The Wage Penalty for Motherhood in a Cross-National Perspective: Relationships with Work-Family Policies and Cultural Attitudes

Michelle J. Budig
Joya Misra
Irene Böckmann

University of Massachusetts-Amherst

Please direct questions and comments to the first author: Michelle Budig, Social & Demographic Research Institute, W33cd Machmer Hall, University of Massachusetts, Amherst, MA 01003. budig@soc.umass.edu. 413-545-5972. We are thankful to the National Science Foundation Sociology Program (Grants #0600926 and #0751505) for their support.

While family policies are argued to impact the wage penalty for motherhood, the relationship between specific policies and the size of motherhood penalties is not clearly understood. Using newly collected policy data and microdata from the Luxembourg Income Study (LIS), we estimate multi-level models across 22 countries to examine the relationship between country-level family policies and the motherhood wage penalty. We find, net of individual factors and country-level controls for public sector size, income inequality, and maternal employment probabilities, that publicly funded childcare for children 0-2 is significantly linked to lower wage penalties. In addition, job-protected extended parental leave for women has a curvilinear relationship with motherhood penalties: no or very short leaves as well as very long leaves are linked to the highest wage penalties. Notably, support for fathers' engagement in childcare and social approval for full-time employment among mothers of preschoolers are also linked to smaller motherhood penalties. In light of findings for other policies that failed to have an effect on the wage penalty, we conclude that despite the varying socio-political contexts of the countries in our analyses, social policies and norms that support new mothers' continuous connection to the labor force are most strongly linked to reductions in motherhood wage inequalities.

The wage penalty incurred by women for motherhood varies significantly cross-nationally (Budig and England 2001; Harkness and Waldfogel 2003; Sigle-Rushton and Waldfogel 2004; Misra, Budig and Moller 2007a), as do work-family policies (paid or unpaid parental and family leave and subsidized or state-provided childcare) that impact the ability of mothers to maintain employment. Whether variations in motherhood wage penalties are linked to specific work-family policies is unclear.

On the one hand, many scholars contend that work-family policies increase women's employment and wages, by helping them balance the demands of both family and work (Esping-Andersen 1999; Korpi 2000; Daly 2000; Gornick and Meyers 2003). Many of these works have examined the relationship between work-family policies and outcomes, such as wages, by comparing welfare state contexts or regimes (Esping-Andersen 1990, 2001; Orloff 2002: Gornick and Meyer 2003; Misra et al. 2007a). By contrasting countries with different policy contexts (for example, Scandinavian countries with generous policy regimes, versus North American countries, with less generous work-family policies), these authors have argued that more generous policy contexts lead to more gender-egalitarian outcomes.

On the other hand, Hadas Mandel and Moshe Semyonov (2005, 2006) argue that work-family policies have paradoxical effects on women's economic outcomes: while these policies increase women's labor force participation and economic independence, they simultaneously limit their job opportunities and wages and therein decrease women's employment and increase the gender earnings gap. Mandel and Semyonov (2005, 2006) develop an index of work-family policies, that include public sector employment, leaves, and childcare, and argue that positive outcomes are not guaranteed; instead, there are important trade-offs, worth considering.

From yet another perspective, scholars emphasize the importance of cultural contexts in how family policies impact women's economic outcomes (Pfau-Effinger 1998, 2004; Kremer 2007). These scholars emphasize that policies do not shape employment outcomes in a vacuum; policies interact with culture to influence women's (and men's) choices about managing work and family. Family policies, in addition to direct effects on the motherhood penalty, may alter the socio-political norms regarding employment among mothers. But pre-existing cultural expectations concerning the appropriateness of mothers' employment may shape policy formation, as well as

policy effects (Kremer 2007). Cultural norms can change before social policies are enacted, or, as critics of "social engineering" claim, policies may attempt to change prevailing cultural understandings. For example, Pfau-Effinger (2004) considers how changes in cultural traditions interact with social institutions – including the welfare state, labor market, and family – to shape women's employment and changes in women's employment. Thus, while policies may be enacted to support mothers' employment, if these are not in synch with the gender culture, wage penalties may persist in the face of generous policies.

In our study, we try to draw from the strengths of these previous approaches to understanding the relationship between work-family policies and wage penalties to motherhood, to develop an integrated, and more nuanced understanding of this relationship. Counter to both the "regime" the regime approach and studies that examine overall work-family indices, we argue that we can best understand the effects of policies if we disaggregate policies, looking at their effects separately (as opposed to as a larger welfare state context, in a single index of work-family generosity), as different gendered assumptions underlie these policies. Particular policies may have countervailing effects on the motherhood wage penalty. At the same time, we argue that cultural contexts and policies shape one another, while having their own effects, making it important to analyze the effects of both policies and larger cultural contexts.

Our contribution to this literature is to investigate whether specific social policies and cultural understandings of men's and women's roles are differentially linked to motherhood wage penalties. Specifically, we examine the distinct effects of maternity, paternity, and parental leaves, publicly funded child care for very young (0 to 2 years) and for older (3 to 5 years) children, and cultural attitudes regarding maternal employment. We use our newly created Family Policy Database (funded by the National Science Foundation Grants #0600926 and #0751505),

the Luxembourg Income Study (LIS), which provides the best cross-national micro-data for comparing income across OECD countries (OECD 1995), and data from the International Social Survey Program (ISSP) for cultural indicators.

Wage Penalties to Motherhood

Motherhood wage penalties occur in the U.S. (Anderson, Binder, and Krause 2003; Avellar and Smock 2003; Budig and England 2001; Lundberg and Rose 2000; Waldfogel 1997, 1998a, 1998b), the U.K. (Waldfogel 1997, 1998b; Harkness and Waldfogel 2003; Joshi and Newell 1989; Joshi, Pierella, and Waldfogel 1999; Davies and Pierre 2005), Austria, Canada, Germany, Finland and Sweden (Harkness and Waldfogel 2003; Davies and Pierre 2005), and Denmark, Spain, and Portugal (Davies and Pierre 2005). Previous cross-national work suggests substantial variations in the size of this penalty (Harkness and Waldfogel 2003; Davies and Pierre 2005; Misra et al. 2007a), but this previous research does not directly test impact of the country-level factors.

How might individual- and country-level factors impact the motherhood penalty? We detail these multi-level pathways in Figure 1. In this figure, pathways between factors empirically proven to affect the penalty are shown as solid lines. Dashed lines represent the new pathways we investigate. We first discuss how individual-level factors (level 1) shape the motherhood wage penalty, as measured by number of children in the home. At level 2, the dependent variable is the partial coefficient for number of children on annual wages (net of individual factors and estimated at level 1). Each country has a child penalty coefficient, and level 2 factors discussed below, detail how country-level polices shape the penalty.

----------FIGURE 1 ABOUT HERE----------

Effects of Individual-Level Factors on Wage Penalties for Motherhood

In order to estimate the relationship between policies and culture with the motherhood penalty, we must first account for individual-level factors that are known to affect this penalty (Anderson et al. 2003; Avellar and Smock 2003; Budig and England 2001; Lundberg and Rose 2000; Waldfogel 1998a andb; Sigle-Rushton and Waldfogel 2004a). The motherhood penalty is partially explained by differences in human capital. Women with (more) children may have less experience and seniority due to the employment breaks taken to accommodate childcare (Klerman and Liebowitz 1999). The motherhood penalty also varies by educational attainment (Andersen et al. 2003). Mother's lower labor supply, measured as hours worked or part-time status, explains an additional portion of this penalty (Budig and England 2001; Waldfogel 1997), but a significant penalty remains even after controls for experience and labor supply are added.

Job characteristics shape the motherhood penalty if mothers trade earnings for family-friendly jobs. While Budig and England (2001) found no effect of job characteristics on the penalty in the U.S., other work shows the penalty is larger among women in non-professional/ non-managerial occupations (Budig 2006b). While female-dominated occupations are argued to be potentially more family friendly (Gangl and Ziefle 2009), it is well documented that gender occupational segregation increases the gender pay gap (England et al. 1988; Reskin and Roos 1990; Jacobs 1989; Petersen and Morgan 1995; Tomaskovic-Devey and Skaggs 2002). It is reasonable to think gender segregation may shape wage inequalities for motherhood as well.

The motherhood penalty also varies by family structure. Budig and England (2001) find that married women incur larger penalties for motherhood in the United States. Cross-nationally, however, married and partnered[1] women do not always suffer the largest motherhood penalties.

[1] In many countries, cohabitation is akin to marriage. We include cohabitors as married couples.

Comparative work shows that gross motherhood penalties are often largest for single women, while in other countries there is no difference between single and married mothers (Misra et al. 2007a).

Our cross-national design allows us to consider how country-level policies and cultural supports impact the wage penalty despite diverse socio-political contexts. Even in models that include all of the individual-level factors discussed above, a significant penalty persists in many countries in Europe and North America (Budig and England 2001; Harkness and Waldfogel 2003; Misra et al. 2007a). Possible explanations for this unexplained penalty among American mothers include employer discrimination, lowered productivity, inadequate childcare options, and the absence of paid family leave. To date these alternative explanations are untested (but see Correll, Benard and In Paik 2007 for evidence of employer discrimination).[2] In this paper we address the question whether country-level factors are able to account for the cross-national variation in the unexplained motherhood penalties. We thus fill a major gap in the literature by assessing relationships between paid and unpaid parental leaves, childcare provision for young and older children, and cultural attitudes regarding maternal employment with the motherhood penalty.

Work-Family Policies, Cultural Support for Maternal Employment, and Motherhood Wage Penalties

While the characteristics and choices of mothers explain some of their wage penalty, a significant portion of the wage penalty cannot be explained by individual-level factors (Budig and England 2001; Harkness and Waldfogel 2003). Scholars assume that family-work reconciliation policies broadly are positively related to outcomes such as wages, but have not analyzed how different policies are specifically associated with different outcomes. While recent cross-national

[2] We cannot measure of employer discrimination, but country-level variation in discrimination may be affected by the policy measures.

work examines the effects of motherhood on earnings (Gornick and Meyers 2003; Harkness and Waldfogel 2003; Misra et al. 2007a), virtually no research measures the impact of specific social policies on the motherhood penalty.[3] Cross-national research that quantifies policy effects examines gender wage inequalities, but not inequality by motherhood status (Mandel and Semyonov 2005).

What policies may influence the motherhood wage penalty? Following previous research, we identify at least three factors that may influence mothers' (and fathers') abilities to combine work and care: (1) maternity, paternity, and parental care leave policies, (2) childcare for very young and older children, and (3) cultural attitudes regarding the impact of maternal employment on children (Gornick and Meyers 2003; Gauthier and Bortnik 2001; Evans 2002; Pettit and Hook 2005; Morganand Zippel 2003; Jaumotte 2003). While many policies may affect parents' employment and wages, work-family reconciliation policies target the pressures families face in balancing care and employment. Indeed, these policies appear to be strongly associated with higher levels of women's employment (Gornick and Meyers 2003; Pettit and Hook 2005; Misra et al. 2007a) – though their associations with motherhood wage penalties have not been directly tested.

Previous research primarily uses generalized indices that group together leave, child-care policies and country level factors (Gornick and Meyers 2003; Mandel and Semyonov 2005). For example, Mandel and Semyonov's (2005) index of welfare policies (including maternity leave, public childcare coverage, and public sector employment) decreases gender wage gaps across countries, when not controlling for cross-country differences in the wage structure. Yet additional analyses show that, measured separately, maternity leave increases the gender wage gap. Although Mandel and Semyonov claim that the index "represents a composite phenomenon with

[3] Waldfogel (1998b) found women covered by and using maternity leave in Britain and the U.S. received a wage premium.

consequences that go beyond the unique effects of each of its components" (2005, p. 964), we argue that combining them into one index obscures important differences. We examine how specific work-family reconciliation policies mediate the wage penalty to motherhood.

Leave policies, (i.e., maternity, paternity, and parental leave[4]), are meant to support caregiving, while allowing parents to stay connected to employment. Depending upon the length of leave, leave policies may have varying associations with the wage penalty. For example, long parental care leaves could decrease women's employment continuity and earnings (Morgan and Zippel 2003; Pettit and Hook 2005), while ensuring that women remain "on the hook" for care (Bergmann 1998, 2001). The absence of leave policies may also increase the motherhood penalty by forcing women to exit the workforce during the child's first year of life. At the same time, moderate leaves may help mothers maintain labor force attachment. Indeed, studies show curvilinear effects of leave length on women's employment outcomes and poverty (Pettit and Hook 2005; Kenworthy forthcoming; Evertsson and Duvander 2006; Misra et al. 2007b).

Hypothesis 1: No and extremely short leaves should be linked to higher motherhood wage penalties. Moderate parental leaves should decrease the motherhood penalty by allowing women to maintain employment after giving birth. In contrast, very long leaves (e.g., one to three years) should increase the wage penalties to mothers, insofar as long leaves reduce mothers' labor force attachment. We measure women's leaves in terms of the maximum number of weeks of a) paid maternity leave, b) extended job-protected parental care leave and c) combining maternity leave with child care leave and include a squared term for leave to model curvilinear effects.

[4] Maternity and paternity leave refer to birth-related leave often accompanied by earnings-related benefits, while parental leave stands for longer leave to enable parents to care for young children in the home.

Leave policies targeted at men may also increase mothers' employment and earnings. For example, paternity leave policies for fathers could strengthen women's employment continuity and earnings by providing incentives for men to engage in care (Gornick and Meyers 2003; Gornick 2004). This work leads us to predictions regarding the effects of leave:

Hypothesis 2: Weeks of paid paternity leave may decrease the motherhood penalty to the extent men establish care-providing relationships with newborns and alleviate some carework for mothers.

Childcare policies might impact mothers' earnings. While childcare programs were adopted both to support parents' employment and to provide education, these programs – particularly those for children under 3 – are explicitly recognized as helping families balancing care and employment (Kamerman and Kahn 1991; Gornick and Meyers 2003). Indeed, childcare costs have strong effects on women's employment; Han and Waldfogel (2002) argue that in the U.S., reducing childcare costs could substantially raise employment of both married and single mothers. Since government-funding and subsidies tend to reduce the cost of childcare to parents, we focus on public, rather than market-based childcare. Cross-nationally, Pettit and Hook (2005), show that high levels of childcare positively affect women's labor market participation. This leads us to predict:

Hypothesis 3: The proportion of children enrolled in government-provided or -subsidized childcare should be inversely related to the motherhood wage penalty by allowing women the opportunity to engage in paid employment (McDonald 2000). We use separate measures for policies that apply to infants (< age 3) and those that apply to preschoolers (aged 3 to 6).

Of course, cross-national differences may result from multiple factors, including cultural differences shaping women's preferences, the levels at which mothers are engaged in national workforces, and overall earnings inequality.

Cultural Attitudes. Country differences in cultural norms regarding mothers' paid employment, particularly when children are young, may be linked to the motherhood penalty. While social policies may result, or cause, changes in cultural norms around mothers' engagement in employment, it is likely that policies and cultural norms are not completely in synch. Pfau-Effinger (2004) considers how temporal change in cultural traditions interact with social institutions – including the welfare state, labor market, and family – to shape women's employment and changes in women's employment. Thus, while policies may be enacted to support mothers' employment or reduce discrimination against mothers by employers (gender order) if these are not in synch with the gender culture, we may see wage penalties persist in the face of generous policies. This leads us to predict:

Hypothesis 4a: In countries where social values support maternal employment, motherhood wage penalties should be smaller. We use separate measures of level of support for maternal full-time employment when children are preschool aged versus school aged.

Hypothesis4b: Where maternal employment is viewed as harmful to children, we should expect to see greater wage penalties to motherhood. We use an indicator of level of agreement that preschool children are harmed if mothers work.

Data and Measures

Our study uses data from multiple sources. Individual-level data files come from the Luxembourg Income Study (LIS). The LIS is an excellent source of secondary cross-national survey data on households, employment, and earnings. With a few exceptions analyses use Wave

5 (representing the years 2000/2001)[5] of the LIS data for 22 countries. For all countries, the sample is restricted to employed adult women, age 25 to 45 (prime years for childrearing), who are not self-employed and are not in the military.[6]

Our dependent variable is the natural log of annual earnings in 2000 U.S. constant dollars[7]. Differences in the motherhood penalty in earnings across countries could be due to differential selection of mothers into employment across countries. To examine whether this differential selection alters the effects of policies on the motherhood penalty, we check for the robustness of effects with the inclusion of a country-level measure of mothers' employment probabilities, described below.[8]

Our primary independent variable assesses the motherhood wage penalty with number of dependent children in the home. We tested an alternate specification of motherhood with number of child dummy variables and found the effects to be monotonic. Individual-level independent variables include family composition, human capital and labor supply, and job characteristics. Family characteristics include, in addition to number of children, relationship status (married or cohabiting=1, otherwise=0). Human capital measures include educational attainment measured with a dummy variable=1 to indicate post-secondary education or higher occupational training

[5] We use wave IV data for the Czech Republic and the Slovak Republic and wave VI data for Poland because Wave V data is not available or is of poorer quality.
[6] Due to data limitations, only mothers with children living in their household can be identified. This likely leads to underestimation of the penalty because mothers whose children have left the home could still suffer from reduced earnings, but would be coded as childless women in our sample.
[7] We use average annual exchange rates to convert national currencies into US dollars, all individual earnings are adjusted to represent the value in the year 2000. We also ran models using earnings in national currencies. Coefficients are only minimally affected by the conversion. Since the conversion into US Dollars reduces the spread of the earnings distributions, the standard errors tend to be smaller in the models using logged 2000 US Dollars.
[8] In future analyses, we intend to incorporate a Heckman sample selection correction estimation procedure where we include a measure for high educational attainment (post-secondary education or occupational training leading to certification), transfer income, other household wage income (household wages minus the respondent's wages), and presence of a preschooler as selection criteria. Due to current software constraints on the LIS server, we are unable to estimate this model.

leading to credentials. We use respondent's age as a proxy for labor market experience.[9] We include a dummy for part-time work, defined as those working less than 30 hours weekly. Job characteristics measures include a dummy variable =1 if the respondent holds a professional or managerial occupation. We also include a measure of occupational segregation, i.e. the percent of each occupation that is female, coded at the finest level of occupational detailed category provided for each country.

Our country-level social policy database is modeled after those developed by Gornick and Meyers (2003), Gornick, Meyers, and Ross (1997), Gauthier and Bortnik (2001), and Jaumotte (2003). Our database includes multiple time points for 22 countries: Australia, Austria, Belgium, Canada, Czech Republic, Finland, France, East Germany[10], West Germany, Hungary, Ireland, Israel, Italy, Luxembourg, Netherlands, Poland, Russia, the Slovak Republic, Spain, Sweden, the United Kingdom, and the United States[11]. We match our policies measures to the LIS survey year for each country, lagging the measurement of leave policies to two years prior to the survey year.[12] Childcare policy includes the percentage of children age 0-2 and the percentage of children age 3-5 in publicly funded care. For leaves, our measures distinguish between highly paid maternity and paternity leaves and generally low-paid or unpaid job-protected parental care leaves that begin after maternity leave is exhausted. We only include statutory, job protected leave provisions that can be taken full-time.[13]

[9] While not an ideal measure of experience, this is commonly used when actual work experience is lacking (see Filer 1993; Stewart 2000).
[10] We examine former East and West Germany separately, due to the persistent differences in employment patterns and different policy legacies (Rosenfeld, Trappe, and Gornick 2004).
[11] We also have policy data for Switzerland, but have found the LIS data for Switzerland to be too problematic to be used for our analyses
[12] Of course, it is likely that the lagged effect is longer, especially given our measurement of motherhood. Without longitudinal individual-level data, however, we believe that this is the best approach to take.
[13] In federally organized states, we measure leave policies at the federal level. More detailed information about the policy measures are available from the authors.

We also use several measures from the second and third "Family and Changing Gender Roles" modules (1994 and 2002) of the International Social Survey Program (ISSP).[14] We match ISSP items from the survey year closest to the LIS survey year.[15] Specifically, we use items measuring cultural attitudes towards mothers' full-time employment when the youngest child in the family pre-school aged, and if school-aged, and the degree to which young children are thought to suffer if mothers engage in paid employment.[16]

Finally, we use a set of country-level control variables to conduct a robustness analysis of our policy models. Drawing from earlier research (Misra, Budig, and Boeckmann 2009), we include the predicted probabilities of maternal employment. These probabilities are estimated in separate logistic regression models controlling for age, education, other household income, and other household income squared predicting employment. Second, we include a measure of the proportion of workers in a country that are located in the public sector. Public sector employment is more likely to enforce work-family policies that could reduce the motherhood penalty (Nielsen et al. 2004). Finally, we include the Gini coefficient, drawn from the LIS key figures. It may be that countries with larger motherhood wage penalties simply have greater overall income disparities, similar to the impact of income inequality on gender gaps in wages (Blau and Kahn 1992, 1996, 2003; Mandel and Semyonov 2005).

Methodology

Hierarchical Linear Modeling (HLM) enables direct tests of the relationships between societal-level factors and individual-level effects while simultaneously modeling individual and

[14] These data are available through the Leibniz Institute for the Social Sciences: http://www.gesis.org/en/services/data/survey-data/issp/modules-study-overview/family-changing-gender-roles/2002/.
[15] For Italy and Canada, only 1994 ISSP data was available.
[16] The wording of the items used are: a) "A pre-school child is likely to suffer if his or her mother works." (respondents were asked to answer using a 5-point likert scale, including "strongly disagree, disagree, neither disagree nor agree, agree, and strongly disagree."); b) Do you think that women should work outside the home full-time, part-time or not at all under these circumstances: When there is a child under school age; c) After the youngest child starts school.

contextual controls (Bryk and Raudenbush 1992; DiPrete and Forristal 1994). HLM (also called multilevel random-effects models) is the best method for our multilevel, nested data. Recent research demonstrates the HLM produces stable coefficients with fewer than 15 macro cases (Quillian 1995; Raudenbush and Liu 2000), and HLM has been used with the LIS data to examine the effects of welfare policies on the gender gap in earnings for 14 to 20 countries (Mandel and Semyonov 2005) and the effects of family policies on women's employment for 19 countries (Pettit and Hook 2005). As opposed to single-level models that attempt to measure contextual effects, HLM provides standard errors that correct heteroskedastic errors, caused by clustered individual observations within countries. While multi-level models estimate the impact of country-level and individual-level factors simultaneously (see combined model (3) below), one could conceptualize the HLM model as a series of separate regression models that estimate the motherhood penalty for each of the 22 countries, and then treats the coefficients from each country as the dependent variable in a country-level regression equation. The individual-level (1) and country-level equations (2) can be written as follows:

$$\text{Earnings}_{ij} = \beta_{0j} + \beta_{1j}\text{NUMKID} + \beta_{2j}X_{ij} + r_{ij} \quad (1)$$

$$\beta_{0j} = \gamma_{00} + \gamma_{01}Z_j + u_{0j} \quad (2)$$
$$\beta_{1j} = \gamma_{10} + \gamma_{11}Z_j + u_{1j}$$
$$\beta_{2j} = \gamma_{20}$$

where i indexes individual women and j indexes country. Earnings_{ij} represents individual earnings i in country j. β_{0j} is the intercept, denoting mean earnings. Number of children, and its coefficient $\beta_{1j,}$ estimates the average per-child motherhood penalty. X_{ij} is the vector of other individual measures (marital status, human capital, job characteristics, etc.) and β_{2j} is the vector of their coefficients. r_{ij} is the individual-level error term. In the country-level equations (2), the coefficients from equation (1) become the dependent variables. The γ coefficients represent

country-level coefficients, Z_j the vector of country-level measures (policy and cultural) and u_j the country-level residuals. Note that only the equations for the intercept β_{0j} and β_{1j} of the number of children have an error term. The rest of the level-1 covariates are entered as fixed effects, assuming that the direction of their effect is the same across all countries. Since the aim of this analysis is to examine the impact of policy and cultural measures Z_j on the number-of-children-slope β_{1j}, level-2 measures are only entered into the equation for the intercept and the slope.
If we substitute the level-1 coefficients with the level-2 equation, we arrive at a combined model which reads as follows:

$$Earnings_{ij}=\gamma_{00}+\gamma_{10}*NUMKID+\boxed{\gamma_{11}Z_j*NUMKID}+\gamma_{01}Z_j+\gamma_{20}X_{ij}+u_{0j}+u_{1j}*NUMKID+r_{ij} \quad (3)$$

In our analysis we focus on the cross-level interaction $\gamma_{11}Z_j$*NUMKID, indicating the effect of social policies and country-level control variable on the number-of-children-slope, i.e. the per-child motherhood penalty.

Prior to estimating the full model with controls, we will estimate an intercept-only model. By initially running the intercept-only model, which allows us to estimate the interclass correlation, we can estimate the variance components, which decompose the variance in the dependent variable into the within-context variance (individual-level) and between-context variance (country-level), to examine two sources of variation for the micro-level outcome.

Potential Limitations

We recognize that our proposed models do not fully address issues of endogeneity. Endogeneity may occur, for example, if women who are more likely to have low earnings are more likely to have children, therein reversing the causal order of the logic of the wage penalty. Establishing causal order is difficult with cross-sectional data. A future strategy we will use is to estimate propensity scores for the differential selection processes and use those scores in the HLM

analysis. This approach is widely used in HLM (Hong and Raudenbush 2005; Rosenbaum and Rudin 1983 and 1984; Rubin 1997). In our example here, we would use measures of human capital, labor supply, and other family income to apply the selection correction. However, to the extent the data contain imperfect measures of human capital and other factors, our contribution will center on describing the extent of wage penalties across nations and how policies are associated with these penalties, rather than on making causal claims. Such a contribution marks a substantial advance on current research in this area.

Despite the individual-level control variables included in our models, unobserved heterogeneity among women and between countries may constrain our ability to fully explain variation in the motherhood wage penalty and the full effects of policies on this penalty (but see Waldfogel 1998b showing that controlling for unobserved heterogeneity does not lower the motherhood penalty in a cross-national study). For example, differences in women's preferences regarding employment and motherhood are unobserved in our data. Cross-sectional data prevents us from controlling for stable unmeasured heterogeneity through statistical models and this is a limitation of our data. However, it is reasonable to think that family policies, in addition to directly impacting the motherhood penalty, may also alter the socio-political norms regarding employment among mothers, which, in turn, may change women's own preferences and thereby affect the motherhood penalty. Hook (2006) makes a similar argument about the impact of social policies influencing normative gendered behaviors. Similarly, policy contexts may impact employers' preferences for hiring and evaluating the work performance of mothers. To the extent policies change preferences, this kind of unobserved heterogeneity would be difficult to capture even with longitudinal data in the absence of measures of preferences. Despite these limitations, our study

will advance the state of knowledge of family policy effects as well as potentially lead us closer to designing future studies to address causality.

Findings

Country-level and Individual-level Characteristics

Our first table presents data from our policy database, our cultural measures, and our country-level control variables. We find great variation in the percentage of children under 3 who are enrolled in publicly funded childcare, from than 5 percent in the British Isles, Poland, the Czech Republic, Austria, and Luxembourg to more than one-third of children aged 0 to 2 years are in publicly funded care in Israel, the former East Germany, and Sweden. There is also variation in the proportion of children aged 3 to 6 in publicly funded care (or schooling), though with the exception of Australia, in all countries at least one-half of children in this age bracket are in such care. Indeed, in West Germany, the Netherlands, Belgium, and Italy, this proportion tops 95 percent. Birth-related maternity leave ranges from no leave at all in the United States and Australia to 28 weeks in the Czech Republic and Slovak Republic (in the early 1990's when we measure income for the latter two countries). Looking at the maximum job-protected leave available to women, we see a very large range, from zero weeks of leave in Ireland, the Netherlands, and the UK, to more than 2 and ½ years in East/West Germany, Spain, and France. We find little variation in the number of weeks of paid paternity leave: most countries have zero weeks, but Israel, Finland, and Sweden offer 2 to 6 weeks.

While paternity leave is a policy, the weeks actually funded are too low (with the exception of 6 weeks in Israel, which is perhaps enough time to bond with a newborn and/or establish intra-family norms around father care) to significantly alter fathers' pre-dispositions

toward child care responsibilities. Thus, paternity leave may be less a signal of policy intervention, and more a signal of cultural valuation regarding the importance of father-care.

Our explicit cultural measures tapping norms around maternal employment are also presented. Less than 5 percent of respondents approve of full-time employment for mothers of preschoolers in the former West Germany, the UK, Australia, and Austria. In contrast, more than one-quarter of respondents approve such employment of mothers of young children in Israel. In regard for support of maternal employment when children are school aged, these proportions are low (under 20 percent) in Austria, Australia, France, and Italy, and relatively high (over 40 percent) in Canada, the US, Israel, and Spain. Finally, we examine the percentage of people agreeing that preschool children suffer when mothers work. The majority of people agreed with this statement in Italy, Hungary, Austria, Poland and France, while Sweden and Finland were the outliers on the lower end of levels of agreement (under 30 percent).

----------TABLE 1 ABOUT HERE----------

Turning to country level control variables, we find that net of human capital and other personal characteristics, mothers are far less likely to be in the labor market in Italy, Spain, West Germany, the UK, Ireland, and Australia. If the mothers more likely to earn lower wages are not in the labor markets in these countries, we might find lower wage penalties. Conversely, we find higher net likelihoods of employment in Russia, Sweden, Belgium, Poland, and the United States. Finally, table 1 also presents public sector size and the Gini coefficient as an indicator of income inequality. The distributions on these factors are well documented. We also present descriptive statistics for our individual measures in each country with Table 2, which shows the weighted means and standard deviations for all level 1 variables.

The Wage Penalty to Motherhood

We begin our series of nested multi-level models with a model that estimates the intercept only, results shown in model 1 of table 3. The average earnings across all countries is 8.925 in the natural log of 2000 US dollars. We can divide the variance components from this model into that due to within-country variation (Sigma-squared = .780) and between-country variation (tau=.941) and calculate the intra-class correlation (ICC), which is .941/ (.780+.941) = .55. This indicates that 55 percent of the variation in women's earnings is due to variation between countries, while 45 percent is due to within-country variation. However, this variation is that in all women's earnings, and not the variation in the motherhood penalty in earnings.

Model 2 adds simply the number of children in the household to the model. We find that the unadjusted average child effect across countries is a statistically significant and is about -15.8 percent per child. Model 3 adds marital status and human capital characteristics, which reduce the average per child penalty by almost 50 percent, from -.158 to -.084, but the penalty remains significant. Our fourth model adds job characteristics, and consistent with past findings (Budig and England 2001), we observe adding these characteristics does not explain the child penalty, nor is the model fit improved. Because we believe job characteristics are endogenous to the wage equation, our next series of models that estimate policy effects use only human capital and family structure controls.

----------TABLE 3 ABOUT HERE----------

The fifth model in the table presents the cross-level interactive effect between the percentage of children aged 0 to 2 years who are in publicly funded child care slots and the per child penalty. We hypothesized that the availability of state-provided childcare might impact mothers' earnings. Programs for children under three have been explicitly designed to help families balancing care and employment, while programs for children three to six are more likely to be seen

as educational programming in addition to supporting working parents (Kamerman and Kahn 1991; Gornick and Meyers 2003).[17] We expected that state-provided or -subsidized childcare should decrease the wage penalty by allowing women the opportunity to engage in paid employment (McDonald 2000). The main effect for number of children is -.104, indicating that in a country with no children aged 0 to 2 years in publicly funded child care, the per child penalty is roughly -10.4%. The significant interaction between infant child care and number of children is positive, equaling .002. This indicates that for each additional percentage of infants in publicly funded care, the per child wage penalty declines by .002 log points.

To show the impact of this interacted effect more clearly, figure 2 presents the per child effect on wages across the observed cross-national distribution of the percentage of infants in publicly funded care. We see that increases in childcare for infants are associated with smaller penalties, reducing the per child penalty from roughly -10 percent in countries with no such care to roughly -4 percent in countries with 40 percent of infants in publicly subsidized care. We do not extrapolate outside of our observed values: Israel, the country with the highest percentage of infants in publicly funded care, has 41 percent of infants in public care. We did not find a similar significant interaction between the percentage of children aged 3 to 6 years and the motherhood penalty; for simplicity's sake, we do not present the non-significant findings. In summary, our first hypothesis is partially supported: greater levels of childcare for very young children are linked to smaller motherhood wage penalties, though we see no significant associations between publicly funded childcare for older children and the wage penalty.

[17] In addition, programs for 3-6 year olds vary remarkably in the number of hours children are in care, as well as the number of days each year that care is provided. With a stronger measure, for example including the number of hours of care each year for 3-6 year olds, we might expect to find stronger effects. Indeed, Jane Lewis (2009) does present % of kids in care (public or private) for 30 or more hours a week, but only for Austria, Belgium, Finland, France, Germany, Ireland, Italy, Luxembourg, Netherlands, Spain, Sweden, UK, USA. We are working on finding sources for this measure in additional countries.

----------Figure 2 about here----------

Turning to the impact of family leave, we first consider leaves available to women: maternity leave and job-protected (but not necessarily paid) parental care leaves. In results not shown, we examined the effect of number of weeks of paid maternity leave alone on the per child wage penalty, and found no significant interactions. This may be because paid maternity leaves tend to be fairly short and, with the exception of the US and Australia, ubiquitous across countries. The truncated range and lack of variation across countries may have rendered the effect non-significant. However, when we use the number of weeks of extended job-protected child care leave, or combined maternity leaves with extended job-protected childcare leaves, we find significant effects.

The sixth model in table 3 presents the impact of the maximum number of weeks women's job protected parental leave (and its squared term) on the wage penalty for motherhood. (Findings for the combination of maternity plus parental care leaves are equivalent to the results presented for parental care leaves alone). Parental care leave may or may not be associated with monetary transfers to families, depending upon the country. Here, the main effect of number of children is significant and indicates that in countries with zero weeks of job protected leave, the per child penalty is roughly -12 percent. The cross-level statistical interactions between the child penalty and weeks of leave is significant and positive, while the cross-level interaction between the child penalty and the squared leave term is negative. This indicates a curvilinear relationship, which is best viewed graphically in figure 3. Again, this figure shows how the effect of children on earnings varies by the number of weeks of leave offered to women. The curvilinear pattern is dramatic and shows that countries with zero to 20 weeks of job protected care leave have larger motherhood penalties, as do countries with extremely long leaves, exceeding 120 weeks per year. The per child

wage penalty is smallest (just over -4 percent per child) in countries with 72 to 74 weeks of job protected leave (just under 15 months of leave).

----------Figure 3 about here ----------

In summary, for women we find our second hypothesis supported for extended care leaves, care leaves in combination with maternity leaves, but not for paid maternity leaves alone. No or very minimal extended care leaves are linked to higher motherhood penalties, perhaps because these leaves do not offer significant job protections to mothers who wish to care for newborns beyond the first few months of life. Moreover, countries that allow for very long leaves of absence (from 18 months to over 2 and ½ years) are also associated with high motherhood penalties, perhaps due to lost human capital or employer discrimination against long-absent workers. However, countries that allow for a year or so of job-protected leave are associated with the smallest per child penalties – that are roughly 67 percent smaller on average, perhaps because this leave length strikes the best balance between mothers' desires to care for newborns and their desires to return to employment.

We next considered the impact of men's leave availability on the motherhood wage penalty by looking at weeks of paid paternity leave. The seventh column of table 3 shows the cross-level interactive effect between number of children and the length of paternity leave. Here we find that the average per child effect in countries offering no paid leave to fathers is about 9.3 percent per child. The significant interaction is positive, however, and shows that for each additional week of paternity leave, the per child penalty declines by about 1.6 percentage points. Again, to illustrate this interaction, Figure 4 presents the per child effect across the observed range of paid paternity leave weeks for men cross-nationally.

----------Figure 4 about here----------

While the graph makes it appear that six weeks of paid paternity leave might eradicate motherhood wage penalties, we urge strong caution against interpreting this effect in such a manner. The distribution of countries on this variable is highly skewed, as we saw in table 1. The vast majority of countries offer no paid paternity leave to men, and several of those that do offer only a few days. As we suggested above, with such little time offered to fathers, it is unlikely that this paternity leave alters any traditional gender distribution of care work in heterosexual couples. Israel, with its six weeks of leave for new fathers, may be the exception in this regard, but we think it more likely that the presence of paid paternity leave may signal cultural differences in the valuation of father involvement with children. Indeed, Israel, Sweden and Finland are known for their multiple policies aimed at gender egalitarianism, and paternity leave may be a signal of a broader regime of equalizing the sexes. In addition to paternity leave, we also examined the cross-level effects of job-protected parental care leave for men (often unpaid) and the motherhood penalty. We found no significant interactions, this may result from the fact that men's take-up of un- or low-paid leave for childcare is very low, even when a portion of the leave cannot be transferred to the female partner[18]. In summary, we find some evidence to support our third hypothesis that care leaves for men should be associated with smaller motherhood penalties, though for the reasons discussed above, we are not wholly convinced by the evidence.

Turning to data on cultural norms regarding maternal employment, we focus on the last two columns of table 3. Because we did not have data on the cultural measures for Luxembourg, the eighth column of table 3 re-estimates the human capital model (found in the third column) excluding Luxembourg. Results are remarkably similar with the exclusion of Luxembourg. Given

[18] Sweden is the well-documented exception here where the so-called "daddy month" has increased fathers' take-up of parental leave, even though women still take the overwhelming majority of leave-days (Haas and Hwang 1995).

our strong findings for childcare, we examined cultural preferences for maternal employment when children are preschoolers and school aged. We expect that where social values supporting maternal employment are positive, motherhood wage penalties should be smaller. Where maternal employment is viewed as harmful to children, we should expect to see greater wage penalties to motherhood.

While we did not find significant effects between the percentage of respondents favoring maternal employment for mothers of older children and the per child wage penalty, we did find a significant interaction with norms around employment by mothers of preschool children.[19] The final column shows the cross-level interactive effect between number of children and the percentage of respondents in the ISSP who supported full-time work among mothers of preschool children. We find that in countries with hypothetically zero support for mothers of preschoolers to work full-time, the predicted per child wage penalty is about -11.4 percent. However, the significant and positive interaction between number of children and percent supporting maternal full-time employment for young mothers indicates cultural support is associated with smaller penalties. To illustrate, we graphically present variation in the per child effect across levels of support in figure 5.

----------FIGURE 5 ABOUT HERE----------

As figure 5 clearly shows, the largest wage penalties are associated with the least support and the smallest penalties with the greatest support for maternal employment when children are preschool-aged. In addition to these two measures, we also examined a third cultural indicator, the

[19] In an earlier paper that did not use a multilevel approach (Budig et al. 2009), when we examined the relationship between support for maternal employment of school-age children and wage penalties, controlling for low levels of women's employment, findings are stronger. Some countries (such as Italy), with very low levels of women's employment, also have limited wage penalties, suggesting the relatively few mothers remaining in the labor market are particularly strong. However, ideologies are strong in those countries, regarding the importance of maternal caregiving. While it is not possible to identify "which came first," it would seem that policies and culture reinforce one another, as does mothers' employment probabilities.

percentage of respondents who thought that maternal employment was harmful to children.[20] Again, we did not find any significant cross-level interaction with number of children. Thus, while the cultural indicators analysis offers some support for our fifth set of hypotheses, two indicators failed to show any associations.

Robustness of Cross-Level Interactions

We were concerned that other country-level characteristics might explain away the significant policy and cultural impacts on the motherhood wage penalty established in our multi-level models. We thus conducted a robustness analysis of our significant interactions to examine whether the associations between policies and the child penalties might be due to country-level differences in the adjusted probabilities of maternal labor force participation, the size of the public sector, and the level of within-country income inequality. Table 4 presents the results from this series of analyses.

----------TABLE 4 ABOUT HERE----------

The four policy and cultural measures are presented in separate panels. The first column of table 4 replicates results from table 3 where human capital individual controls and the particular policy measure, plus an interaction between the policy measure and number of children, are included. Column two includes a measure of maternal employment probabilities in each country. These employment probabilities were calculated in each country controlling for age, education, other household income, and other household income squared predicting employment. Controlling for maternal employment probabilities tests whether differential selection and engagement in the labor force by mothers across countries can render our policy and cultural effects on the motherhood wage penalty spurious. The third column controls for the size of the public sector in

[20] As in note 18, we found that this relationship was stronger, when we controlled for countries with low levels of women's employment (Budig et al. 2009).

each country, which is associated both with maternal employment and the likelihood of enforcement of family policies. Finally, the fifth column controls for the Gini coefficient to examine whether country-level income inequality can explain variation in the motherhood wage penalty and the effects of policies on this penalty. In each model, the country-level control is included as a main effect, and, where significant, as an interaction with number of children. Non-significant interactions were excluded from the models.

Looking first at the effect of childcare for 0 to 2 year olds on the motherhood penalty we find that neither maternal employment probabilities nor size of the public sector altered a) the effect of children on earnings or b) the interactive effect between childcare and number of children. Neither measure significantly interacted with number of children, moreover the relationship between the policy and number of children was robust to the additive effects of the control variables. In contrast, the Gini coefficient did have a significant interaction with number of children, showing that countries with greater income inequalities have smaller motherhood wage penalties, a surprising finding. This is very interesting, particularly given the important impact of income inequality on gender gaps in wages (Blau and Kahn 1992, 1996, 2003; Mandel and Semyonov 2005), and suggests that motherhood penalties cannot be explained or easily attributed to larger economic pressures leading to wage inequalities.[21] But more importantly, even with this significant interaction between the Gini coefficient and number of children, the interaction between childcare and number of children is unaffected and remains significant.

[21] We were concerned that the high inequality of evidenced in Eastern Europe might be driving the association between the Gini coefficient with number of children. In results not shown, we tried including a dummy variable for eastern European countries and interacting this dummy with number of children in addition to childcare and Gini coefficient main effects and interactions with number of children. We also tried re-estimating the model excluding the five Eastern European countries. The results of these two alternate specifications revealed that the significant interaction between the Gini coefficient and number of children is robust, and not due to the high inequality in Eastern European countries. Moreover, the cross-level interaction between the childcare policy measure and number of children remained robust across these specifications.

In robustness checks for the next three measures (women's care leave, paternity leave, and cultural attitudes), the none of the control variables (employment probabilities, public sector, and the Gini coefficient) significantly interacted with number of children. Moreover, the impact of number of children on earnings, and the interactions between number of children and the policy/cultural measures were unaffected by the inclusion of the country-level control variables. We thus conclude that our policy and cultural measure findings are robust to the inclusion of these country-level controls.

Discussion and Conclusions

Our analysis endeavored to accomplish several goals. First, in contrast to past research that used welfare state typologies and/or welfare policy indices to theorize and investigate the impacts of family policies on women's economic outcomes, we examined the relationship between particular policies and the wage penalties for motherhood cross-nationally. We argued that past findings of inconsistent effects of policies on women's, and mothers', economic outcomes might result from the conflation of contradictory policy effects. Our analysis shows that two widely studied policies, leave and childcare, clearly have countervailing effects. The increased prevalence of publicly funded childcare for children under the age of three is significantly associated with smaller per child wage penalties. We find this effect despite the varying socio-economic policy contexts of the twenty-two nations in our analysis. In contrast, the effects of leave are not at all uniform. Both the absence of childcare leaves for women, and very long leaves, serve to increase the negative effects of motherhood on earnings, while moderate job-protected leaves are associated with smaller motherhood penalties. While maternity leaves were not significantly associated with motherhood penalties, paternity leaves were: longer paternity leaves are linked to smaller motherhood penalties.

Secondly, given the potential disharmonies between family policies and cultural norms regarding maternal employment, we investigated the relationship between support for maternal employment and the motherhood wage penalty. Our evidence indicates that cultural support matters, particularly support for maternal employment when children are very young. Moreover, we argue that our findings regarding paternity leaves, given the relative absence of these leaves cross-nationally and their short duration, is better interpreted from a cultural standpoint. We argue that the presence of these leaves is best viewed as a cultural indicator of the value of father-care and gender equity in the nations that have them (Sweden, Finland, and Israel).

Our third goal was to correctly model the multi-level effects of individual-level factors and country-level indicators. We wanted to break with the tradition of using welfare-state typologies and associating ideal-types with women's economic outcomes. While this approach has advanced understandings of welfare states and gender inequities significantly, it cannot disentangle contexts particular to specific countries from their policy effects. Our approach reveals that despite significant differences in socio-economic and political settings, some family-policy effects are robust across these differences. For policymakers contemplating which policies might be most effective at reducing pay inequities, the answer is clear: policies that serve to keep women attached to the labor market, through moderate length leaves and publicly funded childcare, as well as cultural support for the employment of mothers of young children, appear most effective at reducing the motherhood wage penalty. However, it is also possible that policies may combine to produce differential effects. Previous research (Misra, Moller, Budig 2007b) suggests that, for example, when we control for the effects of one policy, we may find stronger (or weaker) effects of another policy. We have conducted preliminary models examining culture and policy combinations using the measures in this paper. Initial findings

show women's parental care leave effects are robust to the inclusion of other policy and cultural measures. We intend to expand this analysis in our next revision of this paper. Such an approach may provide clearer answers about the associations between particular policies and wage penalties.

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Figure 1. Factors Impacting the Wage Penalty for Motherhood, Two-Level Model

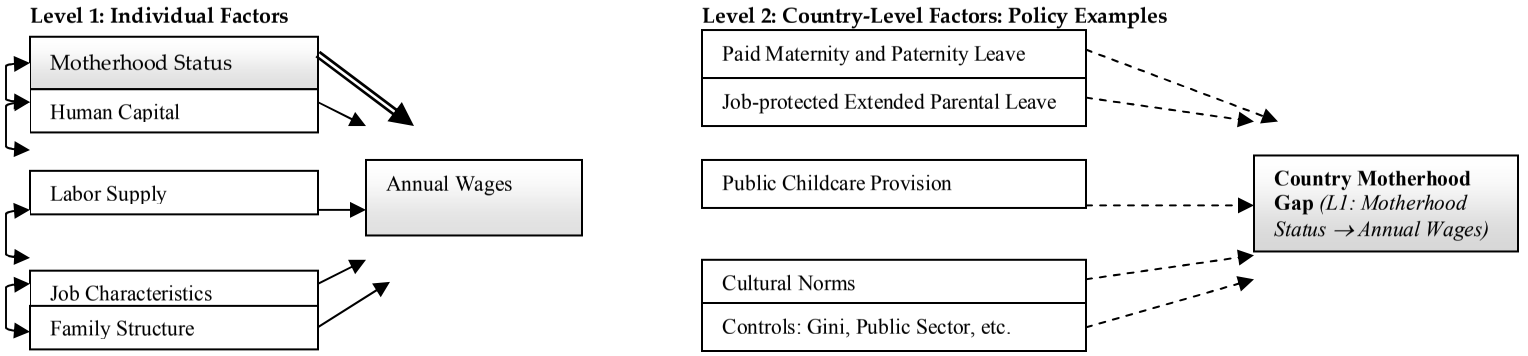


Table 1. Country-level Measures

	% 0-2 year olds public-funded care[1]	% 3-6 year olds public-funded care[1]	#Weeks matern-ity leave[1]	Women Max. # weeks parental leave[1]	# Weeks Patern-ity leave[1]	% support maternal full-time emp. preschool child[2]	% support maternal full-time emp. schoolage child[2]	% agreeing pre-schoolers suffer if mother works[2]	Maternal Employ. Probab.[3]	Gini coefficient[4]	Size of Public Sector[5]
Australia	5	40	0	52	0	3.50	18.04	38.81	.610	.317	.164
Austria	4	79	16	69	0	4.28	10.98	58.35	.766	.257	.274
Belgium	30	97	15	13	0.6	16.65	31.13	34.82	.762	.279	.312
Canada	5	53	15	10	0	18.84	50.48	31.32	.727	.315	.190
Czech Rep.	1	77	28	127	0	6.39	22.59	46.21	.752	.259	.222
Germany E	34	66	14	147	0	16.92	38.31	32.92	.775	.231	.232
Germany W	10	99	14	147	0	3.36	31.28	37.68	.652	.280	.220
Finland	22	89	17.5	26	2	18.63	36.00	28.04	.626	.246	.273
France	29	60	16	143	0.6	11.90	9.55	50.26	.690	.278	.295
Hungary	10	86	24	83	0	6.53	31.23	63.67	.630	.292	.367
Ireland	3	56	14	0	0	11.81	27.59	32.74	.611	.313	.180
Israel	41	75	12	43	6	27.33	41.46	42.33	.593	.346	.170
Italy	6	95	21.5	26	0	5.10	17.14	66.74	.514	.333	.155
Luxembourg	3	58	16	26	0.4	NA	NA	NA	.729	.260	.111
Netherlands	6	98	16	0	0.4	17.75	31.04	36.65	.762	.231	.253
Poland	2	51	18	103	0	21.17	47.89	51.97	.699	.507	.291
Russia	21	64.3	20	68	0	7.18	25.95	64.1	.829	.434	.379
Slovak Rep.	16	90	28	127	0	11.65	36.55	48.67	.746	.189	.435
Spain	5	84	16	139	0.4	20.99	40.69	46.8	.497	.336	.157
Sweden	33	72	12	77	2	16.44	38.05	20.15	.847	.252	.337
UK	2	77	18	0	0	4.92	20.00	34.19	.670	.347	.192
US	6	53	0	12	0	14.43	42.96	35.64	.734	.368	.158

Sources:

[1] UMass Policy Database

[2] International Social Survey Programme, Family and Changing Gender Roles Modules 1994 and 2002

[3] authors' calculations based on LIS data: predicted probabilities of maternal employment controlling for age, education, partnered status, other household income, and other household income squared

[4] Luxembourg Income Study, Key Figures

[5] International Labor Organization and authors' calculations based on LIS data

Table 2. Weighted Means and Standard Deviations for Individual-Level Variables

	N (aged 25-45)	Logged Annual Earn.	Number of Child.	Married / Cohab.	Age	Part-time Worker	Higher Educ.	Profess. or Manag.	% Women in Occ.
Austria	2,267	9.127	1.137	.759	35.242	.310	.179	.101	.573
		(.744)	(.971)	(.428)	(6.008)	(.463)	(.383)	(.302)	(.156)
Australia	728	9.547	1.237	.775	35.010	.348	.245	.279	.577
		(.690)	(1.147)	(.418)	(5.657)	(.477)	(.430)	(.449)	(.189)
Belgium	918	9.459	1.463	.793	35.719	.257	.489	.235	.592
		(.912)	(1.133)	(.405)	(5.768)	(.437)	(.500)	(.424)	(.162)
Canada	9,435	9.438	1.311	.760	35.849	.207	.218	.199	.626
		(1.105)	(1.128)	(.427)	(5.898)	(.405)	(.413)	(.400)	(.217)
Czech Rep.	8,832	8.109	1.623	.843	36.734	.043	.104	.087	.623
		(.579)	(.883)	(.364)	(5.735)	(.203)	(.305)	(.282)	(.195)
Finland	2,935	9.410	1.267	.774	35.509	.085	.221	.236	.675
		(1.005)	(1.178)	(.418)	(6.022)	(.280)	(.415)	(.424)	(.203)
France	3,462	9.146	1.349	.775	35.415	.218	.211	.218	.679
		(.846)	(1.060)	(.418)	(5.969)	(.413)	(.408)	(.413)	(.224)
E. Germany	864	9.396	1.165	.751	36.379	.177	.314	.137	.649
		(.952)	(.864)	(.432)	(5.645)	(.382)	(.464)	(.344)	(.209)
W. Germany	2,959	9.336	1.008	.740	35.749	.344	.202	.122	.639
		(1.079)	(1.052)	(.439)	(5.723)	(.475)	(.401)	(.328)	(.211)
Hungary	505	7.342	1.543	.856	36.265	.078	.215	.199	.775
		(.940)	(.968)	(.352)	(5.702)	(.269)	(.412)	(.400)	(.222)
Ireland	794	9.398	1.536	.785	34.918	.333	.330	.227	.619
		(.881)	(1.319)	(.411)	(5.674)	(.472)	(.471)	(.419)	(.166)
Italy	2,299	9.145	1.202	.833	36.907	.251	.171	.145	.435
		(.560)	(.933)	(.374)	(5.301)	(.434)	(.377)	(.353)	(.135)
Israel	2,270	9.450	2.038	.837	35.106	.237	.457	.193	.573
		(.762)	(1.462)	(.369)	(5.943)	(.426)	(.498)	(.395)	(.166)
Luxembourg	947	9.553	1.022	.756	34.765	.289	.330	.175	.592
		(.900)	(1.027)	(.430)	(5.810)	(.454)	(.471)	(.380)	(.211)
Netherlands	1,897	9.531	1.180	.816	34.849	.498	.329	.327	.601
		(.904)	(1.117)	(.387)	(5.757)	(.500)	(.470)	(.469)	(.212)
Poland	10,932	8.027	1.482	.798	36.109	.077	.307	.243	.628
		(.569)	(1.061)	(.402)	(6.016)	(.267)	(.461)	(.429)	(.182)
Russia	1,050	6.012	1.381	.765	37.060	.064	.265	.272	.800
		(1.023)	(.862)	(.424)	(5.840)	(.245)	(.442)	(.445)	(.236)
Slovak Rep.	6,638	7.275	1.879	.863	36.322	.034	.123	.132	.642
		(.514)	(1.005)	(.344)	(5.528)	(.182)	(.328)	(.339)	(.194)
Spain	1,461	8.871	1.043	.870	34.341	.155	.308	.210	.562
		(.975)	(1.034)	(.337)	(5.687)	(.362)	(.462)	(.407)	(.148)
Sweden	3,910	9.408	1.380	.688	35.078	.280	.197	.103	.548
		(1.108)	(1.161)	(.463)	(5.912)	(.449)	(.398)	(.304)	(.145)
UK	8,144	9.669	1.234	.797	35.515	.359	.217	.219	.574
		(.930)	(1.132)	(.402)	(5.824)	(.480)	(.412)	(.413)	(.175)
US	15,826	9.870	1.384	.716	35.764	.148	.309	.348	.645
		(1.013)	(1.240)	(.451)	(5.913)	(.355)	(.462)	(.476)	(.238)

Table 3. Multi-Level Models Estimating the Effect of Family Policy Indicators on the Wage Penalty for Motherhood, Net of Individual-Level Controls

	(1) Int. Only	(2) Gross Pen.	(3) Hum. Cap.	(4) Job Char.	(5) HC + 0-2cc	(6) HC +W. Lv.	(7) HC+M. Lv.	(8) HC	(9) HC +Cult.
								w/o Luxembourg	
Intercept	**8.926**	**9.139**	**8.593**	8.581	**8.632**	**9.692**	**8.537**	**8.564**	**8.302**
	(0.207)	(0.217)	(0.224)	(0.224)	(0.337)	(0.382)	(0.246)	(0.232)	(0.496)
Fixed Effects									
Effect of Individual-Level Measures									
Number of Children		**-0.158**	**-0.084**	**-0.086**	**-0.104**	**-0.119**	**-0.093**	**-0.081**	**-0.114**
		(0.021)	(0.011)	(0.011)	(0.015)	(0.019)	(0.011)	(0.011)	(0.022)
Cohab/Married			-0.006	-0.007	-0.006	-0.006	-0.006	-0.005	-0.005
			(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)
Age			**0.017**	**0.017**	**0.017**	**0.017**	**0.017**	**0.017**	**0.017**
			(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.001)
Part-time Worker			**-0.822**	**-0.797**	**-0.822**	**-0.822**	**-0.822**	**-0.821**	**-0.820**
			(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)
University Degree			**0.481**	**0.306**	**0.481**	**0.481**	**0.481**	**0.48**	**0.480**
			(0.007)	(0.008)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)
Professional/Manage				**0.352**					
				(0.008)					
% Female in Occupation				**-0.052**					
				(0.014)					
Effect of Country-Level Measures									
% of Children Aged 0 -2 in Public Care					-0.003				
					(0.019)				
% 0-2 in Care * # Children					**0.002**				
					(0.001)				
Max. Leave for Women						**-0.043**			
						(0.014)			
Max.Women's Leave Squared						**2.5E-05**			
						(9.0E-06)			
Max. Women Leave * # Children						**0.002**			
						(0.001)			
Max. Women Leave Sq. * # Children						**-1.4E-05**			
						(4.7E-07)			
Max. Paternity Weeks							0.103		
							(0.171)		
Max. Paternity Weeks * # Children							**0.016**		
							(0.007)		
Culture: Prescl. Mom FTE									0.021
									(0.034)
Culture: Prescl. Mom FTE * # Children									**0.003**
									(0.001)

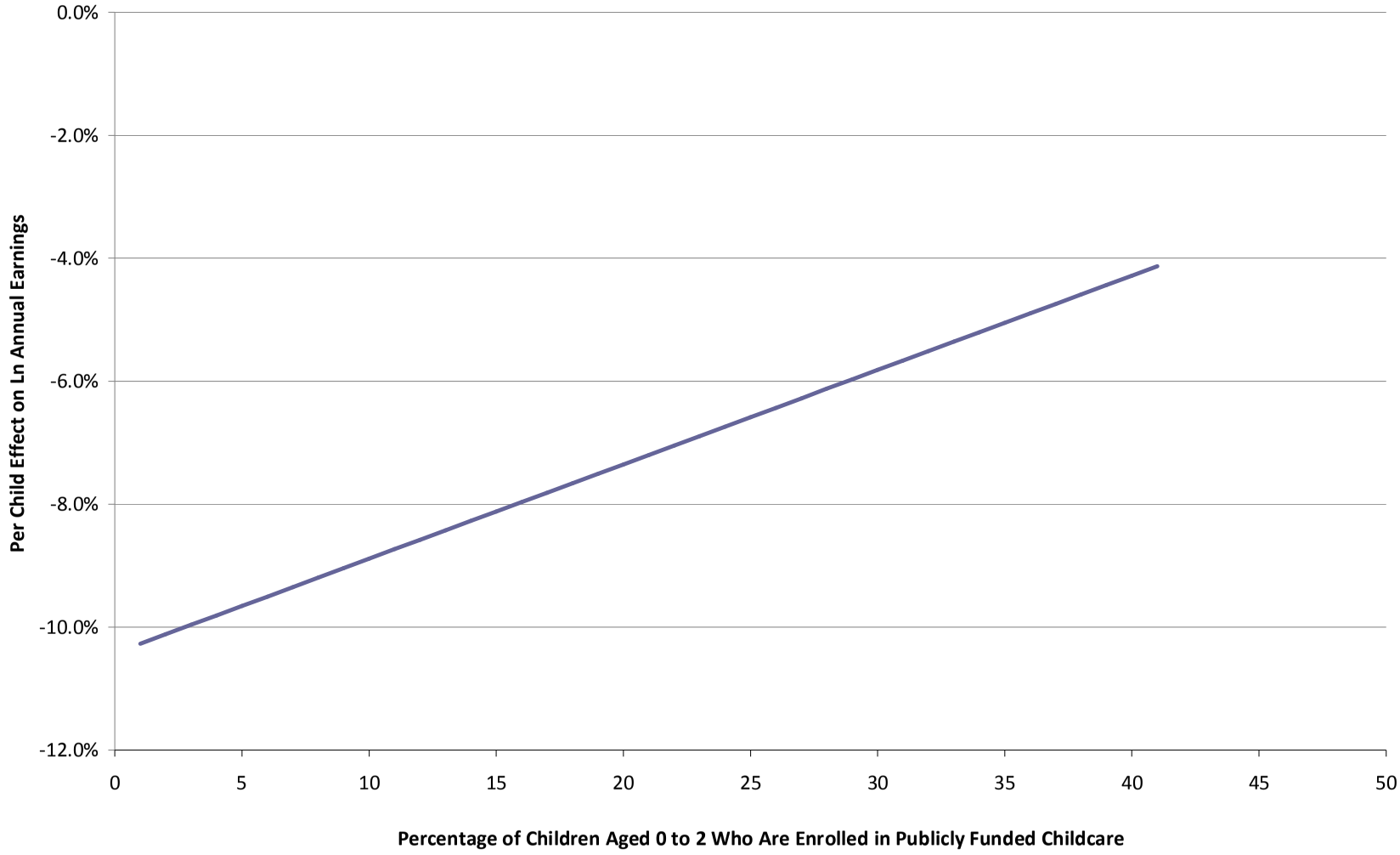
Notes: Significant coefficients are bolded. All models control for a missing hours dummy indicator.

Table 4. Robustness Analysis: Effect of Policies Net of Human Capital, Maternal Employment Probabilities, Size of Public Sector, and Gini Coefficient

	HC Only	& Emp. Prob.	& Pub. Sect.	& Gini Coeff.	HC +Ginint
Effect of 0-2 Childcare on # of Children Slope					
Number of Children	**-0.104**	**-0.104**	**-0.105**	**-0.104**	**-0.188**
	(0.015)	(0.015)	(0.015)	(0.015)	(0.047)
% of Children Aged 0 -2 in Public Care	-0.003	0.003	0.016	-0.005	-0.008
	(0.019)	(0.019)	(0.014)	(0.019)	(0.019)
% 0-2 in Care * # of Children	**0.002**	**0.002**	**0.002**	**0.002**	**0.002**
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Gini Coefficient					-.0465
					(.03284)
Gini * # of Children					**0.003**
					(0.001)
Effect of Women's Max Leave + Leave Sq. on # of Children Slope					
Number of Children	**-0.119**	**-0.119**	**-0.118**	-0.118	
	(0.019)	(0.019)	(0.018)	(0.018)	
Maximum Leave for Women	**-0.043**	**-0.041**	**0.029**	**-0.040**	
	(0.014)	(0.014)	(0.013)	(0.014)	
Maximum Women's Leave Squared	**0.000**	**0.002**	**0.0002**	**0.002**	
	(0.000)	(0.000)	(0.0001)	(0.000)	
Max. Women Leave * # of Children	**0.002**	**0.002**	**0.002**	**0.002**	
	(0.001)	(0.001)	(0.001)	(0.000)	
Max. Women Leave Sq. * # of Children	**-1.0E-6**	**-1.0E-6**	**-1.0E-6**	**-1.0E-6**	
	(0.000)	(0.000)	(0.000)	(0.000)	
Effect of Paternity Leave on # of Children Slope					
Number of Children	**-0.093**	**-0.0933**	**-0.094**	**-0.093**	
	(0.011)	(0.0107)	(0.011)	(0.011)	
Max. Paternity Weeks	0.103	0.0793	0.063	0.103	
	(0.171)	(0.1723)	(0.130)	(0.169)	
Max. Paternity Weeks * # Children	**0.016**	**0.0162**	**0.016**	**0.016**	
	(0.007)	(0.0072)	(0.007)	(0.007)	
Effect of Culture (Mom of preschooler FTE) on # of Children Slope					
Number of Children	**-0.114**	**-0.114**	**-0.115**	**-0.114**	
	(0.022)	(0.022)	(0.022)	(0.021)	
Culture: Prescl. Mom FTE	0.021	0.020	0.021	0.024	
	(0.034)	(0.034)	(0.025)	(0.034)	
Culture: Prescl. Mom FTE * # of Children	**0.003**	**0.003**	**0.003**	**0.003**	
	(0.001)	(0.001)	(0.001)	(0.001)	

Note: All models control for human capital measures and a missing dummy indicators for hours. Significant coefficients are bolded

Figure 2. Net Per Child Effect on Ln Annual Earnings, by the Percentage of Children Age 0 to 2 Who Are Enrolled in Publicly Funded Childcare



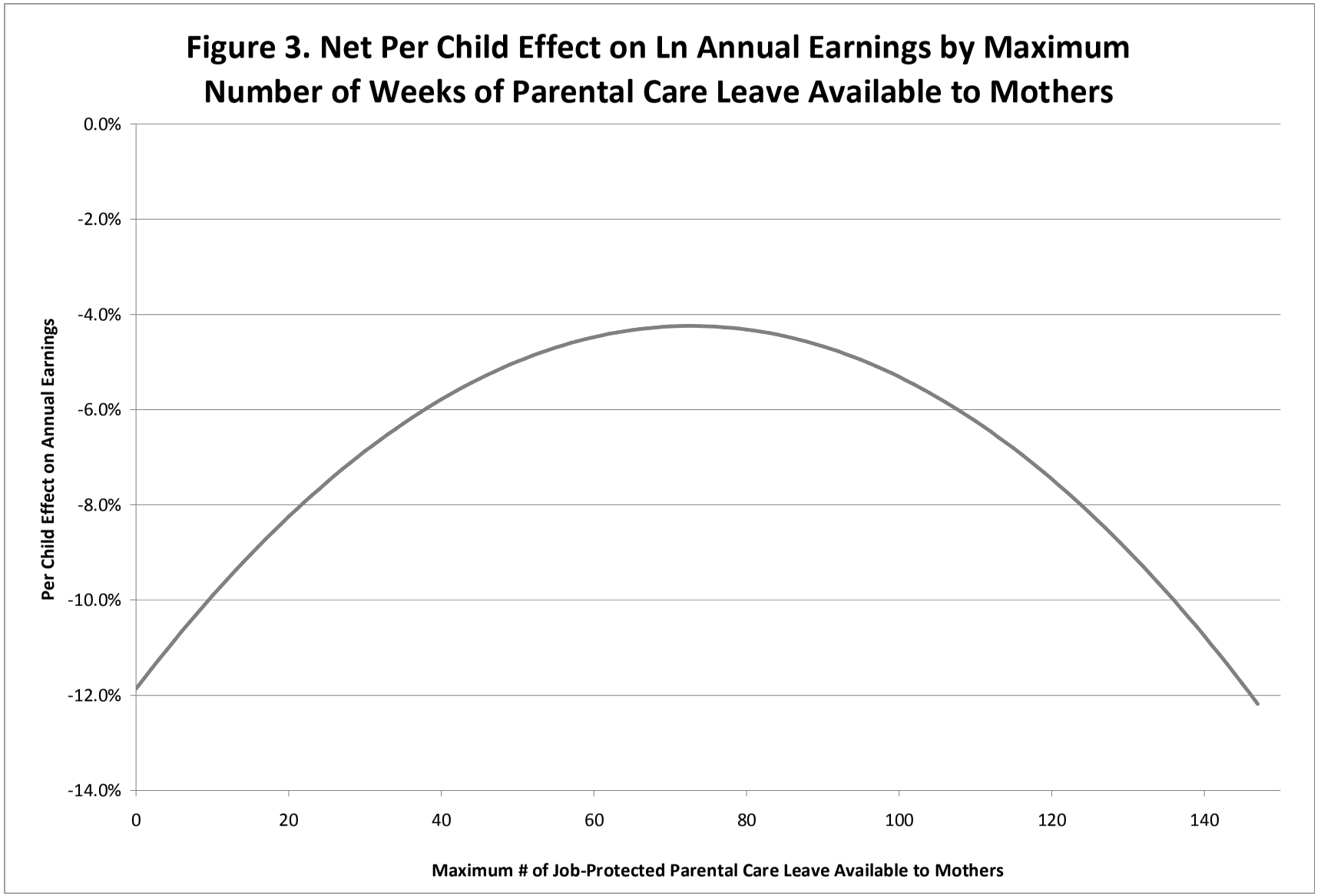


Figure 3. Net Per Child Effect on Ln Annual Earnings by Maximum Number of Weeks of Parental Care Leave Available to Mothers
0.0%
-2.0%
-4.0%
-6.0%
-8.0%
-10.0%
-12.0%
-14.0%
Per Child Effect on Annual Earnings
0
20
40
60
80
100
120
140
Maximum # of Job-Protected Parental Care Leave Available to Mothers

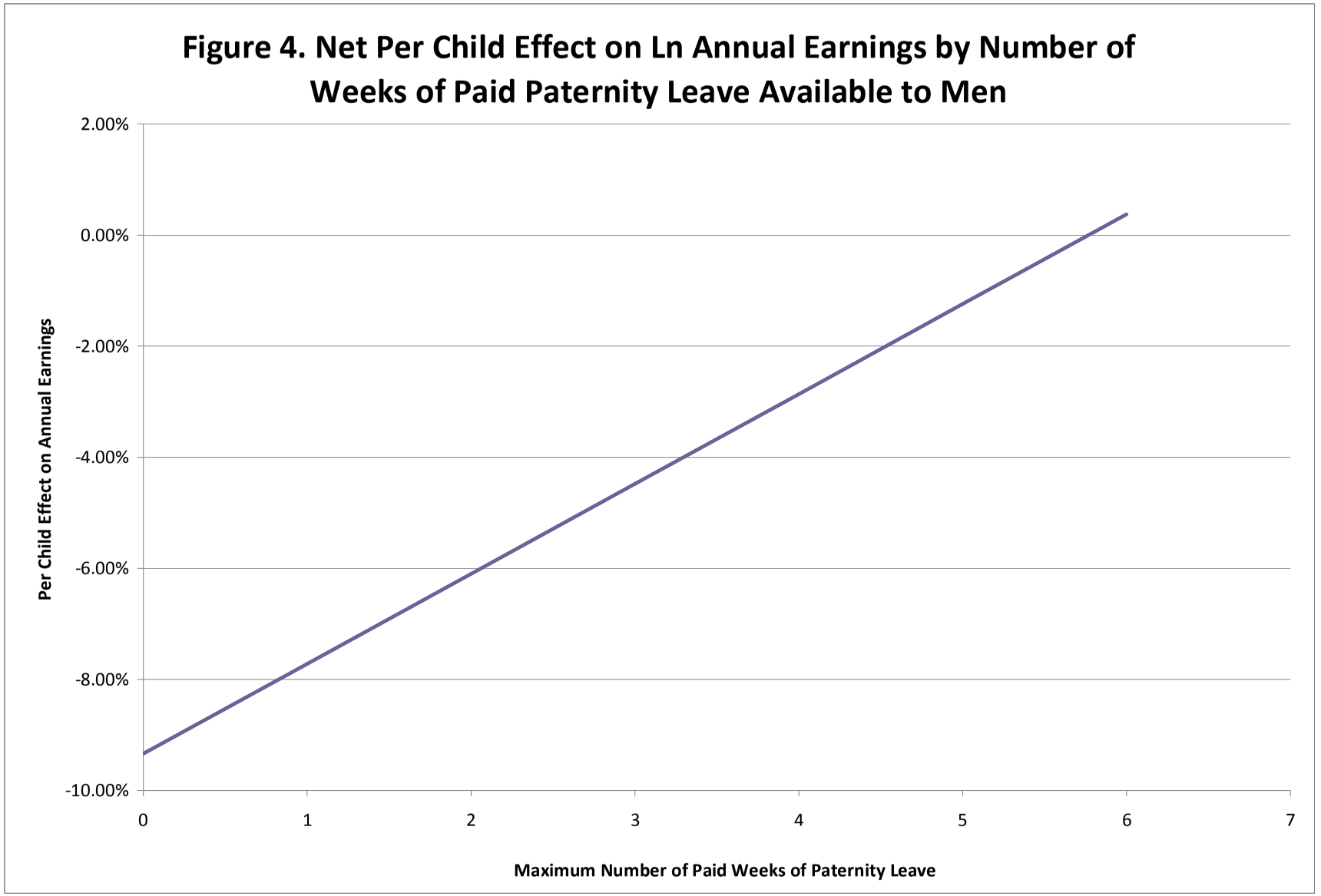


Figure 4. Net Per Child Effect on Ln Annual Earnings by Number of Weeks of Paid Paternity Leave Available to Men
2.00%
0.00%
-2.00%
-4.00%
-6.00%
-8.00%
-10.00%
Per Child Effect on Annual Earnings
0
1
2
3
4
5
6
7
Maximum Number of Paid Weeks of Paternity Leave

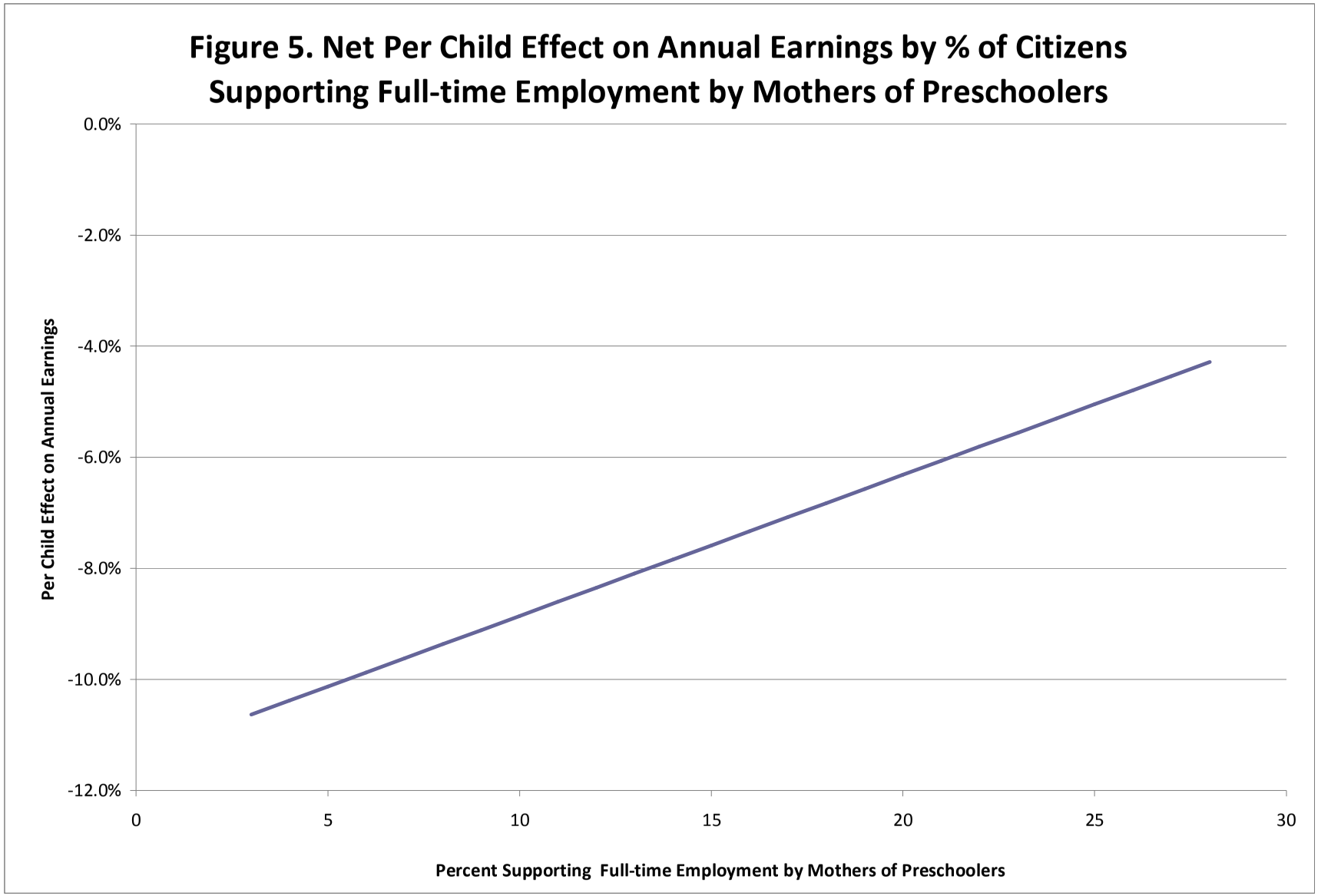


Figure 5. Net Per Child Effect on Annual Earnings by % of Citizens Supporting Full-time Employment by Mothers of Preschoolers
0.0%
-2.0%
-4.0%
-6.0%
-8.0%
-10.0%
-12.0%
Per Child Effect on Annual Earnings
0
5
10
15
20
25
30
Percent Supporting Full-time Employment by Mothers of Preschoolers