In Sickness and in Health:

Job Displacement and Health Spillovers in Couples

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Abstract

Using administrative labor market data matched to mortality and patient records, we document that negative labor market shocks produce sizable health spillovers in couples. For every 10,000 displaced men, there are 110 additional deaths. Of those, 60% accrue to the displaced worker but 40 % are due to excess spousal mortality. We further show for the first time a stunning gender asymmetry: while male job displacement generates persistent health effects, no such dire consequences are observed after a woman's job loss. We explore several explanations for these patterns: risk sharing through spousal labor supply; earnings losses and public insurance; widowhood; and gender roles in the family.

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1 Introduction

Workers who lose their job in a plant closure or mass layoffs experience 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 gone beyond the labor market to investigate the health consequences for displaced workers (Black et al., 2015; Browning et al., 2006; Browning and Heinesen, 2012; Eliason and Storrie, 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.[1]

The detriments of job loss might not be confined to displaced workers but fan out to their partners. Social scientists have long underscored that family interactions shape individual behavior, particularly in the context of labor supply, leisure and consumption (Becker, 1991; Browning et al., 2014; Blundell et al., 2016). Spillover effects could benefit a couple if they absorb or reduce some of the negative consequences of job displacement. One compensation mechanism, and an important motive for marriage, is risk sharing. If one person suffers an unexpected shock such as an illness or job loss, pooling income helps to stabilize financial resources for the family. Moreover, partners may increase their labor supply to compensate for some of the earnings lost.

Yet, there are many scenarios where spillovers may have potentially adverse effects on the partner. A displaced worker might develop or exacerbate harmful behavior like heavy drinking or depression harming both partners. In the extreme case, a displaced worker might die following a job loss with severe costs to the partner left behind. Until now, we still lack a good understanding of how spillovers manifest in the family and the channels that fuel or mitigate them. Ignoring such potential externalities in the family may severely under- or overestimate the actual costs from job displacement. As such, spillovers have important implications for public policy. Positive spillovers like risk sharing, for instance, reduce the need for government programs, while negative spillovers such as alcoholism or suicide, in turn, raise the demand for public interventions.

This paper investigates the size and nature of health spillovers in couples. We start out with estimating the effects of job loss on the health of displaced workers *and* their partners to quantify the full health costs of job displacement. In a second step, we explore several potential mechanisms for the observed health spillovers: spousal labor supply responses; the importance of income losses

[1] Our work also speaks to the link between macroeconomic conditions and health (Ruhm, 2000 2003). Unlike that literature, we focus on individual negative labor market shocks thus abstracting from business-cycle fluctuations in pollution, trade and traffic volumes, for instance.

and public insurance; the effect of widowhood and separation; and the influence of family structure. Analyzing health spillovers and their underlying mechanisms is often hampered by sizable challenges. First of all, it is very difficult to obtain suitable data that allow linking the records of partners and that contain detailed information about labor market outcomes, health and mortality for both. We match employer-employee data with detailed records on employment, earnings and public transfers to mortality and patient records for every adult over several decades. Most importantly, we can match partners in a couple, irrespective of whether they are married or cohabitating, using a unique identifier for the partner in the data.[2]

An important challenge is how to identify causal effects of job loss on health. The main concern here is that a worker's job loss is not a random event and might be correlated with pre-displacement health risks or lower earnings as employers lay off workers with low tenure and poor health, or because declining industries employ less healthy workers, for instance.

To overcome this challenge, our empirical strategy consists of several steps and supporting evidence. In a first step, we focus on workers who lose their job because their plant closes down. Plant closures can be considered exogenous from the individual worker's perspective as all workers in the plant lose their job irrespective of prior performance. Yet, workers whose plants close down might still have characteristics that make them more likely to have worse health or career trajectories. To address this concern, we focus in a second step on the many plant closures that occurred during Finland's great depression of the early 1990s (Gorodnichenko et al., 2012). The sudden collapse of the Soviet Union led to a massive decline in GDP and mass unemployment of up to 16% (see appendix figure A1). The many plant closures and mass layoffs that occurred during the depression mean that the displaced workers look much closer to the average worker in terms of earnings trajectories, health and observable characteristics. Third, our estimation relies on an event study approach comparing outcomes of workers displaced in a plant closure to an appropriate control group. Our main control group consists of workers who were not displaced during the depression years. We further demonstrate that workers in closing plants do not have worse health prior to displacement than non-displaced workers: hospitalization rates are very similar prior to displacement. In addition, the mortality of workers to be displaced in the future is no different than mortality rates of workers who do not get displaced. Moreover, we find similar results if we use an alternative control group of workers that get displaced in later years. Finally, we use additional

[2]Couples might be married or cohabitating with joint finances. Throughout the article, we will use the terms partner and spouse interchangeably.

samples and specification checks to rule out that our results persist when accounting for differential employment rates, co-displacement or gender-specific career paths.

Our results indicate that male job loss significantly increases both his own and his partner's mortality risk. For every 10,000 displaced men, there are 24 additional deaths in the first five years and 110 additional deaths within twenty years of displacement. Around 60% of the additional deaths occur among displaced workers, but a stunning 40% occur among partners of displaced men. Partners therefore carry a sizable share of the health burden associated with male job displacement.

We further document a stunning gender asymmetry: while there are negative health spillovers after male job displacement, no such dire consequences are found after female job displacement. If a woman loses her job in a plant closure, the mortality risk of the displaced woman and her partner remains unchanged. This gender asymmetry is evident in single as much as in dual earner couples. As such, the asymmetry cannot be explained by differences in health status between working and non-working partners. The gender asymmetry is also not accounted for by gender-specific selection into the public or private sector. While women are more likely to work in the public sector than men, we find very similar asymmetric health effects in the combined sample of public and private sector firms. The results can also not be explained by men and women sorting into different educational and career trajectories as we find no health effects of displacement for women with more 'male careers'.

To shed light on the type of health risks after job loss, we turn to hospitalization and cause-specific mortality records. Displaced men are more likely to die from heart disease and 'deaths of despair' (Case and Deaton, 2020). Displaced men are also more likely to suffer from mental health issues than their non-displaced peers. These findings not only substantiate the profound societal costs of job loss that go beyond purely monetary losses; they also indicate that job losses impose sizable psychological burden on men, in particular.

We then turn to classic economic explanations for the observed health spillovers in couples and the observed gender asymmetry. Specifically, we study whether spouses respond to their partner's job loss by expanding their own labor supply. An increase in spousal employment or working hours would raise spousal earnings and family income. Spousal labor supply could explain the health asymmetry if women increase their labor supply after their partner's job loss, but men's labor supply remains unchanged. We find very small spousal labor supply responses both at the extensive and intensive margin – irrespective of whether a man or a woman gets displaced. Ten years after displacement, spousal employment is just 1% higher for spouses of displaced workers

than for spouses of non-displaced workers. Spousal annual earnings after male displacement rise by at most 3% in the long run. Hence, spousal labor supply responses play only a limited role in explaining health spillovers.

The observed spillovers could also be the consequence of a persistent decline in family resources, which reduces a couple's investments in health-promoting activities or goods.[3] We find some support for this explanation: the absolute decline in earnings and total family income is more severe when a man loses his job than when a woman loses her job in a plant closure. The observed decline in family resources is systematically related to mortality after male job displacement accounting for up to one-fourth of excess male mortality. Moreover, we find that public insurance through transfers is partial and declines with time since displacement.

In the last section, we explore the role of the partnership and family structure in mitigating the health burden of job loss. We first investigate whether widowhood may explain the mortality spillover or the gender asymmetry. Despite a strong co-morbidity in couples, we find little support for the hypothesis that widowhood accounts for the observed health costs of job displacement. Finally, we shed light on the role of family structure and gender roles. We distinguish between traditional and non-traditional couples based on age, employment, marital status or earnings share. We find that the health effects of men after job loss do not vary much with family structure – they are high irrespective of whether he is the main breadwinner or not, older or of similar age than his spouse. If anything, the effects are slightly lower in traditional couples. We observe the opposite pattern for partners of displaced men: here, mortality effects are somewhat more pronounced in traditional couples. Most importantly, spouses suffer no negative health consequences after male job loss if they are dependent children in the household. Hence, children act as a type of insurance for women but not for men. Overall, these patterns indicate that gender-specific roles within the family play some role for the observed asymmetric health effects.

Our paper makes several important contributions to the literature. We add to the job displacement literature by investigating for the first time health spillovers in couples. We show that the health burden of job displacements exceeds the costs for the displaced worker alone. While excess mortality after a man's job displacement is similar in magnitude to estimates in the literature (Sullivan and von Wachter, 2009), accounting for health spillovers raises the excess mortality of job displacement by 40%. Moreover, we document an important gender asymmetry where excess

[3] A decline in family income might reduce the intake of health-damaging goods like alcohol or smoking. 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).

mortality in couples is strong and persistent after male job displacement, but absent after female job displacement. Finally, we assess four distinct mechanisms that could aggravate or mitigate the health perils after job displacement: widowhood, spousal labor supply, loss of economic resources and family structure.

Moreover, we shed new light on family health spillovers. Public health research has long documented a widowhood effect, i.e. higher mortality risks after the loss of a partner (Elwert and Christakis, 2008; Martikainen and Valkonen, 1996; Ytterstad and Brenn, 2015). More recently, several studies have discussed positive family spillovers after a person obtains treatment to stop smoking (Fletcher and Marksteiner, 2017) or experiences a negative health shock (Fadlon and Nielsen, 2019). In both cases, spouses improve their own health behavior in response to changes in their partner's health. Most recently, one study analyzes the impact of job displacement on domestic violence, a very specific measure of health (Bhalotra et al., 2021).[4] Our study differs from existing work as we investigate broad health effects after a negative labor market shock. More importantly, we document that such shocks do not spill over symmetrically in a partnership. It matters whether a man or a woman loses the job in a plant closure.[5] We further provide a detailed investigation which mechanisms help explain why negative health spillovers persist after job displacement.

Our paper further contributes to the literature on spousal labor supply. 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., 2020). One potential explanation is that generous unemployment provisions crowd out spousal labor supply responses (Cullen and Gruber, 2000; Hendren, 2017). Yet, our results, like others, suggest that unemployment insurance provides only partial and temporary insurance against the persistent income losses of displacement (Hendren, 2017).

Finally, we provide novel evidence whether family structure and gender roles for health spillovers. Recent evidence shows that women violating traditional gender norms live in less stable relationships and even adjust their labor supply to conform with gender norms.(Bertrand et al., 2015;

[4]Persson et al. (2021) in turn show that information about family medical history influences diagnoses and treatment for ADHD but has little effect on the well-being of the marginal patient. Here, family spillover effects emerge because of the health care system using genetic disposition on health status; both factors are absent in our setting.

[5]Job loss may also affect children living 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; Fradkin et al., 2019).

Fortin, 2005; Zinovyeva and Tverdostup, 2021). We find that men suffer from job loss hit men irrespective of the underlying family structure or gender roles. Their partners, in turn, are shielded against the spillover effect of male displacement if they have dependent children in the household.

2 Data and Empirical Strategy

2.1 Data Sources

We combine several administrative data covering the population of residents and plants in Finland between 1988 and 2013. Three characteristics make our data uniquely suited for analyzing health spillovers in couples. First, we have data on the full population of plants and their workforce. The data allow identifying plant closures and to distinguish them from breakups or other forms of restructuring. Second, we can follow an individual's health and labor market career over more than two decades as our data contain the complete work history, mortality and hospitalization records of each adult in Finland.[6] Third, and most importantly, our data contain an identification number for spouses or cohabitating partners. By linking the individual records of couples, we can study whether job displacement of one person has an impact on the health, labor supply or earnings of the partner.

We next 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. As control variables, we use five skill groups based on the level of formal education: compulsory education, high school (including vocational training), some college, Bachelor degree or post-graduate education (Masters or Ph.D.). We further distinguish between fields of education (e.g. natural sciences, social sciences and business, humanities and arts, health and welfare, agriculture and technology).

Based on partner IDs, we can identify couples and thus link the couple's labor market histories and earnings. The data further contain information on the number of dependent children in the household. A couple is separated in our data if a person has no longer the same partner in a year compared to our reference year of job loss. Earnings are measured as annual taxable labor

[6] Attrition is negligible in our matched administrative data: from our base year sample, only 0.68 percent have left Finland by year 20, i.e. two decades after the great recession. For comparison, more than 6 percent of the base year sample have died over the same time period.

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.[7] Family income is constructed by adding up the total taxable income including transfers for both spouses. We use these data below to assess the importance of earnings and income losses for displaced workers.

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 according to the ICD classification.[8] We define cumulative mortality for each post-displacement year starting from one-year mortality and continue up to twenty-year mortality. For the analysis of cause-specific mortality, we group causes of deaths into four broad classes: cancer, circulatory and heart disease, accidents (including traffic) and deaths of despair (combining suicides and alcohol-related deaths).

We use information from the Finnish Hospital Discharge Register to shed light on health and health behaviors after job displacement more broadly. The hospital discharge register provides complete and high-quality information about all inpatient consultations including the dates of hospital admissions, diagnosed medical conditions and medical operations. We group visits into five broad causes based on the main diagnosis.[9] In addition to the four causes for mortality (cancer, circulatory and heart disease, accidents and deaths of despair), we also include visits because of mental health issues. Our outcome variables are indicators equal to one if an individual had an inpatient visit, which was diagnosed by a specific cause, over a certain time period; and zero otherwise.

2.2 Sample Construction and Treatment Definition

Our analysis traces the mortality risk, hospitalization and labor market performance of individuals for several years before and up to twenty years after job loss. Yet, workers experiencing a job loss

[7] All 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 and can be received for 23 months (or 500 days). After exhaustion, individuals are eligible for a much lower transfer of around 22 percent of average monthly earnings. Individuals who have an illness or disability that reduces their capacity to work are eligible for sickness (for illnesses less than one year) or disability allowance (for illnesses impairing the capacity to work for more than a year). Sickness benefits are available for 60 days with a waiting period of two weeks; extensions to 300 days require special permission. The disability allowance is available without time limit and depends on the degree of impairment and assistance needed.

[8] Diagnoses are coded using the ICD-9 classification until 1995 and ICD-10 classification since 1996. Appendix table A1 provides the ICD-9 and ICD-10 codes to construct our cause-specific mortality and hospitalization variables.

[9] Validation studies have found the quality and completeness of the Finnish Hospital Discharge Register to be exceptionally high (Sund, 2012).

might have unobservable characteristics or differential career and health trajectories than individuals who did not lose their job. To identify causal effects, we focus on workers who lose their job in a plant closure during the great depression that hit Finland after the breakup of the Soviet Union. After 1990, many firms that were heavily specialized in producing for the socialist economies, lost their main market in the Former Soviet Union. The economic crash that followed reduced Finland's GDP by a stunning 11 percent between 1990 and 1993 (see figure A1). In the labor market, unemployment quadrupled from 3.5 percent in 1990 to over 16 percent in 1993 (Gorodnichenko et al., 2012). Plant closures in the export sector and the many supplier industries were so widespread that workers who lost their job in a plant closure during the great depression resemble the average worker in terms of observable and unobservable characteristics (see also Huttunen and Kellokumpu, 2016).

Our sample is restricted to workers between the ages of 20 and 49 with at least one year of tenure at their employer in the years 1991-1993. We label these years as 'base years', t. We drop public sector employees in our main analysis as plant closures are less frequent in the public sector; we show below that including public sector workers does not affect our results. We focus on workers in plants with at least 10 and at most 1,000 employees as employment tends to be very volatile in very small plants. We further restrict the sample to individuals with a partner or spouse who was at least 18 years old in the base year.

Using these data, we label workers as displaced workers if their 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 require that less than 70 percent of the displaced individuals are observed in a single other plant in the following year. Plants might start to shed labor even before the actual plant closure, and some workers might quit and leave before the plant actually closes (see, e.g., Eliason and Storrie, 2006). To capture these early leavers, we also include workers in the displaced group if they separated between t and $t+1$ from a plant that closed down between $t+1$ and $t+2$.

The comparison group consist of all workers in the sample that are not in our displaced worker group. Importantly, we allow workers in the control group to separate for other reasons than job displacement (such as sickness or voluntary job changes) or get laid off later. The idea is that during the deep recession plant closures disrupt job matches for largely exogenous reasons; hence, it is uncertain what would have happened to the worker and his match had his plant not closed

down.[10] Notably, the control group is constructed to satisfy the same sample restrictions with respect to age, employment, tenure, plant size, sector and partners as our treated group in the same base year.

Figure A2 shows annual earnings (in 1,000 euros) and employment of displaced (in red) and non-displaced workers (in blue) and provides a first visual support for our identification strategy. Negative numbers on the x-axis refer to pre-displacement years, positive numbers to post-displacement years and year zero reflects the base year, i.e. one of the depression years 1991, 1992 or 1993. Both employment rates (top panels (a) and (b)) and earnings (bottom panels (c) and (d)) evolve very similarly for displaced and non-displaced men (left) and women (right) in the pre-displacement period. The fact that levels and growth rates for displaced and non-displaced workers are so similar prior to displacement supports our argument that during the great depression job losses due to plant closures were unrelated to labor market outcomes prior to displacement. The picture looks completely different for workers who are displaced in non-depression years. Appendix figure A3 shows not only sizable pre-displacement earnings differences but also small or transitory earnings losses upon job loss in 'normal' recessions (see also Davis and von Wachter, 2011).

Workers displaced in a plant closure may still systematically differ from workers who do not get displaced in terms of their skill level, age or other characteristics that affect their mortality risk. Table A2 shows that differences between displaced and non-displaced workers are small: displaced workers are 2-4 months younger, earn slightly more and men are 2 percentage points less likely to be married than non-displaced workers. The biggest difference is that displaced workers work in smaller plants than non-displaced workers. Hence, if anything, we would expect them to suffer lower earnings losses and mortality after displacement than the average non-displaced workers. To adjust for these differences, we include a comprehensive set of pre-displacement worker characteristics and earnings in our estimation.

A final concern is that plants that close down employ sicker workers or offer less healthy working conditions than other plants. To check for pre-treatment differences in worker health, we implement three additional tests shown after our main results: first, we check for pre-displacement differences in hospitalization between displaced and non-displaced workers. Second, we compare the mortality risk of individuals working in plants that close down in the future to those working in plants that do not close down in the future. In both cases, we find no pre-treatment differences suggesting that displaced workers do not have different health or health risks than non-displaced workers prior

[10] Our job displacement definition follows Huttunen et al. (2011) and Huttunen and Kellokumpu (2016).

to displacement. Finally, we construct an alternative control group consisting of workers in plants that close down in the future. We find similar results to our baseline indicating that it is indeed the event of job loss, and not some prior unobservable difference, that accounts for the excess mortality we document.

It is important to point out that a job loss, regardless 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 loses access to occupational health services but still has full access to public health services. Yet, quality differences across public and occupational health care services seem to be small.[11]

2.3 Estimation Approach

2.3.1 Effects of Job Loss on Health and Mortality

To track health outcomes for displaced workers relative to our control group, we estimate variants of the following model:

$$Y_{it\tau} = \gamma_\tau \, JobLoss_{it} + X_{it} \, \beta_\tau + \lambda_r + \theta_t + \epsilon_{it\tau} \tag{1}$$

where $Y_{it\tau}$ 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 $Pr(Death_{it\tau} = 1)$, 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 $Pr(Visit_{it\tau} = 1)$ equal to one if individual i had at least one hospital visit τ years post-displacement; and zero otherwise.

The main independent variable $JobLoss_{it}$ 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). For individuals who get displaced multiple times in the great depression, we focus on their first displacement. We include X_{it} to control for any observable differences prior to displacement. As individual characteristics, we include dummies for each age in base year t to capture earnings differences over the life-cycle and the health effects of

[11] There is some evidence that waiting times for doctor appointments are lower in the occupational health care system (see Karanikolos, 2018 for a comprehensive survey of the Finnish health care system). Complex and dangerous procedures like major operations are almost always performed within the public health care system for all patients.

aging non-parametrically. We control for both the level and field of education to account for the well-known health gradient in education. We further include labor market experience, firm tenure and earnings in base year t to adjust for differences in career trajectories prior to displacement. We control for plant size in base year t and industry fixed effects at the 2-digit level to account for differences in labor demand 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 the 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 partner in base year t: a full set of age dummies, the partner's level and field of education, a dummy whether the partner is employed and its interaction with the partner's labor market experience, plant size and industry of employment.[12]

To allow for flexible health effects of job displacement, we estimate equation (1) separately for each year $-3 \leq \tau \leq 20$. 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 unobservables that affect the health of the workforce in our sample conditional on our controls. Note that displacement effects on health cannot be explained by a worsening health infrastructure or industrial decline as we control for detailed region and industry fixed effects. We present several additional pieces of evidence that provide empirical support for the identification strategy. For hospitalization, we plot the γ_τ coefficients for the pre- and post-displacement years and the corresponding confidence intervals. Our estimates show no differences in hospitalization risk prior to displacement between displaced and non-displaced workers. For mortality, we cannot compare pre-displacement mortality ($\tau < 0$) because our treatment definition requires that an individual has to be alive in the base year to be displaced in a plant closure. To demonstrate the absence of pre-displacement differences, we show that comparing workers that get displaced in the future to those not displaced in the future do not exhibit differential mortality levels or trends prior to the actual displacement.

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

$$Y^S_{i*t\tau} = \gamma^S_\tau \, JobLoss_{i*t} + X_{i*t} \, \beta^S_\tau + \lambda^S_r + \theta^S_t + \epsilon^S_{i*t\tau}, \tag{2}$$

[12]The interactions ensure that we include displaced workers with and without employed partners.

where the dependent variables $Y^S_{i*t\tau}$ are health outcomes (mortality or hospitalization) of the partner $i*$ in year τ after i's displacement. As above, $JobLoss_{it}$ 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 otherwise. The set of observable characteristics X_{i*t} is the same as in equation (1) above.[13] Estimating equation (2) separately for each pre- and post-displacement year τ, the coefficients γ^S_τ measure the cumulative effect of i's job displacement on the partner $i*$'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 for the outcomes of spouses of displaced workers after displacement conditional on our control variables. This assumption could be violated if the probability of job loss is correlated across spouses because the couple works in the same firm or same industry. We show below that restricting the sample to dual earners in the base year and controlling for the job loss of each partner does not affect our results. As such, correlated risk of job loss cannot explain the spillovers we observe.

2.3.2 Effects of Job Loss on Employment, Earnings and Income

We explore several potential mechanisms for the observed spillovers, in particular 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 and von Wachter, 2011; Huttunen et al., 2011). Pooling pre- and post-displacement years, we estimate the following model for the displaced worker:

$$Y_{it\tau} = \sum_{\tau=-3}^{20} \gamma_\tau JobLoss_{it\tau} + X_{it\tau}\,\beta + \alpha_t + \delta_\tau + \theta_i + \epsilon_{it\tau}, \tag{3}$$

where the dependent variable $Y_{it\tau}$ is employment, annual earnings or annual income of worker i observed in period τ after the base year t. The key independent variables $JobLoss_{it\tau}$ are indicators equal to one for individual i observed in period τ who was displaced in base year t; and zero otherwise. We include the same comprehensive set of control variables $X_{it\tau}$ for the worker, spouse, region, plant and industry as in equation (1). Dummies for each individual age control for any differences in earnings capacity across a worker's career. 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

[13] In particular, we control for spousal level and field of education, individual age dummies, spousal employment and spousal labor market characteristics by interacting spousal experience, plant size and industry with spousal employment to include non-working spouses (all variables measured in base year t).

income between displaced and non-displaced workers in different depression years t.[14] The equation for the partner of i is defined accordingly.

For earnings or income, we also include individual fixed effects θ_i. As identifying assumption, we then only require changes in earnings and income (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 compositional changes in the treatment or control group through selective withdrawal from the workforce. 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 the pre-displacement year $\tau = -3$. If our identifying assumption is valid, the coefficients γ_{-2}, γ_{-1} and γ_0 in equation (3) should be close to zero and statistically insignificant.[15]

3 Empirical Results

3.1 Mortality Effects after Job Displacement

We first examine the direct effect of job displacement on the displaced worker. Studying the mortality risk of job loss is interesting in its own right and aids in interpreting spillovers in the couple. If we find no adverse impact on mortality for the displaced worker, we would not expect to see sizable health spillovers on the spouse. Appendix figure A4 shows the distribution of base year age for displaced and non-displaced workers conditional on them dying over the next two decades. As expected, the mortality risk increases for both displaced and non-displaced workers with age. Yet, there is a notable jump in the mortality risk for workers displaced after age 30. Hence, it is primarily workers displaced in their prime working years who die at much higher rates than non-displaced workers.

Figure 1 plots the coefficients and 95 percent confidence intervals from equation (1) for cumulative mortality from all causes within τ years after job loss. Displaced men (panel (a)) face a

[14] One could even include base year (t) x post-displacement fixed effects (τ) interactions to allow that post-displacement earnings of individuals displaced early in the depression evolve differently than the earnings of workers displaced later on. The estimates from this even more flexible specification are very similar to the ones reported here. As such, the evolution of earnings and income after displacement do not depend on the particular timing of displacement during Finland's great depression.

[15] Though this condition is neither sufficient nor necessary, it is commonly used to gauge the absence of differential pre-trends (Kahn-Lang and Lang, 2020). Event studies estimates might be inaccurate when pooling cohorts of individuals treated at different times. In our case, we only pool three depression years (1991-1993) and control for level differences in outcomes through base year fixed effects (α_t), however.

higher mortality risk than non-displaced men shortly after the job loss but even twenty years later. We find a strikingly different pattern for displaced women. Losing the job in a plant closure has literally *no* impact on women's mortality risk as shown in panel (b) of figure 1. The estimates are even slightly negative in the first three years after displacement suggesting health gains for displaced women in the short-run. These reductions in mortality could be related to reduced stress from work and more time to invest in health-promotion activities relative to non-displaced women. Estimates turn positive six years after displacement, but remain close to zero and never reach statistical significance.

We report estimates for cumulative five-year and twenty-year mortality in table 1. As mortality risks are small, the coefficients can be interpreted as percentage point changes in mortality five or twenty years after job loss relative to the change in mortality risk of non-displaced workers. The gender asymmetry in mortality after job displacement is clearly reflected in the estimates. Men who get displaced in a plant closure face a 0.14 percentage points or 20 percent (compared to a mean of 0.7 percentage points) higher mortality risk than non-displaced men (column (1) in table 1). These estimates imply that, for every 10,000 displaced men, there are 14 additional deaths over a five-year period. The higher mortality risk of displaced workers persists even in the long run. Twenty years after displacement, the added mortality risk is 0.69 percentage points (column (2)) resulting in 69 excess deaths for every 10,000 displaced men. In percentage terms, the long-term effect (12%) is smaller than the medium-term effect because of catch-up mortality among non-displaced men.[16]

The excess mortality we find for men is smaller in the first years after job displacement than in United States, but remarkably similar for the two countries in the long run (Sullivan and von Wachter, 2009).[17] One potential explanation for the smaller short-run mortality effect is that most 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 question below when we investigate earnings losses. Because appendix figure **??** showed that many men are in their prime age when displaced, the health burden in terms of years

[16] Martikainen 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 do not think so. Individuals who get displaced in a boom period are much more negatively selected compared to either the average non-displaced worker or individuals who lose their job in a plant closure during a recession. Hence, the larger estimates for displacements outside of recessions are likely an overestimate as non-displaced workers have better unobserved labor market outcomes or lower unobserved health risks than workers who become unemployed during an economic expansion.

[17] A 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 49 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 cohorts enter retirement.

of life lost (YLL) is substantial. On average, displaced workers die at age 54 losing around 21 years of their remaining life. Using Finnish life tables we calculate that 1,000 displaced men lose 1,451 life years indicating a sizable health cost of displacement.[18]

For women, there is no mortality effect whatsoever – neither in the medium nor in the long run (columns (3)–(4) of table 1). The five-year mortality risk is 0.04 percentage points or 13 percent *lower*, while twenty-year mortality is 0.05 percentage points or 1.4 percent higher than for non-displaced women. Both estimates are statistically indistinguishable from zero. In comparison, the mortality effect for displaced women is only about one-third the mortality effect of displaced men in the medium run and less than one-tenth in the long run.[19]

The direct mortality effects of job displacement in figure 1 could reflect a selection effect of workers with higher mortality or health risk into closing plants. To assess this concern, we construct an alternative control group of workers working in plants that close down in the future. Specifically, we compare the 5-year mortality effects for workers displaced during the years 1991-1993 to workers working in plants during the years 1991-1993 that close down five years later. The results are reported in column (5) and (6) of table 1. The point estimate is similar than in the baseline suggesting that workers displaced in the great depression face a higher mortality risk even relative to workers displaced later.

One explanation for the slightly larger effect is that plants closing down in non-recession years may employ different workers than plants closing down during the great depression.[20] Yet, the estimates are also noisier because the comparison sample is now much smaller than in the baseline. We provide additional evidence that workers in closing plants are not selected in terms of their health in figure A5. Panel (a) compares the annual mortality risk of males who were employed in year -3 in plants that close down between years 0 and 1 to the mortality risk of individuals working in plants in year -3 that did not close between years 0 and 1. There is little support for a prior selection effect as both group of workers had a similar risk of dying in the years -2 to 0. After the plant closure (after year 1), the mortality risk of workers working in plants that closed down start to increase. The figure indicates that our results of higher mortality of displaced workers is not driven by selection of less healthy workers to closing plants. Section 3.4 further shows that there is hospitalization evolves similarly for displaced and non-displaced workers prior to displacement.

[18]We use period life expectancy in 1990 at each age to calculate the YLL using data from the Human Mortality Database (2021).

[19]We also implemented a matching approach to control for differences in observable characteristics between treatment and control in a flexible manner. We find very similar results as for the linear event study reported here.

[20]Our result is consistent with the evidence in Hilger (2016) that fathers who get laid off in a recession are more productive than fathers laid off in a boom if work productivity is negatively correlated with mortality.

3.2 Spillover Effects of Job Displacement

We next turn to the question whether job displacement has negative consequences for the partner of a displaced person. Evidence of such negative spillover effects would imply that the societal costs of job displacement exceed the damage suffered by the displaced worker alone. Figure 2 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 (female) partner and the key independent variable is whether a (male) person got displaced in a plant closure, and vice versa. Stunningly, panel (a) shows that women face a higher mortality risk after her partner gets displaced. The coefficients are consistently larger than zero and statistically significant eight years after the man's job loss. The elevated mortality risk stabilizes about a decade after displacement. Panel (b) of figure 2 suggests no such dire consequences for the partners of displaced women. Men's mortality hovers close to zero within the first decade after the job loss of their partner and never reaches statistical significance.

Table 2 quantifies the health spillovers and compares them to the direct mortality effect on the displaced person. Male job loss raises spousal mortality risk by about 0.1 percentage points or 28 percent (compared to a mean of 0.37 percentage points) over the first five years after displacement. Hence, for every 10,000 displaced men, there are 10 additional spousal deaths within five years of displacement. Over a twenty-year period, the effect accumulates to 41 additional partner deaths, an increase of 14 percent. For the partners of displaced women, in turn, we find zero spillover effect on mortality both in the medium and long run (see columns (3)–(4) of table 2). The coefficients for husbands are even slightly below zero and hence, of opposite sign than the direct effect on displaced men in table 1, while the standard errors are slightly larger. Spousal mortality after female displacement even declines by about 5 percent (-0.0006/0.0121) in the medium run and is essentially zero in the long run.

To rule out concerns about differential pre-trends in mortality among partners, we implement the same two tests than for displaced workers. Comparing the mortality risks of women whose partner gets displaced between 1991 and 1993 to women whose partner gets displaced five years later, we still find an effect for women of displaced men, but not effect for men of displaced women (see columns (5) and (6) of table 2). Moreover, comparing the annual mortality risk of female spouses prior to their male partner's plant closure in year 0 and 1 relative to partners of workers whose plant did not close down between years 0 and 1, shows no mortality differences between partners in the years prior to the plant closure (see the lower panel of figure A5). Hence, it is

indeed the event of job loss and not some existing, unobservable health condition of the partner that accounts for the observed excess mortality after male displacement.

3.3 Alternative Samples and Specification Checks

The stunning spillover and gender asymmetry in mortality we document might be due to differences in employment rates, job risk or career path between men and women in our sample.

Specifically, women's differential mortality after male or female job loss could be related to their employment status. If employed women are healthier or less affected by their partner's job loss than non-employed women, the direct effect of female job loss would be lower than the spillover effect of male job loss on women. We re-estimate equations (1) and (2) and restrict the sample to couples where both spouses were employed in the base year. Columns (1) of table 3 indicate that the direct effect of male job loss on 5- and 20-year male mortality in dual earner couples is similar to those in the full sample, which includes couples with non-working spouses. Hence, differences in the health of employed and non-employed women cannot explain the observed spillover effect.

The spillover effects after male job loss in figure 2 could be the direct consequence of partners losing their job in the same recession. A couple's risk of job loss might be positively correlated if they work in the same firm or industry, for instance. Appendix figure A6 shows that partners of displaced men initially have a 3.5 percent higher likelihood of separating from their job voluntarily or involuntarily than partners of non-displaced men – but the effect vanishes over time. To control for the influence of job separation, we compare the mortality of displaced and non-displaced workers conditional on job separation of their partner. Just like in the baseline, column (2) of table 3 shows that displaced men face a substantially higher mortality risk (see the top panel in column (1) of table 3); even more importantly, the spillover effect on their partners is also very similar to the baseline (see the bottom panel in column (1) of table 3). Because spousal separation includes voluntary and involuntary job changes, column (3) of table 3 instead controls for partner's displacement in the same recession as the displaced man. These results confirm that co-displacement does not alter the estimated relationship between male displacement and mortality (see top panel of column (3) in table 3). Most importantly, the correlated risk of job loss cannot explain the higher mortality risk for partners of displaced men (see bottom panel of column (3) in table 3).

While employment rates do not differ much across genders, many more women work in the public sector. As the public sector offers more job security on average, more women with health risks could be selecting in the public sector. As a result, women employed in the private sector might be

less vulnerable to the detrimental effects of job displacement men. To assess whether selection into public sector jobs explains the observed gender asymmetry, we re-estimate our mortality regressions combining employees in the public and private sector. While plant closures are less frequent in the public sector, they do occur during the depression, esp. in public services like energy supply. The results are shown in columns (3) and (4) of table 3. The direct effect of male job loss is very similar to the effects estimates for the private sector alone; the spillover effect on the partner are slightly smaller possibly because a partner working in the public sector benefits from higher job security and less disruption during the great depression.

Finally, the differences in the displacement effects might be the consequence of men and women sorting into different career paths. If men sort into more stressful jobs or industries with higher health risk, they might end up with more health problems than women making them less resilient to the negative consequences of job displacement. To assess this argument, we turn to a re-weighting approach. That is, we use observable worker and job characteristics from the pre-displacement period to estimate the likelihood of having a male career; we then re-weight female workers with larger weights for women in male careers.[21] Columns (7) and (8) of table 1 indicate that women do not suffer higher mortality after job displacement even if they have similar work experience, education or work in similar occupations and industries than men. Hence, differences in working conditions or careers per se cannot explain the asymmetric health effects of job loss.

Plant closures, or the underlying great depression we analyze, might be esp. harsh for workers most exposed to stress or most vulnerable in terms of their health. As an alternative setup, we analyze mortality for a sample of workers who lost their job in a mass layoff. Mass layoffs by the employer, 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 reduced its employment by more than 30 percent between t and $t+1$. The last two columns of table 3 show that men who lose their job in a mass layoff also suffer higher mortality in the medium and long run; the spillover effects on the partner are more muted than for workers displaced in plant closures. The yearly estimates in appendix figure A7 confirm that pattern indicating that the negative effects of job displacement are not restricted to plant closures only.

[21] Our re-weighting approach proceeds as follows. Pooling male and female workers in the base years, we estimate the propensity for a male career using educational level and field, work experience, occupation and industries for each worker. Using these variables, we predict the probability of 'male job'. We then re-estimate our baseline for the sample of female workers where we give higher weights for women with more male careers and lower weights to women in female jobs. Men tend to have more work experience, are somewhat less educated but more likely employed in technical fields than women.

3.4 Effects on Cause-Specific Hospitalization and Mortality

To learn more about the type of health issues that emerge among displaced workers and their partners, we turn to cause-specific hospitalization and mortality records. We focus on four broad causes: accidents, cancer, heart disease and deaths of despair where the latter combines suicides and alcohol-related deaths (following Case and Deaton, 2020). For hospitalization, we add mental health issues. We re-estimate equation (1) where the dependent variables are now inpatient visits and medical treatment for a specific cause (measured within five after displacement) or cause-specific mortality (measured by an indicator if the person died within twenty years after the displacement). We then use the corresponding outcomes for the partners of the displaced worker to investigate spillover effects based on equation (2).[22]

The top panel of table 4 shows that displacement carries a substantial psychological burden for men: displaced men are more likely to be treated for issues related to mental health and despair than their non-displaced peers. Over a five-year period, treatment for mental health issues increases by 17 percent (0.00215/0.0127), while alcohol-related visits or suicide attempts increase by 19 percent (0.00174/0.009).[23] In sharp contrast, we see no increase in hospitalization rates for displaced women relative to non-displaced women (see bottom panel of table 4).

The hospitalization data enable us to provide further support for our identifying assumption that treatment and control groups have comparable health risks *before* the plant closure. Figure 3 plots the estimated risk of hospitalization of displaced men relative to non-displaced men in the years prior to plant closure. More specifically, we estimate the annual risk of hospitalization for mental health or out of despair in the years -3 to 1 for workers who lost their job in plant closure between years 0 and 1 relative to workers not displaced in those years. The figures indicate no differences in mental health or despair-related issues among displaced men *prior* to the plant closure. Hospitalization effects only start to increase in the year of the plant closure (year 0). Hence, figure 3 supports our identifying assumption that there are no differential health dynamics between displaced and non-displaced workers prior to the actual displacement.

[22]Hospitalization and mortality might be positively or negatively correlated – even for the same cause. The two are negatively correlated if displaced workers or their partners are less likely to seek treatment and later die from that specific cause (like cancer, 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.

[23]Health care expenditures, esp. for anti-depressants, also seem to increase for men after a plant closure (Kuhn et al., 2009).

Turning to long-run mortality by major causes in table 5 reveals that cardiovascular diseases, alcohol and suicides are the main culprits for excess male mortality. The risk to die from heart disease is 15 percent (0.00254/0.0165) higher even twenty years after displacement than for non-displaced men.[24] Moreover, we observe many more deaths of despair among displaced men over the twenty-year period than among non-displaced men, an increase by 22 percent (see column (4) in table 5). For displaced women, we even see a slight decrease in long-run mortality due to heart disease confirming that women do not suffer negative health consequences after job displacement.[25] Overall then, the evidence on hospitalization and causes of death clearly reveal that stress related to stigma and loss of self-worth appear major drivers of the severe health effects for men.

4 Explaining the Health Spillovers: Spousal Labor Supply and Financial Income Losses

Our results so far show that job loss not only reduces long-run health and life expectancy of the displaced worker; it also generates sizable and persistent negative spillovers for their partner. The health spillovers we document are, in percentage terms, as negative for the partners as for the directly affected worker.[26] Surprisingly, negative health effects only occur after a man's job displacement. We find no evidence of persistent negative health consequences after women lose their job. Hence, men only suffer a higher mortality risk if they lose their job, but not if their partner gets displaced from their job. The opposite is true for women: they face a higher mortality or hospitalization risk only if their partner gets displaced, but not if they themselves lost their job in a plant closure. For both partners, it is more deadly if the man loses his job than if the woman loses her job. How can we explain these health spillovers and the observed gender asymmetry? In this section, we explore the role of spousal labor supply and the loss in economic resources as possible explanations for the observed patterns.

[24] The effect is even larger in the short-run: within five years after displacement, the risk of dying from heart disease is 44 percent higher among displaced men compared to the control group.

[25] Appendix table A5 shows that partners of displaced men are more likely to be treated than the control group though the effects do not reach statistical significance. For partners of displaced women (shown in the bottom panel of appendix table A5), there are opposing effects with fewer treatments for cancer but more treatments for mental health issues – consistent with no overall effect. With respect to cause-specific mortality, we do not find statistically significant differences between partners of displaced and non-displaced men or women (see appendix table A6).

[26] In absolute terms, the number of additional deaths per 10,000 displaced men is higher than for their partner as men face a higher mortality rate on average.

4.1 Spousal Labor Supply

The partner of a displaced worker might try to compensate for a job loss by increasing their own labor supply. The literature on added workers and second earners has long stressed that spousal labor supply is one mechanism to insure the family against unemployment and other negative labor market shocks (Lundberg, 1985; Stephens, Jr., 2002; Halla et al., 2020). Spousal labor supply could explain the observed gender asymmetry in health spillovers if women increase their labor force attachment or earnings after male job loss, whereas men do not adapt their behavior after female job loss. To estimate spousal labor supply responses, we use equation (3) but replace the dependent variable with employment or earnings of the spouse ($i*$) of displaced individual i. We include the same set of worker and spousal characteristics as before adding individual fixed effects in the earnings regressions.

Panels (a) and (b) of figure 4 shows that employment rates of men and women decline in the first two years after their partner's job loss but return back to its normal level after the end of the great depression. In subsequent years, employment slightly increases relative to partners of non-displaced workers. Overall, however, employment effects are very modest irrespective of the time horizon or the gender of the displaced worker. The short-run employment decline ranges from 1.6 (for female partners) to 2.1 percentage points (for male partners). In the long run, spouses increase their employment rate by at most 1.3 percentage points. Such extensive margin responses are economically negligible when compared to employment rates of over 90 percent for both genders. To convert our estimates into a participation elasticity, we relate the absolute change in employment rates in year 5 after displacement (0.3 percentage points) to the losses in husband's cumulative earnings (-17 percent). The resulting (semi-) elasticity of $\eta^P = 0.022$ is very similar to the elasticity of women's employment response after their husband's displacement reported for Austria (Halla et al., 2020).

Spouses might also increase their earnings, which capture responses both at the intensive and extensive margin. Interestingly, we find similarly modest changes in spousal earnings after displacement (panels (c) and (d) of figure 4). For women, earnings remain unchanged initially but increase by up to 700 euros relative to earnings changes for spouses of non-displaced workers. The earnings changes for men in response to their partner's job displacement follow a similar pattern: earnings

increase in the long run by at most 1,100 euros. Hence, spouses only earn around 3 percent more in response to a displacement of their partner.[27]

What does the observed labor supply response tell us about spillover effects in couples? The short-run decline in partner employment could be explained by the higher risk of job loss during the severe depression we analyze. Partners might have a difficult time keeping their old job, finding a new one or increasing working hours when employers prefer to downsize rather than hire new employees. Figure A6 indeed suggests that women are more likely to separate from their job after male job displacement. Yet, this depression effect fades over time and vanishes eventually. As such, the small spousal labor supply response cannot be attributed to the lack of job opportunities, especially because figure A2 showed that employment rates of displaced workers do catch up with their non-displaced peers over time.[28]

Overall, both extensive and intensive labor supply responses after job loss are too small in magnitude to explain the higher mortality of partners after male job loss or the absence thereof after female job loss. The absence of a sizable labor supply 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 is limited room 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. (2020) report similar small effects for Austria, an environment with much lower female employment rates than in Finland. An alternative explanation could be that private insurance through spousal labor supply responses gets crowded out by public insurance (Cullen and Gruber, 2000; Hendren, 2017). We investigate the role of public insurance in the next section.

4.2 Financial Losses and Public Insurance

Earnings Losses Negative health spillovers could be the consequence of declining family resources, which reduces the couple's demand for health-promoting goods or activities. Economic deprivation

[27] Previous evidence suggests that labor supply responses are lower among women with very young children (Halla et al., 2020). 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. Given that our spousal labor supply effects are very small in the full sample (where couples have children of all ages), our results cannot be explained by the presence of small children in the household.

[28] Leisure complementarities might be an alternative explanation for the short-term employment decline we observe (Goux et al., 2014). If leisure complementarities are used for health-promoting activities, they could explain why we find a small decline in mortality after female job loss for both displaced women and their spouses shortly after displacement. Yet, leisure complementarities cannot explain why the mortality of men and their partners increase after male job loss. To explain the gender asymmetry in mortality, the couple would have to engage in health-promoting activities after a woman's job loss, but in health-damaging activities after a man's job loss.

could further explain the gender asymmetry if earnings losses are larger and more persistent after male than after female job loss. To explore the role of family resources, we use our event study design in equation (3) to compare earnings changes of displaced workers in post-displacement year τ to earnings changes of non-displaced individuals. The top panels of figure 5 show the effect for annual earnings after male job displacement (panel (a)) and after female job displacement (panel (b)). Male job loss causes substantial and persistent earnings losses. The strongest decline is observed in the second year after displacement where male earnings are 11,000 euros or about 33 percent lower than mean earnings of non-displaced workers. Over a five-year period, displaced men lose 30,000 euros or 17 percent of their total earnings capacity (see column (1) in appendix table A7). Male earnings never fully recover to pre-displacement levels even two decades after job loss. Twenty years after displacement, the cumulative earnings loss amounts to 76,300 euros or 10 percent of total earnings capacity (see column (2) of appendix table A7). Displaced women also experience sizable earnings losses: the decline is with around 7,000 euros lower in absolute terms than after male job loss, though with 31 percent very similar in relative terms. Cumulative earnings losses amount to 22,000 euros or 20 percent over a five-year and 47,700 euros or 10 percent over a twenty-period (see columns (5)–(6) in appendix table A7). Overall then, job displacement is associated with sizable and persistent earnings losses for both men and women.

Income Losses and Public Insurance Lower earnings need not translate into economic hardship if earnings losses are compensated by private or public insurance. As spousal labor supply responses are small, private insurance plays a rather limited role in our context. One reason could be crowding out by unemployment insurance or other transfers. Panels (c) and (d) in figure 5 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 suggesting some insurance against job loss. Public transfer compensate for about one-third of the total earnings losses after male displacement over a five-year period.[29] The insurance provided by public transfers is even more modest in the long-run. The cumulative loss in personal income twenty years after male displacement is 59,800 euros. Hence, public transfers compensate only 16,500 Euros or 22 percent of the earnings lost over the two decades (see column (2) in bottom panel of appendix table A7).

[29]The cumulative earnings loss in the first five years after male displacement is 30,200 euros. The cumulative personal income loss over the same period is 19,000 euros (see column (1) of appendix table A7). Hence, the five-year loss in personal income is 36 percent lower than the earning loss.

For women, public transfers compensate almost half (46 percent) of the earnings losses in the medium-run and again just 25 percent in the long run.[30]

Finally, panels (e) and (f) in figure 5 trace the impact of job displacement on family income, which combines earnings for both spouses and public transfers. The panels show that family resources decline by less than earnings losses but exhibits a pattern very similar to personal income. The similar dynamic of personal and family income after displacement underscore the modest spousal labor supply responses documented in the previous section.[31]

4.3 Income Losses and Excess Mortality

Are the gender differences in earnings losses large and persistent enough to account for the health effects and their asymmetry across gender? To answer this question, we need to quantify how earnings or income are related to mortality. A large literature reports a negative association between various measures of income and mortality, but has reached no consensus on the direction of causality and causal pathways linking economic resources and health.[32] We thus proceed by estimating the correlation between pre-displacement earnings (averaged over three years prior to displacement) and mortality in our data following the approach in Sullivan and von Wachter (2009). The pre-displacement correlation should in part reflect the effect of earnings on mortality. If some displaced individuals have worse health and hence, lower labor market earnings prior to displacement, the partial correlation we estimate would be larger in absolute terms than the causal effect of earnings on mortality. If anything, our calculations would therefore overstate the contribution of earnings losses to excess mortality.

Table 6 reveals a correlation between pre-displacement log earnings with 5-year male mortality of -0.0019 (see table 6). As displaced men face a 20 percent higher mortality risk over the first five years, the elasticity of 5-year mortality with respect to earnings for displaced men is -0.27.[33] A reduction in earnings by 10 percent would then raise the 5-year mortality of displaced men by 2.7 percent. As displaced men lose 17 percent of their cumulative earnings over a five-year period, we

[30]The cumulative earnings loss in the first five years after female displacement is 22,000 euros; the cumulative personal income loss over the same period is 11,800 euros (compare columns (5) in appendix table A7. Hence, the five-year loss in personal income is 46 percent lower than the earning loss.

[31]The modest private insurance through spousal earnings is also evident from appendix table A7. Spousal earnings after either male or female job loss after five years (see columns (3) and (7) in appendix table A7) or even twenty years (see columns (4) and (8) in appendix table A7) are never statistically significantly different from zero.

[32]Using shocks to income like lottery wins, some studies report negative effects on mortality (Lindahl, 2005), some zero effects (Cesarini et al., 2017) and some even positive effects on mortality (Snyder and Evans, 2006).

[33]The coefficient of job displacement on 5-year mortality is 0.0014, while the baseline 5-year mortality rate is 0.0071. Hence, 0.0014/0.0071=0.20.

calculate that earnings losses raise mortality by 4.6 percent. Relative to the total mortality increase of 20 percent, earnings losses can thus account for 22.5 percent of the increased mortality risk for displaced men (see the bottom row of column (1) in table 6). We obtain a very similar contribution of 20.5 percent for 20-year male mortality (see column (2) of table 6).[34] Earnings losses can thus account for at most 25 percent of the mortality increase after male job displacement, which is much lower than the contribution of 50-75 percent reported for the U.S. (Sullivan and von Wachter, 2009). The reason is not that Finnish men have lower earnings losses after displacement than displaced men in the U.S.. Earnings losses turn out to quite similar in the two countries ranging from 10-17 percent in Finland to 15-20 percent in the U.S.. The two countries mainly differ in the estimated association between pre-displacement earnings and mortality. The elasticities are around -0.3 in Finland but -0.5 in the U.S.. That implies that earnings play a much more important role for health outcomes in the U.S. than in Finland. One likely explanation for the lower elasticity is that Finnish workers, unlike their U.S. peers, do not lose their health insurance after job displacement.[35] The calculation for personal income, which reflects more closely the loss of actual economic resources, reveals that income losses can account for only 14 percent of the mortality increase for displaced men (see columns (3) and (4) of table 6). The smaller contribution of income relative to earnings underscores that public insurance of job-related earnings losses partially shields a family from the negative consequences of job displacement.

Columns (5)-(8) of table 6 quantify the link between financial losses and spousal mortality. The elasticity of spousal mortality with respect to pre-displacement earnings is around -0.17 – and thus only two-thirds of the earnings elasticity of mortality for displaced men. Relative to the overall increase in spousal mortality (28 percent in the medium run and 14 percent in the long run), male earnings losses may therefore account for around 10-12 percent of the health spillovers in couples. The explanatory power of male income losses for spousal mortality is again somewhat lower (7-10 percent) than for earnings.

What do our findings indicate for the link between economic resources and health? First, monetary losses after job loss are important determinants of health. We acknowledge that the

[34] Interestingly, the elasticity of mortality with respect to earnings does not change much with time elapsed since displacement (-0.24 for 20-year mortality compared to -0.27 for 5-year mortality). Yet, earnings losses become smaller in percentage terms over time (10 percent over a 20-year period rather than 17 percent over a 5-year period) as long-run earnings recover relative to their non-displaced peers. At the same time, catch-up mortality among non-displaced men also reduces the 20-year mortality differential to 12 percent (rather than 20 percent over a 5-year period).

[35] Another potential explanation is that the correlation between pre-displacement earnings and mortality suffers from reverse causality or omitted variable bias. The empirical correlation would be then higher in the U.S. than in Finland, if poor health reduces earnings more in the U.S. than in Finland, for instance.

correlation of mortality with pre-displacement earnings and income might not fully reflect a causal effect. It may well be that individuals with lower pre-displacement earnings had worse health that prevented them from working. In that case, our calculations provide an upper bound to the contribution of economic resources to health. Second, women's earnings losses are smaller in absolute terms than men's earnings losses, which accounts for some of the observed gender asymmetry if the relationship between earnings and mortality were non-linear.[36] Finally, the loss in economic resources can only explain a small share of the rise in spousal mortality. Together with the modest contribution to excess mortality for displaced men, these findings suggest that the higher mortality risk after job loss has a strong non-monetary component.

5 Explaining the Health Spillovers: Widowhood, Separation and Gender Roles

5.1 Widowhood or Breakdown of Relationship

The higher mortality after male job displacement may have a direct effect on the partner. It is well known that the grief and potential social isolation associated with a person's death reduces the remaining life expectancy of the partner left behind. The spillover effect after male job displacement (and its absence after female displacement) might then just be the result of the higher excess mortality of men after job loss compared to women.

To shed light on this mechanism, we relate spousal mortality to job displacement and the occurrence of partner death. The specification is the same as in equation (2) augmented by an indicator whether the displaced worker died within five years of displacement. The results in table 7 show three interesting patterns: becoming a widow or widower after the partner's displacement is indeed deadly. The coefficients on partner death in columns (1) and (2) indicate sizable co-morbidity in couples.[37] It is interesting to note that the negative effects of widowhood are very similar across genders, however. Both men and women are more likely to die when their partner passed away within five years after being displaced (compare columns (1) and (3) and (2) and (4) in table 7). The effects are even slightly stronger for male partners than for female partners.

[36] For female displacement, the direct and spillover effects on mortality are small. In addition, the relationship between pre-displacement earnings and mortality is much smaller than for displaced men. Therefore, despite sizable earnings and income losses for women after displacement, earnings and income play a limited role for explaining mortality.

[37] The impact for twenty-year mortality will isolate a causal effect if partner death within five years after displacement is pre-determined and hence, uncorrelated with health or labor market shocks affecting mortality of the partner left behind.

Most importantly, the gender asymmetry in health spillovers after job loss remains the same as in the baseline even conditional on the partner's death. Hence, widowhood can neither explain the spillover effects after displacement nor the stunning gender asymmetry.

Even if the partner remains alive, the loss of a well-paid job followed by a period of un- or non-employment is likely to strain the couple's relationship. Destructive or aggressive coping strategies of the displaced worker could reduce the actual or future gains from marriage. As a result, the relationship might break down – with negative health consequences for both partners (Charles and Stephens, 2004; Mjörk et al., 2018; Rege et al., 2011). A strained or broken relationship could explain the gender asymmetry in health spillovers if the relationship is more adversely affected when a man loses his job than when a woman loses her job. To investigate the effects of job displacement on breakups and separations, we use the empirical model in equation (1) where the dependent variable is now an indicator whether a couple either gets divorced or stops cohabitating in year τ after displacement. The dynamics of the cumulative probability of breakup of couples with a displaced partner relative to couples without a displacement is shown in figure A8 for male job loss (panel (a)) and female job loss (panel (b)). More couples divorce or separate in year two after male job loss, but then relationships return to a normal pattern compared to couples of non-displaced workers. Following female job loss, the estimates are similar in magnitude but less precisely estimated. Overall, separations seem to play a minor role for explaining health spillovers or their gender asymmetry.

5.2 Effects by Family Structure

Job displacement might shake some couples to the core, while others are better equipped to absorb the negative shock. Do the health consequences of male job displacement differ between traditional couples with a clear division of labor and other couples with more equal roles, for instance? We define 'traditional' couples in several different ways: couples where the man is the main breadwinner; couples in which the man is much older than his partner; couples that are older than the median couple; couples that are married; or couples where the partner does not work.[38] We also investigate the role of children in the household.

A traditional couple where the man is the main breadwinner or the partner is not employed will likely experience a larger financial shock to family income after male job displacement than a couple

[38] A man is the main breadwinner if he contributes more than the median share of 64% to family income. One could also define traditional as couples where the man contributes more than 50% to family resources prior to displacement following Bertrand et al. (2015). The mortality patterns for this alternative definition are similar but statistically noisier than our definition.

where both partners have similar careers, for instance.[39] As such, we might expect worse health outcomes in more traditional couples. At the same time, the gender roles in traditional couples are likely to be more clearly defined, which could reduce the psychological burden or stigma experienced after job loss. To compare the health burden of job displacement for traditional and modern couples, we rerun our mortality regressions using equation (1) separately for traditional and non-traditional couples.

The top panel of figure 6 suggests that men suffer similar health consequences after their displacement irrespective of whether they live in a more traditional or non-traditional relationship. If anything, the mortality effect of job displacement is smaller in traditional couples – if defined by earnings share, age difference and marriage – but not statistically significantly different from the effects in non-traditional couples. The picture is different for the spouse: she is more negatively affected in traditional couples – if defined by earnings share, age difference, age, marriage and spousal employment. Most interestingly, spouses suffer most after male job loss if they do not have children. The presence of dependent children seems to be an insurance device that helps women overcome and cope with the burden of male job displacement.

Overall, the evidence clearly indicates that relationships are under additional strain when the man loses his job. The fact that the mortality risk is influenced by family structure in non-trivial ways highlights that monetary losses alone cannot explain the health spillovers in couples. Instead, patterns for hospitalization and family type point to a substantial psychological component. An involuntary job loss appears to be a more severe blow to the self-defined or ascribed role of men than for women. For women, in turn, the negative spillover effects of job loss mostly manifest in more traditional couples or if the couple has no children.

6 Discussion and Conclusion

A long line of research has shown that individuals who are displaced for exogenous reasons suffer severe earnings losses and excess mortality. Our analysis shows that the dire health effects are not confined to the displaced worker. Using administrative data over more than two decades, we show that man's job loss during an economic downturn significantly increases his own mortality, but also his partner's risk of dying. For every 10,000 displaced men, there are 110 extra deaths within two

[39] Earnings losses might be even 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 modern couples. Yet, partners in traditional couples also have more room to expand their labor supply to compensate the earnings losses after displacement.

decades. Up to 40 percent of this excess mortality fall upon the partners of displaced men. Our study also reveals a stunning gender asymmetry: when a man loses his job in a plant closure, both he and his spouse suffer negative health consequences. When a woman loses her job, in contrast, we find no such dire health consequences.

We investigate four channels for the observed health spillovers and gender asymmetry. First, spousal labor supply response may insure the couple against negative shocks like job loss reducing the health burden on the displaced worker. We find only very modest spousal labor supply responses for both men and women. As such, they cannot explain neither the health spillovers nor the gender asymmetry. We then investigate the role of declining economic resources and public insurance, for which we find some support. Earnings losses may account for around one-quarter of the direct effect of male job displacement on male mortality. As public transfers provide only partial and temporary insurance, financial hardship helps to explain why the health burden for the couple is worse after male job displacement; the monetary channel seems less successful in accounting for health spillovers in couples, however.

Third, we show that the death of the displaced worker along cannot explain the health spillovers of job displacement even though we document a sizable widowhood effect. Finally, we explore whether some couples are better able to absorb the negative consequences of job displacement than others. Men's health suffers irrespective of the type of relationship he is in. Women, in contrast, suffer less if the couple has children. These findings are not explained by differences in spousal labor supply or earnings losses and point to a substantial psychological component of job loss that affect some families more than others.

Overall, our findings highlight that the societal burden of job displacement is much higher than the economic and health consequences for the displaced workers alone. A second novel result is that the health burden for families with a displaced worker goes well beyond economic deprivation. From this perspective, periods of economic recession or even depression imply a persistent toll on human lives and the long-run health of the population. The size of health spillovers we find has important policy implications and needs to be taken into account when designing public policies to mitigate or insure workers against negative labor market shocks. By highlighting the health costs of great recessions, our results further provide important insights into the current pandemic. In particular, our results show that there is no simple trade-off between economic and health costs as economic recessions also carry a substantial health burden among displaced workers and their families.

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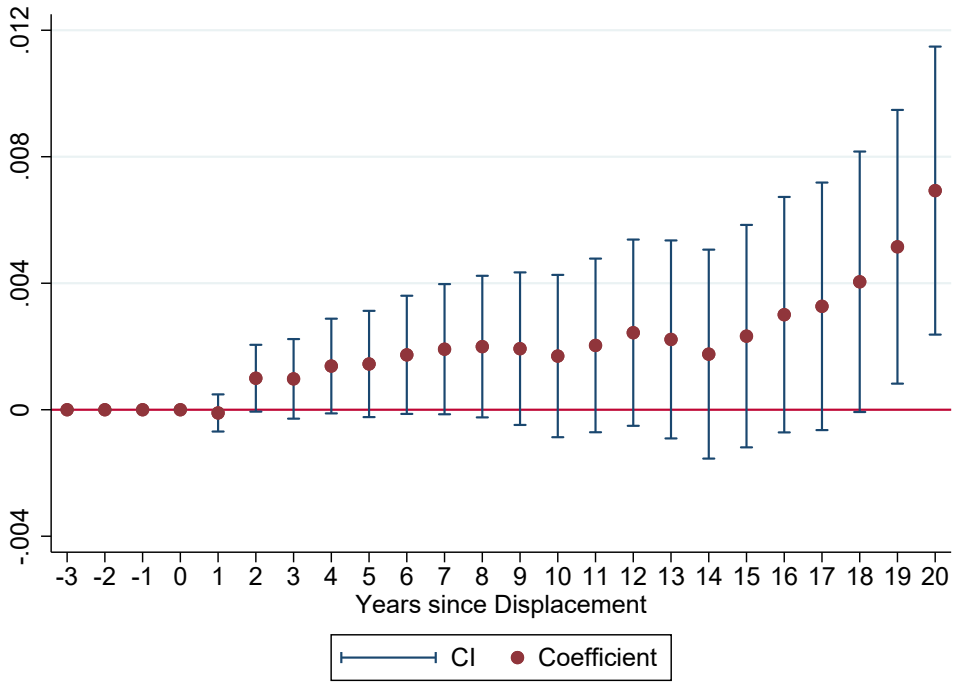
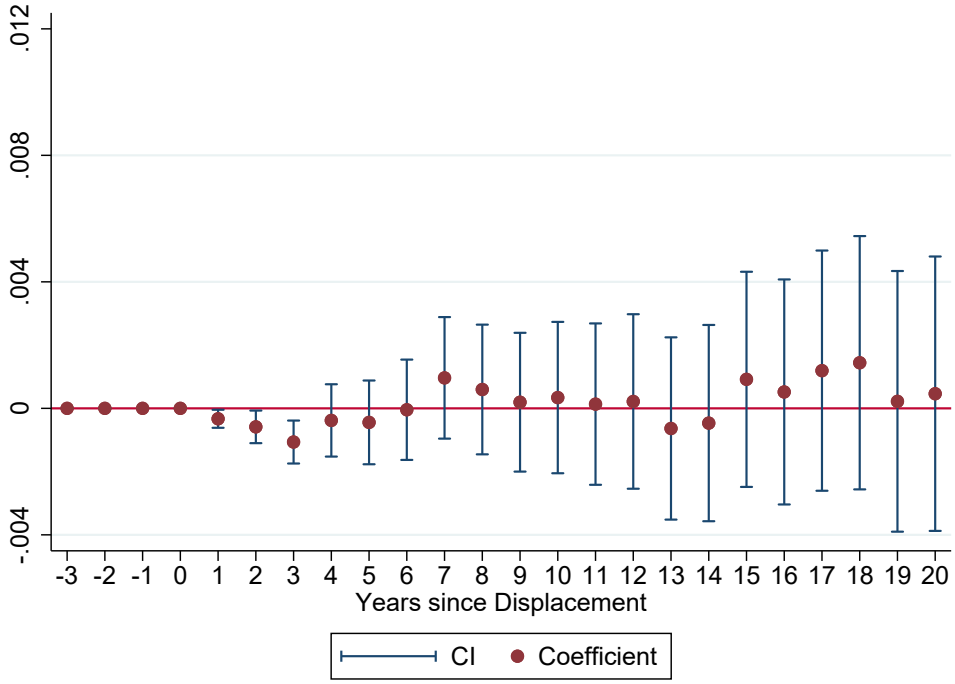


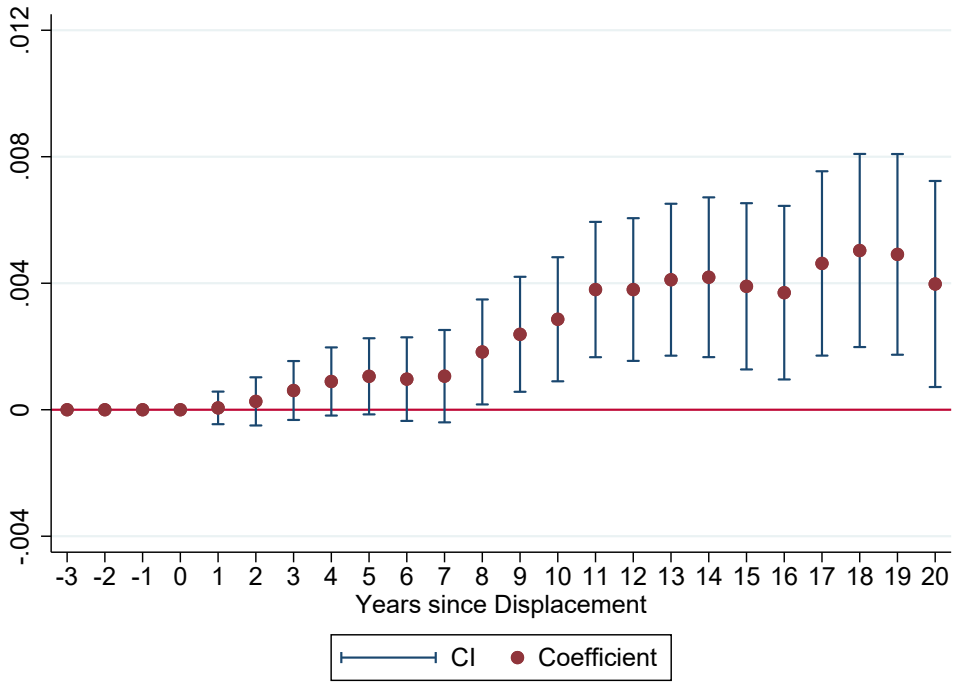
(a) Male Job Displacement and Male Mortality



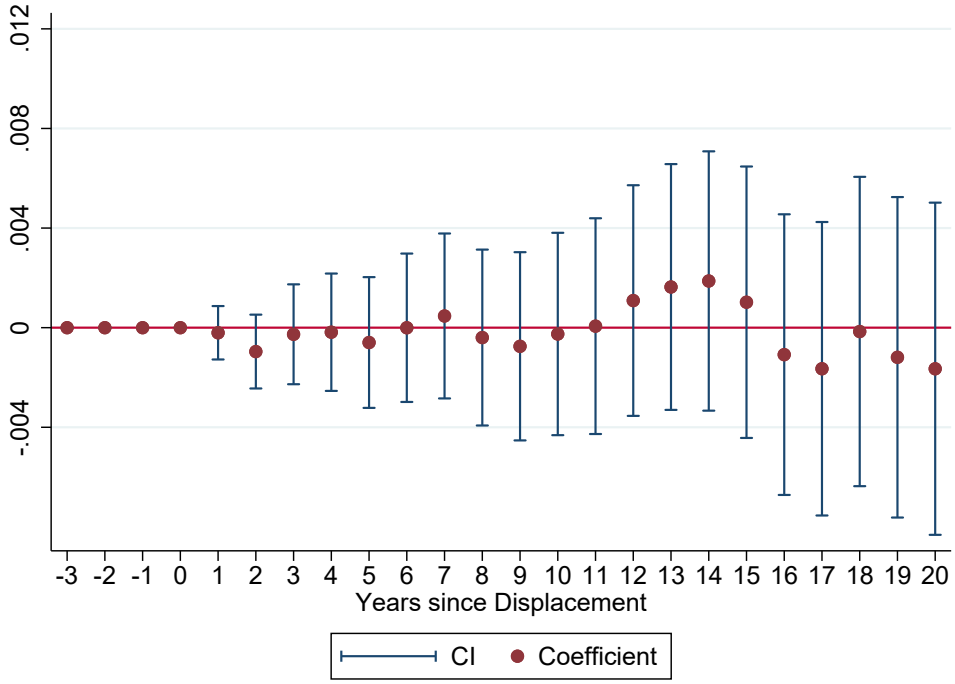
(b) Female Job Displacement and Female Mortality

Figure 1: Direct Mortality Effect of Job Displacement

Notes: The figure displays coefficients and 95% confidence intervals from separate regressions of equation (1), which estimates the effect of displacement on the probability that a worker dies by the year denoted on the x-axis.



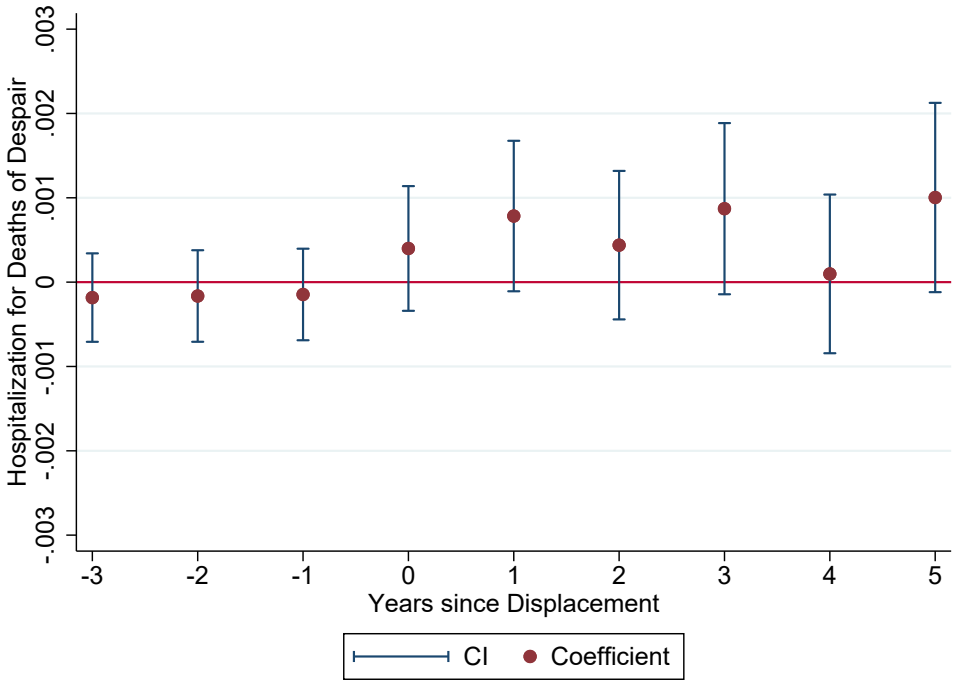
(a) Male Job Displacement and Female Mortality



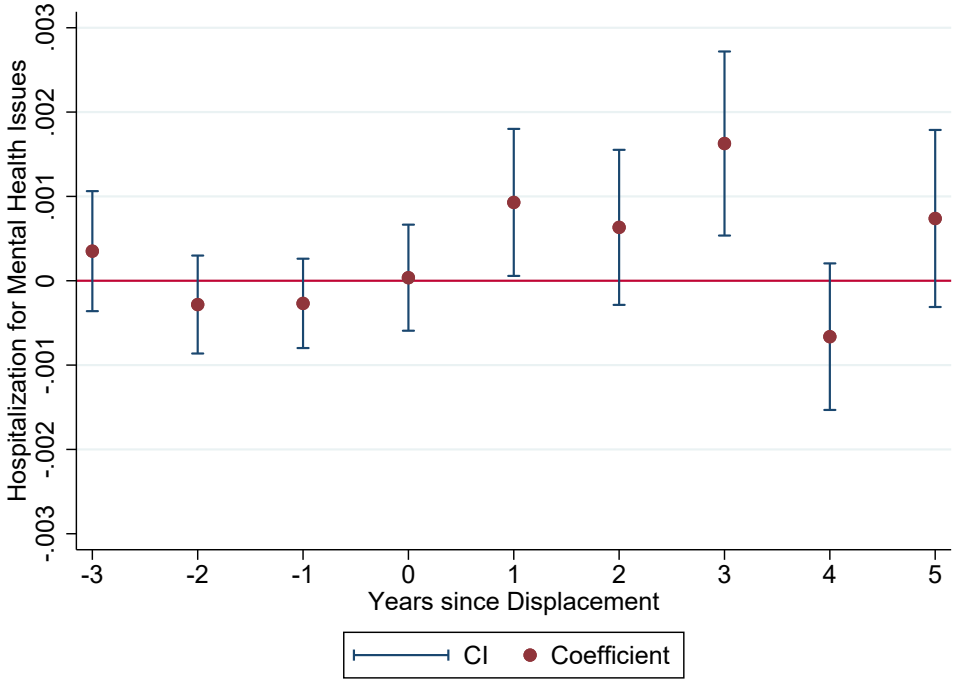
(b) Female Job Displacement and Male Mortality

Figure 2: Spousal Mortality Effect of Job Displacement

Notes: The figure displays coefficients and 95% confidence intervals from separate regressions of equation (2), which estimates the effect of displacement on the probability that the partner dies by the year denoted on the x-axis.



(a) Deaths of Despair



(b) Mental Health Issues

Figure 3: Male Job Displacement and Hospitalization

Notes: The figure displays coefficients and 95% confidence intervals from separate regressions of equation (1), which estimates the effect of displacement on the probability that a displaced man is hospitalized for alcohol (panel (a)) or mental health issues (panel (b)) by the year denoted on the x-axis.

(a) Spousal Employment (Women)

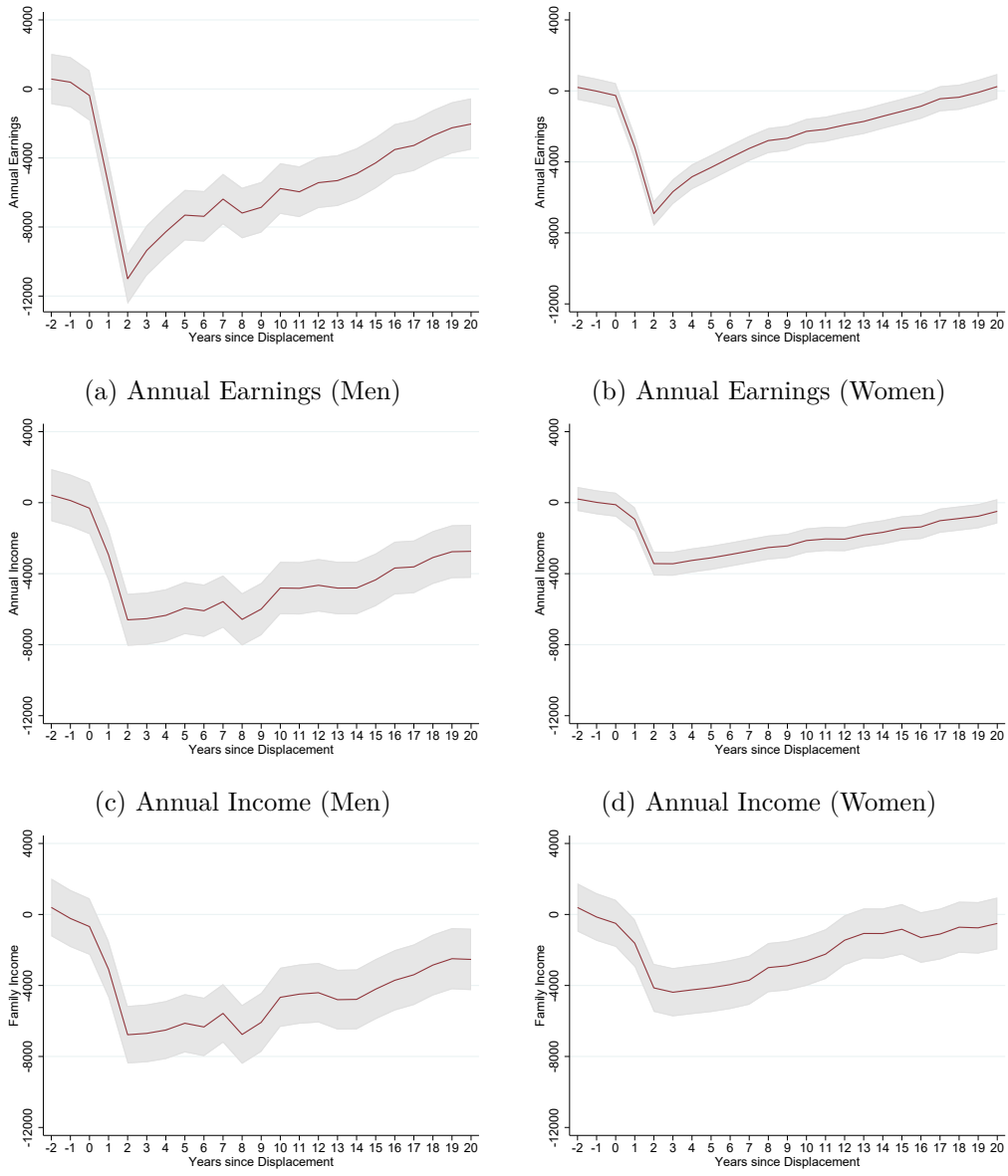
(b) Spousal Employment (Men)

(c) Spousal Earnings (Women)

(d) Spousal Earnings (Men)

Figure 4: Effect of Job Displacement on Spousal Earnings and Employment

Notes: The figure displays coefficients and 95% confidence intervals from regression equation (3), which estimates the effect of displacement on spousal employment (upper panel) and spousal earnings (lower panel) in the years before and after male (left-hand side) and female (right-hand side) job displacement. The earnings regression includes individual fixed effects, and drops the displacement indicator for year -3 from the regression.



(a) Annual Earnings (Men)

(b) Annual Earnings (Women)

(c) Annual Income (Men)

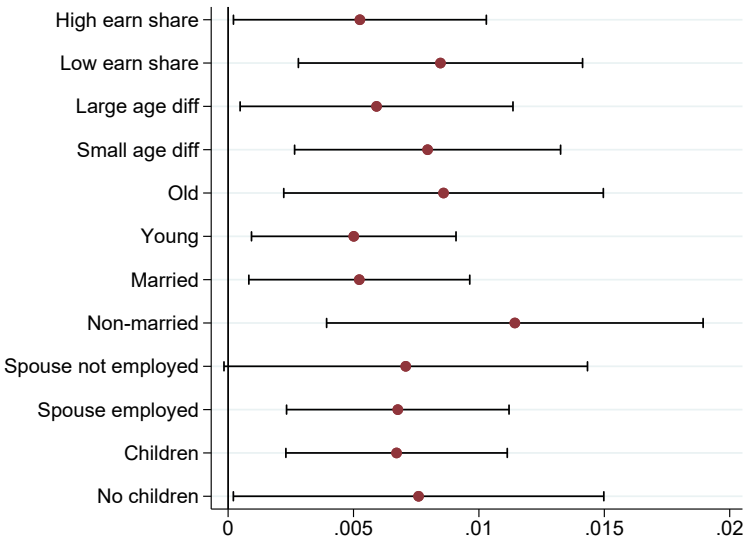
(d) Annual Income (Women)

(e) Family Income (Men)

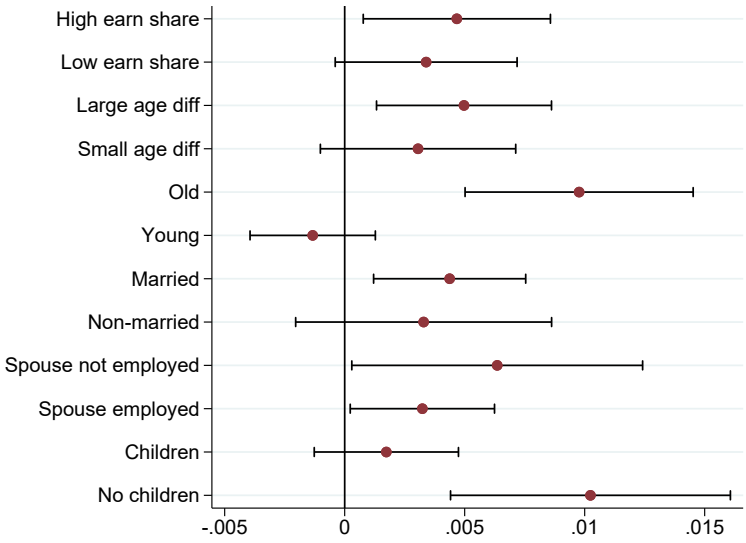
(f) Family Income (Women)

Figure 5: Effect of Job Displacement on Earnings and Income

Notes: The figure displays coefficients and 95% confidence intervals from regression equation (3), which estimates the effect of displacement on worker's earnings and employment in the years before and after male (left-hand side) and female (right-hand side) job displacement



(a) Direct Effect on Male Mortality



(b) Spillover Effect on Partner Mortality

Figure 6: Male Job Displacement and Mortality by Family Structure

Notes: The figure displays the 20-year mortality effects and 95% confidence intervals of male displacement on the displaced worker (in Panel (a)) and his partner (in Panel (b)) estimated from separate regressions of equations (1) and (2) for the couples specified on the y-axis: couples where the man is the main breadwinner (high vs. low earnings share); couples with an age difference above the median (large vs. small age difference); couples split by the median age (old vs. young); married and non-married couples; couples where the partner was working vs. not working; and couples with vs. without children. All characteristics are measured in the base year and hence, prior to displacement.

Table 1: Direct Effects of Job Displacement

	Full Sample				Displaced Worker Sample		Re-weighted Sample	
	Male Job Loss		Female Job Loss		Male Job Loss	Female Job Loss	Female Job Loss	
	5-Year	20-Year	5-Year	20-Year	5-Year	5-Year	5-Year	20-Year
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Job Displacement	0.00144*	0.00687***	-0.00044	0.00046	0.00170	0.00055	-0.00060	-0.00037
	[0.00085]	[0.00231]	[0.00067]	[0.00220]	[0.00145]	[0.00095]	[-0.00047]	[-0.00368]
Individual Characteristics (Pre-Job Loss)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Plant Size (Pre-Job Loss)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Occupation Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Region Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Displacement Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Spousal Characteristics (Pre-Job Loss)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	468,016	468,016	345,239	345,239	26,968	19,502	345,239	345,239
Mean of Dependent Variable	0.007	0.059	0.003	0.032	0.007	0.003	0.003	0.032
R^2	0.005	0.030	0.004	0.018	0.025	0.019	0.009	0.029

Notes: The table reports the direct effect of male and female job displacement in t on 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 $t+20$. Columns (1) to (4) use all non-displaced workers as control group; columns (5) and (6) use workers who get displaced in the future as control group; and columns (7) and (8) uses a reweighting approach to give high weights to women with male labor market characteristics. All specifications include the following pre-displacement characteristics for the displaced worker and partner: individual age dummies, annual earnings, labor market experience, level and field of education, plant size, 2-digit industry. Spousal labor market characteristics are interacted with an indicator for spousal employment to include non-working spouses. Controls also include whether the couple is married or has children in the baseline, region and base year dummies. Standard errors are reported in square brackets. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.001$.

Table 2: Spillover Effects of Job Displacement

	Full Sample				Displaced Worker Sample		Re-weighted Sample	
	Male Job Loss		Female Job Loss		Male Job Loss	Female Job Loss	Female Job Loss	
	5-Year	20-Year	5-Year	20-Year	5-Year	5-Year	5-Year	20-Year
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Job Displacement	0.00103*	0.00409**	-0.00064	-0.00162	0.00179*	-0.00109	0.00331	0.00632
	[0.00061]	[0.00166]	[0.00133]	[0.00339]	[0.00092]	[0.00218]	[0.00645]	[0.0118]
Individual Characteristics (Pre-Job Loss)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Plant Size (Pre-Job Loss)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Occupation Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Region Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Displacement Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Spousal Characteristics (Pre-Job Loss)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	468,016	468,016	345,239	345,239	26,968	19,502	345,239	345,239
Mean of Dependent Variable	0.004	0.030	0.012	0.089	0.004	0.013	0.012	0.089
R^2	0.005	0.027	0.015	0.073	0.020	0.042	0.028	0.075

Notes: The table reports the spillover effect of male and female job displacement in t on 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 $t+20$. Columns (1) to (4) use all non-displaced workers as control group; columns (5) and (6) use workers who get displaced in the future as control group; and columns (7) and (8) uses a reweighting approach to give high weights to women with male labor market characteristics. All specifications include the following pre-displacement characteristics for the displaced worker and partner: individual age dummies, annual earnings, labor market experience, level and field of education, plant size, 2-digit industry. Spousal labor market characteristics are interacted with an indicator for spousal employment to include non-working spouses. Controls also include whether the couple is married or has children in the baseline, region and base year dummies. Standard errors are reported in square brackets. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.001$.

Table 3: Specification Checks of Direct and Spillover Mortality after Male Job Loss

	Direct Effects						
	Dual Earner Couple			Private & Public		Mass Layoff	
	20-Year (Base)	20-Year	20-Year	5-Year	20-Year	5-Year	20-Year
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Job Displacement	0.00676**	0.00670**	0.00651**	0.00140*	0.00526**	0.00148***	0.00425****
	[0.00270]	[0.00270]	[0.00270]	[0.00079]	[0.00212]	[0.00048]	[0.00131]
Spousal Job Separation		0.00646****					
		[0.00098]					
Spousal Displacement			0.00194				
			[0.00372]				
Observations	348,799	348,799	348,799	551,489	551,489	468,016	468,016
Mean of Dependent Variable	0.060	0.060	0.060	0.007	0.060	0.007	0.059
R^2	0.029	0.030	0.029	0.005	0.030	0.005	0.030
	Spillover Effects						
	Dual Earner Couple			Private & Public		Mass Layoff	
	20-Year (Base)	20-Year	20-Year	5-Year	20-Year	5-Year	20-Year
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Job Displacement	0.00324*	0.00304*	0.00324*	0.00076	0.00265*	0.00047	0.00115
	[0.00183]	[0.00183]	[0.00183]	[0.00057]	[0.00152]	[0.00034]	[0.00093]
Spousal Job Separation		0.0061****					
		[0.00068]					
Spousal Displacement			-0.00007				
			[0.00259]				
Observations	348,799	348,799	348,799	551,489	551,489	468,016	468,016
Mean of Dependent Variable	0.028	0.028	0.028	0.004	0.031	0.003	0.030
R^2	0.018	0.019	0.018	0.005	0.027	0.005	0.027

Notes: The table reports the direct (top panel) and spillover (bottom panel) effect of male job displacement in t on 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 $t+1$. Results for dual earner couples, where both partners are employed in the base year are shown in columns (1)-(3). Column (2) adds an indicator whether the partner separated from their job; column (3) adds an indicator whether the partner was displaced from their job in one of the base years. Results for the sample, which includes both private and public sector workers, are shown in columns (4)-(5); results for the sample of workers displaced in mass layoffs are shown in columns (6)-(7). In all of the specifications, the dependent variable is the probability of dying by year $t+5$ or $t+20$. All specifications include the following pre-displacement characteristics for the displaced worker and partner: individual age dummies, annual earnings, labor market experience, level and field of education, plant size, 2-digit industry. Spousal labor market characteristics are interacted with an indicator for spousal employment to include non-working spouses. Controls also include whether the couple is married or has children in the baseline, region and base year dummies. Standard errors are reported in square brackets. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.001$.

Table 4: Direct Effect of Job Displacement on Hospitalization

	Male Job Loss				
	Accidents (1)	Cancer (2)	Heart (3)	Mental Illness (4)	Despair (5)
Job Displacement	-0.00031	-0.00010	-0.00225	0.00215*	0.00174*
	[0.00187]	[0.00070]	[0.00152]	[0.00113]	[0.00094]
Observations	468,016	468,016	468,016	468,016	468,016
Mean of Dependent Variable	0.042	0.005	0.031	0.013	0.009
R^2	0.006	0.004	0.014	0.004	0.004
	Female Job Loss				
	Accidents (1)	Cancer (2)	Heart (3)	Mental Illness (4)	Despair (5)
Job Displacement	-0.00272	0.00103	-0.00144	-0.00061	0.00006
	[0.00175]	[0.00136]	[0.00227]	[0.00118]	[0.00080]
Observations	345,239	345,239	345,239	345,239	345,239
Mean of Dependent Variable	0.024	0.011	0.041	0.010	0.004
R^2	0.005	0.008	0.013	0.004	0.003

Notes: The table reports the direct effect of male job displacement (top panel) and female job displacement (bottom panel) on hospitalization 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 $t+5$ for a specific cause. All specifications include the following pre-displacement characteristics for the displaced worker and partner: individual age dummies, annual earnings, labor market experience, level and field of education, plant size, 2-digit industry. Spousal labor market characteristics are interacted with an indicator for spousal employment to include non-working spouses. Controls also include whether the couple is married or has children in the baseline, region and base year dummies. Standard errors are reported in square brackets. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.001$.

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

	Male Job Loss				Female Job Loss			
	Accidents (1)	Cancer (2)	Heart (3)	Despair (4)	Accidents (5)	Cancer (6)	Heart (7)	Despair (8)
Job Displacement	0.00019	0.00101	0.00254**	0.00309***	0.00046	-0.00015	-0.00135*	0.00020
	[0.00077]	[0.00126]	[0.00127]	[0.00119]	[0.00057]	[0.00161]	[0.00073]	[0.00088]
Individual Characteristics (Pre-Job Loss)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Plant Size (Pre-Job Loss)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Occupation Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Yes								
Region Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Displacement Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Spousal Characteristics (Pre-Job Loss)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	468,016	468,016	468,016	468,016	345,239	345,239	345,239	345,239
Mean of Dependent Variable	0.006	0.017	0.017	0.014	0.002	0.017	0.005	0.005
R^2	0.003	0.016	.015	0.004	0.002	0.012	0.005	0.003

Notes: The table reports the effect of male job displacement (left side) and female job displacement (right side) on cumulative 20-year mortality. The dependent variable is the probability of dying by year $t+20$ where the worker is displaced (in either t or $t-1$) from a plant that shuts down between year t and $t+1$. All specifications include the following pre-displacement characteristics for the displaced worker and partner: individual age dummies, annual earnings, labor market experience, level and field of education, plant size, 2-digit industry. Spousal labor market characteristics are interacted with an indicator for spousal employment to include non-working spouses. Controls also include whether the couple is married or has children in the baseline, region and base year dummies. Standard errors are reported in square brackets. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.001$.

Table 6: Contribution of Earnings/Personal Income to Male and Spousal Mortality

	Male Mortality				Spousal Mortality			
	Male Earnings		Male Personal Income		Male Earnings		Male Personal Income	
	5-year	20-year	5-year	20-year	5-year	20-year	5-year	20-year
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Male Displacement	0.00148*	0.00700***	0.00147*	0.00693***	0.00102*	0.00413**	0.00102*	0.00412**
	[0.00086]	[0.00231]	[0.00085]	[0.00231]	[0.00061]	[0.00166]	[0.00061]	[0.00166]
Men's Log Earnings/Income (Pre-Displacement)	-0.00189****	-0.0141****	-0.00195****	-0.0137****	-0.00064**	-0.00511****	-0.00070**	-0.00593****
	[0.000510]	[0.00142]	[0.00057]	[0.00156]	[0.00031]	[0.00100]	[0.00034]	[0.00108]
Earnings/Income Elasticity of Mortality	-0.269	-0,241	-0,277	-0,234	-0,175	-0,169	-0,190	-0,196
Male Earnings/Income Loss (%)	-0,170	-0,100	-0,102	-0,070	-0,003	0,008	0.007	0.012
Mortality Increase through Earnings/Income Loss	0,046	0,024	0.028	0,016	0,030	0,017	0,019	0.014
Total Mortality Effect (%)	0.203	0.117	0.203	0.117	0.280	0.135	0.280	0.135
Contribution of Economic Channel	22,5%	20,5%	13,9%	14,0%	10,6%	12,4%	6,9%	10,1%

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 the full set of control variables. See notes to previous tables for details. Standard errors are reported in square brackets. * p < 0.10, ** p < 0.05, *** p < 0.001.

Table 7: Widowhood Effects after Job Displacement

	Male Job Loss		Female Job Loss	
	5-Year	20-Year	5-Year	20-Year
	(1)	(2)	(3)	(4)
Job Displacement	0.00101*	0.00406**	-0.00062	-0.00158
	[0.00061]	[0.00166]	[0.00133]	[0.00339]
Death of Displaced by $t+5$	0.0108****	0.0262****	0.0290****	0.0737****
	[0.00270]	[0.00593]	[0.00801]	[0.0156]
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	468,016	468,016	345,239	345,239
Mean of Dependent Variable	0.004	0.030	0.012	0.089
R^2	0.006	0.027	0.016	0.073

Notes: The table reports the effect of job displacement on spousal mortality conditional on the displaced worker dying within five years of displacement. The dependent variable is the probability of spousal death by time $t+5$ or $t+20$ where the worker is displaced (in either t or $t-1$) from a plant that shuts down between year t and $t+1$. Death of Displaced by $t+5$ is an indicator equal to one if the displaced worker has died within five years after displacement; and zero otherwise. All specifications include the following pre-displacement characteristics for the displaced worker and partner: individual age dummies, annual earnings, labor market experience, level and field of education, plant size, 2-digit industry. Spousal labor market characteristics are interacted with an indicator for spousal employment to include non-working spouses. Controls also include whether the couple is married or has children in the baseline, region and base year dummies. Standard errors are reported in square brackets. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.001$.

For Online Publication: Supporting Material for "In Sickness and in Health: Job Displacement and Health Spillovers in Couples"

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February 28, 2022

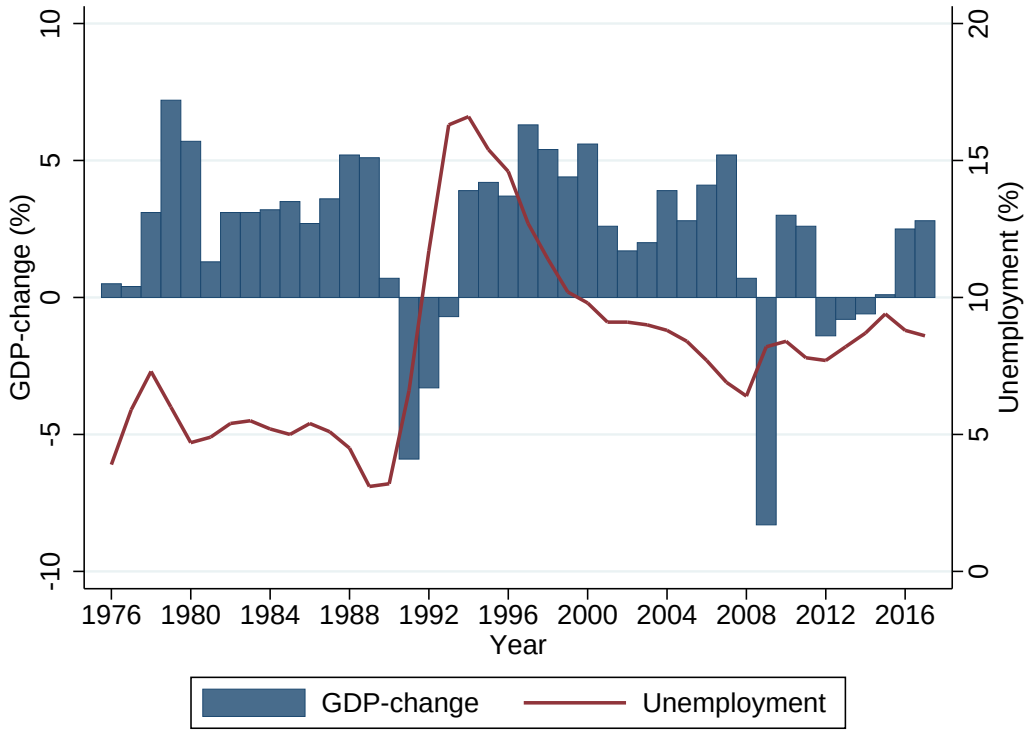
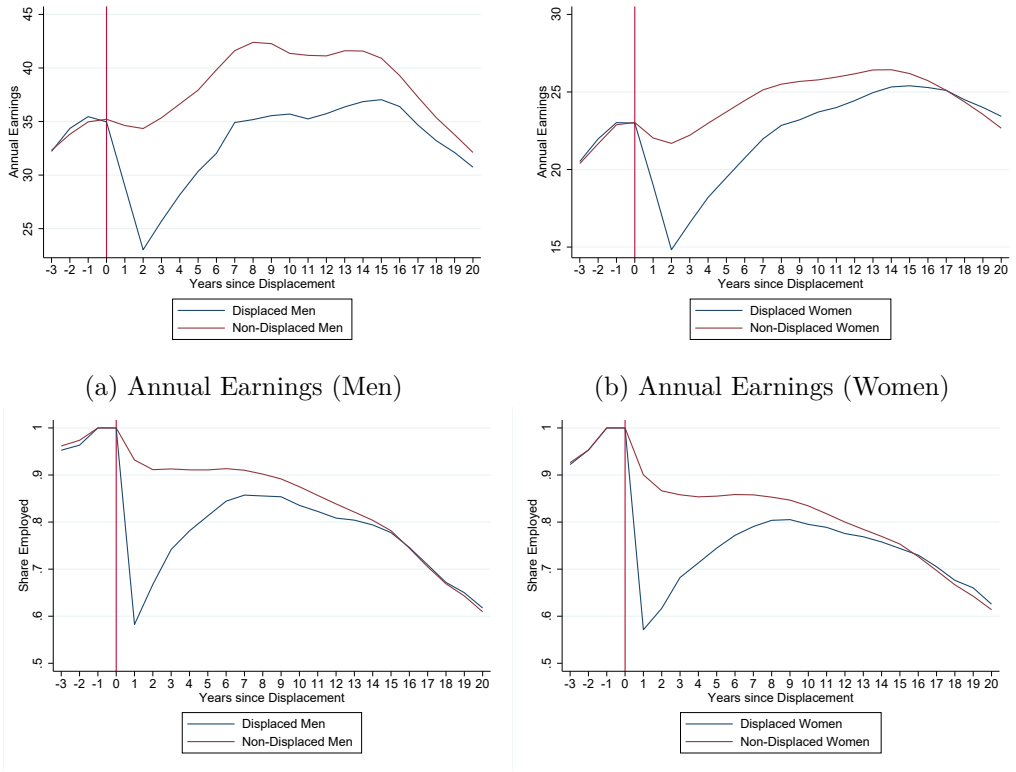


Figure A1: Unemployment and GDP during Finland's Great Depression of the 1990s

Notes: The figure plots the evolution of the GDP-change and unemployment rate in Finland from the year 1976 to 2017.



(a) Annual Earnings (Men)

(b) Annual Earnings (Women)

(c) Share Employed (Men)

(d) Share Employed (Women)

Figure A2: Earnings and Employment after Job Displacement during the Great Recession

Notes: The figure plots the mean annual earnings and employment status of male (left-hand side) and female (right-hand side) workers working in plants with between 10 and 1000 workers in base years 1991-1993. Displaced workers refer to group that lost their job in plant closure between year 0 and 1 where year 0 denotes one of the base years.

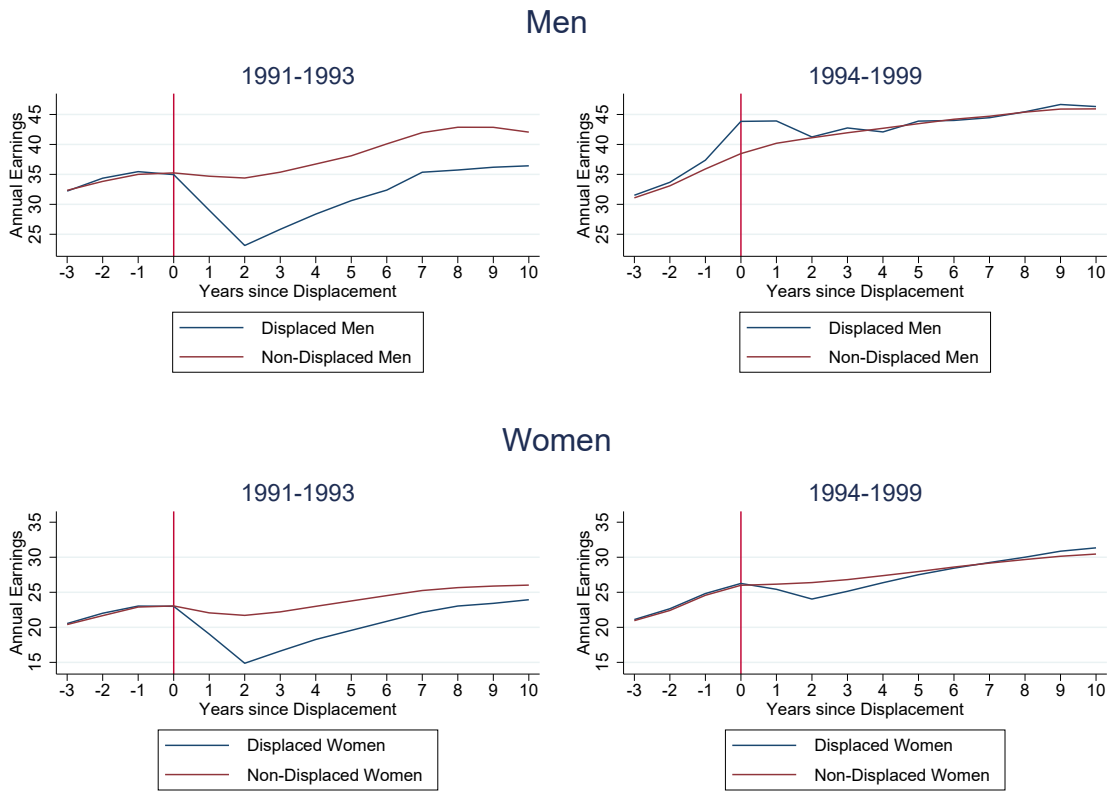


Figure A3: Earnings after Job Displacement in Depression and Non-Depression Years

Notes: The figure plots mean annual earnings of male (top panel) and female (bottom panel) workers employed in plants with between 10 and 1000 workers during the depression years 1991-1993 (left-hand side) and later recession years 1994-1999 (right-hand side). Displaced workers refer to group that lost their job in plant closure between year 0 and 1 where year 0 denotes one of the base years.

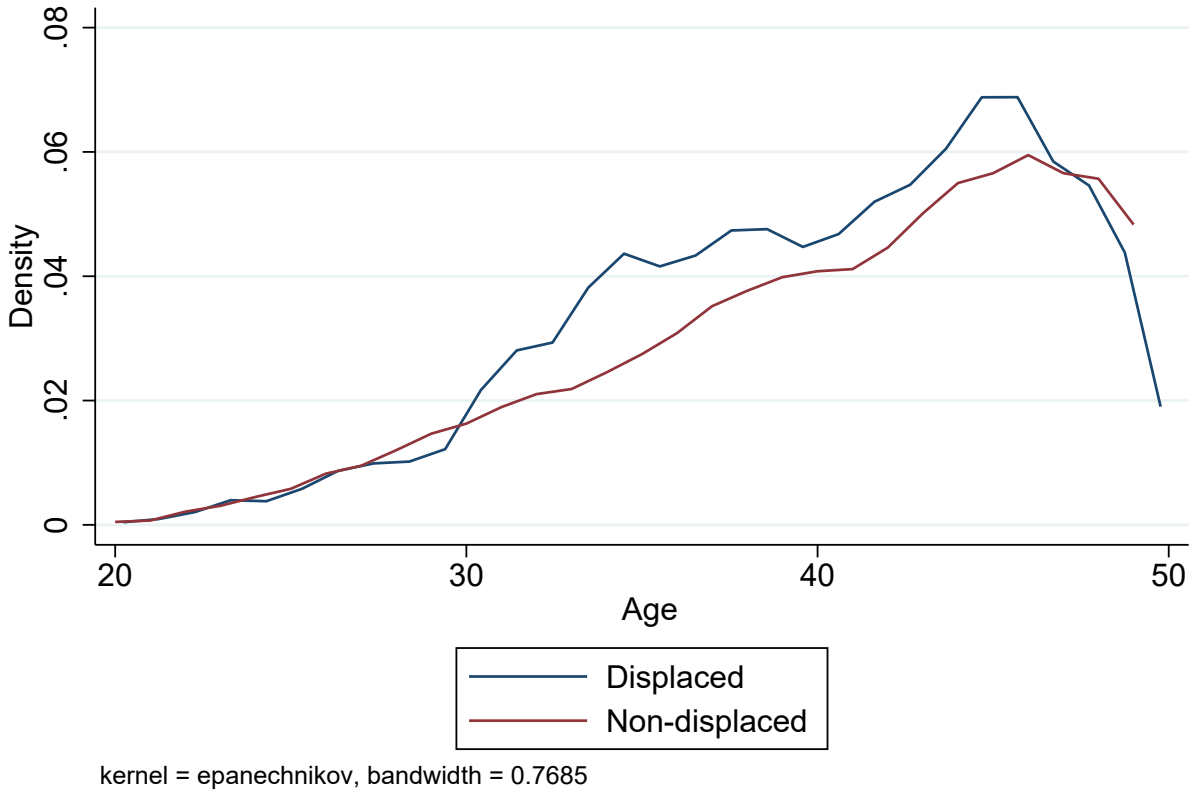
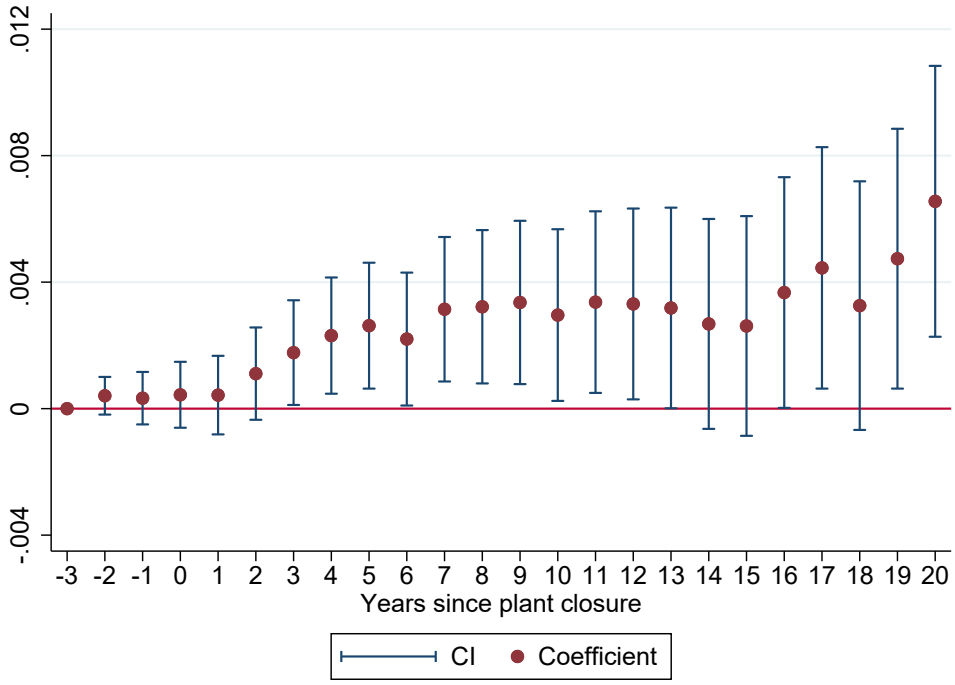
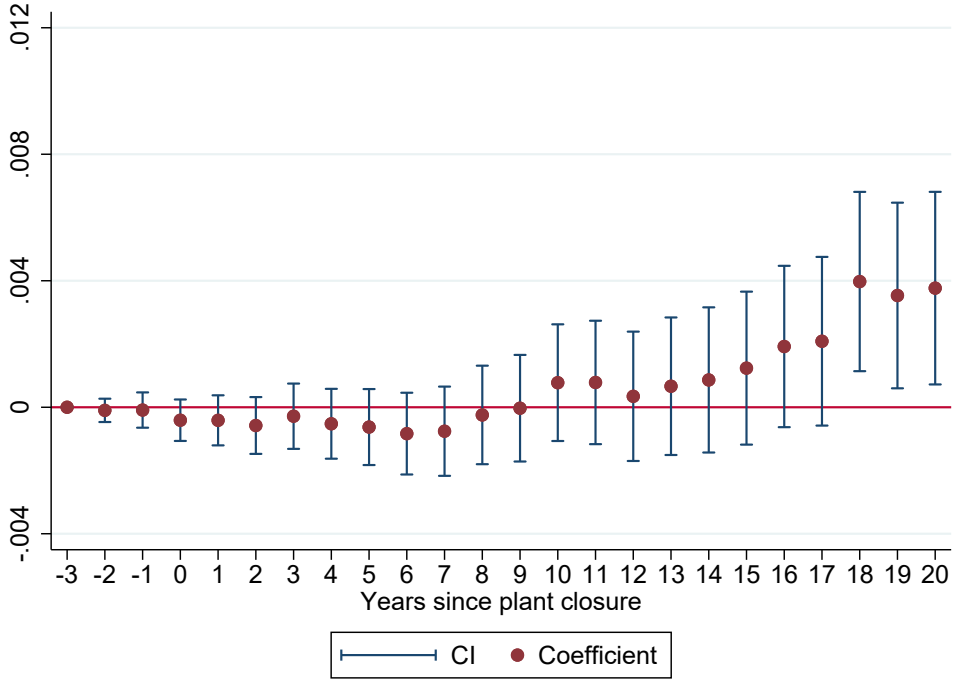


Figure A4: Age Distribution of Workers Dying within Twenty Years by Displacement Status

Notes: The figure shows kernel density estimates of the age distribution of displaced and non-displaced workers who died within twenty years after the base period (1991-1993).



(a) Plant Closures and Male Mortality



(b) Plant Closures and Spousal Mortality

Figure A5: Direct And Spousal Mortality before and after Plant Closure

Notes: The figure in panel a) plots coefficients and 95% confidence intervals from regressions comparing the mortality of individuals working in year -3 in plants that close down between year 0 and 1 to the mortality of individuals working in year -3 in plants that do not close down between year 0 and 1. The figure in panel b) plots coefficients and 95% confidence intervals from regressions comparing the spousal (female) mortality of men working in year -3 in plants that close down between year 0 and 1 to spousal (female) mortality of men working in year -3 in plants that do not close down between year 0 and 1.

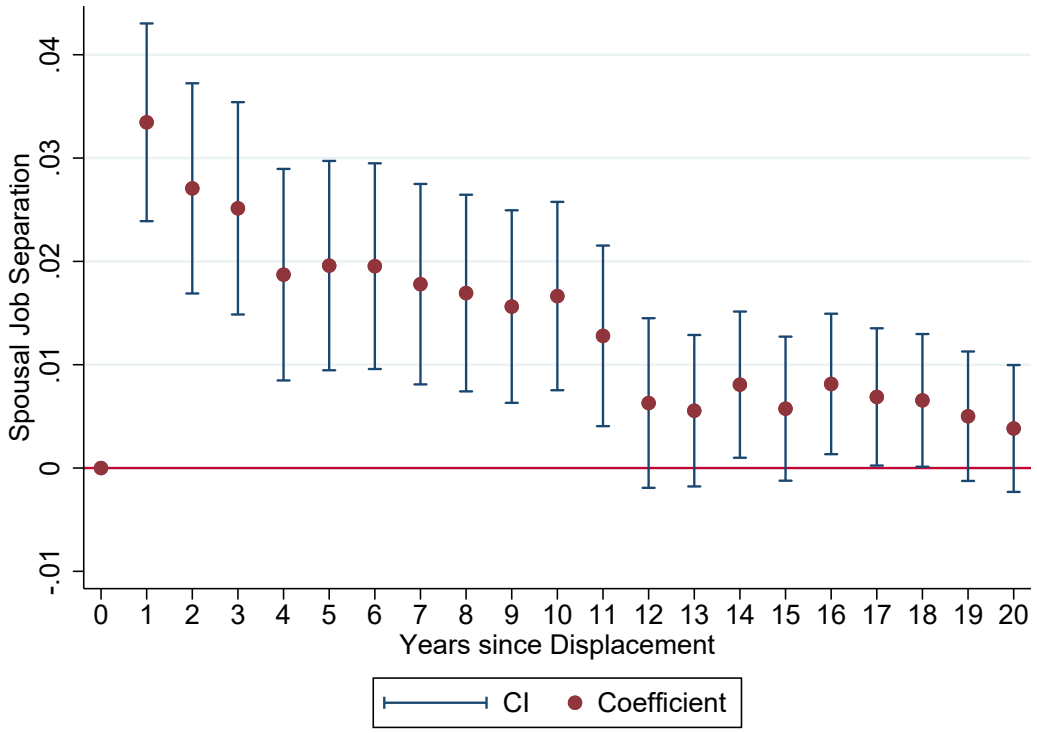
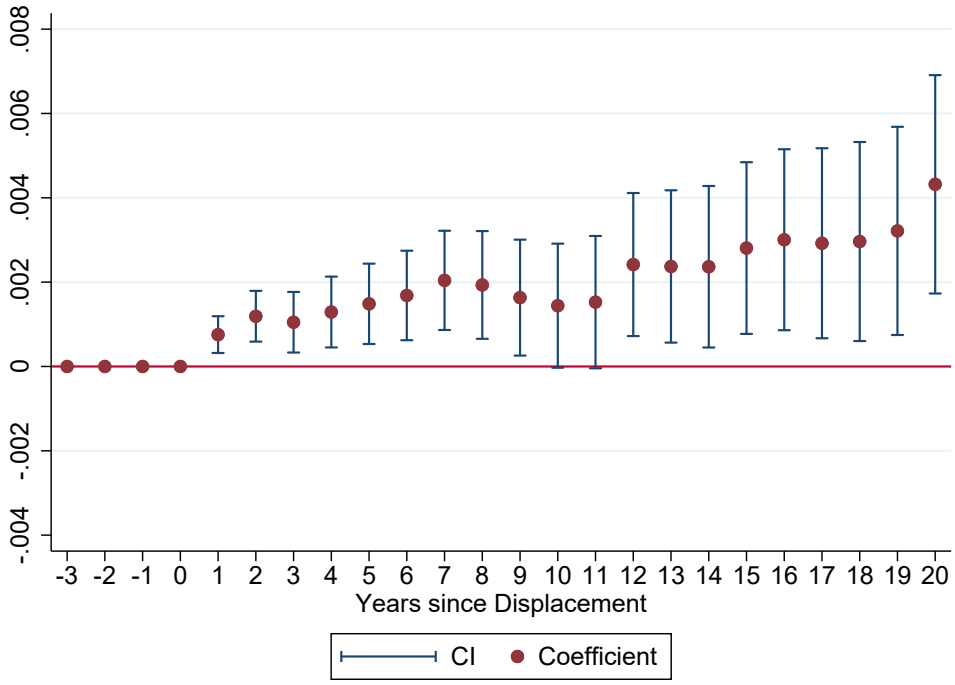
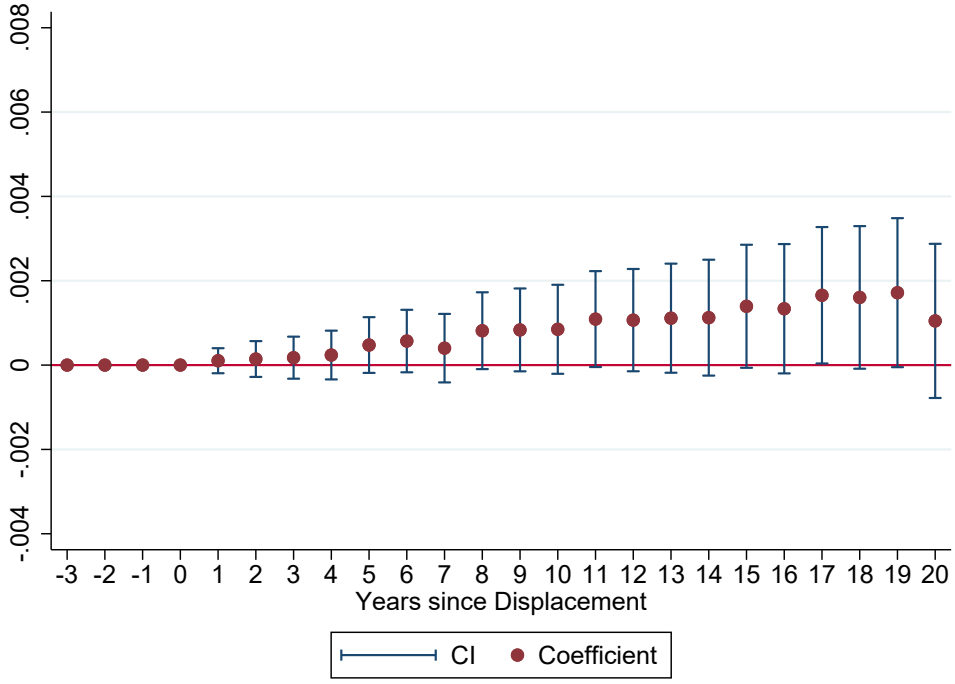


Figure A6: Job Separation of Partner after Male Displacement

Notes: The figure displays coefficients and 95% confidence intervals from separate regressions of equation (2), which estimates the effect of displacement on the probability that a worker's spouse separated from her base year plant by the year denoted on the x-axis.



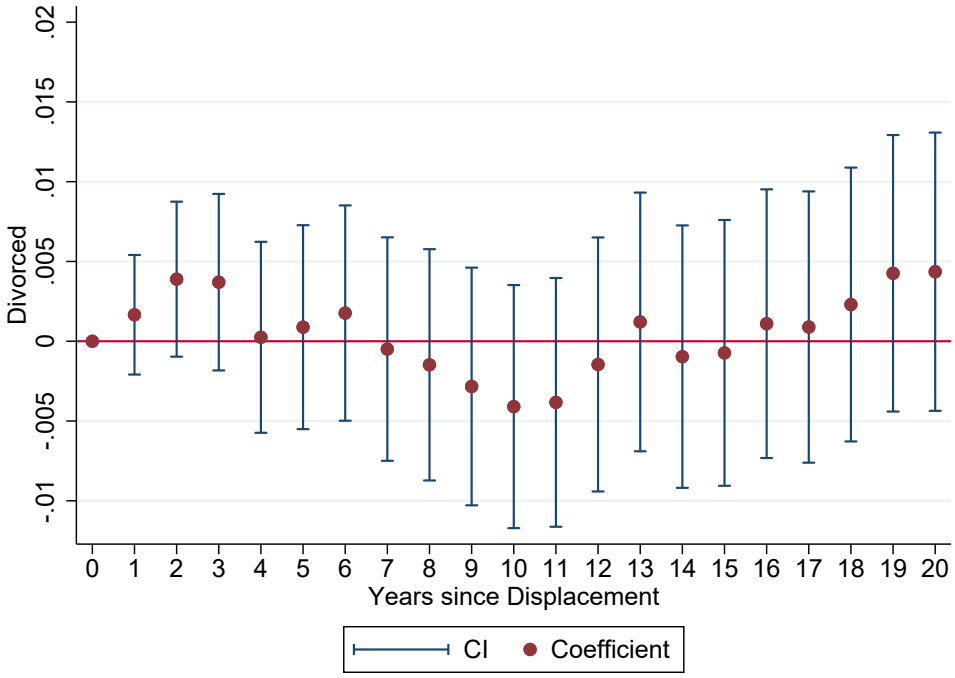
(a) Direct Effect of Male Job Displacement



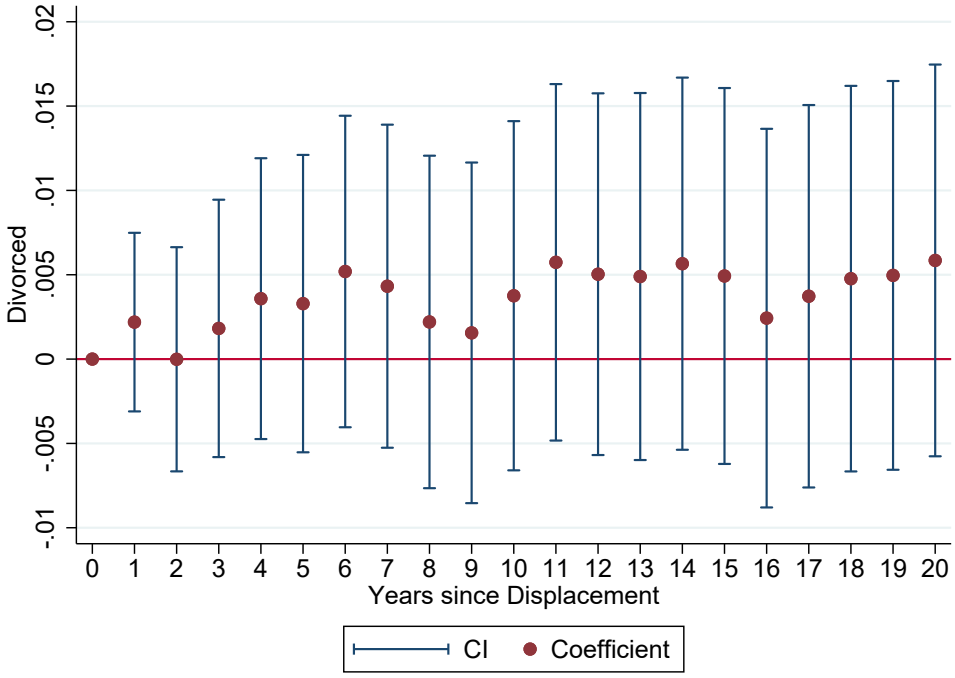
(b) Spillover Effect of Male Job Displacement

Figure A7: Direct and Spousal Mortality after Male Displacement in Mass Layoff Sample

Notes: The figure displays coefficients and 95% confidence intervals from separate regressions of equation (2) estimating the effect of job displacement due to either plant closure or downsizing on the probability that a worker dies by the year denoted on the x-axis.



(a) Male Job Displacement



(b) Female Job Displacement

Figure A8: Effect of Job Displacement on Relationship Dissolution

Notes: The figure displays coefficients and 95% confidence intervals from separate regressions of equation (2), which estimates the effect of displacement on the probability that a person separates from his or her base year partner by the year denoted on the x-axis.

Table A1: ICD-10 and ICD-9 Codes for Disease Groups

	Death certificate	Hospitalization (patient records)	
Disease group	Statistics Finland Classification (corresponding ICD-10 codes)	ICD-10 (1996-2013)	ICD-9 (1988-1995)
Accidents	V01-X44, X46-Y89	V01-X44, X46-Y89	E800-E840, E860-E990, 850
Alcohol	F10, G312, G4051, G621, G721, I426, K292, K70, K852, K860, 0354, P043, Q860, X45	F10, G312, G4051, G621, G721,I426, K292, K70, K852, K860, X45	291, 303, 3050, 3575, 4255, 5353, 5713, 5770D-F, 5771C-D 7607A, 7795A, E851
Cancer	C00-D48	C00-C97	140-208
Heart	I00-I425, I427-I99	I00-I59, I70-I99	390-429, 440-459
Mental illness	-	F00-F99	290-319
Suicide	X60-X84, Y870	X60-X84	E950-E959

Notes: The table provides the ICD-9 and ICD-10 codes used to construct the cause-specific mortality and hospitalization variables. Disease groups are coded using the ICD-9 classification until 1995 and ICD-10 classification since 1996.

Table A2: Characteristics of Displaced and Non-Displaced Workers

	Men			Women		
	Displaced Workers	Non-Displaced Workers	p-value	Displaced Workers	Non-Displaced Workers	p-value
	(1)	(2)	(3)	(4)	(5)	(6)
Age	36.19	36.51	0.00	35.86	36.07	0.02
Low-skilled	0.31	0.31	0.81	0.38	0.38	0.36
Medium-skilled	0.37	0.37	0.67	0.32	0.34	0.00
High-skilled	0.32	0.32	0.49	0.30	0.28	0.01
Labor Market Experience	15.31	15.74	0.00	15.82	15.90	0.45
Tenure	2.54	2.94	0.00	2.54	2.85	0.00
Plant Size	75.40	183.30	0.00	70.96	156.00	0.00
Annual Earnings	33,977	33,683	0.08	21,833	21,631	0.10
Annual Earnings (3 yrs. before job loss)	32,212	32,326	0.51	20,530	20,387	0.29
Employment (2 yrs. before job loss)	0.96	0.97	0.00	0.95	0.95	0.97
Annual Personal Income	35,753	35,368	0.03	23,760	23,470	0.02
Married	0.75	0.77	0.00	0.74	0.74	0.43
Number of Children	1.31	1.32	0.26	1.04	1.06	0.17
Dead in year t+5	0.0084	0.0070	0.10	0.0029	0.0034	0.46
Dead in year t+20	0.0663	0.0584	0.00	0.0326	0.0322	0.87
Observations	12,461	455,555	468,016	6,937	338,302	345,239

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. The last two rows of the table report the cumulative mortality of the displaced by $t+5$ or $t+20$.

Table A3: Characteristics of the Spouses of the Displaced and Non-Displaced Workers

	Women			Men		
	Displaced Workers (1)	Non-Displaced Workers (2)	p-value (3)	Displaced Workers (4)	Non-Displaced Workers (5)	p-value (6)
Age	34.57	34.88	0.00	38.11	38.26	0.14
Low-skilled	0.25	0.24	0.20	0.33	0.32	0.39
Medium-skilled	0.44	0.43	0.04	0.40	0.42	0.00
High-skilled	0.31	0.32	0.00	0.27	0.26	0.02
Labor Market Experience	11.84	11.97	0.09	14.35	14.46	0.40
Tenure	1.37	1.45	0.00	1.59	1.69	0.00
Plant Size	2805.30	2676.60	0.22	1911.29	1930.50	0.88
Annual Earnings	16,292	16,410	0.24	28,321	27,764	0.02
Annual Earnings (3 yrs. before job loss)	16,750	16,901	0.18	30,160	29,621	0.03
Earnings growth (2-3 yrs. before job loss)	0.84	0.77	0.61	0.46	0.46	0.99
Employment (2 yrs. before job loss)	0.81	0.81	0.66	0.92	0.92	0.27
Annual Personal Income	20,242	20,195	0.61	33,041	32,372	0.00
Married	0.75	0.77	0.00	0.74	0.74	0.47
Number of Children	1.31	1.32	0.26	1.04	1.06	0.17
Dead in year t+5	0.0044	0.0037	0.21	0.0118	0.0121	0.81
Dead in year t+20	0.0335	0.0301	0.04	0.0868	0.0892	0.48
Observations	12,461	455,555	468,016	6,937	338,302	345,239

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. The last two rows of the table report the cumulative mortality of the spouses of the displaced by $t + 5$ or $t + 20$.

Table A4: Specification Checks for Female Job Loss

	Dual Earner Couple		Private & Public		Matched Sample		Mass Layoff	
	20-Year (Baseline)	20-Year	5-Year	20-Year	5-Year	20-Year	5-Year	20-Year
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Direct Effects								
Job Displacement	0.00085	0.00072	0.00001	-0.00062	-0.00060	-0.00037	0.00071*	0.00132
	[0.00236]	[0.00237]	[0.00064]	[0.00192]	[0.00047]	[0.00368]	[0.00041]	[0.00118]
Spousal Displacement		0.00229						
		[0.00241]						
Observations	283,190	283,190	463,992	463,992	345,239	345,239	345,239	345,239
Mean of Dependent Variable	0.030	0.030	0.003	0.032	0.003	0.030	0.003	0.032
R^2	0.017	0.017	0.003	0.017	0.009	0.029	0.004	0.018
Spillover Effects								
	Dual Earner Couple		Private & Public		Matched Sample		Mass Layoff	
	20-Year (Baseline)	20-Year	5-Year	20-Year	5-Year	20-Year	5-Year	20-Year
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Job Displacement	0.00118	0.00096	0.00033	0.00036	0.00331	0.00632	0.00016	-0.00109
	[0.00356]	[0.00356]	[0.00122]	[0.00302]	[0.00645]	[0.0118]	[0.00074]	[0.00183]
Spousal Displacement		0.00395						
		[0.00357]						
Observations	283,190	283,190	463,992	463,992	345,239	345,239	345,239	345,239
Mean of Dependent Variable	0.076	0.076	0.012	0.087	0.012	0.084	0.012	0.089
R^2	0.046	0.046	0.014	0.070	0.028	0.075	0.015	0.073

Notes: The table reports the direct (top panel) and spillover (bottom panel) effect of female job displacement in t on 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 $t+1$. Results for dual earner sample, where both spouses are employed in base year in columns (1)-(2), for sample including public sector workers in columns (3)-(4), for matched sample in columns (5)-(6) and for sample including mass layoffs in columns (7)-(8). In all of the specifications, the dependent variable is the probability of dying by year $t+5$ or $t+20$. All specifications include the following pre-displacement characteristics for the displaced worker and partner: individual age dummies, annual earnings, labor market experience, level and field of education, plant size, 2-digit industry. Spousal labor market characteristics are interacted with an indicator for spousal employment to include non-working spouses. Controls also include whether the couple is married or has children in the baseline, region and base year dummies. Standard errors are reported in square brackets. * p < 0.10, ** p < 0.05, *** p < 0.001.

Table A5: Spillover Effects of Job Displacement on Hospitalization

	Male Job Loss (5-Year Hospitalization)				
	Accidents	Cancer	Heart	Mental Illness	Despair
	(1)	(2)	(3)	(4)	(5)
Job Displacement	0.00191	0.00088	-0.00244	0.00101	0.00103
	[0.00146]	[0.00095]	[0.00178]	[0.00109]	[0.00071]
Observations	468,016	468,016	468,016	468,016	468,016
Mean of Dependent Variable	0.023	0.010	0.041	0.013	0.005
R^2	0.005	0.008	0.012	0.009	0.004
	Female Job Loss (5-Year Hospitalization)				
	Accidents	Cancer	Heart	Mental Illness	Despair
	(1)	(2)	(3)	(4)	(5)
Job Displacement	-0.00184	-0.00164*	0.00228	0.00319*	0.00088
	[0.00250]	[0.00096]	[0.00240]	[0.00182]	[0.00152]
Observations	345,239	345,239	345,239	345,239	345,239
Mean of Dependent Variable	0.045	0.008	0.039	0.019	0.015
R^2	0.006	0.009	0.027	0.013	0.013

Notes: The table reports the spillover effects of male job displacement (top panel) and female job displacement (bottom panel) on hospitalization. The dependent variable is the probability that a partner is hospitalized by year $t+5$ for a specific cause where the worker is displaced (in either t or $t-1$) from a plant that shuts down between year t and $t+1$. All specifications include the following pre-displacement characteristics for the displaced worker and partner: individual age dummies, annual earnings, labor market experience, level and field of education, plant size, 2-digit industry. Spousal labor market characteristics are interacted with an indicator for spousal employment to include non-working spouses. Controls also include whether the couple is married or has children in the baseline, region and base year dummies. Standard errors are reported in square brackets. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.001$.

Table A6: Spillover Effects of Job Displacement on Cause-Specific Mortality

	Male Job Loss				Female Job Loss			
	Accidents (1)	Cancer (2)	Heart (3)	Despair (4)	Accidents (5)	Cancer (6)	Heart (7)	Despair (8)
Job Displacement	0.00072 [0.00047]	0.00122 [0.00115]	0.00083 [0.00065]	0.00040 [0.00068]	-0.00005 [0.00108]	0.00269 [0.00200]	-0.00142 [0.00191]	-0.00066 [0.00169]
Individual Characteristics (Pre-Job Loss)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Plant Size (Pre-Job Loss)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Occupation Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Region Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year of Displacement Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Spousal Characteristics (Pre-Job Loss	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	468,016	468,016	468,016	468,016	345,239	345,239	345,239	345,239
Mean of Dependent Variable	0.002	0.015	0.005	0.005	0.008	0.025	0.027	0.019
R^2	0.002	0.013	0.014	0.004	0.004	0.031	0.036	0.008

Notes: The table reports the effect of male job displacement (left side) and female job displacement (right side) on cumulative mortality of the spouse. The dependent variable is the probability of the spouse dying by year $t + 20$ due to a specific cause where the worker is displaced (in either t or$t-1$) from a plant that shuts down between year t and $t+1$. All specifications include the following pre-displacement characteristics for the displaced worker and partner: individual age dummies, annual earnings, labor market experience, level and field of education, plant size, 2-digit industry. Spousal labor market characteristics are interacted with an indicator for spousal employment to include non-working spouses. Controls also include whether the couple is married or has children in the baseline, region and base year dummies. Standard errors are reported in square brackets. * p $<$ 0.10, ** p $<$ 0.05, *** p $<$ 0.001.

Table A7: Cumulative Earnings and Income Losses of the Couple

	Male Job Loss				Female Job Loss			
	Earnings		Spousal Earnings		Earnings		Spousal Earnings	
	5-year	20-year	5-year	20-year	5-year	20-year	5-year	20-year
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Job Displacement	-30,181.1****	-76,263.7****	-252.9	2,825.2	-22,021.3****	-47,696.1****	-1,835.8*	-3,391.2
	[776.4]	[5,100.9]	[450.4]	[2,253.6]	[651.3]	[3,128.8]	[1,070.2]	[5,401.0]
Observations	468,016	468,016	468,016	468,016	345,239	345,239	345,239	345,239
Mean of Dependent Variable	177,262	763,555	80,891	372,583	111,926	488,712	126,086	512,998
R^2	0.393	0.200	0.379	0.286	0.358	0.312	0.343	0.273
	Male Job Loss				Female Job Loss			
	Income		Spousal Income		Income		Spousal Income	
	5-year	20-year	5-year	20-year	5-year	20-year	5-year	20-year
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Job Displacement	-18,980.8****	-59,807.5****	699.9*	5,063.2**	-11,848.3****	-35,971.9****	-1,713.7*	-4,813.4
	[695.1)	[5,317.2]	[409.1]	[2,244.8]	[529.7]	[2,987.7]	[1,001.2]	[5,530.3]
Observations	468,016	468,016	468,016	468,016	345,239	345,239	345,239	345,239
Mean of Dependent Variable	186,601	852,938	97,702	436,450	124,764	567,765	146,534	624,601
R^2	0.383	0.191	0.368	0.287	0.386	0.304	0.319	0.247

Notes: The table reports the effect of male (left-hand side) and female (right-hand side) job displacement in t on worker's and their spouse's cumulative earnings (top panel) and income (bottom panel) 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 $t+1$. All specifications include the following pre-displacement characteristics for the displaced worker and partner: individual age dummies, annual earnings, labor market experience, level and field of education, plant size, 2-digit industry. Spousal labor market characteristics are interacted with an indicator for spousal employment to include non-working spouses. Controls also include whether the couple is married or has children in the baseline, region and base year dummies. Standard errors are reported in square brackets. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.001$.