided into non-mothers and mothers captures only a small part of the costs to women in general of motherhood. These effects may vary by level of education. For example, low-educated women may be more likely to be treated as potential mothers than higher-educated women as employers may be more likely to expect some higher-educated women to pursue careers that do not also involve motherhood. This again could lead to wider gaps between non-mothers and mothers.

Several studies use women's attitudes and preferences to account for unexplained gender pay differences both pre- and post-children. Examples include Hakim's (1991)

renowned preference theory which she used to explain why some women made early career choices to pursue family-friendly careers due to a preference for prioritizing motherhood from a young age. This approach has been critiqued for regarding preferences as exogenous rather than endogenous and to be invariant to policies with respect to labour market and child-care opportunities. A related approach is used by Chevalier (2007) to explain gender pay gaps that are not explained by years of education. He included expectations of career breaks as a variable and argued that it increased the explained share of the gender pay gap, accounting for why even prior to family formation some women graduates in the United Kingdom experienced high and widening gender pay gaps. It is hypothesized that these expectations may lead to less active search for high pay or promotion opportunities.

A further development of this approach is found in some recent studies investigating whether women display different degrees of competition, ambition or greed to men or have different orientations with respect to people versus money in job choice. Although not directly related to motherhood, the search for different attitudinal traits is clearly linked to a view that women's presumed nurturing and caring roles are likely to generate different priorities and attitudes. Where these differences are expected to emerge even in initial pre-motherhood careers, this approach is very close to a gender essentialist argument that gender pay gaps reflect unchangeable gender differences, but the experience of motherhood could also be expected to create or reveal these differences. Manning and Swaffield (2008) have considered a range of psychological factor measures for the United Kingdom and find that at most they explain only 4.5 log points of the gender pay gap in that country. Meanwhile an unexplained 8 log point gap is found after ten years in the labour market for female full-time workers with no children and who have no plans to be mothers. Similarly, in her analysis of six European countries, Gash (2009) tests whether mothers are more likely than non-mothers to trade off pay in their job for other compensating factors (such as work-life balance for example). She finds no significant difference for all countries except the UK where mothers did appear to display an attitudinal difference (op. cit.: table 4). This fits with her wider theoretical proposition that countries with weak policy support for working mothers, such as the UK, are more likely to witness divergent attitudes to paid employment among mothers and non-mothers (see also below).

A narrow focus on attitudes encounters three major methodological problems: the first is that researchers often have to rely on proxies for attitudes; the second is that expressed attitudes may reflect societal expectations (Alwin et al., 1992); the third is that attitudes may not be closely linked to actual labour market behaviour (Steiber and Haas, 2012; Crompton and Lyonette, 2005); and the fourth is that in any case there may be reverse causation with work experience shaping attitudes (Fagan and Rubery 1996). Steiber and Haas (2012) conclude in their state-of-the-art review that "extant research suggests that such processes of attitude adaptation tend to be more common than the attitude-based selection of behaviours" (p. 347); they cite as evidence the work of Molm (1978), Smith-Lovin and Tickamyer (1978), Himmelweit (2002) and Berrington et al. (2008). Furthermore, they point to a range of studies (Crompton and Harris, 1998; McRae, 2003; Irwin, 2004; Crompton and Lyonette, 2005) showing a lack of congruence between women's attitudes to work and their actual behaviour when they are forced by economic necessity to work or prevented from working due to lack of opportunities.

4.2. The role of stereotyping and societal expectations

The notion of a motherhood pay gap is generally taken to indicate either productivity differences between mothers and non-mothers or active discrimination against mothers. Sociological work on the motherhood pay gap suggests that the stereotyping of mothers and the associated force of societal expectations institutionalizes the notion that mothers are less productive, such that the outcome is a reflection of societal values and expectations rather than a function of actual productivity capacities. Self (2005) argues that stereotyping explains much of the lower wages attributed to mothers. These societal expectations affect both the behaviour of mothers and the options open to them. For example, a mother's decision to interrupt her career may not be a purely personal decision but "a reflection of a mother's acceptance of social norms/traditions or a reaction to unavoidable or unavailable child-care options" (p. 852). Likewise, "offering lower pay and/or a less demanding job or a part-time job to a mother could be prejudiced by an employer's acceptance of social expectations from a woman in terms of work effort or availability following childbirth" (ibid.). These responses to societal expectations may also become "self-fulfilling prophecies" (p. 855) as low wage opportunities confirm mothers' role as primary caregivers.

Similarly, Ridgeway and Correll (2004) present a framework for understanding motherhood as a status characteristic which leads to assumptions of reduced job performance, not only because of presumed lower effort levels but also lowered expectations of capacities, thereby increasing the standards mothers have to display at the workplace (Fuegen et al., 2004) to be considered suitable for higher-level roles. Ridgeway and Correll argue that motherhood will lead to stronger biases than gender alone because of the disjuncture between cultural definitions of what makes a good mother and an ideal worker. This increases the salience of this status distinction at the workplace. Fuegen et al. (2004) also argue that it is the parenting role that first of all leads to assessments that those with children are "less agentic and less committed to employment" but there is also a gender interaction with fathers who are held to less strict standards, as evidenced by the fatherhood wage premium (see section 3). These perspectives provide a counterbalance to the rationalist models reviewed in Part I in which motherhood gaps are taken to represent actual differences in measured and measurable productivity and potential between mothers and others (Crosby et al., 2004). Cultural attitudes towards how a mother should behave are also found to affect the impact of welfare state policies in improving the pay and labour market participation of women, as discussed in more detail in Part IV.

4.3. The relations between fertility, labour supply and child care

Much of the literature on the impact of motherhood is concerned with the impact of child care on participation decisions. However, recent work has changed the focus to recognize that both fertility and labour supply decisions may be endogenous and influenced by child-care policy. Connelly et al. (2006) define endogeneity as occurring when "expectations of future employment might affect current fertility just as past fertility can be expected to affect current employment" (p. 565); in other words, motherhood pay gaps are converted into one factor affecting fertility rather than simply being an outcome of exogenous fertility decisions. Thus, Haan and Wrohlich (2009) show through the development of a model (applied to the case of Germany) that it is plausible that "increasing child-care subsidies conditional on employment increases

labour supply of all women as well as fertility of the childless and highly educated women” (p. 1). Michaud and Tatsiramos (2011), however, argue that there are still robust findings with respect to differences in employment experiences associated with fertility across countries that are not dependent on assuming that fertility is exogenous.

Fertility decisions are thus not made necessarily independently of either labour market opportunities or child-care provisions; nor is it the case that low labour market opportunities will lead to higher fertility. If fertility and female employment rates are considered for all countries and over time, an apparent negative relationship between female participation and fertility can be detected (ILO, 2004), as there has been a global trend towards reduction in fertility alongside growing female employment. However, these trends are also confounded with growing income levels and rising education among women which may enable women to control fertility. Indeed, despite these long-term global trends the relationship between fertility and women’s employment in developed countries has changed direction, from a negative relationship even in advanced countries up until the 1980s (Vos, 2009), to now a more positive relationship where opportunities to combine work and motherhood are more likely to generate fertility at around replacement rates (Vos, 2009; Bettio and Villa, 1998). Thus, many have suggested that the low fertility in Southern Europe is the outcome of women’s weak labour market position (together with high unemployment for young people raising the cost of children) (Bettio and Villa, 1998; Esping-Andersen, 2009). The concerns in developed countries over fertility being below replacement levels turn the constraints on motherhood, including here pay gaps, constrained employment opportunities and weak support for working parents, into policy issues for those concerned with the ageing society. These issues are also likely to be very relevant for low- and middle-income developing countries where better provision of crèches for children, as well as full-day school and pre-school hours, could be very important for improving women’s labour market access. Some studies point to the challenges in planning for fertility in contexts associated with very rapid change and uncertainty, for example in Brazil (Connelly et al., 2006). A further challenge concerns the well-known “implementation gap” between policy and practice, such that the large share of informal workers do not enjoy effective cover by existing leave and child-care policies, although again in the case of Brazil (and several other Latin American countries) the share of informal workers has declined significantly in recent years.

Likewise, decisions over age of first birth may be endogenously determined, shaped by career structures and child-care opportunities. Amuedo-Dorentes and Kimmel (2005) suggest that college-educated women in the United States postpone fertility until they have found a more family-friendly employer, with the result that those who do postpone enjoy an enhanced motherhood boost rather than a penalty (although their study surprisingly finds a motherhood boost for all college-educated women). The variability of the pay gap with the timing of fertility (see also Wilde et al., 2010) suggests that women have some degree of agency over the size of the motherhood gap, provided they are prepared to face the challenges associated with lower fertility at older ages and other factors giving rise to a gap between actual and desired number of children (Esping-Andersen, 2009). It is this gap between actual and desired fertility that leads Esping-Andersen to argue that the gender revolution is so far an incomplete revolution, even as applied to developed economies, leading to unstable equilibria due to suboptimal

outcomes in the sense of unfulfilled desires and to greater income inequalities and polarization in investments in children.

The need to recognize the interrelations between fertility, child care and labour supply decisions has been taken a stage further in the analysis by Self (2005), who argues that mothers face a low level equilibrium trap because as individuals they are not able to change the social expectations that mothers should provide child care themselves, resulting in career interruptions and/or the choice of part-time jobs. This is because of high set-up costs and potential for economies of scale in the development of alternative child care; as an individual in a society where child-care facilities are not widely developed it is very difficult to access child care and thus mothers have few choices other than to follow societal expectations. Self (2005) attributes these problems also to a lack of coordination mechanisms between employer needs and the development of child-care options; because mothers' labour supply requires prior provision of child care, the scope for women to make effective choices is restricted.

4.4. Differences among mothers

As already established in Part I, mothers are not one homogeneous group: the motherhood gap may vary for different groups of women, and moreover, policies to reduce the motherhood gap may have varying impacts between groups of mothers. Within countries, variations in behaviour can be expected according to women's access to labour market resources (earnings, leave opportunities, working time options, career prospects), their access to family resources (income and benefits – related to presence of partner or income of partner, availability of family-based child care, employment hours of partner, and so on) and the prevailing attitudes and values of key actors and in the wider society (variations according to prevailing gender culture in family and workplace, but also variations in attitudes among mothers and their immediate family and partners).

The notion that there are fixed attitudinal differences among women within the same society has been promulgated by Hakim (1991), who argues that women are pre-divided into career and non-career oriented at the time that they make choices over education and initial labour market entry and also suggests that changes in institutional arrangements such as more extensive child care will have limited impact on career choices. The alternative position (see Steiber and Haas 2012 for a summary) suggests that women's preferences evolve in relation to their perceptions of both needs and opportunities, such that career choices will be shaped by actual availability of child care, family income necessities and experiences at the workplace rather than predetermined into the non-career oriented (labelled "grateful slaves" by Hakim). These different perspectives will influence the anticipated impact of country-level policies on women's job choices and also influence patterns of behaviour within one country, such that increased availability of child care would have more impact, according to Hakim, on the more career-oriented, while in the adaptive preferences approach the impact on the less educated may be similar or even stronger as it may open up choices that previously appeared unavailable to those with lower potential earnings.

The interest in variation among mothers also links to current debates on intersectionality, and in particular the intersection of gender with class, race and age. Recent research by Pal and Waldfogel (2014) finds that although on average the motherhood pay gap declined in the United States over the period 1977–2007 for all

women, this only holds for non-Hispanic white women; it has in fact risen for African-American and Hispanic women. The debate over welfare state regimes and their effects by gender intersected with class is discussed further in Part IV. Herd (2005) uses a similar approach to review what kind of welfare state reform of pensions (US social security) would be most beneficial for women; she finds that minimum benefits not connected to employment status are best at redistributing towards lower-class and non-white women, while care credits have more impact on women throughout the class structure. Both are more redistributive than reforms that would extend benefits only to divorced women.

4.5. Comparing motherhood effects across countries (or over time) and identifying policy effects

One of the major reasons for calculating motherhood gaps or penalties is to be able to compare across countries to identify whether a particular country is more or less punitive towards mothers. Many studies then attempt to identify whether these differences can be explained by specific policy regimes and their orientation towards supporting or not supporting working mothers (e.g. Misra et al. 2012; Sigle-Rushton and Waldfogel 2007; see Part IV below). For example, a comparison of pay penalties in Europe shows that wage penalties are high in Germany and the UK but much smaller in Finland and Denmark, which fits with expectations about the wage benefits of strong policy support for working mothers (Gash 2009). Important though this work has been in identifying the range of policy regimes and their association with different patterns of participation and wages for mothers, there are a number of methodological issues which require caution when the research primarily explores macro-level correlations between female employment patterns and policy regimes.

Steiber and Haas (2012) have pointed to the inappropriate use of single regression models for exploring data “sampled from clustered populations (e.g. women nested in countries) and may for this reason overstate the true impact of any macro-level effects (e.g. of state policy)” (p. 349). Indeed, instead of a causal “policy effect” the results may only suggest “tentative links” (p. 358). Multi-level models (used by Uunk et al., 2005; Pettit and Hook, 2005; and Steiber and Hass, 2009) are held to provide more accurate but also more conservative results. These techniques allow a focus on the specificities of the policies and on the effects for different groups of women (Petit and Hook, 2005).

Another problem also pointed to by Steiber and Haas (2012) is the focus on gaps between mothers and non-mothers; the outcome may be that among the countries that appear to have limited penalties for mothers one may find those that have high employment rates for both categories and those that have low employment rates for both categories. Levels of achieved employment thus need to be taken into account, not just gaps. A parallel point is made by Korpi et al. (2013) in their critique of gender pay gap analysis for developed countries. They argue that while the difference in gender pay gaps at the median and upper decile positions is often taken as a measure of a country’s glass ceiling, this is a mistake since it also reflects country differences in gender gaps at the median level, not just at the top. In the “earner–carer” countries of Finland, Norway and Sweden the gender pay gap is relatively narrow at the median point and then widens considerably, moving up the wage distribution to levels similar to the United Kingdom and the United States, while in the “market-oriented” countries of the United Kingdom and United States the gap is relatively similar at all points of the wage distribution.,

It should also be noted that availability of part-time jobs could both increase female employment measured by head count and reduce volume of female employment, if women who would otherwise have been employed full-time work part-time. Motherhood gaps should also thus include gaps in volume of employment (headcount and hours) as well as in hourly pay rates, for a fully rounded comparison across countries.

Much of the cross-national research on motherhood gaps focuses on the impact of policy directly related to parenting. However, Fortin (2005) finds that gender culture does have an independent effect on the influence of policy in OECD countries, such that models which do not include gender culture may overestimate the impact of care policy. A recent study by Budig et al. (2012) also found that welfare state policies in developed countries (Australia, Europe, United States) have stronger effects in countries where gender culture is favourable to women working, again suggesting that the impact of care policies is not universal but shaped by prevailing values and culture. Uunk et al. (2005), in contrast, find that gender values in Europe have an insignificant effect once public policy for child care is taken into account. Another problem in identifying the impact of, for example, formal child-care policies is that formal child care may squeeze out informal forms of child care, thereby modifying the impact of an expansion of formal care on employment participation.

It is also important to extend the range of factors considered beyond specific gender and parental support policies. For example, Blau and Kahn's (1992) work on differences in wage structures in the United States suggests the importance of labour market institutions for understanding the size of pay penalties for those situated towards the bottom of the labour market, ranked by pay levels. Similarly, Whitehouse (2002) argues that the higher wage premium for fathers in the UK compared to Australia is largely explained by the greater level of wage inequality in the UK. Work on developing countries suggests the need to take into account economic necessity as the core factor in mothers' labour supply, overwhelming issues related to the adequacy of alternative care provision. This "affluence effect" (that is, the ability to exercise preferences once very basic income needs have been satisfied) applies even among European countries where similar policies are found to have variable effects on employment and wage outcomes in high-income versus low-/medium-income countries (Uunk et al., 2005).

However, work which purports to show an increasing tendency to reduce hours of work after childbirth with increasing affluence needs to be treated with caution. Steiber and Haas (2012) argue that it is not clear whether reduced hours in higher-income countries is a result of an affluence effect or a response to the greater availability of part-time work in those countries. It is thus not clear if it is the availability of part-time work or affluence that leads to the association.

4.6. The costs of motherhood gaps and who bears these costs

In assessing the motherhood pay gap, a key issue is whether the gap matters. Some would argue it reflects a free choice by women first to have children and second to change their labour market behaviour to enable them to follow their preferences to care for their children. However, many objections can be raised to this perspective and suggest the need for a wider framework in assessing costs of motherhood pay gaps. These objections fall under four headings:

- the constraints on choice;

-
- the long-term impact of the gap on lifetime income and poverty;
 - the impact of the costs on children and the role of children as a public good; and
 - the evidence that the gap represents more than a productivity loss.

With respect to constraints on choice, these arise from multiple factors including gendered norms, labour market arrangements (preventing fathers sharing care or requiring mothers to work excessive hours) and welfare support deficiencies (notably the availability and cost of child care). Most importantly, it is not necessarily possible for an individual couple to make alternative choices, as women with children may not have the opportunity to forge a well-paid career in the labour market if there is employer discrimination not related to actual productivity; the couple's own caring division of labour also plays a role.

Not only are there constraints on choices, but the implications of choices under available labour market, welfare and family arrangements may also have both long-term and spillover effects. For women, evidence suggests that motherhood may result in long-term lifetime costs (see the evidence surveyed in Part I). This is because mothers may not be able to make up for lost ground in the pay hierarchy and moreover may become trapped into careers with limited pay promotion opportunities, as is suggested by the widening gender gaps with age found in many countries. These costs are in addition to lost earnings due to time out of the labour market or reduced hours of work (Davies et al., 2000). The costs may be particularly severe in old age, where pensions are based on years of employment and related to earnings, or when due to divorce a woman who has withdrawn from employment to look after her children is required to pursue wage employment to support herself and her children.

There is also ample evidence that women's earnings have positive spillover effects on the well-being of children (see Walby and Olsen, 2002 for a summary for the United Kingdom), as more of women's earnings than men's are spent on children. Single parents may face particularly tight budget constraints leading to child poverty, and these may result at least in part from barriers to entry to higher-paying jobs. Under these conditions not only may children suffer from constraints on mothers' earnings, but also mothers are expected to absorb all these costs even when child care can be considered a public good, providing the basis for future support of the whole cohort, not just mothers. In developing countries there is evidence that transfers of resources to mothers improve children's well-being; much of the research focuses on transfers for poverty alleviation (Yoong et al., 2012) but it follows that better employment opportunities for mothers would have similar effects provided support was available for child care and household tasks.

Finally, studies on the motherhood gaps find that the penalties incurred may generate long-term costs and are likely to be disproportionate to any expected loss of productivity, thereby suggesting the prevalence of discriminatory wage and employment practices against mothers. All these factors indicate that the costs of the motherhood gap have to be considered taking into account the spillover and lifetime costs and the disproportionate size of the costs relative to any realistic estimate of lost productivity.

Part III: Explaining the motherhood pay gap: Economic and sociological approaches

There are multiple competing and overlapping explanations for the motherhood pay gap, each seeking to provide a convincing explanation for the wage penalties experienced by mothers who are engaged in paid employment and have one or more children at home. Section 5 reviews the differences in approach to emerge out of the disciplinary perspectives associated on the one hand with economics – the rationalist, productivity-related explanations – and the sociological accounts of gendered institutions and sex discrimination on the other hand. Comparative institutionalist and development accounts are also important and we consider these separately in Part IV.

5. Main explanations for the motherhood pay gap

Box 5.1 sets out the main issues arising from the alternative approaches to explaining the motherhood pay gap, distinguishing between the mainstream economics approach, which emphasizes the productivity effects of women's changed circumstances and characteristics following childbirth, and the sociological (as well as feminist economics) approach, which interrogates the problems of sex discrimination, market failure and undervaluation of mothers' work. For each issue, box 5.1 draws out the distinctive role of caring as assumed, or shown, in the respective explanation. Our definition of caring includes both personal care and household work (see Razavi and Staab, 2010). The following discussion follows the structure of the table, reviewing first the three main economics-based explanations and then the three main sociology-based explanations. While most studies fit within one of these two broad perspectives, many are sensitive to the need to explore the competing rationales and are open to eclectic explanations.

5.1. Depreciated human capital

According to the basic human capital model, the longer an individual spends in education or training the higher the expected wage. This logic follows from the assumption at the core of neoclassical economics that marginal productivity equates with an individual's market-determined wage and that human capital serves as a good (observable) proxy of productivity. While this assumption is questionable from a sociological and industrial relations perspective (Grimshaw and Rubery, 2003), many studies explore the human capital (and therefore wage) consequences of interruptions from paid employment. It is postulated that employment breaks result in diminished human capital through forgone employment experience, lost skills through returning to a different occupation or job position and direct depreciation of the education acquired at school and the skills, knowledge and expertise accumulated at work (Mincer and Polachek, 1974; Waldfogel, 1997).

Research undertaken in Europe and the United States since the 1990s typically sets out with the hypothesis that increasing use of family-friendly policies (especially maternity leave and the right to return to the same job) and the associated opportunities for mothers to pursue continuous employment (often defined as returning to work within 12 months) ought to have reduced the wage penalty associated with a presumed

depreciation of human capital. An early example of this type of study is provided by Joshi et al. (1999) who indeed find no significant differences in returns to human capital between mothers in the United Kingdom with a continuous full-time employment experience and childless women; mothers who took an extended employment interruption (more than 12 months) by contrast do display lower rewards to their human capital, suggestive either of depreciation or difference from other women in unobserved attributes. Moreover, comparing their results for the early 1990s with the late 1970s, Joshi et al. demonstrate that the wage penalties associated with part-time work and lost work experience have worsened; the pay gap between mothers and non-mothers stayed the same but the component due to returning into part-time jobs and interrupting careers increased, suggesting a bifurcation of experience among mothers.

The results in Davies and Pierre's (2005) European study are also partially supportive of the direct wage penalty effects of mothers' extended interruptions. For the United Kingdom, they find lower returns to human capital for mothers with extended employment interruptions during the 1990s compared to mothers who had children with short breaks, but the difference is not statistically significant; for Germany, however, the same patterns hold and are statistically significant.

In a relatively novel method of analysis, Meurs et al. (2010) identify the wage effects of employment interruptions by comparing women who have had career interruptions with those who have not; their data for France show that around one-third of mothers in paid employment did not in fact interrupt their career. Their statistical decomposition results show that the pay gap between women with and without interruptions is entirely explained by human capital differences, thus lending support to the human capital depreciation theory, while the gender pay gap between a sample of men and women with no history of interruptions remains largely unexplained. What they argue, in a twist on the usual neoclassical economics explanation, is that while employment interruptions do depress wages, they do not explain the gender pay gap since women with no interruptions still face sex bias in pay.

5.2. Reduced commitment to paid employment

Economics research hypothesizes that because women are more likely than men to face employment interruptions caused by childbirth and family care responsibilities, they exhibit weaker attachment to their job; in Hakim's words, they are "intrinsic mothers", not "intrinsic workers" (Hakim, 2002). Because women expect to experience career interruptions, so the argument goes, they show less interest in investing in training that might improve their skill-sets for the organization, are less inclined than men to seek out job positions where compensation is future loaded and, as a result, are at high risk of employers' rational practice (in purely economic terms) of "statistical discrimination". Mincer and Polachek (1974, pp. 83, 86) state the following:

Prospective discontinuity may well influence many young women during their pre-maternal employment to acquire less job training than men with comparable education ... The implications for comparative-earnings profiles are clear: Greater investment ratios imply a steeper growth of earnings, while declining investment profiles imply concavity of earnings profiles.

Several studies test for evidence of mothers' apparent weaker job commitment. In Munasinghe et al.'s (2008) wide-ranging analysis of wage data for young adults (aged 14–37) in the United States, various key pieces of evidence are provided: low- and high-

educated women display higher rates of separations and “quits” from organizations than men (although men are more likely to be laid off) and the gender gap is wider among the older cohort of women (25–37); women received only around half of the total hours of organization-related training received by men; and in a test of career expectations (“What would you like to be doing at age 35?”) fewer women than men expected to be still working. This evidence, together with the regression analysis results that show that women have significantly lower returns to job tenure than men, are claimed to support the hypothesis that mothers display weaker commitment to their work (although see section 5.4 below).

Box 5.1. Competing explanations for the motherhood pay gap

| Economics: Rationalist/productivity effect explanations | | |
|---|--|--|
| | <i>Change in labour market position or behaviour</i> | <i>Role of caring</i> |
| Depreciated human capital | <ul style="list-style-type: none"> - Break in employment - Return to different job/occupation | Caring fails to renew or develop human capital |
| Reduced commitment | <ul style="list-style-type: none"> - Change to shorter hours - Higher job quits - Low investment in training - Limited career aspirations | Caring takes precedence over work commitment even during working hours |
| Employed in less productive job | <ul style="list-style-type: none"> - Job status or pay traded for mother-friendly hours or lower work intensity - Reallocation of paid/unpaid tasks between household partners | Job matched to caring requirements, not skills |

| Sociology: Gendered institutions, discrimination explanations | | |
|---|--|---|
| | <i>Change in labour market position or behaviour</i> | <i>Role of caring</i> |
| Employer discrimination in hiring, pay and career tracks | <ul style="list-style-type: none"> - High wage penalties for interruptions - Cumulative negative effects of employers' hiring and career decisions | Sexist presumption that caring makes women less productive/committed |
| Market failure | <ul style="list-style-type: none"> - Employer requirements and child-care requirements not coordinated | <p>Unable as individual mothers to access child care or non-discriminatory wages</p> <p>Social capital networks less able to provide access to employment resources</p> |
| Low valuation of people versus money work orientations | Female skills/orientations attract lower wages | Gender differences in attitudes reinforced through motherhood experience |

Such results feed into economic theories of statistical discrimination: because many women interrupt their careers and possibly opt out of training investments, it is argued that it is rational for employers to base hiring and promotion decisions on the basis of probable future returns to an individual's productivity; economists refer to irrational discrimination as "taste discrimination". However, in practice there is imperfect information in labour markets, so employers apply a group-based logic (that women may on average be more likely to underinvest in training and careers than men) to individuals, which is of course discriminatory. As Meurs et al. (2010) observe, individual women do not typically enjoy a position at the point of hiring or promotion where they can make a credible signal to the employer regarding their long-term commitment:

Women without any career break do not get a specific advantage of their uninterrupted participation in the labor market. Conversely these women are disadvantaged in term of returns to their productive characteristics when compared with men. This suggests that these women who have never interrupted their participation in the labor force did not find the possibility to convey a credible signal to their employers of their long-term commitment to work; consequently their wages are determined "as if" they were likely to interrupt their careers. This supports an interpretation of the gender wage gap in terms of a statistical-type discrimination. (p. 18)

5.3. Employed in less productive jobs

A third key economics-based explanation is that after having children women are assumed to opt into lower productivity or less time-/effort-intensive jobs both because children sap their energy and because child care may be unreliable and/or demands a great deal of flexibility in a job (in terms of hours worked), which may trade off against job status. The conventional explanation is that partners reallocate market and non-market tasks through increased specialization within the household unit (Becker, 1985); mothers in paid work are said to "store" energy that is needed for work at home (Becker, 1991). Moreover, economic ideas about compensating differentials suggest that employers are able to offer lower wages to certain groups of workers who are attracted by non-pecuniary characteristics such as, in this case, mother-friendly practices that, for example, do not require weekend working, make limited demands for travel, offer part-time hours or offer on-site child care (Budig and England, 2001). Alternatively, as we discussed in Part II, there may be reverse causation such that lower productivity women opt into motherhood (Korenman and Neumark, 1992).

The analysis of mothers' and fathers' wages in Lundberg and Rose (2000) finds partial support for the thesis of household specialization: in households where mothers have interrupted paid employment they return to work fewer hours and earn less, while fathers work more hours and earn more; but in households where mothers have worked continuously their wages do not change on return to employment and the fathers in these households work less but earn more.

Budig and England's (2001) more comprehensive analysis for the United States includes a test for whether or not mothers trade wages for mother-friendly jobs, including jobs that might be less demanding in terms of required effort or productivity. Support for this proposition is weak: the estimated wage penalty per child of 5 per cent is only

reduced to around 4 per cent and, moreover, half of the effect is achieved by one variable – whether or not the woman works part-time. Furthermore, the authors find that mothers are no more likely than non-mothers to work in female-dominated jobs, that inclusion of the measure of managerial/supervisory authority has no significant effect on the motherhood wage penalty and that adding commuting time to the regression model has no effect either. Overall, in the authors’ words, “Motherhood does not seem to have its effects through the kinds of jobs women hold, with the important exception of working part-time” (p. 216), and “Most job characteristics had no effect on the motherhood penalty – either because the characteristics don't affect pay or because motherhood does not affect whether women hold these jobs” (p. 220).

Overall, then, the results of studies searching for rationalist/productivity-based explanations often arrive at the conclusion that a significant portion, if not the majority, of the motherhood pay gap cannot be explained by diminished experience, skill levels, mother-friendly job characteristics and measures of work commitment. Unobserved differences in productivity between mothers and non-mothers are one possible explanation and this seems justified, according to Budig and England, given the increasing size of the child penalty with number of children, the implausibility of employers practising wage discrimination by number of children and the likely relationship between number of dependants and the risk of exhaustion and distraction among mothers in paid work. However, the elephant in the room is employer sex discrimination, which is not easily measured (although see below) and is therefore not a standard variable used in regression models. As we discussed above, the component of the motherhood pay gap attributable to employer discrimination is not known, since there are other unobserved variables that may also have explanatory power. Sociological approaches may be better equipped to interrogate the nature and consequences of employers’ discriminatory practices.

5.4. Employer discrimination in hiring, pay and career tracks

Sociological accounts of the motherhood pay gap argue that employers build into their hiring and promotion decisions traditional stereotypical expectations of the burdens imposed by families on mothers’ time and energy. Contingent upon the particular socio-cultural norms (at a particular time and in a specific place), employers may perceive all mothers as potentially risky investments prone to erratic employment participation and reduced commitment in time and in the capacities and energy required to accumulate experience and expertise. Such views may extend to all young women, especially in low-to-medium income countries where high fertility rates mean that the potential for motherhood is high for all women, such that employers may not distinguish between mothers and non-mothers. The difference with the economics accounts is that these expectations, which impose a price on motherhood, are theorized as outside the direct individual control of the mother; that is, women exercise individual agency but in a context of an already given set of penalties. As Self (2005, p. 854) cogently puts it, societal expectations can be thought of as a “negative externality” of childbirth to mothers. In the absence of radical policy reform or a massive shift in employer behaviour, sociological accounts suggest that historically established expectations that mothers are best suited to the primary caring role continue to hold force despite the rise of a service economy and women’s education.

Such expectations can be continuously reinforced by the individual actions of employers, governments, mothers and fathers. A number of studies in the United States have performed controlled laboratory experiments in an effort to illuminate discriminatory employer practices: evaluators appraised consultants who were identified as mothers as less competent than when informed they did not have children; and visibly pregnant managers were assessed as less committed and less dependable than non-pregnant female managers, controlling for a range of characteristics (Cuddy et al., 2004 and Halpert et al., 1993, cited in Correll et al., 2007).

In another fascinating laboratory experiment, Correll et al. (2007) assess the potential tensions between cultural notions of motherhood, defined as a “low-level status characteristic”, and the “ideal worker” (see also Crosby et al., 2004). While mothers are culturally expected to be forever on-call for their children, this clashes with the normative belief that the ideal worker ought to be unencumbered by non-work demands; this generates a “perceived cultural tension” between the two roles (p. 1306). The authors hypothesize that because performance expectations are lower for low-status groups such as mothers, then evaluations also tend to be lower and strictness of standards higher; “status-based discrimination” functions such that “the standard used to evaluate workers is systematically biased in favour of high-status groups” (p. 1302).

Many studies analyse specific examples of employer practices of anti-mother discrimination in the organizational setting. For example, employers have been shown to practise twin career tracks in order to fit high and low human resource investments with those employee groups expected to show high/low commitment. Importantly, segmentation of career tracks is not necessarily based on differences in ability of female employees with and without children, but on the expectation that mothers may not stay the course; practices such as those requiring long or uneven hours are therefore operationalized in order to deter mothers, or future mothers, from qualifying. Self (2005) argues that under these circumstances, women follow a slow-track career, earn a lower wage, devote more time as a consequence to child care, and thus perversely fulfil employers’ beliefs about the appropriateness of “mommy track” careers. Moreover, it is not economically feasible for any one employer or mother to break out of this cycle since individual actions alone would not shift the overall demand for child-care services sufficiently to alter the cost equation (see also section 5.5. below).

Roth’s (2006) study of gender inequality among Wall Street financial companies also found that since all women were viewed as potential mothers, their career commitment was perceived by employers or line managers as suspect. Such discriminatory views prevailed despite the fact that both mothers and fathers reduced their average weekly hours following parenthood: mothers worked 8 per cent fewer hours than fathers but earned only half their pay, while fathers worked 10 per cent fewer hours than non-fathers but earned 22 per cent more pay (cited in Lips, 2013).

Such clear evidence concerning the persistence of what Lips (2013) refers to as “system-justifying” beliefs and practices provides an alternative explanation for the findings presented in some of the economics studies cited above. For example, in contrast to Munasinghe et al.’s (2008) interpretation of their results that young mothers’ lower accumulation of skills on the job and lower returns to job tenure are supportive of the hypothesis that they display weaker commitment, an alternative interpretation might regard the results as indicating the exclusion of young mothers from company training

due to prejudicial beliefs that they might leave to have children, reduce hours, or be otherwise distracted by family commitments – views that are unlikely to be grounded in evidence of mothers’ differential performance.

5.5. Market failure

In her innovative application of ideas about market coordination failures from the development studies literature, Self (2005) argues that women’s labour supply and child-care services are interdependent, such that investments in the hiring and promotion of mothers are often not made because investments in child-care services are missing and vice versa. In Self’s multiple equilibria, two-sector model, the “modern sector” equilibrium (involving developed child-care services) is shown to be superior to the “traditional sector” equilibrium (where child care is organized within households) but requires the coordination of use and production of child-care services. This coordination failure is exacerbated in developing countries where sustained investment in women’s education may also be required. The policy lesson from Self’s work is that countries can become “stuck” in a low-performing equilibrium. Some employers may already realize the benefits from what Self calls the “psychic income” of employing mothers (by which she means the returns to what some employers may consider to be socially beneficial investment), but this is not enough to shift from one equilibrium to another.

Further light on these market coordination/failure issues derives from cross-national comparative studies that point to the stratification of experience among mothers by class and level of education. Mandel and Shalev (2009) argue that in relatively unequal societies, higher-educated mothers may be more able to hire low-educated women to provide child care at low cost, while in more equal, social democratic (Scandinavian) societies, higher-educated mothers tend to pay a penalty for publicly provided child care by their simultaneous reliance on having to seek employment in relatively lower paid, public sector managerial and professional jobs. In other words, their work suggests that societies with highly developed child-care services (a high level of defamilialization in their words) risk blocking mothers’ high-level attainments, where the benchmark for high-level attainment is the higher pay of private sector jobs as afforded in the liberal market economies of the United States, for example. Other studies that examine stratification effects by mothers’ level of education include a Spanish study that found medium-level educated mothers were more likely than low- or high-level educated mothers to respond to a new policy of cash benefits for children aged under three by increasing labour market participation (Sánchez-Mangas and Sánchez-Marcos, 2008, cited in Steiber and Haas, 2012). Further stratification effects are observed between single mothers and mothers with partners. The negative effects of child-care costs on mothers’ employment participation, for example, are found to be significantly stronger among single mothers (Connelly and Kimmel, 2003).

5.6. Valuation of altruistic versus competition orientations

A third sociological explanation for the motherhood pay gap is that societal stereotyping of women’s competences and low agency, or bargaining power, creates situations where women’s work is undervalued or discredited (Grimshaw and Rubery, 2007). One consequence is that mothers become a source of underutilized and undervalued labour for secondary labour markets, or for low-wage career tracks within occupations or organizations, which may be convenient for employers, especially those

able to exercise a degree of monopsony power. Tomlinson et al.'s (2009) study, for example, found that mothers returning to work were often underutilizing their previous training and skills, with significant evidence of over-qualification of mothers who had returned to jobs in caring, sales and customer services.

Several studies have sought to estimate the quantitative impact of such prejudicial views on the gender pay gap. Fortin's (2005) analysis of data for 25 OECD countries from the World Value Surveys suggests that anti-egalitarian views are negatively associated with the gender pay gap. She tests the impact of gender differences in a range of stereotypical attitudes on the gender pay gap; examples include "scarce jobs should go to men" and "being a housewife is just as fulfilling as working for pay". She finds that countries where significantly more men than women think that scarce jobs should go to men tend to have wider gender pay gaps than other countries, and where fewer women than men believe being a housewife is fulfilling, the gender pay gap tends to be narrower. One curious finding is that over the 1990s, men's views about the benefits of housewifery seem to have hardened while women increasingly recognized its potential costs, contributing to a widening of the gender pay gap; as Fortin states (borrowing from Blau and Kahn, 1997), the failure of men to adapt their views contributes to the currents women face as they attempt "to swim upstream".

There is some evidence that these types of attitudes may have more negative wage effects when mothers return to work for a new employer rather than continue with the same employer after their interruption. In an analysis of German data, Felfe (2012) finds that mothers who return to work for the same employer suffer a small wage cut (around 9 per cent) and reduce their hours (by around 7 per week). However, mothers returning to work at a new workplace suffer a wage cut of approximately 24 per cent, along with reduced hours and a switch into a job that is associated with a significantly lower level of stress or intensity. While the economics explanation would interpret these results as supportive of compensating wage differentials, a sociological account would instead highlight the possibility that women are sorted into lower intensity jobs by employers who rely on prejudicial views about the suitable job–mother match.

Part IV: Investigating the impact of the institutional environment

In this part we explore key dimensions of a country's institutional environment that shape the changing patterns of motherhood pay gaps, namely the welfare and family systems and the labour market system. The analysis in each section is attentive to stratification effects – that is, the variable effects experienced by mothers with respect to their socio-economic class status, level of education, age and timing of childbirth, position in the formal, informal or rural economy and type of employment contract. Section 6 examines the impacts of country policies that provide general support for care and work (including child-care provision, length and payment for maternity leave and school hours schedules). Section 7 reviews country approaches towards women as economically dependent or economically independent citizens (paying particular attention to issues such as tax and benefit systems including pensions and availability of support for lone parents) and, with a focus on developing countries, the family system and cultural context (including expectations of motherhood and availability of care within extended families). Section 8 examines the role of country labour market systems

in shaping the motherhood pay gaps. It focuses on the general dynamics associated with different forms of labour market organization (market-oriented and coordinated), different occupational groups, and variations in the balance of bargaining power.

6. The impact of a country's welfare system and support for working parents

There is now a vast literature that explores the impact of different policy approaches towards the support of care for those in wage employment. This interest has been generated by both the increase in female employment – especially among mothers – across a wide range of countries, thereby increasing the number of women actively in need of support; and by the debate on the impact of welfare regimes on both employment patterns and gender regimes and gender equality. This literature in some cases considers directly the impact of policy on the gender pay gap, but in other cases the link is indirect, through the impact of policy on employment continuity, hours of work and occupational level and progression. We start by a summary of the core research findings in relation to three dimensions of support for workers with care responsibilities, namely leave arrangements, child care and flexible working, drawing extensively on an authoritative survey of the literature by Hegewisch and Gornick (2011). This is followed by a review of the currently hotly debated notion of the “welfare state paradox” whereby support for working mothers is argued by some authors – particularly Mandel and co-authors (Mandel and Shalev, 2009; Mandel and Semyonov, 2006) – to have very different impacts on different groups of women and mothers, such that what may be supportive for the lower-educated mothers may be counterproductive for the higher-educated.

6.1. The impact of leave

Hegewisch and Gornick's (2011) summary of empirical studies on the impact of leave has largely confirmed the following findings:

- Leave which provides for job security has a positive impact on women's employment continuity and on continuity in careers, while leaves which do not provide job security do not have these effects (Hegewisch and Gornick 2011).
- Leave entitlements are highly variable, both in relation to weeks of leave and pay for leave (Ray et al., 2010).
- Paid leave (and the higher the pay) increases continuity more than unpaid leave (De Henau et al., 2007) – but for higher-educated women it is difficult to disentangle the effect of higher-paid leave from both the pull of higher-paid jobs and the higher penalty for discontinuity in their decision to return to work (Boushey and Schmitt, 2006).
- Length of leave has been found to have non-linear effects, with both too short and too long leaves having weaker effects on continuity; optimal length of leave is estimated by one influential OECD study as 20 weeks (Jaumotte, 2003) although a more recent investigation found that negative effects only started at three years (Pettit and Hook, 2005) and an even more recent study (Keck and Saraceno, 2013) finds, against the evidence of other studies, that there is no non-linearity in the positive impact of leave and that it is only too short leave that is disincentivizing. A study by Aisenbrey et al. (2009) suggests that the pattern of

effects by length of leave vary between labour markets linked to paid leave norms. Thus, in the United States even short periods out of the labour market are penalized and there is a linear effect of length of leave on prospects. In contrast, these effects are only found in Sweden if the leave exceeds the normal 15 months of paid leave provided for by statutory policy. In Germany, leaves at the time of the study were long and destabilized careers, although women returning early were also penalized.

- The impact of leave depends on the availability of complementary policies, particularly child-care availability and also tax and benefit systems (OECD, 2007a, Jaumotte, 2003).
- The immediate impact on pay for those taking leave and returning to the same employer is broadly neutral, as productivity loss due to time out is compensated by opportunities for career continuity, but where employment becomes discontinuous the wage penalties on returners are in excess of any productivity effect (Hegewisch and Gornick, 2011). Thus as Waldfogel (1998) notes, “the main reason that maternity leave coverage raises women’s pay ... is it raises the likelihood that women return to work for their prior employer after childbirth” (p. 151).
- The impact of leave policies varies with social class. Korpi et al (2013) point to the fact that:

a long-term low flat-rate homecare allowance for care of a child is likely to be more attractive for a lower-earning mother than that for a higher-paid professional woman; a parental leave program of moderate length with earnings-related benefits, in combination with affordable and high-quality daycare, might appeal to both of them. (p. 4).
- It is mainly the Scandinavian countries, and particularly Iceland and Sweden – though also now Germany – that have made provision for specific fathers’ leave beyond the two-week paternity leave at the birth of the child. Take-up is higher when the leave is higher paid – hence the freeze in payments for leave in Iceland after the financial crisis reduced fathers’ take-up (Thorsdottir, 2013).
- Men and women tend to take their leaves differently: women tend to take it as continuous leave even when flexible leave is possible, while men more often take it flexibly and in shorter chunks (Hegewisch and Gornick, 2011).

6.2. Child care

The importance of the affordability and availability of child care has come to the policy fore in Europe ever since the European Union included child-care targets as part of its overall employment strategy, including the goals of raising the female employment rate in the EU to 60 per cent by 2010 and subsequently a combined 75 per cent target for men and women by 2020, which it regarded as unobtainable without more child care. However, the importance of formal child care as a prerequisite for higher female employment is not common to all societies. Overall the key findings with respect to child-care provision are as follows.

- Provision of formal child care does not necessarily precede women’s integration into employment, and welfare state support for child care may be as much a

response to existing demand for child care from employed mothers as a precondition for employment (Leira (1992) cited in Hegewisch and Gornick, 2011; Tavora and Rubery, 2013). Nevertheless, shortage of child care can inhibit female participation and formal child care is very important for mothers in full-time work in western societies (Pettit and Hook, 2009). Moreover, child-care provision does not display the non-linear effects associated with both leave and flexible working where too much can be disadvantageous for women's employment.

- In developing economies, more informal and family-based systems of child care may be available at lower costs. The possibility of combining wage work and child care is also more possible for those operating in informal or agricultural sectors compared to those with more education and seeking to work in the formal sector, as Agüero et al. (2011) explain:

Poorly educated women can combine work and family responsibilities relatively easily because most work is conducted from or near home. Women with more education are far more likely to participate in the formal labor market and away from home. However, most developing countries lack institutions such as formal child care, family medical leave and school buses, which facilitates the balance of work and family. As more women participate in the formal labor market demand for such institutions is likely to grow and the family gap for school age children should reduce. (p. 28)

- Even in western societies, formal child care has less impact on employment participation where work is part-time and where it may therefore displace more informal child -care arrangements (Steiber and Haas (2012), citing Havnes and Mogstad, 2009; Blau and Currie, 2006).
- Availability and stratification of childcare – entitlement to places plus opening hours of child-care provision – may have as an important an impact as costs on women's employment decision (see Hegewisch and Gornick (2011) for an extensive list of studies). Where child care is primarily provided for educational reasons it may have less impact on women's employment as hours of provision are not geared to labour market needs (Jaumotte, 2003). Likewise, length and arrangement of the school day matters, not just early childhood care arrangements, although this is less researched (Keck and Saraceno, 2013).
- Attitudes towards formal child care vary but are more positive in countries where it is commonly available and used, suggesting that attitudes may reflect practice (Hegewisch and Gornick, 2011).

6.3. Flexible working

As with leave arrangements, flexible working can have negative as well as positive impacts on participation and earnings. It can reinforce rather than change the gender division of labour for care. Again, the key findings can be summarized as follows.

- Rights to flexible working in a pre-birth job may promote gender equality where the alternative may be either more discontinuous employment or the search for a new job often involving occupational downgrading (Connolly and Gregory, 2008; Neuburger et al., 2010).

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- Interest in flexible working is not universal and normally follows patterns evident in the general labour market. Where full-time work is the norm, as in Portugal for example, regular hours may be the functional equivalent form of mother-friendly hours (Tavora, 2012).
 - Much work that is classified as flexible is not related to policies to support combining work and care and is more related to employer-flexibility requirements (Fleetwood, 2007).

6.4. The welfare state paradox debate: Does welfare support reinforce the glass ceiling?

There is now strong and accumulating evidence from high-income countries that welfare states that provide support for mothers to engage in paid work have positive impacts on employment participation. Many studies also find that this contributes to higher female earnings and a reduction in the gender and motherhood gaps, though Mandel and co-authors (Mandel, 2009, 2012; Mandel and Semyonov, 2006; Mandel and Shalev, 2009) have stressed that the association of strong welfare states with countries that have compressed wage structures which also benefit women makes it difficult to disentangle the impact of the family-friendly supports from the impact of the more egalitarian pay structure, such that family-friendly policy effects may be overestimated. These same authors also claim to show that welfare state policies – particularly maternity leave but also rights to flexible working – have mixed effects by social class.² On the one hand, family policies are likely to bring more women, particularly the less educated, into employment. On the other hand, however, they encourage a higher rate of statistical discrimination by employers against women who seek higher-level jobs in the private sector, based on biased employer assumptions that women’s eligibility to high-level social rights rarely used by men lowers women’s commitment to careers (Mandel and Semyonov, 2006); discriminatory employer practices thereby reduce opportunities for women to compete in the higher rungs of the labour market. However, the improvements for lower-educated women are such as to almost certainly, in the authors’ views, justify the development of welfare support. Other authors suggesting that there are unintended negative consequences of welfare state support policies include, according to Korpi et al. (2013), Albrecht et al. (2003), Arulampalam et al. (2007), Booth (2006), Gupta et al. (2008) and Estevez-Abe (2006).

A variant of this argument is made by Bergmann (2008) in the context of the United States where women are integrated into paid work despite a lack of general rights to paid leave and flexible working. Here the introduction of such rights could in her view do more harm to women than good in reinforcing difference and a gender division of labour. The only progressive policy for gender equality from this position is to support child-care provision.

² A similar argument is made by Blau and Kahn (2013) who argue that more generous leave and family policies have increased women’s participation in “non-US” countries but have also reduced women’s access to higher-level jobs relative to the United States. However, it is well known that both leave and other conditions vary widely among non-US countries, and also that the United States is an exception with respect to women’s access to higher-level jobs. Countries such as Australia – also without paid leave until very recently – do not show similar effects with respect to access to higher-level jobs.

Korpi et al. (2013) have, however, provided new methodological arguments and empirical material to suggest that the welfare state paradox claims are unsupported and exaggerated. The methodological arguments are fourfold:

- The test of the welfare state paradox should be the share of the relevant female population in higher-level jobs, not the share of employed women as this does not allow for composition effects.
- The test for evidence of a glass ceiling should not be the increase in the gender pay gap between the median and the higher deciles, as this does not take into account the fact that in strong welfare state countries the gap may be very small or non-existent at the median.
- Public sector employment should not be categorized as low-skilled.
- Even if women were to move to the private sector they might earn a great deal less than men from this move, as the rates of return for women are much lower than men's in the private sector.

In addition to these critiques, Korpi et al. (2013) provide empirical tests based on multi-level modelling where countries are classified according to their policies which fall into three main categories – support for dual earners/carers, market-oriented policies and policies which support traditional families – and where educational level is used a proxy for social class. The results suggest that the dual earner/carer models promote women's employment at all three educational levels although the effect is less steep for the higher-educated. The traditional family policies have the opposite effect, with the market-oriented occupying a middle position (but including a high degree of heterogeneity). The modelling is extended to look at access to high-paying jobs, and the proposition that the dual earner/carer policies hinder access to the top jobs is not supported.

7. Welfare states: The economic status of women and family systems

7.1. The treatment of women as economically dependent or independent adults

One of the major influences on women's economic activity, particularly after marriage and motherhood, is whether the welfare state treats women as primarily economically independent or dependent adults. The extent to which women are incentivized or disincentivized to engage in wage work will clearly have an impact on motherhood gaps, though because of both the positive effects of participation on earnings due to employment continuity, and the potential negative effects due to increased participation of mothers who have lower earnings potential, the overall impact on the measured motherhood gap is unclear. Most relevant research in this area focuses on the impact on participation and thus on behaviour that has indirect influences on pay gaps.

Jaumotte (2003) in a comprehensive study of the impact of institutional arrangements on female labour force participation found that women's participation rates were negatively affected by the tax treatment of second-income earners. This tax treatment will have significant impacts on mothers. She comments:

The tax system imposes excessive distortions on the labour supply decisions of married women, compared with those of men and single women. Indeed, optimal taxation implies that the total deadweight loss of the tax system is reduced if marginal tax rates are lower for those individuals whose labour supply is more elastic and, thus, more sensitive to marginal tax rates ... The implication would be to tax married women and mothers less than men and single women. (p. 8)

Instead she finds that in most OECD countries married women are taxed at higher rates than men and single women. In comparing second earner and single individual tax rates for earnings at 67 per cent and 100 per cent of Average Production Worker earnings (APW) she found the tax rates to be equal only in eight cases and higher for second earners in 23 cases. Tax incentives for part-time work also affect patterns of participation, with higher part-time rates found where tax incentives are positive. Modelling these two effects together by endogenizing part-time work, Jaumotte finds that:

the estimations confirm that a high tax wedge between second earners and single individuals exerts a negative impact on female participation. The effect is mostly on full-time participation ... Family taxation also appears to matter for part-time participation. The tax incentives to part-time, measured by the increase in disposable income resulting from sharing market work between spouses (involving earnings of 33 per cent of APW for the wife), are shown to have a strong positive effect on part-time participation. (p. 41)

These two effects, high tax burdens for second-income earners and incentives for part-time work, are strikingly brought together in the German system of taxation which allows for income splitting between husband and wife, thereby increasing tax on second earners, but also providing for effectively tax free participation in so-called “mini jobs”. It is thus hardly surprising to find that mothers’ participation is often in these mini jobs which by definition provide only limited earnings and few career prospects; the effects on mothers’ employment participation after the 2003 reforms were increased participation among inactive mothers and reduced hours among those already working in order to benefit from the zero social security contributions below the then €400 monthly threshold (Bargain et al., 2006). In contrast, the Institute for Fiscal Studies (IFS) in the United Kingdom has looked at how the tax and benefit system in that country leads to rather low rates of lone parents’ participation in mini jobs – defined in the United Kingdom as under 15 hours a week (Bell et al., 2007). Thus the motherhood pay gap is far from independent of the economic incentives provided in combination by the tax system and the organization of the labour market, as discussed further below. Moreover, a fuller analysis of the financial incentives and disincentives ought to include the child-care costs in combination with income tax rules (subsidies, credits and so on, see OECD 2007b).

The welfare benefit system has in fact considerable impacts on the employment behaviour of certain groups of mothers; for example, in the United Kingdom the focus on means-tested benefits, including relatively generous housing benefits, has traditionally been associated with a low participation rate for lone mothers. In other European countries participation rates of lone parents are higher than those of mothers in couple households, either because of less generous state support or because of more support for lone parents in employment (Pedersen et al., 2000). There is a huge raft of work on the design and impact of welfare benefit systems, both entitlement-based and means-tested, and out-of-work and in-work benefits, and their incentives to work. Many of these

studies still focus only on single-earner households, thereby neglecting the impact of these systems on the participation patterns of mothers in couple households and thus their likely earnings. Indeed, the notion that mothers may need to have independent access to employment for their own careers and long-term insurance against risk of poverty is often not given due recognition. For example, the OECD (2005) comments that “Tax/benefit systems may create disincentives for workless households to obtain employment, while on the contrary encouraging labour market participation of second earners in one-earner families” (p. 134). The implication is that households should be considered unitary entities and that the only group of mothers to be given priority in these “make work pay” debates are lone mothers. The need to combine incentives with child care is however increasingly recognized (OECD, 2005).

While there is much analysis of the immediate incentive and disincentive effects of tax and benefit systems, there are broader and longer-term factors linked both to the welfare system and to the social construction of women as dependents or otherwise that may influence mothers’ participation. These include:

- i) access to health care;
- ii) pension entitlements;
- iii) family structures and social norms with respect to independence; and
- iv) labour market structures.

Access to health care linked to employment status has potentially major impacts on participation. Tomlinson (2007) attributes the higher share of mothers working full-time in the United States, despite the lack of child-care subsidies, to the need to have health insurance which may be withheld for part-time work. Alternatively, Hüfner and Klein (2012) attribute the popularity of mini jobs in part to the fact that there is no need to pay for health insurance as partners can claim on their husband’s/wife’s insurance when working up to a certain limit – and recommend abolition of this benefit. In the United Kingdom health care is free to all citizens so has no impact on participation.

Pension systems also have impacts on participation although the effects may be complex. For example, in many countries women’s incentives to participate are reduced by derived rights systems, but where – as in Sweden – there are no derived rights but citizen-based pension entitlements, the need for continuous participation is not clear-cut. However, paid parental leave, rights to flexible working and the strong social norm of economic independence for women ensure high participation. More European countries are providing pension credits for child care at the same time as extending the number of years of employment required for full pension entitlements. The impact of these double reforms is thus more likely to affect directly women’s participation in older ages than when children are young (Anxo et al., 2010; Karamessini and Rubery, 2013).

Participation of mothers is also likely to be affected by expectations of security. This has both a family and a labour market dimension. Where family structures are fragile and insecure – indicated by high divorce rates and multiple union formation – the likelihood of mothers relying on their partners’ economic position for future security can be expected to be less (Bucholz and Grunow, 2006). Such behaviour patterns may be reinforced in countries such as the United States where state support in the event of family breakdown is minimal. Even where family structures are more secure, participation is likely to be affected by perceptions of the ability of the male parent to obtain and maintain a secure job and one that pays sufficiently to maintain dependants.

However, countervailing effects will apply to the extent that female employment opportunities deteriorate with increased flexibility in labour markets (Bucholz and Grunow, 2006).

7.2. The family system and cultural context

Most analyses of welfare states, and in particular analyses of the impact of welfare states on gender equality, relate to advanced countries. However, there has been some work undertaken on classifying welfare regimes for developing countries by Gough and colleagues, but based on different criteria from the classification of developed country welfare states by Esping-Anderson and others. Two important issues emerge from this work for the conceptualization of the impact of institutions on the employment and pay of mothers in developing countries. The first is the central role of the family or “enterprise-household” for security, through both income pooling and provision of care for the young and the elderly, but with the outcome that employment opportunities outside the enterprise-household are often restricted (Gough, 2000).

The second issue that emerges, however, is the variations among developing countries, and in particular the distinction made by Abu Sharkh and Gough (2009) between informal security regimes (where security is provided by community and family systems) and insecurity regimes (where there are not even any stable informal systems in place to provide security). This division is potentially important for understanding differences among developing countries with respect to gender. Where informal family and community-based security systems are in place, women’s relationship to market work may need to be understood as part of that family and community system. Where the family systems are more unstable, women’s relationship to market work may be more individualized. The importance of the family or household as the centre of economic activity, particularly for women, is also recognized in calls for the development of policies to support working mothers; for example, Beneria (2007) stresses the need to develop appropriate reconciliation policies for developing countries:

... policies aimed at increasing labor market flexibilization are not very relevant given that the informal economy is highly flexible. This implies that policies to balance different types of work should be designed around the household as the center of people’s life and work, such as with the availability of neighborhood day care (as opposed to day care at the firm’s or other institutional levels), access to local schools for all children, and measures to save time in domestic and care activities. (p. 6)

While the family takes on greater importance in developing countries, differences in gender culture can still be expected to influence women’s roles as both workers and mothers. In particular, countries where women are not actively engaged in paid work or not in paid work alongside men are likely to have smaller gaps in income and employment between non-mothers and mothers than in those societies where there are expectations of differences in behaviour at the point of marriage or childbirth.

Beyond these clear manifestations of differences in gender culture, there seems to be a lack of research on cross-national comparisons of the role of gender attitudes on mothers’ activity in developing countries. However, there has been a spate of interest in analysing the impact of gender role attitudes on mother’s labour market behaviour in developed countries. These studies use either enacted policies as an indicator of the general cultural attitudes towards women and the family (Korpi et al., 2013), or data on gender role attitudes across countries (Jaumotte, 2003; Uunk et al., 2005; Budig et al.,

2012). These studies have generally, though not universally, found that gender culture influences the impact of welfare state policies on women's employment behaviour (and thus indirectly influences the motherhood gap; see also section 5.6 above). Uunk et al. (2005) find a separate effect for gender culture in increasing women's labour supply without affecting the size of the institutional effect, but Budig et al. (2012) suggest that not including gender attitude data may lead to an overestimate of the impact of welfare state support policies. However, it is also the case that there is no linear relationship between attitudes and for example employment rates; Portugal, for example, has had high female employment rates while maintaining a conservative attitude to family roles and the gender division of labour in the household (Tavora, 2012; Ferreira, 2013).

8. Labour market systems

It is generally assumed that mothers will respond in their labour market behaviour to differences in welfare policy and gender culture. What has been less intensively investigated is the extent to which women and mothers respond to differences in the way labour markets function. However, some recent research (Gangl and Ziefle, 2009) suggests that not only do labour markets operate differently – such that similar motherhood gaps arise through different labour market processes – but that women in the different labour markets appear to understand these different effects and thus change their labour market behaviour to reduce risk and income loss. This latter argument is made particularly with respect to women in the United States, associated with a market-oriented model of labour market organization. The US labour market penalizes heavily reduced experience, labour market interruptions, job changes and part-time work; mothers in the United States minimize their behaviour on each of these dimensions, at least in comparison to mothers in Germany and the United Kingdom. As Gangl and Ziefle write:

In other words, our results imply that if American mothers behaved like their European sisters, they would see their total wage costs of motherhood soaring, whereas European mothers might actually see somewhat (although not very much, given weak market incentives) reduced wage penalties for motherhood if they behaved in a more market-oriented fashion. (p. 365)

It should be recognized, though not focused on in the Gangl and Ziefle (2009) paper, that the imperative for US mothers to follow the dictates of the market may also be related to the link between access to welfare and employment status, including not only pensions but also health care (as stressed above), and indeed also for funds to provide for children's higher education. This greater market orientation could thus be interpreted as much as a family provisioning strategy requirement (such as might be used for understanding mothers' activity in developing countries) as a strategy to prioritize personal career over caring.

In the other countries considered by Gangl and Ziefle, the patterns of penalties and of behaviour are different. In the United Kingdom there are lower penalties against lower experience, but interruptions and job changes are heavily penalized but are still more common than in the United States (but with no implications for health care, for example). Mothers who avoid these patterns face reduced penalties, but in Germany all mothers face penalties regardless of behaviour, suggesting that employers exercise statistical discrimination against mothers in general in the German labour market.

Labour market organization does not only vary across countries but also over time and among sectors and occupational groups. Crompton's (2001) study of work–life balance strategies among women in higher-level jobs (such as bank managers and doctors) in France, Norway and the United Kingdom found that the changing pressures within banking were reducing the capacity of managers to combine work and family as the organizational pressures on managers increased. Increased labour market deregulation was thus working in the opposite direction to improved welfare support policies to facilitate the retention of higher-educated women in employment. However, women doctors were more able, due to greater bargaining power and fewer organizational pressures, to negotiate acceptable work–life balance strategies.

Thus the ability to negotiate labour market arrangements that are compatible with motherhood and deliver reasonable rewards and conditions for participation is likely to depend on the individual bargaining power of particular women and groups, but also on the general balance of power in the labour market (reflected in the extent and reach of regulation), and on the extent to which established regulations and norms are compatible with family arrangements. In the context of low-income countries, in particular, regulatory effects are significantly conditioned by the size of the “implementation gap”, such that in some cases the majority of women workers lack access to statutory systems of maternity protection and other family policies. These issues are also relevant for high-income countries in a context of a trend towards destandardization of employment and a rise of precarious employment forms where rights to social benefits are sometimes unclear. The reach of regulation and its compatibility with family arrangements may have unintended consequences for the integration of mothers into employment: higher levels of regulation have been associated by some authors and organizations (for example the World Bank and the OECD) with the development of an insider versus outsider divide, with women concentrated among the outsiders. This approach has been challenged by others who demonstrate that the alternative of an unregulated labour market often exacerbates inequality and allows discrimination to have free reign (Rubery, 2011). Moreover, it may be easier to integrate more family-friendly policies into a more regulated than into a deregulated labour market. Nevertheless, the form of regulation matters, both across societies and sectors/organizations.

Part V: Implications for policy and future research

In this final part of the study we identify the implications for policy (section 9) and outline an agenda for future research (section 10), including options for the types of research approaches and forms of data that would benefit research and policy.

9. Policy options

Women's increased education and greater continuity of employment have not been sufficient to eliminate wage penalties faced by mothers returning to work after having children. Scores of economics studies demonstrate that women's improved human capital in many countries has not provided the necessary full protection from discrimination against mothers. Sociological and comparative institutionalist research, on the other hand, identifies the benefits of particular constellations of legal rights, forms of collective action, cultural attitudes and policy support for working parents (mothers and fathers), while also warning of persistent patriarchal attitudes among employers (and men more

generally) that hinder progress even in countries with enlightened policy infrastructure. As with earlier work on the gender pay gap that pointed to the difficulties for women of “swimming upstream” (Blau and Kahn, 1992), in the arena of mothers’ opportunities to earn equal pay over the life course we appear to be witnessing constantly moving goal posts (Rubery and Grimshaw, forthcoming), exacerbated in the present context of resurgent neoliberal labour market policy in many advanced countries. Economics studies disagree over the precise technical size of the motherhood pay gap attributable to employer discrimination, and sociological studies are using new data sources to empirically test the effects of culturally embedded “system-justifying” discriminatory beliefs. Whatever the approach, the overall picture is one of societies free-riding on mothers, who bear most of the costs of rearing children. As Folbre (1994) and Budig and England (2001) argued, employers may be the most obvious beneficiaries when mothers successfully rear the next generation of workers, but they are not the only ones. Societies may need to consider how to ensure a broader redistribution of the costs of child-rearing.

A number of policies and measures are needed, therefore, to reduce motherhood pay gaps, as well as to ensure constant monitoring and understanding of government policy, employer actions, legal interpretations, and the organization and structuring of families and attitudes towards families. Here we identify six key areas that might be considered for policy action and the fostering of supportive cultural attitudes, and then briefly discuss the “coverage gap”.

i) Job-protected parental leave

Protecting mothers against employment termination after childbirth by joining parental leave measures with job protection regulations is perhaps the most fundamental policy instrument to ensure mothers’ fair rewards in the labour market. Transitions to new employers or new jobs within the previous workplace tend to be associated with wage reductions and a long-term negative cumulative effect on mothers’ wages, especially when associated with reductions in hours. As such, legal rules that mandate the right to return to the same or equivalent position, as specified in the ILO’s Maternity Protection Convention, 2000 (No. 183), are critical.

Setting a suitable length of parental leave is also critical. Many studies confirm the negative consequences of very generous leave programmes that allow extended employment interruptions, especially when employers are fully and directly liable to cover the associated costs: Gangl and Ziefle (2009) conclude

that employers are actually successful in passing on the economic costs of family policy mandates to mothers through, for example, processes of statistical discrimination, and that triggering respective responses might be an unintended consequence of more generous family policy provisions... (p. 365).

Related studies attribute a marginal wage penalty effect for each year of leave, with many marking 12 months as the turning point; any longer turns into a career break and is marked by a significant increase in wage penalty. Nevertheless, our review of studies in section 6 suggests there is currently no consensus about the optimum length of leave to encourage continuity of employment and minimal wage penalty effects; finding the suitable length of leave depends very much on its interaction with other regulatory policies and a country’s socio-cultural norms. At the same time, there are clear costs for mothers of very short leave provision, associated with a high risk of women dropping out of the labour market altogether (e.g. Keck and Saraceno, 2013).

The level of pay during the leave period is also critical. It has a significant effect on continuity of employment and, by sustaining a mother's financial independence, it can also act to constrain regressive shifts in the gender division of labour in the household. Specific provision for fathers is also a facilitator of women's equal employment experience, although few studies have to date examined the links, reflecting slow progress in policy provision (see for example O'Brien, 2013).

ii) High accessibility of child-care provision

Affordable, accessible provision of child-care services, particularly for young children under the age of three years, facilitates women's free choice to continue with their paid work after childbirth. In high-income countries, affordable child care for very young children tends to be critical in shaping decisions among mothers with a relatively low level of education, for whom high child-care costs are more likely to be a barrier to re-entry. In low-to-middle income countries, the situation often depends on the availability of family and other informal networks for care, and the proximity of work and home: low-educated workers may be more likely to work close to their neighbourhood than women with high levels of education who may have to travel further to work and are therefore more dependent on formal arrangements, as well as good transport infrastructure and employer policies of family medical leave (Agüero et al., 2011). Moreover, unlike leave arrangements, there is no evidence to suggest that too much child-care provision can be a bad thing; the volume of affordable child-care provision displays a positive and linear relationship with the quality of mothers' paid employment.

Child-care provision may take various forms, including public provision funded through taxation, publicly subsidized private sector provision, and pre-school and after-school facilities that can help align school opening hours with parents' working hours. Empirical studies struggle to provide a precise estimate of the impact of different country programmes because of the difficulties of inputting diverse country data reflecting various types of child-care costs – hourly rates, public subsidies, tax refunds, vouchers, employer subsidies and so on – affecting opening hours, public and private sector provision and practices that ration hours entitlements. Overall, however, many studies reviewed in this study confirm the important role of child-care provision in alleviating the wage penalty of family formation experienced by mothers and in freeing up the range of opportunities they face. Self (2005), in particular, highlights the disconnection between women's individual labour supply decisions and society-level decisions to expand or adjust child-care provision; the direction of causality is two-way since child care acts as both a precondition and a response to labour supply decisions, yet responses require the active coordination of multiple individual decisions.

iii) Right to flexible working and occupational upgrading of part-time work

In many countries, mothers' wage opportunities are critically shaped by the labour market capacity to provide good quality part-time jobs. Returning mothers would therefore benefit from rules, set by legislation or negotiated in collective agreements, which provide the right to return to the same job with reduced hours. This may involve a form of flexible working entitlement that can enable reduced hours in formerly full-time jobs, or proactive employer (and union) actions to upgrade part-time job opportunities traditionally associated with slow career tracks, job insecurity and/or low pay.

In labour market contexts where conditions for part-time jobs are for the most part poor and where child-care provision makes returns to full-time jobs difficult, the research shows that mothers are likely to be penalized when they seek to combine paid work at reduced hours with child-care responsibilities at home. Moreover, expectations of duties and responsibilities in a part-time job are closely related with those set for a full-time job. This means that in an economy with a large share of long hours working (of more than 45 hours per week) individuals find it difficult to manage the workload accompanying a part-time job and, equally, line managers face conflicting expectations concerning the design of a reasonable set of tasks for a part-time job. As such, a holistic approach to working time is required in order to design suitable workloads and performance expectations for reduced hours jobs that fit with the caring demands faced by parents.

iv) Progressive cultural context supportive of maternal employment and a shared division of labour in the household

The need to develop ways of counteracting anti-egalitarian attitudes in societies is highlighted by recent international research on the effects of prejudicial views on mothers' pay (see section 5). Conservative views on traditional roles where the woman is the housewife or homemaker and the man the main breadwinner directly conflict with the goal of improving mothers' labour market status and establishing a broader redistribution of the costs of child-rearing. Conservative belief systems, which often interact with and are reinforced by social policy measures that penalize dual full-time earner households, are most likely to restrain mothers' employment choices and encourage long interruptions from paid employment or re-entry to part-time work (Davies and Pierre, 2005).

Such attitudes may interact with many women's own inner conflicts, what the literature refers to as "mother's guilt", which are played out regularly in popular current affairs debates, for example on the benefits for children of being reared by stay-at-home mothers or by career mothers. However, there appears to be evidence that cultural attitudes change with the development of more progressive social policy, and with more progressive attitudes in countries with developed provision of child care, leave entitlements and other policies that support mothers in paid employment (Hegewisch and Gornick, 2011). A progressive policy approach would seek to further equality of support for mothers and fathers: obligatory shared leave arrangements for mothers and fathers, equal rights to benefits while on leave and entitlement to flexible hours on return to work for mothers and fathers.

v) Tax and benefit rules that treat mothers as economically independent adults

Tax and benefit systems in many countries impose significant anti-egalitarian distortions on women's labour market participation because of their frequent status as second-income earners in a household. As we showed in section 7, this is true in the majority of OECD countries (Jaumotte, 2003). Those countries with egalitarian tax and benefit status among household partners are shown to promote greater gender equity of wage and employment prospects among parents.

vi) Affirmative action hiring and promotion practices

Several studies call for employers to adopt affirmative action policies as a possible temporary measure to counter employer discrimination, especially with respect to hiring

and promotion decisions (e.g. Self, 2005). Evidence that mothers may be segregated in slow career tracks, so-called mommy tracks, means that mothers may over time come to display lower commitment to work than similarly educated and experienced male colleagues due to experience of inequality and unfairness at work, and therefore perpetuate employers' stereotypical beliefs about their suitable fit with lower-grade careers. Affirmative action offers a way out of this low-level equilibrium of undervalued and underutilized mothers' capabilities, and may be particularly suitable in those societies with underdeveloped child-care provision.

vii) Addressing the implementation gap in family and social policies

With respect to low-income countries, but also to a lesser degree high-income countries, one concern highlighted in many studies reviewed in this study is the partial coverage of family and social policies. Paid employment in the informal sector, precarious contracts in the formal sector and patterns of intermittent working all contribute to weaken the inclusiveness or reach of statutory policy and typically also inhibit the reaching of mutually satisfactory agreements between employer and workforce concerning better work–family arrangements. More needs to be done therefore to address the implementation gap in policy reach. We know from related research on compliance with statutory minimum wage rules that informal sector employers in low-income countries are often influenced by minimum wage standards, referred to as a “lighthouse effect” (Lemos, 2009). This suggests that further development of policy is therefore critical to diffusing norms of decent standards. At the same time, policy needs to strengthen mechanisms for encompassing more informal activities within the boundaries of formal employment, and to facilitate leave with state funding in order to address problems of financing experienced particularly by small employers (Bertranou, 2007).

10. Data limitations and future research agenda

A future research agenda needs to be multi-disciplinary and to build on the valuable advances in international comparative research that have illuminated many of the effects of welfare and labour market institutions that shape women's wage and employment trajectories following childbirth. Policies have multiple effects contingent upon women's class status, level of education, urban/rural residency, prior labour market experience and household situation. Moreover, as we know from related comparative institutional research (e.g. Grimshaw, 2013 on minimum wage policies), individual policies have diverse effects in different societal settings because they interact with different constellations of institutions, labour market conditions and cultural expectations. Cooke's (2011) “institutional equality frame” provides a useful analytical device for exploring the heterogeneous, and unequal, effects of different countries' policies on mothers' pay and employment prospects and the diverse frames of reference that inform individual mothers' rational decisions. This multiple concern with intersectionality and cross-national comparative research on the one hand and the character of rational decision-making on the other has generated many useful findings, including overturning conventional wisdom with respect to some issues (see for example Keck and Saraceno, 2013).

Nevertheless, the bulk of research to date relies on highly technical statistical analyses, which while offering robust estimates of the explanatory power of a range of

quantifiable variables, lacks a deeper understanding of the complex and often contradictory effects of factors shaping mothers' wage outcomes. One theme largely missing in the literature is a focus on the actual pay and employment practices of employers with respect to the hiring, wage-setting, promoting and firing of mothers, as well as of women who are expected to become mothers, as we discussed in section 5. Such research offers the advantage that it does not presume a neat matching of pay and productivity, as is the case with the usual wage decomposition models for which the assumptions of the human capital approach apply; indeed, Lips (2013, p. 228) argues that "it would be desirable to stop using and referencing such models altogether". Moreover, research at the level of the organization provides an alternative perspective to what Stieber and Haas (2012) call the "macro-macro approach", whereby a study investigates associations between macro-level institutional measures and macro-level indicators of women's employment; this is the approach adopted in much of the research reviewed in this study. The downside to this approach is that it cannot reveal the rich patterns of diversity and complexity of pay and employment among different groups of women; "using aggregate data, the researcher has no means to pay attention to within-country heterogeneity and cannot investigate whether contextual factors (e.g. family policies, labour market conditions) have the same or different effects on different groups of women." (Stieber and Haas, p359).

In common with Stieber and Haas (2012), we propose a multi-disciplinary approach since this can improve our understanding of both the rational choices of individual mothers and the structural and institutional constraints and opportunities they face. Case studies can therefore be very insightful. Roth's (2006) fascinating study of the financial sector demonstrates how a detailed case study can illuminate the subtle discriminatory practices in contemporary organizations and the multiple competing factors that influence pay, including social status, external labour market conditions, individual and collective wage bargaining power and business strategy, among others.

A key issue for future analysis of the motherhood pay gap is the expansion of the country frame of reference. There are few studies outside the OECD member countries. While several excellent and informative studies of low-to-middle income countries are reviewed in this study, our overall knowledge and understanding of the particular policy issues, labour market conditions and household situations is limited compared to that for the high-income countries. Advances should not be limited to efforts to expand the country coverage of standardized indicators in international datasets, although this is a valuable project. Instead, single country studies on the issues facing mothers' labour market prospects can shed new light on the distinctive historical development of alternative policies and the interaction with gendered patterns of labour market participation and wage outcomes.

One of the key data limitations many studies highlight is the lack of good quality longitudinal data, especially cross-national, harmonized data, which can facilitate a more robust exploration of individual changes in circumstances (household, labour market, education, etc.), individual use of available policies (leave arrangements, formal and informal child care), and individual patterns of behaviour. One issue, for example, relates to the impact of new working patterns such as working from home or remotely from the workplace, and the extent to which this is enjoyed by women as much as by men,

whether employers apply similar monitoring and control of such practices, and how it aligns with family policies of child care and flexible working arrangements.

A final issue concerns the relative paucity of studies investigating new patterns of labour market behaviour among fathers. For example, we know relatively little about the impact on fathers' wage and career trajectory caused by their taking leave or working flexibly (through reduced hours, compressed hours or annual leave schemes among others). Moreover, a clearer understanding of fathers' labour market behaviour and rewards over their life course provides a necessary comparison to that of mothers. As we discussed in sections 1 and 4, research studies almost always compare mothers' wages with the wages of women without children, or with mothers whose children no longer share the same household. Instead, we need to develop a better understanding of the multiple effects of family policy, changing expectations and employer practices on men and women, with and without children, across the family life course with respect to the quality of their employment and the division of caring responsibilities in the household.

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