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# The Effect of Job Displacement on Couples' Fertility Decisions*

## Abstract

This paper analyzes the effects of job displacement on fertility using Finnish longitudinal employer-employee data (FLEED) matched to birth records. We distinguish between male and female job losses. We focus on couples where one spouse has lost his/her job due to a plant closure or mass lay off and follow them for several years both before and following the job loss. As a comparison group we use similar couples that were not affected by job displacement. In order to examine the possible channels through which job loss affects fertility we examine also the effect on earnings, employment and divorce. The results show that a woman's own job loss decreases fertility mainly for highly educated women. For every 100 displaced females there are approximately 4 less children born. A man's job loss has no significant impact on completed fertility.

**JEL Classification:** J65, J13, J12

**Keywords:** plant closure, employment, earnings, divorce, fertility.

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# 1 Introduction

The question of how income affects people's fertility behavior has interested economists for decades. The existing evidence points to various directions. Most cross sectional studies suggests that family size is negatively related to household income. The quality-quantity literature explains this finding by suggesting that parents not only demand number of children but also children with certain qualities[1]. Several economic and demographic studies have documented a procyclical pattern of fertility using macro data (see. e.g. Silver, 1970, Ben-Porath, 1973). Dehejia and Lleras-Muney (2004) find that there is an important selection into pregnancy during recessions, which indicates that the effect of income on fertility is not equal to all.

The challenge in studies that examine the relationship between income and fertility is how to obtain exogenous variation in income. Household's income and fertility tend to be jointly determined, which makes it difficult to disentangle the causal mechanism between income and fertility. Several studies have focused on changes in aggregate income (Heckman and Walker, 1990) or unemployment (Dehejia and Lleras-Muney, 2004) in order to mitigate the problems of reverse causality. The use of aggregate measures may however hide important heterogeneity in responses. The impact of income on fertility is likely to differ between spouses and by workers' skill level.

In this study we estimate the effect of job loss that is due to plant closure on couple's fertility behavior. A plant closure can be thought to be an exogenous shock to a worker's career, since it results in a separation of all plant's workers and it is not related to the worker's own job performance. We also use an alternative measure for job displacement, a job loss that results

from significant downsizing of a plant (mass layoffs). A number of studies have shown that displaced workers suffer long lasting earnings losses (e.g. Jacobson, Lalonde and Sullivan 1993, Stevens, 1997, Eliason and Storrie 2006, Huttunen, Møen and Salvanes 2011). Thus we can use plant closures (or mass layoffs) to explore the causal effect of an income shock on fertility behavior.

A job loss is likely to have an indirect effect on a couple's fertility decisions through other ways than income changes. The career break itself can influence a worker's fertility decisions. A worker may want to continue into a new employment relationship without breaks and fear that a child or a pregnancy may decrease the chances of finding new employment (Del Bono, Weber and Winter-Ebmer, 2011). Job displacement also increases the uncertainty concerning the future employment conditions since it increases temporal employment relationships and subsequent job displacements (Stevens 1997, 2001, Farber 2007). This uncertainty can reduce prudent parents' desired fertility (Fraser 2001). Job loss may have an indirect effect on fertility through increased risk of marital dissolution (Charles & Stephens 2004, Eliason 2004, Rege et al. 2007) and by increased health risk (Browning et al. 2006 and Martikainen et al. 2007) and mortality (Sullivan & von Wachter, 2009).

We use Finnish longitudinal employer-employee data (FLEED) matched to birth records to analyze the effect of a job loss on fertility. The data consist of all 16–70 year old Finnish residents from 1988 to 2004. Each worker and their employer in these data have a unique identification code. In addition, information on workers' spouses is included, which makes it possible to create a sample of couples and follow them several years after a job loss. We focus on couples where one spouse lost his/her job due to a plant closure (or mass layoff) in the years

[1] See e.g. Becker and Lewis, 1973, Becker and Tomes, 1976, and Angrist, Lavy and Schlosser, 2007

1991–1993. As a comparison group we use similar couples who were not affected by a plant closure (mass layoff). We follow each couple for 4 years before a job loss and 11 to 13 years after a job loss in order to investigate the changes in their fertility in post-displacement years.

This paper makes several contributions both to family economics and to literature that examines the impacts of job displacements. First, our set up and the data allow us to study the causal effects of income shocks on a couple's fertility behavior at the micro-level. We can distinguish between a woman's own and her spouse's job loss, and thus make a distinction between a shock to the woman's career and a pure income shock. Previous studies have either focused on the effect of a woman's own job loss (Del Bono, Weber and Winter-Ebmer, 2011) or the effect of a husband's job loss (Amialchuk 2008, Lindo 2009), Second, the very long time span makes it possible to distinguish between the impact on postponement and completed fertility. Career and income shocks may force a couple to postpone childbearing without having an impact on completed fertility. Third, the rich data allow us to examine how this effect varies by various observable dimensions, such as education, a spouse's income, family composition etc. We use our theoretical framework to interpret how the effect of job displacement may vary by worker characteristics. Finally, the study uses data from Finland in the early 1990s, during which it experienced a very severe recession where the unemployment rate rose from 3 to 17 percent in less than 4 years. We argue that because of this unusually deep recession the sample of displaced workers can be thought of as a representative group of the work force. The very deep recession also made the income shock a very large and long lasting one. [2]

[2] Davis and von Wachter (2011) show that earnings losses of workers who are displaced in recessions are much bigger than losses during recovery periods. Korkeamäki and Kyyrä (2008), and Verho (2008) also examined the earnings effects of this deep recession on Finnish workers.

The results show that a job loss leads to a long-lasting income reduction. A woman's job loss decreases fertility mainly for highly educated women and for high wage earners. A man's job loss has a much weaker and not so significant effect on fertility as a woman's own job loss. Since men are less engaged in the care of young children, we expect a man's job loss to affect fertility mainly through the income effect. The results indicate that the income effect seems not to be the mechanism through which job displacement influences couples' fertility behavior. Career concerns, especially in the case of highly educated women, seem to be a much more important determinant.

The paper proceeds as follows. The next section presents a brief theoretical background. The third section gives an overview of the existing literature. In the fourth section we describe our data. The fifth section outlines the empirical set up. The sixth section presents the results and summarizes the implications of our estimates. The final section concludes.

## 2 Theoretical Framework

Job displacement can affect fertility in several ways. First, a number of studies have shown that displaced workers suffer from long lasting earnings losses.[3] In the traditional model of fertility (see e.g. Becker 1960, 1965) a reduction of a woman's own wage (a woman's job loss) can affect fertility through income and substitution effects. If children are normal goods, reduction in income reduces fertility (income effect). The wage reduction (or unemployment) makes, on the other hand, the value of a woman's time cheaper and reduces the opportunity costs of having

[3]See for example, Jacobson, Lalonde, and Sullivan (1993), Eliason and Storrie (2006), Couch and Placzek (2010), Huttunen, Møen and Salvanes (2011).

children. This substitution effect increases fertility. The overall effect is ambiguous and depends on the relationship between market wages and the profitability of home production.

In this traditional static model, a man's earnings changes affect fertility only through the income effect, since men are not assumed to take time off from work to participate in the care of young children (see e.g. Heckman and Walker, 1990).

The income shock may also differ between workers of different characteristics. Perry (2004) uses the static model of household production introduced by Gronau (1977) to illustrate how a woman's wage changes affect fertility decisions for different skill groups. The effect will depend on the relationship between market wage and the home production function. For high wage women who initially spend little time in home production, a decrease in earnings will only affect the consumption of goods and thus decrease fertility since the income effect dominates. For low-wage women the wage reduction may even increase fertility, since the substitution effect dominates.

A dynamic model of fertility can help us to understand the possible heterogeneity in the income effect further. It also illustrates that the job loss may affect both the timing of births and completed fertility. In a dynamic framework the effect of earnings on fertility depends on whether the effect is transitory or permanent, and whether the individuals are credit-constrained or not (see e.g. Hotz, Klerman, and Willis, 1997). Under perfect capital markets (i.e. no one is credit constrained) a transitory effect should not have an effect on fertility. However, for credit-constrained households a transitory effect may affect spacing of children, since they want to postpone childbearing to periods when incomes are higher. A permanent effect on earnings (income) affects the completed fertility.

Job displacement can influence a couple's fertility decisions through other mechanisms other than just income changes. The inevitable consequence of job displacement is that there is a career break, since the worker either starts a new employment relationship after the lost one or remains without a job. Job displacement also increases the risk of subsequent job losses (e.g. Stevens 1997). The increased uncertainty about future job prospects may reduce parents' desired fertility (Fraser 2001). Women may want to postpone childbearing after a job loss if they expect pregnant women or women with small children to face more difficulties in finding a new job (Del Bono, Weber and Winter-Ebmer, 2011). The career interruptions may also influence workers from different skill categories differently. Generally, highly skilled workers are assumed to have human capital that deteriorates more rapidly (see e.g. Dehejia Llerajas Muney, 2004, Adda, Dustmann, and Stevens, 2011). Highly skilled women do not want to be double penalized after a job loss, and thus they may more easily decide to postpone childbearing after losing a job. However, job displacement literature has documented (von Wachter and Weber Handverker, 2010, Stevens, 1997) that highly educated workers tend to have shorter non-employment spells and suffer less severe earning losses after job displacement. These studies argue that skilled workers have more transferable human capital and a better ability to re-accumulate skills faster.

Finally, job displacement can influence a couple's fertility behavior through several non-economic outcomes. It is known to increase the risk of divorce (Charles & Stephens 2004, Eliason 2004, Rege et al. 2007), and influence workers' health and mortality (Sullivan and von Wachter, 2010).

To sum up, we expect job displacement to affect fertility through various mechanisms. The impact is likely to vary both between spouses and by a worker's skill level. If we expect that the

impact of job displacement influences fertility mainly through income changes, the reduction in fertility after a male job displacement should be stronger than the reduction after a female job loss (since females' earnings changes work both through substitution and income effects). The effect can vary by a worker's skill level as well, although the direction of heterogeneity of the effect is ambiguous. We should expect the highly educated to react more to job loss, since the income effect may be more dominant for them. However, highly educated workers are less likely to be credit constrained, so transitory shocks on income should not influence their behavior.

If job displacement influences fertility decision through career breaks and concerns, then female job loss should have a stronger impact on fertility than male job loss, since females are more likely to take time off from work after a child birth. The impact may be stronger for the highly educated since they are expected to have human capital that deteriorates more rapidly during jobless periods.

## 3 Previous Literature

Previous studies that have examined the effect of job displacement on fertility include Del Bono, Weber and Winter-Ebmer (2011), Amialchuck (2008) and Lindo (2009). Del Bono et al (2011) examine the effects of a woman's own job loss using Austrian data from 1972–2002. When traditional family economics emphasize the income and substitution effects of a job loss on fertility Del Bono et al. consider the loss of future income and possible difficulties in finding employment when being pregnant or with small children as further effects that a job loss may have on fertility. Comparing the birth rates of displaced women with those unaffected by job losses they find that job displacement reduces average fertility by 5 to 10 %. The strong average

response is mainly explained by the behavior of white collar women. Although the study focuses on women, they also use as a robustness check a small subsample of men, in order to examine how male job loss influences fertility behavior. The male job loss decreases fertility, although the point estimates are slightly smaller than those for females. Their interpretation is that it is not only the loss of income (the income effect) that causes fertility to decline but the career interruption that occurs due to the displacement.

Amialchuck (2011) examines how a husband's job loss affects fertility. Amialchuck uses a husband's layoff and plant closures as sources of exogenous income shocks to a household. He uses Panel Study of Income Dynamics (PSID) data from 1968–1992 and estimates a continuous-time hazard model that describes the hazard of having a first, second or third child 1–6 years after a job displacement. He finds that the husband's job loss and layoffs have a negative effect on the timing and spacing of only the first and the third births.

Lindo (2009) uses the PSID to examine the effect of a husband's job loss on fertility. He finds that a husband's job loss increases fertility in the years immediately after job loss, but the effect becomes positive for the years 3 to 8 after job loss. The total effect on fertility by the $8^{th}$ year after a job loss is slightly negative, although not statistically significant when individual fixed effects are included into the model.

Several studies have investigated the relationship between unemployment and fertility using either macro or micro data. The findings suggest that high unemployment tends to be associated with low fertility (e.g. Ahn and Mira, 2002, Adsera, 2005). The challenge in the studies is that female unemployment status is likely to be endogenous with respect to fertility decisions. Similarly, the studies that examine the impact of income changes on fertility face the challenge

that it is difficult to find exogenous variation in household income (Heckman and Walker, 1990). The studies tend to find a positive relationship between male earnings and fertility.[4]

Few studies have examined the heterogeneity in the effect of income or employment changes on fertility behavior. Dehejia and Lleras-Muney (2004) study the relationship between unemployment rate and selection into motherhood. They find that the fertility response to temporary shocks in income differs substantially by socioeconomic status and by race. In line with theory women who are more likely to be credit constrained (low educated black women) have an incentive to postpone childbearing when the unemployment rate is high, while non credit constrained low skilled women (low educated white women) tend to increase fertility in recessions.

To sum up, there are relatively few studies which have examined how career shocks or income shocks affect fertility. The previous studies that have examined the impact of job displacement on fertility have either focused on male or female job displacement. Without having data on both couples and their characteristics we cannot compare the differences between female and male job losses to fully understand the possible mechanism through which job loss affects fertility behavior. It is also well established that job displacement increases the risk of divorce; this is also an aspect that has been ignored in previous studies that have examined the impact of job displacement on fertility. Finally, there are no previous studies that have examined how the impact of a job loss on fertility differs by education. These are some areas this study aims to contribute to.

[4] To review this literature is beyond the scope of this paper. There is also a large amount of literature that has focused on how financial incentives affect fertility (see e.g. Milligan, 2005).

# 4 Data and Empirical Specification

## *4.1 Data*

The empirical analysis is based on a panel data set from Statistics Finland that links information on employees, establishments and firms. The data include all individuals who were 16–70 years old in the years 1988-2004. The data has unique individual, plant and municipality codes that can be used to merge additional information from other registers. Information on child births is drawn from the population registers provided by Statistics Finland. It has information on the time of birth and the gender of the child.

## *4.2 Structure of Sample*

A sample of workers is constructed as follows. In the original data, which covers all (Finnish) private sector plants from 1988 to 2004, we first define plant closures and downsizing plants. A plant is an exiting plant in year $t$ if it is in the data in year $t$ but it is no longer there in year $t+1$ or in any of the years after $t+1$. We also check whether these are real plant closures. Those exiting plants for which more than 70 % of the workforce is working in a single new plant in the following year are not considered as real closures. A plant is a downsizing plant if it reduces employment more than 30 % between $t$ and $t+1$.

Then we merge the plant exit and downsizing information to individual-level data. We restrict our sample to a (one-third) random sample of 20–40 year old females. We merge spouse information on these data. Spouse can be either a married or non-married cohabiting spouse. When examining the effect of a women's own job loss we restrict the analysis to women who

were working in the Finnish private sector plants with at least 5 workers in year $t$[5]. These years are labeled as *base years*, *t.* Because we want to have women who are well attached to the labor market before job displacement occurs we exclude women who gave birth in year *t*.

We divide this sample into displaced and non-displaced workers. A displaced worker is a worker who was separated between *t* and *t + 1* from a plant that closed down during this time. In addition, we take so called early-leavers i.e. workers who left between *t* and *t + 1* from plants that closed down between *t + 1* and *t + 2*. A plant closure can be thought to be an exogenous shock to a worker's career, since it results in a separation of all a plant's workers and is not related to the worker's own job performance. However, small plants are more likely to close down. As a robustness check we also use an alternative definition of job displacement: a job loss that results from a mass layoff event. This means that a worker is labeled as displaced in year *t*, if she separated between *t* and *t + 1* a plant that downsizes more than 30 % between *t* and *t + 1* Since small plants are much more likely to have relatively large employment fluctuations, we follow the previous literature and take workers in plants with at least 50 workers in base year *t* when using this job displacement definition.

After having defined a worker's displacement status in base year *t*, we follow each worker and his spouse 3 years before a possible job loss, until the 11$^{th}$ or 13$^{th}$ year after a job loss. Our base years are 1991–1993, and we follow workers form these years using the data covering 1988–2004. Thus we have a panel that consists of both pre- and post-displacement year information for both spouses. The construction of the sample allows us to use the rich information on the pre-displacement period to construct the pre-displacement comparability between those who were

[5] The employment information is from the last week of the year. We also restrict sample to workers, who's parental or unemployment benefits did not exceed their annual earnings in base year *t*.

affected by the plant closure or mass layoff event (*treatment group*) and those who were not (*control group*)[6].

When analyzing the effect of a man's job displacement, we take men who were working in Finnish private sector plants with at least 5 (or 50) workers in year *t*, and whose spouses (women) were 20-40 years old in year *t* and that did not give birth in year *t*[7]. These couples are then followed several years before and after job displacement. We also estimate the impact of both spouses' job displacement using a sample of couples, where both spouses where employed in year *t*.

Our object is to look how job displacement affects earnings, employment, income, marital status and fertility. We define our outcome variables in the following way. Employment is an indicator variable that gets the value one if a worker's employment status is "employed". Annual earnings are measured as annual taxable *labor* income in year *t*. We also use another income measure, annual taxable income, which includes also transfers such as unemployment and parental benefits. It is important to make a distinction between these two measures, since in Finland the level of both unemployment insurance and parental benefits is relatively high[8]. We also use total family income as an outcome variable. This is constructed by adding up both spouses' total taxable income. Divorce status is defined using spouse codes. A worker is labeled as divorced if

[6] Following most recent studies, the control group consists of both stayers as well as workers who separated voluntarily or due to illness etc.

[7] The reason for restricting sample to couple's who did not give birth at t, is that we want to compare the effect of female and male job displacements and thus use similar set up. As a robustness check we also examined how results change if we keep couple's that gave birth in year t.

[8] Workers who have been working and contributing insurance payments to the unemployment fund for 10 months during the two years prior to unemployment are entitled to earnings-related unemployment benefits. The average replacement rate is 60 %. The maximum length of earnings related UI is 500 days (23 months). After this workers are entitled to labor market support. All parents in Finland are eligible for earnings-related parental allowance. The parental allowance is calculated using previous year annual taxable labor income and the average compensation is 75 % of previous earnings. The length or parental leave is 263 days (10.5 months). Parental allowance is higher than earnings related UI for most people. Only at very low income-levels can UI exceed parental benefits.

she no longer has the same spouse as in base year *t*. Birth is an indicator variable that gets the value one if the woman has given birth in the current year.

The combined data set has several attractive features. First, it allows us to reliably identify plant closures and downsizing events for the whole economy and follow all the workers affected by these plant close downs. Second, the long follow-up period provides reliable information on the fertility patterns for both displaced and non-displaced workers and makes it possible to distinguish between effects on completed fertility and postponements. Third, since the data contain information on both spouses, we are able to follow both spouses over time and to control for a rich set of family characteristics, including the joint income of the couple, a spouse's age, tenure, employment and job loss status.

### *4.3 Empirical Specification*

In order to examine the effect of job displacement on fertility and other outcomes, we use a standard approach in the job displacement literature and estimate the following equation[9].

$$Y_{ibt} = X_{ibt}\beta + \sum_{j=-3}^{11} D_{ibt-j}\delta_j + \tau_{bt}(+\alpha_{ib}) + \varepsilon_{ibt} \qquad (1)$$

$Y_{ibt}$ is the outcome variable for individual *i* in base year sample *b* in year *t*. We use four different outcome measures: annual earnings in 1 000 euros, annual income and annual family income in 1 000 euros, a dummy for being employed, a dummy for being divorced within a year, a dummy for giving birth in a given year, and a cumulative number of births. X is a vector of the observable worker and firm pre-displacement characteristics; the worker's age at the time of

[9] See e.g. Jacobson et al. 1993. Our approach follows very closely Huttunen, Møen and Salvanes, 2011.

displacement, age squared, a dummy for education level (6 categories), a dummy for education field (10 categories), pre-displacement years of tenure, tenure squared, pre-displacement marital status, the spouse's employment status in base year, the spouse's earnings in base year, the spouse's age and age squared, the number of children four years before a job loss, pre-displacement plant size, pre-displacement region (21 categories) and industry dummies (10 categories), and time dummies*base year dummies interactions.

The model is estimated using all pre- and post-displacement years. The main variable of interest is the displacement variable $D_{it-j}$. This is a dummy variable indicating whether a displacement occurs at time $t - j$, $t$ being the observation year. A job loss is assumed to affect labor market outcomes four years before its occurrence and 11 years after its occurrence, hence j = -3, 11[10]. We will estimate these models as a linear probability model by OLS or as a probit model. Our estimation method relies on the assumption that job displacement event $D_{ibt-j}$ is an exogenous shock to a worker's career[11]. We restrict estimation to couples (men and women who had a spouse in year t) and estimate the model separately for each spouse[12].

# 5 Results

## *5.1 Descriptive Analysis*

The mean values of pre-displacement characteristics for displaced and non-displaced female workers are presented in Table I. Displaced workers in the first two columns are defined as

[10] When using all base years 1991−1993 we follow workers until the end of the year 11th. We also followed base year sample 1991 until the 13th year after job loss.
[11] We also estimated the model using individual fixed effects in order to test whether there are time-invariant differences between displaced and non-displaced workers. Since the groups were very similar before the job loss, the inclusion of fixed effects had little effect and we chose not to report these results.
[12] We also estimate specification that includes both spouses' job displacement dummies in the same regressions.

workers who lost their job due to plant closure during 1991–1993. There should be no significant differences between these groups since a job loss that is a result of a plant closure should be independent of the worker's own performance. However, the group of displaced workers may be selected if there is selective turnover or if plant closures occur more frequently in regions and industries with certain types of workers. The difference in the characteristics immediately before job loss (year *t*) may also be caused by a job loss. It is well known that earnings of displaced workers start to decrease before the job loss actually occurs (see Jacobson et al. 1993).

Table 1 shows that the female workers displaced in plant closures are very similar to non-displaced workers. The only significant difference is plant size. Displaced workers are more likely to be employed in smaller plants. This indicates that most of the disappearing plants are small. We do take this into account in our analysis by conditioning on rich set of pre-displacement plant, worker and industry characteristics, including plant size. However, as a robustness check we restrict the sample to workers in bigger plants and use an alternative definition of job displacement that is a job loss that occurs because a plant closes down or downsizes significantly (mass layoffs). The next two columns in table I report the descriptive statistics for this mass layoff sample. Similarly to the plant closure sample, the differences between displaced and non-displaced workers are very small. Displaced workers are still working in smaller plants, but the relative difference in plant size is smaller than in the plant closure sample. All in all, table I highlights that the raw pre-displacement differences between displaced and non-displaced workers are very small in both data sets, supporting the identification strategy in our paper.

[Table 1]

Table 2 reports the mean of the variables for male sample. Again the differences between displaced and non-displaced workers are very small. The main difference between workers displaced in plant closures and non-displaced workers is the plant size. Non-displaced workers have also a longer tenure than displaced workers. This reflects that young plants are more likely to die. The next columns report the mean characteristics in the mass layoff sample. Now the difference in tenure is even more pronounced between displaced and non-displaced workers. Also, displaced workers seem to have slightly less children than non-displaced workers. The difference in number of children and tenure can most likely be explained by employment contract legislations. In some manufacturing industries the employee contracts require that when employers need to lay off workers for productive reasons, they first have to lay off workers with the least tenure and no children[13]. These industries are male-dominated, which explains why the difference is bigger in the male mass layoff sample. Since this questions the exogeneity of the mass layoff event, we focus on plant closures as our main measure of job displacement definition. We do however report the results for mass layoff sample for comparison. We also include controls for tenure, plant size and number of children in year $t-4$ in our regressions and report the results for outcomes several years before job loss occurs. This way we can transparently show whether job displacement affects outcomes related to the possible pre-displacement differences.

[Table 2]

Figure 1 shows the average annual earnings of displaced and non-displaced workers. The upper panel shows the figure for female workers. The results show that the earnings of the two groups are very similar before job loss. This does indicate that job displacement was an exogenous shock to these workers. Job displacement reduces the earnings of displaced workers and opens

[13] See the Finnish federation for industries and technology http://www.teknologiateollisuus.fi/fi/tyomarkkina-

up a significant earnings gap between displaced and non-displaced workers. The gap is slightly smaller in the mass layoff sample, which may reflect that among workers who are displaced in a mass layoff event there may be more voluntary job to job movers. In the lower panel we report the results of a man's job displacement. Again the groups are surprisingly similar before job loss occurs. After job displacement a wide and persistent gap opens up between earnings of displaced and non-displaced workers. In line with previous findings (e.g. Jacobson et al. 1993) the earnings difference between displaced and non-displaced begins a couple of years before the job loss occurs.

[Figure 1]

One obvious reason for a big drop in annual earnings is the loss of earnings that is due to non-employment. Figure 2 shows the share of employed workers among displaced and non-displaced workers in years preceding and succeeding job loss. In the first year after job displacement there is a significant drop in the employment level of displaced workers. Of women who are displaced in plant closures 66% are re-employed by the following year. There is an important drop in the employment rate of the comparison group as well. Female workers who are displaced in a mass layoff event have a slightly higher re-employment rate; around 72% are re-employed within one year after job loss. For the male sample the drop in employment is even more pronounced (re-employment rates are 62% and 67%). It is important to remember that these workers were displaced during a very severe recession, which explains the relatively low re-employment rate compared to previous studies.

[Figure 2]

asiat/tyoehtosopimukset.html

One important question that we aim to answer in this study is how changes in income affect a couple's fertility behavior. Since Finland has relatively generous parental and unemployment benefits it is reasonable to focus on changes in total taxable family income rather than just changes in earnings (from work). In figures 3 and 4 we report the average annual taxable income for both the worker himself (figure 3) and for couples (figure 4). The figures illustrates that job displacement creates a significant and long lasting gap between total income of displaced and non-displaced workers. Since a man's earnings generally exceed a woman's earnings, a man's job displacement results in a much bigger drop in total family income than a woman's own job displacement.

[Figures 3 and 4]

In figure 5 we report the birth rates of displaced and non-displaced worker groups. Female displaced workers are less likely to give birth in years around the job loss event than non-displaced workers[14]. We see however no difference in birth rates between displaced and non-displaced male workers. In figure 6 we report the number of children for the displaced and non-displaced group. It is important to note that since there was no pre-displacement difference in fertility in year $t - 4$ for females (see table I), the difference in year $t - 3$ is explained by the slightly higher probability to give birth during this year. The gap in the number of children seems to increase in time for females. For males, displaced workers have slightly less children throughout the time period, especially in the mass layoff sample. As already explained, this can be due to the employment contract legislation. Employers in certain industries are expected to first lay off workers who do not have any children and who have the shortest tenure. The fact that the gap in the number of children decreases in time in the mass layoff sample may indicate

[14] Note that we exclude workers who gave birth in year t.

that childless workers are more likely to have children in later periods than people who have children in year *t*. This is something we further investigate in the next section.

[Figure 5 and 6]

### 5.2 Effect of Job Displacement on Earnings, Family Income and Joint Employment Decisions

We begin by estimating a linear regression model where we estimate the effect of job loss on annual earnings (in 1 000 euros) using all pre- and post-displacement years. The results are reported in figure 7. We find that displacement significantly reduces the earnings of displaced workers. The biggest drop is in the second year after a job loss. This is expected since the employment information in the data concerns the last week of the year. So for those labeled as displaced, the displacement is occurring some time in year 1 and the earnings are from the whole calendar year. On average, displaced female workers earn around 3 900 euros less in the second post-displacement year than similar non-displaced workers. This corresponds to a 22 % decrease in earnings. The significant and negative effect on earnings appears to be long lasting: in the 11$^{th}$ post-displacement year displaced workers earn still 1 300 euros less than similar workers in the control group. Workers displaced in a mass layoff event seem to suffer slightly less severe earning losses.

A man's job displacement results to a significant earnings loss as well (figure 8). The magnitude of this effect is similar in percentage (24 %) although the gap in euros between displaced and non-displaced workers is bigger than in the female sample. On average, displaced male workers earn 6 500 euros less in the second post-displacement year than similar non-displaced workers.

The effect is persistent. In the 11th post displacement year displaced workers earnings are still 2 500 euros lower than earnings of similar non-displaced workers.

[Figure 7 and 8]

Figures 9 and 10 present results of regression where the outcome variable is annual taxable family income (including transfers). There is a significant drop in family income immediately after job displacement. For displaced females the effect is around 4 %[15]. The effect seem to be relatively long-lasting, although in the mass layoff sample the difference between displaced and non-displaced workers becomes not significant in later years. Male job loss results in a much bigger drop in total family income than female job loss 7.24 % (3 301 euros).

[Figures 9 and 10]

Table 3 reports the results of female job loss on several alternative outcomes. The first column reports the estimated marginal effects of job displacement on the probability to be employed in the current year[16]. The results show that the probability to be employed decreases strongly after a job loss. The effect is strongest immediately after the job loss and it remains significant until the 11th post-displacement year. The slow recovery of employment can partly be explained by the very severe recession of the early 1990s. The next column reports the results of the effect of job displacement on a spouse's employment. We find that female job loss is associated with a slight reduction in a spouse's employment immediately after job loss. The third column reports the effect of job displacement on the probability to separate from base year spouse in the years

[15] This is calculated by dividing the estimated effect for the year t+2 (-1,62517) by the average annual family income of the non-displaced group in year *t + 2* (44, 272).
[16] Results for linear probability model were similar.

following job loss[17]. The results show that female job displacement is not associated with increased risk of divorce.

[Tables 4 and 5]

Table 4 reports these results for the male sample. A man's job displacement reduces his probability to be employed by 26 %. There is no indication of so called "added worker effect"; that is a man's job loss does not increase a woman's employment[18]. On the contrary, women whose partner lost his job between years *t* and *t + 1* are slightly less likely to be employed in year *t + 1*. The third column reports the impact on divorce probability. Unlike a woman's own job loss, a man's job loss seems to be associated with a small increase in divorce probability[19]. The columns 5–7 report the results for the mass layoff sample. When defining job displacement as a mass layoff event, the reduction in employment and increase in divorce probability after job loss are more pronounced than when using just plant closures.

### *5.3 Effect of a Woman's Job Displacement on Fertility*

The last column in table III reports how a woman's job displacement affects the probability that she gives birth in the current year. Displaced women are less likely to give birth in years surrounding job displacement. The impact is biggest in the year immediately following job loss. Women who have lost their job in plant closures are 0.5 % less likely to give birth within a year from job displacement than similar non-displaced women. This represents a 5 % increase in

[17] The first coefficient (for year *t – 1*) captures the pre-displacement difference, i.e. whether displaced workers have shorter relationships than non-displaced workers. The years *t – 3* and *t – 2* are excluded from this regression, since we do not have spouse codes for years 1988 and 1989, and we are thus not able to define divorce status for year *t – 3* and *t – 2* for base year 1991 workers.

[18] Stephens (2002) finds some evidence for the "added worker effect", i.e. that a man's job displacement increases a woman's employment.

[19] This is in line with previous studies that have found that a man's job displacement increases risk of divorce. See Eliason and Storrie, 2009.

probability to give birth since the average non-displaced worker has around 10 % probability to give birth during this year.

Figure 11 presents the results for fertility. The dependent variable is the number of children by the end of the year. We use the number of children in year t-4 as a control variable in order to take account of the permanent differences in fertility between displaced and non-displaced. Results indicate that a woman's own job displacement decreases fertility immediately after job loss. The effect is persistent and thus transforms to a significant difference in completed fertility. For every 100 couples with a displaced woman, 4 children less are born by the 11$^{th}$ year after job loss, than what there would have been in the absence of a woman's job loss.

[Figure 11]

As argued in section 2 there may be a number of reasons why the impact of job displacement on fertility may differ between skill groups. Figure 12 presents the results where we have split the sample into two groups by women's education. We find that there is an important heterogeneity in the effect of job displacement on fertility. The impact of job loss is much stronger and statistically significant for highly educated women. By the 11$^{th}$ post displacement year there is approximately 0.05 less children born for displaced high wage women than for similar non-displaced women. The effect remains until year 11$^{th}$ (although becoming less precise). It seems that highly educated women postpone births after job loss, which corresponds to a reduction in completed fertility.

We also examined how the effect varies by pre-displacement wage and the share of a worker's earnings of the total family income. The results are similar. A woman's job loss significantly reduces the fertility for high-wage women (not reported), for women in households where the

husband's share of household income is low (not reported). The results suggest that in families were the woman is the principal earner and well-attached to the labor market, the woman's own job loss has an important negative impact on fertility.

[Figure 12]

These results are in line with our theoretical expectations. If career breaks have more severe consequences for highly educated women, they do want to postpone child bearing after job displacement since they do not want to remain without a job for a long time or increase the risk of not finding a job after a job loss (and maternity leave). Low educated woman are less likely to be re-employed after job displacement, and thus have much lower opportunity cost of having children.

We also examined the heterogeneity of the effect in various other dimensions, such as age and number of children before job loss. We found that job displacement reduces fertility significantly for women who were more than 27 years old at the time of job loss (results not reported). There is no significant effect on the fertility of younger women. When splitting the sample by number of children before job loss, we find that a woman's job displacement decreases fertility more strongly for women with one child. It seems to have a smaller effect on higher order births.

### *5.4 The Effect of a Man's Job Displacement on Fertility*

Next we ask how a man's job loss affects a couple's fertility decision. Columns 4 and 8 in table IV report the marginal effects of specification that explains how male job displacement affects

the probability of giving birth during the year[20]. A man's job displacement does not affect a couple's fertility in the plant closure sample. In the mass layoff sample, there is a modest decrease in fertility immediately after job loss.

Figure 13 reports the point estimates of a specification that estimates the impact of a man's job loss on the cumulative number of children. The results indicate that there is no significant difference in fertility between male workers that were displaced in plant closures and not-displaced males. In the mass layoff sample there seems to be a significant pre-displacement difference in fertility. Displaced male workers seem to have fewer children in the years before job loss. This difference decreases in time and in the end transforms to a positive, although imprecise, difference in completed fertility. The results most likely reflect the fact that in some industries employment protection contracts require employees to layoff first employees who do not have any children. Since childless people are more likely to have children in the future this transforms to a positive but imprecise effect in later years. In order to check this further we split the sample by number of children before job loss. There is no significance difference between fertility of displaced and non-displaced men when splitting the sample.

Finally, we study the impact of both a spouse's job displacement using a sample of employed couples. This means we estimate a model where we include dummies for both spouse's displacement status. Figure 14 reports the estimated coefficients for a spouse's job loss variable on the number of children. The results indicate that female job loss significantly reduces a couple's fertility. The impact seems to be persistent. By year 11 there is a -0.04 difference in the average number of children in couples with displaced females. This means that for each 100

[20] Note, that the birth information is linked to males using the base year spouse's id codes. The results did not change when we used current year spouses.

displaced women, there are almost 4 less children born. A man's job displacement has no impact on fertility.

We also examined how response to a man's job loss depends on the characteristics of both spouses. We find that a man's job loss has a negative (although not significant) effect on fertility only for couples with highly educated women or high-wage women. The results suggest that in families where woman is the principal earner and well-attached to the labor market, both a woman's own and her spouse's job loss have more severe consequences on fertility. However, the impact is clearly stronger when the woman loses her job. This indicates that income effect seems not to be the mechanism through which the job displacement influences couples' fertility behavior. Career concerns – especially in the case of highly educated woman – seem to be a much more important determinant.

[Figures 13 and 14]

# 6 Conclusions

In this study we have examined how a job loss that is due to a plant closure affects couple's fertility patterns by following the same couples for more than 15 years. Because a plant closure should be an exogenous shock to a worker's career, we can disentangle the causal effect of income changes on fertility behavior of couples. Unlike previous studies, we focus on couples and carefully compare how the impact of a job displacement varies between spouses' and couples' characteristics. We test the robustness of the set up by using an alternative job displacement definition, mass layoff event.

Our results indicate that a job displacement leads to a long-lasting income and employment reduction for both men and women. A woman's own job loss decreases fertility. The effect is stronger for highly educated women and for high wage earners. When analyzing the impact of a man's job loss on a couple's fertility behavior we find that his job loss has a much weaker and insignificant effect on fertility than if the woman had lost her job. Since men are less engaged in the care of young children, we expect a man's job loss to affect fertility mainly through the income effect. The result suggests that income does not influence a couple's fertility behavior. The negative effect of a woman's own job displacement may be explained by career concerns after a job loss. This may also explain why we find that job displacement has a stronger effect for highly educated women. Highly educated women are more attached to the labor market and more concerned about losing human capital during career breaks. They do not want to suffer from long employment breaks after a job loss and decide to postpone child bearing to better times.

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Tables and Figures

TABLE 1 Descriptive Statistics Female Sample

| Variable | Plant closure | | Mass Layoffs | |
|---|---|---|---|---|
| | Displaced | Non-displaced | Displaced | Non-displaced |
| Age | 32,14 | 32,31 | 32,34 | 32,55 |
| Primary | 0,25 | 0,24 | 0,25 | 0,26 |
| Secondary | 0,42 | 0,43 | 0,4 | 0,41 |
| Tertiary | 0,33 | 0,33 | 0,34 | 0,33 |
| Experience | 11,45 | 11,51 | 11,67 | 11,83 |
| Tenure | 5,13 | 5,79 | 6,51 | 6,47 |
| Plant size | 57,29 | 161,83 | 255,86 | 308,53 |
| Annual earnings at t | 19,17 | 19,44 | 20,26 | 20,21 |
| Annual earnings at t-3 | 15,44 | 15,60 | 16,63 | 16,36 |
| Spouse's earnings | 21,78 | 21,72 | 23,42 | 22,57 |
| Annual income (inc. Transfers) at t | 19,53 | 19,79 | 20,5 | 20,55 |
| Family Income at t | 42,96 | 43,32 | 45,29 | 44,71 |
| Spouse employed | 0,83 | 0,82 | 0,83 | 0,83 |
| Spouse displaced | 0,07 | 0,02 | 0,12 | 0,05 |
| Married | 0,64 | 0,66 | 0,64 | 0,66 |
| Number of children at t-4 | 0,91 | 0,91 | 0,88 | 0,89 |
| Number of children at t | 1,07 | 1,10 | 1,06 | 1,09 |
| Share giving birth at t | 0 | 0 | 0 | 0 |
| Observations | 3237 | 97055 | 3327 | 45690 |

Notes: Sample consist of women who were 20–40 years old at the time *t* (base years 1991–1993), who were working in the end of the year *t* and $t-1$ and who did not give birth during year *t*. Plant closure sample consists of workers working in plants with at least 5 workers in year t. Mass layoff sample consists of workers working in plants with at least 50 workers in year *t*.

TABLE 2 Descriptive Statistics Male Sample

| Variable | Plant closure | | Mass Layoffs | |
|---|---|---|---|---|
| | Displaced | Non-displaced | Displaced | Non-displaced |
| Age | 34,26 | 34,7 | 34,67 | 35,05 |
| Primary | 0,24 | 0,23 | 0,22 | 0,22 |
| Secondary | 0,47 | 0,46 | 0,44 | 0,46 |
| Tertiary | 0,29 | 0,31 | 0,33 | 0,33 |
| Experience | 11,67 | 11,98 | 11,76 | 11,99 |
| Tenure | 5,32 | 7,35 | 6,71 | 8,70 |
| Plant size | 62,27 | 228,44 | 306,21 | 392,55 |
| Annual earnings at t | 27,67 | 28,2 | 29,11 | 29,38 |
| Annual earnings at t-3 | 24,92 | 25,36 | 26,07 | 26,16 |
| Spouse's earnings | 14,14 | 13,91 | 14,58 | 14,17 |
| Annual income (inc. Transfers) at t | 27,99 | 28,53 | 29,35 | 29,64 |
| Family Income at t | 43,09 | 43,6 | 44,72 | 44,97 |
| Spouse employed | 0,75 | 0,74 | 0,76 | 0,75 |
| Spouse displaced | 0,04 | 0,01 | 0,02 | 0,01 |
| Married | 0,70 | 0,73 | 0,72 | 0,74 |
| Number of children at t-4 | 0,99 | 1,04 | 1,00 | 1,06 |
| Number of children at t | 1,32 | 1,36 | 1,32 | 1,37 |
| Share giving birth at t | 0 | 0 | 0 | 0 |
| Observations | 5872 | 155044 | 6706 | 82380 |

Notes: Sample consists of men who were working in the end of the year $t$ (base years 1991–1993), and $t-1$ and whose spouses (women) were 20–40 years old and did not give birth during year $t$. Plant closure sample consists of workers working in plants with at least 5 workers in year t. Mass layoff sample consists of workers working in plants with at least 50 workers in year $t$.

TABLE 3 Effect of female job displacement on alternative outcomes

| | Plant closure sample | | | | Mass layoff sample | | | |
|---|---|---|---|---|---|---|---|---|
| Effect by years since displacement | Employed | Spouse employed | Divorced | Gave birth | Employed | Spouse employed | Divorced | Gave birth |
| dpl_3 | 0.015*** | -0.005 | | -0.005** | 0.015*** | 0.005 | | 0.001 |
| | (0.005) | (0.007) | | (0.002) | (0.005) | (0.007) | | (0.003) |
| dpl_2 | 0.005 | -0.005 | | -0.004* | 0.009 | 0.006 | | -0.005** |
| | (0.006) | (0.007) | | (0.002) | (0.006) | (0.006) | | (0.002) |
| dpl_1 | | -0.004 | 0.010 | -0.003 | | 0.005 | 0.014 | -0.003 |
| | | (0.006) | (0.008) | (0.003) | | (0.006) | (0.008) | (0.003) |
| dpl_0 | | 0.004 | | | | -0.005 | | |
| | | (0.004) | | | | (0.004) | | |
| dpl1 | -0.305*** | -0.010* | 0.011 | -0.005*** | -0.312*** | -0.026*** | 0.018* | -0.007*** |
| | (0.010) | (0.005) | (0.009) | (0.002) | (0.010) | (0.006) | (0.010) | (0.002) |
| dpl2 | -0.163*** | -0.005 | 0.005 | 0.002 | -0.133*** | -0.005 | 0.014* | 0.000 |
| | (0.008) | (0.006) | (0.008) | (0.002) | (0.008) | (0.005) | (0.008) | (0.002) |
| dpl3 | -0.100*** | 0.000 | 0.004 | -0.005** | -0.083*** | -0.007 | 0.018** | -0.004* |
| | (0.007) | (0.006) | (0.007) | (0.002) | (0.007) | (0.006) | (0.008) | (0.002) |
| dpl4 | -0.094*** | -0.006 | 0.001 | 0.001 | -0.078*** | -0.007 | 0.014* | 0.001 |
| | (0.007) | (0.006) | (0.007) | (0.003) | (0.007) | (0.006) | (0.007) | (0.003) |
| dpl5 | -0.059*** | -0.010 | 0.003 | -0.001 | -0.054*** | -0.002 | 0.016** | 0.000 |
| | (0.006) | (0.006) | (0.007) | (0.003) | (0.006) | (0.006) | (0.007) | (0.003) |
| dpl6 | -0.053*** | -0.001 | 0.005 | 0.000 | -0.042*** | 0.003 | 0.018*** | -0.001 |
| | (0.006) | (0.006) | (0.007) | (0.003) | (0.006) | (0.006) | (0.007) | (0.003) |
| dpl7 | -0.049*** | -0.003 | 0.003 | -0.001 | -0.042*** | 0.000 | 0.018*** | 0.004 |
| | (0.006) | (0.006) | (0.007) | (0.003) | (0.006) | (0.006) | (0.007) | (0.003) |
| dpl8 | -0.042*** | -0.001 | 0.001 | -0.001 | -0.030*** | -0.001 | 0.021*** | -0.002 |
| | (0.006) | (0.006) | (0.006) | (0.003) | (0.006) | (0.006) | (0.007) | (0.003) |
| dpl9 | -0.031*** | 0.003 | 0.002 | -0.003 | -0.023*** | 0.002 | 0.024*** | -0.003 |
| | (0.006) | (0.006) | (0.006) | (0.003) | (0.006) | (0.006) | (0.007) | (0.003) |
| dpl10 | -0.022*** | 0.002 | 0.004 | -0.001 | -0.017*** | 0.002 | 0.021*** | -0.008*** |
| | (0.006) | (0.006) | (0.006) | (0.004) | (0.006) | (0.006) | (0.007) | (0.003) |
| dpl11 | -0.016*** | 0.004 | 0.003 | -0.001 | -0.018*** | -0.004 | 0.023*** | -0.005 |
| | (0.006) | (0.006) | (0.006) | (0.004) | (0.006) | (0.006) | (0.007) | (0.004) |
| Observations | 1295552 | 1496094 | 1195295 | 1395823 | 632951 | 730967 | 583949 | 681959 |

Notes: Marginal effects of probit regression. The years when outcome variable does not vary (e.g. all are employed in years $t-1$ and $t$) are dropped from the regression, which explains why the number of observations varies between columns. Sample consists of women who were 20–40 years old at time $t$ (base years 1991–1993), who were working in the end of the year t and $t-1$ and who did not give birth during year $t$.

TABLE 4 Effect of male job displacement on alternative outcomes

| | Plant closure sample | | | | Mass layoff sample | | | |
|---|---|---|---|---|---|---|---|---|
| Effect by years since displacement | Employed | Spouse employed | Divorced | Gave birth | Employed | Spouse employed | Divorced | Gave birth |
| dpl_3 | 0.003 | -0.000 | | 0.001 | 0.005** | 0.001 | | 0.000 |
| | (0.003) | (0.005) | | (0.002) | (0.003) | (0.005) | | (0.002) |
| dpl_2 | -0.001 | -0.006 | | -0.003 | -0.002 | 0.007 | | -0.001 |
| | (0.004) | (0.005) | | (0.002) | (0.003) | (0.005) | | (0.002) |
| dpl_1 | | -0.008 | 0.004 | -0.001 | | 0.005 | 0.004 | 0.001 |
| | | (0.005) | (0.005) | (0.002) | | (0.005) | (0.005) | (0.002) |
| dpl_0 | | 0.000 | | | | 0.001 | | |
| | | (0.004) | | | | (0.004) | | |
| dpl1 | -0.264*** | -0.016*** | 0.011* | -0.002 | -0.327*** | -0.018*** | 0.020*** | -0.003* |
| | (0.007) | (0.005) | (0.006) | (0.002) | (0.007) | (0.005) | (0.006) | (0.002) |
| dpl2 | -0.134*** | -0.007 | 0.006 | 0.000 | -0.146*** | -0.005 | 0.010* | 0.002 |
| | (0.005) | (0.005) | (0.005) | (0.002) | (0.005) | (0.005) | (0.005) | (0.002) |
| dpl3 | -0.086*** | -0.006 | 0.004 | -0.003 | -0.096*** | -0.005 | 0.010** | -0.002 |
| | (0.005) | (0.005) | (0.005) | (0.002) | (0.005) | (0.005) | (0.005) | (0.002) |
| dpl4 | -0.063*** | -0.008 | 0.003 | -0.001 | -0.073*** | -0.008 | 0.005 | 0.003 |
| | (0.004) | (0.005) | (0.005) | (0.002) | (0.004) | (0.005) | (0.005) | (0.002) |
| dpl5 | -0.041*** | -0.007 | 0.008* | -0.002 | -0.054*** | -0.008 | 0.009** | 0.001 |
| | (0.004) | (0.005) | (0.005) | (0.002) | (0.004) | (0.005) | (0.005) | (0.002) |
| dpl6 | -0.031*** | -0.008 | 0.008* | -0.001 | -0.038*** | -0.007 | 0.008* | 0.006** |
| | (0.004) | (0.006) | (0.004) | (0.002) | (0.004) | (0.005) | (0.004) | (0.002) |
| dpl7 | -0.020*** | -0.005 | 0.004 | 0.000 | -0.029*** | -0.010* | 0.005 | 0.001 |
| | (0.003) | (0.006) | (0.004) | (0.003) | (0.003) | (0.006) | (0.004) | (0.002) |
| dpl8 | -0.012*** | -0.004 | 0.008* | 0.002 | -0.019*** | -0.008 | 0.003 | 0.006** |
| | (0.003) | (0.006) | (0.004) | (0.003) | (0.003) | (0.006) | (0.004) | (0.003) |
| dpl9 | -0.004 | -0.004 | 0.005 | 0.003 | -0.012*** | 0.000 | 0.002 | 0.001 |
| | (0.003) | (0.006) | (0.004) | (0.003) | (0.003) | (0.006) | (0.004) | (0.003) |
| dpl10 | -0.006** | -0.004 | 0.004 | 0.000 | -0.013*** | 0.002 | 0.003 | 0.000 |
| | (0.003) | (0.006) | (0.004) | (0.003) | (0.003) | (0.006) | (0.004) | (0.003) |
| dpl11 | -0.004 | 0.003 | 0.003 | -0.000 | -0.014*** | 0.001 | 0.000 | 0.001 |
| | (0.003) | (0.006) | (0.004) | (0.004) | (0.003) | (0.006) | (0.004) | (0.003) |
| Observations | 2071422 | 2393254 | 1910955 | 2232338 | 1146318 | 1324490 | 1057481 | 1235404 |

Notes: Marginal effects of probit regression. Sample consists of men who were working in the end of the year t (base years 1991–1993), and $t-1$ and whose spouses (women) were 20–40 years old and did not give birth during year $t$. See notes under table 3..

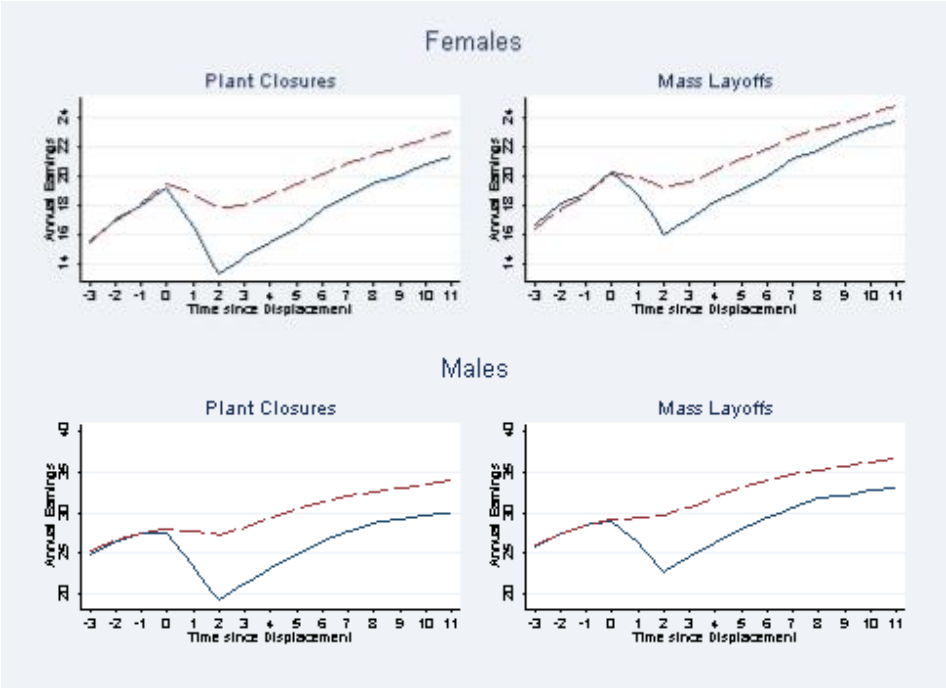


FIGURE 1 Annual earnings by displacement status

Notes: Solid lines describe the outcome of displaced workers. Dotted line is the outcome of non-displaced workers.

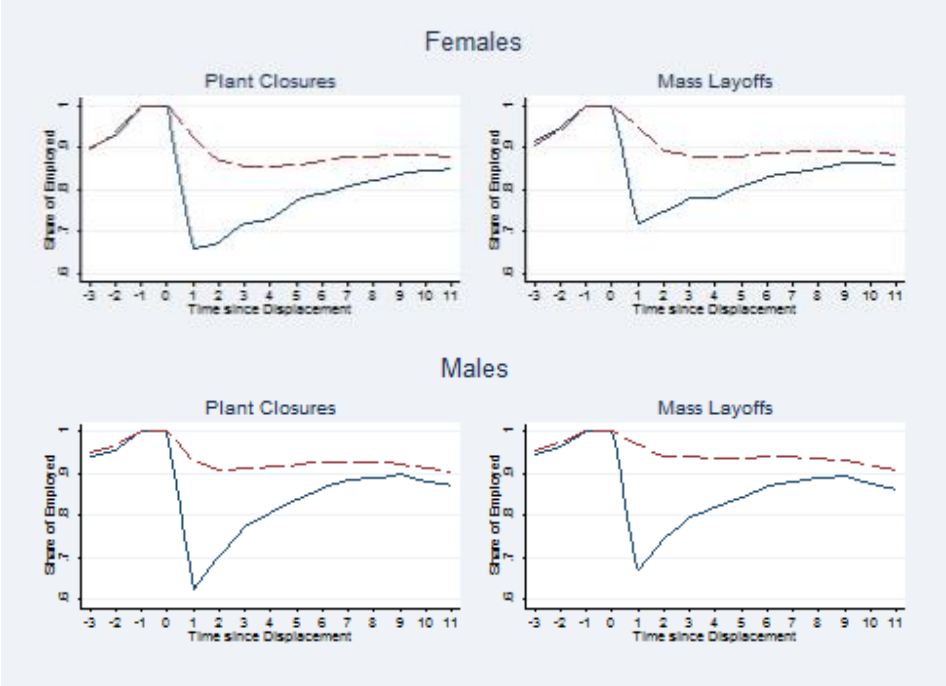


FIGURE 2 Employment share by displacement status

Notes: Solid lines describe the outcome of displaced workers. Dotted line is the outcome of non-displaced workers.

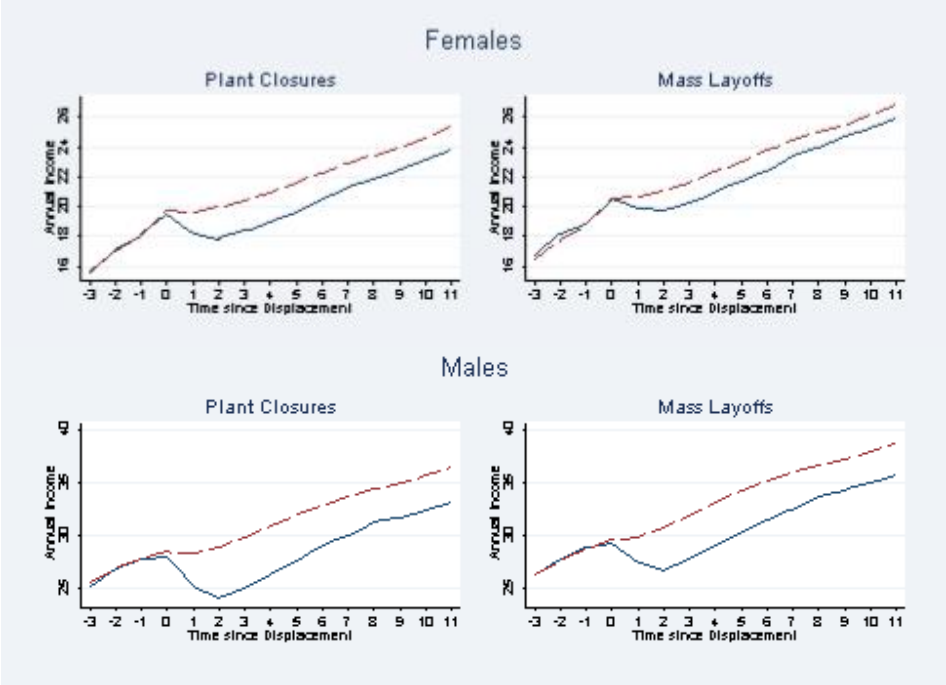


FIGURE 3. Annual income (with transfers) by displacement status

Notes: Solid lines describe the outcome of displaced workers. Dotted line is the outcome of non-displaced workers.

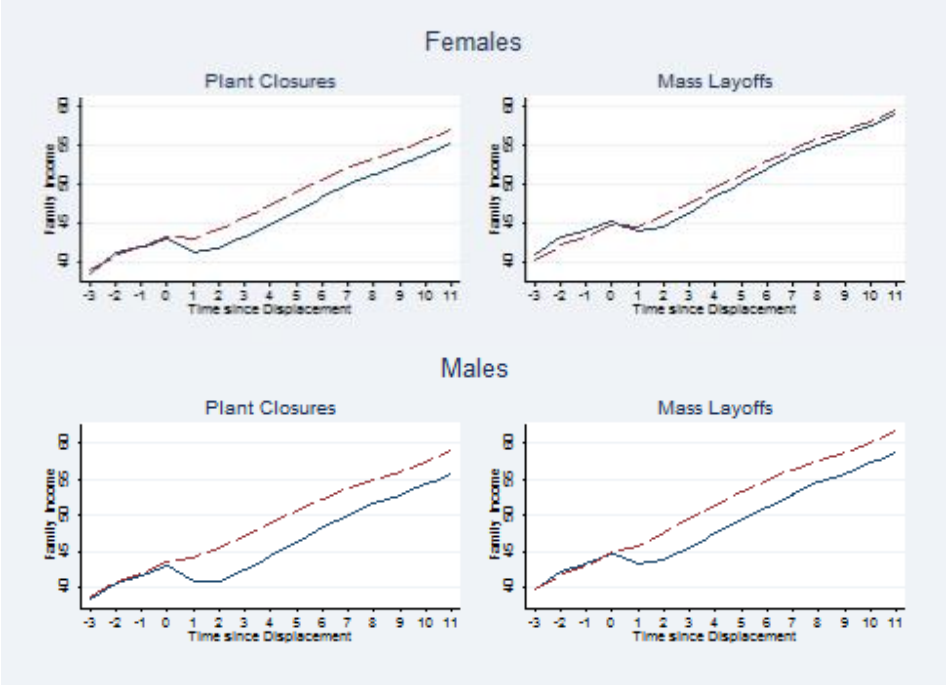


FIGURE 4 Annual family income (with transfers) by displacement status

Notes: Solid lines describe the outcome of displaced workers. Dotted line is the outcome of non-displaced workers.

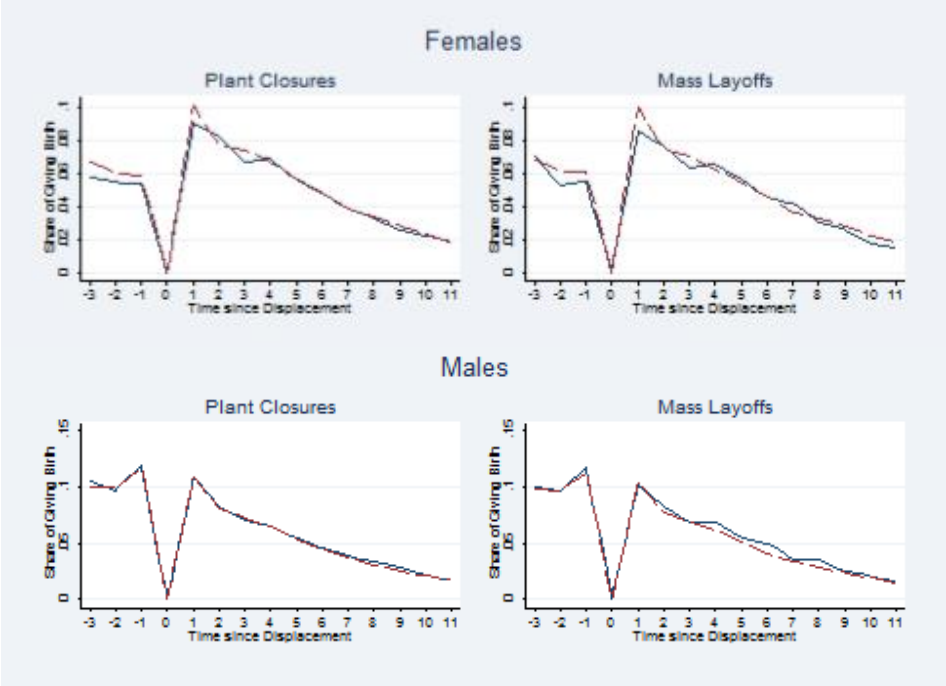


FIGURE 5 Share of giving birth by displacement status

Notes: Solid lines describe the outcome of displaced workers. Dotted line is the outcome of non-displaced workers.

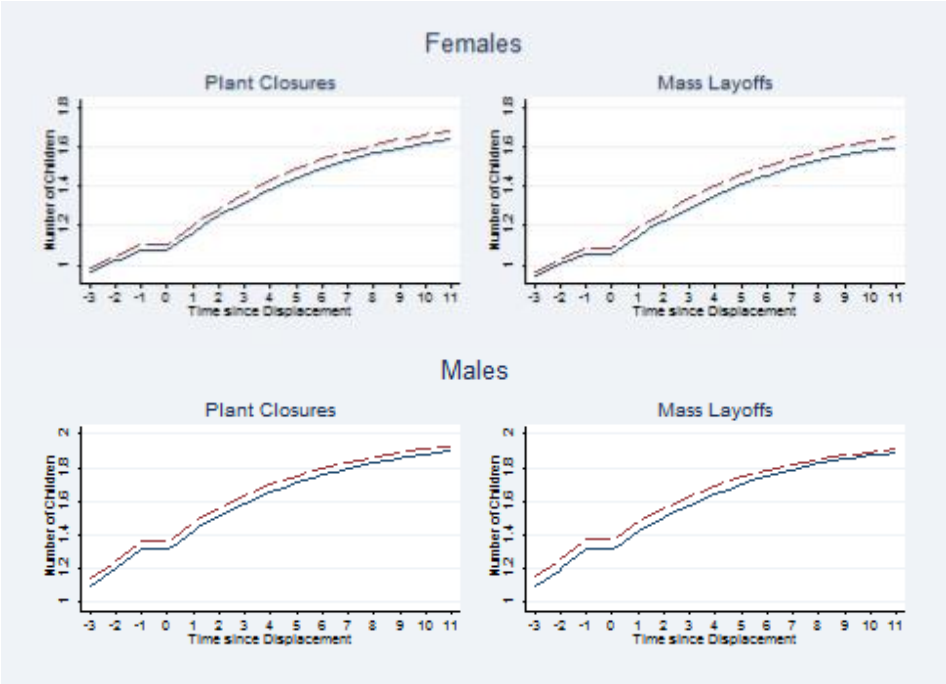


FIGURE 6 Cumulative number of children by displacement status

Notes: Solid lines describe the outcome of displaced workers. Dotted line is the outcome of non-displaced workers.


FIGURE 7 Effect of female job displacement on annual earnings

Notes: Sample consists of women who were 20-40 years old at time 0 (base years 1991-1993), who were working in the end of the year 0 and -1 and who did not give birth during year 0. The additional control variables are: worker's age at the time of displacement, age squared, a dummy for education level (6 categories), a dummy for education field (10 categories), pre-displacement years of tenure, tenure squared, pre-displacement marital status, spouse's employment status in base year, spouse's earnings in base year, spouse's age and age squared, the number of children four years before job loss, pre-displacement plant size, pre-displacement region (21 categories) and industry dummies (10 categories), and time dummies*base year dummies interactions.


FIGURE 8 Effect of male job displacement on annual earnings

Notes: Sample consists of men who were working in the end of the year t (base years 1991-1993), and t-1 and whose spouses (women) were 20-40 years old and did not give birth during year t. For controls see text under figure 7.

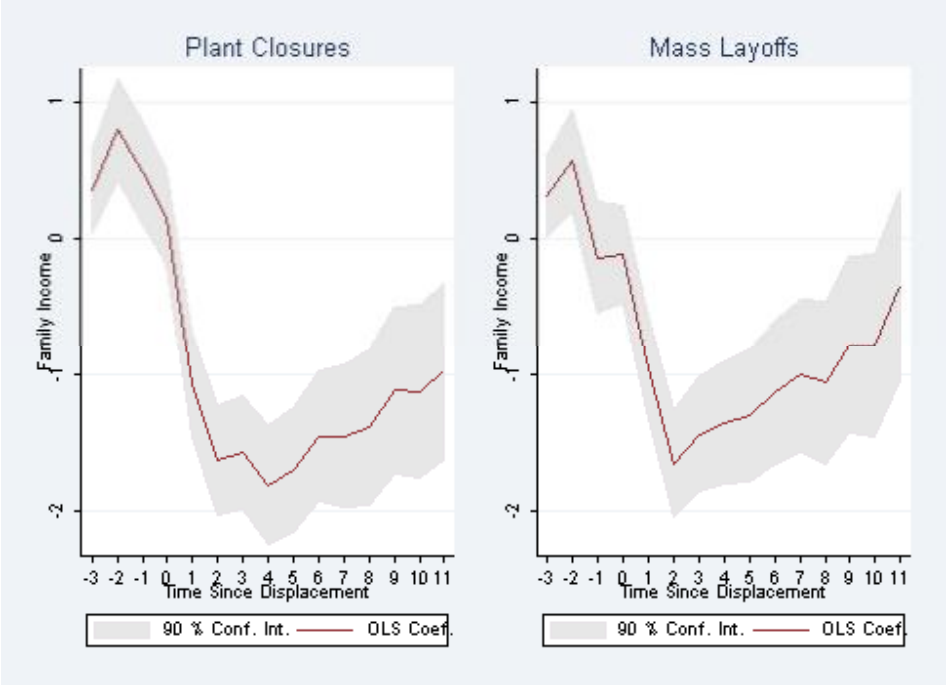


FIGURE 9 Effect of female job displacement on annual family income
Notes: see text under figure 7.


FIGURE 10 Effect of male job displacement on annual family income
Notes: see text under figure 8.

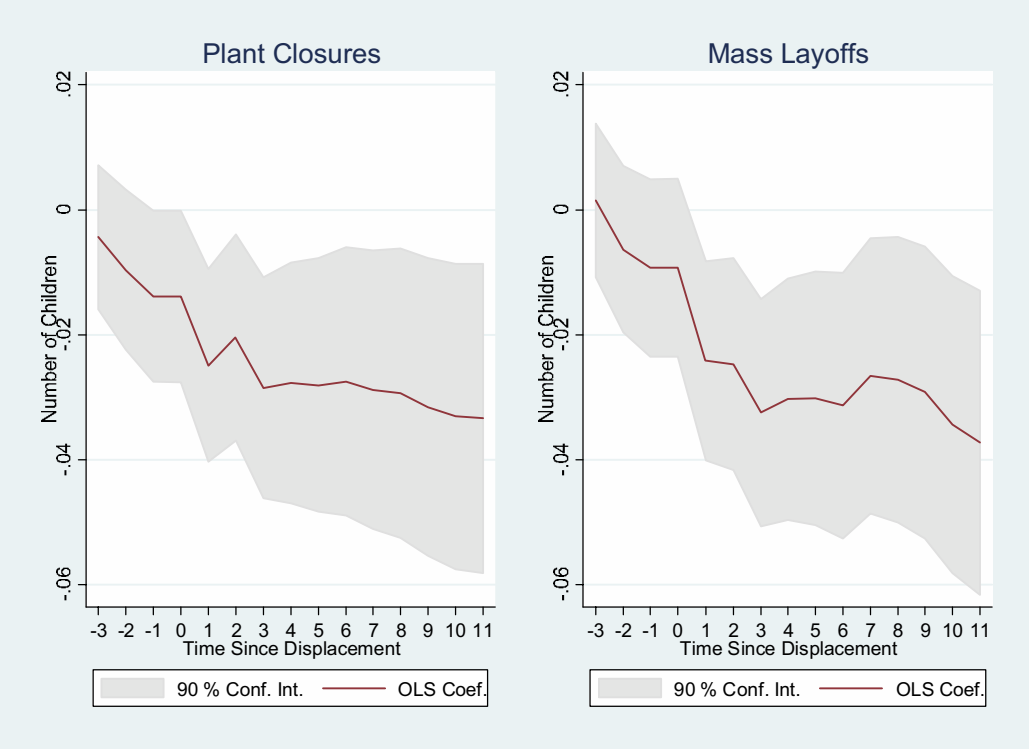


FIGURE 11 Effect of female job displacement on cumulative number of children
Notes: see text under figure 7.

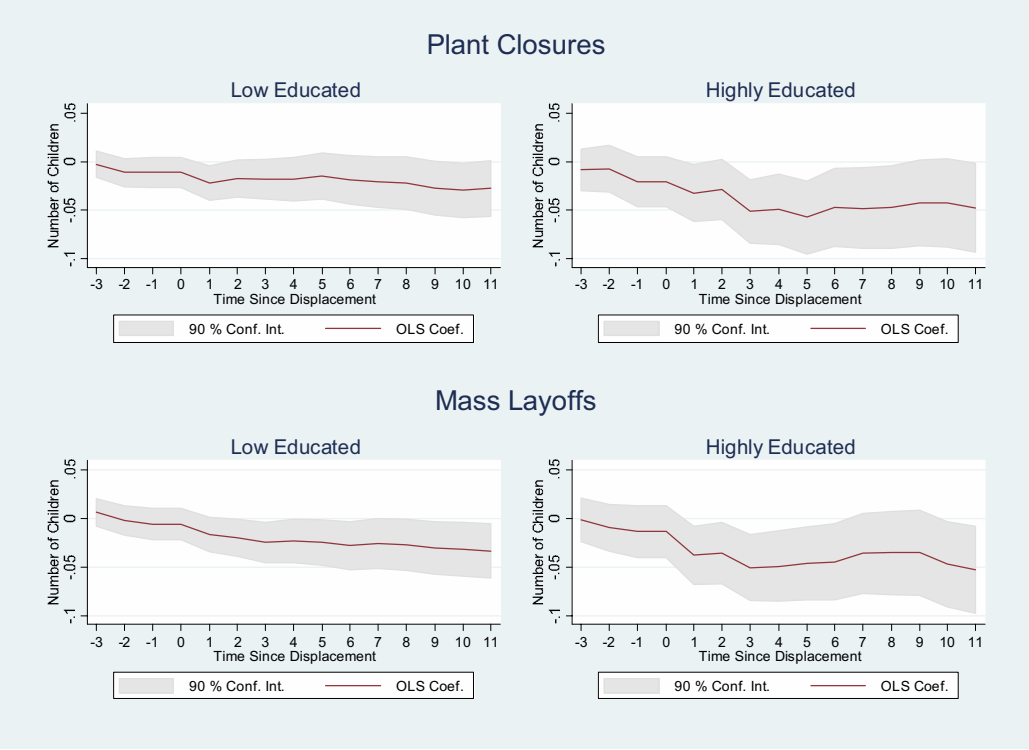


FIGURE 12 Effect of female job displacement on fertility by education
Notes: text under figure 7.

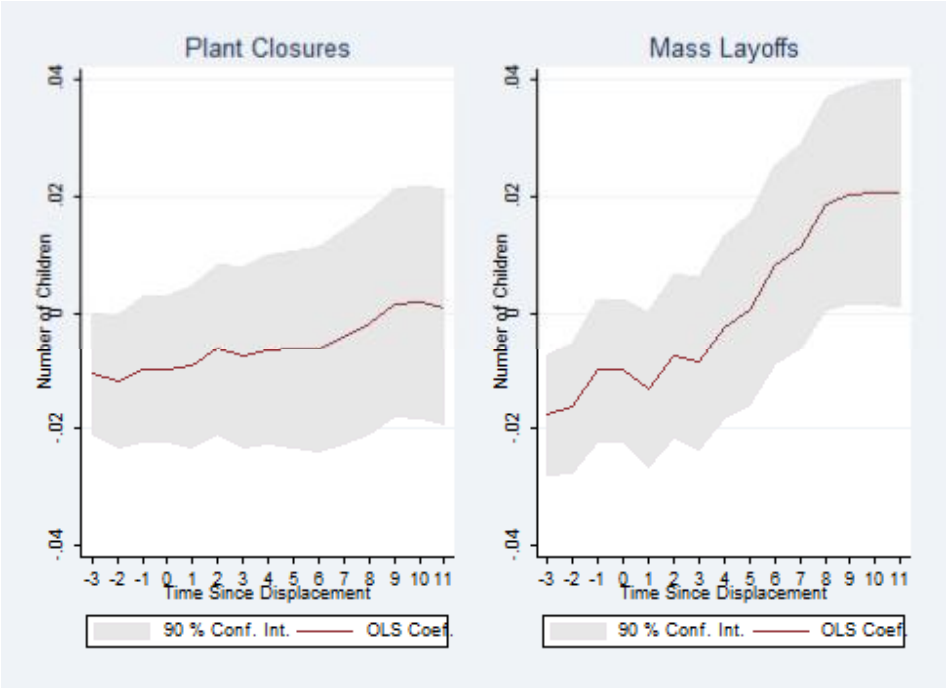


FIGURE 13 Effect of male job displacement on fertility
Notes: text under figure 8.

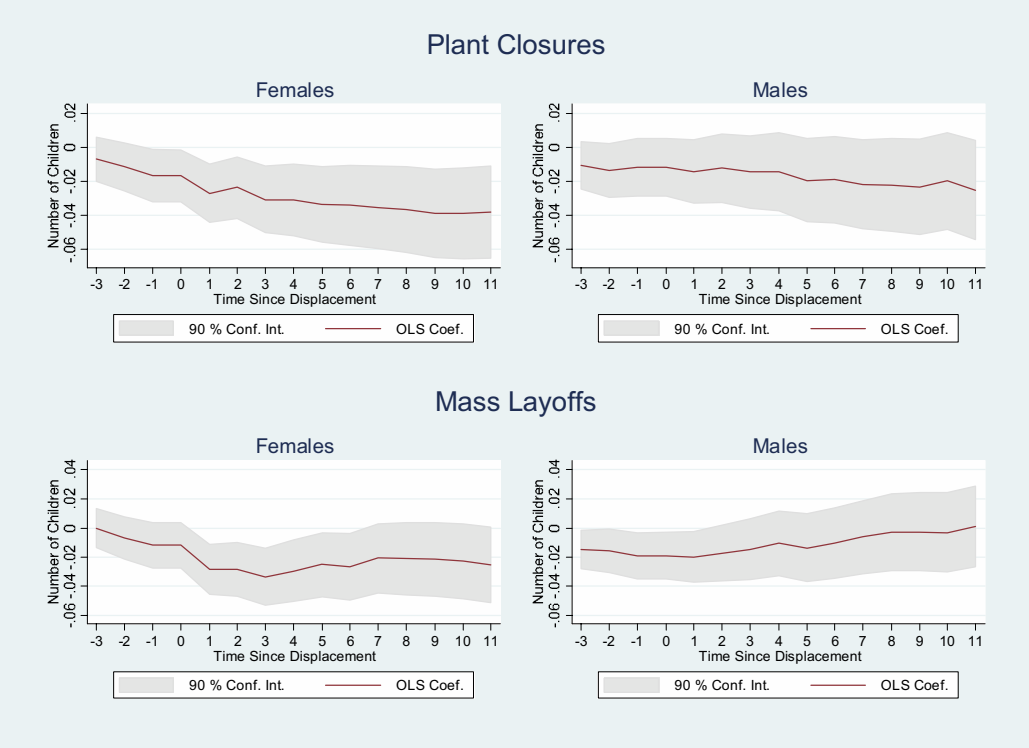


FIGURE 14 Effect of male and female job displacement on fertility for employed couples
Notes: Sample consists of employed couples (both employed at time 0) where women were between 20-40 years old at time 0 (base years 1991-1993) and did not give birth during year 0.