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Job Loss and Health Spillovers in the Family

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Abstract

A sizable literature documents that displaced workers suffer substantial negative consequences in the labor market and health. These effects may extend to the partner or spouse through household decision-making. Using administrative data of all workers and firms matched to mortality and patient records, we document a stunning asymmetry: when a man loses his job in a plant closure, both the man and the spouse suffer negative health consequences. When a woman loses her job, in contrast, we find no such dire health consequences. We explore three explanations for this phenomenon: the role of spousal labor supply, the size of earnings and income losses, and the importance of family structure and gender roles. Spousal labor supply responses are very small despite limited insurance through public transfers. The size of income losses and gender roles seem to play a role for explaining the observed asymmetry.

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1 Introduction

A long line of research has documented that workers who lose their job in a plant closure or mass layoff have less stable jobs and lower earnings than non-displaced workers – even decades after the initial displacement (Ruhm 1991 Jacobson et al. 1993 Eliason and Storrie 2006 Couch and Placzek 2010 Huttunen et al. 2011). More recently, the literature has looked beyond the labor market to investigate health outcomes (Black et al. 2015 Browning et al. 2006 Eliason and Storrie 2009 Kuhn et al. 2009 Sullivan and von Wachter 2009). Sullivan and von Wachter (2009), for instance, document that displaced men suffer a substantially higher mortality risk, which seems closely related to their sizable earnings losses after displacement. Displacement is also associated with higher hospitalization rates among surviving men (Browning and Heinesen 2012). Whether women also face a higher mortality risk after they lose their job remains debated (Black et al. 2015 Eliason and Storrie 2009).

Yet, the negative consequences of job loss might not stop there if they spill over to other family members. Social sciences have long underscored how family interactions may shape outcomes of spouses, particularly in the context of labor supply, consumption or health (Becker 1991 Browning 2014 Fadlon and Nielsen 2019). Yet, we do still lack a clear understanding of the size and nature of these intra-family spillovers.

Analyzing family spillovers is hampered by two key challenges. First, there is a scarcity of appropriate data matching labor market information with health and mortality records. We are able to match employer-employee data with detailed records on employment, earnings, public transfers and individual characteristics for every adult with cause-specific mortality records and administrative patient records over several decades. Most importantly, we can match couples irrespective of whether they are married or cohabitating using a unique identifier for the partner in the matched data. Throughout our analysis, we refer to cohabitation couples as spouses independently of their marital status.

A second challenge is that the incidence of job loss might be correlated with pre-displacement health risks because employers lay off workers with poor health or because declining industries employ less healthy workers, for instance. To address these concerns, we focus on workers laid off in plant closures that occurred during the deep recession that hit Finland after the collapse of the Soviet Union (figure ??). Plant closures during that period can be considered largely exogenous to workers’ idiosyncratic circumstances or performance, reducing concerns about reverse causality (e.g.

Huttunen and Kellokumpu 2016). We further control detailed industry and regional fixed effects to adjust for mortality risk or health services varying across space or sectors. Finally, we control for pre-displacement education to account for the well-known health gradient in education as well as pre-displacement age and marital status to address the health effects of aging or relationship changes. Our estimates confirm that workers displaced in a plant closure during 1991 – 1993 and those not displaced during that period face similar mortality risk and hospitalization prior to the job loss.

We start out with documenting that job displacement has strong negative consequences for the health of the displaced workers as well as their partner. Yet, we demonstrate a stunning asymmetry in the health effects after job displacement: If a man gets displaced from his job due to a plant closure, the mortality risk for both him and his spouse increases. In contrast, if a woman loses her job in a plant closure, the mortality risk of the woman and her spouse remains unchanged. The increase in mortality risk for the displaced men is about twice as large as for his spouse. Yet, the percentage increase is similar for husband and wives. As the pattern is found in both single and dual earner couples, the asymmetry cannot be explained by differential health status of working and non-working spouses.¹

To shed more light on the observed health spillover, we turn to hospitalization records and cause-specific mortality data. We find that both men and their spouses are more likely to be treated for alcoholism and mental health issues than their non-displaced peers in the years after displacement. Displaced men are more likely to die from heart diseases both in the medium- and the long-run. These findings clearly indicate that the societal costs of job loss are much larger than the health and earnings losses for the displaced worker alone.

Our comprehensive data enable us to investigate several potential explanations for the observed asymmetry in health spillovers. Spouses might respond to their partner’s job loss by expanding their own labor supply. An increase in spousal employment would raise spousal earnings and family income, but could also imply heightened stress as more time is spent in the labor market. Spousal labor supply could explain the health asymmetry if men do not, but women do increase their labor supply after their partner’s job loss.

We find very small spousal labor supply responses both at the extensive and intensive margin

¹One recent study reports positive correlations between self-assessed mental health of spouses, which seem in part related to self-reported job troubles of one spouse (Bubonya et al. 2017). Yet, it is unclear whether the self-reported problems at work are the cause or rather the consequence of the mental health status. Our setting uses plant closures in a deep recession to tease out the direction of causality and shed light on the underlying causal mechanisms.

– irrespective of whether a man or a woman gets displaced. Ten years after displacement, spousal employment is between 1-2 percentage points or about 2% higher among spouses of non-displaced workers. Spousal annual earnings after male displacement rise by only 300-400 euros or about 2% in the long-run. We rule out that current economic or employment conditions account for the small labor supply response. While employment rates for men and women are high prior to displacement, spouses could adjust their labor supply at the intensive margin. Furthermore, similarly small spousal employment responses have been found in other settings with much lower employment rates among women (Halla et al. 2019).

The deep recession might have made it difficult for spouses to find a job or increase hours. The recession has some explanatory power in the first year after displacement, but cannot explain why spouses do not take up a job or increase working hours later on. The small response could also reflect leisure complementarities between spouses. Yet, these complementarities would need to have a very special feature: they would have to be health-promoting after a woman’s job loss but health-damaging after a man’s job loss.

A second channel for the observed asymmetry could be that men suffer larger earnings losses after displacement than women. A long-term decline in family resources reduces health-promoting activities or goods.² We find some support for this channel: the absolute decline in earnings is more severe after a man loses his job compared to a woman. Male earnings losses can explain up to 25% of the mortality increase for displaced men, but only 15% of the increase in spousal mortality. One reason economic resources play only a limited role is that families do not lose their health insurance after job loss. A second explanation for the limited role of earnings could be public insurance. If we take personal income, which includes public transfers, the actual loss in economic resources explains at most 15% of the rise in male or spousal mortality.

We provide additional evidence that gender roles and family structure play a role (Akerlof and Kranton 2000 Bertrand et al. 2015). Men who contribute less than 50% to family income tend to face a higher mortality risk after job loss than men who are the primary breadwinner.

@KRISTIINA: I WOULD NOT STATE THIS IN INTRODUCTION AS THIS IS PUZZLING FINDING- WE WOULD EXPECT THE OPPOSITE. Spousal mortality after male job loss, in contrast, is independent of the income share contributed. The differential responses depending on

²In principle, lower family income could reduce the intake of health-damaging goods like alcohol or smoking as well. The empirical evidence suggests that men smoke more after they lose their job, however (Black et al. 2015). Hence, the inward shift of the budget constraint after a job loss seems to reduce the demand for health resulting in fewer health investments and worse health status of the displaced and other family members (Grossman 1972 Deaton 2001).

relative earnings in the couple are not explained by differences in pre-displacement incomes or in earnings losses after displacement. However, spousal mortality after male job displacement depends on the presence of children in the household. A spouse faces a higher mortality risk if the couple does not have any dependent children living in the household. Hence, dependent children might act as an insurance device for women against the income and status loss after male displacement. We see no such insurance effect of children for men after they have lost their job.

@To the extent that stable relationships and marriages carry positive health benefits, a breakdown of the relationship increases the health risks for the couple. We find an increased risk of divorce immediately after the job loss, this short-run hazard is unlikely to explain much of the mortality spillover of male job loss (e.g. Charles and Stephens 2004 Halla et al. 2019 Rege et al. 2011 Mjörk et al. 2018).@

Our study makes several novel contributions. We contribute to the literature on the consequences of job loss.@ First, while several papers have documented that workers losing jobs in mass layoffs have worse health (Sullivan and von Wachter 2009) , our paper is the first one that studies whether these health consequences spillover to other family members. Our study contributes to a large literature on the income-health gradient (Adda et al. 2009 Banerjee et al. 2010 Deaton 2003 Smith 1999 Snyder and Evans 2006 Van Den Berg et al. 2006). The health gradient has been documented for many indicators like income, wealth or education and for a range of health indicators, including mortality, morbidity, measures of general health, health habits, and functional limitations. While the basic positive relationship between health and income is generally accepted, there is less consensus about the mechanisms driving the health-income relationship.³ We add to the literature that uses job displacement due to mass layoff (see e.g. Sullivan and von Wachter (2009)) as an exogenous shock to status and income to identify the health consequences for adults members in the household.

We contribute to the literature on family spillovers (Fadlon and Nielsen 2019 Hendren 2017). While Fadlon and Nielsen (2019) explore the consequences of unexpected health shocks on health behavior in the family, Hendren (2017) documents consumption and labor supply responses to future job loss.⁴ Our study investigates health spillovers in response to a severe labor market shock. We provide the first investigation why health spillovers following job displacement are highly persistent

³A few studies have explored exogenous shocks to income to get at the causal effect of income on health (Frijters et al. 2005 Lindahl 2005, see e.g.).

⁴Job loss may affect the children in the household: it is known to reduce fertility (Del Bono et al. 2012 Huttunen and Kellokumpu 2016), while the consequences for older children remain disputed (Rege et al. 2011 Hilger 2016 Mjörk et al. 2018 Page et al. 2019).

and asymmetric across gender. Our research also speaks to the literature on gender roles (Bertrand et al. 2015 Aizer 2010), which has showed that relative earnings or the gender gap affects couples' labor supply, household chores and domestic violence. Our analysis, in turn, shows that negative shocks to men's labor market careers and earnings have worse consequences if couples follow less traditional gender roles.

Finally, our study contributes to the literature on added worker or spousal labor supply responses. Early studies focused on whether female labor supply increases in response to a husband's unemployment spell. Most studies either found no or small responses (Lundberg 1985 Maloney 1987 Mincer 1962), though slightly larger responses in the long-run (Stephens, Jr. 2002). More recent analyses of spousal labor supply after job loss again find small effects (Goux et al. 2014 Halla et al. 2019). One potential explanation is that generous unemployment provisions crowd out spousal labor supply responses (Cullen and Gruber 2000 Hendren 2017). Yet, our results suggest that unemployment insurance provides only partial and temporary insurance against the persistent income losses of displacement. Yet, spousal labor supply responses are small even when we follow couples up to two decades after the initial displacement.

Our results show that the costs of job loss go way beyond the costs for the displaced person. The costs extend to the spouse through negative health consequences – but only after male job displacement. Public transfers, especially unemployment insurance, provide only partial and temporary insurance against the negative consequences of job displacement. As additional private insurance through spousal labor supply is limited, job displacement does reduce family welfare especially after the job displacement of men. Overall, our results indicate that beyond economic resources and family spillovers, there might be a strong psychological component of job loss through status loss or stigma.

The paper proceeds as follows. The next section discusses our linked data sources and the empirical strategy to assess the effects of job displacement on mortality. Section 3 shows the basic asymmetry in the health effects of job displacement by studying overall mortality, cause-specific mortality and hospitalization. Section 4 explores three potential mechanisms for the observed asymmetry: the role of spousal labor supply responses, earnings and income losses as well as family structure and gender roles. Section 5 discusses the implications of our findings and concludes.

2 Data and Empirical Strategy

2.1 Data Sources

We combine several administrative datasets covering the full population of residents and plants in Finland between 1988 and 2013. Three characteristics make the matched data uniquely suited for the analysis of health spillovers after job loss. First, data on the full population of plants and their workforce enable us to identify plant closures and distinguish them from breakups or other forms of restructuring (see the next section for details). Second, we observe the full labor market history as well as detailed mortality and hospitalization records for each person. Hence, we can track how a shock in the labor market translates into long-run health outcomes. Third, and most importantly, the data contain an identification number for spouses or partners. By linking the individual records between couples, we can study whether job displacement of one person has negative consequences for spousal health, labor supply or earnings.

We now describe each data source in more detail. Information on individual job histories, worker and plant characteristics come from the Finnish Longitudinal Employer-Employee Data (FLEED). For each individual, we observe employment status, education, occupation, industry and region of employment at the end of each year. We define an indicator for employment if the individual is employed in the current year and zero otherwise. We define five skill groups based on the level of formal education: compulsory education, upper secondary (including vocational training), lowest tertiary (some college), lower tertiary (Bachelor degree) or post-graduate education (Masters or Ph.D.). In addition, we distinguish between fields of education (e.g. natural sciences, social sciences and business, humanities and arts, health and welfare, agriculture and technology).

Based on the Id of the spouse, we can identify couples and link their labor market histories and earnings. The database further contains information on the number of dependent children in the household. A couple is separated in our data if a person no longer has the same spouse in some year compared to our reference year of job loss.

Earnings are measured as annual taxable labor income in the current year. We also observe annual taxable income, which includes transfers, such as unemployment or sickness benefits, pensions, as well as parental and child benefits.⁵ Family income is constructed by adding up the total taxable

⁵All individuals who have been employed and paid unemployment insurance for at least ten months over the two years prior to an unemployment spell are eligible for unemployment benefits. Unemployment benefits are on average 60 percent of the last gross earnings but get exhausted after 23 months (or 500 days). After exhaustion, individuals are eligible for a much lower transfer of around 22 percent of average monthly earnings.

income including transfers for both spouses. We use these data below to assess the importance of earnings and income losses for displaced workers, for instance.

To study mortality, we merge cause-of-death statistics from Statistics Finland to the employer-employee data using the unique person and partner Ids. The mortality statistics report all deaths and their detailed causes based on ICD-10 coding. We define cumulative mortality for each post-displacement year starting from one-year mortality and continue up to twenty-year mortality. The risk of dying twenty years after a displacement, for instance, is an indicator equal to one if an individual dies between the year of job loss t and $t + 20$; and zero otherwise. Mortality risk for other post-displacement years are defined accordingly. For the analysis of cause-specific mortality, we group causes of deaths into five broad classes: cancer, circulatory and heart disease, suicide, accidents (including traffic) and alcohol-related deaths. We define the cumulative twenty-year mortality, for instance, as an indicator equal to one if a person has died from cancer between base year t and $t + 20$; and zero otherwise.

To shed light on the broader health effects of job loss, we merge to our database the Finnish Hospital Discharge register from 1988 to 2013. The hospital discharge register provides complete and high-quality information about all inpatient consultations in Finland including the dates of hospital admissions, diagnosed medical conditions and medical operations. We group visits into six broad causes depending on the ICD code of the main diagnosis.⁶ In addition to the five causes for mortality (cancer, circulatory and heart disease, suicide, accidents and alcohol-related diseases), we also include visits because of mental health issues. Our outcome variables are indicators equal to one if individual had an inpatient visit, which was diagnosed by a specific cause, over a certain time period, and zero otherwise. Below, we study medium-run (between t and $t+5$ years) and long-run (between t and $t + 20$ years) effects on inpatient visit for each of the six specific causes.

2.2 Plant Closures and Sample of Displaced Workers

A key challenge in studying the consequences of job loss is how to identify a sample of displaced workers who, in the absence of a job loss, would have been very similar to non-displaced workers with respect to their labor market outcomes and future health risk. We focus in our main analysis on workers who got displaced because their plant had to close down during the great recession that hit Finland after the collapse of the Soviet Union. Figure ?? shows that Finland's GDP declined

⁶Diagnoses are coded using the ICD-9 classification until 1995 and ICD-10 classification since 1996. Validation studies have found the quality and completeness of the Finnish Hospital Discharge Register to be exceptionally high (Sund 2012).

by 11 percent after the breakdown of the export sector between 1990 and 1993. As a result, the unemployment rate quadrupled from 3.5 percent in 1990 to over 16 percent in 1993 with many workers losing their job because of plant closures and mass layoffs (Gorodnichenko et al. 2012). The sheer scope of the 1991-1993 recession makes job displacement a regular event ensuring that displaced workers are very similar to the average worker (Huttunen and Kellokumpu 2016).⁷

A plant closure can be considered as an exogenous shock to a worker’s career because all employees in a plant lose their job. Therefore, the job loss is not directly related to the worker’s prior job performance or prior health status. Using the data for all plants in the private sector with more than ten employees from 1990 to 1993, we define a plant closure if a plant is observed in the data in year t (say, 1991) but no longer observed in $t+1$ (say, 1992) or thereafter. To ensure that we capture a true plant closure and not merely a change in the plant identifier or a spin-off, we further impose a restriction that less than 70 percent of the individuals leaving a plant are observed in a single other plant in the following year. We then define workers as displaced if they were employed in a plant in t or $t-1$ that closed down between t and $t+1$. Plants might start to shed labor even before the actual plant closure, and some workers might quit and leave before the plant closes (see, e.g., Eliason and Storrie 2006 Pfann and Hamermesh 2008 Schwerdt 2011). To capture these early leavers, we include all workers who left their job between $t-1$ and t in a plant that closed down between t and $t+1$ in our sample of displaced workers.

It is important to point out that a job loss, independently of whether it was due to a plant closure, mass layoff or separation, does not imply the loss of health insurance for the displaced worker and the immediate family. Finland has publicly provided health care for all residents irrespective of employment. In addition, all employers provide occupational health services to their employees under the Occupational Safety and Health Care Act. If an employee loses her job, she will no longer have access to the occupational health services but still has full access to public health services.⁸

We restrict our sample to workers between the ages of 20 and 55 in the year of displacement due to plant closure with at least one year of tenure at their employer in the base year (which can be 1991, 1992 or 1993). We drop public sector employees because there are no plant closures in

⁷Workers who lose their job, in contrast, have worse unobservables than workers who remain employed (see, e.g., Gibbons and Katz 1991). Even workers who get displaced during an economic recovery or boom differ from the average worker among many observable and potentially unobservable characteristics (see, e.g., Davis et al. 2011).

⁸Quality differences across type of health care services seem to be small. There is some evidence that waiting times for doctor appointments are lower in the occupational health care system, however (see Karanikolos 2018, for a comprehensive survey of the Finnish health care system). Complex procedures like major operations are always performed within the public health care system for all patients.

the public sector. In addition, we study plant closures for plants with at least 10 and at most 1000 employees. We merge to this sample all spouses, who are at least 18 years old in the base year (1991, 1992 or 1993). Our sample is restricted to individuals with a spouse in base year t .

Based on plant closures during the 1991-1993 recession, we can trace the mortality risk and labor market performance of displaced workers for at least three years prior to and up to twenty years after the job loss. Our control group consists of non-displaced workers who satisfy the same sample restrictions with respect to age, tenure, plant size, sector and the presence of a spouse. Thus, the control group consists of individuals who remain with their current employer, but also of workers who are fired, get displaced or separate voluntarily from their employer after the 1991-1993 recession.

Figure ?? show raw annual earnings (in 1,000 euros) and employment for displaced and non-displaced workers. The top left panel compares earnings for displaced and non-displaced men, the top right panel for displaced and non-displaced women. Year zero refers to the year of the displacement (any of the recession years 1991, 1992 or 1993). The y-axis shows pre-displacement earnings (negative numbers) and the evolution of earnings after displacement (positive numbers). The bottom panels show the same comparisons for employment between displaced and non-displaced men and women, respectively.

The figures indicate that employment and earnings of displaced and non-displaced workers evolve very similarly prior to job loss supporting our argument that plant closures during the 1991-1993 recession were exogenous and unrelated to prior labor market performance for the displaced workers. The figures in the bottom panel suggest that workers who lost their job due to plant closure are less likely to be employed for up to ten years after the displacement. The figures in the top panel further reveal that displacement is also associated with sizable and persistent reductions in earnings relative to non-displaced workers.

Even if a plant closure is an exogenous event from the individual point of view, workers who lose their job due to plant closure may still systematically differ from workers who do not get displaced. Workers displaced in a plant closure may be less skilled, older or have other characteristics that increase their mortality risk. To check for such pre-displacement differences, table ?? compares observable characteristics for displaced and non-displaced workers prior to displacement. We find that displaced men have slightly lower, displaced women slightly higher, pre-displacement earnings than non-displaced men and women, respectively. Displaced workers are slightly younger and work in smaller plants. Hence, if anything, we would expect them to suffer lower earnings losses

after displacement than older, high-tenure workers with a good firm match. To adjust for the few observable differences, we include a comprehensive set of pre-displacement worker characteristics and earnings in our estimation (see section 2.3).

2.3 Empirical Strategy

2.3.1 Effects of Job Loss on Health and Mortality

To track health outcomes for displaced workers relative to non-displaced workers, we estimate variants of the following model:

$$Y_{i,t,\tau} = \gamma_{\tau} JobLoss_{i,t} + X_{i,t-1} \beta_{\tau} + \lambda_r + \theta_t + \epsilon_{i,t,\tau} \quad (1)$$

where $Y_{i,t,\tau}$ represents health outcomes (mortality or hospitalization) τ years after (or before) displacement for individual i who was employed or displaced in base year t . For all-cause or cause-specific mortality, the dependent variable is $Pr(Death_{i,t,\tau} = 1)$, which measures the cumulative mortality between the base year t and post-displacement period τ . To study hospitalization for specific causes, the dependent variable is an indicator $Pr(Visit_{i,t,\tau} = 1)$ equal to one if individual i had at least one hospital visit τ years post-displacement, and zero otherwise.

The main independent variable $JobLoss_{i,t}$ is an indicator equal to one if worker i was displaced in a plant closure between base year t and $t + 1$; the variable is equal to zero if she was not displaced in base year t (where $t = 1991, 1992$ or 1993). We include a set of individual and plant-level control variables $X_{i,t}$ to control for any observable differences prior to displacement. As individual characteristics, we control for a fourth-order polynomial in age in base year t , the level and field of education, labor market experience, firm tenure and earnings in base year t .

We further include plant size in base year t and industry fixed effects at the 2-digit level to account for different labor market prospects and health risks across plants and industries. We account for regional differences in labor market prospects or the quality of health services through region fixed effects (λ_r). Equation (1) further includes base year dummies (θ_t) to ensure that we compare displaced and non-displaced workers in the same base year t . Finally, we control for family structure prior to displacement as this might influence an individual's health and well-being: whether the individual is married and whether the individual has children in base year t . We also control for the following characteristics of the spouse or cohabitating partner in base year t : a fourth-order polynomial in age, the level and field of education and whether the spouse or partner was employed.

We allow for flexible health effects of job displacement by estimating equation (1) separately for each post-displacement year $0 < \tau \leq 20$ with a linear probability model. We then plot the γ_τ coefficients for the post-displacement period and the corresponding confidence intervals. Note that we cannot estimate mortality in the pre-displacement period ($\tau < 0$) because an individual has to be alive in the base year in order to be in the treatment or control group.

Our key identifying assumption in equation (1) is that health outcomes of displaced workers would have evolved similarly to non-displaced workers in the absence of displacement conditional on our control variables. This assumption implies that plant closures are uncorrelated with any unobservables that affect the health of the workforce. Note that any displacement effects on health cannot be explained by a worsening health infrastructure or declining industries as we control for region and detailed (2-digit) industry fixed effects.

To analyze the effect of job loss on spousal health, we estimate variants of the following model:

$$Y_{i*,t,\tau}^S = \gamma_\tau^S JobLoss_{i,t} + X_{i,t} \beta_\tau^S + \lambda_r^S + \theta_t^S + \epsilon_{i*,t,\tau}^S, \quad (2)$$

where the dependent variable $Y_{i*,t,\tau}^S$ are health outcomes (mortality or hospitalization) of the spouse i^* in year τ after i 's displacement. As above, $JobLoss_{i,t}$ is an indicator variable equal to one if person i who is married or cohabitates with person i^* was displaced from his or her job in base year t (where $t = 1991, 1992$ or 1993); and zero if he or she was not displaced in year t . The set of observable characteristics $X_{i,t}$ is the same as in equation (1) above.⁹

Estimating equation (2) separately for each post-displacement year τ , the coefficients γ_τ^S measure the cumulative effect of job displacement of person i on spousal i^* 's health within τ years of displacement relative to the mortality of spouses of non-displaced workers. The identifying assumption in equation (2) is that the outcomes of spouses of non-displaced workers are a valid counterfactual conditional on our control variables for the outcomes of spouses of displaced workers after displacement. One concern could be that the probability of job loss is correlated across spouses because the couple works in the same firm or same industry, for example. We address this issue when we discuss the empirical results below.

⁹In particular, we control for spousal level and field of education, a fourth-order polynomial in age and whether the spouse is employed (all variables measured in base year t). Note that we cannot and should not control for other labor market characteristics (like spousal experience, plant size or industry) because not all spouses are employed in base year t .

2.3.2 Effects of Job Loss on Employment, Earnings and Income

To explore the mechanisms for the observed health spillovers, we explore the role of income pooling and spousal labor supply. Here, we rely on an event study approach commonly used in the displacement literature (Jacobson et al. 1993 Davis et al. 2011 Huttunen et al. 2011). In particular, we estimate variants of the following model:

$$Y_{i,t,\tau} = \sum_{\tau=-3}^{20} \gamma_{\tau} JobLoss_{i,t,\tau} + X_{i,t,\tau} \beta + \alpha_t + \delta_{\tau} + \theta_i + \epsilon_{i,t,\tau} \quad (3)$$

where the dependent variable $Y_{i,t,\tau}$ is employment, annual earnings or annual income of worker i (or partner i^*) observed in period τ after the base year t . The key independent variables $JobLoss_{i,t,\tau}$ are indicators equal to one for individual i who was displaced in year t and period τ ; and zero otherwise. As equation (3) pools all pre- and post-displacement years, we estimate the effect relative to pre-displacement year $\tau = -3$ (hence, $\gamma_{-3} = 1$).

We include the same comprehensive set of control variables $X_{i,t,\tau}$ for the worker, spouse, region, plant and industry as in equation (1). We further add current age and age squared to control for age-earnings profiles. Fixed effects for time since displacement τ (δ_{τ}) and for each base year (α_t) absorb any potential level differences in employment, wages or income between displaced and non-displaced workers in different recession years t .¹⁰

Finally, we include individual fixed effects, θ_i . As such, we only require changes in outcomes (and not levels) of non-displaced workers to be a valid counterfactual for the outcomes of displaced workers in the absence of a plant closure. The fixed effects specification further ensures that our results are not driven by any compositional changes in the treatment or control group through selective withdrawal from the workforce. We show below that including fixed effects primarily improves the precision, but has little impact on the estimated coefficients. The close correspondence between estimates without and with fixed effects indicates that our displaced sample is not selected on time-invariant unobservables, which provides further support for our identification strategy.

The parameters of interest are γ_{τ} , which measure the changes in employment, earnings or income for displaced workers (or their spouses) relative to those for non-displaced workers (or their spouses) $-2 \leq \tau \leq 20$ years before or after displacement relative to $\tau = -3$. An additional advantage of the event study design is that we can compare displaced and non-displaced workers in pre-displacement

¹⁰One could even include base year (t) x post-displacement fixed effects (τ) interactions, which allows post-displacement earnings or incomes of individuals displaced early in the recession to evolve differentially than the earnings or incomes of those displaced later on. The estimates from this even more flexible specification are very similar to the ones reported here. As such, earnings and income dynamics after displacement do not appear to depend on whether a person got displaced earlier or later in Finland's great recession.

years in order to provide suggestive evidence for our identifying assumption. The coefficients γ_{-2} , γ_{-1} and γ_0 in equation (3) should be close to zero and statistically insignificant.¹¹

3 Empirical Results

3.1 Mortality Effects for the Displaced Worker

We first examine the direct effect of job loss on mortality. Studying the mortality risk for those displaced in a plant closure is interesting in its own right and aids in interpreting the results on spousal mortality. If we find no adverse impact on mortality or health for the displaced worker, we would not expect to see sizable health spillovers on the spouse or cohabitating partner.

The top panel of Figure ?? plots the coefficients and 95 percent confidence intervals from estimating equation (1) for cumulative mortality from all causes within τ years after job loss. Displaced men (shown in the top panel) have a higher mortality risk than non-displaced men in all post-displacement years. Losing one’s job does not only carry negative health consequences in the short-run but reduces the life expectancy of displaced men permanently.

We find a strikingly different pattern for women shown in the bottom panel of figure ?. Losing the job in a plant closure has no impact on women’s mortality risk. The estimates are even slightly negative in the first three years after displacement suggesting some small gains, possibly because of reduced stress and more time to invest in health-promotion activities. In the medium-run (after six post-displacement years), estimates become positive, but are much smaller than for men and never reach statistical significance.

To quantify the displacement effect, we report in table ?? estimates for cumulative five-year and twenty-year mortality. The dependent variables are the same as in the graphs: mortality results after male job loss are shown in columns (1)–(2) and after female job loss in columns (3)–(4). The coefficients can be interpreted as the percentage point increase in mortality for displaced workers $\tau = 5$ or $\tau = 20$ years after job loss relative to the mortality risk for non-displaced workers over the same period.

In the medium-run, men who got displaced in a plant closure face a 0.16 percentage points or 23 percent (0.00160/0.00704) higher mortality risk than non-displaced men (column (1) in table ??).

¹¹While this condition is neither necessary nor sufficient for the absence of differential trends in the post-displacement period, it is commonly used to corroborate the absence of differential pre-trends (Kahn-Lang and Lang 2018). Another concern of event study designs like ours occurs if cohorts of individuals who are treated at different times are pooled (Abraham and Sun 2019). In our case, we only pool three recession years (1991-1993) and control for level differences in outcomes through base year fixed effects (α_t).

This higher mortality risk for displaced men persists even in the long-run (column (2)). Twenty years after displacement, the mortality risk is 0.77 percentage points or 13 percent ($0.00765/0.0586$) higher than for non-displaced men. The smaller long-run effect is likely explained by catch-up mortality among non-displaced men over time.¹²

The mortality effects we estimate for men are smaller in the first years after displacement than estimates for the United States (Sullivan and von Wachter 2009). One potential explanation is that workers in the United States lose their employer-provided health insurance after displacement; they might also suffer from larger income losses than Finnish men losing their job in a plant closure. We return to this issue when studying potential mechanisms in the next section. The long-run estimates for Finland and the United States are very similar, however.¹³

For women, there is no mortality effect whatsoever - neither in the medium- nor in the long-run (columns (3)–(4) of table ??). The five-year mortality risk is only 0.03 percentage points or 8 percent ($0.000262/0.00334$) higher than for non-displaced women, while twenty-year mortality is 0.1 percentage points or 3 percent ($0.00104/0.0322$) higher. None of these mean estimates reach statistical significance. Hence, displaced women have a slightly higher mortality risk than non-displaced women but the effect is only about one-third the mortality effect of displaced men in the medium-run and less than one-fourth in the long-run. In prior work, mortality effects for displaced workers are similar for men and women, but noisier, and hence, less statistically robust for women than for men (see, e.g., Eliason and Storrie 2009, for Sweden).

Overall, we confirm that a plant closure has sizable negative health consequences for those displaced. Yet, these negative effects are concentrated among displaced men, while we do not find any effect for displaced women.

¹²Martikainen et al. (2007) finds that an unemployment spell raises mortality more during economic booms than during recessions in Finland. Should our estimates therefore be interpreted as a lower bound of the true effect? We think not. Individuals who get displaced in a period of economic growth are much more negatively selected compared to the average non-displaced worker than individuals who lose their job in a plant closure during a recession. Hence, the larger estimates for displacements outside of recessions are likely the consequence that employed workers have better unobserved labor market outcomes or lower unobserved health risk than workers who become unemployed during an economic expansion.

¹³A Swedish study finds no effect on long-run mortality, but larger effects on five-year mortality than our study (Eliason and Storrie 2009). Yet, the Swedish study covers men between the ages of 25 and 65, while men in our sample are aged between 20 and 55 in the base year. Hence, there is more catch-up mortality of non-displaced workers in the Swedish sample over time (ten or more years after displacement) as male cohorts reach their retirement age.

3.2 Health Spillovers of Job Displacement

We now investigate whether job displacement has an impact on the health of the spouse of the displaced worker as well. Spillover effects are not only evidence for family spillovers in health but also imply that the societal costs of displacement are much higher than the damage suffered by the displaced worker. Figure ?? plots the coefficients and 95 percent confidence intervals from estimating the model in equation (2) separately for each post-displacement year. The dependent variable is now the mortality risk of the wife after the job displacement of her husband, and vice versa. Panel A shows that the mortality risk of women increases after her spouse gets displaced. The coefficients are consistently larger than zero and statistically significant eight years after the husband's job loss. The elevated mortality risk stabilizes about a decade after displacement. Surprisingly, Panel B of figure ?? suggests no such dire consequences for the husbands of displaced wives. Difference in mortality hovers close to zero within the first decade after job loss and never gets statistically significant within twenty years after the wife's displacement.

Table ?? quantifies the spillover effects of job loss on spousal mortality in the medium- and long-run. The estimates indicate that male job loss raises spousal mortality risk by about 0.1 percentage points or 29 percent ($0.00105/0.00368$) in the first five years after displacement. The cumulative effect is even 0.4 percentage points in the long-run. Yet, because of catch-up mortality, displacement contributes just 13 percent ($0.00380/0.030$) to the long-run mortality of spouses of displaced men.

For displaced women, we find no mortality effect for husbands in the medium- and long-run (see columns (3)–(4) of table ??). The coefficients for husbands are by a factor of ten smaller than the mean effect for displaced men in table ??, while the standard errors are slightly larger. Spousal mortality after female displacement declines by about -5 percent ($-0.000595/0.0121$) in the medium-run and is close to zero ($-0.00054/0.0890$) in the long-run.

If we compare the direct effect and spillover effect of job loss, two interesting asymmetries emerge. After male job displacement, displaced men die at higher rates than their spouses relative to couples in which the man did not get displaced in a plant closure. A comparison of the percentage point increase in male mortality (shown in columns (1) and (2) of table ??) and spousal mortality (shown in columns (1) and (2) of table ??) reveals that mortality risk for displaced men is about twice as high as for their spouses. Yet, because male mortality is also higher, the percentage increase in mortality turns out to be quite similar for displaced men and their spouses. The picture

looks very different after a woman’s job loss: women suffer a higher mortality risk if their spouses lose their job than if they themselves are displaced. And if they are displaced, neither the woman nor the spouse face higher mortality risk.

Elevated spousal mortality after a man’s job loss might be explained by the correlated risk of job loss if spouses work in the same firm, industry or occupation, for instance. To address this concern, we re-estimate equations (1) and (2) and restrict the sample to couples where both partners were employed in the base year. The top panels of appendix figure ?? indicate that the direct effect of male job loss on male mortality in double earner couples is similar to those in the full sample, which includes couples with non-working spouses. The bottom panel of figure ?? reports the results while controlling for spousal job loss in the base year. The comparison is now between displaced and non-displaced workers conditional on whether their spouse lost their job. The result in the bottom panel shows that the health effects after male job loss conditional on spousal job loss are very similar to the overall effect shown in the top panels of figures ?? and ?. Hence, the increase in spousal mortality after male job displacement cannot be explained by the correlated risk of job loss.

Finally, plant closures mostly occur during recessions and might therefore displace workers who are the most exposed to stress or most vulnerable in terms of their health more broadly. To check this, we re-estimate how displacement affects mortality for a sample of workers who lost their job in a mass layoff. Mass layoffs by the employer, just like plant closures, should be largely exogenous to the health problems and career performance of individual workers prior to displacement. The mass layoff sample consists of all workers who lost their job at a plant that reduces its employment by more than 30 percent between t and $t + 1$.¹⁴ One advantage of using workers displaced in mass layoffs is that mass layoffs are more common than plant closures and also occur outside of recessions.¹⁵ Using displaced workers from mass layoffs, appendix figure ?? indicates that mortality of the displaced worker and their partners increase after male displacement though the effects are slightly smaller than in the plant closure sample.

¹⁴To define the mass layoff sample, we include all plants in the private sector with more than 50 employees in the base year t .

¹⁵Earnings losses of workers who get displaced in recessions tend to be more severe than for workers displaced in recoveries (Davis et al. 2011 Korkeamäki and Kyrrä 2014).

3.3 Cause-specific Mortality and Hospitalization Effects

To better understand the nature of the gender asymmetry in mortality risk after job loss, we turn to data on mortality by causes and health behaviors. We focus on five broad causes of deaths: cancer, heart disease, accidents, diseases related to alcoholism and suicide. As mortality might be a too extreme outcome to measure health effects, we also use patient records to shed light on health behaviors more broadly. We collapse the hospitalization data into six broad causes: the same five cases as for mortality (accidents, alcohol-related diseases, cancer, heart disease and suicides) and add mental health issues.

Hospitalization tells us more about the health behavior of displaced relative to non-displaced workers. The mortality and hospitalization effects after displacement might be positively or negatively correlated over time – even for the same cause of treatment or death. The two are negatively correlated if a displaced person is less likely to seek treatment and later dies from that specific cause (like suicide, for example). The two would be positively correlated if a job loss leads to illness, for which a person seeks treatment but still dies from it (like a heart attack, for instance). Finally, specific causes for hospitalization or mortality might also be correlated because of competing risks: a job loss might raise alcohol consumption, which in turn could trigger a heart attack later on.

For the analysis of cause-specific inpatient visits and mortality, we focus on displaced men and their spouses as the evidence on all-case mortality revealed no direct or spillover effects for displaced women.¹⁶ For the direct effect on men’s health, we re-estimate equation (1) where the dependent variables are now inpatient visits and medical treatment for a specific cause (measured within five or twenty years after displacement) or mortality from a specific cause (measured by an indicator if the died within five or twenty years after the displacement). We then use the corresponding outcomes for spouses of those men to investigate spillover effects on cause-specific inpatient visits and mortality using equation (2).

The results on hospitalization confirm that job loss is a substantial psychological burden involving stigma, stress and the loss of self worth. Displaced men are more likely to be treated for diseases related to alcohol intake and mental health issues than their non-displaced peers (see table ??). These two causes raise the likelihood of alcohol-related diagnosis by 19 percent (0.0014/0.0074)

¹⁶The long-run results on cause-specific mortality and inpatient visits after women’s job loss are contained in appendix tables ??, ?? and ??. Confirming the null effect on all-cause mortality, the cause-specific mortality and hospitalization estimates do not reveal any statistically significant relationships between female displacement and the long-run health of the displaced women or their spouses even twenty years after the displacement.

and mental health diagnosis by 17 percent (0.00213/0.0127) in the medium-run.¹⁷ These estimates should not be thought of as the cumulative risk of hospitalization because of competing risks: higher alcohol consumption might also raise the occurrence of mental health issues and vice versa. The higher incidence of inpatient visits for these causes disappears in the long-run as non-displaced workers catch up on inpatient visits (see appendix table ??).

Turning to mortality, table ?? shows that displaced men are more likely to die from cardiovascular disease both in the medium- and long-run. The risk to die from heart diseases is a stunning 45 percent (0.00081/0.0016) higher in the medium-run (see column (4)), while displaced men are still 17 percent (0.0028/0.0165) more likely to die from heart disease than their non-displaced peers in the long-run (see column (9)). In addition, we observe (in column (10)) more suicides among displaced men over the twenty-year period than among non-displaced men, an increase by 32 percent (0.00181/0.00558).¹⁸

Do spouses or partners of displaced men suffer from similar diseases and possibly die from similar causes? Table ?? shows that spouses are not immune to the stress of male job loss. Spouses are more likely to be treated for mental illness (see column (5)), an increase by 16 percent (0.00311/0.0194) in the medium-run ($t+5$).¹⁹ With respect to mortality, table ?? indicates spouses are more likely to die from accidents, which would include accidental suicides or accidents under the influence of alcohol or drugs. While the effect is visible in the medium-run (see column (1)), it amounts to a sizable and statistically significant 44 percent (0.00081/0.00186) increase in mortality in the long-run (see column (6)) compared to the spouses of non-displaced workers.

4 Explaining the Gender Asymmetry in Health Spillovers

Our results so far show that job loss is bad for the long-run health and life expectancy of the displaced worker. Yet, the dire consequences do not stop there. Job loss has persistently negative consequences for the spouse of the displaced worker as well. Surprisingly, negative health spillovers only occur when men lose their job; we find no evidence of persistent negative health consequences after women lose their job. How can we explain the asymmetry in health spillovers by gender? In

¹⁷Studying health care expenditures rather than mortality or inpatient visits also finds that health care spending, esp. for anti-depressants, increases for men but not women after a displacement due to plant closure (Kuhn et al. 2009).

¹⁸That displaced men are more likely to die from external causes including suicides and accidents has also been found for Denmark and Sweden (Browning and Heinesen 2012 Eliason and Storrie 2009).

¹⁹Appendix table ?? shows that, in the long-run, spouses of displaced men are 16% (0.00211/0.0128) more likely to be treated for alcohol-related diseases than wives or partners of men who did not get displaced in the 1991-1993 recession.

this section, we explore three potential mechanisms for the observed pattern: spousal labor supply responses, losses in economic resources and the role of family structure and gender norms. We discuss each of them in turn.

4.1 Spousal Labor Supply

One potential explanation for the observed asymmetry is that spouses increase their own labor supply after the partner’s job loss. The literature on added workers and second earners has long stressed that spousal labor supply might be one mechanism to insure the family against unemployment and other negative labor market shocks (Lundberg 1985 Stephens, Jr. 2002 Halla et al. 2019). Additional spousal earnings could partially or fully compensate for the earnings losses of the displaced worker (see figure ??). Spouses who take up a job or work more hours likely face more work-related stress and have less time for health-promoting activities. Both could be detrimental for the couple’s health.

Spousal labor supply could explain the gender asymmetry in health spillovers if women increase their labor force attachment or earnings after male job loss, but men do not respond after female job loss. Such differential responses might be expected in an environment where women’s labor force attachment has traditionally been lower than men’s attachment. To estimate spousal labor supply responses, we use equation (??) but replace the dependent variable with employment or earnings of the spouse (i^*) of individual i . We include the same set of worker and spousal characteristics as before as well as fixed effects for the spouse. The coefficients γ_τ now identify spousal employment or earnings changes in year τ after i ’s displacement compared to the pre-displacement period ($t-3$) and relative to the partners of non-displaced workers.

The top left panel of figure ?? shows the employment response of women to the job loss of their husband or male partner, while the top right panel shows how male employment changes after the job loss of their wives or partners. For both men and women, we see initially a slightly negative employment response (1-2 years after the job loss of their spouses). Over time, the employment response becomes positive, but remains small. The short-run and longer-run effects on employment are very modest independent of the gender of the displaced worker, however. The short-run employment decline is between 1.5 percentage points (for female spouses) and 3 percentage points (male spouses). In the long-run, spousal employment increases by at most 1-2 percentage points in response to job displacement.

Relative to pre-displacement employment rates of around 75 percent for women of displaced men

(and even higher employment rates for men of displaced women), the extensive margin responses for both genders are economically negligible. To convert this into a participation elasticity, we follow Halla et al. (2019) and relate the absolute change in employment rates in year 5 after displacement (-0.011 percentage points) to the losses in husband’s earnings (-21 percent). The resulting (semi-) elasticity of $\eta^P = 0.04-0.05$ is very similar to the elasticity of women’s employment response after their husband’s displacement in Halla et al. (2019).

Turning to the intensive margin, we find similarly modest changes in spousal earnings after displacement (see the bottom panels of figure ??). For women, the coefficients are negative for the first eight years after male job loss and only then turn positive. Most of the estimates are not statistically significant, however. In the long-run (more than 15 years after their husband or partner got displaced), women’s earnings are about 300-400 euros higher than before displacement relative to the spouses of non-displaced workers. Yet, the rise in earnings is small; it amounts to a 1-2 percent (300/16700) increase relative to spousal earnings in the base year. There is no increase in male earnings in response to the displacement of their spouse. The coefficients are negative for the first ten years after the displacement of their spouses and then turn positive but remain close to zero.²⁰

Overall, there is no labor supply response of the husband after female job loss and a very modest labor supply response of the wife after male job loss. While asymmetric, the extensive and intensive labor supply responses after male job loss are way too small to explain the higher mortality of women after male job loss.

Why do we find small spousal response in the short-run and an even smaller response in the long-run? Is there simply no added worker effect in advanced economies with high employment rates of both genders? The small positive response in the long-run could be the result of the high employment rates of women and men prior to displacement. If most individuals work full-time, there might be little room left for an added worker effect or adjustments in working hours. We think that high employment rates are unlikely to be the sole reason for the small response at the extensive and intensive margin. Halla et al. (2019) report similar small effects for Austria, an environment with much lower female employment rates than in Finland.

²⁰Previous evidence suggest that labor supply responses are lower among women with very young children (Blundell et al. 2018 Halla et al. 2019). Unfortunately, we do not observe the exact age structure of the children but only the total number of dependent children under 18 in the household. Appendix table ?? shows that the spousal employment and earnings responses do not differ much for couples with (columns (1) and (2)) and without children (columns (3) and (4)). Similarly, the labor supply responses do not differ for couples with an above or below median number of children. Given that our spousal labor supply effects are very small in the full sample (where couples have children of all ages), the results cannot be explained by the presence of small children in the household.

The short-run negative response might be a consequence of studying a severe economic recession when employers prefer to downsize the number of employees than hire new employees. Figure ?? indeed suggests that women are more likely to lose their job after male job displacement. Yet, this recession effect is short-lived and vanishes after one or two years. As such, the lack of job opportunities during a deep recession cannot explain the small labor supply responses in the medium- or long-run. Figure ?? showed that employment rates of displaced workers catch up eventually, within fifteen years after displacement, with their non-displaced peers.

The negative short-run effect on spousal employment might also be explained by leisure complementarities between spouses. Leisure complementarities, as long as they are used for health-promoting activities, could explain why we find a small decline in mortality after female job loss for both displaced women and their spouses shortly after displacement (see figures ?? and ??). Yet, leisure complementarities cannot explain why mortality of men and their partners increase after male job loss (see figures ?? and ??). In order to explain the gender asymmetry in mortality effects, leisure complementarities in the couple would have to be used for health-promoting activities after a woman’s job loss, but for health-damaging activities after a man’s job loss. Such a pattern seems rather unlikely.

Finally, we might not observe much of a spousal labor supply response because private insurance through family members is crowded out by public insurance (Autor et al. 2019 Cullen and Gruber 2000). We investigate this mechanism in the next section.

4.2 Earnings and Income Losses

Negative health effects could also be the result of declining economic resources, which reduces the couple’s demand for health health-promoting goods or activities. Economic deprivation could explain the gender asymmetry if earnings losses are larger and more persistent after male than after female job loss. To explore the role of earnings, we use our event study design from equation (3) comparing changes in earnings for a displaced person in post-displacement year τ relative to the same individual prior to the job loss relative to changes in earnings for non-displaced individuals. Figures ?? plot the coefficients and confidence intervals.

The top two panels of figure ?? show the effect for annual earnings after male job displacement (panel (a)) and female job displacement (panel (b)). Male job loss causes substantial and persistent earnings losses. The strongest decline is observed in the third year after displacement where male annual earnings are 8.500 euros or about 26 percent ($= 8.500/33.200$) below his pre-displacement

earnings. Over a five-year period, displaced men lose 31.000 euros or about 18 percent of their total earnings capacity (see column (1) in appendix table ??). Male earnings never fully recover to pre-displacement levels even two decades after the initial job loss. Over the twenty-year period after displacement, the cumulative earnings loss amounts to 80.500 euros or 11 percent of total earnings capacity (see column (2) in appendix table ??).

Women also experience the strongest earnings decline in year three after displacement. Yet, the decline is with around 5.300 euros much lower than after male job loss. In percentage terms, however, the earnings losses are with 23 percent ($= 5.300/22.700$) remarkably similar for men and women. Cumulative earnings losses amount to 22.900 euros or 20 percent over a five-year and 51.200 euros or 11 percent over a twenty-period (see columns (3)–(4) in appendix table ??).

The sizable earnings losses need not translate into economic deprivation if earnings losses are compensated by private or public insurance. As spousal employment and earnings responses to job displacement are small (see Section (4.1)), private insurance mechanisms play only a very limited role. One reason for the absence of spousal response could be that public transfers like unemployment insurance compensates for the observed earnings losses. Panels (c) and (d) of figure ?? show the impact of job displacement on personal income, which includes public transfers like unemployment and sickness benefits.

Personal income declines by less than personal earnings, which underscores that transfers provide some insurance against the labor market shock. Yet, public insurance is only partial and temporary compared to the persistent earnings losses from job displacement. Over a five-year period, public transfer compensate for about one-third of the total earnings losses after male displacement.²¹

The insurance role of public transfers is even more modest in the long-run. The cumulative loss in personal income twenty years after male displacement is about 65,400 euros, which implies that public transfers compensate only 20 percent the earnings lost over this period (see column (6) of appendix table ??). For women, public transfer compensate almost half (44 percent) of the earnings losses in the medium-run, but only 22 percent in the long-run.²²

Panels (e) and (f) of figure ?? traces the dynamic effects of male job loss (panel (e)) and female

²¹The cumulative earnings loss in the first five years after male displacement is 31,000 euros; the cumulative personal income loss over the same period is 20,000 euros (see columns (1) and (5) of appendix table ??). Hence, the five-year loss in personal income is 35.5 percent ($11,000/31,000$) lower than the earning loss.

²²The cumulative earnings loss in the first five years after female displacement is 22.900 euros; the cumulative personal income loss over the same period is 12.800 euros (compare columns (3) and (7) of appendix table ??). Hence, the five-year loss in personal income is 44 percent ($10.900/22.900$) lower than the earning loss.

job loss (panel (f)) on annual family income. Family income contains earnings of both spouses plus public transfers. The graphs show that family income declines by less than the earnings of the displaced person, but exhibits a pattern very similar to personal income. The similar dynamic of personal and family income after displacement underscore the modest added worker effects documented in the previous section.

Public transfers might provide more insurance for the low-income population. Yet, this is not the case. Appendix figure ?? plots the direct and spousal mortality after male job loss separately for the low-income and high-income population (measured as base year income below/above the median). The figure shows two interesting patterns: the low-income population faces consistently higher direct and spousal mortality after job displacement. This result underscores the importance of economic resources for health and mortality. The graph further reveals that public transfers do not provide more insurance against earnings losses in the low-income population than in the rest of the working population.

Overall, our findings confirm that public transfers only partially insure workers against the sizable earnings losses after a job loss. Moreover, public transfers are only a temporary measure, while earnings losses after displacement are persistent and long-lasting. Family income never recovers after male job loss. After female job loss, family income recovers only because female earnings eventually return to their pre-displacement levels.

Based on our estimates, we can quantify how much the loss in economic resources can account for the rise in mortality of displaced men and their spouses. We hereby use the estimates of pre-displacement earnings (or income) in our mortality regression under the assumption that this correlation reflects the reduced-form effect of earnings on mortality. We use the log of pre-displacement earnings (or personal income) averaged over three years prior to displacement to proxy long-term economic resources (Sullivan and von Wachter 2009, following).

The calculations are shown in table ?. The mortality risk for displaced men increases by 23 percent relative to non-displaced men over the first five years after job loss.²³ The effect of pre-displacement log earnings on 5-year male mortality is -0.0022. Hence, the elasticity of 5-year mortality with respect to earnings for displaced men is -0.32. Raising earnings by 10 percent would then decrease 5-year mortality for displaced men by around 3 percent.

Displaced men lose 18 percent of their cumulative earnings over a five-year period. Multiplying

²³The coefficient of job displacement on 5-year mortality is 0.0016, while the baseline 5-year mortality rate is 0.007. Hence, $0.0016/0.007=0.227$.

the earnings losses with the elasticity of mortality with respect to earnings, earnings losses increase mortality by 5.57 percent over a five-year period. Relative to the total increase of 23 percent, earnings losses thus explain 25 percent of the increased mortality risk for displaced men (see column (1) of table ??). We obtain a very similar contribution of 22 percent for 20-year male mortality (see column (2) of table ??).²⁴ Earnings losses thus account for about one-fourth to one-fifth of the rise in male mortality after job displacement, which is much lower than the contribution of 50-75 percent reported for the U.S. (Sullivan and von Wachter 2009). The main reason is not that Finnish men have much lower earnings losses after displacement than displaced men in the U.S.. Earnings losses are actually quite similar in the two countries: they range from 11-18 percent in Finland and 15-20 percent in the U.S.. The main difference is that mortality responds much less to earnings in Finland than in the U.S. (the elasticities are around -0.3 in Finland but -0.5 in the U.S.). One likely explanation for the lower sensitivity is that workers in Finland, unlike their U.S. peers, do not lose health insurance after displacement.

We can go one step further by using the same calculation for personal income, which reflects more closely the loss of actual economic resources. Personal income can account for only 15 percent of the increase in (5-year or 20-year) mortality for displaced men, which is substantially lower than the contribution of 20-25 percent for earnings. The difference underscores that public insurance of job-related earnings losses partially shields a family from the negative consequences of job displacement. The smaller contribution of income suggests that job and earnings losses imply much more than the decline in actual economic resources. It likely reflects psychological stress or stigma associated with losing one's role as a provider for the family or in society more broadly.

Can earnings or income losses also explain the rise in spousal mortality after male job loss? Column (3) and (4) of table ?? indicate that spousal mortality does indeed respond to male earnings: the elasticity of spousal mortality is around -0.17 both in the short- and in the long-run – and thus half the elasticity of male mortality with respect to male earnings. Hence, male earnings losses (11-18 percent) increase spousal mortality by 3 percentage points in the medium-run and 1.9 percentage points in the long-run. Compared to the overall increase in spousal mortality (29 percent in the medium-run and 13 percent in the long-run), male earnings can thus explain between 11 and 15

²⁴Interestingly, the elasticity of mortality with respect to earnings does not change much with time elapsed since displacement (-0.27 for 20-year mortality compared to -0.33 for 5-year mortality). Yet, earnings losses become smaller in percentage terms over time (11 percent over a 20-year period rather than 18 percent over a 5-year period) as long-run earnings recover somewhat relative to their non-displaced peers. At the same time, catchup mortality among non-displaced men reduce the 20-year mortality differential to 13 percent (rather than the 23 percent over a 5-year period). The two catch-up effects together imply that earnings can explain between one-fifth to one-fourth of the elevated mortality risk for displaced men.

percent of the spillover effect on spousal mortality. The explanatory power of male income losses for spousal mortality is, just like for displaced men, again quite similar to the contribution of earnings.

The higher absolute losses in earnings and income after male job loss can thus explain why mortality increases a lot more for displaced men and their spouses than for displaced women and their spouses. Yet, two empirical facts suggest that economic deprivation is not the only reason for the observed health effects. The first one is that economic resources, measured by personal income, can explain a much smaller share of the mortality increase among displaced men than the loss of labor market earnings. The second result is that the loss in economic resources can explain little of the rise in spousal mortality after male job loss. Both findings indicate that the observed mortality effects after job loss also have a strong non-monetary component likely related to psychological stress or stigma and evident from the mental health and alcohol abuse problems documented above.

4.3 Family Structure and Gender Roles

A third explanation for the gender asymmetry in health spillovers after displacement is that the couple's relationship is less stable after male job loss. Such a pattern could emerge if male job loss poses more of a threat to perceived gender roles in the household or the couple's relationship than female job loss. Akerlof and Kranton (2000) introduced the idea that social categories, like husband and wife in a couple, come with a prescribed role or set of expected behavior following a long line of research in social psychology and sociology. From that perspective, a person who identifies with the social category would then incur psychic costs (and possibly negative health consequences) if it violates the associated prescribed behavior. Traditional gender roles prescribe the man to be the main breadwinner for the family; and women to focus on the household and the upbringing of children. Couples who do not follow these traditional roles seem to have less stable relationships, among others (Bertrand et al. 2015).

To investigate the effects of job loss on partnership stability, we use the same empirical model as in equation (1) where the dependent variable is now equal to one if a couple gets divorced or stops cohabitating by period τ ; and zero otherwise. To show the dynamics of marital stability after displacement, Figure ?? shows the estimates of male job loss (top panel) and female job loss (bottom panel) on the cumulative probability of breakup relative to those of non-displaced workers separately for each post-displacement years. More couples get divorced or separate in year 2 and 3 after male job loss. after female job loss, estimates are smaller and not statistically significantly

different from zero. Somewhat surprisingly, there is no elevated risk of divorce in the long-run. @Report instead t+5 and t+20 estimates (right now in appendix table A7)

@LATER:@ Could more equal gender roles also play a role for the evolution of couple’s health after male displacement? Intuitively, we would expect the direct mortality effect to be larger if a male breadwinner loses his job. Why? A man who is the main provider of financial income and loses his job in a plant closure does fail to fulfill his perceived gender role. The associated stigma or loss of status is then likely to have worse health consequences than for displaced men in couples with more equal income contributions. Moreover, mortality effects of displacement might be stronger for male breadwinners as working spouses earnings cannot easily compensate for the earnings loss of the displaced men.²⁵

Our empirical results confirm the first hypothesis of larger earnings and income losses after the male breadwinner gets displaced; yet, we find no support for the second hypothesis that male breadwinners face a higher mortality risk after displacement than other displaced men. Empirically, we follow Bertrand et al. (2015) and define the couple to have a male breadwinner if the man contributes more than 50% or more than the sample median (64%) to family income respectively. We then interact our job displacement variable with an indicator whether the man is the main breadwinner in the couple or not.

Table ?? shows an interesting pattern: Male mortality after male displacement tends to be *lower* if the man is the main breadwinner prior to displacement than displaced men in couples with more equal earnings shares. This pattern cannot explained by smaller earnings or income losses of male breadwinners after job displacement. Quite the contrary; we find support for our first hypothesis that earnings and personal income losses are actually larger for main breadwinners after male job displacement (see the top panel in appendix table ??).²⁶ This result can also not be explained by differential labor supply responses of spouses in couples with more or less equal earnings shares. Spousal labor supply responses are small in the overall sample (see Section 4.1, but also in couples with equal or unequal earnings shares (see bottom panel of appendix table ??).

The evidence in appendix table ?? thus supports the notion that total economic resources of double earners with roughly equal contributions are better insured against the earnings losses from

²⁵We might even expect that earnings losses are higher in the case of the male breadwinner if specialization in the couple allows the husband to accept attractive job opportunities or invest more in job-specific skills, for instance, than husbands in couples with more equal earnings shares.

²⁶Moreover, pre-displacement family income is about five percent lower in couples where the man contributes a higher share to family income. Hence, the effect cannot be explained by the lack of resources in couples where the husband is not the primary provider of family income.

job displacement. Despite smaller income losses, however, male mortality increases *more* after male displacement in couples with more equal roles. How can we explain this?

-pattern could be explained by higher divorce risk of equal-earning couples. If less traditional gender roles make relationships more vulnerable and this has negative consequences for health, couples with a more equal distribution of earnings should experience a higher mortality risk after male displacement than couples where the man is the primary earner. If that is the case, we should see that couples contributing equal shares to family income to face a higher risk of separation or divorce.

@spousal mortality@ Moreover, if it was economic resources alone, spousal mortality after male job displacement should increase more in couples with a male breadwinner than in other couples. Yet, mortality of the spouse or cohabitating partner follows a similar pattern independently of the man's contribution to family income (see columns (5)-(8) of table ??).

Is there any role for gender norms for spousal mortality as well? Indeed, there is. In figure ??, we re-estimate our baseline mortality model and split the sample whether the couple have dependent children in the household or not. Spousal mortality after male job loss tends to be higher in couples with no dependent children. In contrast, the mortality risk of displaced men is similar in couples with or without dependent children.²⁷ As before, the pattern cannot be explained by larger earnings or income losses after displacement as earnings losses are actually more pronounced for displaced men with children than for those without (see the top panel in appendix table ??).²⁸ This pattern suggests that the presence of children might work as an insurance device against the detrimental health effects of male displacement for the wife – but it does not work for the displaced man himself.

5 Discussion and Conclusion

A long line of research has shown that individuals that lose their job for exogenous reasons suffer severe earnings losses and negative health consequences in the short- and long-run. Economic theory suggests that these negative consequences might not be confined to the displaced worker but, through household decision-making, may spill over to the spouse as well. We start out with documenting a stunning asymmetry: when a man loses his job in a plant closure, both he and his

²⁷We find a very similar pattern if we split the sample by the median number of dependent children in the household instead.

²⁸While losses in income are initially slightly higher for those without children, this pattern gets reversed in the medium- and long-run. As before, we find little evidence and no heterogeneity for spousal labor supply responses after job displacement (see the results in the bottom panel of appendix table ??)

spouse suffer negative health consequences. When a woman loses her job, in contrast, we find no such dire health consequences.

Our investigation into the potential explanations for the health asymmetry shows that spousal labor supply responses are small, independently of whether the man or the woman gets displaced. The persistently small reaction cannot be explained by the deep recession or high initial employment rates. They are also not explained by a crowding out as public transfers only provide partial and temporary insurance against displacement losses.

More important are the sizable and persistent earnings losses associated with job displacement, which are larger after male than after female job displacement. Earnings losses are an important reason for men's higher mortality risk after male displacement, but less important to explain spousal mortality. Income losses are lower than earnings losses in the medium-run, but similar in the long-run suggesting temporary public insurance.

Three results indicate that the negative health consequences for displaced men go beyond economic deprivation. First, the fact that income losses explain less of male mortality after job displacement than earnings losses. Second, earnings or income losses can explain little of spousal mortality after male job loss. Third, poorer couples do exhibit similar elevated mortality risk after male job loss than richer couples. Hence, health of displaced men declines not only because of economic deprivation, but also because of the status loss and stigma associated with job loss. While status from work is strongly correlated with earnings, it is less correlated with income. This interpretation is in line with our finding that displaced men are much more likely to be hospitalized for alcohol and mental health problems in the years after job loss than their non-displaced peers.

Finally, we provide evidence that family structures and gender roles have an influence on whether displacement has negative health consequences for the affected couples. Men seem most vulnerable if they are not the primary breadwinner indicating that their sense of self-worth and well-being is strongly tied to their job and career. Wives, in turn, are most negatively affected by male job displacement if there are no dependent children in the household. Dependent children seem to be an insurance for the wife, but not the displaced man, suggesting that they derive their sense of self-worth more from the family than their husband's job.

References

- Abraham, Sarah and Liyang Sun (2019) “Estimating Dynamic Treatment Effects in Event Studies with Heterogeneous Treatment Effects,” Technical report, Working Paper, MIT.
- Adda, Jerome, James Banks, and Hans-Martin von Gaudecker (2009) “The Impact of Income Shocks on Health: Evidence from Cohort Data,” *Journal of the European Economic Association*, Vol. 7, pp. 1361–1399.
- Aizer, Anna (2010) “The Gender Wage Gap and Domestic Violence,” *American Economic Review*, Vol. 100, pp. 1847–1859.
- Akerlof, George A. and Rachel E. Kranton (2000) “Economics and Identity,” *Quarterly Journal of Economics*, Vol. 115, pp. 715–753.
- Autor, David, Andreas Kostol, Magne Mogstad, and Bradley Setzler (2019) “Disability Benefits, Consumption Insurance, and Household Labor Supply,” *American Economic Review*, Vol. 109, pp. 2613–54.
- Banerjee, Abhijit, Esther Duflo, Gilles Postel-Vinay, and Tim Watts (2010) “Long-Run Health Impacts of Income Shocks: Wine and Phylloxera in Nineteenth-Century France,” *Review of Economics and Statistics*, Vol. 92, pp. 714–728.
- Becker, G. S. (1991) *A Treatise on the Family*: Harvard University Press.
- Bertrand, M., E. Kamenická, and J. Pan (2015) “Gender Identity and Relative Income within Households,” *Quarterly Journal of Economics*, Vol. 130, pp. 571–614.
- Black, Sandra E., Paul J. Devereux, and Kjell G. Salvanes (2015) “Losing Heart? The Effect of Job Displacement on Health,” *Industrial and Labor Relations Review*, Vol. 68, pp. 833–861.
- Blundell, Richard, Luigi Pistaferri, and Itay Saporta-Eksten (2018) “Children, Time Allocation and Consumption Insurance,” *Journal of Political Economy*, Vol. 126, pp. S73–S115.
- Browning, Martin, Anne Møller Dano, and Eskil Heinesen (2006) “Job Displacement and Stress-related Health Outcomes,” *Health Economics*, Vol. 15, pp. 1061–75.
- Browning, Martin and Eskil Heinesen (2012) “Effect of job loss due to plant closure on mortality and hospitalization,” *Journal of Health Economics*, Vol. 31, pp. 599–616.
- Browning, P.-A. Chiappori Weiss Y., M. (2014) *Economics of the Family*: Cambridge University Press.
- Bubonya, Melisa, Deborah A. Cobb-Clark, and Mark Wooden (2017) “Job loss and the mental health of spouse and adolescent children,” *IZA Journal of Labour Economics*, Vol. 6, pp. 1–27.
- Charles, Kerwin Kofi and Melvin Stephens (2004) “Job Displacement, Disability, and Divorce,” *Journal of Labor Economics*, Vol. 22, pp. 489–522.
- Couch, Kenneth A. and Dana W. Placzek (2010) “Earnings Losses of Displaced Workers Revisited,” *American Economic Review*, Vol. 100, pp. 572–589.
- Cullen, Julie Berry and Jonathan Gruber (2000) “Does Unemployment Insurance Crowd Out Spousal Labor Supply?,” *Journal of Labor Economics*, Vol. 18, pp. 546–72.

- Davis, Steven J., Till Von Wachter, and Till von Wachter (2011) “Recessions and the Costs of Job Loss,” *Brookings Papers on Economic Activity*, pp. 1–72.
- Deaton, Angus (2001) “Inequalities in Income and Inequalities in Health,” in Frank Welch ed. *The Causes and Consequences of Increasing Inequality*: University of Chicago Press.
- (2003) “Health, Inequality, and Economic Development,” *Journal of Economic Literature*, Vol. 41, pp. 113–158.
- Del Bono, Emilia, Andrea Weber, and Rudolf Winter-Ebmer (2012) “Clash of Career and Family: Fertility Decisions after Job Displacement,” *Journal of the European Economic Association*, Vol. 10, pp. 659–683.
- Eliason, Marcus and Donald Storrie (2006) “Lasting or Latent Scars? Swedish Evidence on the Long-Term Effects of Job Displacement,” *Journal of Labor Economics*, Vol. 24, pp. 831 – 856.
- (2009) “Does Job Loss Shorten Life?,” *Journal of Human Resources*, Vol. 44, pp. 277–302.
- Fadlon, Itzik and Torben Heien Nielsen (2019) “Family Health Behaviors,” *American Economic Review*, Vol. forthcoming.
- Frijters, Paul, John P. Haiken-DeNew, and Michael A. Shields (2005) “The Causal Effect of Income on Health: Evidence from German Reunification,” *Journal of Health Economics*, Vol. 24, pp. 997–1017.
- Gibbons, Robert and Lawrence F. Katz (1991) “Layoffs and Lemons,” *Journal of Labor Economics*, Vol. 9, pp. 351–380.
- Gorodnichenko, Yuriy, Enrique G Mendoza, and Linda L Tesar (2012) “The Finnish Great Depression: From Russia with Love,” *American Economic Review*, Vol. 102, pp. 1619–1644.
- Goux, Dominique, Eric Maurin, and Barbara Petrongolo (2014) “Worktime Regulations and Spousal Labor Supply,” *American Economic Review*, Vol. 104, pp. 252–276.
- Grossman, Michael (1972) “On the Concept of Health Capital and the Demand for Health,” *Journal of Political Economy*, Vol. 80, pp. 223–255.
- Halla, Martin, Julia Schmieder, and Andrea Weber (2019) “Job Displacement, Family Dynamics and Spousal Labor Supply,” *American Economic Journal: Applied Economics*, Vol. forthcoming.
- Hendren, Nathaniel (2017) “Knowledge of Future Job Loss and Implications for Unemployment Insurance,” *American Economic Review*, Vol. 107, pp. 1778–1823.
- Hilger, Nathaniel G. (2016) “Parental Job Loss and Children’s Long-term Outcomes: Evidence from 7 Million Fathers’ Layoffs,” *American Economic Journal: Applied Economics*, Vol. 8, pp. 247–83.
- Huttunen, Kristiina and Jenni Kellokumpu (2016) “The Effect of Job Displacement on Couples’ Fertility Decisions,” *Journal of Labor Economics*, Vol. 34, pp. 403–442.
- Huttunen, Kristiina, Jarle Møen, and Kjell G. Salvanes (2011) “How Destructive is Creative Destruction? Effects of Job Loss on Job Mobility, Withdrawal and Income,” *Journal of the European Economic Association*, Vol. 9, pp. 840 – 870.

- Jacobson, Louis S., Robert J. LaLonde, and Daniel G. Sullivan (1993) “Earnings Losses of Displaced Workers,” *American Economic Review*, Vol. 83, pp. 685–709.
- Kahn-Lang, Ariella and Kevin Lang (2018) “The Promise and Pitfalls of Differences-in-Differences: Reflections on ‘16 and Pregnant’ and Other Applications,” Technical report, NBER Working Paper No. 24857.
- Karanikolos, M (2018) “State of Health in the EU. Finland. Country Health Profile 2017,” *European Journal of Public Health*, Vol. 28, pp. cky213–594.
- Korkeamäki, Ossi and Tomi Kyrrä (2014) “A Distributional Analysis of Displacement Costs in an Economic Depression and Recovery,” *Oxford Bulletin of Economics and Statistics*, Vol. 76, p. 565588.
- Kuhn, Andreas, Rafael Lalive, and Josef Zweimüller (2009) “The Public Health Costs of Job Loss,” *Journal of Health Economics*, Vol. 28, pp. 1099–1115.
- Lindahl, M. (2005) “Estimating the Effect of Income on Health and Mortality using Lottery Prizes as an Exogenous Source of Variation in Income,” *Journal of Human Resources*, Vol. 40, pp. 144–168.
- Lundberg, Shelly (1985) “The Added Worker Effect,” *Journal of Labor Economics*, Vol. 3, pp. 11–37, DOI: <http://dx.doi.org/10.1111-37>.
- Maloney, Tim (1987) “Employment Constraints and the Labor Supply of Married Women: A Reexamination of the Added Worker Effect,” *Journal of Human Resources*, Vol. 22, pp. 51–61.
- Martikainen, Pekka, Netta Mäki, and Markus Jäntti (2007) “The Effects of Unemployment on Mortality following Workplace Downsizing and Workplace Closure: A Register-based Follow-up study of Finnish Men and Women during Economic Boom and Recession,” *American Journal of Epidemiology*, Vol. 165, pp. 1070–75.
- Mincer, Jacob (1962) “Labor Force Participation of Married Women,” in H. G. Lewis ed. *Aspects of Labor Economics*: Princeton University Press.
- Mjörk, Eva, Anna Sjögren, and Helena Svaleryd (2018) “Parental job loss and child human capital in the short and long run,” Technical report, IZA Discussion Paper.
- Page, M., J. Schaller, and D. Simon (2019) “The effects of Gender-Specific Labor Demand Shocks on Child Health,” *Journal of Human Resources*, Vol. 54, pp. 37–78.
- Pfann, Gerard A. and Daniel S. Hamermesh (2008) “Two-sided Learning with Applications to Labor Turnover and Worker Displacement,” *Jahrbücher für Nationalökonomie und Statistik*, Vol. 228, pp. 423–445.
- Rege, M., K. Telle, and M. Votruba (2011) “Parental Job Loss and Children’s School Performance,” *Review of Economic Studies*, Vol. 78, pp. 1462–1489.
- Ruhm, Christopher J. (1991) “Are Workers Permanently Scarred by Job Displacements?,” *American Economic Review*, Vol. 81, pp. 319–324.
- Schwerdt, Guido (2011) “Labor turnover before plant closure: Leaving the sinking ship vs. captain throwing ballast overboard,” *Labour Economics*, Vol. 18, pp. 93–101.

- Smith, James P. (1999) “Healthy Bodies and Thick Wallets: the Dual Relation between Health and Economic Status,” *Journal of Economic Perspectives*, Vol. 13, pp. 144–166.
- Snyder, Stephen E. and William N. Evans (2006) “The Effect of Income on Mortality: Evidence from the Social Security Notch,” *Review of Economics and Statistics*, Vol. 88, pp. 482–495.
- Stephens, Jr., Melvin (2002) “Worker Displacement and the Added Worker Effect,” *Journal of Labor Economics*, Vol. 20, pp. 504–537.
- Sullivan, Daniel and Till von Wachter (2009) “Job Displacement and Mortality: An Analysis Using Administrative Data,” *Quarterly Journal of Economics*, Vol. 124, pp. 1265 – 1306.
- Sund, Reijo (2012) “Quality of the Finnish Hospital Discharge Register: A Systematic Review,” *Scandinavian Journal of Public Health*, Vol. 40, pp. 505–515.
- Van Den Berg, Gerard J., Maarten Lindeboom, and France Portrait (2006) “Economic Conditions Early in Life and Individual Mortality,” *American Economic Review*, Vol. 96, pp. 290–302.

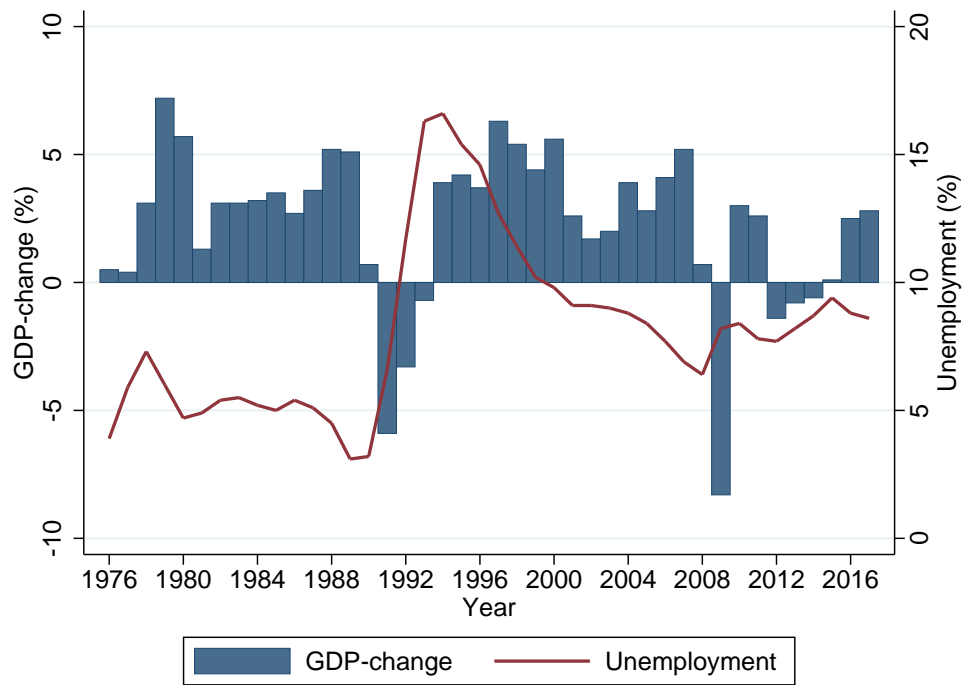
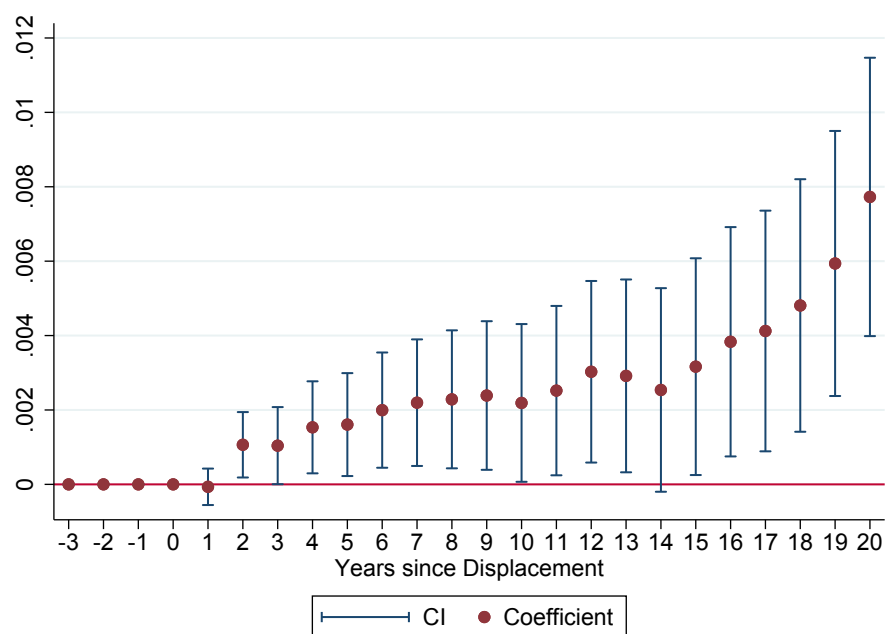


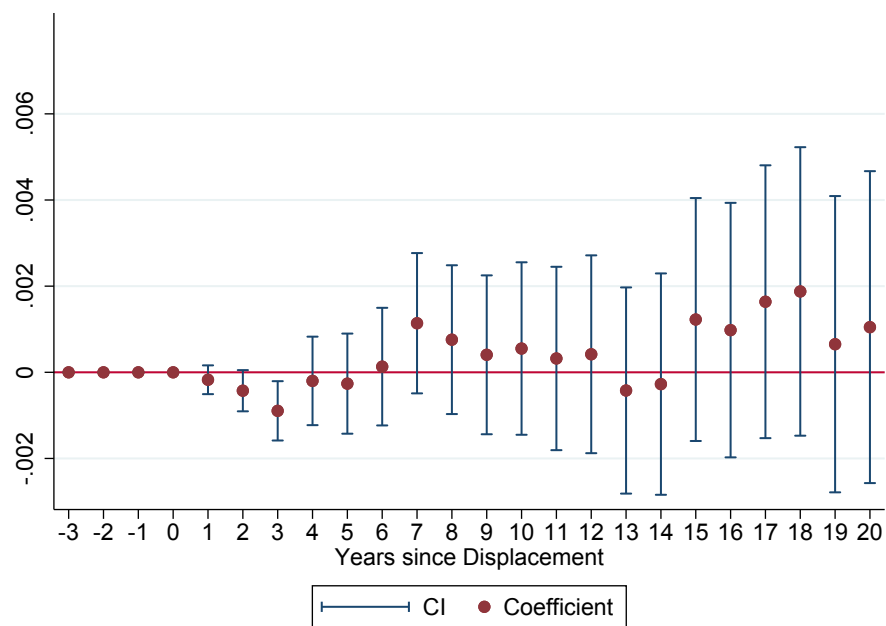
Figure 1: Unemployment and GDP during Finland's Great Recession



Figure 2: Earnings and Employment after Male and Female Job Loss

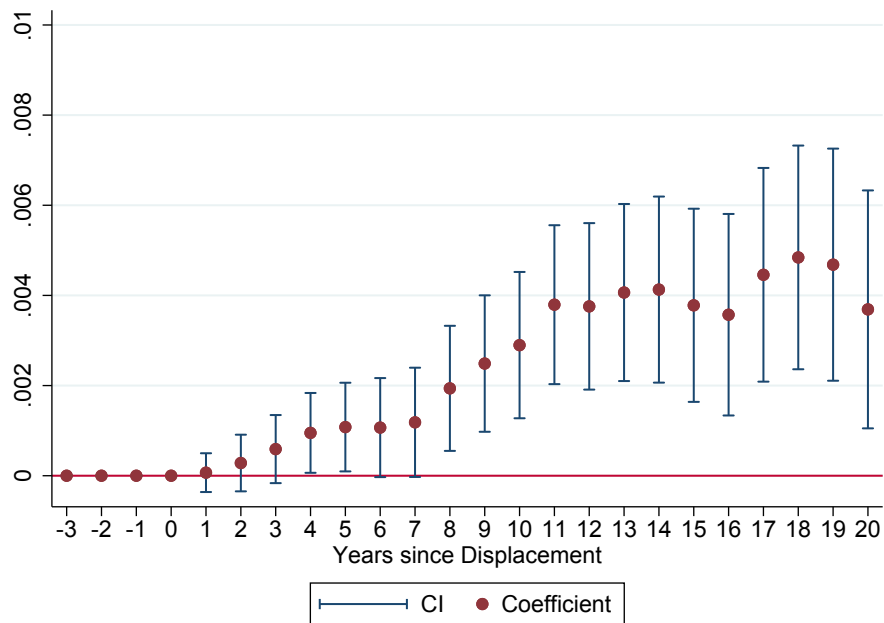


(a) Male Job Displacement and Male Mortality

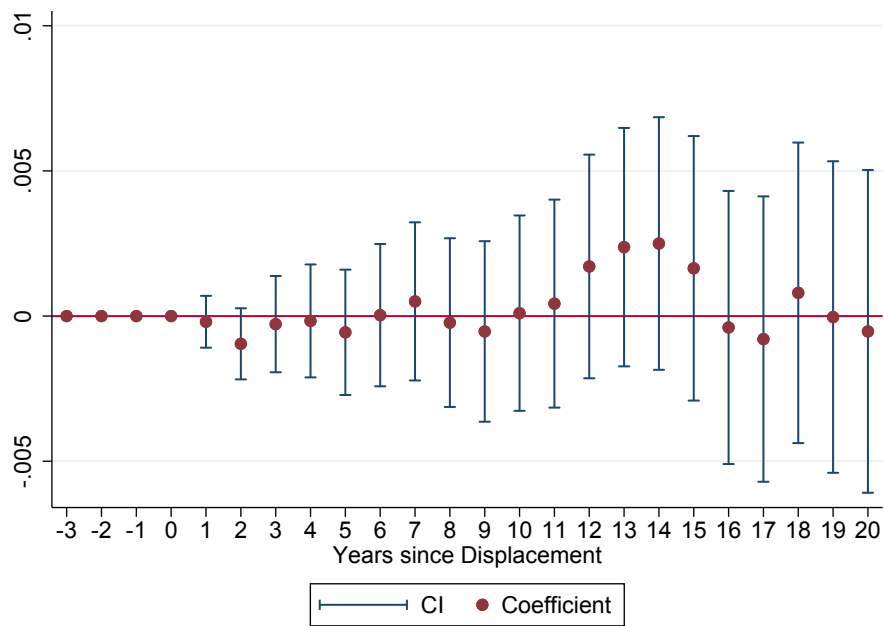


(b) Female Job Displacement and Female Mortality

Figure 3: Direct Mortality Effect of Job Displacement

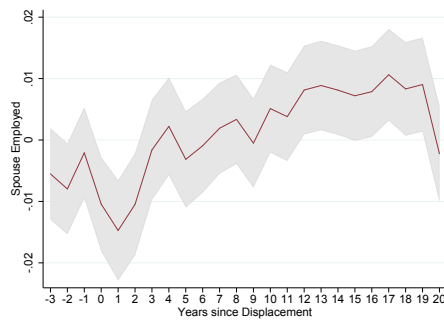


(a) Male Job Displacement and Spousal Mortality

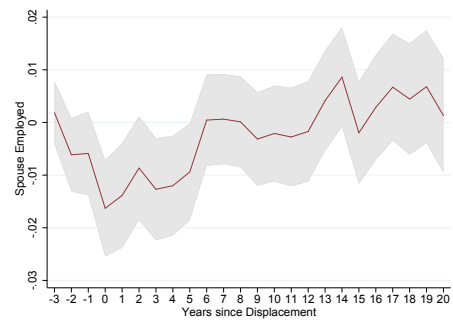


(b) Female Job Displacement and Spousal Mortality

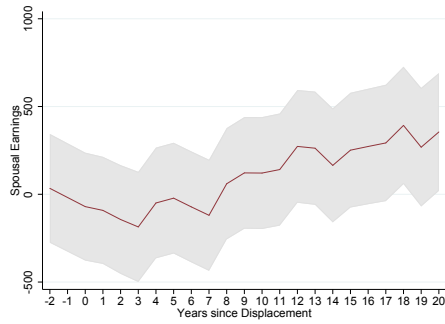
Figure 4: Spousal Mortality Effect of Job Displacement



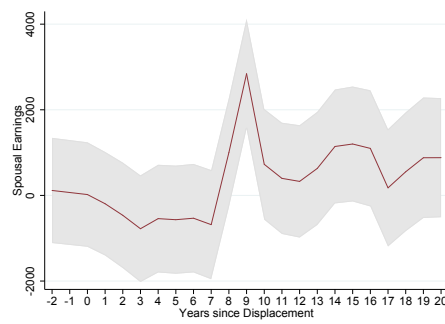
(a) Employment (Male Job Loss)



(b) Employment (Female Job Loss)

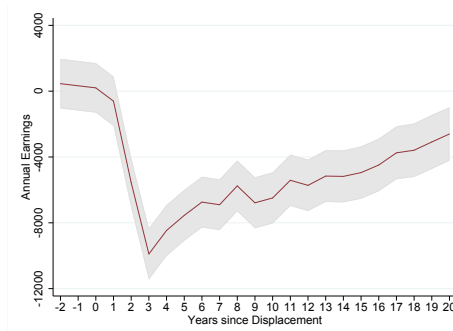


(c) Ann. Earnings (Male Job Loss)

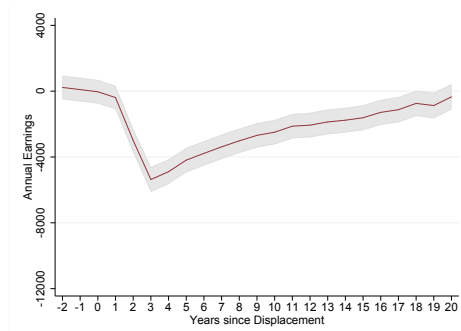


(d) Ann. Earnings (Female Job Loss)

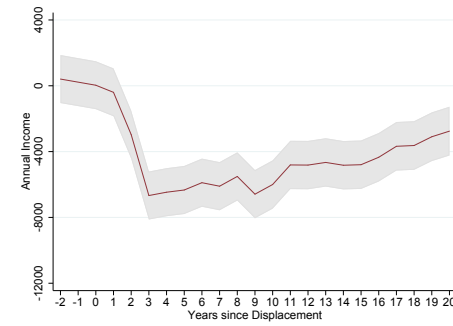
Figure 5: Spousal Employment and Earnings after Job Displacement



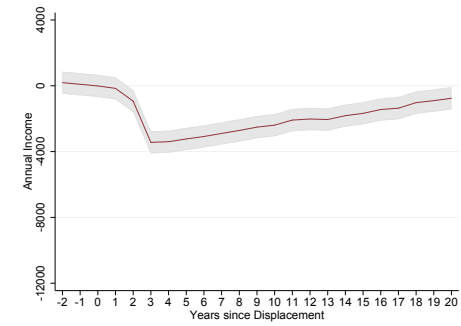
(a) Annual Earnings Men



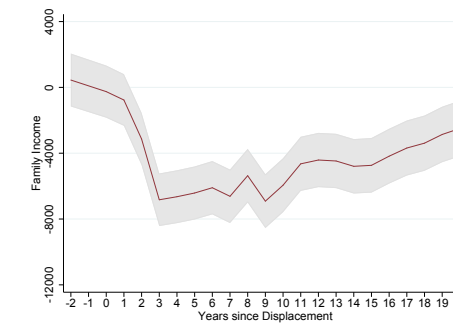
(b) Annual Earnings Women



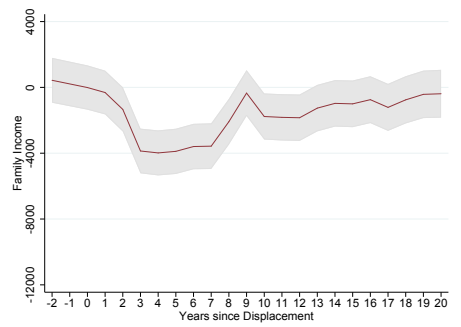
(c) Annual Income Men



(d) Annual Income Women

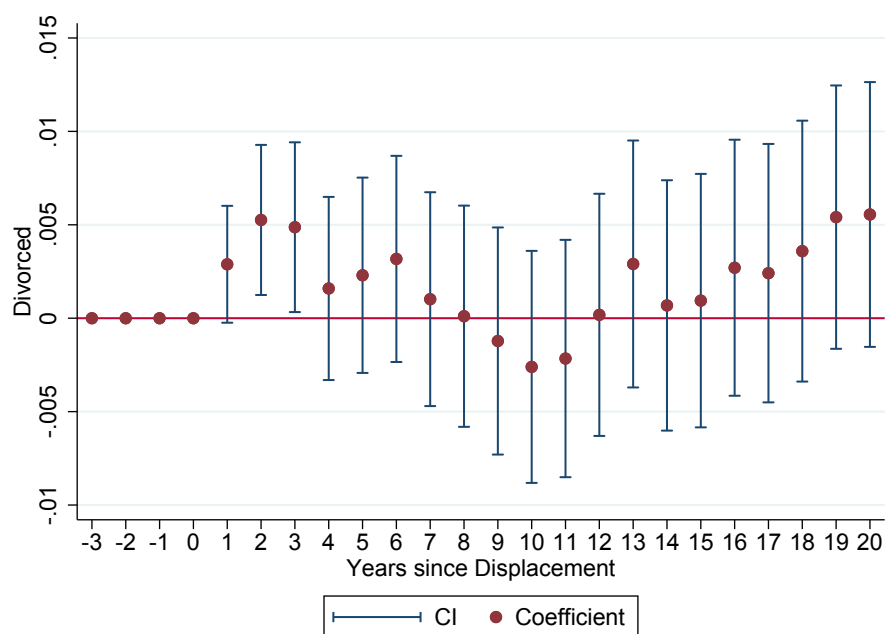


(e) Family Income Men

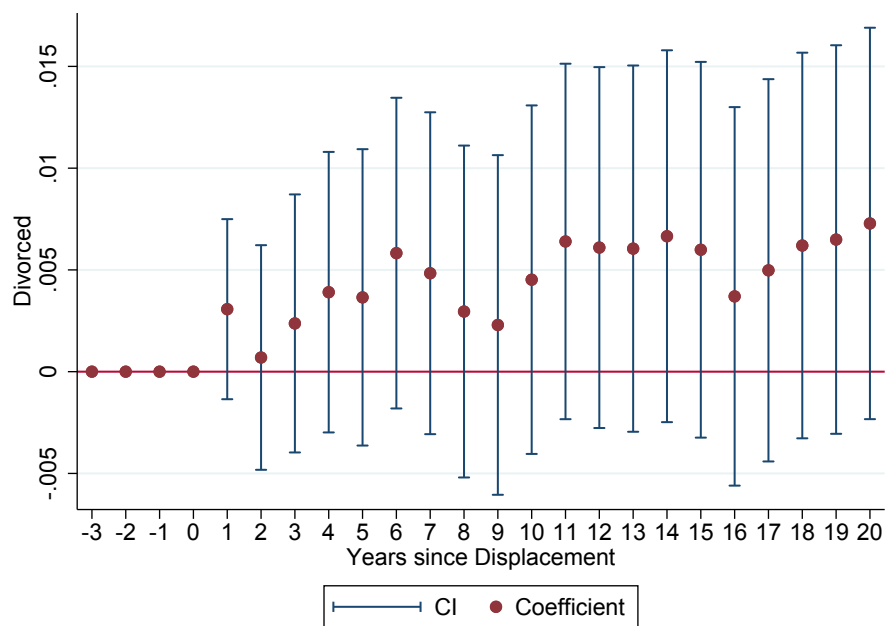


(f) Family Income Women

Figure 6: Earnings and Income after Job Displacement

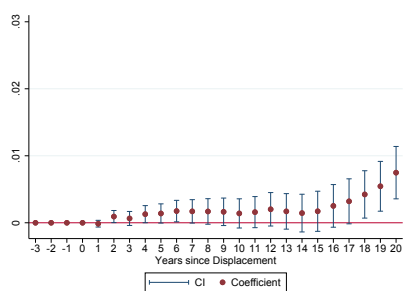


(a) Male Job Displacement

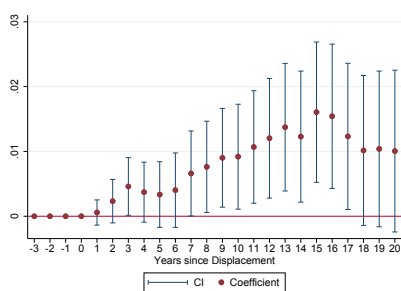


(b) Female Job Displacement

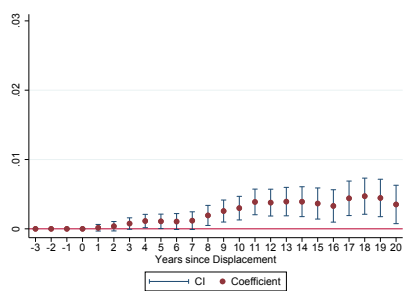
Figure 7: Effect of Job Displacement on Divorce



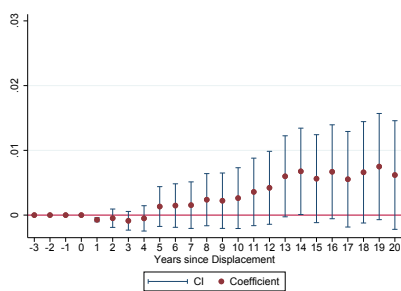
(a) Male Mortality (Above 50%)



(b) Male Mortality (Below 50%)

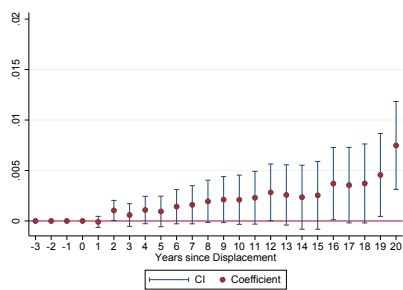


(c) Spousal Mortality (Above 50%)

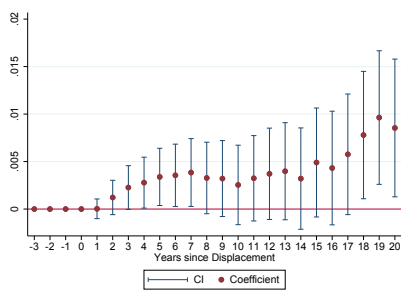


(d) Spousal Mortality (Below 50%)

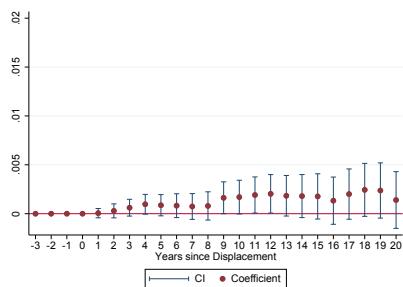
Figure 8: Direct and Spillover Mortality by Husband's Earnings Share



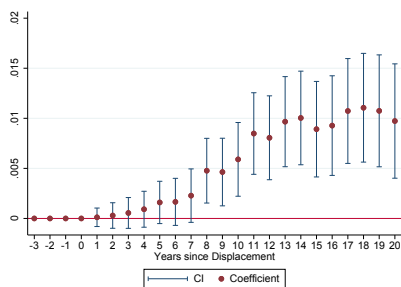
(a) Male Mortality (with Children)



(b) Male Mortality (without Children)



(c) Spousal Mortality (with Children)



(d) Spousal Mortality (without Children)

Figure 9: Mortality Effects after Male Displacement with and without Children

Table 1: Characteristics of Displaced and Non-Displaced Workers

	Men			Women		
	Displaced Workers (1)	Non-Displaced Workers (2)	p-value (3)	Displaced Workers (4)	Non-Displaced Workers (5)	p-value (6)
Age	36.19	36.50	0.00	35.87	36.07	0.03
Low-skilled	0.31	0.31	0.86	0.38	0.38	0.43
Medium-skilled	0.37	0.37	0.72	0.32	0.34	0.00
High-skilled	0.32	0.32	0.59	0.30	0.29	0.01
Labor Market Experience	15.32	15.73	0.00	15.82	15.90	0.49
Tenure	2.53	2.93	0.00	2.52	2.84	0.00
Plant Size	75	182	0.00	71	155	0.00
Annual Earnings	34,699.2	34,294.5	0.01	22,360.6	22,033.4	0.01
Annual Earnings (3 yrs. before job loss)	32,213.5	32,336.2	0.47	20,541.7	20,397.4	0.29
Earnings growth (2-3 yrs. before job loss)	0.26	0.52	0.00	0.55	0.66	0.47
Employment (2 yrs. before job loss)	0.96	0.97	0.00	0.95	0.95	0.99
Annual Personal Income	36,569.7	36,463.1	0.61	25,095.3	24,884.4	0.08
Married	0.75	0.77	0.00	0.74	0.74	0.47
Number of Children	1.31	1.32	0.24	1.05	1.06	0.24
Dead in year t+5	0.00847	0.00700	0.08	0.00301	0.00335	0.62
Dead in year t+20	0.06664	0.05830	0.00	0.03288	0.03210	0.72

Notes: All variables are measured in the pre-displacement year, i.e. 1991, 1992 or 1993 unless stated otherwise. Low-skilled means the person has finished compulsory education; medium-skilled means the person has finished upper secondary education; and high-skilled implies a university or college degree. Earnings and income are deflated to 2009 Euros. Last two rows of the table report the cumulative mortality of the displaced by $t + 5$ or $t + 20$

Table 2: Direct Effect of Job Displacement on Mortality

	Male Job Loss		Female Job Loss	
	5-Year (1)	20-Year (2)	5-Year (3)	20-Year (4)
Job Displacement	0.00160* [0.00084]	0.00765*** [0.00226]	-0.00026 [0.00070]	0.00104 [0.00219]
Individual Characteristics (Pre-Job Loss)	Yes	Yes	Yes	Yes
Plant Size (Pre-Job Loss)	Yes	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes	Yes
Region Fixed Effects	Yes	Yes	Yes	Yes
Year of Displacement Fixed Effects	Yes	Yes	Yes	Yes
Spousal Characteristics (Pre-Job Loss)	Yes	Yes	Yes	Yes
Observations	475,674	475,674	349,455	349,455
Mean of Dependent Variable	0.007	0.059	0.003	0.032
R^2	0.005	0.030	0.003	0.018

Notes: The table reports the effect of male and female job displacement in t on cumulative mortality by $t+5$ or $t+20$ where the worker is displaced (in either t or $t-1$) from a plant that shuts down between year t and $t+1$. The dependent variable is the probability of dying by year $t+5$ or $t+20$. All specifications include pre-job loss characteristics: a quartic in age, annual earnings, labor market experience, level and field of education, whether the person is married or has children in the baseline. Other characteristics include controls for base plant size, 2-digit industry, region and base year dummies. We also include characteristics of the spouse: a quartic in age, the level and field of education and whether the spouse is employed. Standard errors are reported in square brackets. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.001$.

Table 3: Spillover Effect of Job Displacement on Spousal Mortality

	Male Job Loss		Female Job Loss	
	5-Year (1)	20-Year (2)	5-Year (3)	20-Year (4)
Job Displacement	0.00105* [0.00060]	0.00380** [0.00160]	-0.00060 [0.00131]	-0.00054 [0.00336]
Individual Characteristics (Pre-Job Loss)	Yes	Yes	Yes	Yes
Plant Size (Pre-Job Loss)	Yes	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes	Yes
Region Fixed Effects	Yes	Yes	Yes	Yes
Year of Displacement Fixed Effects	Yes	Yes	Yes	Yes
Spousal Characteristics (Pre-Job Loss)	Yes	Yes	Yes	Yes
Observations	475,674	475,674	349,455	349,455
Mean of Dependent Variable	0.004	0.030	0.012	0.089
R^2	0.004	0.025	0.013	0.069

Notes: The table reports the effect of male and female job displacement in t on cumulative mortality of the spouse by $t + 5$ and $t + 20$ where the worker is displaced (in either t or $t - 1$) from a plant that shuts down between year t and $t + 1$. The dependent variable is the probability of the spouse dying by year $t + 5$ or $t + 20$. All specifications include pre-job loss characteristics: a quartic in age, annual earnings, labor market experience, level and field of education, whether the person is married or has children in the baseline. Other characteristics include controls for base plant size, 2-digit industry, region and base year dummies. We also include characteristics of the spouse: a quartic in age, the level and field of education and whether the spouse is employed. Standard errors are reported in square brackets. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.001$.

Table 4: Direct Effect of Male Job Displacement on Hospitalization

	Men					
	Accidents (1)	Alcohol (2)	Cancer (3)	Heart (4)	Mental Illness (5)	Suicide (6)
Job Displacement	-0.00026 [0.00182]	0.00140* [0.00084]	0.00008 [0.00070]	-0.00225 [0.00147]	0.00213* [0.00110]	0.00018 [0.00038]
Observations	475,674	475,674	475,674	475,674	475,674	475,674
Mean of Dependent Variable	0.042	0.007	0.005	0.031	0.013	0.002
R^2	0.006	0.004	0.003	0.014	0.004	0.001
Job Displacement	-0.00165 [0.00356]	-0.00015 [0.00172]	0.00056 [0.00192]	-0.00163 [0.00311]	-0.00062 [0.00196]	0.00035 [0.00075]
Observations	475,674	475,674	475,674	475,674	475,674	475,674
Mean of Dependent Variable	0.184	0.035	0.047	0.144	0.048	0.006
R^2	0.010	0.008	0.029	0.043	0.008	0.003

Notes: The table reports the effect of male job displacement in t on hospitalization by $t + 5$ (top panel) and $t + 20$ (bottom panel) where the worker is displaced (in either t or $t - 1$) from a plant that shuts down between year t and $t + 1$. The dependent variable is the probability of being hospitalized by year $t + 5$ or $t + 20$ due to a specific cause. All specifications include pre-job loss characteristics: a quartic in age, annual earnings, labor market experience, level and field of education, whether the person is married or has children in the baseline. Other characteristics include controls for base plant size, 2-digit industry, region and base year dummies. We also include characteristics of the spouse: a quartic in age, the level and field of education and whether the spouse is employed. Standard errors are reported in square brackets. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.001$.

Table 5: Direct Effect of Male Job Displacement on Cause-Specific Mortality

	5-Year Mortality				20-Year Mortality					
	Accidents (1)	Alcohol (2)	Cancer (3)	Heart (4)	Suicides (5)	Accidents (6)	Alcohol (7)	Cancer (8)	Heart (9)	Suicides (10)
Job Displacement	0.000056 [0.00031]	-0.00006 [0.00024]	0.00032 [0.00040]	0.00081* [0.00045]	0.00014 [0.00034]	0.00032 [0.00076]	0.00142 [0.00089]	0.00121 [0.00122]	0.00282** [0.00124]	0.00181** [0.00077]
Individual Characteristics	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
(Pre-Job Loss)										
Plant Size (Pre-Job Loss)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Occupation Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Region Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year of Displacement Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Spousal Characteristics	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
(Pre-Job Loss)										
Observations	475,674	475,674	475,674	475,674	475,674	475,674	475,674	475,674	475,674	475,674
Mean of Dependent Variable	0.001	0.001	0.002	0.002	0.001	0.006	0.008	0.017	0.017	0.006
R ²	0.001	0.001	0.003	0.003	0.001	0.002	0.003	0.016	0.014	0.002

Notes: The table reports the effect of male job displacement in t on cumulative mortality by $t + 5$ and $t + 20$ where the worker is displaced (in either t or $t - 1$) from a plant that shuts down between year t and $t + 1$. The dependent variable is the probability of dying by year $t + 5$ or $t + 20$. All specifications include pre-job loss characteristics: a quartic in age, annual earnings, labor market experience, level and field of education, whether the person is married or has children in the baseline. Other characteristics include controls for base plant size, 2-digit industry, region and base year dummies. We also include characteristics of the spouse: a quartic in age, the level and field of education and whether the spouse is employed. Standard errors are reported in square brackets. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.001$.

Table 6: Spillover Effect of Male Job Displacement on Hospitalization

	Spouse					
	Accidents (1)	Alcohol (2)	Cancer (3)	Heart (4)	Mental Illness (5)	Suicide (6)
Job Displacement	0.00189 [0.00142]	0.00111** [0.00055]	0.00084 [0.00092]	-0.00254 [0.00172]	0.00103 [0.00106]	0.00004 [0.00047]
Observations	475,674	475,674	475,674	475,674	475,674	475,674
Mean of Dependent Variable	0.023	0.003	0.010	0.041	0.013	0.003
R^2	0.004	0.003	0.007	0.011	0.006	0.002
Job Displacement	-0.00036 [0.00306]	0.00211* [0.00109]	-0.00093 [0.00220]	-0.00375 [0.00299]	0.00147 [0.00191]	0.00085 [0.00095]
Observations	475,674	475,674	475,674	475,674	475,674	475,674
Mean of Dependent Variable	0.128	0.013	0.064	0.131	0.045	0.010
R^2	0.009	0.006	0.023	0.024	0.010	0.005

Notes: The table reports the effect of male job displacement in t on the hospitalization of the spouse by $t + 5$ (top panel) and $t + 20$ (bottom panel) where the worker is displaced (in either t or $t - 1$) from a plant that shuts down between year t and $t + 1$. The dependent variable is the probability of the spouse being hospitalized by year $t + 5$ or $t + 20$ due to a specific cause. All specifications include pre-job loss characteristics: a quartic in age, annual earnings, labor market experience, level and field of education, whether the person is married or has children in the baseline. Other characteristics include controls for base plant size, 2-digit industry, region and base year dummies. We also include characteristics of the spouse: a quartic in age, the level and field of education and whether the spouse is employed. Standard errors are reported in square brackets. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.001$.

Table 7: Spillover Effect of Male Job Displacement on Cause-Specific Mortality

	5-Year Mortality				20-Year Mortality					
	Accidents (1)	Alcohol (2)	Cancer (3)	Heart (4)	Suicides (5)	Accidents (6)	Alcohol (7)	Cancer (8)	Heart (9)	Suicides (10)
Job Displacement	0.00027 [0.00021]	-0.00005 [0.00012]	0.00056 [0.00042]	-0.00011 [0.00017]	0.00006 [0.00019]	0.00081* [0.00045]	0.00088 [0.00056]	0.00103 [0.00110]	0.00073 [0.00062]	-0.00042 [0.00037]
Individual Characteristics (Pre-Job Loss)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Plant Size (Pre-Job Loss)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Occupation Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Region Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year of Displacement Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Spousal Characteristics (Pre-Job Loss)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	475,674	475,674	475,674	475,674	475,674	475,674	475,674	475,674	475,674	475,674
Mean of Dependent Variable	0.00029	0.00018	0.00172	0.00053	0.00050	0.00186	0.00279	0.01480	0.00456	0.00195
R ²	0.001	0.001	0.003	0.002	0.001	0.001	0.003	0.012	0.012	0.002

Notes: The table reports the effect of male job displacement in t on cumulative mortality of the spouse by $t + 5$ or $t + 20$ where the worker is displaced (in either t or $t - 1$) from a plant that shuts down between year t and $t + 1$. The dependent variable is the probability of the spouse dying by year $t + 5$ or $t + 20$ due to a specific cause. All specifications include pre-job loss characteristics: a quartic in age, annual earnings, labor market experience, level and field of education, whether the person is married or has children in the baseline. Other characteristics include controls for base plant size, 2-digit industry, region and base year dummies. We also include characteristics of the spouse: a quartic in age, the level and field of education and whether the spouse is employed. Standard errors are reported in square brackets. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.001$.

Table 8: Contribution of Earnings/Personal Income to Male and Spousal Mortality

	Male Mortality			Spousal Mortality		
	Male Earnings 5-year (1)	Male Earnings 20-year (2)	Male Personal Income 5-year (3)	Male Earnings 5-year (5)	Male Earnings 20-year (6)	Male Personal Income 5-year (7)
Male Displacement	0.00160* [0.00838]	0.00765** [0.00226]	0.00160* [0.00838]	0.00105* [0.00060]	0.00380** [0.00016]	0.00380** [0.00016]
Men's Log Earnings/Income (Pre-Displacement)	-0.00222*** [0.00053]	-0.01590*** [0.00147]	-0.00233*** [0.00059]	-0.00063** [0.00031]	-0.00534*** [0.00102]	-0.00626*** [0.00110]
Earnings/Income Elasticity of Mortality	-0.31534	-0.27133	-0.33097	-0.17038	-0.17624	-0.17989
Male Earnings/Income Loss (%)	-0.16930	-0.09881	-0.10154	-0.00429	0.00583	0.01003
Mortality Increase through Earnings/Income Loss	0.05339	0.02681	0.03361	0.02885	0.01741	0.01827
Total Mortality Effect (%)	0.22727	0.13055	0.22727	0.28533	0.12541	0.28533
Contribution of Economic Channel	0.23491	0.20537	0.14787	0.10110	0.13886	0.06402

Notes: The table calculates the contribution of earnings and income drops on the mortality effect of job loss for the displaced and their spouse in $t + 5$ and $t + 20$. The earnings/income elasticity of mortality is calculated as the pre-displacement log earnings/income effect on mortality relative to baseline mortality. We use average log earnings/income on the 3-year pre-displacement period for the interaction of pre-displacement and mortality effect of job loss. Each regression includes our full set of control variables. Standard errors are reported in square brackets. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.001$.

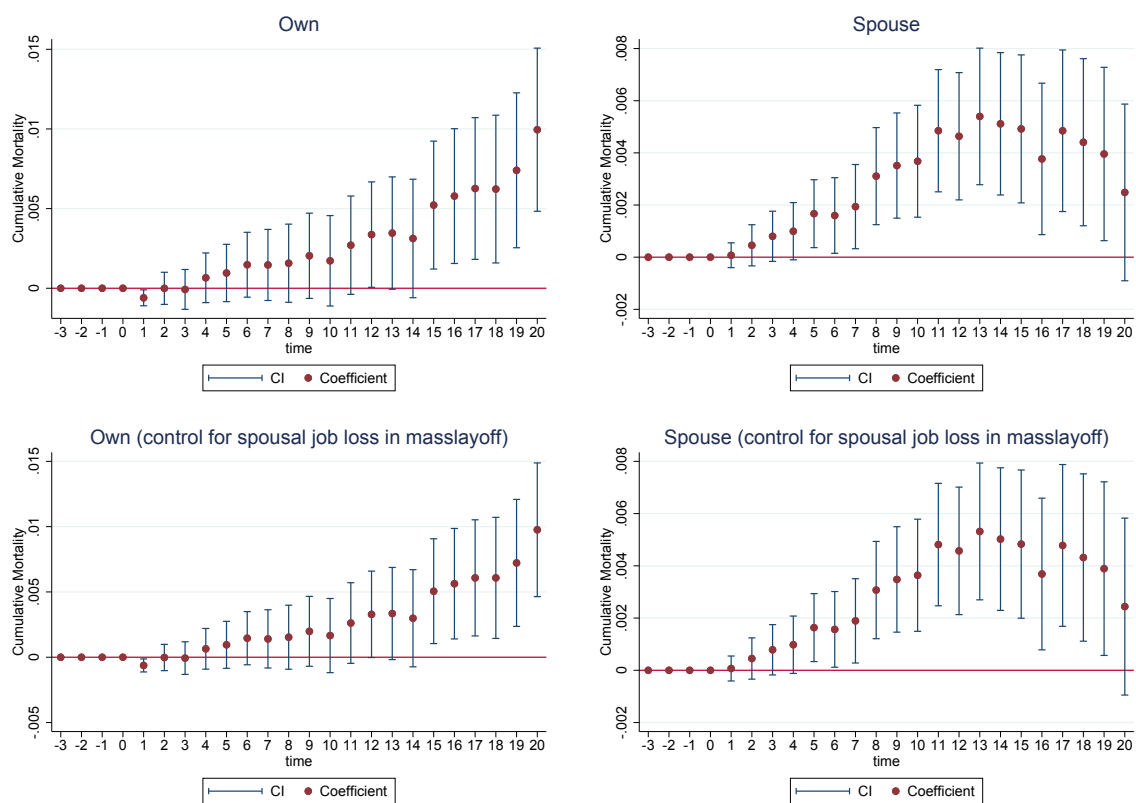


Figure A1: Direct and Spillover Effect of Male Job Displacement on Mortality (Both Spouses Employed)

Table A1: Direct Effect of Female Job Displacement on Hospitalization

	Women					
	Accidents (1)	Alcohol (2)	Cancer (3)	Heart (4)	Mental Illness (5)	Suicide (6)
Job Displacement	-0.00250 [0.00172]	0.00034 [0.00062]	0.00135 [0.00137]	-0.00162 [0.00223]	-0.00067 [0.00115]	-0.00031 [0.00049]
Observations	349,455	349,455	349,455	349,455	349,455	349,455
R^2	0.004	0.003	0.008	0.013	0.003	0.002
Mean of Dependent Variable	0.023	0.002	0.011	0.041	0.010	0.002
Job Displacement	-0.00213 [0.00404]	-0.00014 [0.00136]	0.00065 [0.00315]	0.00337 [0.00401]	0.00269 [0.00238]	0.00054 [0.00110]
Observations	349,455	349,455	349,455	349,455	349,455	349,455
R^2	0.010	0.005	0.023	0.028	0.006	0.004
Mean of Dependent Variable	0.128	0.013	0.071	0.130	0.038	0.008

Notes: The table reports the effect of female job displacement in t on hospitalization by $t + 5$ (top panel) and $t + 20$ (bottom panel) where the worker is displaced (in either t or $t - 1$) from a plant that shuts down between year t and $t + 1$. The dependent variable is the probability of being hospitalized by year $t + 5$ or $t + 20$ due to a specific cause. All specifications include pre-job loss characteristics: a quartic in age, annual earnings, labor market experience, level and field of education, whether the person is married or has children in the baseline. Other characteristics include controls for base plant size, 2-digit industry, region and base year dummies. We also include characteristics of the spouse: a quartic in age, the level and field of education and whether the spouse is employed. Standard errors are reported in square brackets. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.001$.

Table A2: Spillover Effect of Female Job Displacement on Hospitalization

	Spouse					
	Accidents (1)	Alcohol (2)	Cancer (3)	Heart (4)	Mental Illness (5)	Suicide (6)
Job Displacement	-0.00156 [0.00248]	-0.00012 [0.00137]	-0.00162* [0.00093]	0.00253 [0.00237]	0.00311* [0.00180]	0.00114 [0.00074]
Observations	349,455	349,455	349,455	349,455	349,455	349,455
Mean of Dependent Variable	0.045	0.013	0.008	0.039	0.019	0.002
R^2	0.005	0.011	0.008	0.026	0.010	0.003
Job Displacement	-0.00630 [0.00480]	0.00280 [0.00267]	0.00264 [0.00291]	0.00160 [0.00444]	0.00434 [0.00303]	0.00137 [0.00119]
Observations	349,455	349,455	349,455	349,455	349,455	349,455
Mean of Dependent Variable	0.196	0.047	0.062	0.171	0.062	0.008
R^2	0.007	0.017	0.044	0.067	0.015	0.005

Notes: The table reports the effect of female job displacement in t on the hospitalization of the spouse by $t + 5$ (top panel) and $t + 20$ (bottom panel) where the worker is displaced (in either t or $t - 1$) from a plant that shuts down between year t and $t + 1$. The dependent variable is the probability of the spouse being hospitalized by year $t + 5$ or $t + 20$ due to a specific cause. All specifications include pre-job loss characteristics: a quartic in age, annual earnings, labor market experience, level and field of education, whether the person is married or has children in the baseline. Other characteristics include controls for base plant size, 2-digit industry, region and base year dummies. We also include characteristics of the spouse: a quartic in age, the level and field of education and whether the spouse is employed. Standard errors are reported in square brackets. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.001$.

Table A3: Direct Effect of Female Job Displacement on Cause-Specific Mortality

	5-Year Mortality				20-Year Mortality					
	Accidents (1)	Alcohol (2)	Cancer (3)	Heart (4)	Suicides (5)	Accidents (6)	Alcohol (7)	Cancer (8)	Heart (9)	Suicides (10)
Job Displacement	-0.00007 [0.00014]	-0.00006 [0.00015]	-0.00015 [0.00053]	-0.00022 [0.00020]	0.00022 [0.00029]	0.00047 [0.00056]	0.00006 [0.00068]	0.00044 [0.00162]	-0.00128* [0.00071]	0.00011 [0.00052]
Individual Characteristics (Pre-Job Loss)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Plant Size (Pre-Job Loss)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Occupation Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Region Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year of Displacement Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Spousal Characteristics (Pre-Job Loss)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	349,455	349,455	349,455	349,455	349,455	349,455	349,455	349,455	349,455	349,455
Mean of Dependent Variable	0.00024	0.00019	0.00180	0.00046	0.00040	0.00178	0.00296	0.01700	0.00476	0.00170
R ²	0.002	0.001	0.003	0.001	0.001	0.002	0.003	0.011	0.005	0.002

Notes: The table reports the effect of female job displacement in t on cumulative mortality by $t + 5$ and $t + 20$ where the worker is displaced (in either t or $t - 1$) from a plant that shuts down between year t and $t + 1$. The dependent variable is the probability of dying by year $t + 5$ or $t + 20$ due to a specific cause. All specifications include pre-job loss characteristics: a quartic in age, annual earnings, labor market experience, level and field of education, whether the person is married or has children in the baseline. Other characteristics include controls for base plant size, 2-digit industry, region and base year dummies. We also include characteristics of the spouse: a quartic in age, the level and field of education and whether the spouse is employed. Standard errors are reported in square brackets. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.001$.

Table A4: Earnings/Income Losses and Spousal Labor Supply by Men's Income Share

	Male Earnings				Male Personal Income			
	5-year Earnings Below 50% (1)	Above 50% (2)	20-year Earnings Below 50% (3)	Above 50% (4)	5-year Income Below 50% (5)	Above 50% (6)	20-year Income Below 50% (7)	Above 50% (8)
Job Displacement	-22,777.0*** [1,580.2]	-30,725.7*** [810.2]	-44,381.6*** [8,624.7]	-78,247.0*** [5,355.2]	-14,350.7*** [1,288.7]	-19,366.5*** [725.9]	-43,053.4*** [8,222.7]	-60,455.9*** [5,598.9]
Observations	44,950	430,873	44,950	430,873	44,950	430,873	44,950	430,873
Mean of Dependent Variable	131,387.3	181,693.2	574,750.7	778,820.1	142,247.3	191,026.4	658,021.2	868,070.1
R ²	0.342	0.399	0.385	0.196	0.366	0.388	0.364	0.188
	Spousal Employment				Spousal Earnings			
	5-year Earnings Below 50% (1)	Above 50% (2)	20-year Earnings Below 50% (3)	Above 50% (4)	5-year Earnings Below 50% (5)	Above 50% (6)	20-year Earnings Below 50% (7)	Above 50% (8)
Job Displacement	-0.00312 [0.00696]	0.00028 [0.00315]	-0.00362 [0.00469]	0.00049 [0.00208]	-2,292.3 [1,625.0]	-93.85 [486.7]	2,109.4 [8,561.2]	2,296.7 [2,263.7]
Observations	44,950	430,873	44,950	430,873	44,950	430,873	44,950	430,873
Mean of Dependent Variable	0.954	0.873	0.979	0.947	120,400.5	76,819.0	503,106.2	357,332.3
R ²	0.043	0.052	0.040	0.052	0.392	0.241	0.335	0.228

Notes: The top panel of the table reports the effect of male job displacement on male annual earnings and male personal income in $t + 5$ and $t + 20$ years for individuals in families in which the husband earns below/above 50% share of household income. The bottom panel of the table reports the effect of male job displacement on spousal earnings and spousal employment in $t + 5$ and $t + 20$ years for individuals in families in which the husband earns below/above 50% share of household income. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A5: Earnings/Income Losses and Spousal Labor Supply for Couples with and without Children

	Male Earnings				Male Personal Income			
	5-year Earnings Children (1)	No Children (2)	20-year Earnings Children (3)	No Children (4)	5-year Income Children (5)	No Children (6)	20-year Income Children (7)	No Children (8)
Job Displacement	-31,163.4*** [924.2]	-27,258.6*** [1,269.7]	-83,675.9*** [6,034.3]	-54,602.8*** [8,649.4]	-19,724.7*** [831.3]	-17,206.8*** [1,124.5]	-66,512.2*** [6,217.8]	-41,520.9*** [9,395.4]
Observations	337,477	138,346	337,477	138,346	337,477	138,346	337,477	138,346
Mean of Dependent Variable	183,498.4	160,944.8	791,719.9	681,048.6	192,996.1	170,372.7	878,456.3	774,487.5
R ²	0.402	0.349	0.178	0.335	0.387	0.352	0.173	0.311

	Spousal Employment				Spousal Earnings			
	5-year Earnings Children (1)	No Children (2)	20-year Earnings Children (3)	No Children (4)	5-year Earnings Children (5)	No Children (6)	20-year Earnings Children (7)	No Children (8)
Job Displacement	0.00159 [0.00343]	-0.00247 [0.00560]	0.00087 [0.00216]	-0.00206 [0.00407]	-32.41 [569.0]	-642.7 [870.1]	3,050.4 [2,689.0]	632.7 [3,990.4]
Observations	337,477	138,346	337,477	138,346	337,477	138,346	337,477	138,346
Mean of Dependent Variable	0.884	0.871	0.957	0.932	82,078.8	78,148.5	384,948.4	337,329.8
R ²	0.050	0.058	0.023	0.090	0.270	0.232	0.239	0.246

Notes: The top panel of the table reports the effect of male job displacement on male annual earnings and male personal income in $t + 5$ and $t + 20$ years for individuals with and without dependent children under age 18 in the household. The bottom panel of the table reports the effect of male job displacement on spousal earnings and spousal employment in $t + 5$ and $t + 20$ years for individuals with and without dependent children under age 18 in the household. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

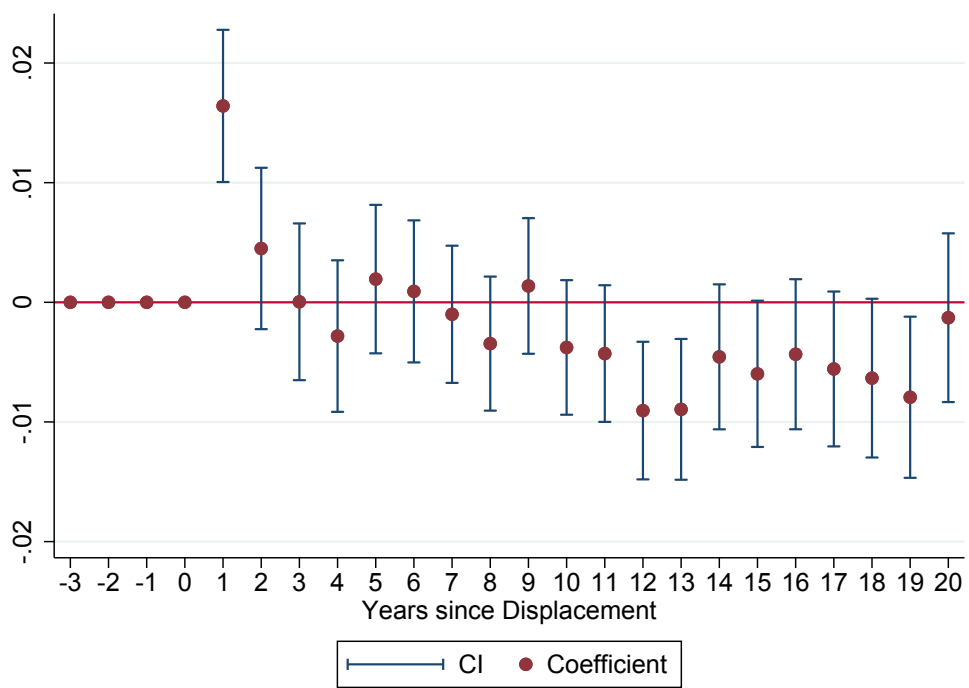
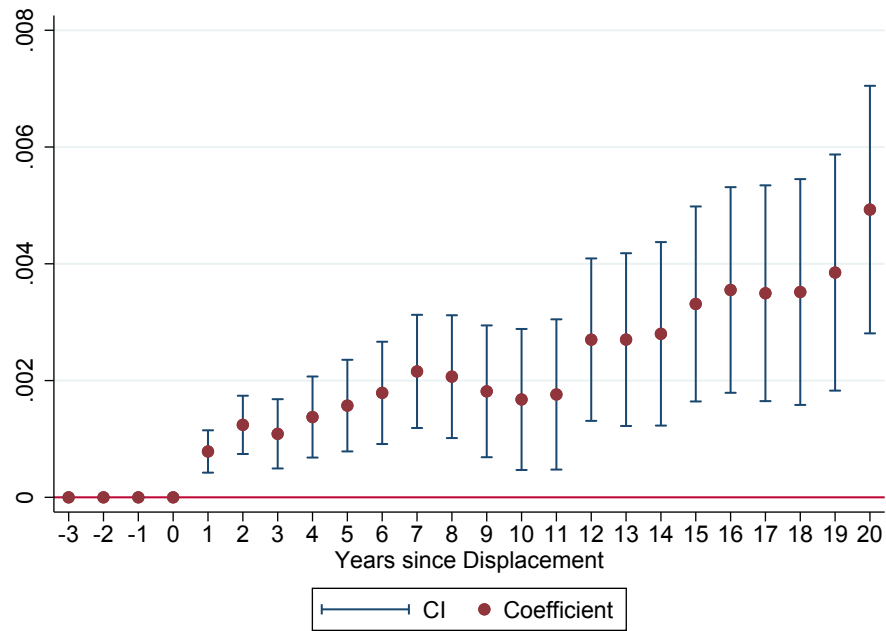
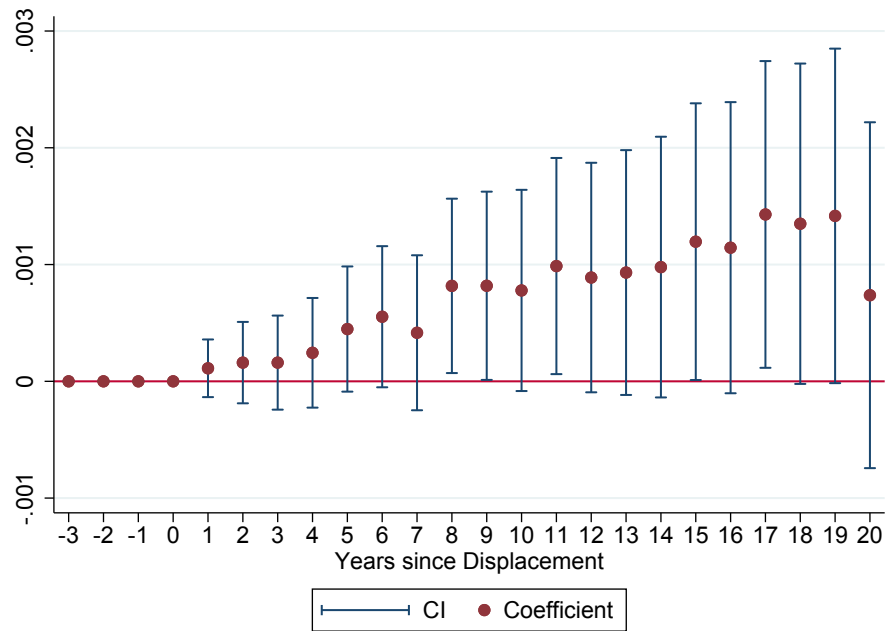


Figure A2: Spousal Job Separation after Male Displacement



(a) Direct Effect of Male Job Displacement



(b) Spillover Effect of Male Job Displacement

Figure A3: Direct And Spousal Mortality after Male Displacement in Mass Layoff Sample

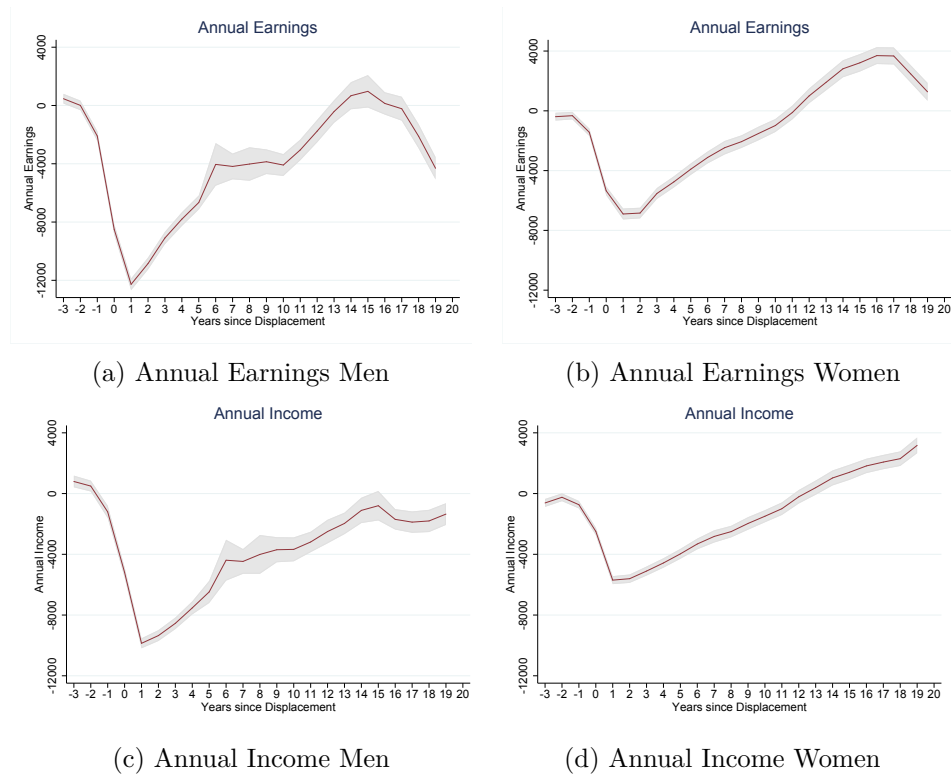
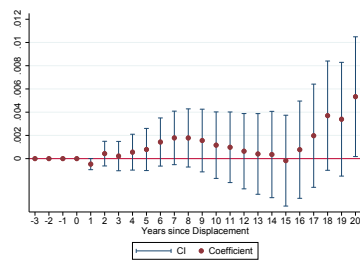
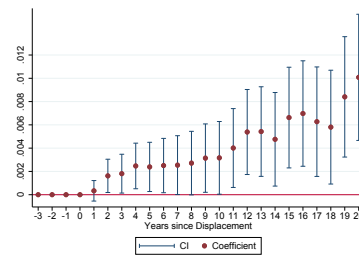


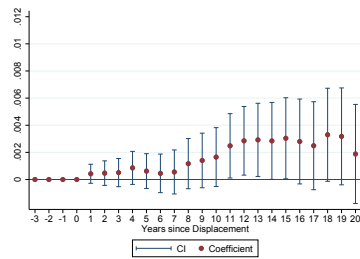
Figure A4: Employment and Earnings Effect after Male and Female Job Displacement (OLS)



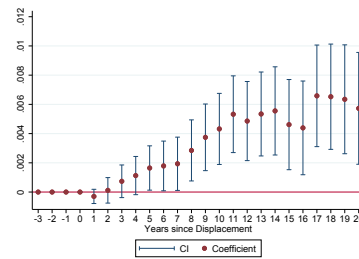
(a) Male Mortality (Above Median Income)



(b) Male Mortality (Below Median Income)



(c) Spousal Mortality (Above Median Income)



(d) Spousal Mortality (Below Median Income)

Figure A5: Direct and Spillover Effect of Male Displacement on Mortality by Income Share