The Effects of Family Leave Policy on Child Health: Evidence from 19 OECD Countries from 1969-2010

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Abstract

Since the welfare of children is one of the most important objectives of family policy, most OECD countries have implemented policies to help working parents take care of their newborns and balance their family and work responsibilities.

This study examines the effects of family leave policy on eight child health outcomes - five age specific child mortality rates (infant, perinatal, neonatal, post-neonatal, and child mortality rates), low birth weight, and immunization rates for measles and DPT (diphtheria, pertussis, and tetanus) across 19 OECD (Organisation for Economic Co-operation and Development) countries from 1969 to 2010. This research contributes to the existing literature (Ruhm, 2000; Tanaka, 2005) by including one additional country, South Korea, a highly developed but considerably understudied country, and by incorporating data from 2001 to 2010.

I use data on family leave policy from Ruhm (2000) and Tanaka (2005) and extend it using data from the Max Planck Institute for Demographic Research (MPIDR), Organization for Economic Co-operation and Development (OECD), World Health Organization (WHO), International Labour Organization (ILO), and World Bank. Additional data sources include the United States Social Security Administration (SSA), International Social Security Association (ISSA), and various government sources.

I estimate the effects of family leave policy (specially, number of weeks provided) – considering both job protected paid leave and other leave (unpaid or non-job protected leave) – on child health using OLS models. I control for other relevant variables including GDP per capita, health expenditures, healthcare coverage, dialysis patients, and fertility and female employment rates. I also include: (1) country fixed effects; (2) year fixed effects; and (3) country-time trend interactions. Missing values are imputed 20 times using the predictive mean matching method.

The results suggest that job protected paid leave significantly reduces infant mortality (deaths less than 1 year of age) and post-neonatal mortality (deaths between 1 month and 1 year of age). In particular, the largest effects of job protected paid leave are found in reducing post-neonatal mortality – a 6.16% decrease ($p=0.000$); the effects are robust throughout all model specifications. Comparing the effects of other leave (unpaid or non-job protected) and job protected paid leave, other leave has no significant effects on any of the outcome indicators. This suggests that parents do not respond to leave provided without adequate payment benefits or job protection and mothers may return to work early. As a result, other leave does not have any significant effects on infant health.

The concluding section discusses how these findings compare to previous research and explores future research and policy implications.

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Chapter One: Background

Introduction

Dramatic changes have taken place in the family and workforce over the last decades on a global level, especially in the Organisation for Economic Co-operation and Development (OECD) countries. For instance, infant and maternal mortality rates dropped; life expectancy soared; fertility rates declined; fewer women got married; many postponed marriage; more couples cohabitated without getting legally married; and among married couples, the divorce rate increased. In addition, female employment has consistently grown with higher numbers of educated women and more mothers participating in the labor market either by choice or out of necessity (OECD, 2011). In the midst of these rapid changes in society, many governments in developed countries recognized families in more diverse forms and made great efforts to address their unique needs and demands by introducing various types of family policies. While the general purpose of such a family policy is to support and assist parents to provide them with more choices and greater flexibility in balancing their family and work responsibilities, how policy objectives become developed and implemented across countries may vary, depending on the country's specific needs; more explicitly, family policy may be designed to: (1) help parents to reconcile work and family decisions and responsibilities; (2) promote conditions that can help adults have the number of children that they desire at the time of their choice; (3) mobilize female labor supply and promote gender equality to foster economic growth and financial sustainability; (4) combat child and family poverty; and finally (5) enhance child well-being and promote child development (Adema, 2012; Kamerman & Moss, 2009).

As the welfare of children is one of the most important objectives of family policy, most OECD countries have implemented and extended the provision of family policy to help parents, especially those who work, to be able to properly take care of their newborns by providing financial or in-kind resources and more time for family. While there are various factors that may influence the well-being of children both at the micro (e.g., breast feeding) and macro (e.g., medical infrastructure) levels, this study examines whether family policy, specifically family leave policy in weeks, has any effects on child health across 19 OECD countries over the last four decades, from 1969 to 2010. The 19 countries[1] are as follows: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Japan, Republic of Korea (South Korea or "Korea"), the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, the United Kingdom, and the United States. The measures of family leave policy are: (1) maternity leave; (2) parental leave; and (3) childcare leave. In this paper, unless noted, leave policy refers to only those three leave measures not including paternity leave (usually a much shorter job-protected leave of absence for employed fathers

[1] *I sincerely thank Dr. Ruhm and Dr. Tanaka for kindly sharing the dataset they have developed. Their sources include the OECD, International Labor Organization, World Health Organization, United States Social Security Administration, and Work Life Research Centre.*

exclusively), as well as other types of leave, such as sick, holiday, or vacation leave. Further definitions and details about family leave policy are discussed in the "*Terminology"* section below.

The paper uses the theoretical framework proposed by Ruhm (2000) and Tanaka (2005) that looked into the effects of leave mandates on child health with a smaller number of countries and years; Ruhm studied 16 European countries from 1969 to 1994, and Tanaka observed 18 countries by adding the US and Japan from 1969 and 2000. I further develop their dataset by adding the years from 2001 to 2010 and one additional East Asian country, South Korea ("Korea"). My study, therefore, contributes to the existing literature as follows:

(1) There is no cross-national study on family leave policy and child health after 2000, although there have been a number of reforms and changes in family policy in 19 OECD countries in recent years.

(2) There are no comparative studies that include Korea. Japan is the only East Asian country that has been considered previously. By adding Korea, another representative country in East Asia that has been traditionally understudied, my research provides a more diverse and balanced view on how leave policy impacts child health across various regions.

(3) In addition to maternity and parental leave considered in Ruhm (2000) and Tanaka (2005), I also incorporate childcare leave in my research. In the process of developing the dataset created by Ruhm and Tanaka, I use the updated version three of the Comparative Family Policy data from the Max Planck Institute for Demographic Research (Gauthier, 2011a) and PF 2.5. Annex: Detail of Change in Parental Leave by Country (OECD, 2012b), in addition to data from various international and governmental sources.

Therefore, my main research question is: **Does family leave policy have any effects on child health outcomes?**

To investigate whether family leave policy has any effects on child health, I evaluate the effects of leave policy on eight child health outcomes, including five age-specific mortality rates: infant, perinatal, neonatal, post-neonatal, and child mortality, as well as low birth weight and immunization rates for measles and diphtheria, pertussis, and tetanus (DPT) under 1 year of age. Over the last four decades, 19 OECD countries have witnessed a dramatic improvement in child health on a global level. For instance, Table 1-1 presents a remarkable achievement of 19 OECD countries in lowering all five mortality rates that occur among infants and children.[2] According to the OECD Stat Extracts, from 1970 to the present

[2]*I note that the measure of infant mortality can be different across countries and, thus, controversial. For instance, in the United States, all live births at any birth weight or gestational age, thus including very premature births, are required to be reported, whereas in other industrialized countries they may not be (Berkman & O'Donnell, 2013; MacDorman & Mathews, 2009; Liu et al., 1992). However, there is a consensus that it is unlikely that differences in reporting are the primary explanation for the relatively low international ranking of the US. (Methodologically speaking, the issue of variations across countries is addressed by using country and year fixed effects, as well as country-specific time trend interaction variables.) It is known that the US is an outlier among wealthy countries for having weak labor laws and limited family protection policies (Gornick & Meyers, 2004), which contributes to the continuous decline of its ranking in infant mortality from 12th in 1960, 18th in 1980, and 30th in 2008. For more*

time, infant mortality (deaths under 1 year of age per one thousand live births) decreased from 22.1 to 3.5; perinatal mortality (deaths within 1 week of life and stillbirths) from 26.6 to 5.3; neonatal mortality (deaths under 28 days of age) from 14 to 2.3; post-neonatal mortality (deaths between 28 days and 1 year of age) from 5.4 to 1.2; and, finally, child mortality (deaths between 1 and 5 years of age) from 4.2 to 0.7. While there are many factors that have contributed to this remarkable global achievement within a relatively short period of time, this research aims to look into the effects of family leave policy on child health over the last four decades.

Child Health Outcomes

My research focuses on five age-specific mortality rates, low birth weight, and immunization rates for measles and DPT. These are the only available health data that I can obtain for 19 OECD countries over the last four decades. I fully acknowledge that there are other important health outcomes to be considered, such as breastfeeding or accidents; however, sufficient data are not available. Ruhm (2000) pointed out that mortality rates are the primary proxy for health because "from a policy perspective, the greatest concern is for problems that have lasting effects and, in the extreme, result in death…[and] many health ailments afflicting the very young are transitory and have little impact on long-term development" (p. 6). Moreover, infant mortality is widely accepted as a proxy for well-being and health of children in the international community (Berkman & O'Donnell, 2013). Infant mortality is also closely correlated to socioeconomic status, access to health care, and the health of women of fertile age groups, as well as other measures of overall population health, including life expectancy (MacDorman et al., 1994).

Previous research has shown that leave schemes may have effects on different age-specific mortality rates; therefore, it is appropriate to include all five mortality measures covering ages from 0 to 5: perinatal (death within 1 week of life and stillbirths), neonatal (death within 1 month of life), infant (death within 1 year of age), post-neonatal (death between 1 month and 1 year of age), and child mortality (death between 1 and 5 years of age). Among these outcome indicators, larger effects of policy are expected to be found in reducing deaths that occur within the first year after birth: infant (death under 1 year old) and post-neonatal (death between 28 days and 1 year old) mortality rates. This hypothesis stems from the fact that leading causes of infant and post-neonatal deaths are greatly influenced by the activities of parents and their involvement in infant care during the first year of a newborn's life (e.g., Sudden Infant Death Syndrome, accidents, pneumonia and influenza, and homicide), which are expected to be affected by family leave policy (Ruhm, 2000).

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details of the history and trend of infant mortality rates in industrialized countries, see Berkman & O'Donnell (2013).

While there may be some effects of leave policy, especially pre-birth leave, on mortality rates that occur within the first month after birth—i.e., perinatal (death within 1 week of life and stillbirths) and neonatal (death within 1 month of life) mortality rates, I expect them to be very small or possibly none, as those mortality rates are more likely to be influenced by pre- and at-birth health conditions of parents (Ruhm, 2000). The parents' pre- and at-birth health status would not change dramatically by leave policy, as the 19 OECD countries typically provide time off from work for only a short period of time immediately before birth—approximately five to six weeks, in general (Gauthier, 2011a; Tanaka, 2005). I also include child mortality rate (death between 1 year and 5 years of age), as several countries have family leave policies that extent beyond one year (e.g., Norway and Sweden); however, I do not expect to find as significant effects in that period as I would during the first year of life because older children are more likely to be out of the home and, thus, their mortality would be influenced by many other factors.

In addition to the five mortality rates, I estimate the effects of family leave policy on several secondary health outcomes: low birth weight (less than 2,500 grams) and immunizations for measles and DPT within one year of a newborn's life. I include low birth weight because, similar to perinatal and neonatal mortality rates, it may be affected by leave policy, specifically pre-birth leave, which may contribute to the mother's pre-birth health. The mother's pre-birth health is, in turn, closely related to the occurrence of low birth weight, although as discussed above, I do not expect large effects of leave policy on such outcomes. Also, immunization rates may be influenced by leave policy, as parents on leave would have more time to take their infants to get the necessary immunizations during the first critical year after birth. However, I note that it is possible that the effects of leave policy on these secondary outcome indictors may be very small or possibly none. For low birth weight, the hypothesis is based on the fact that the parents' pre-birth condition may not change dramatically because of the short length of recommended pre-birth leave, as mentioned previously. Regarding immunizations for measles and DPT, the hypothesis for small or no effects comes from the fact that the immunization rates in the 19 OECD countries have been already very high (i.e., in the high 90s, without much fluctuation); thus, it may be difficult to see variations due to the policy effects (Tanaka, 2005).

Theory: Family Leave Policy and Child Health

Public health policies over the last centuries have brought a remarkable global achievement in improving child health, with policies addressing pertinent issues, such as water sanitation, milk pasteurization, and vaccination (Rose, 1958); medical and hospital advancements in treating deadly diseases (Jarvis, 1994); and medical knowledge and practices on neonatal care (Cutler & Meara, 1999), along with many others. Instead of focusing on these direct healthcare social policies, this study looks into a domain of non-healthcare policy, specifically family leave policy designed to help working parents

better care for their newborn and balance their family and work responsibilities. Such social policy has fundamental consequences of being pro-family and, thus, can improve the overall well-being of children and their parents (Berkman & O'Donnell, 2013).

In order to better understand theoretically how child health outcomes are related to leave policy, I follow the economic model used by Ruhm (2000) and Tanaka (2005), wherein parents try to maximize the utility function (child health in this case) within their given *financial* and *time constraints* (Rosenzweig & Schultz, 1982). Financial constraints are shaped by all income sources, including payments during leave, as well as total expenditures and consumptions. Therefore, it can be suggested that an increase in income may improve child health outcomes both pre- and post-birth by, for instance, providing more health capital, such as health-related goods and nutritious foods (Leibowitz, 2003).

Furthermore, time constraints (which are more relevant in this particular study because I investigate the effects of family leave policy in *weeks*), are subject to factors such as the total time at work and on leave. According to this theory, leave policy would influence child health outcomes by increasing the parents' time away from work that could be spent with their infant instead (Tanaka, 2005). The increase in time with the newborn can help parents further engage in care-related activities, which may benefit child health. Among others, breastfeeding is one of the most studied activities related to the length of leave. While breastfeeding greatly benefits child health (Chen & Rogan, 2004; Lawrence, 1997), numerous studies indicate that employment makes it difficult for mothers to breastfeed their infants; more specifically, it is reported that there are positive effects of an increase in maternity leave on breastfeeding (Arthur et al., 2003; Baker & Milligan, 2008; Berger et al., 2005; Blau et al., 1996; Jacknowitz, 2008; Johnston & Esposito, 2007; Roe et al., 1999; Staehelin et al., 2007; Visness & Kennedy, 1997; Yilmaz et al., 2002). However, while breastfeeding is an important contributor to child health, sufficient data for the 19 OECD countries over the last four decades are not available; thus, it will not be included in this research. In sum, leave policy—both in terms of duration and payment—can be expected to have positive effects on child health.[3]

Theoretically speaking, there are other important factors that might influence child health; therefore, I consider them my control variables when the data are available. While family leave policy designed to mitigate financial and time constraints is the central focus, child health outcomes are, indeed, influenced by many different factors, both at the micro and macro levels. First, as noted above, baseline health and lifestyle of parents before birth would greatly matter for child health outcomes, especially regarding deaths within the first month of a newborn's life, such as perinatal and neonatal mortality rates,

[3]*However, there may be some negative effects where mothers work to be qualified for their leave entitlement prior to birth, which can influence the pre-birth health investments that can affect child health (see Ruhm, 1998 for more details).*

as well as low birth weight. For instance, smoking and drinking by expecting mothers can result in high rates of early mortality rates and low birth weight (Chomitz et al., 1995; Difranza et al., 2004; Frisbie et al., 1996; Lightwood et al., 1999). In addition, Mozurkewich et al. (2000) reported that physically demanding working conditions for expecting mothers (e.g., long working hours and prolonged standing) can result in high rates of adverse birth outcomes, such as low birth weight. Prenatal care (e.g., receiving advice on vitamin use and proper weight gain) is another factor that can impact early mortality rates and birth weight (Kogan et al., 1994). However, data on these indicators for the 19 OECD countries over the last four decades are not available.

On the macro level, medical care infrastructure and availability is an important factor for expecting mothers to have healthy infants. For instance, neonatal intensive care can be critical for the early days of a newborn's life (Currie & Gruber, 1997); this is taken into consideration via a proxy indicator: the number of patients under dialysis, as done in previous studies (Ruhm, 2000; Tanaka, 2005). The total health expenditures can be another macro-level factor, though there is no comparative research with this specific indicator concerning its effects on health outcomes for children (Waldfogel, 2004). GDP per capita, a universally used indicator that determines a country's economic status, is known to have effects in decreasing infant mortality (Ferrarini & Sjoberg, 2010; Pritchett & Summers, 1996), though there are other studies that argue that such positive effects can be uncertain (Ruhm, 2003; Tapia Granados, 2005). While the direct causal effects of these factors on child health can be argued, they are likely to be related to my outcome variables and, thus, will be included in this study.

Terminology: Family Leave Policy and Current Status

Family policy is generally measured in three indicators: (1) family leave policy; (2) financial supports; and (3) public childcare services (Kamerman, 2009; Gauthier, 1999). In this paper, while the latter two are briefly discussed, my main focus is on family leave policy in weeks[4]: (1) maternity leave; (2) parental leave; and (3) childcare leave. Leave benefits have existed since the 1880s in Europe: first in Germany in 1883 with health insurance, paid sick leave, and paid maternity leave (Kamerman, 2000b). Understandably, family leave policy has developed very differently across countries, as each country has its own issues and problems to address, and there are different ways to emphasize underlying policy objectives and dimensions of family leave policy. They are: (1) economic,[5] as leave policy affects labor

[4]*For family leave policy, I first discuss maternity, parental, and childcare leave separately. For quantitative analyses, family leave policy is organized into two parts: job-protected paid leave and other leave (unpaid or non-job-protected leave) as done in previous studies (Ruhm 2000; Tanaka, 2005). Details are provided in the sections below.*

[5] *There is rich literature on the impact of parental leave on the labor market outcomes of women. See Thevenon & Solaz (2013) for the latest analysis; this cross-national study on the 30 OECD countries from 1970 to 2010 reports that the extension of paid leave has positive, though small, effects on female employment and the gender ratio of*

force behaviors and market regulation; (2) social,[6] as leave policy may affect the welfare of working mothers, as well as the emotional, cognitive, and physical health and development of children; and (3) demographic,[7] because parents' reproductive decisions (i.e., whether to have children, how many, and when to have them, etc.) can be influenced by leave policy (Thevenon & Solaz, 2013).

Maternity leave includes a leave arrangement granting employed mothers a designated job-protected period of absence before and after childbirth, and it is usually paid (Kamerman, 2000a). In 1919, the first Convention on Maternity Protection of the International Labour Organization (ILO)[8] recommended 12 weeks with a compulsory six-week post-birth period. In 2000, the Convention was revised to stipulate 14 weeks of recommended leave with six weeks of compulsory leave after childbirth at the minimum payment of 2/3 of earnings during that time (Kamerman, 2000b; Tanaka, 20005). Almost all OECD countries—except the US (no federal mandate) and Korea (13 weeks)—have ratified the minimum duration of 14 weeks of paid leave recommended by ILO and provided specific public income supports tied to the duration of maternity leave (OECD, 2012a). Countries do vary in the time period in which they adopted the ILO recommendations on maternity leave. For instance, Portugal, Spain, and Finland established employment reinstatement provisions that meet the ILO standards between the late 1960s and early 1970s, and similar legislations were passed in France and the Netherlands in the mid-1970s, followed by Denmark, Ireland, and Greece in the early 1980s (Ruhm, 1998). In Asia, Japan was the first country that enacted the maternity leave legislation as part of the Labor Standard Law in 1947 (Tanaka, 20005). Almost all OECD and European Union (EU) countries now have standards that exceed the ILO recommendation of 14 weeks of leave (ILO, 2010). However, while most OECD countries currently have family leave policies in place, there are many differences and disparities in the detailed

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employment within two years of leave. On the other hand, leave longer than two years has negative effects on female employment and the gender employment gap.

[6] *There is also rich literature on maternal employment and child development both on cross-national and specific country levels; for instance, Huerta et al. (2011) examines five OECD countries and suggests that a return to paid work by mothers within six months after childbirth may have negative effects on child outcomes, particularly on cognitive development, though the effects are small and not universally observed. Other studies looked into individual countries to understand the relationship between parental employment and child developmental outcomes (e.g., Brooks-Gunn et al., 2002; Ruhm, 2004).*

[7] *Many studies examined the effects of family policy on fertility rates—both at cross-national and specific country levels. Though it varies, the literature overall reports the positive effects of leave policy in increasing fertility rates. See Luci & Thevenon (2012) for the most recent analysis; using data from the 18 OECD countries from 1982 to 2007, this study reports that a family policy package (paid leave, childcare services, and financial transfers) has positive effects on fertility rates.*

[8] *Ratified by 33 countries, the Convention specified that women working in both public and private sectors: (a) shall not be permitted to work during the six weeks following her confinement; (b) shall have the right to leave her work if she produces a medical certificate stating that her confinement will probably take place within six weeks; (c) shall, while she is absent from her work, in pursuance of paragraphs (a) and (b), be paid benefits sufficient for the full and healthy maintenance of herself and her child, provided either out of public funds or by means of a system of insurance; and (d) shall in any case, if she is nursing her child, be allowed half an hour twice a day during her working hours for this purpose (ILO, 1919, Article 3; Moss & Kamerman, 2009).*

components of the policies, such as duration, payment availability and rate, take-up flexibility, and whether the leave is given as a family or individual right (i.e., whether the entitlement can be transferrable between the two parents or not) (Moss & Kamerman, 2009).

Parental leave is a gender-neutral leave from employment that is usually taken after maternity leave (Kamerman, 2000a). Parental leave is designed to offer parents additional opportunities for more time to take care of their newborn; as of 2010, all countries, except countries, such as Switzerland and the US, provide at least some type of payment benefits during parental leave, either earning-related or based on a flat rate. The way in which parental leave is provided varies, since it can be granted as: (1) family rights that parents can divide between themselves as they choose; (2) individual rights, which are transferrable to the other parent; and (3) non-transferable individual rights, whereby both parents are given an entitlement to a specified amount of leave, i.e. mommy or daddy quotas on a "use it or lose it" basis (Thevenon & Solaz, 2013). Some countries, such as Sweden and Norway, do not have a legal framework of distinction between maternity and parental leave, though they usually set aside a certain period of weeks for the specific use of each parent (Gauthier, 2011b).

Childcare leave (sometimes called homecare leave) is a leave entitlement to care for children until they are up to three years old as a variation or extension of parental leave, and payments are not necessarily restricted to parents with prior work requirements (OECD, 2012a). Countries, including Belgium and all of the Nordic/Scandinavian countries (e.g., Finland, Norway, and Sweden) provide paid childcare leave ranging from 13 to 128 weeks (Gauthier, 2011a; 2011b). Payments vary across countries; for instance, Finland makes homecare-related income supports contingent on not using public day care facilities, and payment rates in Norway vary with the number of hours that publicly provided day care is used (Thevenon & Solaz, 2013). Though not discussed in depth in this study, other types of leave, such as paternity leave (usually a much shorter job protected leave of absence for employed fathers exclusively), as well as other additional leave entitlements (e.g., holidays or sick leave), are available to attend to family and child matters. I note that the 12 weeks of job protected leave entitlement in the US under the Family and Medical Leave Act (FMLA) are counted as unpaid childcare leave for this research (Gauthier, 2011a).

Previous Studies

Overall, all previous cross-national studies have found that longer leave is positively related to better child welfare. Winegarden and Bracy (1995) examined the 17 OECD European countries from 1959 to 1989 and reported that an extra week of paid maternity leave is significantly associated with a reduction in infant mortality by 0.5 per one thousand live births. Ruhm (2000) looked into the effects of paid maternity leave on various pediatric mortality rates for the 16 European countries from 1969 to 1994;

the author indicated that extended paid maternity leave has the largest effects in reducing post-neonatal (between 28 days and one year of life) mortality. Tanaka (2005), as an extension of Ruhm's research using data on the 18 OECD countries from 1969 to 2000, also concluded that job-protected paid leave has positive effects on child health outcomes, especially in reducing the post-neonatal mortality rate, consistent with Ruhm's finding. In addition, some studies have looked into the effects of paternity leave and found positive policy effects on child health (O'Brien, 2009; Tanaka & Waldfogel, 2007).

Some multi-cross-national studies looked into the effects of leave policy on child poverty, and all of them found positive effects in reducing the poverty rate (Engster & Stensota, 2011; Ferrarini, 2006; Misra et al., 2007). Furthermore, studies that investigated the effects of family policy on child welfare in individual countries indicated consistent findings overall. For instance, Roe et al. (1999) found that there is a positive correlation between maternity leave after childbirth and the duration of breastfeeding in the US, using the US Food and Drug Administration's Infant Feeding Practices Study from 1993 to 1994. Using micro-data from the US National Longitudinal Survey of Youth (NLSY), Berger et al. (2005) also found that returning to work within 12 weeks of childbirth has negative effects on child health, particularly on breastfeeding, immunizations, and the behavioral development of the child.

Chapter Two: Data and Method

Data and Measures

In this paper, I focus on the 19 OECD countries from 1969 to 2010.[9] Table 1-4 provides the descriptive statistics for all of the variables used in my study. The data were all retrieved from publicly available sources, such as the OECD (Stat Extracts), WHO (European Health for All Database), ILO (Maternity at Work), and World Bank (World Development Indicators). Additionally, I relied on the United States Social Security Administration (SSA) and International Social Security Association (ISSA). For Korea and Japan, I also used data from the National Office of Statistics and the Statistics Bureau of the Ministry of Internal Affairs and Communications, respectively.[10] For the United States, I additionally used data from the National Vital Statistics Reports from the Centers for Disease Control and Prevention.

Data for my independent variables—family leave policy in weeks—were obtained from the dataset developed by Ruhm (2000) and Tanaka (2005). To extend the dataset, in addition to the sources I mentioned above, I used PF 2.5. Annex: Detail of Change in Parental Leave by Country (OECD, 2012b), as well as the latest version (3) of the Comparative Family Policy dataset from the Max Planck Institute for Demographic Research (MPIDR),[11] which was organized by Gauthier (2011a). Table 1-5 provides an overview of family leave policy in the 19 OECD countries in 2010. Following the way in which family leave policy was organized in Ruhm (2000) and Tanaka (2005), in this section, family leave policy is discussed in three measures as follows:

Independent Variables:

1) Job-protected paid leave: Weeks of job protected paid leave
2) Other leave: Weeks of unpaid leave and non-job protected paid leave
3) Total leave: Sum of all leave

Job-protected paid leave refers to weeks of job protected paid maternity and parental leave, which includes family and adoptive leave, but not paternity leave.[12] In addition, I control separately for weeks of other leave as my second independent variable. Other leave refers to weeks of unpaid leave and non-job protected paid leave, which includes parental leave provided at a very low flat rate and not clearly job

[9] *The 19 countries are Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Japan, Republic of Korea (South Korea or "Korea"), the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, the United Kingdom, and the United States.*

[10] *www.index.go.kr (Korea); and http://www.stat.go.jp/english/index.htm (Japan)*

[11] *One of the most recent OECD reports using the Dataset Version 2 was "Labour Market Effects of Parental Leave Policies in OECD Countries" by Olivier Thevenon and Anne Solaz (2013). The dataset has been updated, and I am using the most recent version (Version 3) for this research. Original sources include the OECD, International Labor Organization, United States Social Security Administration, World Health Organization, Council of Europe, and Missoc, among others.*

[12] *Fathers' take-up rates are known to be still very low in most OECD countries, and as illustrated above, daddy's quota ("take it or lose it") has been enacted in a few countries of the Social Democratic regime.*

protected (e.g., Austria and Germany). In addition, I add childcare leave that is also either unpaid or paid at a very low flat rate and not clearly job-protected. In the effort to follow previous studies (Ruhm, 2000; Tanaka, 2005), I adhere the following rules: (1) When there is no distinction between maternity leave and parental or childcare leave with the same job protection and payment, the leave is under "job-protected paid leave," which was usually the case for the Nordic/Scandinavian countries, including Denmark, Finland, Norway, and Sweden; (2) Parental leave and childcare leave in the dataset are usually the additional leave entitlements taken after maternity leave; therefore, in this case, total leave can be obtained simply by adding all weeks of leave. However, in some countries, parental or childcare leave is given *until* the child reaches a certain age, in which case maternity leave is already included in parental or childcare leave, as noted by Gauthier (2011a); thus, in this case, I deduct post-birth maternity leave from parental or childcare leave in order to avoid overestimation and correlation. For instance: (i) in Finland, childcare leave lasts until the child's third birthday; (ii) in France, Germany, and Spain, parental leave lasts until the child's third birthday; and (iii) in Sweden, childcare leave lasts until the 18 months of age; and (3) when no differentiation between pre-birth and post-birth maternity leave is noted, I assume them to be equal except for: (i) Japan (from 2000 and 2010), where 14 total weeks of maternity leave are assumed to be six pre-birth and eight post-birth as previous years; (ii) the UK (from 1998 to 2003), where 18 total weeks of maternity leave are assumed to be 11 pre-birth and seven post-birth, as in previous years; and (iii) Portugal (from 1996 to 1998), where 14 total weeks of maternity leave are assumed to be 5.4 pre-birth and 8.6 post-birth, as in previous years.

Table 1-6 presents financial sources for maternity protection provided on a national level. The 19 OECD countries typically adopt two main approaches toward financing cash benefits for maternity: (1) social security; or (2) mixed systems. Many countries rely on their social security systems that cover health or unemployment insurance, as well as other types of public funds coming from various levels of government; these systems use contributions from some combination of employees, employers, and government revenues to create an insurance pool that is then used to finance benefits (ILO, 2010). Other countries (e.g., Denmark, Germany, Greece, Korea, Switzerland, and the UK) use mixed systems, in which employers and social security systems usually share a responsibility for benefits, while the percentage employers must contribute to cash benefits varies across countries. Table 1-7 provides the change/increase in weeks of leave over the last four decades across the 19 OECD countries.

For my outcome variables, I use five age-specific pediatric mortality rates, low birth weight, and immunization rates for measles and DPT. All outcome variables are continuous and in the natural log because they are positively skewed (non-zero):

(1) Infant mortality rate (infant deaths under 1 year per one thousand live births);
(2) Perinatal mortality rate (deaths within 1 week of life and stillbirths per one thousand live births);
(3) Neonatal mortality rate (deaths under 28 days of age per one thousand live births);

(4) Post-neonatal mortality rate (deaths between 28 days and 1 year of age per one thousand live births); and
(5) Child mortality rate (deaths between 1 and 5 years of age per one thousand live births).

In addition:

(6) Low birth weight (number of live births <2,500 grams as % of the total number of live births);
(7) Percent of immunization for DPT (diphtheria, pertussis, and tetanus) for children under 1 year of age; and
(8) Percent of immunization for measles for children under 1 year of age.

I include all five mortality measures, covering ages from 0 to 5 years, because prior research has found that the effects of leave policy vary with the child's age. I note again that the largest effects of leave policy are expected to be found in reducing deaths that occur within a year after birth—i.e., infant and post-neonatal mortality rates, as leading causes of infant and post-neonatal deaths are greatly influenced by the parents' activities and their involvement in infant care during the first critical year of a newborn's life (e.g., Sudden Infant Death Syndrome, accidents, pneumonia and influenza, and homicide); such activities and involvement in infant care are expected to be affected by and/or particularly sensitive to family leave policy (Ruhm, 2000). On the other hand, I expect for the effects of leave to be very small or possibly none on deaths within the first week (prenatal) or month (neonatal); the hypothesis is based on the fact that these early mortality rates are more likely to be influenced by pre- and at-birth health condition of parents, which will not change dramatically by a short pre-birth leave of five to six weeks, on average, in OECD countries. I include child mortality in my study, as several countries, like Norway and Sweden, provide leave beyond one year.

In addition, I estimate the effects of family leave policy on my secondary outcome variables: low birth weight and immunization rates for measles and DPT. I include them as my outcome variables because low birth weight, similar to perinatal and neonatal deaths, may be affected by leave policy, specifically pre-birth leave, which may contribute to the mother's pre-birth health conditions that are closely related to the occurrence of low birth weight. However, as noted before, it is possible that the effects of leave may be very small or possibly none; low birth weight is most influenced by the pre-birth condition of parents, which may not improve dramatically by the limited weeks of pre-birth leave. Moreover, immunization rates may be expected to be influenced by leave policy, as parents on leave would be given more time to take their infants to get the necessary immunizations during the first critical year after birth; however, the effects are also expected to be very small or possibly none, given that the rates have already been very high without much variation in all 19 OECD countries, and immunization for measles is introduced after the child's first birthday in many countries (Tanaka, 2005).

All of these secondary outcome variables—including low birth weight, as well as immunization rates for measles and DPT—are also my additional control variables when estimating the effects of leave policy on mortality outcomes, as they may be important mediators that influence the relationship between leave policy and mortality rates. Low birth weight is one of the most influential risk factors for pediatric mortality rates, whereas immunizations for measles and DPT can be important protective factors for a newborn (McCormick, 1985; Strully et al., 2010); they may predict other child health outcomes, including mortality rates and, thus, they are both my outcome variables and control variables.[13]

Furthermore, I analyze the effects of leave on outcome measures with additional control variables (*I also test without them*): (1) real GDP per capita (in thousands of PPP-adjusted 2005 US dollars); (2) the total expenditures on health care as a percentage of GDP; (3) the share of the population covered by health insurance[14] (public and primary private coverage); (4) the number of kidney dialysis patients per 100,000 population; (5) the fertility rate of 15-44 year old women (total fertility rates[15]); and (6) the female employment-to-population ratios. GDP per capita is a universally used economic indicator for a country's wealth; therefore, it is likely to positively influence child health, as indicated above. In the same light, the total health expenditures and health insurance coverage are also important variables to control for because they are specifically allocated for healthcare and, thus, they are highly related to child health measures.[16] The number of dialysis patients is included, as done previously, since it can be a proxy for medical infrastructure/technology (Ruhm, 2000; Tanaka, 2005). Fertility rates are taken into consideration because they are likely positively related to the number of deaths among newborns. Moreover, female employment rates are included because they can positively impact child health with a higher income, but at the same time, it can prevent mothers from spending more time with their children.[17]

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[13] *While Ruhm (2000) found no significant effects of leave policy on low birth weight, Tanaka (2005) detected that paid leave significantly decreased low birth weight, suggesting that pre-birth leave had positive effects on mortality rates by decreasing the occurrence of low birth weight (not immunization rates).*

[14] *In all countries, more than 99% of the population is covered by public health insurance, except Germany (89.2% public and 10.8% primary private) and the United States (26.4% public and 54.9% primary private).*

[15] *I use total fertility rate (TFR), which is a more direct measure of the level of fertility than the crude birth rate, as it refers to births per woman and shows the potential for population change in the country. TFR in a specific year is the average number of children who would be born to a synthetic cohort of women whose age-specific birth rates were the same as those actually observed in the year in question (Hotz, Klerman, & Willis, 1997). Moreover, TFR reflects the interplay of two components, namely quantum tempo effects: the level (number of children) and timing (time of birth) of fertility. Therefore, it is affected by changes in the timing of childbearing; for instance, in years in which timing of childbearing is advanced, the TFR is inflated, compared to the level that would have been observed without such timing changes, and vice versa (Bongaarts & Feeney, 1998). In addressing this issue, many scholars have studied how this measure could and should be better used and adjusted. (For more details, see Bongaarts & Feeney, 1998; Kim & Schoen, 2000; Kohler & Ortega, 2002; and Sobotka et al., 2005.)*

[16] *While more potential control variables, such as health expenditures on pregnant women or infant or prenatal care, would be informative, sufficient data for the 19 OECD countries over the last four decades were not available.*

[17] *I note that fertility rate and female employment may be endogenous because family policy, including leave schemes, usually aims to promote fertility rate as well as female employment in most OECD countries (for more details, see literature review in Gauthier, 2007; and Thevenon, 2011). Nonetheless, I include both variables*

I also control for three types of public social welfare expenditures on families and children (*I also test without them*): (1) the public expenditures on family cash allowances; (2) the public expenditures on maternity and parental leave[18]; and (3) the public expenditures on family services. Because my analysis focuses on the effects of leave on child health indicators, it is appropriate to control for expenditures spent on families and children, as well as to test whether they change the way in which leave policy influences my outcome variables. All of my expenditure variables have been USD PPP-adjusted and defined by expenditures per child. The public expenditures on family cash allowances and the expenditures on family services are divided by the number of children ages 0-14; further, the public expenditures on maternity and parental leave are divided by the number of children ages 0-4. The same method was applied in previous studies (Ruhm, 2000; Tanaka, 2005).

Method of Analysis

I estimate the effects of leave policy—job-protected paid leave and other leave (unpaid or non-job protected)—on eight child health outcomes (all continuous) in 19 OECD countries from 1969 to 2010 using OLS models, including country fixed effects, year fixed effects, and country-time trend interactions to control for unobserved factors across countries and time periods.

(1) Country fixed effects are incorporated in order to control for the specific fixed effects of each country over a time period. These country dummies are defined by dichotomous variables.

(2) Year fixed effects in order to control for the specific fixed effects of each year for all countries. This set of year dummies is also defined by dichotomous variables for all years from 1969 to 2010.

(3) Country-time (linear) trend interactions, which I create using the country dummies and a time trend (linear) variable.[19] The interactions are incorporated to control for country-specific time varying effects—i.e., whether the effects of the country on the outcome depend on time, as well as whether the change of outcome with time also depends on the particular country.

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following Ruhm (2000) and Tanaka (2005), since family leave policy is related to both female employment and fertility rates, and they separately play an important role as control variables. The two variables are quite different because fertility rate is for overall female population, especially fertile age groups, and female employment rate varies by time and by country's overall economy and policy on the labor market.

[18]As was previously indicated, it is expected that by controlling for the expenditures on maternity and parental leave, the magnitude of the effects of leave would be diminished and statistical precision would be eliminated; however, I observe how the results might come out differently with more countries and years, and I concurrently control for other expenditures to compensate for the issue.

[19]The country-specific time trend dummy variables are assumed to be linear in both Ruhm (2000) and Tanaka (2005). I tested for both linear and curvilinear models, whether they contribute to the effects of policy on outcome variables; no change in policy effects was found in all analyses, and, therefore, I also use linear trends.

As expected, I have a number of missing values in my dataset; the results from the missing data analysis are presented in Table 1-8. Instead of applying the method used by previous researchers,[20] I conduct multiple imputations. First, I conduct the Little's Test[21] to test whether missing data are missing completely at random (MCAR), which can be ignorable because the "missing-ness" does not depend on the observed data. However, I had to reject the null hypothesis, as the Little's Test results came out highly significant (p=0.000). Therefore, I assume that my missing data are missing at random (MAR) instead of missing completely at random (MCAR), which suggests that it is appropriate to replace the missing data by conducting multiple imputations. All variables with missing numbers are imputed, except the ones whose values are missing more than 10%, as they are missing in a systematic pattern as underlined in Tables 1-10 and 1-11. The following variables have values that are missing for most countries prior to 1980: low birth weight, immunization rates for measles and DPT, and social expenditures on families (family cash allowances, maternity and parental leave, and family-related services). Some data on dialysis patients are missing for Belgium, Ireland, Italy, Korea, Norway, Sweden, and Switzerland prior to 1980.

For multiple imputations, I use the predictive mean matching (PMM) method to incorporate the appropriate restrictions for the variables I impute[22]; for instance, values should not exceed 100 for variables in a percent measure, such as health expenditures and health insurance coverage. Female employment ranges from 0 to 1. I also do not expect to have any negative values in my variables. After running multiple imputations 20 times, I can confirm that all of the imputed values are within my restrictions. The summary of the non-imputed original data and imputed data is presented in Table 1-9. I note that, as a robustness check, I repeat all analyses with both non-imputed and imputed data and confirm that the results are similar.

[20] *Previous research (Ruhm, 2000; Tanaka, 2005) mainly used the following three methods for missing data: (1) assumed to be same as a previous year (e.g., fertility rate for the US in 1969 and 1970); (2) filled with numbers using the average of the immediate year before and after (e.g., female employment rate for Denmark in 1980); and (3) assumed to have increased/grown at a constant rate (e.g., female employment rate for Greece from 1972 to 1976).*

[21] *Ha: Data are not missing completely at random; Ho: Data are missing completely at random.*

[22] *The predictive mean matching (PMM) method is a tool that calculates the predicted values of target variables according to the specified imputation model and proves to be robust against model misspecification; imputations are based on values observed elsewhere, so they are realistic, and imputations outside of the observed data range will not occur, which prevents problems with meaningless imputations, such as negative mortality rate (Van Buuren, 2012).*

Chapter Three: Findings and Conclusion

Findings: The Effects of Family Leave Policy on Child Health

Five Mortality Rate Outcomes

Table 2-1 shows the results from three models estimating the effects of both job-protected paid leave and other leave (unpaid or non-job protected leave) on infant mortality (the natural log of infant mortality). Model 1 includes the effects of weeks of job-protected paid leave only. Model 2 takes into consideration four country characteristic variables that are related to the governments' direct investments in their citizens and the economic capacity for social safety net: GDP per capita, the total expenditures on healthcare as a percentage of GDP, the share of population with health insurance coverage, and the number of patients under kidney dialysis. Model 3 adds two more crucial control variables that are associated with family and labor market dynamics: fertility rates and female employment-to-population ratios. Finally, Model 4 takes into consideration other leave (unpaid or non-job protected leave). Other leave is a crucial indicator that needs to be added due to the fact that most of the 19 OECD countries have extended both job-protected paid leave and other leave over the last four decades. All four models include country fixed effects, year fixed effects, and country-time trend interactions. The results overall indicate that job protected paid leave has significant effects in reducing infant mortality. In Model 1, without any control variable, a 10-week extension of job protected paid leave reduces infant mortality by 2.05% ($p=0.001$); a 2.05% decrease in infant mortality means a reduction in the infant death rate from 10 to 9.795 per one thousand live births.

In Model 2, with four country characteristic variables, the results indicate that a 10-week extension of job-protected paid leave reduces infant mortality by 1.92%, and the effects are still highly significant ($p=0.002$). In Model 3, when adding two more control variables that are related to family and work dynamics (fertility rates and female employment-to-population ratios), the results are consistent; a 10-week extension of job-protected paid leave reduces infant mortality by 2.00%, and the effects are highly significant ($p=0.002$). Finally, Model 4, when controlling for all six control variables and other leave, shows that the results are quite consistent, which suggests that the effects are robust throughout all model specifications; a 10-week extension of job-protected paid leave significantly reduces infant mortality by 2.06% ($p=0.001$). No effects of other leave are found. Overall, the results from Table 2-1 are consistent with previous findings from Ruhm (2000) and Tanaka (2005).[23]

On the other hand, Tables 2-2 and 2-3 show the results, which indicate that throughout all models (with the model specifications the same as above), the effects of leave policy—both job-protected paid

[23] *Only results on infant mortality with this model specification—i.e., without control variables—were discussed in previously studies (Ruhm, 2000; Tanaka, 2005); they both reported that job-protected paid leave significantly reduced infant mortality.*

leave and other leave—have no significant effects in reducing perinatal and neonatal mortality rates. While I had expected small (albeit some positive) effects of leave policy in reducing all mortality rates, as found in Tanaka (2005), my findings are more consistent with Ruhm (2000), which reported no evidence of the effects of leave in reducing perinatal mortality and little effects in reducing neonatal.

Table 2-4 shows the results indicating the effects of family leave policy on post-neonatal mortality. Models from 1 to 4 have the same model specifications as above, and all include country fixed effects, year fixed effects, and country-time trend interaction variables. Model 1, without any control variables, indicates that a 10-week extension of job-protected paid leave significantly decreases post-neonatal mortality by 5.17% (p=0.000). Model 2, with four country characteristic variables, shows that the leave extension significantly decreases post-neonatal mortality by 6.36% (p=0.000). Model 3, with two additional control variables of fertility and female employment rates, also shows that the leave extension significantly reduces post-neonatal mortality by 6.21% (p=0.000). Finally, Model 4, with all control variables and other leave, indicates that a 10-week extension of job-protected paid leave significantly reduces the post-neonatal mortality rate by 6.16% (p=0.000). Throughout all model specifications, other leave has no effects in reducing post-neonatal mortality. Therefore, as expected, the results overall indicate that job-protected paid leave has more significant effects in reducing post-neonatal mortality than it does on other mortality rates; these findings are consistent with previous research (Ruhm, 2000; Tanaka, 2005).

Table 2-5 shows the results indicating that there are no effects of family leave policy—both job-protected paid leave and other leave—in reducing child mortality. The model specifications are the same as above. My results are somewhat different from previous findings, where job-protected paid leave did have significant effects in reducing the child mortality rate, though the effects were much smaller than they were in post-neonatal mortality.[24]

Low Birth Weight and Immunizations as Outcomes

Tables 2-6 to 2-8 show the results with the same model specifications as above, estimating the effects of leave policy on my secondary outcome indicators: low birth weight and immunization rates for measles and DPT. Again, all models include country fixed effects, year fixed effects, and country-time trend interaction variables. I use data for the 19 OECD countries from 1980 to 2010 (instead of 1969 to 2010) because a great portion of data on low birth weight and immunization rates for most countries are missing prior to that time period. The results show no significant effects—neither for job-protected paid leave and other leave—on any of the secondary outcome variables.

[24] *For instance, Tanaka (2005), using data on the 18 OECD countries from 1969 to 2000, indicated that a 10-week extension of job-protected paid leave significantly decreased the post-neonatal mortality rate by 4.06%, whereas regarding child mortality, the effects were 3.16%.*

Low Birth Weight and Immunizations as Mediators

As job-protected paid leave has the largest effects in reducing post-neonatal mortality than it does on other mortality rates, I estimate some additional models for post-neonatal mortality with more control variables. Table 2-9 indicates the results from models that estimate the effects of both job-protected paid leave and other leave on post-neonatal mortality, additionally controlling for my secondary outcome variables as mediators—low birth weight (which is considered a risk factor for mortality) and immunization rates for measles and DPT (which are considered protective factors for mortality). In all models, I continue to use all six major control variables and country and year fixed effects, as well as country-time trend interactions. Because leave policy does not significantly affect mediating factors as seen from Tables 2-6 to 2-8, it is unlikely that controlling for them would explain the effects of policy on post-neonatal mortality; however, the results still provide some interesting findings. I first note that throughout all model specifications, other leave has no significant effects on any of the outcome variable.

In Model A, controlling for low birth weight, the results indicate that the effects of job-protected paid leave on the post-neonatal remain robust though slightly reduced; a 10-week leave extension reduces post-neonatal mortality by 3.67% (p=0.014). The results also indicate that low birth weight has significant effects on post-neonatal mortality; a 1.00% increase in low birth weight significantly increases post-neonatal mortality by 5.13% (p=0.000). Model B shows the results estimating the effects of leave policy on post-neonatal mortality, particularly controlling for immunization rate for measles. The results indicate that the effects of leave policy in reducing post-neonatal mortality rate remain significant; a 10-week extension of job-protected paid leave predicts a reduction in post-neonatal mortality by 3.77% (p=0.014). The results indicate that the immunization rate for measles does not have significant effects on the mortality rate. In Model C, when controlling for immunization rate for DPT, the results indicate that a 10-week extension of job-protected paid leave policy still significantly reduces post-neonatal mortality by 4.16% (p=0.007). Moreover, the results indicate that a 1.00% increase in the immunization rate for DPT significantly reduces the post-neonatal mortality rate by 0.73% (p=0.031).

Model D shows the results indicating that when controlling for all three mediators concurrently—low birth weight and immunizations for measles and DPT—the effects of job-protected paid leave are still significant in reducing post-neonatal mortality rate by 4.01% (p=0.007). The effects of low birth weight and immunization for DPT are significant in increasing post-neonatal mortality by 5.11% (p=0.000) and reducing the mortality rate by 0.70% (p=0.036), respectively.

Including Social Expenditures on Families

Table 2-10 shows the results from models that estimate the effects of both job-protected paid leave and other leave on post-neonatal mortality controlling for three types of social welfare expenditures on families: (1) the expenditures on family cash allowances; (2) the expenditures on maternity and

parental leave; and (3) the expenditures on family services. Because the data on social expenditures are missing for most countries prior to 1980, I observe the data available in the years from 1980 to 2010. For all models, I continue to include all six control variables and country and year fixed effects, as well as country-time trend interactions. The overall results throughout all of the models show that even when controlling for social expenditures, both individually and concurrently, job-protected paid leave significantly reduces post-neonatal mortality, whereas other leave has no significant effects in all cases.

In Model A, without controlling for any welfare expenditure, a 10-week extension of job-protected paid leave significantly decreases post-neonatal mortality by 4.99% (p=0.002) from 1980 to 2010. In Model B, with controlling for the expenditures on cash allowances, the results indicate that a 10-week extension of job-protected paid leave significantly decreases post-neonatal mortality by 5.10% (p=0.001), suggesting that the effects are slightly amplified but consistently robust. In Model C, when controlling for the expenditures on maternity and parental leave, job-protected paid leave still significantly reduces post-neonatal mortality by 5.02% (p=0.002). In Model D, when controlling for the expenditures on family services, a 10-week extension of job-protected paid leave again significantly reduces post-neonatal mortality by 4.83% (p=0.002). Therefore, the results are robust throughout all of the model specifications, controlling for social expenditure variables individually.

Regarding Models E to H, the results overall indicate that even when controlling for the welfare expenditures concurrently, job-protected paid leave still significantly reduces post-neonatal mortality rate. It is shown that in Model E, when controlling for the expenditures on cash allowances and the expenditures on maternity and parental leave, a 10-week extension of job-protected paid leave significantly decreases post-neonatal mortality by 5.08% (p=0.001). In Model F, when controlling with the expenditures on cash allowances and the expenditures on family services, the mortality decreases by 5.01% (p=0.002). In Model G, when controlling for the expenditures on maternity and parental leave and the expenditures on family services, job-protected paid leave reduces post-neonatal mortality by 4.75% (p=0.003). Finally, in Model H, when controlling for all expenditure variables simultaneously (cash allowances, maternity and prenatal leave, and family services), a 10-week extension of job-protected paid leave significantly reduces post-neonatal mortality by 4.90% (p=0.002). Therefore, the results are robust throughout all of the model specifications, controlling for any two or all three social expenditures concurrently.

Conclusion and Discussions

Consistent with previous studies (Ruhm, 2000; Tanaka, 2005), this paper found that an extension of job-protected paid leave has significant effects in reducing infant mortality; a 10-week extension of job-protected paid leave decreases infant mortality by 2.06% (Table 2-1). Also, larger effects were found

in reducing post-neonatal mortality; a 10-week extension of job-projected paid leave significantly reduces the mortality rate by 6.16% (Table 2-4). Compared to the effects of job-protected paid leave, other leave (unpaid or non-job protected leave) does not show significant effects on any of the health outcome indicators. This suggests that when family leave policy is provided without sufficient payment benefits or job protection, parents do not respond to the policy, and mothers may return to work early. As a result, other leave does not have any significant effects on improving child health.

I did not find any significant effects of job-protected paid leave on perinatal (Table 2-2) and neonatal (Table 2-3) mortality rates. The results make sense because these outcome indicators usually reflect the parents' pre-birth health condition and investments, as well as at-birth health status and care access, which will not change dramatically by the limited pre-birth leave (5-6 weeks) recommended in OECD countries (Gauthier, 2011a; Tanaka, 2005). In order to investigate the effects of pre-existing and at-birth condition on mortality rates, more relevant data (e.g., data on lifestyle, including drinking and smoking habits; work routine, including workload and hours; parents' baseline health; prenatal care; and breastfeeding) need to be included; however, they are not currently available for the 19 OECD countries over the last four decades. In addition, I did not find any significant effects of job-protected paid leave on child mortality (Table 2-5); this can be explained by the fact that most leave policy does not last until the child's fifth birthday. While most countries did extend their leave policy both in duration and payment over the last four decades, the longest childcare leave allows for parents to take leave until the child reaches the age of 3 years old, usually provided in Social Democratic and Conservative welfare state countries. Moreover, older children are more likely to be out of the home and, thus, there would be many other factors that may contribute to their mortality.

I also did not find any significant effects of job-protected paid leave on low birth weight (Table 2-6); this makes sense because low birth weight results from a complex interaction of diverse factors. Similar to prenatal and neonatal mortality rates, pre-birth factors for expecting parents must be considered to understand the accurate dynamics between leave policy and low birth weight (e.g., lifestyle, work routine, parents' baseline health, and prenatal care). As mentioned previously, sufficient data on these indicators are not available.

Low birth weight was expected to be one of the mediators (along with immunization rates for measles and DPT) between leave policy and mortality rates, as it can be a critical risk factor for infant health. However, the results suggest that because there is no significant relationship between the policy

and low birth weight, it is unlikely that controlling for low birth weight would explain the effects of leave on mortality outcomes. Therefore, my results are consistent with Ruhm (2000).[25]

Furthermore, I did not find any significant effects of job-protected paid leave on immunization rates for measles (Table 2-7) and DPT (Table 2-8). One possible interpretation can be that the immunization rates have grown to be very high (i.e., in the high 90s without much fluctuation) in most OECD countries; therefore, it can be difficult to see variations in the rates caused by leave policy. Moreover, the fact that the vaccination schedule for measles is introduced after the child's first birthday in many countries could be another explanation.

Along with low birth weight, immunization rates for measles and DPT were also expected to be additional mediators between leave policy and mortality outcomes, as they can be important protective factors for infant health during the first year of a newborn's life. However, the results suggest that because there is no significant relationship between leave policy and both immunization rates, controlling for them would not explain the mechanism in which leave policy influences mortality outcomes. The results are consistent with previous research (Ruhm, 2000; Tanaka; 2005).

The effects of job protected paid leave on post-neonatal mortality are robust with different model specifications (Table 2-10). In particular, when controlling for the additional social policy variables—including public social welfare expenditures on family cash allowances, the expenditures on maternity and parental leave, and the expenditures on family services—I found that the effects of leave policy on post-neonatal mortality are not eliminated. Also, when controlling for those expenditure variables concurrently, the effects of leave policy are still robust. Therefore, the results indicate that leave policy has positive effects in reducing post-neonatal mortality rate, even after taking into consideration the generosity of social expenditure components.

Policy Implications

When leave is provided without sufficient payment benefits or job protection, parents do not seem to respond to the policy. This implies that if leave policy is implemented to reduce death rates among newborns and young children, it must be provided with proper payment benefits that would support parents to maintain their income source and continue to invest in their newborn, especially during the first critical weeks or months after birth. Moreover, job protection is an important part of leave policy because it guarantees continuous and stable employment for parents when returning from childbirth and care. Therefore, it is expected that parents are more likely to take leave when job protection is given.

[25]*Tanaka (2005) found significant effects of job-protected paid leave in reducing low birth weight; in addition, when estimating the policy effects on post-neonatal mortality rate controlling for low birth weight as a mediator, the results were still significant.*

In addition, if leave policy aims to reduce other mortality rates, especially deaths that occur within the first month of a newborn's life—i.e., perinatal and neonatal deaths and low birth weight—pre-birth leave must be required, rather than simply recommended, and it must be more generous/longer than 5-6 weeks, which is the current average provision in the 19 OECD countries. Leave policy that requires and guarantees longer pre-birth leave, coupled with sufficient payment benefits, is more likely to reduce those early mortality rates, as pre-birth leave can greatly contribute to the parents' pre- and at-birth health condition and quality of life. Furthermore, other supports for expecting parents to better invest in themselves and their coming newborn would improve overall health outcomes; for instance, if parents are guaranteed to be provided with easier and affordable access to high-quality prenatal care on a regular basis, it is more likely that the parents and their newborn will be healthy. Also, allowing expecting working mothers to have a more flexible work schedule, perhaps with a reduced workload and hours, can be another way to help them better prepare for childbirth and -care. Moreover, family-friendly work cultures and environments in which men can take their leave entitlement may greatly contribute to the welfare of mothers and infants. In sum, for effective improvements in the welfare and health of parents and their infants, the government must plan and implement family policy in collaboration with multiple sectors and industries.

Research Challenges and Future Implications

For research that examines the effects of family policy on various health outcomes, more data need to be collected. For instance, outcome indicators, such as earlier mortality rates (i.e., perinatal and neonatal deaths and low birth weight) can be heavily influenced by pre-existing and at-birth factors; therefore, data related to pre- and at-birth health can further inform us about the mechanism, in which leave policy influences those health outcomes. Moreover, as a number of researchers have already pointed out, policy variations and definitions across countries make it challenging to conduct cross-national research, as this study does. For instance, in countries like Sweden and Norway, there is no official maternity leave because it was replaced by parental leave in the 1970s (Gauthier, 2011b; OECD, 2012a). Even when it comes to defining the same leave that allows parents to take leave until the child becomes 3 years old, it is sometimes under childcare leave (e.g., Finland) and in other cases, parental leave (e.g., Germany and Spain). Furthermore, while this research looks into two types of policy measure—job-protected paid leave and other leave (unpaid or non-job protected)—payment benefits during leave are provided in complex and unique channels and methods country by country; therefore, it is difficult to compare the true generosity of family leave policy.

Finally, policymakers and researchers must consider other emerging market countries. As more emerging market countries around the world recognize the importance of families in diverse forms and

their unique needs and demands in balancing family and work responsibilities, it is crucial to collect comparable data using universally agreed-upon methods. It is important to conduct cross-national research to investigate the effects of family policy on various health and social outcomes in newly added countries; while the policy may look similar on the surface, the effects may vary across countries as well as time periods.

References

Adema, W. (2012). Setting the scene: The mix of family policy objectives and packages across the OECD. *Children and Youth Services Review, 34*(2012), 487-498.

Akgunduz, Y.E., & Plantenga, J. (2012). Labour market effects of parental leave in Europe. *Cambridge Journal of Economics, 37*(4), 845-862.

Albertini, M., Kohli, M. & Vogel, C. (2007). Intergenerational transfers of time and money in European families: Common patterns - different regimes? *Journal of European Social Policy, 17,* 319-334.

Arthur C.R., Saenz R.B., & Replogle, W.H. (2003). The employment-related breastfeeding decisions of physician mothers. *Journal of Mississippi State Medical Association, 44(12),* 383-387.

Aspalter, C. (2006). The East Asian welfare model. *International Journal of Social Welfare, 15,* 290-301.

Atoh, M., & Akachi, M. (2003). Low fertility and family policy in Japan. *Journal of Population and Social Security*. Supplement to *1,* 1-30.

Bagley, C. (2011). From sure start to children's centres: Capturing the erosion of social capital. *Journal of Education Policy*, *26*(1), 95-113.

Baker, M., & Milligan, K. (2008). Maternal employment, breastfeeding, and health: Evidence from maternity leave mandates. *Journal of Health Economics*, *27*(4), 871-887.

Berger, L.M., Hill, J., & Waldfogel, J. (2005). Maternity leave, early maternal employment and child health and development in the US. *The Economic Journal*, *115*(501), F29-F47.

Bergqvist, C, Borchorst, A, Christensen, A-D, Ramstedt-Sile, V, Raaum, N & Styrkarsdottir, A (1999). *Equal democracies: Gender and politics in the Nordic countries*. Oslo: Oslo University Press.

Bergqvist, C. & Nyberg, A. (2002). Welfare state restructuring and childcare in Sweden. In S. Michel & R. Mahon (Eds.), *Child care policy at the crossroad: Gender and welfare state restructuring* (pp. 287-307). New York, NY: Routledge.

Berkman, L.F., & O'Donnell, E.M. (2013). The Pro-family workplace: Social and economic policies and practices and their impacts on child and family health. *Families and child health* (pp. 157-179). New York, NY: Springer.

Bettio, F. & Villa, P. (1998). A Mediterranean perspective on the breakdown of the relationship between participation and fertility. *Cambridge Journal of Economics*, *22,* 137-171.

Blank, R.M. (2002). *Evaluating welfare reform in the United States* (National Bureau of Economic Research. Working Paper w8983). Available at http://www.nber.org/papers/w8983. Accessed January 1, 2013.

Blau, D.M., Guilkey, D.K., Popkin, B.M. (1996). Infant health and the labor supply of mothers. *Journal of Human Resources. 31,* 90–139.

Bloom, D.E., & Williamson, J.G. (1998). Demographic transitions and economic miracles in emerging Asia. *The World Bank Economic Review, 12*(3), 419-455.

Bongaarts, J., & Feeney, G. (1998). On the quantum and tempo of fertility. *Population and Development Review, 24*(2), 271-291.

Bonoli, G. (2000) Public attitudes to social protection and political economy traditions in Western Europe. *European Societies, 2*(4), 431-452.

Brandth, B. & Kvande, E. (2009). Norway: The making of the father's quota. In S. Kamerman & P. Moss (Eds.), *The politics of parental leave policies* (pp. 191-206). Portland, OR: The Policy Press.

Brennan, D. (2007). Babies, budgets, and birth rates: Work and family policy in Australia, 1996-2006. *Social Politics: International Studies in Gender, State, and Society, 14*(1), 31-57.

Brennan, D. (2009). Australia: The difficult birth of paid maternity leave. In S. Kamerman & P. Moss (Eds.), *The politics of parental leave policies* (pp. 15-31). Portland, OR: The Policy Press.

Brewer, M., Duncan, A., Shephard, A., & Suárez, M.J. (2005). *Did working families' tax credit work? Analyzing the impact of in-work support on labour supply and programme participation* (Institute for Fiscal Studies. ISBN 1-904983-08-1). Available at http://eprints.ucl.ac.uk/18444. Accessed January 1, 2013.

Brewer, M. (2008). *Welfare reform in the UK: 1997-2007* (IFAU-Institute for Labour Market Policy Evaluation. Working Paper 2008:12). Available at http://hdl.handle.net/10419/45770. Accessed January 1, 2013.

Brewster, K.L. & Rindfuss, R.R. (2000). Fertility and women's employment in industrialized nations. *Annual Review of Sociology, 26,* 271-296.

Brooks–Gunn, J., Han, W.J., & Waldfogel, J. (2002). Maternal employment and child cognitive outcomes in the first three years of life: The NICHD study of early child care. *Child Development, 73*(4), 1052-1072.

Bruning, G., & Plantenga, J. (1999). Parental leave and equal opportunities: Experiences in eight European countries. *Journal of European Social Policy, 9*(3), 195-209.

Carneiro, P., Løken, K., & Salvanes, K.G. (2010). *A flying start? Maternity leave and long-term outcomes for mother and child* (Leibniz Information Centre for Economics. Discussion Paper 5362). Available at http://hdl.handle.net/10419/51874. Accessed January 1, 2013.

Castells, M. (1998). Development and crisis in the Asian Pacific: Globalization and the state. *End of Millennium, 3,* 215-341.

Centers for Disease Control and Prevention. National Vital Statistics Reports. Available at http://www.cdc.gov. Accessed January 1, 2013.

Chen, A., & Rogan, W.J. (2004). Breastfeeding and the risk of post-neonatal death in the United States. *Pediatrics, 113*(5), e435-e439.

Chesnais, J.C. (1996). Fertility, family, and social policy in contemporary Western Europe. *Population Development Review, 22*(4), 729-739.

Chomitz, V.R., Cheung, L.W.Y., & Lieberman, E. (1995). The role of lifestyle in preventing low birth weight. *The Future of Children, 5*(1), 121-138.

Chronholm, A. (2009). Sweden: Individualization or free choices in parental leave? In S. Kamerman & P. Moss (Eds.), *The politics of parental leave policies* (pp. 227-241). Portland, OR: The Policy Press.

Clearinghouse on International Developments in Child, Youth and Family Policies (2008). Countries. Available at http://www.childpolicyintl.org. Accessed at March 1, 2013.

Cochrane, A. & Clarke, J. (1993). *Comparing welfare states*. London: Sage.

Crompton, R. (1999). *Restructuring gender relations and employment: The decline of the male breadwinner*. Oxford: Oxford University Press.

Currie, J & Gruber, J. (1997). Saving babies: The efficacy and cost of recent changes in the Medicaid eligibility of pregnant women. *Journal of Political Economy, 104*(6), 1263-1296.

Cutler, D.M., & Meara, E. (1999). The technology of birth: Is it worth it? *Forum for Health Economics & Policy, 3*(3), 1-67.

Daguerre, A. (2006). Childcare policies in diverse European welfare states. *The politics of post-industrial welfare states: Adapting post-war social policies to new social risks* (pp. 211-226). London: Routledge.

Deven, F., & Moss, P. (2002). Leave arrangements for parents: Overview and future outlook. *Community, Work & Family*, *5*(3), 237-255.

DiFranza, J.R., Aligne, C.A., & Weitzman, M. (2004). Prenatal and postnatal environmental tobacco smoke exposure and children's health. *Pediatrics, 113*(3), 1007-1015.
Duvander, A.Z., Lappegård, T., & Andersson, G. (2010). Family policy and fertility: Fathers' and mothers' use of parental leave and continued childbearing in Norway and Sweden. *Journal of European Social Policy*, *20*(1), 45-57.

Ebbinghaus, B. (2012). *Comparing welfare state regimes: Are typologies an ideal or realistic strategy?* Edinburg: European Social Policy Analysis Network, ESPAnet Conference.

Engster, D., & Stensöta, H.O. (2011). Do family policy regimes matter for children's well-being? *Social Politics: International Studies in Gender, State & Society*, *18*(1), 82-124.

Erler, D. (2009). Germany: Taking a Nordic turn? In S. Kamerman & P. Moss (Eds.), *The politics of parental leave policies* (pp. 119-134). Portland, OR: The Policy Press.

Esping-Andersen, G. (1990). *The three worlds of welfare capitalism*. Cambridge: Polity Press.

Esping-Andersen, G. (1997). Hybrid or unique? The distinctiveness of the Japanese welfare state. *Journal of European Social Policy*, *7(3),* 179-189.

Esping-Andersen, G. (1999). *Social foundations of postindustrial economies*. Oxford: Oxford University Press.

Eurostat. Earnings: Minimum wage. Available at http://epp.eurostat.ec.europa.eu/portal/page/portal/labour_market/earnings. Accessed May 5, 2013.

Eurofound. New maternity protection leave introduced. Available at *http://www.eurofound.europa.eu/eiro/2008/09/articles/gr0809019i.htm*. Accessed May 5, 2013

Fagnani, J. (1998). Helping mothers to combine paid and unpaid work–or fighting unemployment? The ambiguities of French family policy. *Community, Work & Family*, *1*(3), 297-312.

Fagnani, J. & Math, A. (2009). France: Gender equality a pipe dream? In S. Kamerman & P. Moss (Eds.), *The politics of parental leave policies* (pp. 103-117). Portland, OR: The Policy Press.

Feng, J.Y., & Han, W.J. (2010). Maternity leave in Taiwan. *Family Relations, 59(3),* 297-312.

Ferrarini, T. (2006). *Families, states and labour markets: Institutions, causes and consequences of family policy in post-war welfare states*. Cheltenham: Edward Elgar.

Ferrarini, T., & Norström, T. (2010). Family policy, economic development and infant mortality: A longitudinal comparative analysis. *International Journal of Social Welfare, 19*, S89-S102.

Ferrarini, T., & Sjoberg, O. (2010). Social policy and health: Transition countries in a comparative perspective. *International Journal of Social Welfare, 19*, S60–S88.

Ferrera, M. (1996). The "Southern model" of welfare in social Europe. *Journal of European Social Policy*, *6*(1), 17-37.

Fine-Davis, M., Fagnani, J., Giovannini, D., Højgaard, L., & Clarke, H. (2004). *Fathers and mothers. Dilemmas of the work-life balance: A comparative study in four European countries*. New York, NY: Springer.

Flaquer, L. (2000). Is there a Southern European model of family policy? In A.A. Pfenning and T. Bahle (Eds.), *Families and family policies in Europe* (pp. 15-33). New York, NY: P. Lang.

Frisbie, R.G., Strobino, D.M., Salkever, D.S., & Jackson, C.A. (1996). Updates estimates of the impact of prenatal care on birth weight outcomes by race. *Journal of Human Resources, 27*(4), 629-642.

Gallagher, A. (2012). Neoliberal governmentality and the respatialisation of childcare in Ireland. *Geoforum, 43*, 464-471.

Gauthier, A.H. (2002). Family policies in industrialized countries: Is there convergence? *Population, 57*(3), 447-474.

Gauthier, A.H. (2007). The impact of family policies on fertility in industrialized countries: A review of the literature. *Population Research and Policy Review, 26*, 323-346.

Gauthier, A.H. (2011a). Comparative Family Policy Database, Version 3 [computer file]. The Netherlands Interdisciplinary Demographic Institute and Max Planck Institute for Demographic Research (distributors). Available at www.demogr.mpg.de. Accessed December 1, 2012.

Gauthier, A.H. (2011b). A brief history of maternity, parental, and childcare leave schemes in selected OECD countries. The Netherlands Interdisciplinary Demographic Institute and Max Planck Institute for Demographic Research (distributors). Available at www.demogr.mpg.de. Accessed December 1, 2012.

Goodman, R., & Peng, I. (1996). The East Asian welfare states: Peripatetic learning, adaptive change, and nation-building. In G. Esping-Andersen (Eds.), *Welfare states in transition: National adaptations in global economies* (pp.192-224). London: Sage.

Gornick, J. & Meyers, M. (2004). Welfare regimes in relation to paid work and care. In J. Z. Giele & E. Holst (Eds.), *Changing life patterns in western industrial societies* (pp. 167-188). Netherlands: Elsevier Science Press.

Gough, I.R. (2002). Globalization and national welfare regimes: The East Asian case. *Social Security in the Global Village*, 47-66.

Gregg, P., Waldfogel, J., & Washbrook, E. (2006). Family expenditures post-welfare reform in the UK: Are low-income families starting to catch up? *Labour Economics*, *13*(6), 721-746.

Grogger, J., Karoly, L.A., & Klerman, J.A. (2002). *Consequences of welfare reform: A research synthesis*. Santa Monica, CA: RAND.

Grossman, M. (1972). On the concept of health capital and the demand for health. *Journal of Political Economy*, *80*(2), 223-255.

Haataja, A. (2005). Family leave and employment in the EU: Transition of working mothers in and out of employment. In B. Pfau-Effinger & B. Geissler (Eds.), *Care and social integration in European societies* (pp.255-278). Bristol: The Policy Press.

Haataja, A., & Nyberg, A. (2006). Diverging paths? The dual-earner/dual-carer model in Finland and Sweden in the 1990s. In A.L. Ellingsaeter & a. Leira (Eds.), *Politicising parenthood in Scandinavia: Gender relations in welfare states* (pp. 217-239). Bristol: The Policy Press.

Higuchi, Y. (1997). An empirical study of child care leave in Japan: Marriage, childbirth, and job retention. *Keiko Business Review, 33,* 33-51.

Hills, J., & Waldfogel, J. (2004). A "third way" in welfare reform? Evidence from the United Kingdom. *Journal of policy analysis and management*, *23*(4), 765-788.

Hochschild, A. (1997). *The time bind: When work becomes home and home becomes work*. New York, NY: Metropolitan Books.

Hotz, J.V., Klerman, J. A., & Willis, R.J. (1997). The economics of fertility in developed countries. *Handbook of Population and Family Economics*, *1*, 275-347.

Huerta, M., Adema, W., Baxter, J., Corak, M., Deding, M., Gray, M., Han, W.J., & Waldfogel, J. (2011). *Early maternal employment and child development in five OECD countries* (OECD Social, Employment and Migration. Working Paper 118). Available at http://dx.doi.org/10.1787/5kg5dlmtxhvh-en. Accessed March 1, 2013.

Immervoll, H., & Barber (2006). *Can parents afford to work? Childcare costs, tax-benefit policies and work incentives* (Leibniz Information Centre for Economics. Discussion Paper 1932). Available at http://dx.doi.org/10.2139/ssrn.878665. Accessed January 1, 2013.

International Labour Office (2010). *Maternity at work*. Available at http://www.ilo.org/wcmsp5/groups/public/@dgreports/@dcomm/@publ/documents/publication/wcms_124442.pdf. Accessed January 1, 2013.

International Social Security Association. Country profiles. Available at http://www.issa.int. Accessed January 1, 2013.

Jacknowitz, A. (2008). The role of workplace characteristics in breastfeeding practices. *Women & Health, 47*(2), 87–111.

Japan Statistics Bureau, Ministry of Internal Affairs and Communications. Available at http://www.stat.go.jp/english/index.htm. Accessed January 1, 2013.

Jarvis, W. (1994). Handwashing - the Semmelweis lesson forgotten? *The Lancet, 344*(8933), 1311-1312.
Johnson, C. (1999). The developmental state: Odyssey of a concept. In M. Woo-Cummings (Eds.), *The developmental state* (pp.32-60). Cornell, CA: Cornell University Press.

Johnston, M.L., & Esposito, N. (2007). Barriers and facilitators for breastfeeding among working women in the United States. *Journal of Obstetric, Gynecologic, and Neonatal Nursing, 36*(1), 9–20.

Jones. C, (1993). The Pacific Challenge. In C. Jones (Eds.), *New perspectives on the welfare state in Europe*. London: Routledge.

Kamerman, S. (1991). Kamerman, S. B. (1991). Child care policies and programs: An international overview. *Journal of Social Issues, 47*(2), 179-196.

Kamerman, S. (2000a). From maternity leave to parental leave policies: Women's health, employment and child and family well-being. *Journal of American Medical Women's Association*, *55*(2), 96–9.

Kamerman, S. (2000b). Parental leave policies: An essential ingredient in early childhood education and care policies. *Society for Research in Child Development*, *14*(2), 3-15.

Kamerman, S. (2009). Families and family policies: Developing a holistic policy agenda. *Hong Kong Pediatric Journal, 14*, 115-121.

Kamerman, S. & Kahn, A. (1991). *Childcare, parental leave, and the under 3s: Policy innovation in Europe*. New York, NY: Auburn House.

Kamerman, S. & Moss, P. (2009). Conclusion. In S. Kamerman & P. Moss (Eds.), *The politics of parental leave policies* (pp. 259-271). Portland, OR: The Policy Press.

Kaplan, G.A., Pamuk, E.R., Lynch, J.W., Cohen, R.D., & Balfour, J.L. (1996). Inequality in income and mortality in the United States: Analysis of mortality and potential pathways. *British Medical Journal, 312*(7037), 999-1003.

Katrougalos, G.S. (1996). The South European welfare model: The Greek welfare state in search of an identity. *Journal of European Social Policy*, *6*(1), 39-60.

Kennedy, F. (2001). *Cottage to creche: Family change in Ireland*. Dublin: Institute of Public Administration.

Kim, I.K. (2013). *Korean child care policy: Current status and improvement.* Seoul: Korea Development Institute-OECD Joint Conference.

Kim, J.H. (2011). Parental leave and female labor supply in Korea.*Korea Development Institute Journal of Economic Policy*, *34*(1), 169-197.

Kim, Y.J., & Schoen, R. (2000). On the quantum and tempo of fertility: Limits to the Bongaarts-Feeney Adjustment. *Population and Development Review*, *26* (3), 554-559.

Kitterod, R.H. & Lappengard, T. (2012). A typology of work-family arrangements among dual-earner couples in Norway. *Family Relations, 61,* 671-685.

Knudsen, K., & Wærness, K. (2001). National context, individual characteristics and attitudes on mothers' employment: A comparative analysis of Great Britain, Sweden and Norway. *Acta Sociologica*, *44*(1), 67-79.

Kogan, M.D., Alexander, G.R, Kotelchuek, M., & Nagey, D.A. (1994). Relation of the content of prenatal care to the risk of low birth weight: Maternal reports of health behavior advice and initial prenatal care procedures. *Obstetrical & Gynecological Survey*, *49*(10), 667-668.

Kohler, H.P., & Ortega, J.A. (2002). Tempo-adjusted period parity progression measures, fertility postponement and completed cohort fertility. *Demographic Research*, *6* (6), 91-144.

Kolberg, J.E. (1992). *The study of welfare state regimes*. Armonk, NY: ME Sharpe, Inc.

Korea National Statistics. Available at www.index.go.kr. Accessed January 1, 2013.

Korpi, W. (2000). Faces of inequality: Gender, class, and patterns of inequalities in different types of welfare states. *Social Politics,* 7(2), 127-191.

Korpi, W., & Palme, J. (1998). The Paradox of redistribution and strategies of equality: Welfare state institutions, inequality, and poverty in western countries. *American Sociological Review, 63 (5),* 661-687.

Kremer, M. (2002). The illusion of free choice: Ideals of care and childcare policy in the Flemish and Dutch welfare states. In S. Michel & R. Mahon (Eds.), *Child care policy at the crossroad: Gender and welfare state restructuring* (pp. 287-307). New York, NY: Routledge.

Kremer, M. (2006). The politics of ideals of care: Danish and Flemish child care policy compared. *Social Politics: International Studies in Gender, State & Society*, *13*(2), 261-285.

Kwon, H.J. (1997). Beyond European welfare regimes: Comparative perspectives on East Asian Welfare Systems. *International Social Policy*, *26*(4), 467-484.

Kwon, H.J. (2005). Transforming the developmental welfare state in East Asia. *Development and Change*, *36*(3), 477-497.

Lammi-Taskula, J. & Takala, P. (2009). Finland: Negotiating tripartite compromises. In S. Kamerman & P. Moss (Eds.), *The politics of parental leave policies* (pp. 87-102). Portland, OR: The Policy Press.

Lappegård, T. (2010). Family policies and fertility in Norway. *European Journal of Population*, *26*(1), 99-116.

Lawrence, R. A. (1997). *A review of the medical benefits and contraindications to breastfeeding in the United States.* Arlington, VA: National Center for Education in Maternal and Child Health.

Leibowitz, A. A. (2003). *An economic perspective on work, family and well-being*. Washington, DC: Work, Family, Health and Well-being Conference.

Leibfried, S. (1992). Towards a European welfare state: On integrating poverty regimes in the European community. In Z. Ferge, and J.E. Kolberg (Eds.), *Social policy in a changing Europe*. Boulder, CO: Westview Press.

Leitner, S., Ostner, I., & Schmitt, C. (2008). Family policies in Germany. In I. Ostner & C. Schmitt (Eds.), *Family policies in the context of family change: The Nordic countries in comparative perspective* (pp. 175-202). Wiesbaden: VS Springer.

Levy, D.U. & Michel, S. (2002). More can be less: Childcare and welfare reform in the United States. In S. Michel & R. Mahon (Eds.), *Child care policy at the crossroad: Gender and welfare state restructuring* (pp.239-263). New York, NY: Routledge.

Lewis, J. (2011). From Sure Start to children's centres: An analysis of policy change in English early years programmes. *Journal of Social Policy, 40*(01), 71-88.

Lightwood, J.M., Phibbs, C.S., & Glantz, S.A. (1999). Short-term Health and Economic Benefits of Smoking Cessation: Low Birth Weight. *Pediatrics, 104*(6), 1312-1320.

Liu, K., Moon, M., Sulvetta, M., & Chawla, J. (1992). International infant mortality rankings: A look behind the numbers. *Health Care Financing Review, 13*(4), 105-118.

Luci, A., & Thevenon, O. (2012). *The impact of family policy packages on fertility trends in developed countries* (Institut National d'Études Démographiques. Working Paper 174). Available at http://halshs.archives-ouvertes.fr/halshs-00660630. Accessed January 1, 2013.

Lundberg, O., Yngwe, M. Å., Stjärne, M. K., Elstad, J. I., Ferrarini, T., Kangas, O., & Fritzell, J. (2008). The role of welfare state principles and generosity in social policy programmes for public health: An international comparative study. *The Lancet, 372*(9650), 1633-1640.

Lynch, J. (2006). *Age in the welfare state: The origins of social spending on pensioners, workers, and children.* Cambridge: Cambridge University Press.

Lynch, J., Smith, G. D., Hillemeier, M., Shaw, M., Raghunathan, T., & Kaplan, G. (2001). Income inequality, the psychosocial environment, and health: Comparisons of wealthy nations. *The Lancet, 358*(9277), 194-200.

MacDorman, M.F. & Mathews, T.J. (2009). Behind international rankings of infant mortality: How the US compared with Europe. *NCHS Data Brief, 23*, 1-8.

MacDorman, M., Rowley, D., Lyasu, S., Kiely, J., Gardner, P., & Davis, M. (1994). Infant Mortality. In L. Wilcox & J. Marks (Eds.), *From data to action: CDC's public health surveillance for women, infants, and children* (pp. 231-250). Hyattsville, MD: US Department of Health and Human Services.

Mahon, R. (2002a). Child care: Toward what kind of "social Europe"? *Social Politics: International Studies in Gender, State & Society, 9*(3), 343-379.

Mahon. R. (2002b). Gender and welfare state restructuring: Through the lens of child care. In S. Michel & R. Mahon (Eds.), *Child care policy at the crossroad: Gender and welfare state restructuring* (pp. 1-27). New York, NY: Routledge.

Maron, L., Meulders, D., & O'Dorchai, S. P. (2008). *Parental leave in Belgium* (Département d'économie appliquée de l'Université Libre de Bruxelles. Working Paper 08-24RS). Available at http://www.ulb.ac.be/soco/pepsi/WP-DULBEA-8_24.pdf. Accessed May 1, 2013.

Marquez-Pereira, B. & Paye, O. (2001). Belgium: The vices and virtues of pragmatism. In J. Jenson & M. Sineau (Eds.), *Who care? Women's work, childcare, and welfare state redesign.* Toronto: University of Toronto Press.

McCormick, M. C. (1985). The contribution of low birth weight to infant mortality and childhood morbidity. *New England Journal of Medicine*, 312(2), 82-90.

Melhuish, E., Belsky, J., & Barnes, J. (2010). Evaluation and value of Sure Start. *Archives of Disease in Childhood*, *95*(3), 159-161.

Melhuish, E. C. & Petrogiannis, K. (2006). *Early childhood care and education: International perspectives.* London: Routledge.

Midgley, J. (1986). Industrialization and welfare: The care of the four Little Tigers. *Social Policy and Administration*, *20*(3), 225-238.

Midgley, J. (1995). *Social development*. Thousand Oaks, CA: Sage.

Misra, J., Moller, S., & Budig, M. (2007). Work family policies and poverty for partnered and single women in Europe and North America. *Gender and Society*, *21(6*): 804-827.

Moffitt, R.A. (2007). Welfare reform: The US experience. *Swedish Economic Policy Review, 14*, 11-47.
Morgan, K. (2002). Does anyone have a "libre choix?" In S. Michel & R. Mahon (Eds.), *Child care policy at the crossroad: Gender and welfare state restructuring* (pp. 143-167). New York, NY: Routledge.

Morel, N. (2007). From subsidiarity to 'free choice': Child-and elder-care policy reforms in France, Belgium, Germany and the Netherlands. *Social Policy & Administration*, *41*(6), 618-637.

Moss, P. (2009). *International review of leave policies and related research 2009* (Employment Relations Research. Paper Series 102). Available at http://dera.ioe.ac.uk/9285/1/file52778.pdf. Accessed January 1, 2013.

Moss, P. & Kamerman, S. (2009). Introduction. In S. Kamerman & P. Moss (Eds.), *The politics of parental leave policies* (pp. 1-13). Portland, OR: The Policy Press.

Mozurkewich, E.L., Luke, B., Avni, Michal, & Wolf, F.M. (2000). Working conditions and adverse pregnancy outcome: A Meta-analysis. *Obstetrics & Gynecology*, *95*(4), 623-635.

Murphy-Lawless, J. (2000). Changing women's lives: Child care policy in Ireland. *Feminist Economics, 6(*1), 89–94.

Naldini, M., & Jurado, T. (2013). Family and welfare state reorientation in Spain and inertia in Italy from a European perspective. *Population Review, 52*(1), 43-61.

Negrelli, S. (1997). Social pacts and flexibility: Towards a new balance between macro and micro industrial relations: The Italian experience. In G. Fajertag & P. Pochet (Eds.), *Social pacts in Europe* (pp. 48). Brussels: ETUI.

Nyberg, A. (2004). *Parental leave, public childcare and the dual earner/dual carer-model in Sweden*. Stockholm: Swedish National Institute for Working Life.

Nyberg, A., Hill, E., Pocock, B., & Elliott, A. (2007). *Lessons from the Swedish experience*. Sydney: Sydney University Press.

O'Brien, M. (2009). Fathers, parental leave policies, and infant quality of life: International perspectives and policy impact. *American Academy of Political and Social Science, 624*(1), 190-213.

Organisation for Economic Co-operation and Development. OECD Stat Extracts. Available at http://stats.oecd.org. Accessed January 1, 2013.

Organisation for Economic Co-operation and Development (2002). *Babies and bosses - Reconciling work and family life: Australia, Denmark and the Netherlands*. Paris: OECD Publishing.

Organisation for Economic Co-operation and Development (2003). *Babies and bosses - Reconciling work and family life: Austria, Ireland and Japan*. Paris: OECD Publishing.

Organisation for Economic Co-operation and Development (2004). *Babies and bosses - Reconciling work and family life: New Zealand, Portugal, and Switzerland*. Paris: OECD Publishing.

Organisation for Economic Co-operation and Development (2005). *Babies and bosses - Reconciling work and family life: Canada, Finland, Sweden and the United Kingdom*. Paris: OECD Publishing.

Organisation for Economic Co-operation and Development (2007). *Highlights Korea: Babies and bosses – Policies towards reconciling work and family life.* Paris: OECD Publishing.

Organisation for Economic Co-operation and Development (2011). *Doing better for families*. Paris: OECD Publishing.

Organisation for Economic Co-operation and Development (2012a). *PF 2.1. Key characteristics of parental leave systems*. Paris: OECD Publishing.

Organisation for Economic Co-operation and Development (2012b). *PF 2.5. Annex: Detail of change in parental leave by country*. Paris: OECD Publishing.

Page, J. (1994). The East Asian miracle: Four lessons for development policy. *NBER Macroeconomics Annual, 9*, 219-282.

Palley, H.A. (1992). Social policy and the elderly in South Korea: Confucianism, modernization, and development. *Asian Survey, 32*(9), 787-801.

Peck, J. & Tickell, A. (2002). Neoliberalizing space. *Antipode, 34*(3), 380-404.

Peng. I, (2002). Gender and generation: Japanese childcare and the demographic crisis. In S. Michel & R. Mahon (Eds.), *Child care policy at the crossroad: Gender and welfare state restructuring*. (pp. 31-56). New York, NY: Routledge.

Peng, I. (2004). Postindustrial pressures, political regime shifts, and social policy reform in Japan and South Korea. *Journal of East Asian Studies, 4*(3), 389-425.

Peng, I. (2008). Welfare policy reforms in Japan and Korea: Cultural and institutional factors. In W.V. Oorschot, M. Opielka, & B. Pfau-Effinger (Eds.), *Culture and welfare state: Values and social policy in comparative perspective* (pp.162-184). Northampton, MA: Edward Elgar Publishing, Inc.

Petrogiannis, K. (2006). Policy and research on early childcare and education in Greece. In E. Melhuish & K. Petrogiannis (Eds.), *Early childhood care and education: International perspectives* (pp. 27-41). New York, NY: Routledge.

Petrogiannis, K. (2010). Early childhood care and education in Greece: Some facts on research and policy. *International Journal of Early Childhood, 42*(2), 131-139.

Petrogiannis, K., & Melhuish, E. C. (1996). Aspects of quality in Greek day care centres. *European Journal of Psychology of Education*, *11*, 177–191.

Plantenga, J. (2005). Dutch debates: Modernizing social security by introducing the life-course as a frame of reference. In P. de Gijsel and H. Schenk (Eds.). *Multidisciplinary economics: The birth of a new economics faculty in the Netherlands* (pp. 53-64). Dordrecht: Springer.

Plantenga, J. & Remery, C. (2005). *Reconciliation of work and private life: A comparative review of thirty European countries.* Luxembourg: Office for the Official Publications of the European Communities.

Plantenga, J. & Remery, C. (2009). The Netherlands: Bridging labour and care. In S. Kamerman & P. Moss (Eds.), *The politics of parental leave policies* (pp. 175-190). Portland, OR: The Policy Press.

Plantenga, J., Remery, C., Siegel, M., & Sementini, L. (2008). Childcare services in 25 European Union member states: The Barcelona targets revisited. *Comparative Social Research, 25,* 27-53.

Pritchett, L., & Summers, L.H. (1996). Wealthier is healthier. *Journal of Human Resources, 31,* 841–868.

Prskawetz, A., Sobotka, T., Buber, I., Engelhardt H., & Gisser, R. (2008). Austria: Persistent low fertility since the mid-1980s. *Demographic Research, 19,* 293-360.

Puma, M., Bell, S., Cook, R., Heid, C., Shapiro, G., Broene, P., & Spier, E. (2010). *Head Start impact study: Final report.* Washington, DC: US Department of Health and Human Services.

Pylkkänen, E. (2004). *Studies on household supply and home production*. Aarhus: Aarhus School of Business, Aarhus University.

Randall, V. (2002). Childcare in Britain, or, how do you restructure nothing? In S. Michel & R. Mahon (Eds.), *Child care policy at the crossroad: Gender and welfare state restructuring*. (pp.219-238). New York, NY: Routledge.

Roe, B., Whittington, L. A., Fein, S. B., & Teisl, M.F. (1999). Is there competition between breast-feeding and maternal employment? *Demography*, *36*(2), 157-171.

Rostgaard, T., Christoffersen, M.N. and Weise, H. (1999). Parental leave in Denmark. In P. Moss and F. Deven (Eds.), *Parental leave: Progress or pitfall?* Hague and Brussels: NIDI CBGS Publications.

Rosen, G. (1958). *A History of public health*. Baltimore, MD: The Johns Hopkins University Press.

Rønsen, M. (2004). Fertility and family policy in Norway - A reflection on trends and possible connections. *Demographic Research, 10*(10), 265-286.

Rønsen, M., & Sundström, M. (2002). Family policy and after-birth employment among new mothers–a comparison of Finland, Norway and Sweden. *European Journal of Population, 18*(2), 121-152.

Rosenzweig, M.R., & Schultz, T.P. (1983). Estimating a household production function: Heterogeneity, the demand for health inputs, and their effects on birth weight. *Journal of Political Economy, 91*(5), 723-746.

Ruhm, C.J. (2000). Parental leave and child health. *Journal of Health Economics, 19*(6), 931-960.

Ruhm, C.J. (2004). Parental employment and child cognitive development. *Journal of Human Resources, 39*(1), 155-192.

Sainsbury, D. (1996). *Gender, equality and welfare states*. Cambridge: Cambridge University Press.

Sainsbury, D. (1999), Gender and social-democratic welfare states. In D. Sainsbury (Eds.), *Gender and welfare state regimes*. Oxford: Oxford University Press.

Sala, V.D. (2002). "Modernization" and welfare-state restructuring in Italy: The impact on child care. In S. Michel & R. Mahon (Eds.), *Child care policy at the crossroad: Gender and welfare state restructuring* (pp. 171-189). New York, NY: Routledge.

Saraceno, C. (1998). Changes in the family and social policy in Italy. Bologna: Il Mulino.

Seo, M.H. (2005). *Status of childcare nationwide: A study on the use and demand for childcare facilities 2004*. Seoul: Minister of Gender Equality and Family.

Sobotka, T., Winkler-Dworak, M., Testa, M. R., Lutz, W., Philipov, D., Engelhardt, H., & Gisser, R. (2005). Monthly estimates of the quantum of fertility: Towards a fertility monitoring system in Austria. *Vienna Yearbook of Population Research*, 109-141.

Staehelin, K., Bertea, P. C., & Stutz, E. Z. (2007). Length of maternity leave and health of mother and child – A review. *International Journal of Public Health, 52*(4), 202-209.

Strully, K., Rehkopf, D., & Xuan, Z. (2010). Effects of prenatal poverty in infant health: State earned income tax credits and birth weight. *American Sociological Review, 75*(4), 534-562.

Sung, S. (2003). Women reconciling paid and unpaid work in a Confucian welfare state: The case of South Korea. *Social Policy & Administration, 37*(4), 342-360.

Tanaka, S. (2005). Parental leave and child health across OECD countries. *Economic Journal, 115,* F7-F28.

Tanaka, S., & Waldfogel, J. (2007). Effects of parental leave and work hours on fathers' involvement with their babies: Evidence from the millennium cohort study. *Community, Work and Family, 10*(4), 409-426.

Tang, K.L. (2000). *Social development in East Asia*. Basingstoke: Palgrave.

Tapia Granados, J.A. (2005). Increasing mortality during the expansions of the US economy, 1900–1996. *International Journal of Epidemiology*. *34*, 1194–1202

Thévenon, O. (2011). Family policies in OECD countries: A comparative analysis. *Population and Development Review, 37*(1), 57-87.

Thévenon, O., & Solaz, A. (2013). Labour market effects of parental leave policies in OECD countries (OECD Social, Employment, and Migration. Working Paper 141). Available at http://dx.doi.org/10.1787/5k8xb6hw1wjf-en. Accessed March 1, 2013.

United States Social Security Administration. Temporary Disability Insurance. Available at *http://www.ssa.gov/policy/docs/statcomps/supplement/2011/tempdisability.pdf*. Accessed July 4, 2013.

Valdimarsdóttir, F. R. (2006). *Nordic experiences with parental leave and its impact on equality between women and men*. Copenhagen: Ekspressen Tryk & Kopi Center.

Valiente, C. (2002). The value of an educational emphasis: Child care and restructuring in Spain since 1975. In S. Michel & R. Mahon (Eds.), *Child care policy at the crossroad: Gender and welfare state restructuring* (pp. 57-70). New York, NY: Routledge.

Van Buuren, S. (2012). *Flexible imputation of missing data* (pp. 53-93). Boca Raton, FL: CRC Press.

Visness, C.M., & Kennedy, K.I. (1997). Maternal employment and breast-feeding: Findings from the 1988 National Maternal and Infant Health Survey. *American Journal of Public Health, 87(6),* 945–950.

Vogel, C., Brooks-Gunn, J., Martin, A., & Klute, M. M. (2013). Impact of early head start participation on child and parent outcomes at ages 2, 3, and 5. *Monographs of the Society for Research in Child Development, 78(1),* 36-63.

Waldfogel, J., Higuchi, Y., & Abe, M. (1998). *Maternity leave policies and women's employment after childbirth: Evidence from the United States, Britain, and Japan*. London: Centre for Analysis of Social Exclusion, London School of Economics.

Waldfogel, J. (1999). Family leave coverage in the 1990s. *Monthly Labour Review, 122,* 13-21.

Waldfogel, J. (2001). International policies toward parental leave and child care. *The Future of Children,* 99-111.

Waldfogel, J. (2004). A cross-national perspective on policies to promote investments in children. In A. Kalil & T. DeLeire (Eds.), *Family investments in children's potential: Resources and parenting behaviors that promote success* (pp. 237-262). Mahwah, NJ: Lawrence Erlbaum Associates, Inc.

Waldfogel, J. (2008). *Welfare reforms and child well-being in the US and UK* (IFAU-Institute for Labour Market Policy Evaluation. Working Paper 2008: 11). Available at http://www.econstor.eu/bitstream/10419/45716/1/573610274.pdf. Accessed March 1, 2013.

Wall, K. (2004). Portugal: Policies, challenges, opportunities. In B. Cizek and R. Richter (Eds.), *Families in EU 15: Policies, challenges, and opportunities* (pp. 195-207). Vienna: European Observatory on Family Policies, OIF.

Wall, K. (2007). Leave policy models and the articulation of work and family in Europe: A comparative perspective. In P. Moss and K. Wall (Eds.), *International review of leave policies and related research 2007* (pp. 25-43). London: Department for Business, Enterprise, and Regulatory Reform.

Wall, K., & Escobedo, A. (2009). France: Gender equality a pipe dream? In S. Kamerman & P. Moss (Eds.), *The politics of parental leave policies* (pp. 207-226). Portland, OR: The Policy Press.

Wennemo, I. (1993). Infant mortality, public policy and inequality: A comparison of 18 industrialized countries. 1950-1985. *Sociology of Health and Illness, 15*(4), 429-446.

Wikander, U., Kessler-Harris, A., & Lewis, J.E. (1995). *Protecting women: Labor legislation in Europe, the United States, and Australia, 1880-1920.* Champaign, IL: University of Illinois Press.

Winegarden, C. R. & Bracy, P. M. (1995). Demographic consequences of maternal-leave programs in industrial countries: Evidence from fixed-effects models. *Southern Economic Journal, 61(4),* 1020-1035.

Wisensale, S.K. (2001). *Family leave policy*. Armonk, NY: ME Sharpe, Inc.

Wong, J. (2004). The adaptive developmental state in East Asia. *Journal of East Asian Studies, 4,* 345-362.

World Health Organization. European Health for All Databases (HFA). Available at http://data.euro.who.int/hfadb. Accessed December 1, 2013.

World Bank, World Development Indicators. Available at http://databank.worldbank.org/data/home.aspx. Accessed December 1, 2013.

Wurtz Rasmussen, A. (2010). Increasing the length of parents' birth-related leave: The effect on children's long-term educational outcomes. *Labour Economics, 17*(1), 91-100.

Yilmaz ,G, Gürakan, B, Akgün, S., & Özbek, N. (2002). Factors influencing breastfeeding for working mothers. *Turkish Journal Pediatrics, 44(1),* 30-34.

Zabel, C. (2009). Eligibility for maternity leave and first birth timing. *Population Research and Policy Review, 28,* 251-270.

Table 1-1

Change in Mortality Rates in 19 OECD Countries, 1970-2010

Mortality Rates	**1970**	**1980**	**1990**	**2000**	**2010**
Infant	22.1	11.9	7.5	4.8	3.5
Perinatal	25.6	13.3	8.5	6.5	5.3
Neonatal	14.0	7.7	4.5	3.2	2.3
Post-neonatal	5.4	3.9	3.0	1.6	1.2
Child	4.2	2.3	1.6	0.9	0.7

Data Source: OECD.
Numbers are scaled per a thousand live births.

Table 1-2

Country Profiles, 2010

Country	GDP per capita *	Health Expenditures **	Insurance Coverage ***	Female Employment ****	Fertility Rates *****
Mean	**32.7**	**10.6**	**99.0**	**62**	**1.68**
Austria	35.3	11.0	99.3	66	1.44
Belgium	32.9	10.7	99	57	1.84
Denmark	32.4	11.4	100	71	1.87
Finland	31.3	9.0	100	67	1.87
France	29.6	11.9	99.9	60	2.00
Germany	33.6	11.6	100	66	1.39
Greece	24.0	10.2	100	48	1.44
Ireland	36.8	9.2	100	56	2.07
Italy	27.1	9.5	100	46	1.40
Japan	30.8	9.5	100	60	1.39
Korea	26.8	6.9	100	53	1.22
Netherlands	36.9	11.9	98.9	70	1.79
Norway	46.8	9.5	100	73	1.95
Portugal	21.8	11.0	100	61	1.32
Spain	26.9	9.5	99.2	52	1.39
Sweden	34.1	9.6	100	70	1.98
Switzerland	39.3	11.5	100	73	1.50
UK	32.8	9.6	100	65	1.94
US	41.9	17.9	84	62	2.10

Data Source: OECD, WHO, and World Bank.
**GDP per capita in thousands of PPP-adjusted constant US dollars, base year 2005.*
*** Total expenditures on healthcare as % of GDP.*
**** Share of population with health insurance coverage (public and primary private insurance: In all countries, more than 99% of the population is covered by the public health insurance, except Germany (89.2% public and 10.8% primary private) and the United States (26.4% public and 54.9% primary private).*
***** Female employment to population ratio in %.*
******Total fertility rates.*

Table 1-3

Total Public Expenditures on Families in 19 OECD Countries, 2009*

Country	Total Public Expenditures on Family*		Expenditures on Family Cash allowances	Expenditures on Maternity and Parental Leave	Expenditures on Family Services
MEAN	**2.3**		**0.8**	**0.3**	**0.8**
Austria	2.9		2.2	0.2	0.5
Belgium	2.8		1.6	0.2	0.9
Denmark	3.9		1.0	0.6	2.0
Finland	3.3		0.8	0.7	1.1
France	3.2		1.1	0.3	1.3
Germany	2.1		0.8	0.3	0.5
Greece	1.4		0.5	0.2	0.1
Ireland	4.1		1.8	0.2	0.8
Italy	1.6		0.4	0.2	0.7
Japan	1.0		0.3	0.2	0.4
Korea	0.8		0.01	0.03	0.7
Netherlands	1.7		0.8	-	0.9
Norway	3.2		0.6	0.7	1.2
Portugal	1.5		0.6	0.3	0.4
Spain	1.5		0.2	0.3	0.6
Sweden	3.7		0.8	0.8	2.0
Switzerland**	1.3		0.9	-	0.3
UK	3.8		0.8	0.4	1.1
US	0.7		0.1	0.0	0.3

Data Source: OECD.
-Data not available.
All figures are in % of GDP, USD PPP-adjusted.
** Expenditures on family cash allowances, maternity and parental leave, and family services are sub-categories of the total expenditures on families. This also includes other family-related cash benefits and services such as housing and residential care help, which may impact child health outcomes either directly or indirectly.*
***Switzerland: data from 2008.*

Table 1-4

Summary of Variables Used in the Analysis

	N	Mean	S.D.
Outcome Variable			
Infant mortality* (death ratio of children under the 1 year of age)	798	9.4	7.1
Perinatal mortality* (death ratio of children within 1 week of life and stillbirths)	730	11.2	6.6
Neonatal mortality* (death ratio of children under 28 days of age)	727	6.0	4.4
Post-neonatal mortality* (death ratio of children between 28 days and 1 year of age)	738	3.0	2.5
Child mortality* (between 1 and 5 years of age)	798	1.9	1.4
Low birth weight* (< 2,500 grams)	639	5.9	1.4
Immunization DPT by age 1	591	88.9%	12.7
Immunization measles by age 1	566	81.8%	18.6
Independent Variables**			
Weeks of job protected paid leave	798	21.9	18.7
Weeks of other leave	798	32.8	47.2
Weeks of all leave (sum of all leave)	798	54.8	51.8
Control Variables			
Fertility Rates	798	1.8	0.5
Female Employment	742	0.5	0.1
GDP per capita***	782	23.9	8.2
Health insurance coverage****	781	93.2	15.1
Number of Dialysis patients per 100,000 population	662	30.4	35.0
Total Expenditures on healthcare as % of GDP	771	7.8	2.1
Public expenditures on family cash allowances per child*****	549	5.1	10.7
Public expenditures on maternity and parental leave per child*****	498	10.7	22.9
Public expenditures on family services per child*****	501	15.7	72.0

** Numbers are scaled per a thousand live births. For child mortality, as previously done, infant mortality was subtracted from child mortality which in this study refers to the number of deaths between ages 1 and 5 (under age 5 according to the WHO and OECD definition).*

*** Job protected paid leave refers to weeks of job protected paid maternity and parental leave, which includes family leave and adoptive but not paternity leave. Other leave refers to weeks of unpaid leave and non-job protected paid leave, which includes parental leave provided at a very low flat rate and not clearly job protected e.g. Austria and Germany. In addition, I added childcare leave that is also either unpaid or provided at a very low flat rate.*

**** In thousands of PPP-adjusted constant US dollars, base year 2005.*

*****In all countries, more than 99% of the population is covered by the public health insurance, except Germany (89.2% public and 10.8% primary private) and the United States (26.4% public and 54.9% primary private) in 2010.*

*****In thousands of PPP-adjusted constant US dollars. For the expenditures per child, the public expenditures on family cash allowances and family services are divided by the number of children ages 0-14. The public expenditures on maternity and parental leave are divided by the number of children ages 0-4. Similar method was applied in previous studies. Expenditures on family cash allowances, maternity and parental leave, and family services are sub-categories of the total public expenditures on family.*

Table 1-5

Weeks of Leave in 19 OECD Countries, 2010

Country	JOB PROTECTED PAID LEAVE	OTHER LEAVE	TOTAL LEAVE
Austria	16.0	104.0	120.0
Belgium	41.0	13.0	54.0
Denmark	50.0	0.0	50.0
Finland	57.4	127.3	184.7
France	16.0	146.0	162.0
Germany	14.0	148.0	162.0
Greece	43.0	30.5	73.5
Ireland	26.0	44.0	70.0
Italy	65.2	0.0	65.2
Japan	14.0	44.0	58.0
Korea	13.0	44.0	57.0
Netherlands	16.0	52.0	68.0
Norway	104.0	0.0	104.0
Portugal	43.1	26.0	69.1
Spain	16.0	148.0	164.0
Sweden	68.6	43.7	112.3
Switzerland	14.0	0.0	14.0
UK	39.0	26.0	65.0
US	0.0	12.0	12.0

Data Source: Data gathered by Ruhm (2000) and Tanaka (2005) as well as the Comparative Family Policy data from the Max Planck Institute for Demographic Research (Gauthier, 2011a) and PF 2.5. Annex: Detail of Change in Parental Leave by Country (OECD, 2012b).

Note: Job-protected paid leave refers to weeks of job protected paid maternity and parental leave, which includes family and adoptive leave, but not paternity leave. In addition, I control separately for weeks of other leave as my second independent variable. Other leave refers to weeks of unpaid leave and non-job protected paid leave, which includes parental leave provided at a very low flat rate and not clearly job protected (e.g., Austria and Germany). In addition, I add childcare leave that is also either unpaid or paid at a very low flat rate and not clearly job-protected. In the effort to follow previous studies (Ruhm, 2000; Tanaka, 2005), I adhere the following rules: (1) When there is no distinction between maternity leave and parental or childcare leave with the same job protection and payment, the leave is under "job-protected paid leave," which was usually the case for the Nordic/Scandinavian countries, including Denmark, Finland, Norway, and Sweden; (2) Parental leave and childcare leave in the dataset are usually the additional leave entitlements taken after maternity leave; therefore, in this case, total leave can be obtained simply by adding all weeks of leave. However, in some countries, parental or childcare leave is given until the child reaches a certain age, in which case maternity leave is already included in parental or childcare leave, as noted by Gauthier (2011a); thus, in this case, I deduct post-birth maternity leave from parental or childcare leave in order to avoid overestimation and correlation. For instance: (i) in Finland, childcare leave lasts until the child's third birthday; (ii) in France, Germany, and Spain, parental leave lasts until the child's third birthday; and (iii) in Sweden, childcare leave lasts until the 18 months of age; and (3) when no differentiation between pre-birth and post-birth maternity leave is noted, I assume them to be equal except for: (i) Japan (from 2000 and 2010), where 14 total weeks of maternity leave are assumed to be six pre-birth and eight post-birth as previous years; (ii) the UK (from 1998 to 2003), where 18 total weeks of maternity leave are assumed to be 11 pre-birth and seven post-birth, as in previous years; and (iii) Portugal (from 1996 to 1998), where 14 total weeks of maternity leave are assumed to be 5.4 pre-birth and 8.6 post-birth, as in previous years.

Table 1-6

Key National Provisions for Maternity Protection, 2010

Country	**Source**
Austria	Social Security
Belgium	Social Security
Denmark	Mixed: Local Government and Employer
Finland	Social Security
France	Social Security
Germany	Mixed: Social Security and Employer
Greece	Mixed: Social Security and State
Ireland	Social Security
Italy	Social Security
Japan	Social Security
Korea	Mixed: Social Security and Employer
Netherlands	Social Security
Norway	Social Security
Portugal	Social Security
Spain	Social Security
Sweden	Social Security
Switzerland	Mixed: Social Security and Mandatory Insurance (50% Employee and 50% Employer)
UK	Mixed: Social Security and State
US	No National Program

Data Source: ILO (2010)

Table 1-7

Weeks of Leave in 19 OECD Countries, 1970-2010

`YEAR	Job Protected Paid Leave	Other Leave	Total Leave
1970	12.7	4.2	16.9
1980	17.5	20.5	37.9
1990	20.6	40.0	60.6
2000	28.5	52.2	80.7
2010	34.5	53.1	87.6

Data Source: Data gathered by Ruhm (2000) and Tanaka (2005) as well as the Comparative Family Policy data from the Max Planck Institute for Demographic Research (Gauthier, 2011a) and PF 2.5. Annex: Detail of Change in Parental Leave by Country (OECD, 2012b).

Note: Job-protected paid leave refers to weeks of job protected paid maternity and parental leave, which includes family and adoptive leave, but not paternity leave. In addition, I control separately for weeks of other leave as my second independent variable. Other leave refers to weeks of unpaid leave and non-job protected paid leave, which includes parental leave provided at a very low flat rate and not clearly job protected (e.g., Austria and Germany). In addition, I add childcare leave that is also either unpaid or paid at a very low flat rate and not clearly job-protected. In the effort to follow previous studies (Ruhm, 2000; Tanaka, 2005), I adhere the following rules: (1) When there is no distinction between maternity leave and parental or childcare leave with the same job protection and payment, the leave is under "job-protected paid leave," which was usually the case for the Nordic/Scandinavian countries, including Denmark, Finland, Norway, and Sweden; (2) Parental leave and childcare leave in the dataset are usually the additional leave entitlements taken after maternity leave; therefore, in this case, total leave can be obtained simply by adding all weeks of leave. However, in some countries, parental or childcare leave is given until the child reaches a certain age, in which case maternity leave is already included in parental or childcare leave, as noted by Gauthier (2011a); thus, in this case, I deduct post-birth maternity leave from parental or childcare leave in order to avoid overestimation and correlation. For instance: (i) in Finland, childcare leave lasts until the child's third birthday; (ii) in France, Germany, and Spain, parental leave lasts until the child's third birthday; and (iii) in Sweden, childcare leave lasts until the 18 months of age; and (3) when no differentiation between pre-birth and post-birth maternity leave is noted, I assume them to be equal except for: (i) Japan (from 2000 and 2010), where 14 total weeks of maternity leave are assumed to be six pre-birth and eight post-birth as previous years; (ii) the UK (from 1998 to 2003), where 18 total weeks of maternity leave are assumed to be 11 pre-birth and seven post-birth, as in previous years; and (iii) Portugal (from 1996 to 1998), where 14 total weeks of maternity leave are assumed to be 5.4 pre-birth and 8.6 post-birth, as in previous years.

Table 1-8

Missing Values in Original Data

	N	Mean	S.D.	Missing Values	
				Count	Percent
Perinatal	730	11.15	6.64	68	8.5
Infant	798	9.39	7.08	0	0
Neonatal	727	6.03	4.39	71	8.9
Post-neonatal	738	2.99	2.52	60	7.5
Child	798	1.87	1.42	0	0
Low birth weight	639	5.85	1.36	159	**19.9**
Measles	566	81.83	18.62	232	**29.1**
DPT	591	88.88	12.68	207	**25.9**
Health expenditures	771	7.83	2.12	27	3.4
Insurance coverage	781	93.19	15.13	17	2.1
Dialysis patients	662	30.43	35.00	136	**17.0**
Female employment	742	0.54	0.13	56	7.0
Fertility rates	798	1.80	0.48	0	0
GDP per capita	782	23.86	8.17	16	2.0
Expenditures on family cash benefit	549	5.11	10.72	249	**31.2**
Expenditures on leave provision	498	10.68	22.91	300	**37.6**
Expenditures on family services	501	15.73	71.96	297	**37.2**
Job protected paid leave	798	21.93	18.72	0	0
Other leave	798	32.82	47.17	0	0
Total leave	798	54.75	51.78	0	0

Note: Job protected paid leave refers to weeks of job protected paid maternity and parental leave, which includes family leave and adoptive but not paternity leave. Other leave refers to weeks of unpaid leave and non-job protected paid leave, which includes parental leave provided at a very low flat rate and not clearly job protected e.g. Austria and Germany. In addition, I added childcare leave that is also either unpaid or provided at a very low flat rate. Underlined variables are ones with more than 10% missing values and in a specific pattern; data on low birth weight and immunizations for measles and DPT as well as social expenditures are missing for most countries until 1980. Some data on dialysis patients are missing for Belgium, Ireland, Italy, Korea, Norway, Sweden, and Switzerland prior to 1980.

Table 1-9

Summary of Variables after Multiple Imputations

	Original Data*		**Imputed Data****	
Variables	N	Mean	N	Mean
Perinatal	730	11.15	798	11.15
Infant	798	9.39	798	9.39
Neonatal	727	6.03	798	6.24
Post-neonatal	738	2.99	798	3.13
Child	798	1.87	798	1.87
Low birth weight	639	5.85	639	5.85
Measles	566	81.83	566	81.83
DPT	591	88.88	591	88.88
Health expenditures	771	7.83	798	7.78
Insurance coverage	781	93.19	798	92.93
Dialysis patients	662	30.43	662	30.43
Female employment	742	0.54	798	0.53
Fertility rates	798	1.80	798	1.80
GDP per capita	782	23.86	798	23.68
Expenditures on family cash benefit	549	5.11	549	5.11
Expenditures on leave provision	498	10.68	498	10.68
Expenditures on family services	501	15.73	501	15.73
Job protected paid leave	798	21.93	798	21.93
Other leave	798	32.82	798	32.82
Total leave	798	54.75	798	54.79

Note: Job protected paid leave refers to weeks of job protected paid maternity and parental leave, which includes family leave and adoptive but not paternity leave. Other leave refers to weeks of unpaid leave and non-job protected paid leave, which includes parental leave provided at a very low flat rate and not clearly job protected e.g. Austria and Germany. In addition, I added childcare leave that is also either unpaid or provided at a very low flat rate.
**Table 1-4 provides details of the original data.*
*** Multiple Imputations include all variables with missing values except variables with more than 10% missing values (underlined) since they are missing with a systematic pattern; data on low birth weight and immunizations for measles and DPT, as well as social expenditures are missing for most countries until 1980. Some data on dialysis patients are missing for Belgium, Ireland, Italy, Korea, Norway, Sweden, and Switzerland prior to 1980.In the process of MIs, I applied appropriate restrictions for the selected variables; for instance, values should not exceed 100 for variables in % such as health expenditures and health insurance coverage. Female employment ranges from 0 to 1. For all variables, including outcome variables, I should have no negative values. To meet this standard, I used the predictive mean matching method (PMM).*

Table 2-1

Effects of Family Leave Policy on Log of Infant Mortality
Estimates from OLS Models for 19 OECD Countries, 1969-2010

	Infant Mortality			
Regressor	Model 1	Model 2	Model 3	Model 4
Job Protected Paid Leave	-0.205**	-0.192**	-0.200**	-0.206**
	(0.063)	(0.063)	(0.065)	(0.065)
Other Leave				0.018
				(0.015)
GDP per Capita		-0.003	-0.005	-0.004
		(0.002)	(0.002)	(0.002)
Healthcare Expenditures		-0.018**	-0.018**	-0.018**
		(0.001)	(0.001)	(0.006)
Healthcare Coverage		0.001	0.001	0.001
		(0.001)	(0.001)	(0.001)
Dialysis Patients		-0.001	-0.001	-0.001
		(0.001)	(0.001)	(0.001)
Fertility Rates			0.012	0.016
			(0.022)	(0.022)
Female Employment			0.098	0.092
			(0.093)	(0.093)
Country fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Country*Time trends	Yes	Yes	Yes	Yes
R2	0.99	0.99	0.99	0.99
N	662	662	662	662

**p<0.05, **p<0.01*

Note: Numbers shown are coefficients (with standard errors in parentheses). All leave refers to weeks divided by 100.

Table 2-2

Effects of Family Leave Policy on Log of Perinatal Mortality
Estimates from OLS Models for 19 OECD Countries, 1969-2010

	Perinatal Mortality			
Regressor	Model 1	Model 2	Model 3	Model 4
Job Protected Paid Leave	-0.080	0.055	0.115	0.096
	(0.108)	(0.097)	(0.101)	(0.101)
Other Leave				0.057
				(0.022)
GDP per Capita		-0.018**	-0.016**	-0.017**
		(0.004)	(0.004)	(0.004)
Healthcare Expenditures		-0.001	-0.004	-0.006
		(0.010)	(0.010)	(0.010)
Healthcare Coverage		0.005**	0.005**	0.004**
		(0.001)	(0.001)	(0.001)
Dialysis Patients		-0.007**	-0.008**	-0.008**
		(0.001)	(0.001)	(0.001)
Fertility Rates			-0.081*	-0.069*
			(0.034)	(0.034)
Female Employment			-0.114	-0.133
			(0.173)	(0.172)
Country fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Country*Time trends	Yes	Yes	Yes	Yes
R2	0.96	0.97	0.97	0.97
N	662	662	662	662

**p<0.05, **p<0.01*
Note: Numbers shown are coefficients (with standard errors in parentheses). All leave refers to weeks divided by 100.

Table 2-3

Effects of Family Leave Policy on Log of Neonatal Mortality
Estimates from OLS Models for 19 OECD Countries, 1969-2010

	Neonatal Mortality			
Regressor	Model 1	Model 2	Model 3	Model 4
Job Protected Paid Leave	0.008	0.089	0.095	0.070
	(0.092)	(0.086)	(0.091)	(0.090)
Other Leave				0.070
				(0.020)
GDP per Capita		-0.006	-0.006	-0.007
		(0.003)	(0.003)	(0.003)
Healthcare Expenditures		-0.014	-0.014	-0.017*
		(0.008)	(0.008)	(0.008)
Healthcare Coverage		0.004**	0.004**	0.004**
		(0.001)	(0.001)	(0.001)
Dialysis Patients		-0.004**	-0.004**	-0.005**
		(0.001)	(0.001)	(0.001)
Fertility Rates			-0.009	0.007
			(0.033)	(0.033)
Female Employment			-0.060	-0.084
			0.173	(0.172)
Country fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Country*Time trends	Yes	Yes	Yes	Yes
R2	0.98	0.98	0.98	0.98
N	662	662	662	662

**p<0.05, **p<0.01*
Note: Numbers shown are coefficients (with standard errors in parentheses). All leave refers to weeks divided by 100.

Table 2-4

Effects of Family Leave Policy on Post-neonatal Mortality
Estimates from OLS Models for 19 OECD Countries, 1969-2010

	Post-neonatal Mortality			
Regressor	Model 1	Model 2	Model 3	Model 4
Job Protected Paid Leave	-0.517**	-0.636**	-0.621**	-0.616**
	(0.136)	(0.128)	(0.131)	(0.132)
Other Leave				-0.014
				(0.030)
GDP per Capita		0.001	-0.003	-0.003
		(0.005)	(0.001)	(0.006)
Healthcare Expenditures		-0.012	-0.013	-0.013
		(0.012)	(0.012)	(0.002)
Healthcare Coverage		-0.006**	-0.006**	-0.006**
		(0.001)	(0.001)	(0.001)
Dialysis Patients		0.006**	0.007**	0.007**
		(0.001)	(0.001)	(0.001)
Fertility Rates			-0.013	-0.016
			(0.046)	(0.047)
Female Employment			0.657**	0.662**
			(0.220)	(0.220)
Country fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Country*Time trends	Yes	Yes	Yes	Yes
R2	0.94	0.95	0.95	0.95
N	662	662	662	662

**p<0.05, **p<0.01*
Note: Numbers shown are coefficients (with standard errors in parentheses). All leave refers to weeks divided by 100.

Table 2-5

Effects of Family Leave Policy on Log of Child Mortality
Estimates from OLS Models for 19 OECD Countries, 1969-2010

	Child Mortality			
Regressor	Model 1	Model 2	Model 3	Model 4
Job Protected Paid Leave	-0.150	-0.203	-0.240	-0.256
	(0.138)	(0.138)	(0.143)	(0.143)
Other Leave				0.044
				(0.032)
GDP per Capita		0.010*	0.010*	0.009
		(0.005)	(0.005)	(0.005)
Healthcare Expenditures		-0.003	-0.002	-0.004
		(0.012)	(0.012)	(0.012)
Healthcare Coverage		-0.001	-0.001	-0.001
		(0.001)	(0.001)	(0.001)
Dialysis Patients		0.003*	0.003*	0.003*
		(0.001)	(0.001)	(0.001)
Fertility Rates			0.048	0.058
			(0.050)	(0.050)
Female Employment			-0.077	-0.093
			(0.203)	(0.203)
Country fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Country*Time trends	Yes	Yes	Yes	Yes
R2	0.93	0.93	0.93	0.93
N	662	662	662	662

**p<0.05, **p<0.01*
Note: Numbers shown are coefficients (with standard errors in parentheses). All leave refers to weeks divided by 100.

Table 2-6

Effects of Family Leave Policy on Log of Low Birth Weight
Estimates from OLS Models for 19 OECD Countries, 1980-2010

	Low Birth Weight			
Regressor	Model 1	Model 2	Model 3	Model 4
Job Protected Paid Leave	-0.048	-0.032	-0.024	-0.017
	(0.064)	(0.064)	(0.066)	(0.066)
Other Leave				-0.022
				(0.016)
GDP per Capita		0.000	0.003	0.003
		(0.002)	(0.003)	(0.003)
Healthcare Expenditures		-0.009	-0.009	-0.008
		(0.005)	(0.005)	(0.005)
Healthcare Coverage		-0.002**	-0.002**	-0.002**
		(0.001)	(0.001)	(0.001)
Dialysis Patients		0.000	0.000	0.000
		(0.001)	(0.001)	(0.001)
Fertility Rates			-0.047	-0.043
			(0.027)	(0.027)
Female Employment			-0.180	-0.168
			(0.123)	(0.123)
Country fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Country*Time trends	Yes	Yes	Yes	Yes
R2	0.96	0.96	0.96	0.96
N	439	439	439	439

**p<0.05, **p<0.01*

Note: Numbers shown are coefficients (with standard errors in parentheses). All leave refers to weeks divided by 100.

Table 2-7

Effects of Family Leave Policy on Log of Immunization for Measles
Estimates from OLS Models for 19 OECD Countries, 1980-2010

	Immunization for Measles			
Regressor	Model 1	Model 2	Model 3	Model 4
Job Protected Paid Leave	-0.100	-0.163	0.034	0.070
	(0.264)	(0.260)	(0.246)	(0.247)
Other Leave				-0.101
				(0.063)
GDP per Capita		-0.031**	-0.007	-0.006
		(0.011)	(0.011)	(0.011)
Healthcare Expenditures		0.001	0.003	0.007
		(0.022)	(0.020)	(0.020)
Healthcare Coverage		0.010**	0.006**	0.006**
		(0.002)	(0.002)	(0.002)
Dialysis Patients		-0.001	0.001	0.001
		(0.002)	(0.002)	(0.002)
Fertility Rates			-0.836**	-0.815**
			(0.116)	(0.116)
Female Employment			-1.124*	-1.076*
			(0.487)	(0.488)
Country fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Country*Time trends	Yes	Yes	Yes	Yes
R2	0.75	0.76	0.80	0.80
N	437	437	437	437

**p<0.05, **p<0.01*
Note: Numbers shown are coefficients (with standard errors in parentheses). All leave refers to weeks divided by 100.

Table 2-8

Effects of Family Leave Policy on Log of Immunization for DPT
Estimates from OLS Models for 19 OECD Countries, 1980-2010

	Immunization for DPT			
Regressor	Model 1	Model 2	Model 3	Model 4
Job Protected Paid Leave	-0.406	-0.381	-0.399	-0.336
	(0.190)	(0.191)	(0.195)	(0.193)
Other Leave				-0.175
				(0.049)
GDP per Capita		0.001	0.010	0.012
		(0.007)	(0.008)	(0.008)
Healthcare Expenditures		-0.008	-0.007	0.002
		(0.015)	(0.015)	(0.015)
Healthcare Coverage		0.001	0.001	0.001
		(0.002)	(0.002)	(0.002)
Dialysis Patients		-0.002	-0.002	-0.001
		(0.002)	(0.002)	(0.002)
Fertility Rates			-0.057	-0.024
			(0.082)	(0.081)
Female Employment			-0.637	-0.548
			(0.388)	(0.381)
Country fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Country*Time trends	Yes	Yes	Yes	Yes
R2	0.54	0.54	0.54	0.55
N	452	452	452	452

**p<0.05, **p<0.01*
Note: Numbers shown are coefficients (with standard errors in parentheses). All leave refers to weeks divided by 100.

Table 2-9

Effects of Family Leave Policy on Log of Post-neonatal Mortality, including low birth weight and immunizations for measles and DPT
Estimates from OLS Models for 19 OECD Countries, 1980-2010

	Post-neonatal Mortality			
Regressor	Model A	Model B	Model C	Model D
Job Protected Paid Leave	-0.367*	-0.377*	-0.416**	-0.401**
	(0.149)	(0.153)	(0.153)	(0.149)
Other Leave	0.073	0.055	0.043	0.059
	(0.036)	(0.037)	(0.037)	(0.036)
Low Birth Weight	0.513**			0.511**
	(0.118)			(0.118)
Immunization for		-0.030		-0.015
Measles		(0.032)		(0.032)
Immunization for			-0.073*	-0.070*
DPT			(0.034)	(0.033)
Country fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Country*Time trend	Yes	Yes	Yes	Yes
R2	0.96	0.96	0.96	0.96
N	406	406	406	406

**p<0.05, **p<0.01*

Note: Numbers shown are coefficients (with standard errors in parentheses). All leave refers to weeks divided by 100. Controls include GDP per capita, expenditures on healthcare, health insurance coverage, dialysis, fertility, and female employment.

Table 2-10

Effects of Family Leave Policy on Log of Post-neonatal Mortality, including Social Expenditures
Estimates from OLS Models for 19 OECD Countries, 1980-2010

	Post-neonatal Mortality							
Regressor	Model A	Model B	Model C	Model D	Model E	Model F	Model G	Model H
Job Protected Paid Leave	-0.499**	-0.510**	-0.502**	-0.483**	-0.508**	-0.501**	-0.475**	-0.490**
	(0.158)	(0.159)	(0.158)	(0.159)	(0.159)	(0.159)	(0.158)	(0.159)
Other Leave	-0.011	-0.011	-0.011	-0.016	-0.011	-0.019	-0.020	-0.020
	(0.039)	(0.039)	(0.039)	(0.040)	(0.039)	(0.040)	(0.040)	(0.040)
Expenditures on family cash benefits		-0.001			0.000	-0.002		-0.001
		(0.002)			(0.002)	(0.002)		(0.002)
Expenditures on maternity & parental leave			-0.001		0.000		-0.003	-0.002
			(0.002)		(0.003)		(0.002)	(0.003)
Expenditures on family services				0.002		0.005	0.005	0.005
				(0.003)		(0.004)	(0.004)	(0.004)
Country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Years fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country*Time trends	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R2	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
N	375	375	375	375	375	375	375	375

**p<0.05, **p<0.01*

Note: Numbers shown are coefficients (with standard errors in parentheses). All leave refers to weeks divided by 100. For the expenditures per child, the public expenditures on family cash allowances and family services are divided by the number of children ages 0-14. The public expenditures on maternity and parental leave are divided by the number of children ages 0-4. Expenditures on family cash allowances, maternity and parental leave, and family services are sub-categories of the total public expenditures on family (all expenditures are in thousands of PPP-adjusted constant US dollars). Controls include GDP per capita, expenditures on healthcare, health insurance coverage, dialysis, fertility, and female employment.