Do Maternity Leave Benefits Improve Mother's Health at Old Age?

Evidence from 11 European countries during 1960-2010

Authors: Mauricio Avendano[1,2], Lisa F. Berkman[2,3], Agar Brugiavini[4,5], Giacomo Pasini[4]

Affiliations:

[1] London School of Economics and Political Science, Department of Social Policy, LSE Health and Social Care, London, United Kingdom

[2] Harvard School of Public Health, Department of Social and Behavioral Sciences, Boston, USA

[3] Center for Population and Development Studies, Harvard School of Public Health, Cambridge, USA

[4] Department of Economics, University Ca' Foscari of Venice, Fondamenta San Giobbe, Cannaregio 873, 30121 Venezia, Italy

[5] Network for Studies on Pensions, Aging and Retirement, Tilburg, The Netherlands

Address for correspondence:

Giacomo Pasini

Department of Economics, University Ca' Foscari of Venice

Fondamenta San Giobbe

Cannaregio 873, 30121 Venezia, Italy

Email: giacomo.pasini@unive.it

Abstract

Maternity leave policies have been shown to improve long-term labor market outcomes for mothers. We assess whether paid maternity leave benefit policies have long-run, permanent effects on mothers' health at old age. We link retrospective employment histories for women aged 50 and above from the Survey of Health, Ageing and Retirement in Europe (SHARE) to data on maternity leave legislation from 1960 to 2010 in 11 European countries. Based on a difference-in-differences approach, we find that eligibility to more weeks of fully paid benefits at the time of childbirth leads to better mental health at old age. Maternity leave benefits may also improve other dimensions of health such as physical functioning. Our study suggests that maternity leave benefits many not only improve children and maternal outcomes at the time of childbirth, but may also have long-run permanent effects on mother's physical and mental health at old age.

Introduction

During the second half of the twentieth century, high-income countries witnessed a remarkable increase in female labor force participation. Women with children were no exception to this pattern. Mothers today engage in market employment at much higher rates than decades earlier. In the US, 64% of mothers with children under the age of 6 were in the labor force in 2011, as compared to 33% in 1975(Ruhm, 2011, US Bureau of Labor Statistics, 2013). Similarly, in the EU-15, 38% of women were in the labor force in 1975 compared to 71% in 2011. In response to these trends, many European countries enacted comprehensive maternity leave policies during the second half of the twentieth century to help households with children coping with the competing demands from work and family. Maternity leave legislation extends women the right to take a period of leave from work around childbirth, and often to receive income support compensation during maternity leave. Initially, maternity leave policies were motivated by concerns about the health of the child and the mother in the period around birth. Since the end of the 1960's, however, maternity leave policies evolved into a job-protected period out of work to care for newborns and young children. Despite some evidence that maternal leave benefits improve health outcomes among children, relatively little is known about the impact of maternity leave benefits on maternal health, with most studies focusing on the period around birth only(Staehelin et al., 2007, Ruhm, 2011).

A potential, yet untested hypothesis is that maternity leave benefits do not only protect children and mother's health around the period of birth, but they have long term benefits for mothers that extend for several decades. Recent evidence suggests that, by protecting employment among mothers in the period around birth, maternity leave leads to better long-term labor market outcomes after maternity including wage level and growth, career prospects, labor market attachment and employability (Brugiavini A et al., 2012, Rossin, 2011, Rossin-Slater et al., 2013, Ruhm, 2011, Klerman JA and Leibowitz A, 2000). Whether these effects on mother's employment translate into health benefits as well, however, has not yet been explored. Maternity leave policies may lead to improvements in mother's long-term health via at least two mechanisms. By enabling women to recover from childbirth in the weeks after delivery, maternity leave benefits may ameliorate post-partum stress and diminish their risk of both physical and mental health deterioration, including postnatal depression. Longer maternity leave may also directly improve mother's health by releasing some of these immediate pressures and reducing work family conflict, which in turn may reduce stress and prevent the development of longer-term complications that may affect long-term physical and mental health.

A second, less explored hypothesis is that longer maternity leave has permanent effects on mother's social and economic well-being, and may, through this mechanism, improve late-life health among women. By enabling women to return to their employer, maternity leave policies may improve mother's career prospects, earning's accumulation and labor market attachment (Brugiavini A et al.,

2012, Rossin, 2011, Rossin-Slater et al., 2013, Ruhm, 2011, Klerman JA and Leibowitz A, 2000), all of which could have permanent effects on women's health in the long-run. In addition, maternity leave provisions may increase pension entitlements throughout their impact on working-careers and wages (Brugiavini A et al., 2012), thus improving income during the post-retirement years. Whether these improvements in women's career prospects lead to better health in the long-run, however, has not been explored.

In this paper, we aim to shed light on this question by exploiting policy reforms across European countries on the length and generosity of maternity leave benefits during the second half of the twentieth century. Specifically, we assess whether cohorts of mothers in countries which enacted more comprehensive paid maternity leave benefits during the birth of their first child fared better in later adulthood in terms of physical and mental health compared with cohorts of women with less comprehensive benefits. We hypothesized that longer paid maternity leave benefits during the birth of the first child may bring health benefits for mothers. To test this hypothesis, we use data from the Retrospective Survey of Health, Ageing and Retirement in Europe (SHARE), a survey of a representative sample of the European population aged 50 and above in thirteen European countries, containing detailed retrospective histories of employment and maternity episodes, as well detailed data on physical and mental health outcomes in late-life. We linked these data to country- and year-specific information on maternity leave legislation available through the Comparative Maternity, Parental, and Childcare Leave and Benefits Database(Gauthier, 2011). Our study is unique in exploiting the large variation in the timing and comprehensiveness of maternity leave benefits in a sample of European women who worked and raised children under substantively different maternity leave policy entitlements.

Literature review

Research on the health impact of maternity leave legislation has focused primarily on health in the years around birth. In a systematic review, four out of six studies reported a positive association between the length of maternity leave and mental health in the post-partum period (Staehelin et al., 2007). A study using cross-sectional variations in maternity leave entitlements across US states before 1993 found that mothers entitled to 8 to 12 weeks leave after childbirth had fewer depressive symptoms than women entitled to only 6 weeks (Chatterji and Markowitz, 2012). Another study found that maternity leave of 12 weeks or longer is associated with lower depression scores in women with marital concerns, and lower depression and less anger among women with low work rewards, compared to maternity leave of 6 weeks or less (Hyde JS et al., 1995). Two studies found that general mental health at 7 and 9-12 months after childbirth, measured by depression, anxiety, general positive affect and life satisfaction, was better in women with maternity leaves beyond 15 weeks and 24

weeks, as compared to women with less than 9 weeks of leave(Gjerdingen et al., 1991, McGovern et al., 1997). No effects were found in the other two studies included in this systematic review.

A study assessing the effect of a major increase in maternity leave mandates in Canada compared the health of mothers giving birth before 31 December 2000, and entitled to a maximum of approximately six months of job-protected compensated maternity leave, to that of mothers to children born after that date, whose benefit entitlement and job protection benefits were extended to about one year (Baker and Milligan, 2008). Results suggest that extended maternity leave mandates increased the attainment of critical breastfeeding thresholds, but it did not lead to an improvement of maternal and child health outcomes. Another study found that longer maternity leave is associated with a lower probability of having at least three visits to an outpatient physician or clinic during the next six months after childbirth, but the effect was small and not statistically significant. In contrast, a recent study found that shorter maternity leave is significantly associated with worse self-rated health (Chatterji & Markowitz, 2012), although it is difficult to distinguish to what extent this is driven by physical or mental health.

Except for one study in Canada(Baker and Milligan, 2008), all of the studies above were based on data for the United States, the only advanced industrialized country without a national law providing mothers with entitlements for paid maternity leave. In the United States, maternity leave is regulated at the Federal level by the Family and Medical Leave Act (FMLA) enacted in 1993, which provides some parents with rights to 12 weeks of unpaid leave following the birth of a child. Identification in these studies is thus based on variations in allowable ***unpaid*** maternity leave laws across states, providing no information on the impact of paid maternity leave benefits. In contrast, since the 1960s, most European countries mandate compulsory leave for extended durations, often with an extensive period of paid benefits. The large variation in the generosity of paid benefits and duration across Europe, therefore, provide a unique opportunity to assess the impact of paid maternity leave benefits on maternal health outcomes. Another limitations of previous studies is the focus on short-term effects, with none of them covering a sufficiently long period to assess whether maternity leave benefits have long-run, permanent effects on health that manifest years or decades later. Most serious illnesses resulting from chronic conditions such as cardiovascular disease are the result of decades of exposure. If longer maternity leave benefits enable women to remain in the labour market and set the conditions to balance their work and family responsibilities, their effect on health may only become evident in old age, when most serious illness occurs. To the best of our knowledge, no previous study has explored the effect of maternity leave benefits during childbearing years on health at old age.

Methods

Data

Our study draws on data from SHARE, a cross-national panel survey of representative samples designed to provide comparable information on the health, employment and social conditions of the non-institutionalized European population aged 50+. Samples in 13 European countries were drawn from national or regional population registries, or from multi-stage sampling in Northern Europe (Sweden and Denmark), Western Europe (Austria, France, Germany, Switzerland, Belgium, and the Netherlands), Southern Europe (Spain, Italy and Greece) and Eastern/Central Europe (Poland and Czech Republic), as well as Ireland and Israel. Participants in each country were interviewed in 2004 and subsequently re-interviewed in 2006/7 and 2008/9. Interviews were face-to-face and took place in the household using structured computerized questionnaires. Expert agencies translated items, with extensive pre-testing to ensure comparability. Response rates varied from country to country, but overall household response at enrolment was 62% (Börsch-Supan A, 2005, Börsch-Supan and Schröder, 2011b, Börsch-Supan and Schröder, 2011a, Schröder, 2011). Further details on the survey are available elsewhere (Börsch-Supan A, 2005, Börsch-Supan and Schröder, 2011b, Börsch-Supan and Schröder, 2011a, Schröder, 2011).

Data on life histories of employment and health came from the 2008/09 wave of SHARE, which collected detailed retrospective life-histories expanding through early childhood until last interview. Our study included respondents who completed the life-history assessment and who had enrolled in the study in either 2004/5 or 2006/7. Almost 30,000 men and women across 13 European countries took part in this round of the survey(Schröder, 2011). The SHARELIFE questionnaire covered several important areas of respondents' lives, ranging from housing to detailed questions on health and health care. SHARELIFE is particularly suitable for our investigation since it provides complete working and maternity histories. Our analysis concentrates on Western European countries, i.e. we will not consider the Czech Republic and Poland, since women in Socialist countries were included in a system of full, but not freely chosen, employment(Gal and Kligman, 2000): women's decisions concerning job interruptions at maternity would not be comparable to the behavior of women in Western countries. For the same reason, we exclude women who were living in Eastern Germany before 1989.

SHARELIFE contains information on 12,540 women from the 11 countries we consider: 10,382 women had at least one job and, among them, 9022 had at least one child. About 47% of these women (4,227) were retired in 2008– 2009, while the other half is still working, disabled, unemployed or out of the labor force. We focus on women who were working at the time of at least one of their childbirths. Labor market participation at the time of childbirth is very heterogeneous across countries. While in most countries the labor market participation rate of women is above 60% in some

countries, such as Italy and Spain, the percentage of women working at the time of childbirth is very low (between 25 and 40%).

Maternity leave histories

For each maternity episode, SHARELIFE respondents are asked to report if they continued working without interruption, stopped working temporarily or left the labor market and never worked again. Women who stopped working temporarily are asked how long this interruption was (one month or less, one to three months, three to six months, six month to a year, 1 to three years or more than 3 years). Moreover, the dataset contains the year in which each job started and finished: we are then able to determine the employment status of each mother right before but also during the whole interruption at each child birth. Some women took a period of leave and returned to the same job afterwards, i.e. they were employed but not at work throughout the whole child caring period; others left their job at the time of childbirth and returned later to a different occupation; finally, a group of women experienced a combination of both: a first period employed but not at work followed by a period out of the labor force. Brugiavini at al (Brugiavini A et al., 2012) report statistics on the distribution of those types of interruptions at maternity by country and time period, over the sample of birth episodes.

Physical functioning and disability

Measures of functional status and disability included the following indicators: The Katz Activities of Daily Living (ADL) scale assessed difficulties with six basic self-care tasks (bathing, dressing, toileting, transferring, continence, and eating)(Katz et al., 1970); the index of Instrumental Activities of Daily Living (IADL) assessed difficulties with more advanced activities (using a map, preparing hot meals, shopping, telephone use, taking medications, housekeeping tasks, and managing money)(Lawton and Brody, 1969); and an index of mobility, partly based on the Nagi-scale(Nagi, 1976), assessed difficulties with 10 mobility and fine motor control items such as walking 100 meters, sitting two hours and climbing stairs. Summary scores for every single item were constructed based on the total number of difficulties reported.

Maximum Hand Grip Strength (GS)

Hand grip strength is an objective measure of physical performance measure that does not suffer the biases inherent to self-reports, and it is a strong predictor of disability(Kuh et al., 2005, Nybo et al., 2001, Rantanen et al., 1994, Rantanen et al., 1999, Rantanen et al., 1998, Ishizaki et al., 2000), morbidity(Griffith et al., 1989, Kuh et al., 2005, Milne and Maule, 1984) and mortality (Fujita et al., 1995, Gale et al., 2007, Pincus and Callahan, 1992, Rantanen et al., 2000) at older ages. GS was

measured by trained interviewers using a handheld dynamometer (Smedley, S Dynamometer, TTM, Tokyo, 100 kg). Participants were instructed to stand (preferably) or sit, with the elbow at a 90^0 angle, the wrist in neutral position, keeping the upper arm tight against the trunk, and the inner lever of the dynamometer adjusted to suit the hand. Participants were then instructed to squeeze as hard as possible for a few seconds. Two values were recorded for each hand. Measurements were considered valid if the two measurements of one hand differed by less than 20 kg(Börsch-Supan A, 2005). Values of zero ('0') or those above 100 kg (≥100 kg) were considered invalid. We used the maximum value of all measurements of grip strength in both hands.

Mental Health

We use data from the EURO-D (Prince et al., 1999), a standardized scale of depressive symptoms designed to enhance cross-national comparability. The EURO-D consists of 12 items: depression, pessimism, death wish, guilt, sleep, interest, irritability, appetite, fatigue, concentration, enjoyment and tearfulness.

Breast Cancer

The insurgence of breast cancer has been found to be associated to health problems and stress before and right after childbirths. We use a dummy indicator which takes value 1 if the respondent report to have been diagnosed a breast cancer ever in life.

Maternity leave policy entitlements across Europe

We supplement SHARE data with the key characteristics of legislation regarding maternity leave in each country over a 50-year span. Data came from the Gauthier Comparative Maternity, Parental, and Childcare Leave and Benefits Database(Gauthier, 2011), considered to be the most comprehensive data collection on historical trends in family policy regulations. Our study focuses on maternity leave granted to mothers in connection with childbirth, typically referring to a period shortly before and after childbirth. We exclude parental leave entitlements that refer to leave options after the maternity protection periods, which is available both to mothers and fathers in many countries. We chose this restrictive definition due to the large diversity in legislations for parental leave across countries and over time, making it very difficult to obtain entitlement levels that would be comparable.

Table 1 provides summary statistics of the two key variables used in our analysis, namely the duration of leave in weeks and the percentage of past wages that is replaced during maternity leave. Based on the approach previously applied by earlier work (Ruhm, 2000), we multiplied these two indicators to obtain a summary indicator of the generosity of maternity leave benefits that indicates the number of

weeks of full wage leave provided to mothers around the period of childbirth in each country from 1960 to 2010.

Analysis and identification strategy

In order to assess the causal relationship between the exposure to a given type of maternity leave legislation and health later in life we use a Differences-in-Differences (DiD) approach. The thought experiment is the following: we compare women who were working at the moment of childbirth and are exposed to a comprehensive maternity leave policy at the moment of child delivery, with women working at childbirth which were exposed to less generous policies. This comparison alone, however, may be biased by unmeasured factors: as it is reported in table 1, maternity leave legislation become more and more generous from the '60s until the last decade of the 20th century, and only in the 90's and in a selected number of Countries (mostly Scandinavian) maternity legislation turned less comprehensive in terms of amount of the benefit paid. Given such a legislation history, the suggested comparison may simply capture cohort effects rather than the effectiveness of the policy. Therefore, we compare the working women group with a control group of women who were not working at the time of childbirth. Since we know the year or birth of each child, we can link maternity episodes of women out of the labor force to the legislation in place at the moment of maternity. We then compute the same difference as before: we compare health outcomes of women not working for which the legislation was comprehensive at the moment of childbirth, with women not working and facing a less generous maternity leave policy at childbirth. Since the legislation applies only to women working, any significant difference among women in this control group can be imputed to the same confounding factor blurring the causal effect of the policy among the treated women. Figure 1 summarizes our Natural Experiment setup.

Figure 1. The impact of maternity leave benefits on health: Difference-in-difference approach

	Limited coverage of maternity periods	Comprehensive protection of maternity periods
Treated: Women working at childbirth	A	B
Control: Women not working at childbirth	C	D

The maternity leave legislation affects only the treated women, therefore computing the double difference (B-A)-(D-C) we are able to isolate the pure effect of the policy. The estimation proceeds as follows: the outcome variable is regressed on a dummy variable which takes value 1 for treated

women, a second variable accounting for a policy, and an interaction term between the two. The coefficient of the interaction term is exactly the double difference (B-A)-(D-C) on the mean value of the outcome. Regressions include also a set of basic controls: a quadratic in age of the mother at the moment of the interview; age at childbirth; educational level (a set of dummies accounting for high school or college education); total number of years spent working; a full set of country dummies. We limited the sample to maternity episodes taking place between the age of 20 and 40.

Implementing such an estimation strategy requires a few additional technical details. First, policy can be defined in a discrete or continuous way. In our baseline specification (table 2) we distinguish women exposed to legislation which grants at least 12 weeks of full wage at childbirth, with women facing less than 12 weeks of full wage (FWW). Still, legislation across countries and along time varied in a much smoother way. In table 3 we use a continuous treatment indicator, i.e. we do not sharply distinguish women into two groups, but we account for the actual length in terms of full wage weeks each woman faced at each maternity.

The estimation dataset is a "maternity episodes dataset": Each woman enters the sample as many times as maternity episodes she experiences. Correlated effects across maternities are accounted for allowing the standard errors to be heteroskedastic. A more conservative approach is to consider only first maternities: we lose variation in the policy variable, but each woman enters the sample at most once. Results of the same baseline specification of table 3 referring to only the first childbirth are reported in table 4.

Results

We start by assessing whether the number of full-working wages each mother was entitled to at the time of their first childbirth impacts health outcomes among women after age 50. Estimation is based on a comparison of differences between the treatment group, defined as women working at the time of their first childbirth, and the control group, defined as women out of the labor force at the time of their first child. The model estimates the difference in the impact of full-working wage benefits for these two groups, assumed to reflect the impact of benefits given that only women working during childbirth would have benefited from the level of maternity leave benefits. As we explained in the previous section, this difference in the effect for both treatment and control is captured by the interaction between the working-mother indicator variable and the full-working wage benefit entitlement at the time of first childbirth variable, hereby referred as the difference-in-difference estimate.

Table 2 summarizes the results for six different health outcomes in which the treatment variable is dichotomized, i.e. we distinguish women exposed to more than 12 weeks of full-working wage weeks of benefits at the time of childbirth to women exposed to less generous policies. We find that having more than 12 weeks of fully paid benefits at the time of first childbirth significantly reduces depression scores (estimate= -0,197, se=0,071, p<.01) and the number of physical mobility limitations (estimate=-0,1456, se=0.0644, p<.01) at ages 50 and above. There is no evidence of an effect of benefits on limitations with ADL, limitations with IADL, maximum grip strengths or probability of being diagnosed with breast cancer.

Table 3 summarizes results from models, using the total number of full-working wage weeks at the time of childbirth as treatment indicator. This approach fully exploits the variability in maternity leave policy along time and across countries, but blurs the distinction between women exposed to "comprehensive" vs "less comprehensive" policies. Results confirm results from table 2 for depression scores (estimate= -0,021, se=0,006, p<.01), while significance on the number of physical mobility limitations is lost. On the contrary, there is a positive and significant effect on grip strength: estimate= 0, 052, se=0,022, p<.05.

In Table 4 we limit the analysis of table 2 to first childbirth episodes. Results are qualitatively similar to table 2. In particular, the estimate of the effect on depression symptoms gains in statistical precision, despite the fact that the sample is reduced from 18,619 to 6,962 observations.

Conclusion

Previous studies have documented a significant effect of maternity leave benefit provisions on mothers' working careers, earnings and pensions. Our study extends this literature by examining the

impact of maternity leave provisions on health at old age. We find that mothers who were eligible to more generous benefits at the time of their first child birth had better mental health in later adulthood. In addition, we find that fully-paid maternity benefits of 12 weeks or higher lead to less limitations with mobility in later adulthood. Our study provides important insights into the long-run benefits of maternity leave provisions, which many not only improve children and maternal outcomes at the time of childbirth, but may also bring benefits that extend beyond this period and towards the later decades of life.

A possible explanation for this effect is that maternity leave benefits improve the social and economic well-being of mothers and through this mechanism lead to better health outcome at old age. Given that the most consistent effects observed were for mental health, however, a second possible explanation is that maternity leave benefits reduce the risk of post-partum depression or other mental health problems associated with the period following the birth of a child, which may in turn reduce the risk of future episodes of depression in old age. We did not find a consistent effect for limitations with ADL, IADL or grip strength, which may either by due to a lack of power, or to a lack of strong effects of maternity leave benefits on physical health outcomes. Nonetheless, our findings are in line with previous evidence that maternity leave benefits improve mental health outcomes around the period of birth, while effects on physical health are less clear(Ruhm, 2011, Staehelin et al., 2007).

In conclusion, we find evidence that maternity leave benefit policies have important effects on the health of mothers, which extend beyond the period of birth and manifest at old age. This pattern is particularly strong for mental health. Our findings have important policy implications and imply that maternity leave benefits do not only protect mothers and their children around the period of childbirth, but may contributing to healthy ageing among women reaching old age.

References

BAKER, M. & MILLIGAN, K. (2008) Maternal employment, breastfeeding, and health: evidence from maternity leave mandates. *J Health Econ,* 27**,** 871-87.

BÖRSCH-SUPAN A, J. H. (2005) *The Survey of Health, Ageing and Retirement in Europe - Methodology,* Mannheim: Mannheim Research Institute for the Economics of Ageing (MEA).

BÖRSCH-SUPAN, A. & SCHRÖDER, M. (2011a) Employment and Health at 50+: An Introduction to a Life History Approach to European Welfare State Interventions. IN BÖRSCH-SUPAN A & ET AL. (Eds.) *The Individual and the Welfare State. Life Histories in Europe.* Heidelberg: Springer.

BÖRSCH-SUPAN, A. & SCHRÖDER, M. (2011b) Retrospective Data Collection in the Survey of Health, Ageing and Retirement in Europe. IN SCHRÖDER, M. (Ed.) *Retrospective Data Collection in the Survey of Health, Ageing and Retirement in Europe.* Mannheim: Mannheim Research Institute for the Economics of Ageing (MEA).

BRUGIAVINI A, PASINI G & TREVISAN E (2012) The direct impact of maternity benefits on leave taking: Evidence from complete fertility histories. *Advances in Life Course Research,* 18**,** 46-67.

CHATTERJI, P. & MARKOWITZ, S. (2012) Family leave after childbirth and the mental health of new mothers. *J Ment Health Policy Econ,* 15**,** 61-76.

FUJITA, Y., NAKAMURA, Y., HIRAOKA, J., KOBAYASHI, K., SAKATA, K., NAGAI, M. & YANAGAWA, H. (1995) Physical-strength tests and mortality among visitors to health-promotion centers in Japan. *J Clin Epidemiol,* 48**,** 1349-59.

GAL, S. & KLIGMAN, G. (2000) *The politics of gender after socialism: A comparative-historical essay,* Princeton, Princeton University Press.

GALE, C. R., MARTYN, C. N., COOPER, C. & SAYER, A. A. (2007) Grip strength, body composition, and mortality. *Int J Epidemiol,* 36**,** 228-35.

GAUTHIER, A. H. (2011) Comparative family policy database, version 3 [computer file].www.demogr.mpg.de. Netherlands Interdisciplinary Demographic Institute and Max Planck Institute for Demographic Research (distributors).

GJERDINGEN, D. K., FROBERG, D. G. & KOCHEVAR, L. (1991) Changes in women's mental and physical health from pregnancy through six months postpartum. *J Fam Pract,* 32**,** 161-6.

GRIFFITH, C. D., WHYMAN, M., BASSEY, E. J., HOPKINSON, B. R. & MAKIN, G. S. (1989) Delayed recovery of hand grip strength predicts postoperative morbidity following major vascular surgery. *Br J Surg,* 76**,** 704-5.

HYDE JS, KLEIN MH, ESSEX MJ & R, C. (1995) Maternity Leave and Women's Mental Health. *Psychol Women Q,* 19**,** 257–85.

ISHIZAKI, T., WATANABE, S., SUZUKI, T., SHIBATA, H. & HAGA, H. (2000) Predictors for functional decline among nondisabled older Japanese living in a community during a 3-year follow-up. *J Am Geriatr Soc,* 48**,** 1424-9.

KATZ, S., DOWNS, T. D., CASH, H. R. & GROTZ, R. C. (1970) Progress in Development of the Index of ADL. *The Gerontologist,* 10**,** 20-30.

KLERMAN JA & LEIBOWITZ A (2000) Labor Supply Effects of State Maternity Leave Legislation. IN BLAU FD & RG, E. (Eds.) *Gender and Family Issues in the Workplace.* New York, Russell Sage.

KUH, D., BASSEY, E. J., BUTTERWORTH, S., HARDY, R., WADSWORTH, M. E. & THE MUSCULOSKELETAL STUDY, T. (2005) Grip strength, postural control, and functional leg power in a representative cohort of British men and women: associations with physical activity, health status, and socioeconomic conditions. *J Gerontol A Biol Sci Med Sci,* 60**,** 224-31.

LAWTON, M. P. & BRODY, E. M. (1969) Assessment of older people: self-maintaining and instrumental activities of daily living. *Gerontologist,* 9**,** 179-86.

MCGOVERN, P., DOWD, B., GJERDINGEN, D., MOSCOVICE, I., KOCHEVAR, L. & LOHMAN, W. (1997) Time off work and the postpartum health of employed women. *Med Care,* 35**,** 507-21.

MILNE, J. S. & MAULE, M. M. (1984) A longitudinal study of handgrip and dementia in older people. *Age Ageing,* 13**,** 42-8.

NAGI, S. Z. (1976) An epidemiology of disability among adults in the United States. *Milbank Mem Fund Q Health Soc,* 54**,** 439-67.

NYBO, H., GAIST, D., JEUNE, B., MCGUE, M., VAUPEL, J. W. & CHRISTENSEN, K. (2001) Functional status and self-rated health in 2,262 nonagenarians: the Danish 1905 Cohort Survey. *J Am Geriatr Soc,* 49**,** 601-9.

PINCUS, T. & CALLAHAN, L. F. (1992) Rheumatology function tests: grip strength, walking time, button test and questionnaires document and predict longterm morbidity and mortality in rheumatoid arthritis. *J Rheumatol,* 19**,** 1051-7.

PRINCE, M. J., REISCHIES, F., BEEKMAN, A. T., FUHRER, R., JONKER, C., KIVELA, S. L., LAWLOR, B. A., LOBO, A., MAGNUSSON, H., FICHTER, M., VAN OYEN, H., ROELANDS, M., SKOOG, I., TURRINA, C. & COPELAND, J. R. (1999) Development of the EURO-D scale--a European, Union initiative to compare symptoms of depression in 14 European centres. *Br J Psychiatry,* 174**,** 330-8.

RANTANEN, T., ERA, P. & HEIKKINEN, E. (1994) Maximal isometric strength and mobility among 75-year-old men and women. *Age Ageing,* 23**,** 132-7.

RANTANEN, T., GURALNIK, J. M., FOLEY, D., MASAKI, K., LEVEILLE, S., CURB, J. D. & WHITE, L. (1999) Midlife hand grip strength as a predictor of old age disability. *Jama,* JAMA**,** 558-60.

RANTANEN, T., GURALNIK, J. M., LEVEILLE, S., IZMIRLIAN, G., HIRSCH, R., SIMONSICK, E., LING, S. & FRIED, L. P. (1998) Racial differences in muscle strength in disabled older women. *J Gerontol A Biol Sci Med Sci,* 53**,** B355-61.

RANTANEN, T., HARRIS, T., LEVEILLE, S. G., VISSER, M., FOLEY, D., MASAKI, K. & GURALNIK, J. M. (2000) Muscle strength and body mass index as long-term predictors of mortality in initially healthy men. *J Gerontol A Biol Sci Med Sci,* 55**,** M168-73.

ROSSIN-SLATER, M., RUHM, C. J. & WALDFOGEL, J. (2013) The effects of California's paid family leave program on mothers' leave-taking and subsequent labor market outcomes. *J Policy Anal Manage,* 32**,** 224-45.

ROSSIN, M. (2011) The effects of maternity leave on children's birth and infant health outcomes in the United States. *J Health Econ,* 30**,** 221-39.

RUHM, C. J. (2000) Parental leave and child health. *J Health Econ,* 19**,** 931-60.

RUHM, C. J. (2011) Policies to assist parents with young children. *Future Child,* 21**,** 37-68.

SCHRÖDER, M. (2011) *Retrospective Data Collection in the Survey of Health, Ageing and Retirement in Europe. SHARELIFE Methodology,* Mannheim, MEA.

STAEHELIN, K., BERTEA, P. C. & STUTZ, E. Z. (2007) Length of maternity leave and health of mother and child--a review. *Int J Public Health,* 52**,** 202-9.

US BUREAU OF LABOR STATISTICS (2013) BLS Reports: Women in the Labor Force. IN STATISTICS, U. B. O. L. (Ed.).

TABLES

Table 1: Maternity leave policies database

Country	Period	Duration (weeks)			Benefit (% of wage in manufacturing sector)			Weeks of Full wage leave (benefit*duration/100)		
		Min	**Max**	**Mean**	**Min**	**Max**	**Mean**	**Min**	**Max**	**Mean**
Sweden	*1960-1979*	12.8	39.0	25.3	45.0	90.0	63.8	5.8	35.1	17.2
	after 1980	39.0	68.6	59.3	62.0	90.0	72.9	27.7	57.6	42.8
Denmark	*1960-1979*	14.0	14.0	14.0	19.0	90.0	59.3	2.7	12.6	8.3
	after 1980	18.0	18.0	18.0	39.0	90.0	62.2	7.0	16.2	11.2
Germany	*1960-1979*	12.0	14.0	13.0	100.0	100.0	100.0	12.0	14.0	13.0
	after 1980	14.0	14.0	14.0	100.0	100.0	100.0	14.0	14.0	14.0
Netherlands	*1960-1979*	12.0	12.0	12.0	100.0	100.0	100.0	12.0	12.0	12.0
	after 1980	12.0	16.0	14.3	100.0	100.0	100.0	12.0	16.0	14.3
Belgium	*1960-1979*	12.0	14.0	13.0	60.0	79.5	64.9	7.2	11.1	8.5
	after 1980	14.0	15.0	14.7	76.4	79.5	77.4	10.7	11.5	11.3
France	*1960-1979*	14.0	16.0	14.1	50.0	90.0	68.0	7.0	14.4	9.6
	after 1980	16.0	16.0	16.0	84.0	100.0	93.3	13.4	16.0	14.9
Switzerland	*1960-1979*	6.0	10.0	8.6	0.0	0.0	0.0	0.0	0.0	0.0
	after 1980	10.0	16.0	12.4	0.0	80.0	12.9	0.0	11.2	1.8
Austria	*1960-1979*	12.0	16.0	13.2	100.0	100.0	100.0	12.0	16.0	13.2
	after 1980	16.0	16.0	16.0	100.0	100.0	100.0	16.0	16.0	16.0
Italy	*1960-1979*	17.0	23.7	21.3	80.0	80.0	80.0	13.6	18.9	17.1
	after 1980	21.5	23.7	21.9	80.0	82.0	80.1	17.2	18.9	17.5
Spain	*1960-1979*	12.0	14.0	12.3	60.0	75.0	69.7	7.2	10.5	8.6
	after 1980	14.0	16.0	15.3	75.0	100.0	88.7	10.5	16.0	13.7
Greece	*1960-1979*	12.0	12.0	12.0	50.0	50.0	50.0	6.0	6.0	6.0
	after 1980	12.0	17.0	14.7	50.0	50.0	50.0	6.0	8.5	7.4

Table 2. The impact of >12 weeks of full-working wage of benefits at time of first birth on health

	ADL score	IADL score	Mobility score	Euro-depression	Grip strength	Breast cancer
	b/se	b/se	b/se	b/se	b/se	b/se
In work	0.0117	0,0360*	0,1663***	0.0758	-0,3943*	-0.0058
	(0,0149)	(0,0177)	(0,0487)	(0,0523)	(0,1653)	(0,0037)
>12 weeks benefits	0.0319	0,1057***	0,3032***	0,2578***	-0.3769	-0.0084
	(0,0229)	(0,0274)	(0,0687)	(0,0754)	(0,2280)	(0,0054)
>12 weeks benefits*in work	0.0106	-0.0397	-0,1456*	-0,1974**	0.3596	0.0022
	(0,0199)	(0,0236)	(0,0644)	(0,0717)	(0,2195)	(0,0049)
Age	-0,0764***	-0,1294***	-0,1148***	-0,0637*	0.0589	0.0024
	(0,0102)	(0,0132)	(0,0246)	(0,0271)	(0,0784)	(0,0013)
Age squared	0,0007***	0,0011***	0,0014***	0,0005**	-0,0030***	0
	(0,0001)	(0,0001)	(0,0002)	(0,0002)	(0,0006)	(0,0000)
Age of first child	-0.0008	-0.0009	-0,0151***	-0.0066	0,0291*	0.0004
	(0,0010)	(0,0012)	(0,0035)	(0,0040)	(0,0118)	(0,0003)
High-school education	-0,0605***	-0,1245***	-0,5205***	-0,4134***	-0,5229***	0.0014
	(0,0118)	(0,0139)	(0,0387)	(0,0428)	(0,1295)	(0,0026)
College education	-0,1003***	-0,1694***	-0,6870***	-0,6089***	-0,9447***	-0,0129***
	(0,0122)	(0,0143)	(0,0438)	(0,0497)	(0,1609)	(0,0037)
Total work tenure	-0,0011*	0,0028***	0,0099***	0,0070***	0,0123**	0
	(0,0004)	(0,0005)	(0,0014)	(0,0016)	(0,0047)	(0,0001)
Denmark	0.0252	0,0787***	0,1172*	0,1793**	-4,1600***	0.0065
	(0,0195)	(0,0201)	(0,0581)	(0,0645)	(0,2682)	(0,0063)
Italy	-0.0287	0.0101	0,4205***	0,8223***	-4,9374***	0.0041
	(0,0233)	(0,0237)	(0,0714)	(0,0779)	(0,2772)	(0,0060)
Germany	-0.0043	-0.0104	0,3448***	0,2470***	-1,8978***	-0.0045
	(0,0186)	(0,0185)	(0,0664)	(0,0669)	(0,2825)	(0,0060)
Netherlands	0.0086	0,1230***	0,2280**	0,2523**	-1,2015***	-0,0154*
	(0,0231)	(0,0265)	(0,0751)	(0,0775)	(0,3094)	(0,0064)
Belgium	0,0603*	0,1172***	0,3183***	0,6891***	-1,8682***	-0.0016
	(0,0251)	(0,0275)	(0,0744)	(0,0795)	(0,3014)	(0,0067)
France	0.0142	0,0741***	0,3118***	0,9965***	-4,0827***	-0.0057
	(0,0201)	(0,0204)	(0,0612)	(0,0711)	(0,2627)	(0,0056)
Austria	-0.0317	0,0955**	0,3130***	0.0224	-1,2729***	-0,0186**
	(0,0288)	(0,0353)	(0,0938)	(0,0951)	(0,3478)	(0,0062)
Spain	0,0658*	0,1143***	0,9007***	1,3173***	-7,4514***	-0,0251***
	(0,0287)	(0,0319)	(0,0855)	(0,0923)	(0,3082)	(0,0061)
Greece	-0.0244	0.0347	0,4595***	-0.1603	-4,2500***	-0,0232***
	(0,0246)	(0,0269)	(0,0786)	(0,0847)	(0,3044)	(0,0062)
_cons	2,3042***	3,8588***	3,5872***	4,3767***	38,9117***	-0.0707
	(0,3114)	(0,4007)	(0,7794)	(0,8873)	(2,6179)	(0,0432)

N obs	18788	18788	18790	18619	18085	19490

* p<0.05, ** p<0.01, *** p<0.001

Sample is restricted to women with at least 1 child and includes all childbirths; exposure to maternity leave benefits is at the time of childbirth

Standard errors are clustered at the mother level

Table 3. The impact of total number of full-working wage weeks of benefits at time of first birth on health

	ADL score	IADL score	Mobility score	Euro-depression	Grip strength	Breast cancer
	b/se	b/se	b/se	b/se	b/se	b/se
In work	0.0036	0.0492	0,1575*	0,2405**	-0,8751**	-0.01
	(0,0260)	(0,0305)	(0,0804)	(0,0902)	(0,2906)	(0,0069)
>12 weeks benefits	0.0012	0,0077**	0,0246***	0,0298***	-0.0459	-0.001
	(0,0020)	(0,0024)	(0,0062)	(0,0072)	(0,0245)	(0,0006)
>12 weeks benefits*in work	0.001	-0.0025	-0.0047	-0,0208**	0,0522*	0.0004
	(0,0019)	(0,0022)	(0,0057)	(0,0066)	(0,0220)	(0,0005)
Age	-0,0760***	-0,1290***	-0,1147***	-0,0644*	0.0599	0.0023
	(0,0102)	(0,0131)	(0,0245)	(0,0270)	(0,0784)	(0,0013)
Age squared	0,0007***	0,0011***	0,0014***	0,0006**	-0,0030***	0
	(0,0001)	(0,0001)	(0,0002)	(0,0002)	(0,0006)	(0,0000)
Age of first child	-0.0006	-0.001	-0,0169***	-0,0085*	0,0295*	0.0005
	(0,0010)	(0,0012)	(0,0035)	(0,0041)	(0,0121)	(0,0003)
High-school education	-0,0610***	-0,1263***	-0,5270***	-0,4170***	-0,5259***	0.0015
	(0,0117)	(0,0139)	(0,0387)	(0,0428)	(0,1295)	(0,0026)
College education	-0,1003***	-0,1698***	-0,6896***	-0,6098***	-0,9430***	-0,0129***
	(0,0122)	(0,0142)	(0,0438)	(0,0497)	(0,1609)	(0,0037)
Total work tenure	-0,0011*	0,0027***	0,0095***	0,0069***	0,0128**	0
	(0,0004)	(0,0005)	(0,0014)	(0,0016)	(0,0048)	(0,0001)
Denmark	0.0394	0,1255***	0,2990***	0,3056***	-4,2085***	0.0009
	(0,0238)	(0,0247)	(0,0739)	(0,0801)	(0,3274)	(0,0071)
Italy	-0.0116	0,0525*	0,5670***	0,8906***	-4,9300***	0.0008
	(0,0242)	(0,0250)	(0,0733)	(0,0782)	(0,2808)	(0,0063)
Germany	0.0044	0.0183	0,4664***	0,3193***	-1,8902***	-0.0079
	(0,0229)	(0,0229)	(0,0756)	(0,0745)	(0,3105)	(0,0066)
Netherlands	-0.0013	0,1097***	0,2432**	0,2495***	-1,0855***	-0,0154*
	(0,0240)	(0,0258)	(0,0751)	(0,0755)	(0,3185)	(0,0065)
Belgium	0,0544*	0,1262***	0,4101***	0,7626***	-1,8483***	-0.004
	(0,0275)	(0,0287)	(0,0811)	(0,0854)	(0,3436)	(0,0072)
France	0.0281	0,1215***	0,4957***	1,1219***	-4,1310***	-0.0112
	(0,0249)	(0,0253)	(0,0757)	(0,0837)	(0,3167)	(0,0067)
Austria	-0.0318	0,1042**	0,3799***	0.0555	-1,2198***	-0,0202**
	(0,0302)	(0,0361)	(0,0978)	(0,0971)	(0,3626)	(0,0065)
Spain	0,0609*	0,1210***	0,9805***	1,3818***	-7,4237***	-0,0275***
	(0,0308)	(0,0326)	(0,0918)	(0,0973)	(0,3471)	(0,0069)
Greece	-0.0255	0.0617	0,6123***	-0.0252	-4,3024***	-0,0282***
	(0,0310)	(0,0327)	(0,0969)	(0,1010)	(0,3855)	(0,0078)
_cons	2,2882***	3,7801***	3,3084***	4,0781***	39,2547***	-0.0585

	(0,3096)	(0,3975)	(0,7789)	(0,8850)	(2,6340)	(0,0447)
N obs	18788	18788	18790	18619	18085	19490

* p<0.05, ** p<0.01, *** p<0.001

Sample is restricted to women with at least 1 child and includes all childbirths; exposure to maternity leave benefits is at the time of childbirth

Standard errors are clustered at the mother level

Table 4. The impact of >12 weeks of full-working wage of benefits at time of first birth on health (only first childbirth)

	ADL score	IADL score	Mobility score	Euro-depression	Grip strength	Breast cancer
	b/se	b/se	b/se	b/se	b/se	b/se
In work	0.0122	0.0183	0.1282	0.1511	-0.2938	-0.0031
	(0,0203)	(0,0252)	(0,0719)	(0,0808)	(0,2587)	(0,0057)
>12 weeks benefits	0.0342	0.0756	0,3332**	0,3961**	-0.1124	-0.0107
	(0,0321)	(0,0397)	(0,1150)	(0,1358)	(0,4167)	(0,0095)
>12 weeks benefits*in work	-0.0244	-0.031	-0,2370*	-0,4090***	0.2378	0.0061
	(0,0276)	(0,0352)	(0,1049)	(0,1242)	(0,3747)	(0,0084)
Age	-0,0465**	-0,0630***	-0,1227**	0.0103	0.0627	0,0053*
	(0,0161)	(0,0167)	(0,0428)	(0,0475)	(0,1440)	(0,0024)
Age squared	0,0004**	0,0006***	0,0015***	0	-0,0028*	0
	(0,0001)	(0,0001)	(0,0004)	(0,0004)	(0,0011)	(0,0000)
Age of first child	-0.001	-0.0022	-0,0230***	-0.0087	0.0386	0.0001
	(0,0016)	(0,0019)	(0,0058)	(0,0072)	(0,0215)	(0,0005)
High-school education	-0,0297*	-0,0708***	-0,3843***	-0,2573***	0,6872**	0.0019
	(0,0146)	(0,0184)	(0,0586)	(0,0685)	(0,2107)	(0,0044)
College education	-0,0463**	-0,0887***	-0,5175***	-0,4286***	1,2011***	0,0117*
	(0,0159)	(0,0199)	(0,0659)	(0,0788)	(0,2540)	(0,0058)
Total work tenure	-0.0009	-0,0025***	-0,0094***	-0,0054*	0.0141	0
	(0,0006)	(0,0007)	(0,0021)	(0,0024)	(0,0073)	(0,0002)
sweden	-0.0025	-0,0728*	-0,3837***	-0.0503	2,7309***	0.0127
	(0,0298)	(0,0329)	(0,1048)	(0,1170)	(0,4565)	(0,0090)
denmark	0.0129	-0.0183	-0,2468**	0.1762	-1,2529***	0,0196*
	(0,0297)	(0,0357)	(0,0955)	(0,1085)	(0,3614)	(0,0091)
germany	-0.0031	-0,0890**	-0.144	0,2342*	0,9512**	0.0129
	(0,0278)	(0,0317)	(0,1021)	(0,1078)	(0,3520)	(0,0087)
belgium	0.0189	0.0044	-0.089	0,6122***	1,2107***	0,0201**
	(0,0199)	(0,0269)	(0,0788)	(0,0936)	(0,3147)	(0,0069)
france	0.0022	-0.0332	-0.0897	1,0068***	-1,1210***	0.0122
	(0,0297)	(0,0336)	(0,0996)	(0,1178)	(0,3313)	(0,0076)
austria	0.0174	0.0128	-0.0453	0.082	1,4617**	0.0006
	(0,0432)	(0,0577)	(0,1489)	(0,1493)	(0,4914)	(0,0081)
italy	-0.0264	-0,0864*	-0.0922	0,7104***	-1,6369***	0,0280**
	(0,0328)	(0,0395)	(0,1192)	(0,1434)	(0,4260)	(0,0100)
spain	0.0319	0.015	0,2681**	1,1334***	-3,8060***	-0.0034
_cons	1,3709**	1,9301***	4,2091**	1.7971	34,6126***	-0,1735*
	(0,4822)	(0,5018)	(1,3099)	(1,5188)	(4,6377)	(0,0742)
N obs	7020	7020	7021	6962	6788	7283

* p<0.05, ** p<0.01, *** p<0.001; Sample is restricted to women with at least 1 child and includes only the first childbirth; exposure to maternity leave benefits is at the time of first childbirth; standard errors are clustered at the mother level