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Public Policies and the Employment of Mothers:

A Cross-National Study

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ABSTRACT

Drawing on policy variation across fourteen industrialized countries this study analyzes the effect of public child care and parental leave policy on the employment patterns of mothers with young children. The independent variable is national policy performance, as captured in two comparative indices that integrate eleven policy indicators. The dependent variable is the magnitude of each country's "child penalty;" i.e., the estimated decrease in mothers' employment probability given the presence of young children at home, ceteris paribus. Each country's child penalty is estimated using micro-data from the Luxembourg Income Study. The results suggests that policy configurations shape the employment patterns of mothers, primarily improving alternatives to withdrawing from employment for mothers who choose to combine employment and parenting.

INTRODUCTION

In the last three decades, women's participation in the paid labor market has increased dramatically throughout the industrialized countries. A range of factors, including changing gender roles, demographic and economic shifts, and political and policy developments have influenced changing female employment patterns. Policy scholars and labor market analysts alike are particularly interested in the role that policy variables play in shaping women's labor supply decisions. The role of policy in supporting women's employment is also of concern to lawmakers who grapple with issues of labor market efficiency and productivity, employment discrimination, and family economic security. In the United States, with high and growing levels of poverty among families, it is particularly important that policy-makers understand the factors that facilitate full and continuous access to labor force participation by women as well as by men.

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Employment rates and patterns of labor market withdrawals associated with child caretaking vary dramatically across countries. Several single-country studies suggest that public policies influence female employment patterns. There is strong evidence that child care and parental leave policies facilitate employment among mothers. The level of public provision of child care and parental leave also varies cross-nationally, with the United States lagging markedly in both policy areas. Despite the research opportunity provided by this "natural experiment" (i.e., access to policy variation that cannot be observed within a single country), there is little cross-national comparative research on the impact of national child care and maternity leave policies on employment. While several descriptive studies relate policy variation to employment patterns across small samples of countries, none consider the impact of a package of policies on employment using a large number of countries.

This paper uses data from fourteen industrialized countries, during the middle to late 1980's, to analyze the effect of public child care and parental leave policies on the employment patterns of mothers with young children. The intensity of each country's policy effort is captured in a pair of composite indices of policies that maternal employment for mothers with infants and for those with preschool children (Gornick, Meyers and Ross 1996)[1]. The primary indicator of maternal employment patterns is the magnitude of each country's "child penalty." This measure estimates the decrease in mothers' probability of being employed, given the presence of young children in the home, *all else equal*. Child penalties are measured by estimating multivariate labor supply equations with micro-data from the Luxembourg Income Study (LIS). The impact of policy on maternal employment is analyzed by associating the aggregate (national-level)

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1.   In this paper, the term "infant" is used to refer to children up until the third birthday; this age group is often referred to as "infants and toddlers" or as the "under 3's." The term "preschoolers" is used to refer to children aged three through five, taking into account in our empirical work the fact that the age of compulsory schooling varies from five to seven across the industrialized countries. Children aged six and older are referred to as "school-age" children.

policy measures with the country-specific estimates of the child penalties (at the household level).

The paper is organized into six parts. The first section summarizes recent trends in maternal employment and reviews relevant labor supply theory and empirical research on the role of child care and maternity leave policies in female employment. In the second section, an overview of methods and the data are presented and the study's research questions are discussed in more detail. The third and fourth sections describe the two composite indices of policies that support maternal employment and the estimation of country-specific child penalties. In the fifth section, the association between national policies and employment patterns is analyzed. Conclusions and implications for policy in the United States are presented in the final section.

BACKGROUND AND LITERATURE

Maternal Employment in Industrialized Countries

Many labor economists and other scholars describe the influx of women into paid work as the single most influential change in the labor markets of industrialized countries in the post-war period (OECD 1992). Increasing labor force participation by women has signaled at least a partial dismantling of the entrenched sexual division of labor that pervades all Western economies. It has also fueled widespread debate about labor and social welfare policies predicated on the assumption that children will be cared for in two-parent, single earner families.

Between 1960 and 1990, women's labor force participation increased in every OECD country; in some countries, women's participation rates more than doubled. Since male participation rates fell steadily throughout the same period -- though from much higher base levels -- the female share of the labor force rose even more rapidly. By 1990, the female share

was over 35 percent in all OECD countries, except Ireland; between 40 and 45 percent in most countries; and nearly 50 percent in Sweden and Finland (OECD 1992).[2]

Rising levels of female economic activity have been traced to several economic, social, and political changes. Economists often note that women have both been pulled into employment, by expanding opportunities, and pushed into paid work by stagnant and declining male wages in many industrialized countries (OECD 1994). For a growing number of families headed by single mothers and those headed by two adults with limited job skills, economic security now depends on women's earnings. Increasingly, women's direct involvement in the workplace is viewed as a prerequisite for full citizenship status (Pateman 1988). Economic independence lessens barriers and increases opportunities for political participation and for influencing public policy formation (O'Connor 1993; Pateman 1988). The wellbeing of married women, and of their spouses and children, has been found to be positively affected by women's involvement in paid work (see Spitze 1988 for a review of the effects of women's employment on family relations).

Increased maternal employment has also brought new challenges for families. The challenges are especially great for mothers, since women remain the primary caretakers of children in all Western countries. Many mothers have responded to the competing demands of employment and childrearing by loosening their attachment to paid work in a variety of ways. For example, women with dependent children often engage in intermittent employment and/or in various forms of reduced-hour and contingent work, nearly all of which exert downward pressure

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2.   While women's labor force participation increased in all OECD countries, change in the percentage of women working part-time showed more variation. Interestingly, OECD data reveal that, in 1990, there was virtually no relationship, across countries, between the female share in the labor force and the female share in part-time employment. Between 1980 and 1990, the percentage of employed women working part-time increased, sometimes dramatically, in two-thirds of the OECD countries; and decreased, usually modestly, in one-third. In 1990, the female share in part-time work ranged from 60 percent (in Italy) to just over 90 percent (in West Germany); the countries in this study spanned the full range (OECD 1991).

on their wages and benefits (Callaghan and Hartmann 1991; Dex 1992; Gornick and Jacobs 1996; Levitan and Conway 1992; Rosenfeld 1993; Rosenfeld and Kalleberg 1990; Tilly 1990). These accommodations can have important implications for their short- and longer-term economic success.

Cross-National Variations in Policy and Employment

Rates of employment among women vary across countries with similar levels of economic development. In the late 1980's, for example, only 25 percent of mothers in the Netherlands were employed, while 88 percent of Swedish mothers were working for pay (authors' calculations, LIS micro-data). Cross-national variation is also evident in patterns of full-time and part-time employment (Gornick and Jacobs 1996; OECD 1994; Rosenfeld and Birkelund 1995) and in employment withdrawals associated with caretaking responsibilities for children (Gornick 1994).

Cross-national differences in the level of government support for women who combine paid market work with unpaid caretaking are also dramatic. Two subsets of family policies that vary across countries are understood to have particular relevance for the employment of women with children: child care and parental leaves (Hofferth and Deich 1994; Gustaffson and Stafford 1995; Kamerman 1991; Kamerman and Kahn 1991). For example, while most Western industrialized countries provide some form of paid maternity leave the weeks of coverage vary from as few as 12 in many countries to as high as 52 in Sweden. Provisions for nonmaternal care of children also vary widely. In Denmark, nearly half (48 percent) of children under three have access to public child care, and almost as many Swedish infants (32 percent) are in public care. Most other industrialized countries lag far behind these Nordic countries in provisions for infants, with enrollments of 5 percent or less. Public child care is generally more available for

children over three. A number of European countries now provide care for 85 percent or more of preschool-aged children. Variation is still great, however. Several English speaking countries, including the United Kingdom and Australia, provide care for half this number or less. On nearly all these policy dimensions, the United States falls well behind comparably developed countries, with no public paid maternity leave provisions and only extremely limited and narrowly targeted public care subsidies (Gornick, Meyers and Ross 1996).

Cross-national variations in policy and employment provide researchers with an important opportunity to study the role of public policies in shaping patterns of maternal employment. Since the United States lags behind most other countries in policies that support maternal employment, a cross-national comparison of these policies and employment patterns would be especially informative for United States policy analysts. Little empirical research has been done, however, on questions of how variation in policy configurations explain inter-country differences in female employment patterns. Research has been limited almost exclusively to descriptive reports based on aggregate data. A small body of macro-level empirical research relates inter-country differences in women's labor force participation to aggregate population indicators, such as sex ratios and divorce rates, as well as to various measures of national economic development (Ferber and Berg 1991; Mincer 1985; Schultz 1990; Semyanov 1980)..

Comparative micro-level research on the nature of women's decisions regarding their involvement in paid work is extremely limited. The considerable body of comparative research on the gender gap in earnings (Blau and Kahn 1992; Rosenfeld and Kalleberg 1990; Treiman and Roos 1983) does not yet have a developed counterpart in micro-level analyses of female labor supply partly because comparative studies of the wage gap have relied heavily on micro-datasets that include only workers, often full-time workers. Three recent studies of female employment (Gornick 1994; Knudsen and Peters 1994; Phipps 1993), all using micro-data from the

Luxembourg Income Study (LIS), signal growing interest in comparative analyses of factors that affect women's employment decisions.

The Theory of Female Labor Supply

Micro-economic theory provides a well-known framework for analyzing the impact of policy and non-policy factors on women's choices regarding the allocation of their time between paid work and all other activities. Extending the basic micro-economic consumption model, labor supply is viewed as a consumption choice between two commodities -- market income and time spent outside of paid work (i.e., non-market time).

Women are assumed to have individualized sets of preferences, typically conceptualized as reflecting their "tastes" for income versus time at home and represented by maps of downward-sloping indifference curves. Women maximize their utility, subject to a set of constraints. According to labor supply theory, a woman faces a budget constraint determined by her market wage rate (i.e., the slope of the budget constraint) and her other available income (i.e., her non-market or endowed income). Women will choose the combination of market income and non-market time determined by the point of tangency between the budget constraint and the highest possible indifference curve.[3]

The micro-economic model of female labor supply provides a basis for theorizing the effects of policy and other variables on female labor supply. For women with dependent

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3.   Several simplifying assumptions are embodied in this model. First, all earned income is spent on consumption goods. Second, all non-market time is spent in the production of some commodity. This simplifying assumption eliminates the need to distinguish between leisure and time spent in home production. Third, a woman's market hourly wage rate is independent of her hours worked; i.e., the budget constraint has a constant slope. Fourth, non-labor income is independent of a woman's participation or hours worked. (For a presentation of the micro-economic model of female labor supply and its underlying assumptions, see Berndt 1991; Blau and Ferber 1992; Heckman 1993; or Killingsworth 1983).

children, critical factors include the number and ages of children, and the availability and generosity of various government policies that offset the associated caretaking demands.

The Effects of Child-Related Variables on Female Labor Supply

There is an extensive and sophisticated empirical literature on the labor supply of women, especially that of wives (Berndt 1991; Heckman 1993; Killingsworth 1983; Killingsworth and Heckman 1986). The micro-economic literature on female labor supply has focused primarily on estimating the effects of changes in potential or actual wages and/or in non-market income on various measures of labor supply. By the 1980s, a qualitative consensus among empirical researchers had developed: female labor force participation and hours of work are positively associated with market wage rates and negatively associated with non-earned income. Although the estimated magnitudes of these effects vary dramatically across studies, women are consistently found to be much more sensitive than men to changes in both wage rates and non-earned income (Berndt 1991).

The labor supply model further suggests that the *presence of children* in the home will have an impact on a woman's decision to enter the labor force and also on her hours worked. Children are understood to raise the value that a woman places on her time outside of paid work (i.e., to steepen her indifference curves). To the extent that substitute care involves expenditures, children lower women's effective market wages. Thus, as a woman's childrearing responsibilities increase it is less likely that her market wage will exceed her reservation wage ans the probability that she will participate in paid work decreases. For women who are labor force participants, greater childrearing responsibilities would reduce their hours in paid work. A large body of empirical research reports the negative effect of having young children on maternal labor supply (Connelly 1991; Leibowitz, Waite and Witsberger 1988; Mallier and Rosser 1986).

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The Effects of Child Care and Parental Leave Policies on Maternal Employment

Child Care. The conventional labor supply model suggests at least two straightforward approaches to the effects of child care availability, quality, and/or price on women's preferences for employment and hours worked. The first approach depicts child care conditions as affecting women's preferences for non-market time versus time spent in paid work (Blau and Ferber 1992). Theoretically, more satisfactory child care alternatives would decrease mothers' preferences for time spent at home versus time spent in market work, *all else equal*. Thus, having better child care alternatives would flatten mothers' indifference curves and reduce the value that they place on time at home. Any decrease in the reservation wage, other factors held constant, would increase women's probability of seeking employment and would lengthen their hours worked.[4]

In the second approach child care affects women's budget constraints rather than their relative preferences for home time (Connelly 1992; Michalopoulos, Robins and Garfinkel 1992; Ribar 1991). The price of market child care may be viewed as a tax levied on mothers' hourly wages so that higher-priced care would have the same effect as lower net wages -- a decrease in both employment and hours of paid work among women.

Importantly, both theoretical approaches suggest that improvements in women's child care options will be associated with increases in maternal labor supply. Recent empirical

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4.   Feminist economists Blau and Ferber suggest that "tastes" and "preferences" are, in fact, different. Preferences, in effect, are tastes constrained by social attitudes and by the lack of supports for women attempting to combine work and family. "[T]he willingness of a woman to substitute purchased services for her own time in child care is undoubtedly influenced by the social acceptability of doing so" (p.87). They also argue that "when suitable child care becomes available at a lower cost" a woman's home time becomes less valuable to her. Thus, a woman's strong preference for time at home should not be interpreted as indicative of some intrinsic taste for home time, but rather as the result of her tastes shaped by existing constraints. Blau and Ferber conclude their discussion on factors that affect women's preferences for income versus non-market time: "Although such considerations do not invalidate the use of this model in analyzing women's labor supply decisions, they do serve to make us aware that the term tastes (or preferences), as economists use it, covers a lot of ground" (p.87).

research suggests that the relationships among the demand for child care, the price and availability of care, and women's labor supply are complicated and multi-directional. On the whole, however, the literature supports the theoretically-driven prediction that having more attractive child care options increases maternal employment (Blau and Robins 1988; Connelly 1990, 1991, 1992; Kimmel 1995; Leibowitz, Klerman and Waite 1992; Meyers 1993; Michalopoulos, Robins and Garfinkel 1992; Ribar 1992; U.S. General Accounting Office 1994).

Most empirical research focuses on the *price* of substitute care. In their review of the literature on child care price, Leibowitz et al. (1992) conclude: "These studies paint a relatively consistent picture of the impact of child care costs on women's employment. Although the studies differ in the way that they measure costs, all find that the supply of women's labor to the market declines as costs of child care rise" (p.116). The U.S. General Accounting Office (1994) concurs, noting however that estimates of the care price elasticity of women's employment vary widely (from -.20 to -.78). Connelly (1992), reporting one of the smallest elasticities, calculated that the predicted employment rate in her sample of married women would increase from 59 to 69 percent if universal no-cost child care were available.

Leibowitz, Klerman and Waite (1992) note that little empirical research examines the effects of the *availability* of child care, either formal or informal. Leibowitz, Waite and Witsberger (1988) found that the availability of informal care increases maternal employment. Stolzenberg and Waite (1984) reported that the availability of formal care is associated with a decrease in the effect of having young children on women's employment. Survey evidence from several industrialized countries indicates that mothers of young children perceive that limitations on child care options constrain employment and their hours worked (Cohen 1993; Dex and Shaw 1986; Hayes, Palmer and Zaslow 1990; Presser 1980; White 1983).

Parental Leave. The relationship between maternal employment and parental leave policies is understood differently. The presence of strong maternity leave provisions -- especially those including wage replacement -- are generally believed to increase women's attachment to paid work in the short term. In addition to offering basic income support to new mothers, many maternity policies are explicitly designed to prevent women from exiting employment following childbirth (Trzcinski 1991).

The relationship between certain maternity leave features and mothers' patterns in paid work, however, is complicated and dynamic. In contrast to child care, which lessens constraints arising from childrearing responsibilities and enables mothers to spend more time on the job, maternity leaves allow working mothers to spend more time at home -- even though they usually remain officially "employed." Some scholars of maternity provisions express concerns that policies that enable long leave periods may limit certain career-enhancing opportunities that require a degree of continuity on the job (e.g., opportunities for training and promotion). This limit may have a negative long-term effect on mothers' earnings and, in turn, on their labor supply.[5] On the other hand, maternity provisions might strengthen mothers' long-term labor market attachment, since job guarantees and wage replacement presumably lessen the probability that mothers will exit paid work or change jobs following each childbirth.

The empirical literature on the effects of leave provisions on mothers' employment is limited. In their discussion of existing research, Ondrich, Spiess and Yang (1995) cite three studies of the relationship between leave provisions in the United States and women's employment. O'Connell (1990) reports that the availability of employer-provided leave increases the likelihood of an early return to work after the birth of a first child. Joesch (1995) concludes

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5.   Similarly, generous "sick child" leave provisions in Sweden are said to contribute to very high rates of daily absenteeism by mothers (Kolberg 1991). At the same time, without the variety of leave provision in place, it is widely believed that Sweden's very high rates of female labor force participation would be much lower.

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that women's labor force attachment increases with the provision of paid leave. Klerman and Leibowitz (1995), however, found only weak evidence of a relationship between state maternity leave statutes and employment.

Cross-National Research. Some new comparative studies use LIS micro-data to study cross-national variation in women's employment at the individual level (Gornick 1994; Knudsen and Peters 1994; Phipps 1993). Estimating identically-specified models across industrialized countries, these studies point to negative associations between indicators of parenting responsibilities and various measures of female labor supply, including participation, employment and hours. All of these studies report that the magnitude of these child-related effects -- what is referred to here as the child penalty -- varies across countries. The authors of these studies suggest that policy variation underlies the inter-country differences in child effects.

While there is a rich literature describing cross-national policy variation, scholars have rarely focused on how policy variation shapes the cross-national portrait of women's employment. The primary exception is scholarship on the role of public-sector expansion in shaping female employment (Esping-Andersen 1990; Kolberg 1992; Meyer 1994; OECD 1994; Rein 1985). In addition, Whitehouse (1992) found that elements of equal opportunity legislation and centralized wage-fixing are associated with increases in women's labor force participation in OECD countries. Furthermore, some comparative scholars have reported that features of national income tax codes, especially marginal tax rates, affect the employment decisions of married women (Dex and Shaw 1986; Gustafsson 1991; Norregaard 1990; Schmidt 1993; Wolff 1990).

Comparative research linking family policy and female employment is remarkably limited. Schmidt (1993) reported that growth rates in child care provision between 1960 and 1980 were positively associated with increases in female employment rates across eighteen

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OECD countries. Cross-national studies on the effect of parental leave on women's employment patterns are even more sparse. Using data from seventeen countries, Ruhm and Teague (1995) conclude that the duration of paid parental leave is associated with increased employment for both women and men. Others have reported, based on comparative research, that elements of child care and/or maternity leave policy affect not only women's labor force participation but their hours worked as well (Dex and Shaw 1986; Gornick 1994; Gustafsson and Stafford 1995; Rosenfeld and Birkelund 1995).

METHODS AND DATA

Methodological Overview

This study draws on existing policy variation across fourteen industrialized countries during the late 1980's to examine the effect of child care policy and public parental leave provisions on the employment patterns of married mothers. A variety of single-country studies have concluded that the more attractive a family's child care options are, the more likely it is that mothers will seek paid employment. To date, no researchers have systematically used cross-national variation in child care and leave policies to explore this link.

For the *independent* variable, this study uses two indices that integrate several measures of public support for child care and parental leave (Gornick, Meyers and Ross 1996). These indices were constructed to capture the intensity of a country's policies that facilitate the labor force participation of mothers.

The *dependent* variable is the magnitude of the child penalty in each country. Child penalty is defined as the estimated decrease in married mothers' employment given the presence of young children in the home, *all else equal*. This study focuses on cross-national variation in

these child penalties, rather than on variation in maternal employment rates *per se*, to control for other policy and non-policy factors that influence cross-national variations in employment levels. The magnitude of each country's child penalty is measured by estimating country-specific labor supply equations using micro-data from the Luxembourg Income Study (LIS).

The central hypothesis underlying this study is that cross-national variation in policy will explain a large portion of the inter-country variation in the extent to which having young children exerts downward pressure on mothers' likelihood of being employed. More complete public provisions in the areas of maternity leave and child care are also expected to predict higher overall levels of maternal employment rates. This relationship is expected to be weaker since the effect of policies that specifically support maternal employment will interact with the effects of a broad range of policy and non-policy variables.

Data: The Luxembourg Income Study

This study links macro-level policy data (the independent variable) with micro-level employment outcomes (the dependent variable). Data on both variables are available through the Luxembourg Income Study (LIS). LIS, founded in Luxembourg in 1983, is primarily an archive of micro-datasets gathered from a large range of industrialized countries. The micro-datasets are collected from LIS member countries, rendered comparable, and provided for public-access use by the LIS staff. Data are accessed remotely by researchers worldwide. The LIS micro-datasets contain demographic, labor market, and detailed income data (both earned and unearned) at the household and individual level.

In 1992, LIS added a second database to accompany the micro-data, the LIS Institutional Database. This companion database contains aggregate-level data that describe the major income tax and cash transfer programs in the LIS member countries. The institutional data matches the

countries (and years) of the LIS micro-data. In 1996, eighteen new indicators of child care and parental leave policy were added to the institutional database. These policy data are available for fifteen countries for the 1984-1987 time period.[6] The indices used in this study are constructed using these LIS data on child care and parental leave policies.

Empirical results on mothers' employment are based on the LIS micro-data. Fourteen datasets, from the time period 1984-1987, were selected for this study: those from Australia, Belgium, Canada, Denmark, Finland, France, Germany, Italy, Luxembourg, Netherlands, Norway, Sweden, the United Kingdom and the United States. These datasets were constructed from household and/or tax surveys, and data are available at both the individual and household level.[7]

The Independent Variable: Policies that Support Maternal Employment

There was substantial variation in the form and intensity of public provisions for child care and parental leave among the industrialized countries that were included in the 1984-1987 wave of LIS micro-data (Gornick, Meyers and Ross 1996). Labor supply theory and single-country empirical studies suggest that the significant policy variation would lead to a diversity of

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6.   For more information on the Luxembourg Income Study, see LIS Working Paper #7, "LIS/LES Information Guide" (de Tombeur 1995). For a detailed discussion of the collection and processing of the data on policies that support maternal employment, see LIS Working Paper # 139, "Supporting the Employment of Mothers: Policy Variation Across Fourteen Welfare States" (Gornick, Meyers and Ross 1996).

7.   The names of the individual surveys are presented in Appendix Table 1. The fourteen countries included in this study comprise all of the countries for which child care and parental leave policy data are available through LIS, with the exception of Ireland. Ireland (1987) was excluded from this study because the Irish micro-data do not include the age of the children in the household. The time period was also chosen to correspond to the available policy data.

maternal employment patterns. Women's employment decisions are likely to be affected simultaneously by several policies and policy components. Since, when combined, some policies act as complements, and others as substitutes, entire *policy package* is an important construct. Holding other factors constant, the employment decision of a mother with a young infant, for example, is expected to respond to the generosity of paid maternity leave and to the availability of free or subsidized child care. The generosity of maternity leave will depend on the number of weeks covered, the wage replacement rate, and the extent of coverage; the attractiveness of child care options will depend on both tax provisions and direct public provisions.

To capture the multiple and interacting dimensions of policy, this analysis uses two composite indices of national-level policies that are expected to support maternal employment. Individual policy measures were selected for inclusion in the indices based on four criteria. First, the indicator must measure an aspect of policy reasonably assumed to be under government control, i.e., it must constitute *public* policy. Second, it must capture a policy feature that labor supply theory predicts will affect a mother's decisions to enter or to remain in paid work. Third, the indicator must be exogenous to mothers' labor supply decisions. Fourth, reliable and reasonably comparable data must have been available for the fourteen countries included in this study. (see Gornick, Meyers and Ross 1996 for a detailed discussion of the index construction).

The content and operationalization of measures is summarized in Table 1. The first index, *Policies that Support Employment for Mothers with Children under Three,* is the weighted sum of eight indicators. Five indicators measure the coverage, length, and generosity of parental leave policies; two measure national support for child care through tax policies and national guarantees of access to public child care. A final indicator measures enrollments in public or publicly-subsidized child care. The second index, *Policies that Support Employment for Mothers with Preschool-Aged Children* combines indicators that reflect government efforts to facilitate the employment of mothers with children from age three until school enrollment. It aggregates

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two measures of public support for child care -- tax relief and guaranteed access to child care, and two indicators of public supply -- the enrollment of children aged three to five in public or publicly-subsidized care and the percentage of five-year-old children in public child care, preprimary or primary school.

>> Table 1 about here. <<

Data for each of the policy measures were standardized as proportions of variable-specific maximum values, and the two indices were then constructed as weighted sums of the component measures; a second standardization converted index scores to a percentage of the theoretical maximum per index (i.e., scores range from zero to 100). Index results are reported in Table 2; notes to this table summarize the weighting scheme. Although results for the indices are presented in comparable units, numeric scores are very sensitive to the selection, coding, and standardization of individual items in the index. Numeric scores are not, therefore, comparable *across indices*. Simple rankings (provided in Table 2) facilitate comparisons of country performance across the different age groups.

>> Table 2 about here. <<

The Dependent Variable: The Child Penalty

This study considers cross-national variation in two distinct indicators of maternal employment: (1) a measure of the unadjusted employment rate of women with children younger than eighteen; and (2) a measure of the degree of differentiation in employment rates between mothers of young children and otherwise identical mothers (but without young children). The

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second measure, termed the "child penalty" in this analysis, is the estimated *decrease* in mothers'

probability of being employed given the presence of young children (of various ages) in the

home, *all else equal*.

Variation in the child penalty measure is independent of variation in overall maternal

employment rates. The child penalty captures the *difference* in the employment rates of mothers

of infants, and of mothers of preschoolers, compared to otherwise identical mothers with no

young children in the same country. Cross-national variation in maternal employment behavior

is captured, net of a large array of factors that would affect overall female employment rates but

that would not be expected to differentially affect the employment rates of mothers, within

countries, with respect to the age of their youngest child. These factors include, for example,

wage levels, male unemployment rates, gender role expectations, and demand by public

employers.

Measures of Maternal Employment. The sample selected for this study includes married

mothers between the ages of 18 and 64 years old. A "mother" is a woman with at least one child

under eighteen living in the household.[8] Unmarried mothers were excluded from this study

because existing empirical research indicates that single mothers' labor supply behavior is

markedly different from that of married women (Michalopoulis, Robins and Garfinkel 1992). In

comparison to unmarried women, the labor supply of married women is more elastic with respect

to child-related factors (Connelly 1990; Gornick 1994). The expected effect of child care and

leave policy on employment would largely be swamped for single mothers by the effects of

income transfer rules (for example, rules that affect income disregards and effective tax rates).

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8.   The LIS data require some inference to determine which women in the sample are in fact
mothers, since it is possible that children in a household with an adult married woman are not the
offspring of the woman in question. To maximize the likelihood that the women in this sample are the
mothers of the children in the household, households with multiple adult women were excluded.

Table 3 presents employment rates in these countries for all mothers with children under eighteen. As indicated in the notes to Table 3, women were coded as "employed" based on a hierarchy of options that included reported hours of work in the prior week, employment status during the prior year, or earnings.[9] Women were coded as "not employed" if they were not in the labor force or were unemployed. The agricultural sector was excluded.

>> Table 3 about here. <<

The construction of the employment measure was shaped by a variety of data concerns, and some of these raise concerns for the interpretation of results. First, women's labor supply would be more accurately captured by "labor force participation" to include women seeking work but not currently employed. Using these datasets labor force participation cannot be comparably measured across countries. Cross-nationally, however, female unemployment rates were relatively low and did not vary much during the middle to late 1980's (OECD 1994). Country rankings of female labor force participation rates during this time period (OECD 1994), parallel the cross-national portrait of employment rates in this study quite closely. Given the data constraints, then, the employment measure serves as a proxy for labor force participation.

Second, the use of multiple definitions of employment clearly raises the specter of some incomparability, and third, the distinction between part-time and full-time employment is not captured. These two concerns are addressed in the discussion of the multivariate results. Finally, each of these definitions of employment operates such that women who are formally employed,

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9.   In eight countries, women were coded as employed if they reported working at least one hour per week, during the course of the survey week. In four countries, in which data on hours are not available, women were coded as employed based on a labor force status variable, one that captures employment status during the survey year. In two countries, whose datasets allow neither of the first two options, women were coded as employed if they reported earning wage-and-salary income during the survey year.

but who are absent from work due to being on family leave, would be coded as employed. The classification of women on leave as employed is advantageous for this study, since the intention is to capture the extent to which mothers are attached to the labor force. In both aggregate employment measures and child penalties, women are considered to have maintained this attachment if they are employed although out on maternity leave.

Multivariate Analysis. Standard reduced form logistic regression models were specified to predict a mother's employment probability [$p(emp_i)$], where:

$$p(emp_i) = 1 / (1 + \exp(-Z_i))$$
$$\text{and } Z_i = + \text{ß } X_i$$

In these models, the explanatory (X) variables of primary interest are two dummy variables that capture childrearing responsibilities: one indicates that the youngest child in the household is under age three and another indicates that the youngest is between the ages of three and five. Controls include: (1) the presence of a youngest child age six to twelve and the total number of children in the household under the age of eighteen; (2) human capital variables (mother's age[10]

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10.   To capture potential market wage, labor economists often use a measure of "potential experience," calculated as current age minus years of education minus the age of compulsory schooling. That formulation was rejected here because education data in several countries are categorical and cannot be converted reliably into number of years and also because this technique assumes continuous employment, which is clearly problematic for women. Instead, this study uses education, and age and its square. The inclusion of age-squared reflects the fact that, in cross-sectional data, women's earning typically rise and fall with age.

and education[11]) as a proxy for the market wage; and (3) total other income in the household, as an indicator of economic necessity.[12]

Identically-specified employment equations were estimated for mothers, separately by country. The two coefficients of interest -- coefficients for the dummy variables for youngest child under age three and youngest child aged three to five -- are presented in Table 4. Complete regression results and sample means for all independent variables are presented in Appendix Table B.

>> Table 4 about here. <<

Simulations. Logistic regression coefficients are not easy to interpret. They indicate the change in the log of the odds (the ratio of the probability that the dependent variable is positive to the probability that it is negative) for a unit change in the independent variable. For ease of presentation, a hypothetical married mother is created and the logistic regression results are used to calculate her predicted probability of being employed ($p(emp_i)$) in each country. Here, the

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11.   In each country, education was coded into three categories: low, medium, and high. Low corresponds to less than the equivalent of a secondary school degree, medium indicates graduation from secondary school, and high indicates at least some post-secondary education. Comparing education across countries is notoriously difficult, since institutional differences are vast. Representatives from individual countries suggested country-specific education coding that can be obtained from the first author.

12.   Other income refers to all household income minus the mother's own market earnings. For married women, other income is primarily husbands' earnings. Clearly, the assumption of the exogeneity of other income is somewhat problematic. Husbands may earn less because their wives work more, i.e., couples' work decisions may be jointly determined. However, many labor economists argue that married women's labor supply may still be viewed as a function of her other income, as if her other income were independent of her work pattern (Mallier and Rosser 1987; Berndt 1991). Blau and Ferber (1992) argue, with respect to the United States: "This assumption is probably not too unreasonable when we consider women's labor supply decisions, since, in most American families, husbands are likely to remain in the labor market full-time in any case." Very high rates of labor force participation and of full-time work are the norm among married men in all of the industrialized countries included here (authors' calculations, Luxembourg Income Study micro-data).

hypothetical woman is a 35-year-old married mother with two children, both over age 12; she completed her country's "medium" level of education and her other household income is set at her country's mean. The predicted probabilities of these mothers are presented in Table 4.[13] Two changes of interest are then simulated, leaving all other variable values unchanged.[14] Predicted probabilities associated with "adding" one child -- alternatively, under age three and aged three to five -- are presented in the final two columns.[15]

RESULTS

Cross-National Policy Variation

Table 2 reveals that five countries form a cluster of high performers with respect to policy provision for both mothers of infants and mothers of preschoolers. These countries -- whose public provisions would most reduce employment-family conflict for mothers -- include three Nordic countries (Finland, Denmark and Sweden) and two continental European countries

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13.　The ranking of predicted employment rates parallels the ranking of actual employment rates, although mothers in countries with large child penalties tend to rank relatively more highly on predicted employment. This is not surprising since the base case mother (with no young children) would be more likely to be employed than the actual average mother (many of whom do have young children); this discrepancy would be greater in countries with large child penalties.

14.　Changes are simulated only in the seven countries in which the coefficients on these two variables are significantly negative (at $p < .05$). In six countries, neither coefficient is significantly different from zero. In Italy, the estimations produced a surprising and inexplicable result: significantly positive coefficients on both "young children" dummy variables.

15.　As an example, the employment probability of the hypothetical Australian mother (the base case) is 76 percent; "giving" her one child under age three, all else equal, results in a decrease in her employment probability of 35 percentage points to 41 percent, whereas the addition of one child aged three to five is associated with a decrease in her employment probability of 15 percentage points. The simulation results are included to aid in interpretation and are substantively interchangeable with those indicated by the logistic regression coefficients.

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(Belgium and France). Three English-speaking countries (Australia, the United Kingdom and the United States) form a cluster of low policy performers vis-à-vis families with young children in either age group. The remaining six countries, a diverse group comprising Canada, Germany, Italy, Luxembourg, the Netherlands and Norway, form a cluster of moderate performers.

For most countries, movement in ranking is modest between the two indices. Leaders on policies aimed at families with infants tend to be relatively high performers with respect to policies aimed at preschoolers. Exceptions to this are Italy and Norway. Italy is ranked much more highly on the second index, *Policies that Support Employment for Mothers with Preschool-Aged Children* than it is on the first index, *Policies that Support Employment for Mothers with Children under Three*, while Norway reveals the opposite pattern (see Gornick, Meyers and Ross 1996 for a more detailed discussion).

There is, however, considerable re-ranking *within* the loose clusters. France, for example, performs highly on both indices but is markedly more supportive of employment for mothers of preschoolers. This discrepancy reflects the strong French commitment to nearly universal enrollment of children in *l'ecoles maternelle* beginning at age three but somewhat limited parental leaves, the late addition of leave benefits for fathers, and relatively modest rates of public child care provisions for infants.

Cross-National Variation in Employment Patterns

Overall maternal employment rates and logistic regression coefficients (the child penalties) are compared in Figure 1. (Only significantly negative coefficients are presented.) Several important conclusions can be drawn. First, employment rates of mothers with children under age eighteen vary dramatically across these fourteen countries, from a low of 25 percent in

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the Netherlands to a high of 89 percent in Finland. Moderate rates are reported in most English-speaking countries, including 57 percent in United States.[16]

>> Figure 1 about here. <<

Second, child penalties also vary markedly throughout these countries, with significant penalties seen in exactly half of the fourteen countries. The largest child penalties are found in the United Kingdom, where the presence of an infant is associated with a remarkable 45 percentage point decrease in the probability of employment (for the hypothetical 35-year-old mother); the presence of a preschooler is associated with a 31 percentage point decrease. Child penalties are also found in Australia, Canada, Germany, the Netherlands, Norway and the United States. Penalties for infants are consistently larger than are penalties for preschool-aged children. In the remaining countries, mothers of infants and of preschoolers are not significantly less likely to be employed than are similar mothers whose children are all twelve years old or older.

Third, there is little systematic relationship between the maternal employment rates and the presence or magnitude of the child penalties. The weak association underscores the value of treating the two as distinct indicators of maternal employment behavior. Child penalties are observed both in relatively low employment countries, such as the Netherlands and Germany, and in moderately high employment countries, including the United States. While none of the

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16.   To assess the comparability (and robustness) of these employment indicators, maternal employment rates were calculated in each country using a variety of measures. In countries in which employment is measured as "hours worked in the reference week greater than zero," employment rates were also generated using thresholds of five, ten and fifteen hours. In countries in which employment is measured using labor force status or "wages in the reference year greater than zero," employment rates were generated based on a range of wage thresholds. Results based on the different measures varied little; i.e., the cross-national portrait of maternal employment rates was virtually invariant with respect to the various operationalizations of "employment." These results can be obtained from the first author.

three highest employment countries, Finland, Denmark and Sweden, have child penalties, some

of the low employment countries (e.g., Luxembourg) also reveal no child penalties.[17]

A note about part-time employment is important. As indicated in the notes to Table 3,

data on hours worked are available in eight of the fourteen countries. In this study, the

"employed" include both part-time and full-time workers. In those countries with hours data, it

was possible to estimate the effects of having young children on the likelihood that mothers are

employed full-time (defined as 35 hours per week or more, the international standard). These

results (not shown) portray an overall cross-national pattern that is very similar to the pattern

seen in Figure 1. The similarity suggests that the inclusion of part-time workers in this study

does not substantially affect the results. This clearly demands further study.

Policy Variation and Child Penalties

The final step in the analysis assesses the central hypothesis that cross-national variation

in policy will explain a large portion of the inter-country variation in the child penalties. The two

measures of child penalties (for infants and for preschoolers) are regressed on the corresponding

policy indices using ordinary least squares (OLS) regression. The associations between the

policy indices and the child penalties are presented in Figures 2 and 3 and in Table 5.

>> Figures 2 and 3 about here. << >> Table 5 about here. <<

These results provide striking evidence of the association between public policy and

mothers' employment. As seen in Figure 2, the child penalty associated with caring for infants is

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17.   When the logistic regression coefficients for the two "young children" dummy variables are
regressed on the maternal employment rates (using OLS), the R^2 is .08 in both cases (see Table 5).

greatest in two of the three countries with the least generous policies to support maternal employment -- Australia and the United Kingdom. A slightly smaller but still substantial reduction in employment is seen for mothers of infants in the third lowest performing country, the United States. Four of the six countries that form a middle tier in provisions that support maternal employment have significant but smaller child penalties. In the countries with the most well developed policies -- Belgium, Denmark, Finland, France and Sweden -- no significant reduction in employment is seen among mothers of infants. Results for families with preschoolers are similar (see Figure 3). Child penalties associated with preschoolers are confined to those countries in the lower and middle tiers of policy performance; no child penalties are seen in the six countries that rank as top performers.

The strength of the association between policies and employment behavior is suggested by the OLS results in Table 5. The first index, *Policies that Support Employment for Mothers with Children under Three*, explains 53 percent of the variation in the child penalties associated with having infants; the second index, *Policies that Support Employment for Mothers with Preschool-Aged Children*, explains fully two-thirds (66 percent) of the variation in child penalties associated with having preschool-aged children.[18] Strongly positive measures of association support the hypothesis that "policy matters" in the shaping of maternal employment patterns.

The strength of the policy-penalty association is particularly compelling because the analysis controls for a large number of other factors that are expected to explain individual employment decisions and cross-national differences in aggregate employment rates. By comparing mothers of young children to like mothers of older children in the same country,

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18.   Because the relationship in Figure 2 appears curvilinear, logged child penalties were also regressed on the indices. The results were similar to those for the unlogged penalties: the policy-penalty association (the R-squared) was 0.4809 for infants and 0.6949 for preschoolers.

estimates of the child penalty first control for key individual-level differences. Demographic and human capital factors that influence the probability of employment are controlled in labor supply models that include family size, maternal education and age, and household (mostly husbands') income. In addition, because the logistic regressions are estimated separately for each country, the child penalty results are net of a variety of macro-economic, social, historical, and other national differences that would also be expected to influence mothers' employment levels. If, for example, particularly high female wages pull more women into employment in some countries than in others, variation in *overall* female employment rates would be affected. Relatively high wages, however, are unlikely to explain variation in employment rates for women with children of different ages *in the same country*.

Although the overall maternal employment rate is typically used in cross-national research on policy impacts, the child penalty provides a more sensitive indicator of the impact of child care responsibilities on women's employment. The improvement is made clear in Table 5, which displays measures of association between the policy indices and overall rates of maternal employment. As noted earlier, associations between the indices and child penalties are strongly positive. Both of the indices are also positively associated with maternal employment rates in each country. Although positive, these associations are much weaker than those with the child penalty measures. Variation in the first index, *Policies that Support Employment for Mothers with Children under Three*, explains 34 percent of the observed variation in maternal employment rates; variation in the second index, *Policies that Support Employment for Mothers with Preschool-Aged Children*, explains an even smaller 14 percent of variation in overall maternal employment.

CONCLUSIONS AND IMPLICATIONS FOR UNITED STATES POLICY.

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In this sample of fourteen industrialized countries, several emerge as leaders in the provision of public child care and parental leave policies. In the leading countries, women with young children are no more likely to be non-employed than are like women with older children. Mothers in Belgium, Denmark, Finland, France and Sweden have access to job protection and generous maternity benefits at the time of childbirth and, as their children age, to publicly supported child care. Similar employment rates between mothers with children under six and those with children over age twelve, when other factors are held constant, suggest that these mothers successfully combine employment and parenthood without leaving the labor market entirely during their children's earliest years.

The story is quite different in the countries that have less fully developed public policies in these areas. Here, the English-speaking countries of the United States, Australia and the United Kingdom stand out. In each, parental leave policies are limited in availability and generosity. None have adopted policies that guarantee access to child care, and levels of public provision are correspondingly low. Sharp reductions in employment seen among women with young children reveal the labor market consequences for women. In the United Kingdom, the most dramatic case, a 45 percentage point drop in employment is estimated for mothers of infants (relative to similar women with no children under age thirteen); in the United States, with more moderate penalties, a 22 percentage point reduction is seen for these mothers, and a 15 percentage point reduction among mothers with children between the ages of three and five.

These findings have important policy implications for the United States. In the wake of profound secular changes in labor markets and family forms, in the United States and abroad, the efficient use of female labor is increasingly important for a healthy labor market, and women's earnings have become more and more crucial to the economic security of families. Clearly, women's preferences for time spent in waged work (versus time at home) vary both among individual women and across countries. However, the association between weak policy

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provisions and patterns of intermittent employment among mothers suggests that many lack needed supports for combining their dual responsibilities, especially when their children are below school-age. In the face of expanding employment opportunities and growing economic necessity, barriers to full participation in the labor market that are associated directly with women's traditional caretaking responsibilities become less and less defensible.

During the period covered in this study, the middle to late 1980's, the United States lagged significantly behind other industrialized countries in the adequacy of public policies designed to reduce mothers' employment-family conflicts. There was no national legislation providing job protection at the time of childbirth; only an estimated 25 percent of women had access to partially paid maternity leave through publicly-mandated employer-based disability insurance. Although all employed parents with taxable income were eligible for a modest child care tax credit, publicly subsidized child care was available for fewer than 5 percent of children under three and 14 percent of children between age three and five, and these benefits were heavily targeted on the lowest income families (Gornick, Meyers and Ross 1996). The paucity of support in the United States stood in stark contrast to policies in many European countries that included universal provisions for maternity leaves with full or nearly full wage replacements for an average of three to four months and space for up to 32 to 48 percent of infants and 85 to 95 percent of preschoolers in public child care.

Since the late 1980's, public policies supporting maternal employment have been expanded in the United States. The passage of the Family Medical Leave Act in 1993 extended job protection to employed mothers and fathers at the time of childbirth or in the event of a family medical emergency. The 1988 Family Support Act and the 1990 OBRA expanded child care subsidies for low income families, particularly those transitioning from welfare to work. Even with these improvements, however, United States policies lag far behind the comprehensive packages available in other industrialized countries.

Dramatic cross-national variation in the extent of government support for maternal employment corresponds to equally dramatic variation in the strength of women's attachment to the labor force during the years when their children are young. In the case of the United States, an "average" mother's estimated probability of being employed fell a considerable 22 percentage points in association with having an infant, and 15 percentage points, with a preschool-aged child. It is important to consider that, in the United States, several factors serve to *discourage* labor market withdrawals at the time of childbirth -- including the potential loss of health insurance, the absence of universal cash allowances for families (as are standard in other industrialized countries), and the particularly sharp decline in male wages. These "work-forcing" factors very likely mitigate employment withdrawals that would otherwise be even greater, possibly approaching the magnitude of the penalties seen in the United Kingdom. Actual level of employment-parenting conflict that exists in the United States may be partially masked by particularly high levels of economic necessity.

To the extent that United States policy-makers are concerned with enhancing labor market efficiency, ensuring equal opportunities for employment, and strengthening the economic security of families, the paucity of public policies that support the employment of mothers should be cause for alarm.

REFERENCES

Berndt, Ernst R (1991) *The Practice of Econometrics: Classic and Contemporary* (Reading, MA: Addison-Wesley).

Blau, David and Philip K. Robins (1991) "Child Care Demand and Labor Supply of Young Mothers over Time," *Demography* 28, pp. 333-351.

Blau, Francine and Marianne A. Ferber (1992) *The Economics of Women, Men, and Work* (Englewood Cliffs, NJ: Prentice-Hall).

Blau, Francine and Lawrence M. Kahn (1992) "The Gender Earning Gap: Learning From International Comparisons," *The American Economic Review* 82, pp. 533-558.

Callaghan, P. and Heidi Hartmann (1991) *Contingent Work: A Chart Book on Part-Time and Temporary Employment* (Washington, DC: The Economic Policy Institute).

Cohen, Bronwen (1993) "The United Kingdom," in Moncrieff Cochran (ed.), *International Handbook of Child Care Policies and Programs* (Connecticut: Greenwood Press).

Connelly, Rachel (1990) *The Effects of Child Care Costs on the Labor Force Participation and AFDC Recipiency of Single Mothers*, Instutute of Research on Poverty, University of Wisconsin-Madison, Discussion Paper No.920-90.

Connelly, Rachel (1991) "The Importance of Child Care Costs to Women's Decision Making," in David M. Blau (ed.), *The Economics of Child Care* (New York: Russel Sage Foundation).

Connelly, Rachel (1992) "The Effect of Child Care Costs on Married Women's Labor Force Participation," *Review of Economics and Statistics* 74(1) pp. 83-90.

de Tombeur, Caroline, (ed). (1995) *LIS/LES Information Guide*, revised edition, Luxembourg Income Study, Working Paper No. 7.

Dex, Shirley (1992) "Women's Part-Time Work in Britain and the United States," in B. Warme, K. Lundy and L. Lundy (eds.), *Working Part-Time: Risks and Opportunites* (New York: Praeger).

Dex, Shirley, and Lois B. Shaw (1986) *British and American Women at Work: Do Equal Opportunity Policies Matter?* (London: Macmillan Press Ltd).

Esping-Anderson, Gosta (1990) *The Three Worlds of Welfare Capitalism*, (Princeton, NJ: Princeton University Press).

Ferber, Marianne A. and Helen Berg (1991) "Labor Force Participation of Women and the Sex Ratio: A Cross-Country Analysis," *Review of Social Economy* 49(1), pp. 2-19.

Gornick, Janet C. (1994) "Women, Employment, and Part-Time Work: A Comparative Study of The United States, The United Kingdom, Canada, and Australia," (Ph.D. dissertation, Harvard University).

Gornick, Janet C. and Jerry A. Jacobs (1996) "A Cross-National Analysis of the Wages of Part-Time Workers: Evidence from the United States, the United Kingdom, Canada and Australia," *Work, Employment and Society* 10(1), pp. 1-27.

Gornick, Janet C., Marcia K. Meyers and Katherin E. Ross (1996), *Supporting theEmployment of Mothers: Policy Variation Across Fourteen Welfare States*, Luxembourg Income Study, Working Paper No. 139.

Gustafsson, Siv S. (1991) "Separate Taxation and Married Women's Labor Supply. A Comparison of West Germany and Sweden." *Journal of Population Economics* 5, pp. 61-85.

Gustafsson, Siv S. and Frank P. Stafford (1995) "Links Between Early Childhood Programs and Maternal Employment in Three Countries," *The Future of Children: Long-Term Outcomes of Early Childhood Programs* 5(3), pp. 161-174.

Hayes, Cheryl, John Palmer and Martha Zaslow (eds.) (1990) *Who Cares for America's Children? Child Care Policy for the 1990s* (Washington, D.C.: National Academy Press).

Heckman, James J (1993) "What Has Been Learned About Labor Supply in the Past Twenty Years?" in J. David Baldwin and Ronald Oaxaca (eds.), *Papers and Proceedings of the 105th Annual Meetings of the American Economic Association.* Anaheim, CA: January.

Hofferth, Sandra L. and Sharon Gennis Deich (1994) "Recent U.S. Child Care and Family legislation in Comparative Perspective," *Journal of Family Issues* 15(3), pp. 424-448.

Joesch, Jutta M (1995) "Paid Leave and the Timing of Women's Employment Surrounding Birth," paper prepared for the Annual Meeting of the Population Association of America, San Francisco, April.

Kamerman, Sheila B. (1991) "Parental Leave and Infant Care: United States and International Trends and Issues, 1978-1988," in Janet Shibley Hyde and M arilyn J. Essex (eds.), *Parental Leave and Child Care: Setting a Research and Policy Agenda* (Philadelphia, PA: Temple University Press).

Kamerman, Sheila B. and Alfred J. Kahn (1991) *Child Care, Parental Leave, and the Under 3s: Policy Innovation in Europe* (New York: Auburn House).

Kolberg, Jon Eivind, ed. (1992), *The Study of Welfare State Regimes* (New York: M.E. Sharpe).

Killingsworth, Mark R. (1983) *Labor Supply* (Cambridge: Cambridge University Press).

Killingsworth, Mark R. and James J. Heckman (1986) "Female Labor Supply: A Survey." in Orley C. Ashenfelter and Richard Layard (eds.), *Handbook of Labor Economics* (Volume 1), (New York: North-Holland).

Kimmel, Jean (1995) "The Effectiveness of Child-Care Subsidies in Encouraging the Welfare-to-Work Transition of Low-Income Single Mothers," *The American Economic Review* 85, pp. 271-275.

Klerman, Jacob A. and Arleen Leibowitz (1995) "Labor Supply Effects of State Maternity Leave Legislation," paper prepared for ILR-Cornell Institute for Labor Market Policies Conference, Gender and Family Issues in the Workplace, Cornell University, April.

Knudsen, Christen and H. Elizabeth Peters (1994) *An International Comparison of Married Women's Labor Supply*, Luxembourg Income Study Working Paper No. 106.

Kolberg, Jon Eivind, ed. (1991) *The Welfare State as Employer* (NY: M.E. Sharpe).

Leibowitz, Arleen, Jacob Alex Klerman and Linda J. Waite (1992) "Employment of New Mothers and Child Care Chioce: Difference by Children's Age," *Journal of Human Resources* 22(1), pp.223-133.

Leibowitz, Arleen, Linda J. Waite and Christina Witsberger (1988) "Child Care for Preschoolers: Differences by Child's Age," *Demography* 25, pp. 205-220.

Levitan, S. and E. Conway (1992) "Living on Half Rations," in B. Warme, K. Lundy and L. Lundy (eds.), *Working Part-Time: Risks and Opportunites* (New York: Praeger).

Mallier, A. T. and M. J. Rosser (1987) *Women and the Economy: A Comparative Study of Britain and the US* (London: The MacMillan Press).

Meyer, Traute (1994) "The German and British Welfare States as Employers: Patriarchal or Emancipatory?" in Diane Sainsbury (ed.), *Gendering Welfare States* (Thousand Oaks, CA: Sage Publications).

Meyers, Marcia K. (1993) "Child Care in JOBS Employment and Training Program: What Difference Does Quality Make?" *Journal of Marriage and the Family* 55, pp. 767-783.

Michalopoulus, Charles, Philip K. Robins and Irwin Garfinkel (1992) "A Structural Model of Labor Supply and Child Care Demand," *The Journal of Human Resources* 27(1), pp. 166-203.

Mincer, Jacob (1985) "Intercountry Comparisons of Labor Force Trends and of Related Developments: An Overview," *Journal of Labor Economics* 3(1.2), pp. S59-90.

Norregaard, John (1990) "Progressivity of Income Tax Systems," *OECD Economic Studies* 15, pp. 83-109.

O'Connell, Martin (1990) "Maternity Leave Arrantements: 1961-85," in *Work and Famiy Patterns of American Women.* Current Population Reports, Special Studies Series P-23, No. 165, pp. 11-27.

O'Connor, Julia S (1993) "Labour Market Participation in Liberal Welfare States Regimes -- Issues of Quantity and Quality," paper prepared for International Sociological Association Conference on Comparative Research on Welfare States in Transition, University of Oxford, 9-12 September.

Ondrich, Jan, C. Katharina Spiess and Qing Yang (1995) "Barefoot and in a German Kitchen: Federal Parental Leave and Benefit Policy and the Return to Work After Childbirth in Germany," paper prepared for the Ninth Annual Meeting of the European Society for Population Economics, Lisbon, June.

OECD (1991) *Economic Outlook* (Paris: Organization for Economic Co-Operation and Development).

OECD (1992) *Economic Outlook* (Paris: Organization for Economic Co-Operation and Development).

OECD (1994) *Women and Structural Change: New Perspectives* (Paris:Organization for Economic Co-Operation and Development).

Pateman, C (1988) "The Patriarchal Welfare State," in A. Gutman (ed.), *Democracy and the Welfare State* (Princeton: Princeton University Press).

Phipps, Shelley A. (1993) *Determinants of Women's Labor Force Participation: An Econometric Analysis for Five Countries,* Luxembourg Income Study Working Paper No. 99.

Presser, Harriet (1980) "Child Care as a Constraint on Employment: Prevalence, Correlates, and Bearing on the Work and Fertility Nexus," *American Journal of Sociology* 85(5), pp. 1203-1213.

Rein, Martin (1985) *Women in the Social Welfare Labor Market*, Discussion Paper ILM/LMPP 85-18, Wisssenshftszentrum Berlin.

Ribar, David C. (1992) "Child Care and the Labor Supply of Married Women: Reduced Form Evidence," *The Journal of Human Resources* 27(1), pp. 134-65.

Rosenfeld, Rachel A. (1993) "Women's Part-Time Employment: Individual and Country-Level Variation," paper prepared for the 1993 Meeting of Research Committee #28, the International Sociological Association, Durham, N.C.

Rosenfeld, Rachel A. and Gunn Elisabeth Birkelund (1995) "Women's Part-Time Work: A Cross-National Comparison," *European Sociological Review* 11(2) pp.111-134.

Rosenfeld, Rachel A. and Arne L. Kallenberg (1990) "Women's Part-Time Employment: Individual and Country-Level Variation," paper presented at the meeting of RC28, International Sociological Association, Durham, NC, 11 August.

Ruhm, Christopher J. and Jackqueline L. Teague (19950 "Parental Leave Policies in Europe and North America," paper prepared for ILR-Cornell Institute for Labor Market Policies Conference, Gender and Family Issues in the Workplace, Cornell University, 21-23 April.

Semyanov, Moshe (1980) "The Social Context of Women's Labor Force Participation: A Comparative Analysis," *American Journal of Sociology* 86(3), pp. 535-550.

Schmidt, Manfred G. (1993) "Gendered Labour Force Participation," in Francis G. Castles (ed.), *Families of Nations: Patterns of Public Policy in Western Democracies* (Brookfield, VT: Dartmouth Publishing Company).

Schultz, T. Paul (1990) "Women's Changing Participation in the Labor Force: A World Perspective," *Economic Development and Cultural Change* 38(3), pp. 457-88.

Spitze, Glenna (1998) "Women's Employment and Family Relations: A Review," *Journal of Marriage and the Family* 50, pp. 595-618.

Stolzenberg, R. M. and Linda J. Waite (1984) "Local Labor Markets, Children, and Labor Force Participation of Wives," *Demography* 21, pp. 157-170.

Tilly, C. (1990) *Short Hours, Short Shrift: Causes and Consequences of Part-Time Work* (Washington, DC: The Economic Policy Institute).

Treiman, Donald J. and Patricia Roos (1983) "Sex and Earnings in Industrial Society: A Nine-Nation Comparison." *American Journal of Sociology* 89(3), pp. 612-650.

Trzcinski, Eileen (1991) "Employers' Parental Leave Policies: Does the Labor Market Provide Parental Leave?" in Janet Shibley Hyde and Marilyn J. Essex (eds.), *Parental leave and Child Care: Setting a Research and Policy Agenda* (Philadelphia, PA: Temple University Press).

United States General Accounting Office (1994) *Child Care Subsidies Increase Likelihood that Low-Income Mothers Will Work*, GAO/HEHS-94-87 (Washington, DC: GAO).

White, Julie (1983) *Women and Part-Time Work* (Ontario:Canadian Advisory Council on the Status of Women).

Whitehouse, Gillian (1992) "Legislation and Labour Market Gender Inequality: An Analysis of OECD Countries," *Work, Employment, and Society* 6(1), pp. 65-86.

Wolff, Klaus (1990) *An International Comparison of Married Women's Labor Force Participation: A Cross-Country Analysis for Employees in Seven Countries*, Luxembourg Income Study Working Paper No. 48.

Table 1
Policy Indices: Measures Used in Indices

Measure (and Units):	Policies that Support Employment for Mothers with	
	Children under Three	**Preschool-Aged Children**
Public Parental Leave Policies:		
Legislated Job Protection (yes/no)	X	
Paid Maternity Leave (weeks)	X	
Wage Replacement Rate (% of wages)	X	
Coverage (% of employed women)	X	
Paternity Benefits (yes/no)	X	
Public Support for Child Care:		
Tax Relief for Child Care (in 1987 U.S. dollars)	X	X
Guaranteed Child Care Coverage (0-2) (% of age group covered)	X	
Guaranteed Child Care Coverage (3-5) (% of age group covered)		X
Public Supply of Child Care:		
% Children (0-2) in Publicly Funded Care (% of children 0-2)	X	
% Children (3 to school-age) in Publicly Funded Care (% of children 3 to school-age)		X
% Children (age 5) in Preprimary or School (% of 5 year olds)		X

Note: Each country was coded on each measure. The data on each variable were standardized as a proportion of a variable-specific maximum.

See LIS Working Paper #139 (Gornick, Meyers and Ross 1996) for a presentation of the raw policy data.

Table 2
Policy Indices: Index Values and Country Ranks

Country	Index Values		Country Ranks	
	Policies that Support Employment for Mothers with		**Policies that Support Employment for Mothers with**	
	Children under Three	**Preschool-Aged Children**	**Children under Three**	**Preschool-Aged Children**
Australia	21.25	16.80	13	14
Belgium	59.99	51.29	4	6
Canada	34.69	30.12	10	9
Denmark	63.87	63.50	2	3
Finland	65.84	55.85	1	5
France	53.19	76.57	5	1
Germany	36.20	31.90	8	8
Italy	36.04	65.20	9	2
Luxembourg	36.27	34.06	7	7
Netherlands	33.97	30.08	11	10
Norway	41.42	20.94	6	12
Sweden	62.29	61.60	3	4
United Kingdom	21.98	21.25	12	11
United States	13.59	20.65	14	13

Note: Index scores were calculated using weighted combinations of the relevant indicators (see Table 1) as follows:

Index of Policies that Support Employment for Mothers with Children under Three:

0.50[*Legislated Job Protection* + (*Coverage*)*(*Paid Maternity Leave*) + *Wage Replacement Rate* + *Coverage* + 0.50(*Paternity Benefits*)] +

Tax Relief for Child Care + *Guaranteed Child Care Coverage (0-2)* + *Percent Children in Publicly Funded Child Care (0-2)*

Index of Policies that Support Employment for Mothers with Preschool-Aged Children:

Tax Relief for Child Care + *Guaranteed Child Care Coverage (3-5)* + *Percent Children in Publicly Funded Child Care (3-School Age)* +

0.33(*Percent Children in Preprimary or School (Age 5))*

Each index score was then converted into a final score of 0 to 100, with 100 representing 100% of the maximum achievable
score for this index. These final values are presented in this table.

Table 3
Employment Rates of Mothers

Married Women (Age 15-64) with Children Under 18

Country	Year	Sample Size	Employment Rate
Australia	1985	2029	48%
Belgium	1985	1327	50%
Canada	1987	3018	62%
Denmark	1987	2451	81%
Finland	1987	3011	89%
France	1984	3650	57%
Germany	1984	1415	39%
Italy	1986	2160	39%
Luxembourg	1985	439	29%
Netherlands	1987	1285	25%
Norway	1986	1139	60%
Sweden	1987	2736	88%
United Kingdom	1986	1707	56%
United States	1986	2719	57%

Note: Definitions of "employment" are as follows:

A. Hours worked in the reference week greater than zero (LIS variable PHOURS):

   Australia, Belgium, Canada, Germany, Luxembourg, Netherlands, United Kingdom, United States.

B. Employment status coded as "employed" (LIS variable PLFS):

   Denmark, Italy, Norway, Sweden.

C. Wage-and-salary income in the reference year greater than zero:

   Finland (LIS variable PGWAGE), France (LIS variable V41).

Table 4

Child Penalties: Logistic Regression and Simulation Results

Country	Logistic Regression Coefficients		Predicted Employment Rates:		
	(age 0-2) (S.E.)	(age 3-5) (S.E.)	(1) base case	(2) add 1 child age 0-2	(3) add 1 child age 3-5
Australia	**-1.5401**	**-0.7586**	76%	41%	61%
	0.2091	0.2066		(-35)	(-15)
Belgium	0.4637	0.4800	41%	--	--
	0.3572	0.3447			
Canada	**-0.6944**	**-0.4920**	72%	57%	62%
	0.1837	0.1759		(-15)	(-10)
Denmark	-0.2020	-0.0434	91%	--	--
	0.2640	0.2578			
Finland	-0.3271	-0.1497	87%	--	--
	0.2306	0.2270			
France	0.2959	0.1796	53%	--	--
	0.1532	0.1422			
Germany	**-1.1102**	**-0.7743**	53%	28%	36%
	0.2360	0.2148		(-25)	(-17)
Italy	0.8574	0.5366	34%	--	--
	0.1987	0.1795			
Luxembourg	-0.4154	-0.4772	33%	--	--
	0.4439	0.4307			
Netherlands	**-1.1138**	**-0.9182**	60%	35%	39%
	0.3139	0.3065		(-25)	(-21)
Norway	**-1.3458**	**-1.2524**	81%	52%	76%
	0.2786	0.2859		(-29)	(-5)
Sweden	0.0359	-0.3255	96%	--	--
	0.2762	0.2559			
United Kingdom	**-2.0584**	**-1.4723**	82%	37%	51%
	0.2454	0.2401		(-45)	(-31)
United States	**-0.9418**	**-0.6752**	72%	50%	57%
	0.1786	0.1748		(-22)	(-15)

Note on Logistic Regression Coefficients:

   Control variables include marital status, number of children, mother's age and its square, education, other household income.

Model specification is identical in all countries, except in France and Sweden, for which education data are not available.

Statistically significant negative coefficients (p<.05) are marked in bold.

See Appendix Table B for full regression results and sample means.

Note on Simulation Results:

   The "base case" is a 35 year-old married woman with two children over age twelve, with "medium" education, and with other household income equal to the mean for this variable in her country.

The three predicted employment rates should be interpreted as follows:

   (1) the predicted employment rate for the base case (i.e., this hypothetical woman)

   (2) the predicted employment rate for the base case if she is "given" one child age 0-2, all else equal

   (3) the predicted employment rate for the base case if she is "given" her one child age 3-5, all else equal

Table 5
Associations Among Variables

Independent Variable	Dependent Variable	OLS R-squared
Policies that Support Employment for Mothers with		
Children under Three	Child Penalty (0-2)	0.5364
Preschool-Aged Children	Child Penalty (3-5)	0.6580
Policies that Support Employment for Mothers with		
Children under Three	Employment Rate	0.3441
Preschool-Aged Children	Employment Rate	0.1449
Employment Rate	Child Penalty (0-2)	0.0801
Employment Rate	Child Penalty (3-5)	0.0752

Note: R-squared values correspond to results from ordinary least squares (OLS) regressions.

Figure 1
Maternal Employment Rates and Magnitude of Child Penalties

Employment Rates ▢ Child Penalty 0-2 ▢ Child Penalty 3-5
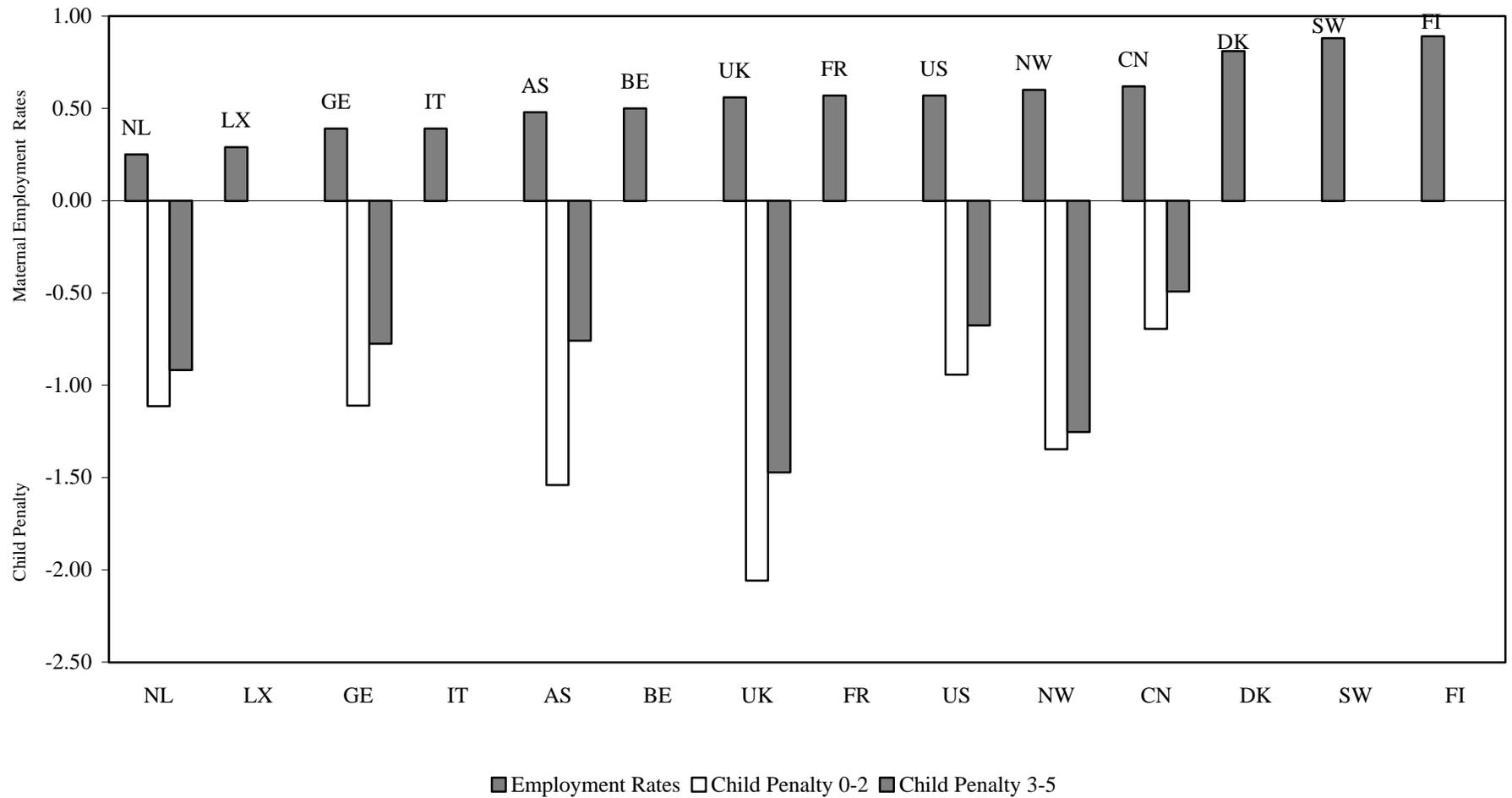
Abbreviations used in the figures are as follows: Australia (AS), Belgium (BE), Canada (CN), Denmark (DK), Finland (FI), France (FR), Germany (GE), Italy (IT), Luxembourg (LX), Netherlands (NL), Norway (NW), Sweden (SW), United Kingdom (UK), United States (US).

Figure 2
Policy Variation and Child Penalties
Mothers With Youngest Child Under Three
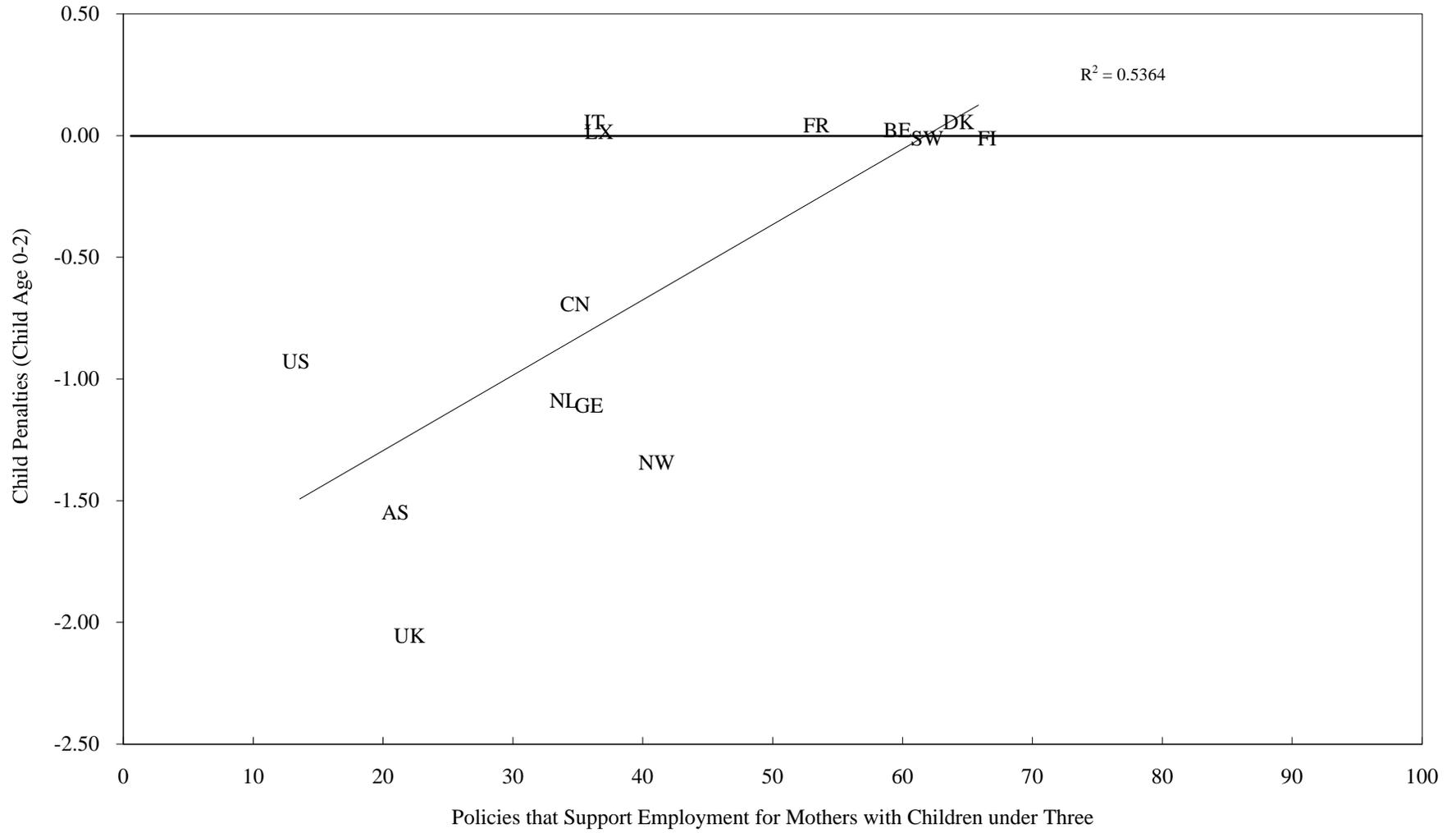
Figure 3
Policy Variation and Child Penalties
Mothers With Youngest Child Age 3-5
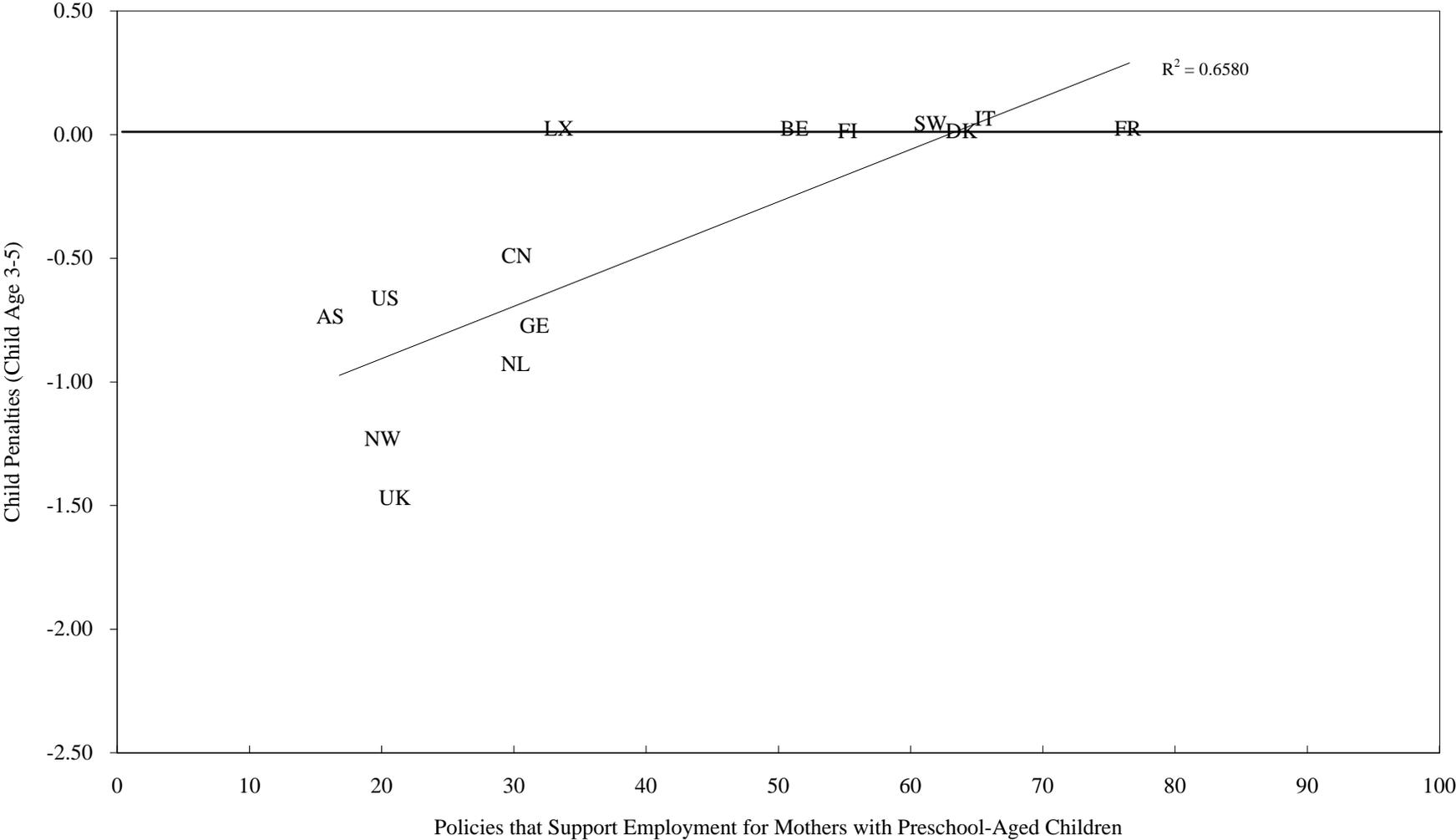
Appendix Table A
List of Luxembourg Income Study (LIS) Surveys

Country:	Year:	Name of Survey:
Australia	1985	Australian Income and Housing Survey
Belgium	1985	Panel Survey of the Centre for Social Policy
Canada	1987	Survey of Consumer Finances
Denmark	1987	Income Distribution Survey
Finland	1987	Income Distribution Survey
France	1984	Survey of Income from Income Tax
Germany	1984	The German Socio-Economic Panel Study
Italy	1986	The Bank of Italy Income Survey
Luxembourg	1985	The Luxembourg Household Panel Study
Netherlands	1987	Socio-Economic Panel
Norway	1986	Income and Poverty Distribution Survey
Sweden	1987	Income Distribution Survey
United Kingdom	1986	The Family Expenditure Survey
United States	1986	March Current Population Survey

Note:
For more information on the Luxembourg Income Study surveys, see
LIS Working Paper #7 (de Tombeur 1995)

Appendix Table B
Full Logistic Regression Results: Coefficients and Sample Means

Variable	B	S.E.	Sample Mean
Australia			
KID012	-1.5401	0.2091	0.36
KID345	-0.7586	0.2066	0.17
KID612	-0.2662	0.1705	0.33
NUMCHILD	-0.1749	0.0598	2.09
MOMAGE	0.3083	0.0629	34.26
MOMAGE2	-0.0045	0.0008	--
EDMED	0.5974	0.1012	0.42
EDHI	1.3211	0.2159	0.06
OTHINC	-0.0322	0.0061	18,900.00
Constant	-3.7486	1.1298	--

Variable	B	S.E.	Sample Mean
Belgium			
KID012	0.4637	0.3572	0.36
KID345	0.4800	0.3447	0.28
KID612	0.2438	0.3183	0.32
NUMCHILD	-0.4244	0.0870	1.83
MOMAGE	0.3873	0.0951	31.81
MOMAGE2	-0.0056	0.0014	--
EDMED	1.0926	0.1810	0.42
EDHI	2.4687	0.2226	0.06
OTHINC	-0.2396	0.0344	57,300.00
Constant	-5.9466	1.6183	--

Variable	B	S.E.	Sample Mean
Canada			
KID012	-0.6944	0.1837	0.33
KID345	-0.4920	0.1759	0.21
KID612	-0.1816	0.1495	0.34
NUMCHILD	-0.2009	0.0476	1.99
MOMAGE	0.3846	0.0479	34.18
MOMAGE2	-0.0052	0.0007	--
EDMED	0.9700	0.1043	0.37
EDHI	1.4841	0.1105	0.44
OTHINC	-0.0243	0.0035	26,110.00
Constant	-6.0655	0.8533	--

Variable	B	S.E.	Sample Mean
Denmark			
KID012	-0.2020	0.2640	0.30
KID345	-0.0434	0.2578	0.18
KID612	-0.0514	0.2087	0.36
NUMCHILD	-0.1808	0.0882	1.75
MOMAGE	0.3765	0.0621	34.67
MOMAGE2	-0.0049	0.0008	--
EDMED	0.8268	0.1297	0.34
EDHI	1.2403	0.1839	0.21
OTHINC	-0.0061	0.0006	137,000.00
Constant	-4.5282	1.1209	--

Variable	B	S.E.	Sample Mean
Finland			
KID012	-0.3271	0.2306	0.29
KID345	-0.1497	0.2270	0.24
KID612	0.1023	0.1937	0.32
NUMCHILD	-0.1586	0.0618	1.80
MOMAGE	0.2419	0.0578	34.86
MOMAGE2	-0.0033	0.0008	--
EDMED	0.8344	0.1556	0.22
EDHI	2.0196	0.2447	0.14
OTHINC	-0.0157	0.0013	75,930.00
Constant	-1.0022	1.0757	--

Variable	B	S.E.	Sample Mean
France			
KID012	0.2959	0.1532	0.29
KID345	0.1796	0.1422	0.23
KID612	0.2551	0.1160	0.32
NUMCHILD	-0.6237	0.0469	1.91
MOMAGE	0.3568	0.0428	34.10
MOMAGE2	-0.0051	0.0006	--
OTHINC	-0.0043	0.0005	103,330.00
Constant	-4.3391	0.7811	--

Variable	B	S.E.	Sample Mean
Germany			
KID012	-1.1102	0.2360	0.22
KID345	-0.7743	0.2148	0.24
KID612	-0.2727	0.1819	0.33
NUMCHILD	-0.2012	0.0821	1.72
MOMAGE	0.2714	0.0691	34.88
MOMAGE2	-0.0040	0.0009	--
EDMED	-0.0069	0.1305	0.48
EDHI	0.4555	0.1800	0.18
OTHINC	-0.0205	0.0041	33,110.00
Constant	-3.3428	1.2348	--

Variable	B	S.E.	Sample Mean
Italy			
KID012	0.8574	0.1987	0.22
KID345	0.5366	0.1795	0.25
KID612	0.1705	0.1513	0.35
NUMCHILD	-0.6240	0.0703	1.73
MOMAGE	0.6101	0.0653	34.64
MOMAGE2	-0.0079	0.0009	--
EDMED	0.0454	0.1538	0.10
EDHI	0.1409	0.1672	0.08
OTHINC	-0.0104	0.0044	18,150.00
Constant	-10.9739	1.1704	--

Variable	B	S.E.	Sample Mean
Luxembourg			
KID012	-0.4154	0.4439	0.28
KID345	-0.4718	0.4307	0.21
KID612	-0.3781	0.3564	0.35
NUMCHILD	-0.2123	0.1620	1.78
MOMAGE	0.3640	0.1566	34.41
MOMAGE2	-0.0054	0.0022	--
EDMED	0.2238	0.2455	0.48
EDHI	2.2098	0.4932	7.00
OTHINC	-0.0015	0.0004	79,855.00
Constant	-5.1310	2.7160	--
Netherlands			
KID012	-1.1138	0.3139	0.32
KID345	-0.9182	0.3065	0.18
KID612	-0.6535	0.2415	0.34
NUMCHILD	-0.3554	0.1079	1.95
MOMAGE	0.6859	0.1269	35.44
MOMAGE2	-0.0093	0.0017	--
EDMED	0.9654	0.2086	0.12
EDHI	1.7784	0.3975	0.04
OTHINC	-0.0678	0.0072	322,000.00
Constant	-10.2387	2.2743	--
Norway			
KID012	-1.3458	0.2786	0.36
KID345	-1.2524	0.2859	0.22
KID612	-0.4957	0.2647	0.33
NUMCHILD	-0.1812	0.0940	1.98
MOMAGE	0.1492	0.0824	34.11
MOMAGE2	-0.0018	0.0011	--
EDMED	0.6705	0.1701	0.58
EDHI	1.9819	0.2345	0.22
OTHINC	-0.0105	0.0013	146,400.00
Constant	-0.3711	1.5003	--
Sweden			
KID012	0.0359	0.2726	0.32
KID345	-0.3255	0.2559	0.18
KID612	-0.2054	0.2012	0.33
NUMCHILD	-0.3915	0.0767	1.79
MOMAGE	0.3902	0.0630	36.78
MOMAGE2	-0.0054	0.0008	--
OTHINC	-0.0073	0.0041	101,690.00
Constant	-3.2032	1.1982	--

Variable	B	S.E.	Sample Mean
United Kingdom			
KID012	-2.0584	0.2454	0.32
KID345	-1.4723	0.2401	0.18
KID612	-0.6673	0.2070	0.33
NUMCHILD	-0.2974	0.0647	1.98
MOMAGE	0.2496	0.0588	34.40
MOMAGE2	-0.0035	0.0008	--
EDMED	0.3233	0.2817	0.68
EDHI	0.6496	0.2941	0.28
OTHINC	-0.0225	0.0108	8,570.00
Constant	-2.4211	1.0484	--

Variable	B	S.E.	Sample Mean
United States			
KID012	-0.9418	0.1786	0.33
KID345	-0.6752	0.1748	0.21
KID612	-0.2308	0.1513	0.32
NUMCHILD	-0.1691	0.0471	1.95
MOMAGE	0.1893	0.0437	33.67
MOMAGE2	-0.0027	0.0006	--
EDMED	0.8903	0.1290	0.48
EDHI	1.2571	0.1405	0.39
OTHINC	-0.0382	0.0035	1,200.00
Constant	-2.1039	0.7775	--

Note:

KID012	= youngest child aged 0-2
KID345	= youngest child aged 3-5
KID612	= youngest child aged 6-12
NUMCHILD	= total number of children under age eighteen
MOMAGE	= mother's age
MOMAGE2	= mother's age squared
EDMED	= medium level of education
EDHI	= high level of education
OTHINC	= other household income