LIS
Working Paper Series

No. 588

The Implications of Cross-National Policies for
the Relative Incomes of Families with Children by
Family Structure and Parental Education

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April 2013

The Implications of Cross-National Policies for the Relative Incomes of Families with Children by Family Structure and Parental Education[1]

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Abstract

Focusing on an array of European and North American welfare states between 1985 and 2005, we consider how welfare state policies are related to households' relative incomes, taking into account cross-national and temporal differences in income distributions. At the same time, we consider how two of the central factors that may be driving income inequality at the individual or household level – parental educational level and family structure – may be related to a household's relative income. This research fills a gap in the literature because there are surprisingly few studies that examine inequality by both family structure and education, and even fewer that examine relative income cross-nationally and longitudinally. Theoretically, our contributions are to structural vulnerability theory. Structural vulnerability theory aims to consider how the individual, or the household, is structurally located within a context. Our analysis provides a better test of structural vulnerability theory than previous studies because structural vulnerability is operationalized in both the independent (through cross-level interactions) and dependent variables. By creating a dependent variable that standardizes household income relative to both median income and societal-level income inequality, we are able to get at the very center of structural vulnerability.

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The Implications of Cross-National Policies for the Relative Income of Families with Children by Family Structure and Parental Education

Welfare states are meant to provide a social safety net for their citizens. While many may debate whether welfare state policies encourage "dependence" (Murray 1994) or help create the conditions necessary for economic growth (Garfinkel, Rainwater, and Smeeding 2010; Kenworthy 2004), one goal of welfare state policies has been to limit inequality by redistributing income across households, to ensure that all households have economic opportunities. How successful are welfare states at addressing this goal among families with children? Focusing on an array of European and North American welfare states between 1985 and 2005, we consider how welfare state policies are related to households' relative incomes, taking into account cross-national and temporal differences in income distributions.

We consider how two of the central factors that may be driving income inequality – parental educational level and family structure – may be related to a household's relative income, as well as how education and family structure may be interlinked. Education affects relative income in intuitive ways: higher levels of education usually translate into higher relative income. The effect of family structure varies by country, but families headed by two parents generally have higher relative incomes than those headed by single parents, particularly single mothers. Historically, scholars have examined these sources of stratification independently, though researchers increasingly examine family and education jointly, finding that motherhood differentially affects income and income inequality across countries, and the degree of this difference varies by mothers' education (McLanahan and Percheski 2008; Sigle-Rushton and Waldfogel 2007; Western, Bloome, and Percheski 2008).

Taking a cross-national approach, we unpack household income inequality within categories of family and education between 1985 and 2005 to tell a more complex and comprehensive story of income inequality. Our research is innovative because it examines family structure and education interactively, as opposed to discretely. We also take a novel methodological approach. Our unique measure of relative income, which we refer to as the Gini adjusted relative income, considers household incomes in light of country- and period-specific income distributions. We argue that this is a more theoretically relevant measure of inequality that integrates the macro and micro by incorporating into the dependent variable household income (i.e., the micro) relative to the overall income distribution (i.e., the macro). Our research is one of the first large cross-national studies of income to consider households nested within countries across multiple time periods, another methodological advance. Most prior cross-national, longitudinal studies have been conducted at the aggregate level and most cross-national, multi-level studies of micro-data have been cross-sectional. We combine these approaches by nesting households within countries longitudinally. We focus on household income because individuals pool resources within households and this pooling of resources reflects individuals' true access to income (DiPrete 2002; Western et al. 2008). We combine four waves of the Luxembourg Income Study (LIS) microdata across 17 countries with country-level data from the newly created Work-Family Policy Indicators Database, which provides historical measures of work-family policy, to consider the role that policies play in shaping inequality by education and household type. We emphasize the role of wage coordination, family allowances, parental leave and public child care, as these policies are widely recognized

to alter inequality and household income (Brady 2003a; Calderón and Chong 2009; Van der Lippe et al. 2011; Wang and Caminada 2011).

Structural Vulnerability and Intersections of Inequality

Theoretically, we take a structural vulnerability perspective, arguing that households' locations within income distributions are predicted by individual and household characteristics interacting with structural features of society (Author 2008, 2012). Scholars who study inequality outcomes must consider individual or household-level factors that may shape inequality, such as educational level or household type. Within a comparative framework, however, we know that inequality is not simply explained by individual or household-level factors, but may reflect structural features within society, such as, for example, more or less generous welfare state provisioning to single parent families. Our structural vulnerability perspective is meant to consider how contexts interact with individual-level factors, to either heighten or lessen the structural vulnerability that groups face. Broadly, we expect that either families with lower educational attainment or families headed by single mothers will be more vulnerable in particular settings; yet we are also interested in how the two intersect – whether families headed by highly educated single mothers, for example, are more or less vulnerable in particular settings. Our aim is to identify which contexts – and specifically which policies – help create better outcomes for vulnerable groups.

We conceptualize structural vulnerability in terms of how household resources compare to the overall distribution of resources in a society. This intersection between household and context has not been adequately investigated by cross-national welfare state and stratification

scholars despite the fact that the essence of structural vulnerability theorizing is found in the intersection of the micro and macro. Prior scholarship has captured this intersection by predicting a micro-level outcome, such as risk of poverty, through interactions between macro and micro level variables (Author 2007, 2008, 2012; Brady et al. 2009). While this approach generates important insights into welfare states and inequality, it does not thoroughly capture structural vulnerability. We follow this approach by including interactions between macro and micro variables in our analyses, but we also go further by incorporating structural vulnerability in the dependent variable.

We operationalize structural vulnerability in a dependent variable that measures the intersection of household income with the overall structure of the income distribution. This intersection is important because relative income predicts happiness, well-being, delinquency behavior, and even health (Bernburg, Thorlindsson, and Sigfusdottir 2009; Dittmann and Goebel 2010; Kondo et al. 2008). Furthermore, researchers have found that when given a choice between a higher income that is lower than peers or a lower income that is higher than peers, approximately half would prefer to have relatively higher income even if it is absolutely lower (Solnick and Hemenway 1998). Thus, not only is relative income theoretically relevant as it more directly operationalizes structural vulnerability, it is practically relevant as it reflects many individuals' preferences.

All households with children are affected by structural conditions (for example, the availability of childcare), but some households are more vulnerable than others; single parenthood and low education are sources of tremendous vulnerability. The source of vulnerability for single mothers is found in the absence of a second adult's income, along with

women's (and mothers') lower average wages (Aisenbrey and Brückner 2008; Budig and England 2001), and mothers' challenges balancing employment and care for children. Women, and mothers in particular, face more obstacles to sustained labor force participation because they have more extensive care-work responsibilities, relative to men (Folbre 2001). This is particularly salient for single mothers. Indeed, some scholars have argued that the ability of mothers to attain sufficient income to sustain households autonomously is an indicator of gender equality (Orloff 1993). Research suggests that family changes, such as separation and divorce, greatly disadvantage women's income, though they have little effect on men's income and living standards (DiPrete and McManus 2000). Inequality may be greater where single mothers are more prevalent (Iceland 2003; McLanahan and Percheski 2008)

Education is a source of vulnerability because it is the primary predictor of workers' market power followed by age (Western et al. 2008). Higher levels of educational attainment lead to higher wages and upward mobility, while lower levels may lead to a higher risk of poverty. Research focused on the United States has shown that there has been a sizable polarization in educational attainment (Autor, Katz, and Kearney 2006; Rodríguez-Pose and Tselios 2009), while labor markets have offered an expanding wage premium for education (Western et al. 2008). As a result, educational inequality has generated income inequality (Rodríguez-Pose and Tselios 2009), and even households headed by two parents with low education are vulnerable, while those with higher educations have seen their incomes expand. Scholars have argued that increasing education can help enhance the incomes of lower wage-earners (Estevez-Abe, Iversen, and Soskice 2001; Huber et al. 2009; Lichter and Crowley 2004).

Yet, increasing education may not enhance household income if mothers, particularly single mothers, face further challenges balancing work and family.

We examine inequality by examining relative income for households by family structure and education. In so doing, we unpack their interactive effects. Aisenbrey (2009) similarly considers this interaction in a study of low income in Germany. By taking a cross-national and historical approach, we are able to examine other sources of inequality. States can minimize household vulnerability by creating and expanding policies to support households and their breadwinners (Bardasi and Gornick 2008; Brady and Denniston 2006; Casper, McLanahan, and Garfinkel 1994; Christopher 2002; Christopher et al. 2002; Esping-Andersen 1990; McLanahan 2004; Smeeding 2005). Some countries provide generous safety nets, which protect families from lower income. These might include family allowance policies, meant to support families with children given the added costs of childrearing, as well as work-family policies, meant to help mothers balance employment and care. Additionally, some countries purposefully coordinate wages while others rely on market forces (Kenworthy 2001). There is substantial evidence that these policies help to reduce inequality and lower families' risks of poverty, but it remains unclear how these policies affect relative income and whether there are differences across families by education-level of the heads of households. This is important given the risk of low income faced by those with low education and by single parents. Thus, we examine the role that social policies play in moderating – or entrenching – labor market inequalities, as they may increase opportunities for mothers or workers with low education, ease the burdens of work-family conflicts, or reinforce the male-breadwinner model, which disadvantages many women.

While we know that welfare state policies and strategies alter overall income inequality and risks of poverty, we do not understand how these policies affect the vertex where the micro and macro interact, i.e., household income relative to the overall level of inequality (Gini adjusted relative income). Our aim is to understand how, controlling for individual-level factors, policies affect households' Gini adjusted relative income. Yet another aim is to explore whether policy effects differ for families with children depending on partnership status and education. Following Aisenbrey (2009), we expect that there are important differences among households; we further expect that policies may create different outcomes for these different groups. We explore these arguments further in the next section.

Policies and Relative Income

The welfare state is widely acknowledged to support vulnerable groups in society by redistributing income through tax and transfer systems and by offering employment protections. We focus on families with children, and explore how the welfare state affects outcomes for these families both through wage-setting practices and work-family policies. We begin by assuming that family structure and parental education will help predict Gini adjusted relative income for most households.

> **Hypothesis 1:** Households' relative income should vary by family structure and parental education.

One strategy that countries can take to reduce inequality and alter households' relative income is to implement a system of centralized wage setting and coordination. Here, the state, labor, and businesses work together to determine wages (Kenworthy 2001; Kenworthy 2003;

Kenworthy 2006). In countries that engage in centralized, coordinated wage bargaining, wages are set at the industry- or economy-level and there is little intra-industry variation. Wage coordination typically generates lower wage dispersion, lower state-mediated poverty, and a higher income floor (Blau and Kahn 1996; Brady 2003a; Pontusson, Rueda, and Way 2002). Yet, it remains unclear whether this translates into changes in relative income across households. It is possible that households with less well-educated parents should disproportionately benefit from wage coordination because income floors negotiated out of wage coordination should enhance these households' incomes relative to the overall distribution. Indeed, Pontusson et al. (2002) found that wage coordination reduces wage inequality by enhancing the wages of unskilled workers. We do not anticipate, a priori, that the effects of wage coordination should vary by family structure. Therefore, we hypothesize:

> **Hypothesis 2:** Wage coordination should enhance the relative incomes of the least
>
> educated.

However, when wage coordination is economy-wide, the benefits of coordination should benefit all workers. Thus, it is also reasonable to predict that wage coordination should benefit all households, irrespective of family structure and parental education, in contrast to hypothesis 2.

We also explore the effect of family policy on inequality among families with children. We begin with family allowances, which provide limited income to families with children. The generosity of family allowances varies dramatically across countries, with some countries offering generous support for extended periods for all families with children, and others offering meager, means-tested support over a shorter period of time. Individuals have a lower

risk of poverty in countries where family allowances are more generous (Author 2012; Wang and Caminada 2011). Yet, do family allowances alter relative income? We expect that relative income will be enhanced when policies are associated with both higher levels of mean income and less dispersion around the mean (i.e., lower levels of aggregate inequality), and family allowances are associated with both. Furthermore, family allowances may make up a smaller share of total income for families with partnered mothers, because these families have the potential for greater earnings, and because women's wages tend to be lower than men's wages. Therefore, we hypothesize that:

> **Hypothesis 3:** Family allowances should have larger positive effects on the relative income of households headed by single mothers compared to partnered mothers.

> **Hypothesis 4:** Family allowances should have larger positive effects on the relative income of households with lower educated householders, compared to medium or higher educated, because these families may earn less.

> **Hypothesis 5:** There will be an intersection between household structure and education, so that the positive effects of family allowances should be greatest for single mother households where mothers have low education.

Next, we turn to work family policies because these policies target the pressures families face in balancing care and employment. As Gustafsson and Kenjoh (2002) aptly note, fertility and employment decisions are influenced by the cost of fertility and career decisions. Publicly subsidized childcare reduces the cost of fertility by providing low- or no-cost care for children while parents work. Researchers have established that public childcare enhances women's labor market participation and wages, and reduces families' risk of poverty,

particularly for families headed by single mothers (Author 2011, 2012; Pettit and Hook 2005; Van der Lippe et al. 2011). Yet, not all families rely on public childcare; family care, private center childcare, and individual-care through nannies also meet care needs. We suspect that state-subsidized childcare is most useful for single parent families as well as for households at lower educational levels, where the costs of private childcare may be prohibitive. We focus on public childcare for children 0-2 because mothers of young children experience the most work family conflict (Bianchi and Milkie 2010). Given the importance of public childcare to employment stability and to reducing risks of poverty, we propose the following hypotheses:

Hypothesis 6: Single mother households and households with lower educated householders should have higher relative income in light of public childcare.

Hypothesis 7: Higher educated, partnered households with children may be less reliant on public childcare and therefore may not see changes in relative income based on child care.

Hypothesis 8: Less educated single mothers will, in particular, benefit from higher relative income in light of public childcare.

Another important work-family policy is parental leave generosity. Parental leave refers to employment leave for care of dependents, including infants and toddlers. It goes beyond the shorter maternity leave, provided to mothers for the weeks before and after the birth of a child. These policies are aimed at helping parents remain attached to the labor force, while also providing them with time to care for families. Generosity may be understood across two dimensions: how long is the leave, and how well paid is the leave. For the most part, longer leaves tend to be less well paid. Research finds the more generous, moderate leave lengths are

associated with higher levels of maternal employment and wages (Pettit and Hook 2005; Pettit and Hook 2009).

By allowing working mothers to remain attached to the workforce after the birth of a child, parental leave may have positive effects on a household's relative income. In most countries, highly-educated mothers are less likely to exit the labor force than mothers with low education, in part because they are more career-oriented (Brewster and Rindfuss 2000; Gustafsson and Kenjoh 2002). Yet parental leave may be particularly important to highly educated women, since less educated women may be able to find similar employment after taking time out, even in the absence of leave, while highly educated women rely on the leave to help them maintain their careers. Furthermore, along with single mothers, highly educated mothers also experience high levels of work-family conflict, conflict that may be minimized by work family policies such as leave (Bianchi and Milkie 2010). Therefore, we expect that:

> **Hypothesis 9**: Higher educated households with children should have a higher relative income in light of parental leave, compared to lower and medium educated households.
>
> **Hypothesis 10**: Single mother households with children should have a higher relative income in light of parental leave.
>
> **Hypothesis 11:** There will be an intersection between household structure and education, so that the positive effects of parental leave should be greatest for single mother households where the mother has a high education.

Yet, we should also note that higher educated mothers are often less likely to take advantage of leave than lower educated moms (Pronzato 2009). This suggests that we may not find support for either hypothesis 9 or 11.

Methods

The data used for this study are from the Luxembourg Income Study (LIS) and the Work-Family

Policy Indicators Database. The LIS dataset is a cross-national dataset that includes individual-

level data across countries and over time. The countries included in the analysis are primarily

from Europe, yet also include Israel, Australia, the United States, and Canada. We include East

Germany and West Germany as separate countries, given their separate histories. The time

period for this data spans 20 years, with the earliest wave of the LIS data, wave 2, beginning in

1985 to the last wave included in this study, wave 6, which includes data from 2005.[2] The total

number of countries included in this analysis is 17, and over the 20 year period translates into a

total of 68 separate country and year specific sets of individual data (See Appendix A for a full

listing of country years.

Our study limits the sample to families with a woman householder between the ages of

25 and 49 years old who was not serving in the military or self-employed and was living with

children under 18 in the household. We select this age range because we are studying policies

that affect work-family balance. Therefore, it is necessary to limit the sample to the working

age and child-bearing population. In addition, our age restrictions are meant to minimize the

effect of inconsistent educational enrollment information across the datasets, as the timing of

degree completion and labor force entry varies greatly across these countries, while also

focusing on women who are likely to have children in the home.[3] The sample excludes all

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[2] We do not include wave 1 in the analyses because some of our independent variables are missing in this wave.
[3] For LIS, motherhood is measured as present if a woman householder has a co-resident minor under age 18. We do not expect that this will bias our results, since we would expect that

families with a self-employed parent because the measure of income is less accurate when self-employed individuals are included in the analysis; self-employment income is not reliable or consistently measured across the nations in our sample.[4]

Dependent Variable

The dependent variable is household Gini adjusted relative income. This measure is created using household-level income data from the LIS dataset.[5] The Gini adjusted relative income is defined as total household disposable income (in U.S. dollars) divided by survey-specific median income (in U.S. dollars), which is further divided by the Gini index.[6] The household's Gini adjusted relative income captures the vertex of the micro and macro (i.e., household income and income structure), as suggested through structural vulnerability theorizing. Although novel, our measurement builds on existing welfare state research. Many welfare state scholars examine the income distribution, through cross-national measures of income inequality and poverty rates (Author 2003; Bradley et al. 2003; Brady 2003a; Kenworthy 1999). In these studies, the Gini index is a common measure of income inequality (Beckfield 2006; Bradley et al.

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children under 18 living in the household would have the most substantial effects vis-à-vis relative income.

[4] For example, there are substantial variations across countries in how negative income is reported.

[5] Income includes total post-tax and transfer household income and is adjusted for household size by utilizing an equivalence scale.

[6] This approach produces a relative measure of household income as opposed to an absolute measure where incomes across countries are compared to a single line (such as median income in the United States). By focusing on country-specific (and period-specific) relative inequality, our measure captures within-country (and period) income inequality. This localized measure is arguably more easily perceptible—compared to cross-country inequality--to residents within countries (Author 2009).

2003; Dallinger 2010; Kenworthy and Pontusson 2005; Lee 2005; Mahler 2008).[7] More

recently, scholars have taken a micro-level approach to studying welfare state outcomes by

examining individuals' and households' incomes and risks of poverty in light of welfare state

policies (Author 2007, 2012; Brady et al. 2009). We combine these approaches by examining

household income relative to the overall income distribution. Our dependent variable, Gini

adjusted relative income, is reflected in the following formula, where income is converted to US

dollars via purchasing power parities:

Gini Adjusted Relative Income = $(x_{ik}/median_k)/g$

where income (x_{ik}) for household i in country-year k is divided by median income in country-

year k. This generates the ratio of income relative to the median (Alpizar et al. 2005). This type

of ratio comparison is common. For example, Aisenbrey (2009) computes a living standards

measure based on the ratio of the household income (taking into account government taxes

and transfers) to the low household-income margin. We deviate from this approach by dividing

income by median income (as opposed to the low income line). Dividing household income by

median household income allows us to compare incomes across countries and over time (Brady

2003b). Our measure is novel because it further divides this ratio by the Gini index (g) allowing

us to better capture relative income because we account for exactly how dispersed the local

income distribution is.[8]

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[7] It is common for researchers to examine the Gini index along with other measures of inequality such as the ratio of income at the 90th and 10th percentiles, 50th and 10th percentiles, or 90th and 50th percentiles because ratios have a more direct interpretation than the Gini index. However, we are interested in household income relative to the overall distribution, not relative to two points in the distribution. Therefore, we incorporate the Gini index.
[8] We divide by the Gini index instead of the standard deviation because the Gini index is a better measure of overall income inequality.

Table 1 provides an illustration of the dependent variable. The first column shows the value of the dependent variable when the Gini is .4, median income is $400 and household income is $500. Here, the dependent variable takes on a value of 3.125. Note that column 4 has the same value for the dependent variable when household income is $1000 and median income is $800 with same Gini level. In both of these cases median income is 4/5 the value of household income. Since the Gini is the same, the dependent variable is the same. These two households have similar Gini adjusted relative incomes. Now, moving from column 1 to column 2, if median income remains at $400 and the Gini remains at .4, but household income moves up from $500 to $1000, the value of the dependent variable doubles to 6.25. If you look at a similar scenario in columns 4 and 5 where the only difference is a higher Gini, the dependent variable also doubles in size, moving from 2.5 to 5. Notably, though, the value of the dependent variable is lower in the presence of a higher Gini. This is further clarified by comparing columns 1 and 5 where the only difference is the Gini. When median income is $400 and household income is $500, the value of the dependent variable is 3.125 when the Gini is .4, and it is 2.5 when the Gini is .5. This is sensible because when income is more dispersed, an income that is $100 more than the median is not as substantial relative to the distribution as when income is more concentrated (i.e., when the Gini is smaller). Therefore, the measure of relative income is relative to median income in light of the overall distribution of income. When income is more dispersed, i.e., when the Gini is higher, it takes more income to substantially enhance relative income compared to when income is more concentrated (i.e., when the Gini is smaller). This is sensible because when individuals live in an environment

where the maximum income potential is higher, their aspirations and perceptions of their standards of living are different than when the perceived maximum income is smaller.

Table 1 About Here

To further clarify the meaning of the dependent variable across countries, Figure 1 presents the mean value of the dependent variable, i.e, the Gini adjusted relative income (the dark gray column) circa 2000 for each country. Figure 1 also presents data on the two components of the dependent variable -- the ratio of household income to median income (the light gray column) and the Gini coefficient (the G).

Figure 1 About Here

The meaning of the dependent variable is clarified when focusing in on the Netherlands, Finland, the United States, the United Kingdom, and Ireland. On average, households with children in the Netherlands and Finland have household incomes approximately 1.1 times median household income. Yet, the average Gini adjusted relative income is lower in Finland than the Netherlands because inequality (i.e., the Gini) is slightly higher. Furthermore, the average ratio of household income to median income in the United States and the United Kingdom is slightly higher at 1.2 times median income. However, relative to these countries' overall income distributions--distributions that are much more dispersed—this income is more modest, and thus the values of the dependent variable take on a smaller value than either Finland or the Netherlands. Additionally, since the United States has higher inequality (i.e., a higher Gini) than the UK, the average Gini Adjusted Relative Income is lower in the United States than in the United Kingdom. If one compares the United States to Ireland, the United States has a higher ratio of household income to the median, but inequality is also substantially

higher in the United States, resulting in a lower average Gini adjusted relative income. The

income distribution in the United States is so dispersed that an even higher average income

ratio would be necessary for this to translate into a higher Gini adjusted relative income

compared to Ireland.

Independent Variables

Following our hypotheses, the primary household-level independent variables of interest are

parental education and partnership status (see Appendix B for brief variable descriptions).

Parental education is measured with two categorical variables for education level of 1) the

mother and 2) the father. Within each measure, the categories of education are low education,

medium education, and high education. These levels are sensitive to the different categories of

education across different countries. Low education generally refers to someone that has only

received a basic level of education, comparable to not completing secondary school in the

United States. The medium education category captures individuals that have received more

than basic education, such as a high school degree, or some vocational or college training. High

education uses completion of tertiary level education as a threshold, which we believe is an

important indicator of income relevant human capital. This mostly includes tertiary university

education, though the actual education titles differ by country. High education is conceptually

designed to measure the level of education that a fairly small percentage of the population has

achieved.

Our measure of father's education also incorporates partnership status, because

father's education is coded as high, middle, low, and no father in the household. This is

necessary because incorporating separate measures of fathers' education and partnership status in the models (along with their interactions) produced model instability due to collinearity between father's education and partnership status. The best fitting models incorporated partnership status in the father's education variable. Single fathers are excluded from the analyses due to their small sample size, and families without children are excluded because our focus is upon families with children.[9]

We also control for age of the mother, employment status of the mother, and other employed adults in the household. We focus on mothers' characteristics because many policies directed at families with children, such as parental leave and public childcare, are primarily designed to support mothers as they negotiate the demands of unpaid work and paid work. Age is simply a measure of the mother's age in years. The employment status of the mother is measured with 3 categories: full-time employment (i.e., more than 30 hours per week), part-time employment, and unemployed or not in the labor force (the excluded category). The models also control for a dichotomous measure indicating whether there are other employed adults in the household. All household-level control variables are group mean centered and their group means are included at the second level.

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[9] Individuals that are identified by the data as legally married or in a civil union were coded as such, though gay couples in countries where there is not legally recognized marriage or civil unions for these couples were not coded as married. This might cause some families to be coded as not partnered when in fact they are living in partnered relationships, yet without the legal union recognized by the country. It would introduce more error to attempt to make judgments on the partnership status of these families. In addition we want to make sure we are comparing families consistently in the countries based on the influence of the poverty policies within these countries. Many countries may have certain restrictions on poverty policies based on the marital status of the mother.

The main country-level independent variables for this study are policies. Family

allowance generosity is created by using the LIS dataset to calculate the percentage of the

average income that the state provides as public family assistance. To calculate this measure

we followed previous researchers (Brady and Burroway 2012) and calculated the average of the

child and family allowances provided by each individual country and divided this by the average

post-tax and transfer income. This measure was created from the entire LIS dataset, and

includes all individuals in the survey regardless of employment status. For this measure the

same equivalence scale that was used in the calculation of the income level was used to

account for differing household sizes. Public childcare is measured as the percentage of

children ages 0 to 2 in publicly funded childcare and early childhood education programs. We

measure generosity of parental leave as the weeks of leave multiplied by the leave benefits as a

percent female median income. Wage Coordination is measured through Kenworthy's index.[10]

It is included in the models as a continuous variable where a value of 1 represents countries

with the most decentralized wage bargaining and 5 represents countries with the most

centralized wage bargaining.

In addition to these policy measures, unemployment rates and gross domestic product

(GDP) were controlled in all models. Unemployment is measured as percent unemployed in

each country for each year of data (International Labour Office, 2011). GDP is measured in

constant 2000 US dollars and is lagged two years from the LIS data years (World Resource

Institute, 2011). Finally, a dummy for each wave is included in the analysis (the final wave is the

excluded category).

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[10]The wage coordination data were downloaded from Jelle Visser's website at http://www.uva-aias.net/207.

Analytic Strategy

We analyze households' Gini adjusted relative income through multilevel modeling. The multilevel model is necessary due to the inclusion of both individual- and country-year-level variables. With multilevel models, we can assess the relationship between country-year-level policies and households' relative incomes, while accounting for the fact that individuals are nested within surveys (or country-years). The household level model (level 1) is:

$$Gini\ Adjusted\ Relative\ Income_{ij} = \beta_{0j} + \beta_{1j}momed_j + \beta_{2j}daded_j + \beta_{3j}momed_jdaded_j + \varepsilon_{ij}$$

where the Gini adjusted relative income of household i in country-year j is predicted by mothers' education (β_{1j}), fathers' education (β_{2j}), and their interaction (β_{3j}). ε_{ij} represents the level 1 error term. This model controls for all household variables, previously mentioned, centered around their group means. Thus, the intercept is interpreted as average income across surveys (Raudenbush and Bryk 2002). The definition of the intercept is critical in multilevel modeling because at the second level, the intercept is a function of second-level variables:

$$\beta_{0j} = \eta_{00} + \eta_{0j}policy + \eta_{1j}period + \alpha_{0j}$$

In the second level equation, β_{0j} is the random intercept and α_{0j} is the second-level error term associated with variation across the surveys (or country-years). η_{0j} represents the overall policy effects, and η_{1j} represents the period effects. We attempted to add random effects for both time and country, but the estimated matrix was singular for most models. Therefore, we controlled for time as a fixed effect in the second level equation and added a random effect for country-year, nested within country. For parsimony, we do not present results for the limited number of models that would run when both random effects were added. However, we

compared results in those models to the final results presented in this paper, and they are

similar. We also attempted to add a third level error term for countries, but this error term

proved redundant (see also Hook 2006).

Given that most of our hypotheses demand a cross-level interaction between the

education variables and the policy variables, we also include random slopes at level 2 where the

slopes $\beta_{1j}, \beta_{2j}, \beta_{3j}$ are predicted by policy variables $\eta_{1j}, \eta_{2j}, \eta_{3j}$ and random effects $\alpha_{1j}, \alpha_2,$

$\alpha_{3j}.$

$$\beta_{1j} = \eta_{10} + \eta_{1j}policy + \alpha_{1j}$$

$$\beta_{2j} = \eta_{20} + \eta_{2j}policy + \alpha_{2j}$$

$$\beta_{3j} = \eta_{30} + \eta_{3j}policy + \alpha_{3j}$$

Given the limited number of countries in the analysis (n=17), we also conducted a jackknife

assessment of the impact of each country on the regression coefficients. For this analysis, we

re-ran the models 17 times, excluding in each model a different country and all of its waves of

data. We find that our results are generally robust. Any differences are reported in the text.[11]

Finally, the analysis of residuals at the country-level slightly deviated from normal. The

jackknife analysis illustrated that when some countries were excluded from the analysis, the

second-level errors were normally distributed. However, excluding those countries did not

change the results of the fixed effects in the models. Therefore, we include all countries in the

final models and we adjust standard errors with the sandwich estimator (with the empirical

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[11] In separate analysis (not shown), we also incorporated a dummy variable that was coded 1 when parental leave generosity took on a value of zero. This was necessary because many countries lack any form of parental leave. The dummy variable was not significant, did not improve model fit, and did not change the results. Therefore, the results reported here exclude this variable.

option in SAS). The sandwich estimator produces robust standard errors when the residuals

deviate from normal. It is important to note that the results are robust to the estimation of

standard errors (as either model-based or empirical).

Results

Table 2 presents results from multilevel regression analyses predicting households' Gini

adjusted relative income. Model 1 presents the interaction between father's education and the

policy variables; Model 2 presents interactive effects of policies with mother's education;

Model 3 tests interactions between mother's education, father's education, and the policy

variables.

Table 2 About Here

Model 1 illustrates that compared to households where mothers have medium levels of

education, any household with a highly educated mom has a higher Gini adjusted relative

income. The same is true when comparing households with highly educated dads to

households with medium educated dads. In contrast, households without a father and

households with lower educated dads have lower Gini adjusted relative income.[12] Turning to

the control variables, older households and households with employed mothers and other

adults have higher relative income. The effects of time illustrate that relative income has varied

over time, with the highest Gini adjusted relative income, on average, found in wave 2. Clearly,

average relative income has declined over time. This is sensible given that income inequality

has risen in many countries, and increases in income among the middle class has not

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[12] In separate analyses (not shown), we divided dad's education and father not in the home into
separate variables. The results were robust.

maintained pace with the incomes of the highest income group. Small increases in average income accompanied by larger increases in inequality generate lower relative income (on average).

Turning to the cross level interactions in Model 1 where policies are interacted with dad's education, the F-tests of the interaction effects reveal that dad's education interacts significantly with wage coordination, public childcare, and parental leave generosity. It is important to note, however, that the cross level interaction between dad's education and parental leave generosity is not robust to the jackknife analysis as it becomes nonsignificant when France or Israel is dropped from the analysis. In contrast, the effects of the interactions between dad's education and both wage coordination and public childcare are robustly significant.

The results illustrate that among households where dads have low education, relative incomes are higher in country-periods where wages are centrally coordinated. This corroborates previous research that found that the lowest skilled workers benefit from wage coordination. Therefore, we find support for the hypothesis that wage coordination should benefit the least educated (Hypothesis 2).[13] Although we did not hypothesize an effect of wage coordination by family structure, we also do find that wage coordination boosts income slightly for families with single mothers (particularly highly educated single mothers, as shown in Model

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[13] In separate analyses, not shown, we ran separate models for cross-level interactions with dad's education (where education does not include the category of no dad in the household). These models controlled for partnership status (coded 1 for no dad in the household). The results are robust. We also ran a model that interacts partnership status with wage coordination, controlling for both mom's and dad's education. Again, the results are robust. This model and subsequent models combine partnership status and dad's education into the dad's education variable because model 3 is unstable when partnership is measured separately and interacted with mom's and dad's education.

3). This empirical finding is sensible, although not addressed in existing theory.

Model 2 presents the cross level interactions between the policy variables and mom's education. The F-tests illustrate that none of the cross-level interactions are significant. The lack of significant cross-level interactions in this model sheds new light on our understanding of household income inequality across countries. First, while the previous model illustrated that households with less well educated dads benefit in the context of wage coordination, the same benefit is not evident among households where mothers have lower education (controlling for father's education). Relative income appears to be, still, driven primarily through fathers' earnings for partnered mothers – with dad's low education mattering more than mom's low education. Second, the nonsignificant interactions between the work-family policies, including public childcare and parental leave, and mother's education are remarkable because these policies are designed primarily to support mothers' work-family balance.

Yet, do policies interact with partnership status and the education of both the mother and father to predict relative household income? Model 3 sheds light by modeling these interactions. The F-tests illustrate that household income varies by mom's and dad's education, and the effects of work-family policies (i.e., public child care and parental leave generosity) vary across these categories. Looking first at the interaction between mom's education and dad's education, compared to households where both the mom and dad have medium education, Gini adjusted relative income is significantly higher when both parents have high education. Interestingly, single mother households where the mother has a high education also have higher predicted Gini adjusted relative income than two parent households where both parents have medium education. These results clearly illustrate that there is an intersection between

partnership status and education (in support of hypothesis 1). It is not simply single

parenthood that leads to low relative incomes – but single parenthood with moderate or lower

levels of education and dual parenthood with low levels of education that leads to such

outcomes.

We also find, in contrast to hypotheses 3 through 5, that family allowances do not

interact with partnership status and education to predict relative incomes. The effect of family

allowances is significant and positive, but it does not vary across education and partnership

status. This may in fact be sensible. Given that family allowances are universal in many

countries and not needs-based, family allowances may serve to slightly increase the relative

incomes of all households with children. If we had included households without children in the

model, then we may have seen a significant effect since family allowances likely distribute from

childless households to households with children. This requires further investigation.

This model also illustrates that public childcare and parental leave generosity significantly

interact with partnership status and parental education. These results are presented

graphically in Figures 2 and 3. In each of these figures, the policy variable ranges from its 10th

percentile to its 90th percentile, and the y-axis presents predicted Gini-adjusted relative income.

Figure 2 presents predicted Gini adjusted relative income by extensiveness of the public

child care system for children under 3. This figure illustrates that categories of households that

fall at the lower end of the relative income spectrum benefit from more extensive public child

care. Less educated and moderately educated single mother families benefit in contexts where

public child care is more extensive, yet the benefit is greatest for single mothers with low levels

of education (both of these are significant). In contrast, single mothers with high education do

not have significantly higher income when they reside in countries with more extensive public childcare systems. The graph suggests that among households with highly educated dads (the solid black lines), that public childcare is associated with lower Gini adjusted relative incomes, but it is important to note, however, that these declines are not significantly different from zero. Therefore, the relative incomes of households with highly educated dads are not significantly affected by the breadth of public childcare in a country-period.

The graph also illustrates that the Gini adjusted relative income gap between households with two medium educated parents and households with two lower educated parents is smaller in countries with more extensive public child care. At the tenth percentile of the public child care distribution, there are significant gaps in predicted Gini adjusted relative income between medium education and each of the following categories: mother low, father low; mother low, no father; mother low, father medium; mother medium, father low; mother medium, no father. These gaps are not significant at the ninetieth percentile of the public childcare distribution. Thus, Gini adjusted relative income gaps at the lower end of the relative income distribution are smaller in the context of more extensive public childcare.

Figure 2 About Here

This figure helps clarify the results in relation to our hypotheses. In support of hypothesis 6, households headed by single mothers and households with low education experience the greatest benefit from public childcare. The availability of public childcare provides these households, which tend to have fewer resources to purchase private childcare, greater employment stability. This translates into higher income relative to the overall income distribution. In contrast, and in support of hypothesis 7, highly educated partnered households

are not reliant on public childcare and therefore do not show a significant boost in relative income from its availability. Finally, in support of hypothesis 8, extensive public childcare is most beneficial to single mother households where the mother is less well educated. Clearly, public childcare is a tool for reducing inequality and for reducing the economic vulnerability associated low education and single parenting.

The results for parental leave are quite different than the results for childcare. Indeed, while childcare was disproportionately supportive of single mother, particularly less well-educated single mothers, parental leave is supportive of most households. Indeed, most lines in Figure 3 have significant, positive slopes. The coefficients presented in Table 2 help interpret the graph. The slope for parental leave generosity (for households where both parents have medium education) is significantly positive, and most of the cross-level interactions with parental leave are not significantly different, meaning that most groups benefit from parental leave generosity. The positive slopes for "Mom High Education * Dad Low Education * Parental Leave Generosity" and for "Mom High Education * No Dad * Parental Leave Generosity" illustrate that the positive effect is even stronger for highly educated moms who have no partner or a partner with low education (in partial support of Hypotheses 9 and 11). In Hypothesis 11, we expected that highly educated single mothers would benefit strongly from parental leave generosity, and find marginally significant support for this hypothesis. The effect of parental leave generosity is also significant for households without a father, in support of Hypothesis 10. As we expected, highly educated mothers benefit the most strongly from parental leaves that allow them to maintain employment, while also taking leave to care for new children, but the story is a little more complicated because this is true when dads have low

education or there is no dad in the household. Overall, parental leave generosity is beneficial for all households.

Figure 3 About Here

The Dependent Variable, Revisited

Returning to the dependent variable, we contend that our measure of Gini adjusted relative income is valuable because it reflects the vertex where household income intersects the local income distribution. We illustrate the necessity of dividing the income ratio by the Gini in Figures 4 which presents the predicted income ratio (i.e., household income divided by median income presented in Figure 2) by partnership status, parental education and public child care. This graph is similar to Figure 2, with the exception that the dependent variable is the income ratio (as opposed to the Gini adjusted relative income). The model on which this graph is built is presented in Appendix C. This graph illustrates that when public childcare is more extensive, there is a smaller gap in the income ratio between higher educated partnered households and lower educated and single mother households. In fact, public childcare has a significantly negative effect on the income of households where both parents have a high education. This result is sensible. Work-family policies, family allowances, and wage coordination are generally found in countries with lower income inequality, and in fact, these policies help to lower income inequality. By definition, inequality is lowered through redistribution between the highest and lowest income households. Therefore, analysis at the household level that compares across household types illustrates lower levels of income inequality between these households at higher levels of the policy variables. Indeed, we find across all income ratio

models run (not shown), that groups of households at the top of the income distribution have lower income ratios (compared to the median) when policies are widespread, compared to when they are weak. Again, this is sensible. Countries with remarkably high inequality are exceptional because they are characterized by minimalist welfare states with limited redistribution and worker protection. As a result, the top of the income distribution has remarkably high income. One could argue that simply controlling for the Gini index in the income ratio models would be sufficient to capture our conceptualization of structural vulnerability, but in fact, the Gini index does not predict average income, instead it predicts the variability in income (indeed, it is the variability in income). Thus, to create a dependent variable that accurately analyzes income experiences of households within countries in light of this variability, this income ratio was divided by the Gini to produce our measure of Gini adjusted relative income. This measure is relative to what is currently possible and perceptible within a country.

Conclusions

This manuscript has illustrated how wage coordination and work-family policies affect households' Gini adjusted relative income across countries by parental education and partnership status. By combining national-level data with historical LIS microdata, we have generated a novel analysis that examines policies' effects on households over time. We believe that we have made both methodological and theoretical contributions with our work.

Methodologically, by pooling data together over time periods, we have more robustly measured policy effects because the sample is larger and more importantly, we have minimized

period-specific effects by pooling across multiple time periods. Pooling data over time is also beneficial because it allows us to test multiple policies in a single model. Welfare state scholars have established that countries cluster in the types of policies they implement; countries that are generous in one policy area are often also generous in other policy areas. Prior studies have examined a single policy area or have examined multiple policies in separate models (Author 2012; Brady and Burroway 2012). These studies have provided important insights into policy effects, but our study allows us to go a step further by examining one policy's effect while controlling for other policy effects, recognizing that policies do not work in a vacuum, but are conditioned by other policies.

Theoretically, our contributions are to structural vulnerability theory. Structural vulnerability theory aims to consider how the individual, or the household, is structurally located within a context. Thus, households headed by single mothers, for example, may be disadvantaged in many settings, but particularly so in contexts that provide little support for working parents. Our analysis provides a better test of structural vulnerability theory than previous studies because structural vulnerability is operationalized in both the independent (through cross-level interactions) and dependent variables. By creating a dependent variable that standardizes household income relative to both median income and societal-level income inequality, we are able to get at the very center of structural vulnerability. Had we looked at income relative to the median alone, we would have simply found how redistribution works within countries. Those results would be fairly obvious – the most highly educated groups who have the highest incomes typically redistribute to the least educated groups. By standardizing relative income, our analysis takes us a step further. Conceptually, our measure is meant to

reflect the vertex where household income meets the income distribution. Thus it illustrates where households fall within the income structure of the country at a specific point in time.

We test structural vulnerability theory by examining policy effects across households, controlling for other policies and GDP. Well-established policy effects at the household or individual level do not necessarily translate into higher incomes for families with children relative to the overall distribution. We focus on four policies that are known to enhance household income or at least limit the risk of poverty for some households. First, we examine wage coordination. Some countries coordinate wages centrally, while others, such as the United States, do not. Wage coordination is associated with a more equitable distribution of wages, and is widely studied by sociologists and political scientists. Our findings give us new insights by showing that wage coordination is associated with higher relative income of households where the fathers have low education (in corroboration of previous studies), but it does not help boost the relative income of households where the mothers have low education. Yet, single mother households, regardless of the education level of the mom, have higher relative incomes in countries with more centrally coordinated wages. Thus, for partnered families, fathers' education is a source of vulnerability (or at least sensitivity) to the context of wage coordination. Single parenting is also a source of vulnerability regardless of mothers' education. Both of these groups are more vulnerable in the income structure when wages are less centrally coordinated. Thus, wage coordination not only alters the structure of the income distribution (as found in previous research), it also changes the point where households intersect with that structure.

Second, we examine family allowances because they are the most widely studied

component of the welfare state as it relates to household income. One of the reasons that family allowances have received widespread attention is because they are important components of family income that help reduce households' risks of poverty. Yet, we find that family allowances do not significantly predict households' relative incomes. Thus, while family allowances may reduce the risk of poverty, they do not alter the financial realities of households with children relative to the overall income distribution. Households may have higher incomes, but family allowances do not noticeably alter where households with children fall in the overall income distribution. We do not mean to suggest that family allowances are not important. We just aim to qualify previous findings to suggest that while family allowances are beneficial, they do not dramatically alter the status quo. It is important to note that this analysis only focuses on households with children. Had childless households been included in the analysis, we might have found differences between these two groups. This is a topic for future research.

The final two policies, childcare and maternity leave, are work-family policies designed to help parents, mothers in particular, combine work and family. Prior scholarship has found that these policies are associated with higher wages, lower risks of poverty, particularly for single mothers, and lower inequality. We build on the previous literature by examining if these policies also alter the intersection of households' incomes with the income structure. We find that in fact work family policies alter relative incomes, but in very different ways. We find that vulnerability to the availability of public childcare must consider family structure and education in tandem; the least educated single moms are the most vulnerable to this structural condition (or absence thereof). In contrast, the relative incomes of all households with children are

conditioned by the generosity of parental leave, yet highly educated single mom households and partnered mom households where the dad has low education are the most sensitive to the presence of this policy environment.

This research has important policy implications. We began this paper by asking whether welfare states were successful at redistributing income across households, in ways that would limit inequality for households with children. In particular, we wished to explore the intersection of education and household structure – and whether policies were successful at addressing the needs of the most vulnerable, for example, households headed by less educated single mothers. We find that the benefits of some policies are widespread. For example, parental leave generosity is beneficial for most families with children. As a result, policy-makers should consider mandatory paid leaves as a strategy toward helping a wide variety of families manage work-family conflict at the point when they expand their families. Some policies, such as wage coordination and public childcare, also have targeted appeal, helping the most vulnerable groups. Thus, policy-makers should consider these policies as strategies to boost the relative incomes of some of the most vulnerable groups in society (including the least educated and single mothers). Clearly, our research further illustrates how policies can help different groups within the overall structure of inequality in a society.

References

Table 1. Clarification of the Dependent Variable: Gini Adjusted Relative Income

Period-Specific Country Gini	0.4				0.5			
Period-Specific Country Median Income, In Local Currency	400		800		400		800	
Family Income, In Local Currency	500	1000	500	1000	500	1000	500	1000
Value of Dependent Variable	**3.1**	**6.3**	**1.6**	**3.1**	**2.5**	**5.0**	**1.3**	**2.5**
Column	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)

TABLE 2. Hierarchical Linear Regression Predicting Gini Adjusted Relative Income among Households

	Model 1			Model 2			Model 3		
Intercept	-3.246	(2.926)		-3.310	(2.929)		-3.450	(2.926)	
Primary Household Level Variables									
Mom High Education	.695	(.036)	***	.738	(.040)	***	.641	(.033)	***
Mom Low Education	-.329	(.025)	***	-.355	(.025)	***	-.375	(.033)	***
Mom Medium Education (Excluded Category)	--	--		--	--		--	--	
Dad High Education	.925	(.044)	***	.861	(.041)	***	.879	(.047)	***
Dad Low Education	-.385	(.026)	***	-.349	(.025)	***	-.409	(.037)	***
No Dad in Household	-.450	(.042)	***	-.380	(.044)	***	-.476	(.047)	***
Dad Medium Education (Excluded Category)	--	--		--	--		--	--	
Mom High Education *Dad High Education	--	--		--	--		.157	(.054)	**
Mom High Education *Dad Low Education	--	--		--	--		-.027	(.088)	
Mom High Education * No Dad in Household	--	--		--	--		.162	(.055)	**
Mom Low Education * Dad High Education	--	--		--	--		-.157	(.084)	+
Mom Low Education * Dad Low Education	--	--		--	--		.051	(.032)	
Mom Low Education * No Dad in Household	--	--		--	--		.020	(.035)	
Primary Country-Year Policy Variables									
Wage Coordination	.028	(.040)		.037	(.042)		.027	(.040)	
Family Allowances	.179	(.074)	*	.181	(.074)	*	.186	(.080)	*
Public Child Care	.004	(.005)		.004	(.005)		.005	(.004)	
Parental Leave Generosity	.012	(.003)	**	.015	(.004)	***	.012	(.004)	**
Cross-level Interactions									
Dad High Education * Wage Coordination	-.030	(.028)		--	--		-.056	(.031)	+
Dad Low Education * Wage Coordination	.037	(.016)	*	--	--		.032	(.023)	
No Dad in Household * Wage Coordination	.047	(.021)	*	--	--		.050	(.027)	+
Dad High Education * Family Allowances	-.071	(.062)		--	--		.030	(.069)	
Dad Low Education * Family Allowances	.006	(.046)		--	--		.007	(.057)	
No Dad in Household * Family Allowances	-.016	(.042)		--	--		-.003	(.059)	
Dad High Education * Public Child Care	-.010	(.003)	***	--	--		-.014	(.003)	***
Dad Low Education * Public Child Care	.002	(.002)		--	--		.001	(.003)	
No Dad in Household * Public Child Care	.009	(.002)	***	--	--		.009	(.002)	***
Dad High Education * Parental Leave Generosity	.006	(.002)	**	--	--		.007	(.002)	**
Dad Low Education * Parental Leave Generosity	.002	(.002)		--	--		.002	(.002)	
No Dad in Household * Parental Leave Generosity	.003	(.001)	*	--	--		.001	(.002)	
Mom High Education * Wage Coordination	--	--		-.006	(.025)		-.038	(.019)	+
Mom Low Education * Wage Coordination	--	--		.021	(.016)		.024	(.022)	
Mom High Education * Family Allowances	--	--		-.089	(.055)		-.029	(.066)	
Mom Low Education * Family Allowances	--	--		.005	(.039)		.023	(.048)	
Mom High Education * Public Childcare	--	--		-.003	(.002)		-.003	(.002)	
Mom Low Education * Public Child Care	--	--		.004	(.002)	+	.002	(.003)	
Mom High Education * Parental Leave Generosity	--	--		-.002	(.003)		-.004	(.002)	*
Mom Low Education * Parental Leave Generosity	--	--		.000	(.002)		.000	(.002)	
Mom High Education * Dad High Education * Wage Coordination	--	--		--	--		.074	(.047)	
Mom High Education * Dad Low Education * Wage Coordination	--	--		--	--		.001	(.048)	
Mom High Education * No Dad in Household * Wage Coordination	--	--		--	--		.073	(.042)	+
Mom Low Education * Dad High Education * Wage Coordination	--	--		--	--		.055	(.055)	
Mom Low Education * Dad Low Education * Wage Coordination	--	--		--	--		.001	(.025)	
Mom Low Education * No Dad in Household * Wage Coordination	--	--		--	--		-.031	(.033)	
Mom High Education * Dad High Education * Family Allowances	--	--		--	--		-.170	(.085)	*
Mom High Education * Dad Low Education * Family Allowances	--	--		--	--		.149	(.106)	
Mom High Education * No Dad in Household * Family Allowances	--	--		--	--		-.112	(.098)	

Continued on Next page…

TABLE 2 Continued. Hierarchical Linear Regression Predicting Gini Adjusted Relative Income among Households

	Model 1			Model 2			Model 3		
Mom Low Education * Dad High Education * Family Allowances	--	--		--	--		-.069	(.094)	
Mom Low Education * Dad Low Education * Family Allowances	--	--		--	--		-.023	(.050)	
Mom Low Education * No Dad in Household * Family Allowances	--	--		--	--		.000	(.059)	
Mom High Education * Dad High Education * Public Childcare	--	--		--	--		.004	(.004)	
Mom High Education * Dad Low Education * Public Childcare	--	--		--	--		-.009	(.004)	*
Mom High Education * No Dad in Household * Public Childcare	--	--		--	--		-.002	(.004)	
Mom Low Education * Dad High Education * Public Childcare	--	--		--	--		.004	(.004)	
Mom Low Education * Dad Low Education * Public Childcare	--	--		--	--		.005	(.002)	*
Mom Low Education * No Dad in Household * Public Childcare	--	--		--	--		-.001	(.003)	
Mom High Education * Dad High Education * Parental Leave Generosity	--	--		--	--		.001	(.002)	
Mom High Education * Dad Low Education * Parental Leave Generosity	--	--		--	--		.009	(.003)	***
Mom High Education * No Dad in Household * Parental Leave Generosi	--	--		--	--		.004	(.003)	+
Mom Low Education * Dad High Education * Parental Leave Generosity	--	--		--	--		.001	(.005)	
Mom Low Education * Dad Low Education * Parental Leave Generosity	--	--		--	--		-.001	(.001)	
Mom Low Education * No Dad in Household * Parental Leave Generosi	--	--		--	--		.003	(.002)	
Control Variables									
Wave 2	1.068	(.239)	***	1.075	(.239)	***	1.101	(.238)	***
Wave 3	.820	(.189)	***	.821	(.190)	***	.839	(.190)	***
Wave 4	.446	(.164)	**	.450	(.165)	**	.465	(.165)	**
Wave 5	.149	(.108)		.151	(.108)		.164	(.109)	
Wave 6 (Excluded Category)	--	--		--	--		--	--	
Mom's Age	.057	(.002)	***	.057	(.002)	***	.057	(.002)	***
Mom Full-Time	1.013	(.061)	***	1.013	(.061)	***	1.013	(.061)	***
Mom Part-Time	.415	(.039)	***	.415	(.039)	***	.416	(.038)	***
Mom Unemployed or Out of the Labor Force (Excluded Category)	--	--		--	--		--	--	
Other Employed Adults in Household	1.105	(.044)	***	1.106	(.044)	***	1.105	(.044)	***
Group Mean -- Mom's Age	.181	(.069)	*	.183	(.069)	*	.187	(.069)	**
Group Mean -- Mom Full-Time	-1.247	(.545)	*	-1.268	(.549)	*	-1.252	(.549)	*
Group Mean -- Mom Part-Time	-.524	(.931)		-.549	(.936)		-.508	(.939)	
Group Mean -- Other Employed Adults in Household	.445	(.585)		.442	(.587)		.432	(.590)	
GDP Per Capita	.022	(.009)	*	.023	(.009)	*	.023	(.009)	*
Unemployment Rate	-.003	(.019)		-.002	(.019)		-.002	(.018)	
F-Tests for Cross-Level Interactions									
Dad's Education * Wage Coordination		F= 4.79**			--			F=4.06**	
Dad's Education * Family Allowances		F=0.49			--			F=0.6	
Dad's Education * Public Child Care		F=17.63***			--			F=12.14***	
Dad's Education * Parental Leave Generosity		F=3.46*			--			F=5.65***	
Mom's Education * Wage Coordination		--			F=0.99			F=1.22	
Mom's Education * Family Allowances		--			F=1.43			F=0.56	
Mom's Education * Public Child Care		--			F=2.01			F=3.07*	
Mom's Education * Parental Leave Generosity		--			F=0.28			F=0.14	
Dad's Education * Mom's Education * Wage Coordination		--			--			F=1.82+	
Dad's Education * Mom's Education * Family Allowances		--			--			F=2.1+	
Dad's Education * Mom's Education * Public Child Care		--			--			F=6.32***	
Dad's Education * Mom's Education * Parental Leave Generosity		--			--			F=5.28***	
Random Effects									
Intercept	.146	(.035)	***	.144	-(.035)	***	.148	(.035)	***
Mom's Education	.036	(.006)	***	.032	(.006)	***	.032	(.006)	***
Dad's Education	.032	(.005)	***	.048	(.006)	***	.028	(.005)	***
Mom's Education * Dad's Education	--	--		--	--		.012	(.003)	***
Residual	2.494	(.008)	***	2.494	(.008)	***	2.489	(.008)	***

Note: 198,509 households nested within 68 surveys for 17 countries; *** p<.001 **p<.01 *p<.05 +p<.10

Figure 1. Distribution of Gini Adjusted Relative Income, Income Ratios, and the Gini Index for Average Households with Children across Countries, circa 2000.
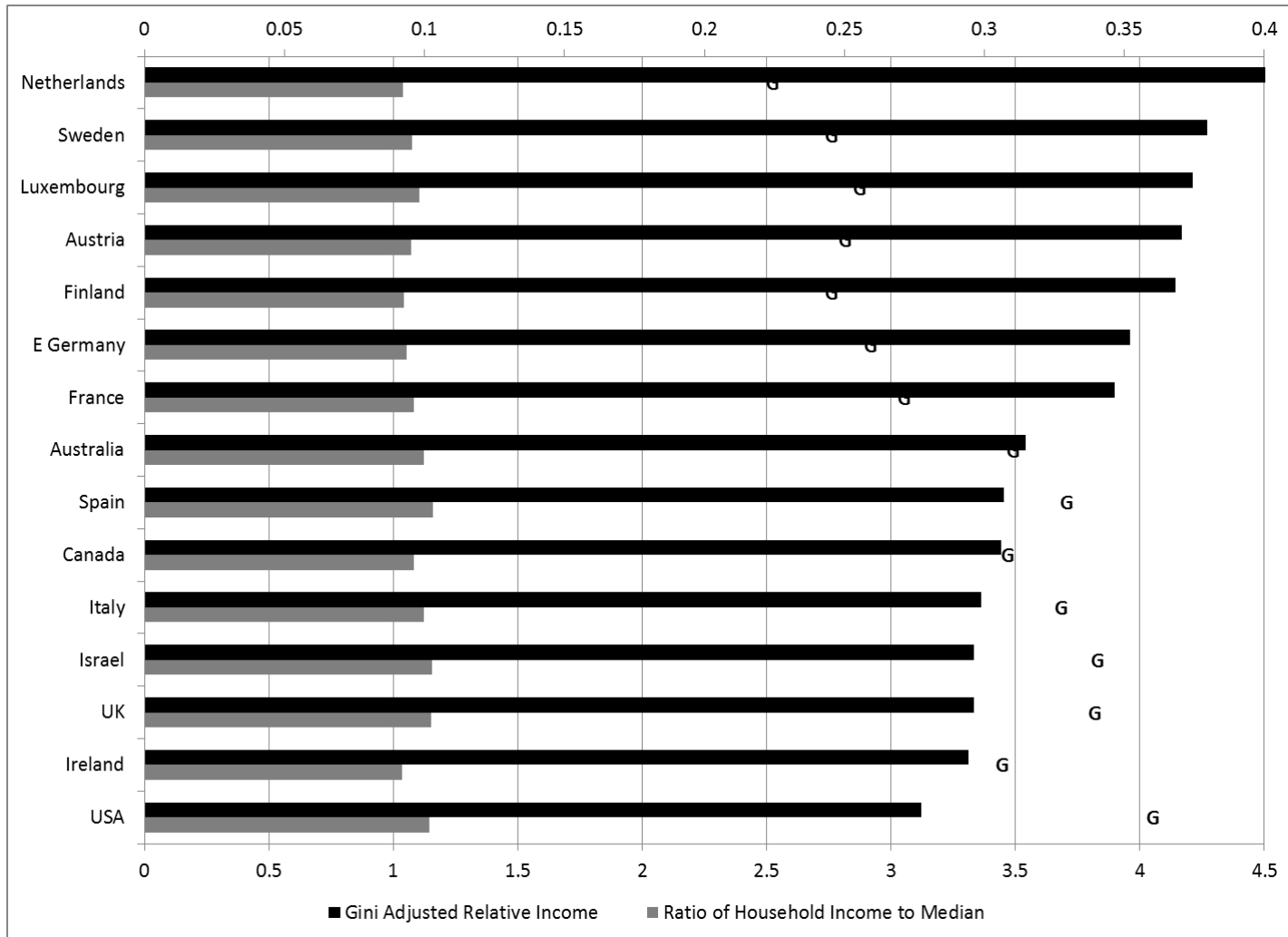
Figure 2. Predicted Gini Adjusted Relative Income for Households with Children by Partnership Status, Parental Education, and Public Child Care (from Table 2, Model 3)
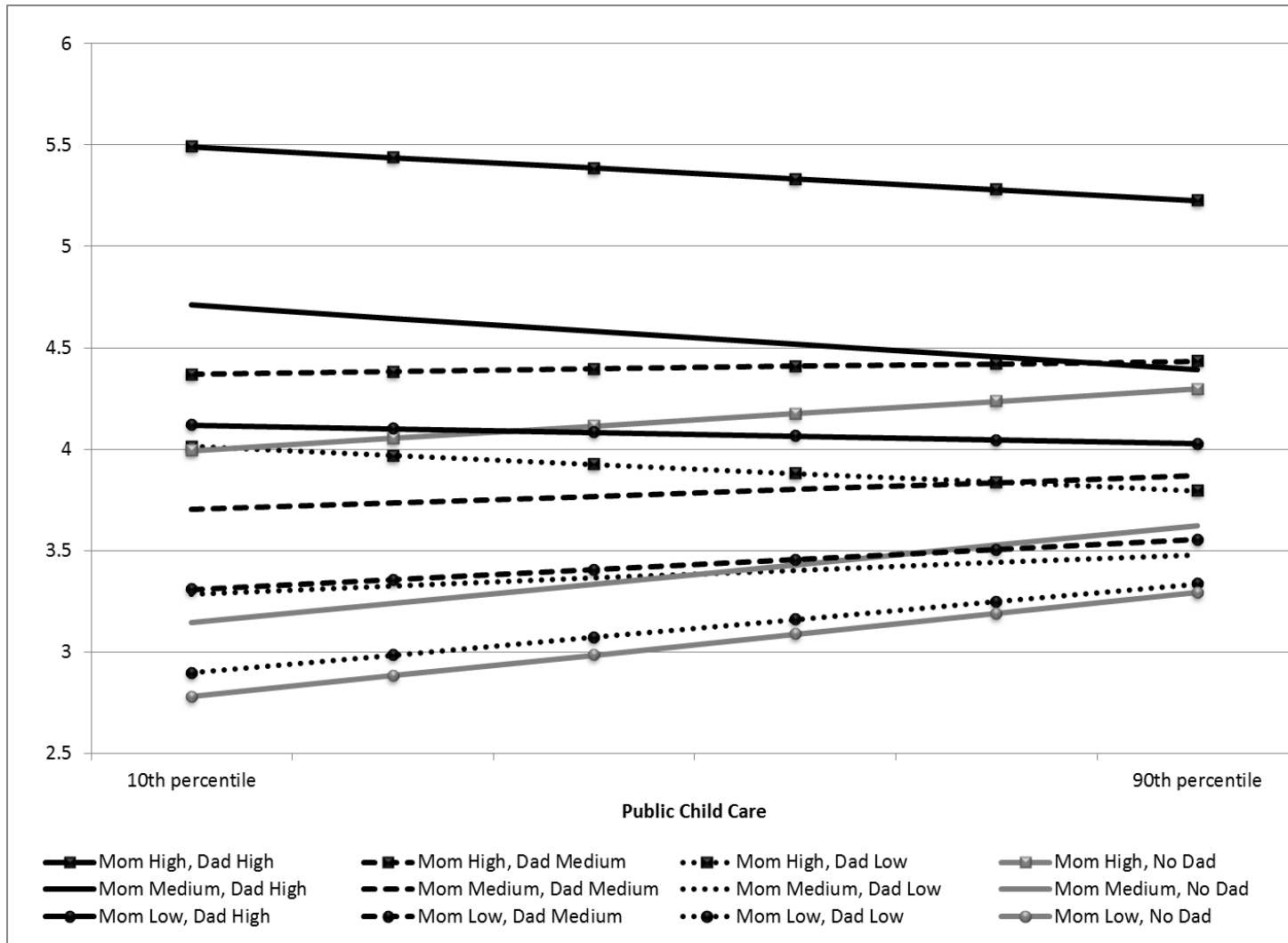
Figure 3. Predicted Gini Adjusted Relative Income for Households by Partnership Status, Parental Education, and Parental Leave Generosity
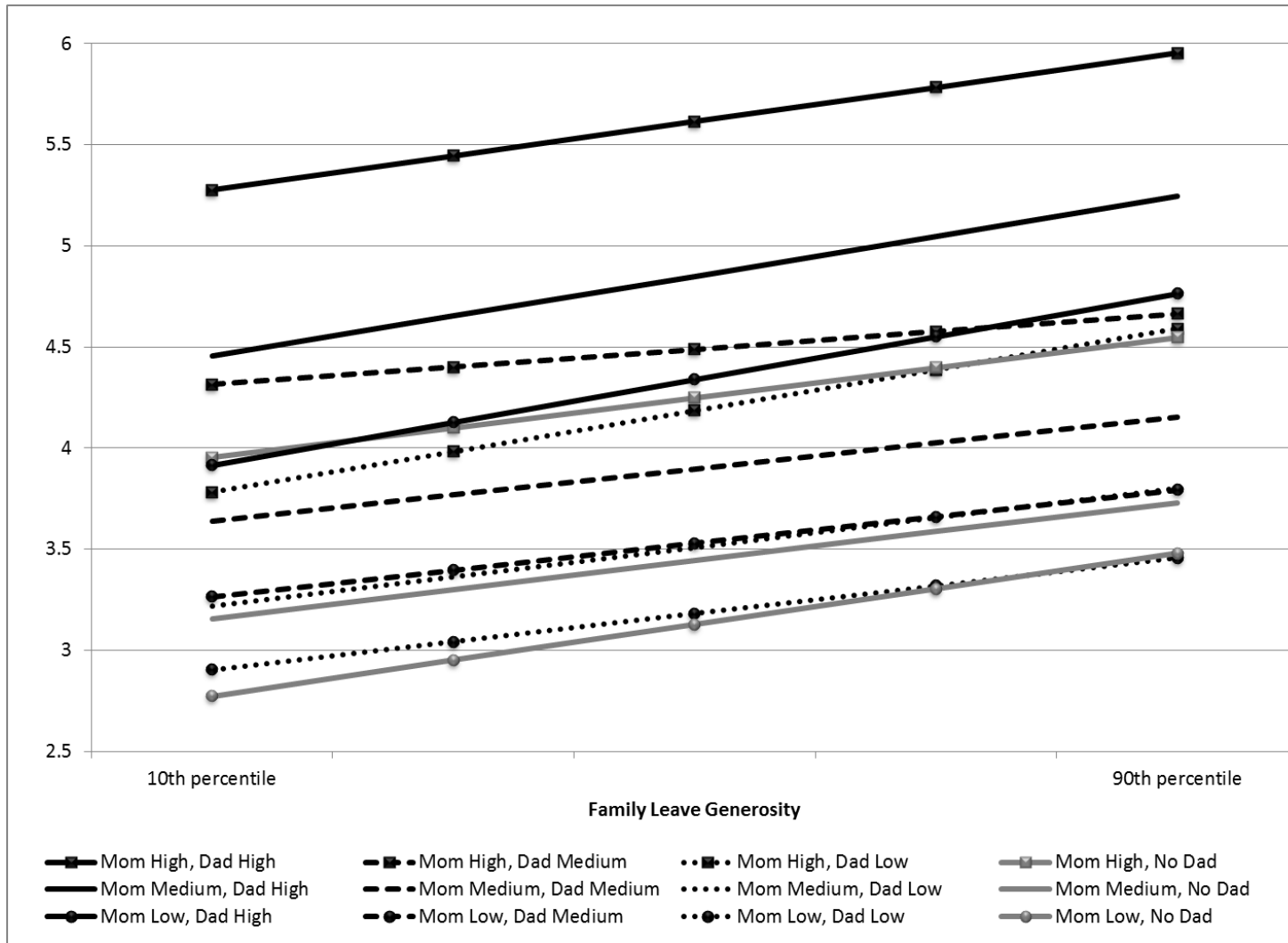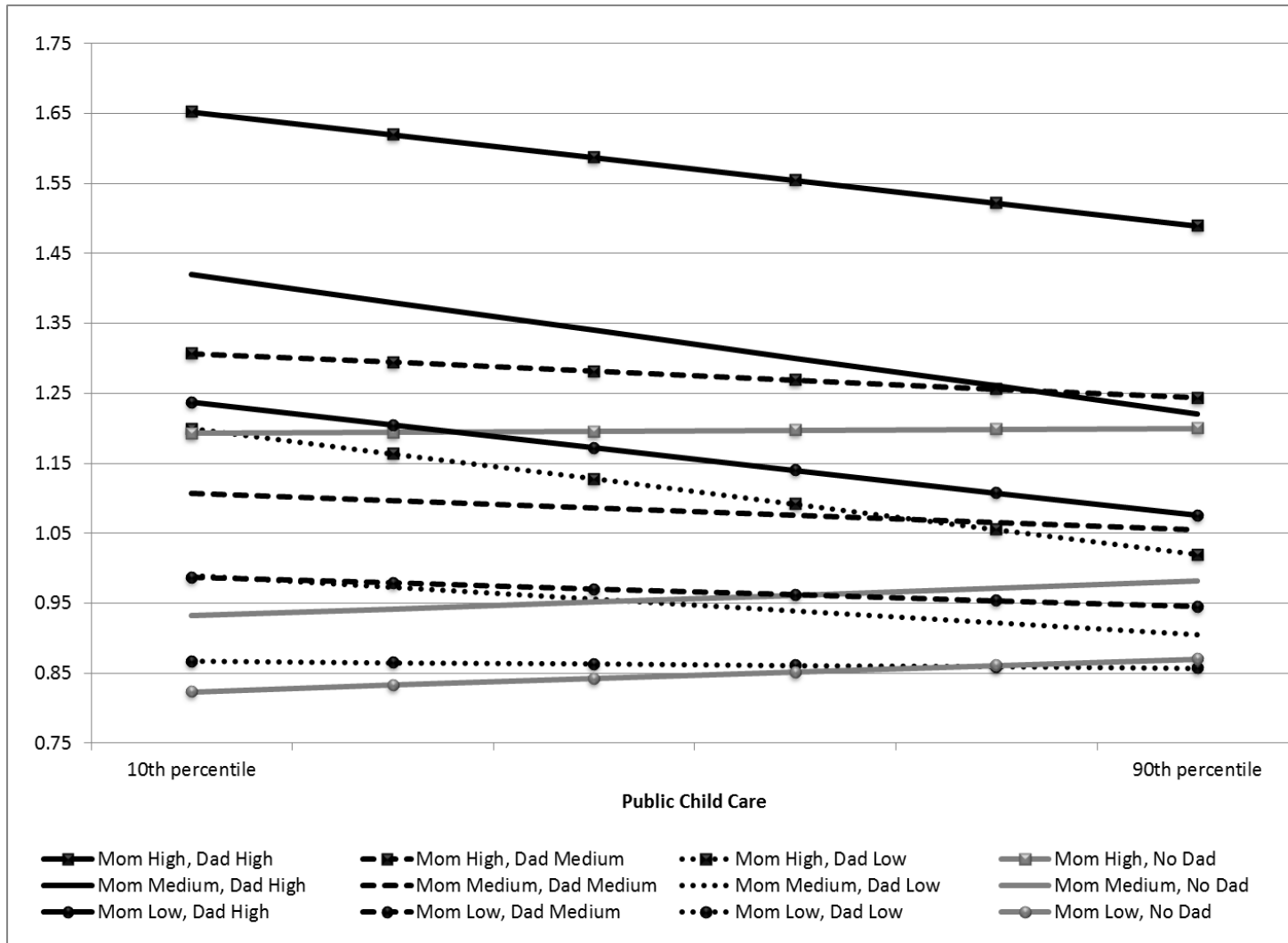
Figure 4. Predicted Ratio of Household Income to Median by Partnership Status, Parental Education, and Public Child Care

Appendix A: Country Years Included in the Analyses

Wave 2	Wave 3	Wave 4	Wave 5	Wave 6
Australia 85	Australia 89	Australia 95	Australia 01	Australia 03
		Austria 95	Austria 00	Austria 04
Belgium 85	Belgium 88	Belgium 95		
Canada 87	Canada 91	Canada 94	Canada 00	Canada 04
Finland 87	Finland 91	Finland 95	Finland 00	Finland 04
		France 94	France 00	France 05
		East Germany 94	East Germany 00	East Germany 04
	West Germany 89	West Germany 94		West Germany 04
		Ireland 95	Ireland 00	Ireland 04
	Israel 92	Israel 97	Israel 01	Israel 05
	Italy 91	Italy 95	Italy 00	Italy 04
Luxembourg 85	Luxembourg 91	Luxembourg 94	Luxembourg 00	Luxembourg 04
Netherlands 87	Netherlands 91	Netherlands 94	Netherlands 99	Netherlands 04
		Spain 95	Spain 00	Spain 04
	Sweden 92	Sweden 95	Sweden 00	Sweden 05
United Kingdom 86	United Kingdom 91	United Kingdom 95	United Kingdom 99	United Kingdom 04
United States 86	United States 91	United States 94	United States 00	United States 04

Appendix B: Description of Independent Variables Included in the Analysis	
Variables	**Definition**
Household Level	
Mom's Education	3 categories: low, medium (excluded), and high
Dad's Education and Partnership Status	4 categories : low, medium (excluded), high, and no father in the household
Mom's Age	Mother's age in years
Mom's Employment Status	3 categories: full-time (more than 30 hours per week), part-time, and unemployed or not in the labor force
Other Employed Adults in Household	1= presence of other employed adult(s) in household. This includes spouse of the mother, adult children, and any other adult
Country-Year Level	
Family Allowance Generosity	Percentage of the average income that the state provides as public family assistance
Public Childcare	Percentage of children ages 0 to 2 in publicly funded childcare and early childhood education programs
Parental Leave	Weeks of leave multiplied by the leave benefits as a percent female median income
Wage Coordination	Measured through Kenworthy's index, continuous variable: 1 = most decentralized wage bargaining and 5 = most centralized wage bargaining
Unemployment Rate	Percent unemployed
GDP	Constant 2000 US dollars, lagged two years from the LIS data years
Wave	Dummy for each wave
Group Mean –Mom's Age	Group mean of mom's age
Group Mean -- Mom Full-Time	Group mean of mom employed full-time
Group Mean -- Mom Part-Time	Group mean of mom employed part-time
Group Mean -- Other Employed Adults	Group mean of other employed adults in the household

Note: Mom's education and dad's education are not centered and do not require group means.

Appendix C. Hierarchical Linear Regression Predicting Ratio of Household Income to Median

	Estimate	Std Error
Intercept	-.208	(.636)
Primary Household Level Variables		
Mom High Education	.198	(.011) ***
Mom Low Education	-.118	(.011) ***
Mom Medium Education (Excluded Category)	--	--
Dad High Education	.275	(.017) ***
Dad Low Education	-.127	(.012) ***
No Dad in Household	-.149	(.014) ***
Dad Medium Education (Excluded Category)	--	--
Mom High Education *Dad High Education	.045	(.016) **
Mom High Education *Dad Low Education	-.013	(.027)
Mom High Education * No Dad in Household	.053	(.016) **
Mom Low Education * Dad High Education	-.056	(.027) *
Mom Low Education * Dad Low Education	.015	(.009)
Mom Low Education * No Dad in Household	.009	(.010)
Primary Country-Year Policy Variables		
Wage Coordination	-.038	(.009) ***
Family Allowances	.003	(.019)
Public Child Care	-.002	(.001)
Parental Leave Generosity	-.001	(.001)
Cross-level Interactions		
Dad High Education * Wage Coordination	-.026	(.009) **
Dad Low Education * Wage Coordination	.019	(.008) *
No Dad in Household * Wage Coordination	.025	(.007) ***
Dad High Education * Family Allowances	-.019	(.023)
Dad Low Education * Family Allowances	.025	(.017)
No Dad in Household * Family Allowances	.017	(.018)
Dad High Education * Public Child Care	-.004	(.001) ***
Dad Low Education * Public Child Care	-.001	(.001)
No Dad in Household * Public Child Care	.003	(.001) ***
Dad High Education * Parental Leave Generosity	.001	(.001) +
Dad Low Education * Parental Leave Generosity	.001	(.001) *
No Dad in Household * Parental Leave Generosity	.001	(.001) *
Mom High Education * Wage Coordination	-.024	(.006) ***
Mom Low Education * Wage Coordination	.011	(.007)
Mom High Education * Family Allowances	-.026	(.018)
Mom Low Education * Family Allowances	.024	(.014) +
Mom High Education * Public Childcare	.000	(.001)
Mom Low Education * Public Child Care	.000	(.001)
Mom High Education * Parental Leave Generosity	-.002	(.001) **
Mom Low Education * Parental Leave Generosity	.001	(.001)
Mom High Education * Dad High Education * Wage Coordination	.021	(.013)
Mom High Education * Dad Low Education * Wage Coordination	.003	(.014)
Mom High Education * No Dad in Household * Wage Coordination	.019	(.012) +
Mom Low Education * Dad High Education * Wage Coordination	.019	(.016)
Mom Low Education * Dad Low Education * Wage Coordination	-.004	(.007)
Mom Low Education * No Dad in Household * Wage Coordination	-.008	(.009)
Mom High Education * Dad High Education * Family Allowances	-.050	(.024) *
Mom High Education * Dad Low Education * Family Allowances	.046	(.033)
Mom High Education * No Dad in Household * Family Allowances	-.049	(.030)

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Appendix C Continued. Hierarchical Linear Regression Predicting Ratio of Household Income to Median

	Estimate	Std Error
Mom Low Education * Dad High Education * Family Allowances	-.006	(.029)
Mom Low Education * Dad Low Education * Family Allowances	-.013	(.014)
Mom Low Education * No Dad in Household * Family Allowances	-.002	(.017)
Mom High Education * Dad High Education * Public Childcare	.001	(.001)
Mom High Education * Dad Low Education * Public Childcare	-.002	(.001) *
Mom High Education * No Dad in Household * Public Childcare	-.001	(.001)
Mom Low Education * Dad High Education * Public Childcare	.001	(.001)
Mom Low Education * Dad Low Education * Public Childcare	.002	(.001) **
Mom Low Education * No Dad in Household * Public Childcare	.000	(.001)
Mom High Education * Dad High Education * Parental Leave Generosity	.000	(.001)
Mom High Education * Dad Low Education * Parental Leave Generosity	.003	(.001) ***
Mom High Education * No Dad in Household * Parental Leave Generosity	.001	(.001)
Mom Low Education * Dad High Education * Parental Leave Generosity	.001	(.001)
Mom Low Education * Dad Low Education * Parental Leave Generosity	-.001	(.000)
Mom Low Education * No Dad in Household * Parental Leave Generosity	.001	(.001)

Control Variables

	Estimate	Std Error
Wave 2	-.019	(.043)
Wave 3	.010	(.034)
Wave 4	.017	(.030)
Wave 5	-.005	(.027)
Wave 6 is Excluded Category	--	--
Mom's Age	.018	(.001) ***
Mom Full-Time	.314	(.016) ***
Mom Part-Time	.128	(.010) ***
Other Employed Adults in Household	.344	(.014) ***
Group Mean -- Mom Full-Time	-.261	(.101) *
Group Mean -- Mom Part-Time	-.279	(.176)
Group Mean -- Mom's Age	.034	(.016) *
Group Mean -- Other Employed Adults in Household	.250	(.105) *
GDP Per Capita	.000	(.002)
Unemployment Rate	.007	(.004)

F-Tests for Cross-Level Interactions

Dad's Education * Wage Coordination	F= 11.91***
Dad's Education * Family Allowances	F=2.36^
Dad's Education * Public Child Care	F=20.40***
Dad's Education * Parental Leave Generosity	F=15.49***
Mom's Education * Wage Coordination	F= 2.06
Mom's Education * Family Allowances	F=2.5^
Mom's Education * Public Child Care	F=1.10
Mom's Education * Parental Leave Generosity	F=1.58
Dad's Education * Mom's Education * Wage Coordination	F= 1.54
Dad's Education * Mom's Education * Family Allowances	F=2.35*
Dad's Education * Mom's Education * Public Child Care	F=5.53***
Dad's Education * Mom's Education * Parental Leave Generosity	F=4.67***

Random Effects

	Estimate	Std Error
Intercept	.003	(.001) **
Mom's Education	.004	(.001) ***
Dad's Education	.003	(.000) ***
Mom's Education * Dad's Education	.001	(.000) ***
Residual	2.588	(.001) ***

Note: 198,509 households nested within 68 surveys for 17 countries; ***p<.001 **p<.01 *p<.05 +p<.10