Online Appendix
Job Displacement, Family Dynamics and Spousal Labor Supply

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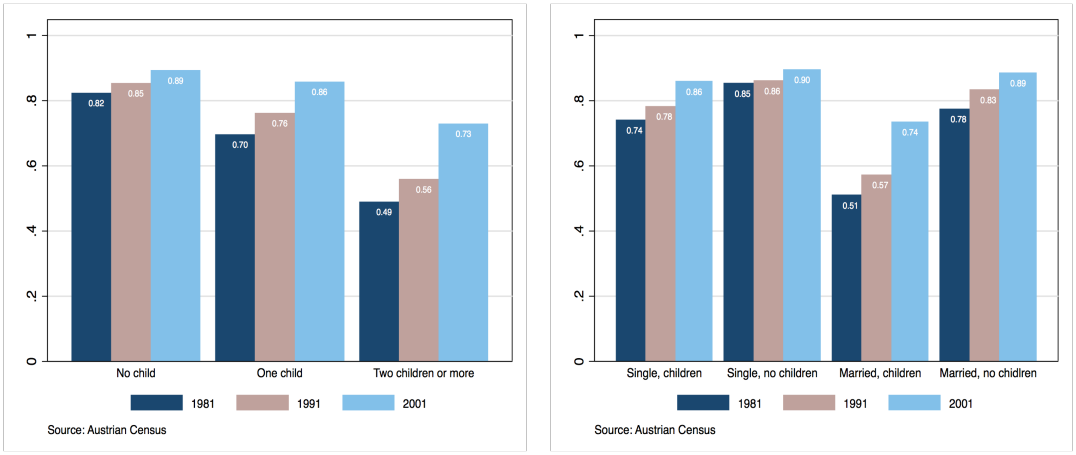
This Online Appendix provides additional material discussed in 'Job Displacement, Family Dynamics and Spousal Labor Supply' by Martin Halla, Julia Schmieder, and Andrea Weber. Section A provides additional figures and tables, Section B provide detailed results based on two alternative control groups, Section C provides further robustness analysis, and Section D describes the AKM sample and explains the estimation.

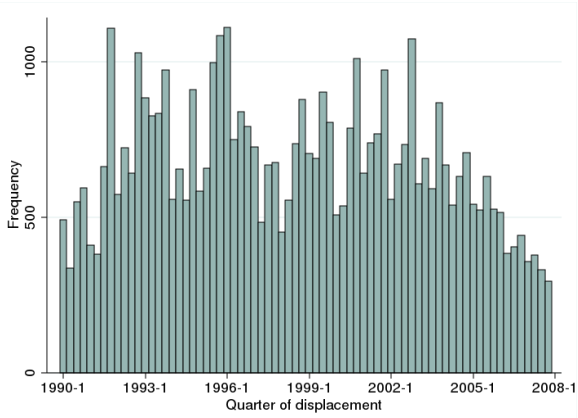
A Additional figures and tables

Figure A1: Female labor force participation by family status, number of children, and year



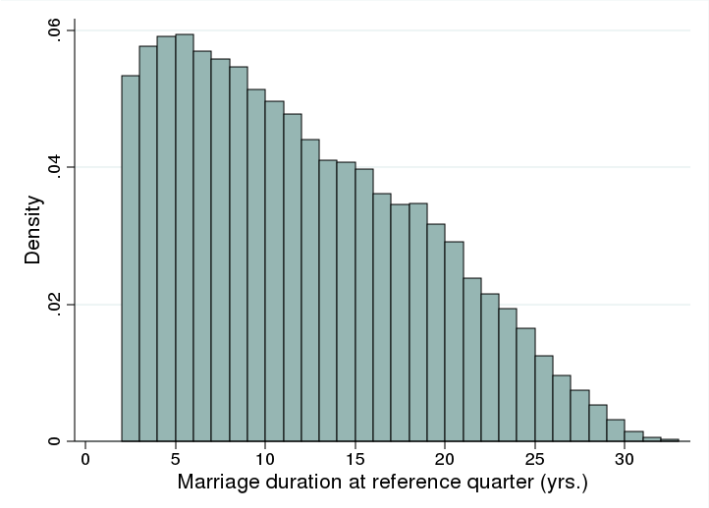
Notes: This figure shows the female labor force participation (for women between 25 and 54 years of age) by family status and year (left graph), and by the number of children and year (right graph). The figures are based on Austrian census data from the years 1981, 1991, and 2001.

Figure A2: Number of displaced workers over time



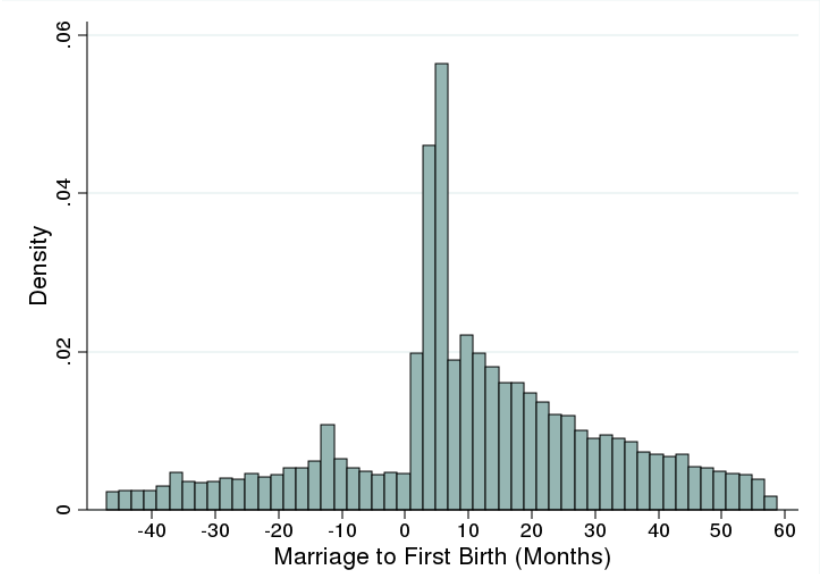
Notes: This figure shows the number of displaced workers for each quarter from 1990 Q1 to 2007 Q4. Workers are displaced through a firm closure or mass layoff event.

Figure A3: Marriage duration at the reference quarter



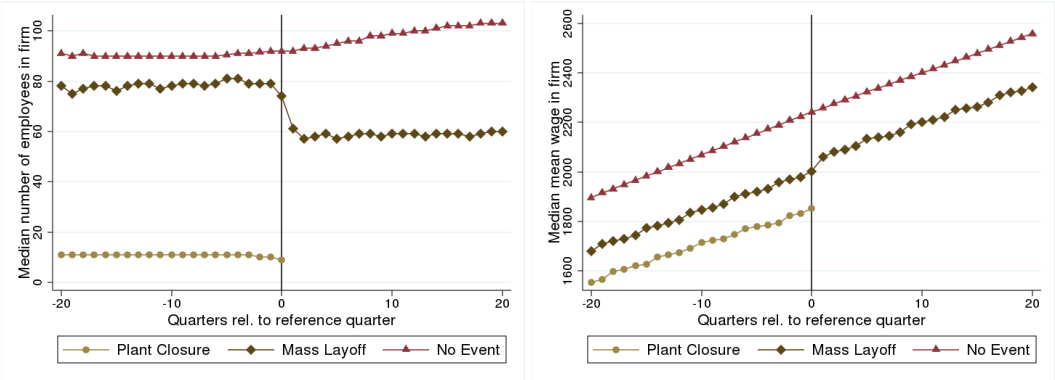
Notes: The figure shows the distribution of marriage durations at the reference date in years.

Figure A4: Distance between marriage and first birth



Notes: The figure displays the distribution of the distance from marriage to the birth of the first child in 2 months bins. The sample includes couples experiencing a displacement through a plant closure or a mass layoff. They are married for at least two years at the reference date. We include one observation per household event.

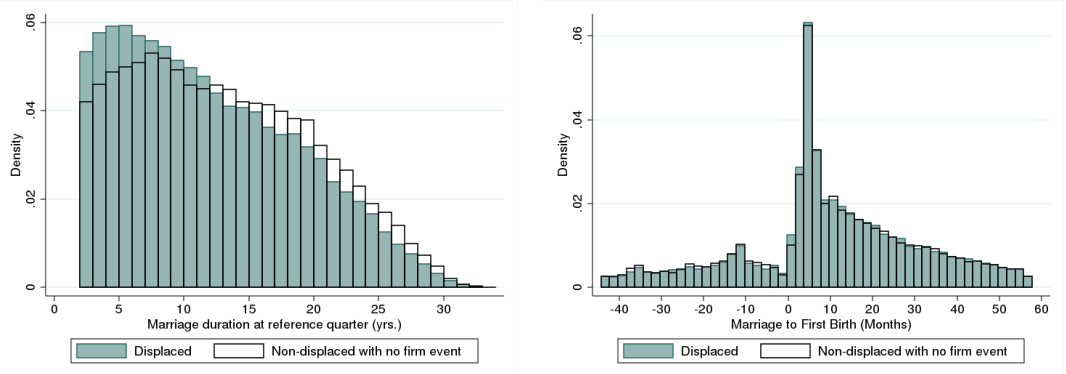
Figure A5: Employment and wages of firms around the reference date



Notes: This figure plots the median number of employees and the average median monthly wage (in Euro, 2000 prices) over time for the employers in our sample. *Plant Closure* refers to firms that close down the quarter following the reference date. *Mass Layoff* refers to firms that reduce employment by at least 5% of their workforce the quarter after the reference date. *No Event* firms have neither a mass layoff nor closure the quarter following the reference date. For each quarter around the reference date, we include one observation per existing firm. We include any firm that employs at least one husband of our sample.

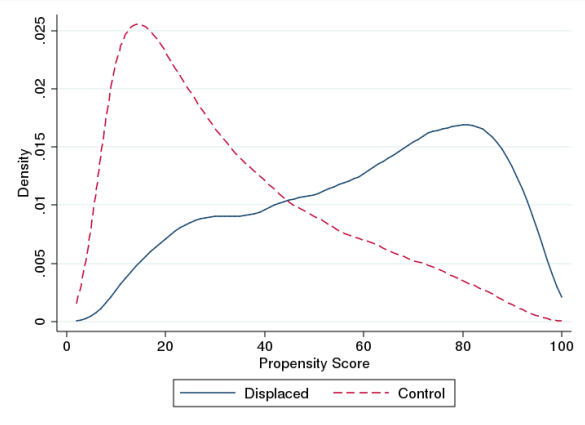
Figure A6: Family dynamics by treatment status

(a) Marriage duration at the reference date **(b)** Distance between marriage and first birth



Notes: Panel (a) shows the distribution of marriage durations at the reference date and panel (b) shows the distance from marriage to the birth of the first child in month. The graphs display the distribution for the sample of households experiencing a displacement at the reference date (green) and for those with no firm event at the reference date (transparent). We include one observation per household event.

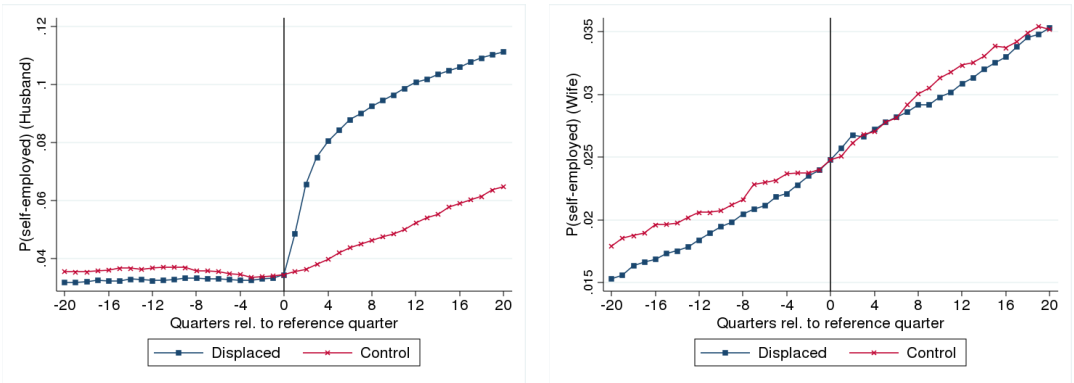
Figure A7: Propensity score distribution



Notes: This figure shows the density distribution of the propensity score in the displaced group and in the control group, which consists of households with husbands with no firm event. We estimate the probability that the husband in a household is displaced by plant closure or mass layoff using a logit model based on the following variables: [husband characteristics at the reference date] interaction of year and season of displacement dummies, age (cubic), tenure in current job (dummies for deciles), employment experience (5 dummies), unemployment experience (4 dummies), number of previous jobs (4 dummies), number of previous mass layoff events (7 dummies), blue-collar indicator [household characteristics at the reference date] marriage duration (30 dummies), number of children aged 0,1,..,12 (13 dummies) and total number of children under 18 [wife characteristics at the reference date] labor market experience (5 dummies), age distance to husband (5 dummies) [husband labor market outcomes for the years -4 to -1 before the reference date] monthly wage, indicator for being employed and for being unemployed [husband's employer variables] indicators for industry and region, firm age (16 dummies), firm age and industry interactions.

Figure A8: Self-employment of displaced husbands and their wives

(a) Probability that husband is self-employed **(b)** Probability that wife is self-employed



Notes: Panel (a) compares the probability of being self-employed of displaced husbands (blue, square) to husbands without firm event at the reference date (red, x). Panel (b) compares the probability of being self-employed of wives with displaced husbands (blue, square) to those with husbands without firm event at the reference date (red, x). This figure is constructed in the same way as Figure 3.

Table A1: Wife's labor supply elasticities in added worker effect studies

	Country	Time	Data	Sample households	Wife's labor supply (semi-)elasticity		Comments
1.Variation in spousal income in a structural life-cycle model of household labor supply							
Haan and Prowse (2015)	DE	1991-2005	GSOEP	Married couples aged 16–65 with labor market experience	Participation without leisure complementarity	-0.025[a] -0.056[a]	Comparison of simulated optimal behavior when spouse is vs. is not subject to unanticipated job destruction
Blundell et al. (2016)	US	1999-2009	PSID	Households with participating and married male head aged 30–57	Hours (total response) Extensive margin	-0.75 -0.168	Permanent shock in spousal wage process identified in structural model
Blundell et al. (2018)	US	1999-2015	PSID	Married couples with wife aged 25–65			Permanent shock in spousal wage process identified in structural model
				with children aged ≤ 10	Hours (total response) Extensive margin Intensive margin	-0.296 -0.193 -0.170	
				no children aged ≤ 10	Hours (total response) Extensive margin Intensive margin	-0.14 -0.065 -0.088	
2.Quasi-experimental variation in spousal income through job displacements							
Stephens (2002)	US	1968-1992	PSID	Married couples aged 25–65	Hours	-0.50	Displacement through plant closure/moving, layoff, firing
Kohara 2010[b]	JP	1993-2004	Panel survey	Wife aged 24-35 in 1993	Hours	-0.893[a]	Layoff, plant closure, and bankruptcy
Eliason (2011)	SE	1987	Admin panel	Married couples aged 25–51	Earnings	0.44	Plant closure
Hardoy and Schøne (2014)	NO	2002	Admin panel	Married couples aged 25–55	Employment Earnings	0.09 0.07	Closure, mass layoff; couple required to stay married in post-treatment period
				with wife not employed at displacement	Earnings	-0.5	
Bredtmann et al. (2018)	C-EU	2004-2013	EU-SILC	Married/cohabiting couples aged 16–65	Employment	0.12[a]	Continental Europe (C-EU) refers to AT, BE, DE, FR, LU, and the NL
3.Quasi-experimental variation in spousal income through social insurance benefits							
Cullen and Gruber (2000)	US	1984-88, 1990-92	SIPP	Married couples aged 25–54	Hours	[-0.49,-1.07]	Lower and upper bound estimates, variation in spousal UI benefits
Autor et al. (2019)	NO	1989-2011	Admin panel	Married couples, one spouse ($<$ 62) applying for DI benefits	Employment	-0.345	Simulated response to permanent change in spousal income in structural model, no separate elasticities by sex
Fadlon and Nielsen (2017)	DK	1980-2011	Admin panel	Married/cohabiting couples, widows ($<$ 67) with spouse dying at age 45–80	Participation	-0.13	Variation in spousal survivor benefits

Notes: The (semi-)elasticity refers to the change in wife's labor supply to a 1% change in husband's income. For the elasticity of hours and earnings, the wife's response is relative to the baseline mean (in %). For the participation and employment elasticity, the response is in absolute terms (in percentage points). [a] Assuming a mean husband's income loss of 20%. [b] This study is published in the *Journal of Population Economics* Volume 23(4). The details for all other listed studies can be found in the list of references in the paper.

Table A2: Gender identity norms and beliefs on child-care in Austria and some selected high-income countries

	Share of survey respondents which strongly agrees with the respective statement across countries									
	AT	DE	DK	FR	IT	NO	SE	GB	US	Total
1.) A pre-school child is likely to suffer if [. . .] mother works	0.37	0.26	0.04	0.20	0.16	0.10	0.05	0.09	0.10	0.17
2.) A working mother [as good as] a mother who does not work	0.23	0.18	0.56	0.51	0.19	0.47	0.51	0.23	0.29	0.32
3.) Important for successful marriage: Sharing household chores	0.28	0.23	0.45	0.39	0.30	0.34	0.55	0.45	0.49	0.36
4.) Both husband and wife should contribute to household income	0.29	0.17	0.26	0.39	0.25	0.35	0.54	0.14	0.23	0.28

Notes: These figures are based on data from the *European and World Values Surveys* (European Values Study Foundation and World Values Survey Association, 2006) and include male respondents between 25 and 55 years of age, and female respondents between 25 and 50 years of age. The original survey questions on statement 1 is as follows '*A pre-school child is likely to suffer if his or her mother works*'. The original survey questions on statement 2 is as follows '*A working mother can establish just as warm and secure a relationship with her children as a mother who does not work*'. The original survey questions on statement 3 is as follows '*Important for successful marriage: Sharing household chores*'. Respondents are asked to evaluate this statement on an ordered scale from '*Very*' (1), '*Rather*' (2), to '*Not very*' (3). The table summarizes the share or respondents (by country), which strongly agrees with statements 1 to 3, and which answers statement 4 with very important. The original survey questions on statement 4 is as follows '*Both the husband and wife should contribute to household income*'. Respondents are asked to evaluate these three statements on an ordered scale from '*Agree strongly*' (1), '*Agree*' (2), '*Neither agree nor disagree*' (3), '*Disagree*' (4), to '*Strongly disagree*' (5). In the case of some country-years the respondents where given a 4-point scale to answer, which does not include the answer possibility '*Neither agree nor disagree*'. The data comprises for each country observations from at least two points in time. The first period is for each country the year 1990. The second (and third) period is AT: 1999, DE: 1997 and 1999, DK: 1999, FR: 1999, IT: 1999, NO: 1996, SE: 1996 and 1999, GB: 1998 and 1999, US: 1995 and 1996. The total number of observations varies across questions (Min: 11,574, Max: 16,729).

Table A3: UI generosity and parental leave across selected OECD member countries

	AT		FR		DE		IT		JP		SE		UK		US	
	1995	2005	1995	2005	1995	2005	1995	2005	1995	2005	1995	2005	1995	2005	1995	2005
UI-GENEROSITY:																
Initial net replacement rate[a]																
Single person	0.57	0.55	0.72	0.69	0.60	0.60	0.28	0.51	0.60	0.59	0.80	0.72	0.21	0.18	0.58	0.58
One earner couple with two children	0.73	0.68	0.64	0.70	0.69	0.71	0.35	0.62	0.57	0.56	0.82	0.76	0.38	0.51	0.59	0.54
Max. UI duration (months)[b]		9		23		12		7		9		14		6		6
PARENTAL LEAVE																
Number of weeks[c]:																
with job-protection	96	70	146	146	148	148	26	26	44	44	74	69	0	13	12	12
with paid leave	112	86	16	42	109	58	48	48	58	58	59	60	18	26	0	0

Notes: [a] The net unemployment replacement rate is the fraction of current income which the social unemployment benefit system provides to a person. The figures refer to the initial phase of unemployment. We list the replacement rate for a single worker and for a one earner family with two children. Benefits for families include child benefits, including means tested benefits. For the calculation of wages, the average wage of a production worker is used. *Source*: van Vliet and Caminada (2012). [b] The maximum UI duration refers to a 40–year–old single worker without children with a 22–year employment record. We do not list figures for the year 1995, since the OECD has changed the definition of this measure substantially in the year 2000. *Source*: OECD (2019) [c] Number of weeks of parental leave with job protection disregard payment conditions and refer to the number of weeks after maternity leave. Number of weeks of paid parental leave refer to the total number of weeks, which a women can be on paid leave after the birth of a child. *Source*: OECD Family Database (2019a) and OECD Family Database (2019b), respectively.

Table A4: Effects of husband's displacement on household labor market outcomes

	Employment		Earnings		Job search
	Husband	Wife	Husband	Wife	Wife
	(1)	(2)	(3)	(4)	(5)
Prior event					
δ_{-5}	-0.008	0.002	-6.642	5.572	0.002
	(0.002)	(0.004)	(4.983)	(6.223)	(0.002)
δ_{-4}	-0.003	0.002	9.554	4.556	0.001
	(0.001)	(0.004)	(3.833)	(5.853)	(0.002)
δ_{-3}	-0.002	0.001	9.840	1.943	0.001
	(0.001)	(0.004)	(3.538)	(5.389)	(0.002)
δ_{-2}	-0.002	-0.000	9.687	-1.050	0.001
	(0.001)	(0.003)	(3.011)	(4.360)	(0.001)
δ_{-1} (δ_0)	-0.000	0.001	-2.522	-0.694	0.003
	(0.000)	(0.002)	(1.702)	(2.647)	(0.001)
Post event					
δ_1	-0.280	0.004	-810.046	5.201	0.009
	(0.002)	(0.002)	(6.049)	(2.696)	(0.002)
δ_2	-0.173	0.009	-612.960	9.363	0.007
	(0.002)	(0.003)	(6.611)	(4.071)	(0.002)
δ_3	-0.144	0.013	-554.129	13.180	0.007
	(0.003)	(0.003)	(7.308)	(4.547)	(0.002)
δ_4	-0.131	0.014	-523.447	15.659	0.007
	(0.003)	(0.004)	(8.092)	(5.122)	(0.002)
δ_5	-0.123	0.013	-504.559	12.939	0.007
	(0.003)	(0.004)	(8.370)	(5.385)	(0.002)
Pre-event mean	1	0.490	2458.082	658.549	0.041
Households			101,609		
Observations			4,386,508		

Notes: This table displays the impact of husband's displacement on own and spousal labor market outcomes at a yearly level based on equation $Y_{ik} = \theta D_i + \sum_{l=-5}^{5} \gamma_l I\{int(k/4) = l\} + \sum_{\substack{l=-5 \\ l\neq 0}}^{5} \delta_l D_i * I\{int(k/4) = l\} + \lambda_{tj} + \upsilon_{ik}$. In columns (1) and (2), the dependent variable is equal to one if husband and wife, respectively, in household i is employed in a given quarter. In columns (3) and (4), the dependent variable is own and spousal monthly earnings in Euro (2000 prices), respectively. In column (5), the dependent variable is equal to one if the wife in household i is unemployed in a given quarter. The coefficient δ_l measures the average difference between employment in displaced and reweighted control groups l years to the reference quarter relative to the difference at the reference quarter. *Pre-event mean* refers to the mean employment in the year before the reference date. Standard errors are bootstrapped (500 replications, with clustering at the household level) and reported in parentheses.

Table A5: Displacement effects by youngest child

Outcome	Husband	Wife	
	Earnings	P(employed)	Earnings
	(1)	(2)	(3)
Youngest child aged 0-2	-509.588	0.011	8.020
	(15.118)	(0.008)	(11.793)
Youngest child aged 3-9	-552.933	0.008	12.989
	(10.531)	(0.005)	(6.477)
Youngest child aged 10-15	-652.092	0.009	6.246
	(14.648)	(0.005)	(7.414)
No child younger than 16	-707.236	0.001	-6.024
	(12.433)	(0.005)	(8.154)

Notes: This table displays the impact of husband's displacement for subgroups defined by the age of the youngest child at the reference date. (2) 4, but it additionally includes the effects on husband's earnings in column (1) and wife's earnings in column (3). The estimates measure the average difference in the corresponding outcome variable between the displaced and the reweighted control group after the reference quarter relative to the difference at the reference date.

Table A6: Effects of husband's displacement on household income

	Prob. of HH receiving		Monthly household income		
	UI	UA	Gross	Net	Net + benefits
	(1)	(2)	(3)	(4)	(5)
Prior event					
δ_{-1}	-0.004	0.001	-17.208	-0.588	-2.297
	(0.003)	(0.002)	(7.634)	(4.988)	(4.923)
Post event					
δ_1	0.223	0.015	-835.031	-530.986	-422.586
	(0.004)	(0.002)	(14.467)	(9.102)	(8.483)
δ_2	0.069	0.038	-794.45	-489.393	-442.212
	(0.004)	(0.002)	(19.488)	(12.243)	(11.867)
δ_3	0.037	0.024	-770.498	-472.311	-443.354
	(0.004)	(0.003)	(20.720)	(13.008)	(12.682)
δ_4	0.028	0.018	-734.077	-445.916	-425.226
	(0.004)	(0.003)	(22.537)	(14.106)	(13.780)
δ_5	0.025	0.017	-715.350	-432.797	-414.887
	(0.004)	(0.003)	(23.667)	(14.803)	(14.518)
Pre-event mean	0.040	0.015	3701.048	2515.338	2530.745
Households			40,771		
Observations			1,049,450		

Notes: This table displays the impact of husband's displacement on household income measures based on the equation specified in Appendix Table A4 for the subsample of households with a reference date in 2001 or later. The dependent variable is equal to one if the household receives unemployment insurance benefits and unemployment assistance in column (1) and (2), respectively. In column (3), the outcome is the sum of the couple's labor earnings. Household net earnings in column (4) are gross earnings minus social security contributions and payroll taxes. In column (5), we add UI and UA benefits. All income variables are measured in Euro (2000 prices) on a monthly basis. We compare individuals in households with a displacement to a reweighted control group of households with no firm event. The coefficient δ_l measures the average difference between the outcome variable in the displaced and the reweighted control group l years to the reference date relative to the corresponding difference at the reference quarter. *Pre-event mean* refers to the mean outcome in the year before the reference date. Standard errors are bootstrapped (500 replications, with clustering at the household level) and reported in parentheses.

B Alternative control groups

In this Appendix, we summarize our approach based on two alternative control groups. In the first section, we define these two groups and discuss our estimation approach. In the second section, we presents our estimation results, which can be directly contrasted with the results based on our main control group presented in the paper. With very few exceptions, we obtain very comparable results across the three different control groups.

B.1 Definition of two alternative control groups

B.1.1 Alternative control group: Non-displaced husbands in mass layoff firms (CG2)

A potential problem with our main control group (henceforth CG1) is sorting into more or less risky firms on the basis of unobserved characteristics. To confront this concern, we define an alternative control group (CG2) by husbands employed in mass layoff plants at the mass layoff date, who do not leave their employer in the subsequent quarter. Put differently, workers in CG2 suffer a mass layoff at their plant, but do not lose their jobs.

As the number of non-layoff workers at the mass layoff plant typically exceeds the number of layoffs, we draw a 40% random sample of all observations. As in the case of our main control group, we exclude workers who are ever displaced from a plant closure or mass layoff over our observation period. However, individuals can be in CG2 in more than one reference quarter. This happens for about 26% of individuals. The reference date for CG2 is defined by the quarter before mass layoff.

Table B2 summarizes main descriptive characteristics measured at the reference quarter for the treated group and all control groups. As in the case of CG1, we observe that workers in CG2 and displaced workers are quite similar in the personal characteristics of husbands and wives. In contrast to CG1, we observe much smaller differences in firm characteristics between CG2 and displaced workers. In particular, workers in CG2 share average firm characteristics with workers displaced by mass layoffs.

As in the case of our main analysis, we use propensity score weighting, such that the average of observable characteristics in CG2 equals the average among

displaced households. The distributional overlap in pre-determined characteristics is closer between CG2 (see Figure B2) and the displaced group than between CG1 and the displaced (see Figure A7). This is mainly due to the similarities in firm characteristics; larger firms tend to have more workers who survive a mass layoff event.

With the definition of CG2, we do not worry about selection into firms, but we might worry about selection into layoff. Many firms apply 'last-in first-out' or similar policies to determine mass layoffs. A further concern is that economic and psychological shocks related to a mass layoff can also affect non-displaced workers and their spouses, due to increased uncertainty or stress or because of a general deterioration of labor market conditions.[1]

B.1.2 Alternative control group: Husbands displaced at a later date (CG3)

As a further alternative control group (CG3), we do not sample individuals who were not displaced, rather, we exploit the timing of firm events and construct control groups of workers who are displaced themselves, but at a later date. Since CG3 is drawn from the same pool of couples as the displaced group, there are by construction no pre-displacement differences in observable.

Our approach is inspired by Fadlon and Nielsen (2017) and Ruhm (1991), who exploit the timing of events to investigate the effects of spousal health shocks on employment and the effect of job displacement on subsequent nonemployment, respectively. Under the assumption that the process determining involuntary job loss does not vary over time, workers who are displaced in later periods should not differ in unobserved characteristics from those who are displaced in the base period. Thus, the confounding effects of unobserved heterogeneity should be accounted for by a comparison of workers displaced at different times (Ruhm, 1991).

Our strategy to construct CG3 is as follows. We start with a cohort of couples getting married in a fixed quarter and define households with husband displaced in a (reference) quarter h as the displaced group. The control group is given by the set of households in the same marriage cohort, who experience husband's

[1] Gathmann et al. (201x) show that mass layoffs worsen the local labor market situation in a causal way. They find that mass layoffs have sizeable negative effects on the regional economy, especially of firms in the same sector. Full reference: Gathmann, Helm, and Schönberg (201x). Spillover Effects of Mass Layoffs. *Journal of the European Economic Association*, forthcoming.

displacement in the near future, in $h + \Delta$. We then assign a placebo shock at h to the households in the control group. It is important to hold the marriage date of the displaced and control group fixed to make sure that they are at the same stage of their life-cycle at date h.

The choice of Δ is restricted by the trade-off between the length of the horizon over which we can observe post-displacement outcomes and the comparability of displaced and control couples. The two groups should be highly comparable if there is only little time difference between displacements, i.e. if Δ is short. However, a short Δ also limits the period over which the counterfactual outcome can be observed. We experimented with values for Δ between 4 and 16 quarters, selecting only multiples of 4 because of the seasonality in mass layoffs and plant closures. As we do not find much evidence for reduced comparability, we present mainly results for $\Delta = 16$. (Section C includes robustness checks with respect to alternative values of Δ). We repeat the construction of the control group for every combination of marriage quarter and reference quarter h and construct weights such that the displaced and control group size is balanced within each cell.

Due to the sample restrictions on marriage duration and tenure at displacement, we must put two additional restrictions on households in CG3. This has implications for the comparability in the case of some of the outcome variables. First, the restriction on the husband's job tenure in CG3 has to hold in quarter h and in quarter $h + \Delta$, which implies that there is full employment among husbands in CG3 in the 4 quarters preceding $h + \Delta$. Therefore, we cannot directly compare the husband's employment and earnings outcomes in CG3 with the displaced group. Second, due to the restriction on a marriage duration of at least 2 years prior to displacement, households in control group 3 are continuously married between h and $h + \Delta$. Thus, we cannot examine divorce behavior based on CG3.

B.2 Estimation results based on the two alternative control groups

The following Table B1 shows where the estimation results across outcomes and alternative control groups can be found:

Table B1: Overview of Tables and Figures summarizing estimation results across outcomes and alternative control groups

	Control groups		
Outcome	CG1	CG2	CG3
Descriptives			
Sample characteristics	Tab 1	Tab B2	Tab B2
Family dynamics	Fig A6	Fig B1	–
Propensity score distrib.	FigA7	FigB2	–
Main results			
Husband: Employment	Fig 3, Tab 2	Fig B3, Tab B3	–
Wife: Employment	Fig 4a, Tab 2	Fig B4a, Tab B3	Fig B4b, Tab B3
Wife: Job search	Fig 4b, Tab 2 &A4	Fig B5a, Tab B3 & B11	Fig B5b, Tab B3 & B11
Wife: Intensive/extensive	Tab 3	Tab B4	
HH: UI & UA	Fig 5, Tab 7 & A6	Fig B6, Tab B5 & B12	–
HH: Income	Fig 6, Tab 7 & A6	Fig B7, Tab B5 & B12	–
HH: Divorce & Fertility	Fig 7, Tab 8	Fig B8, Tab B6	–
HH: Employment	Tab A4	Tab B9	Tab B9
HH: Earnings	Tab A4	Tab B10	Tab B10
Hetereogeneity results			
Age of youngest child	Fig 8, Tab 4 & A5	Fig B9, Tab B7 & B13	Fig B10, Tab B7 & B13
Wife's earnings potential	Tab 5	Tab B14	
Magnitude of shock	Tab 6 (Panel A)	Tab B8 (Panel A)	
Local labor market cond.	Tab 6 (Panel B)	Tab B8 (Panel B)	

Notes: HH stands for Household.

Our estimation results are remarkably consistent across the three control groups. There are only two exceptions:

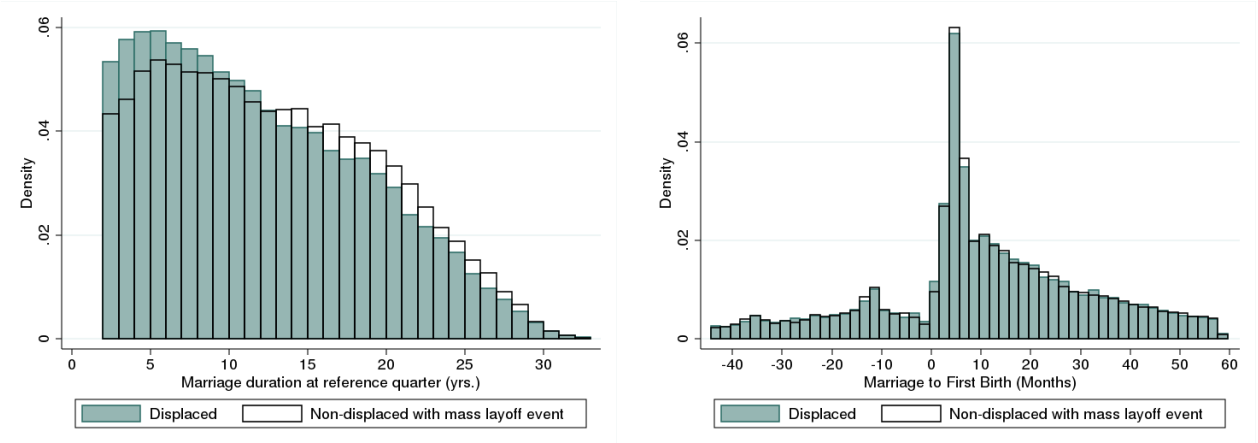
- Job search: Based on CG1 we find evidence for a stable increase in wives' job search rates over five years after the reference date (see Figure 4b and Table A4). Using CG3 we find equivalent results (see Figure B5a). In contrast, CG2 couples, whose husbands were not affected by the mass layoff in their plant, raise their job search rates with some delay after the reference date. This could indicate spillovers from the mass-layoff event to unaffected households, who react to rising uncertainty (see Figure B5a). Table B11) provides a comparison of detailed estimation output for all three alternatives.

- Divorce: Based on CG1 we find a small increase in the probability of divorce (see Table 8). In contrast, CG2 couples, with husbands employed in mass layoff firms but not laid off themselves, face the same divorce rate

patterns as the displaced group (see Table B6). A potential explanation for this finding is that CG2 couples are exposed to higher uncertainty and stress themselves, which may change their gains from marriage and affect their divorce decisions. (CG3 couples are by construction not a valid counterfactual in the case of divorce. By assumption, control households remain married up to four years after the reference date.)

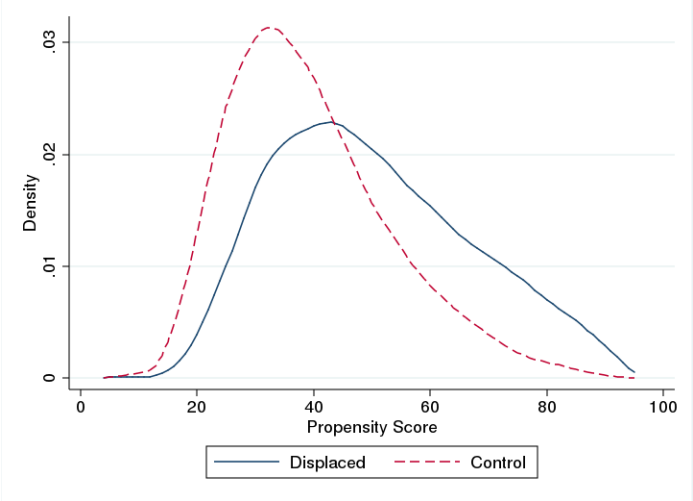
Figure B1: CG2: Family dynamics by treatment status

(a) Marriage duration at the reference date **(b)** Distance between marriage and first birth



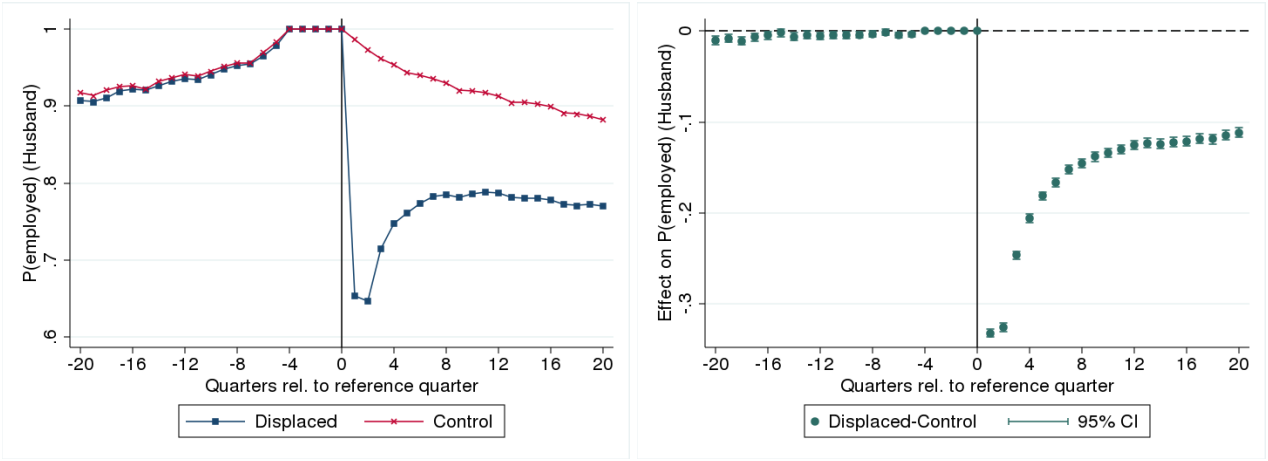
Notes: Panel (a) shows the distribution of marriage durations at the reference date and panel (b) shows the distance from marriage to the birth of the first child in month. The graphs display the distribution for the sample of households experiencing a displacement at the reference date (green) and for households with husbands working in mass layoff firms who keep their jobs (transparent). We include one observation per household event.

Figure B2: CG2: Propensity score distribution



Notes: This figure shows the density distribution of the propensity score in the displaced group and in CG2, which consists of households with husbands that have a mass layoff at the reference date, but are not displaced.

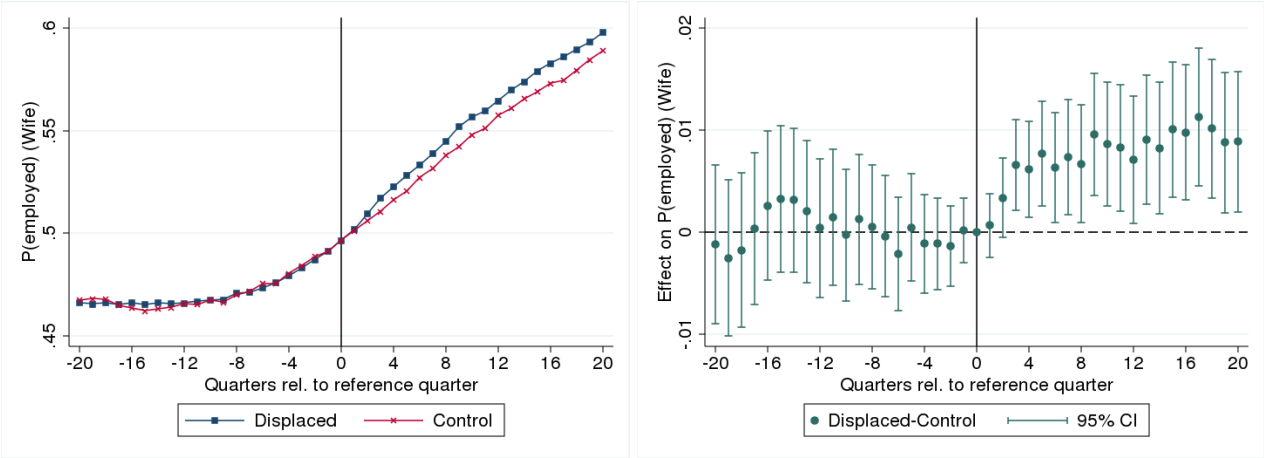
Figure B3: Employment of displaced husbands with CG2



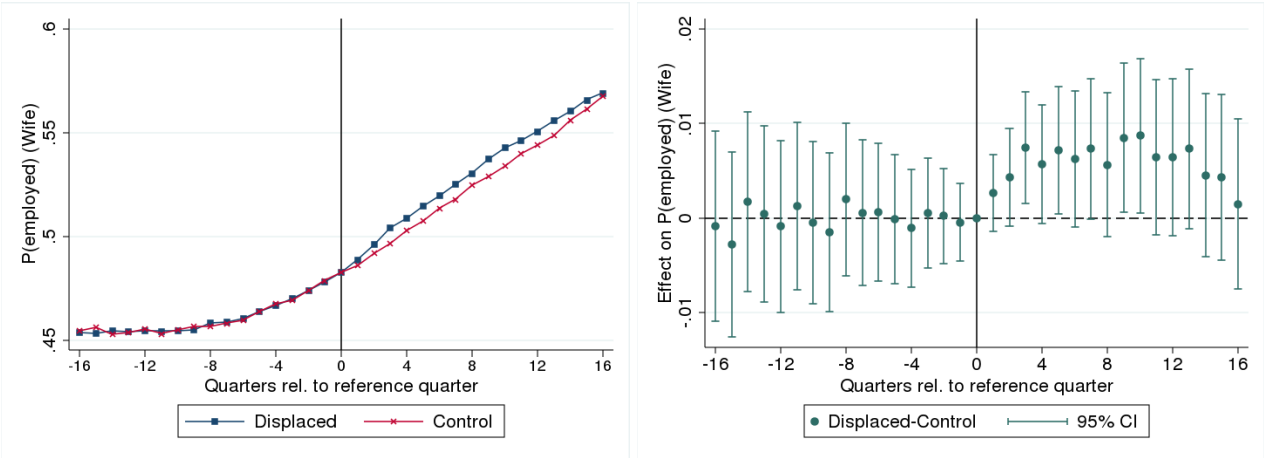
Notes: The graph to the left compares the probability to be employed of men that are displaced (blue, square) to non-displaced men working in mass layoff firms at the reference date based on estimation equation (1). The graph to the right plots the difference between the two lines with the corresponding 95% confidence interval. CG2 is reweighted to resemble the displaced group in characteristics of the husband, the wife, and the household measured at the reference date, the husband's labor market outcomes in the years before the reference date, and the characteristics of the husband's employer (see Appendix Figure A7 for details). The employment probability of the control group is adjusted by its mean difference relative to the displaced group.

Figure B4: Employment of displaced husbands' wives with CG2 and CG3

(a) CG2: Non-displaced in mass layoff



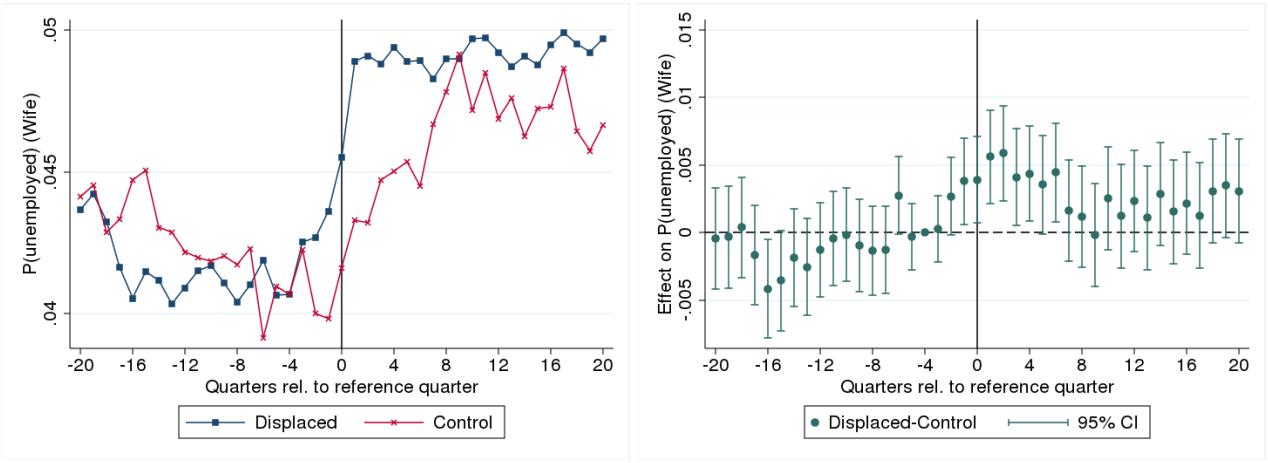
(b) CG3: Displaced in the future



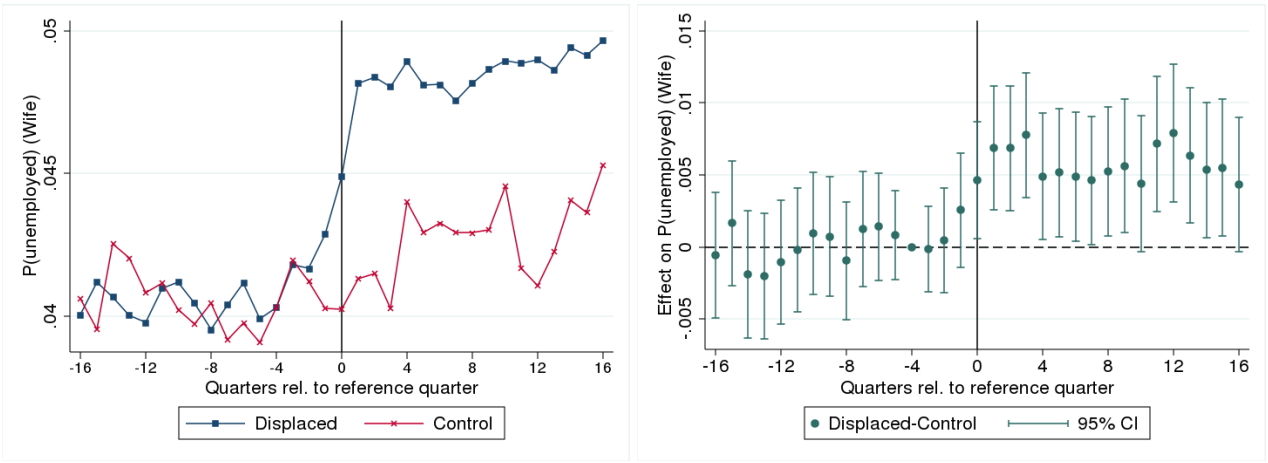
Notes: The graphs to the left compare the probability to be employed of wives with displaced husbands (blue, square) to those with non-displaced husbands working in mass layoff firms at the reference date in Panel (a) and to those with husbands displaced 16 quarters after the reference date in Panel (b). The graphs to the right plot the difference between the two lines with the corresponding 95% confidence interval. CG2 is reweighted to resemble the displaced group as explained in Figure 3. The employment probability of the control group is adjusted by its mean difference relative to the displaced group.

Figure B5: Job search, probability of registered unemployment with CG2 and CG3

(a) CG2: Non-displaced in mass layoff



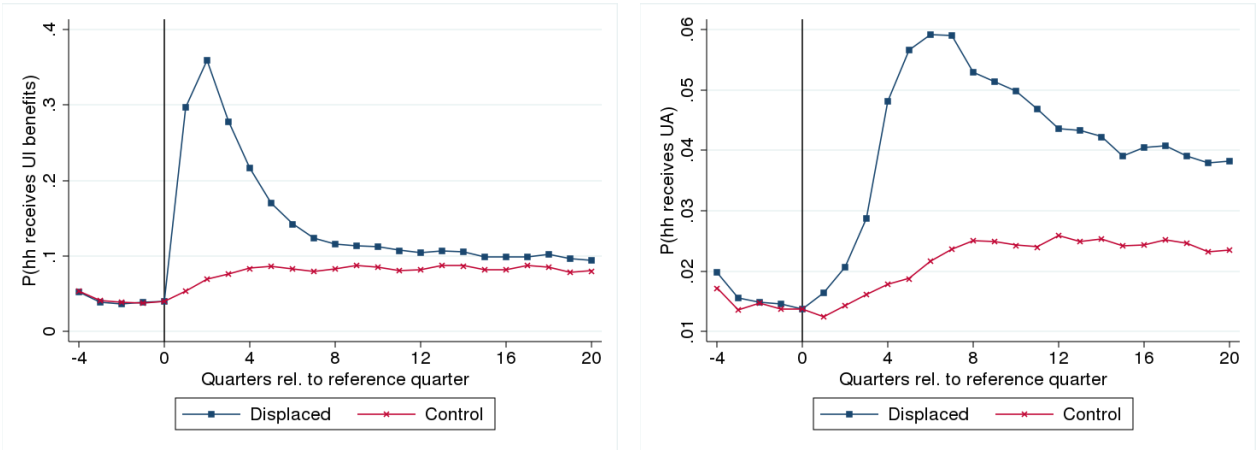
(b) CG3: Displaced in the future



Notes: The graphs to the left compare the probability to be unemployed of wives with displaced husbands (blue, square) to those with non-displaced husbands working in mass layoff firms at the reference date in Panel (a) and to those with husbands displaced 16 quarters after the reference date in Panel (b) based on an adapted version of estimation equation (1), in which we measure unemployment relative to its value in the quarter *one year before* the reference date. The graphs to the right plot the difference between the two lines with the corresponding 95% confidence interval. CG2 is reweighted to resemble the displaced group as explained in Figure 3. The unemployment probability of the control group is adjusted by its mean difference relative to the displaced group.

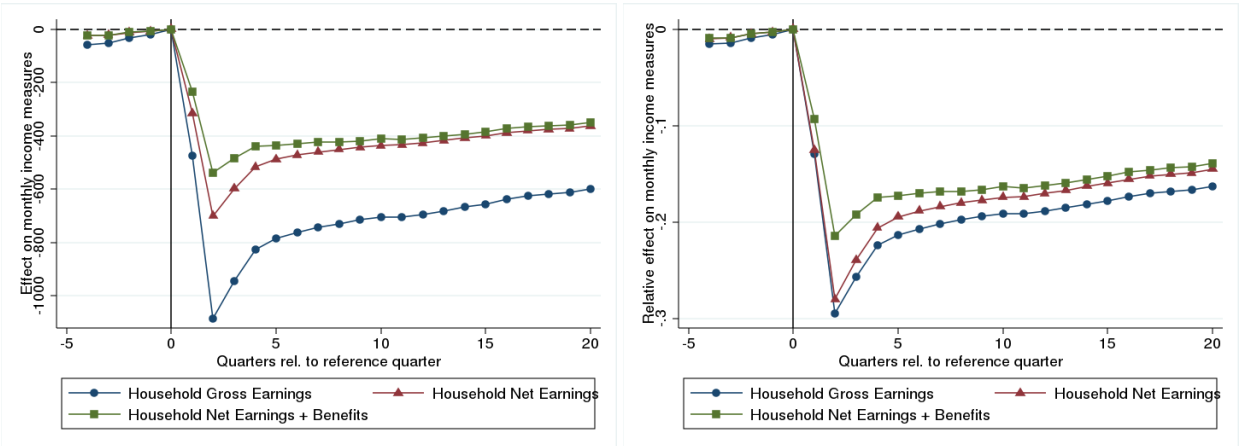
Figure B6: Social benefits around displacement with CG2

(a) Probability that household receives UI benefits **(b)** Probability that household receives UA benefits



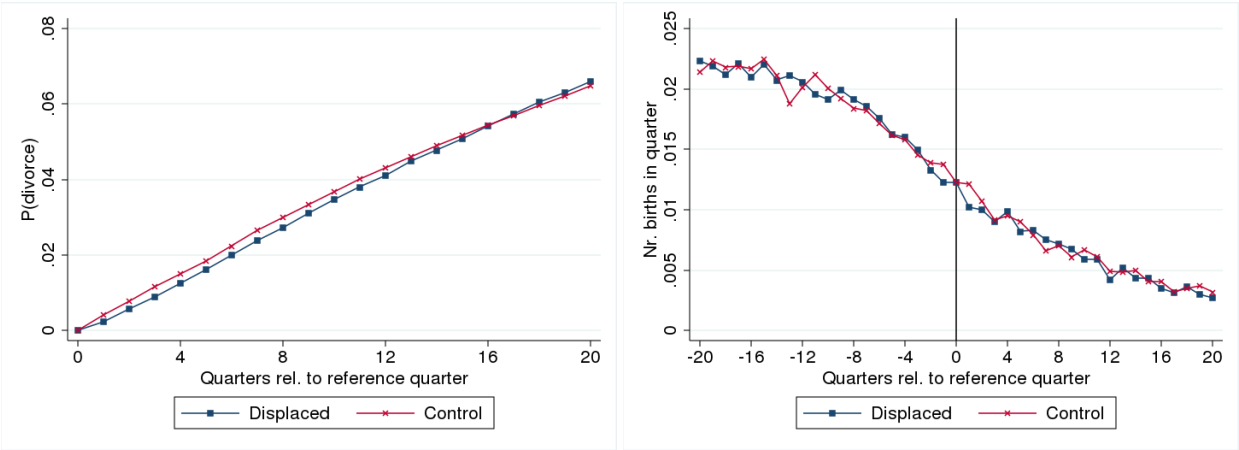
Notes: Comparison of the probability of receiving benefits of households with displaced husbands (blue, square) to those with non-displaced husbands working at mass layoff employers at the reference date (red, x). The control group is reweighted to resemble the displaced group as explained in Figure 3. The employment probability of the control group is adjusted by its mean difference relative to the displaced group.

Figure B7: Displacement effect on household income with CG2



Notes: This figure shows the effect of husband's displacement on monthly household income measures (in Euro, 2000 prices). The effect is given by the difference between households that experience a displacement and reweighted and mean-adjusted households with non-displaced husbands who work at mass layoff employers at the reference date. *Household Gross Earnings* is the sum of husband's and wife's labor earnings according to tax data. *Household Net Earnings* subtracts social security contributions and payroll taxes. *Household Net Earnings + benefits* adds UI and UA benefits.

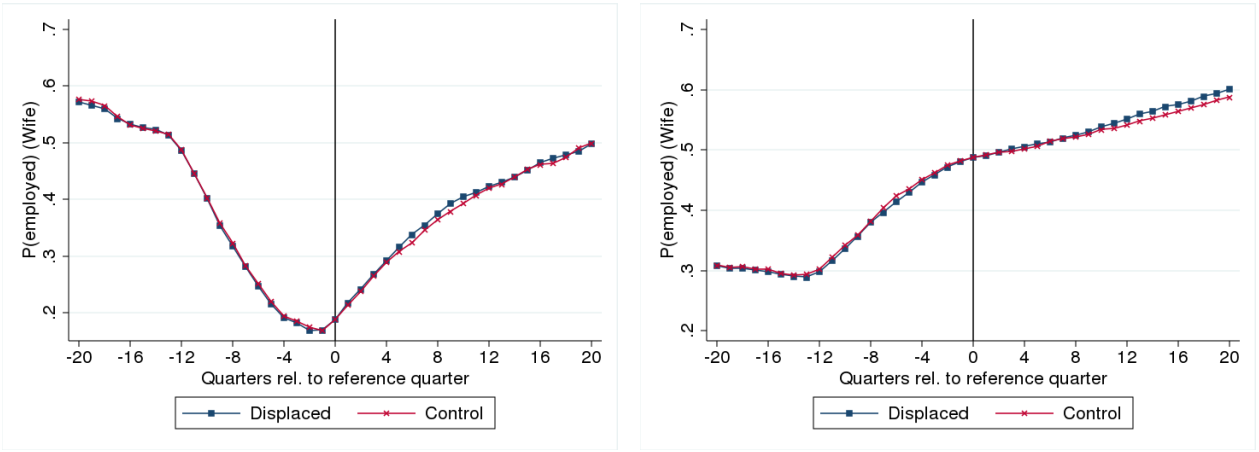
Figure B8: Divorce and fertility around displacement with CG2



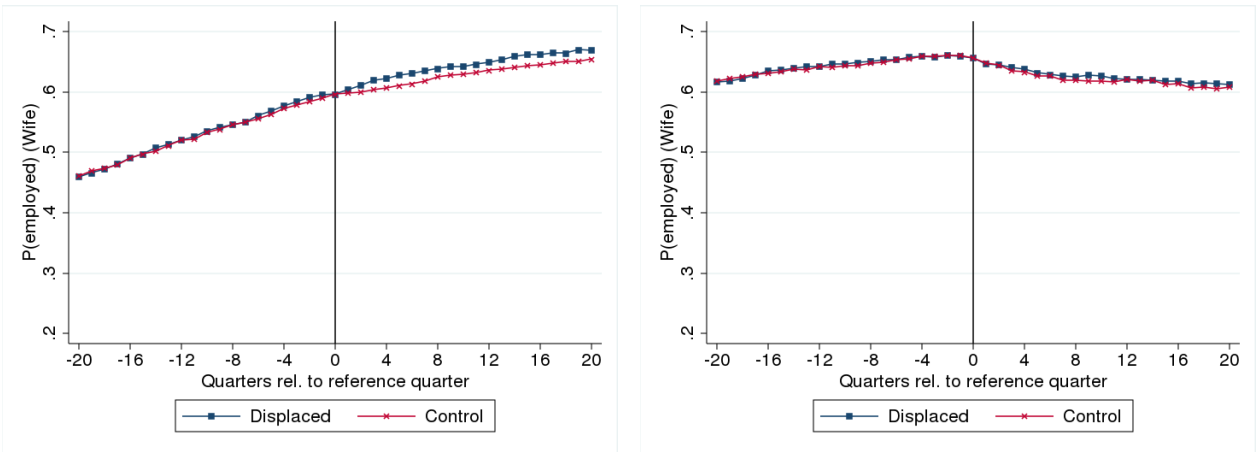
Notes: Comparison of the probability to live in divorce (left) and the number of births (right) for households with husbands experiencing a displacement (blue, square) to households with non-displaced husbands working in mass layoff firms at the reference date. CG2 is reweighted to resemble the displaced group as explained in Figure 3. The number of births of the control group is adjusted by its mean difference relative to the displaced group. Divorce is only displayed after the reference date, since couples are required not to divorce until that date.

Figure B9: Employment of displaced husbands' wives by age of the youngest child with CG2

(a) 0-2 yrs. **(b)** 3-9 yrs.



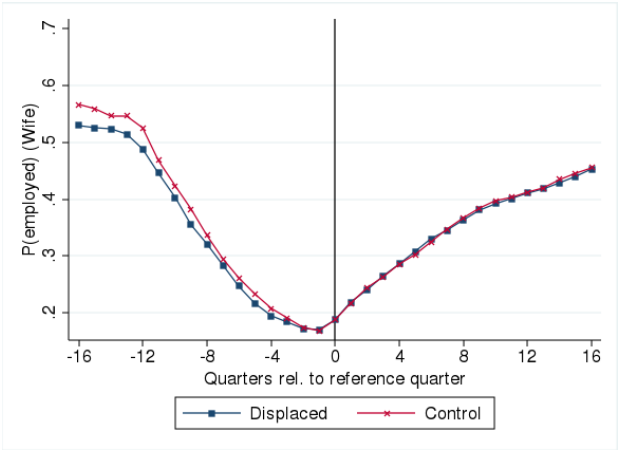
(c) 10-15 yrs. **(d)** No children aged 16 yrs. or younger



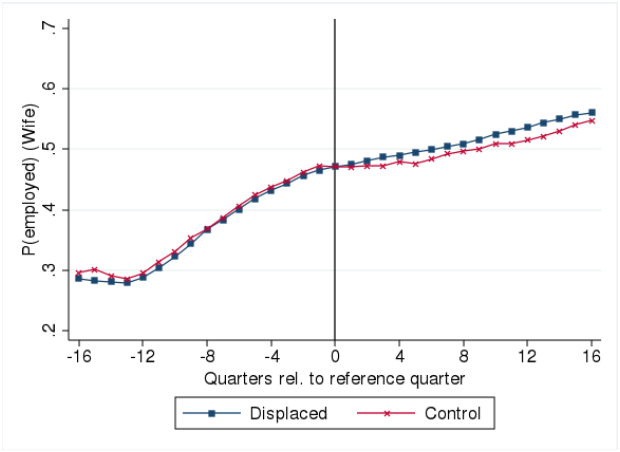
Notes: Comparison of the probability to be employed of wives with displaced husbands (blue, square) to those with non-displaced husbands working at a mass layoff firm at the reference date (red, x) for subgroups defined by the age of the youngest child at the reference date. The control group is reweighted to resemble the displaced group within each subgroup as explained in Figure 3. The employment probability of the control group is adjusted by its mean difference relative to the displaced group.

Figure B10: Employment of displaced husbands' wives by age of the youngest child with CG3

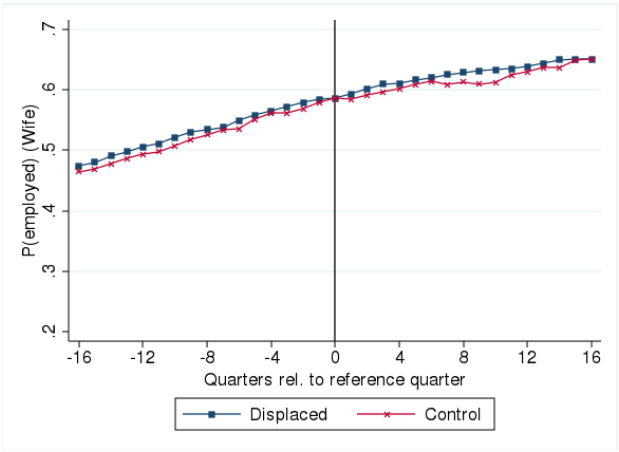
(a) 0-2 yrs.



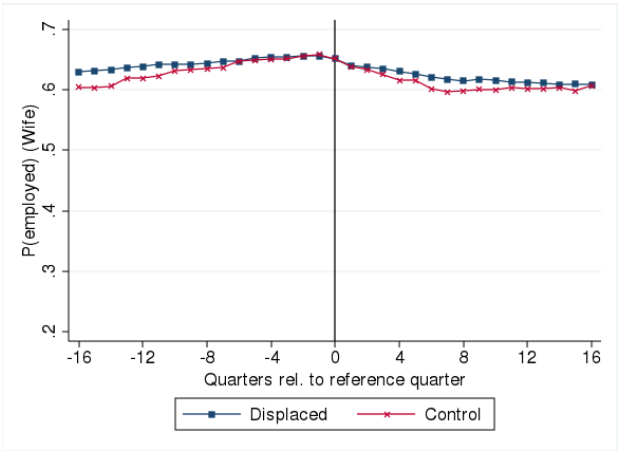
(b) 3-9 yrs.



(c) 10-15 yrs.



(d) No children aged 16 yrs. or younger



Notes: Comparison of the probability to be employed of wives with displaced husbands (blue, square) to those with husbands displaced 16 quarters after the reference date (red, x) for subgroups defined by the age of the youngest child at the reference date. The employment probability of the control group is adjusted by its mean difference relative to the displaced group.

Table B2: Sample characteristics including CG2

	Displaced		Control	
	Closure	Mass layoff	Group 1	Group 2
	(1)	(2)	(3)	(4)
I. Husband				
Age (yrs)	39.41	39.05	40.09	39.74
	[38.95]	[38.54]	[39.84]	[39.44]
	(6.75)	(6.79)	(6.63)	(6.67)
Experience in employment (yrs)	16.97	16.70	18.54	18.06
	[17.03]	[16.75]	[18.61]	[18.36]
	(6.77)	(6.72)	(6.61)	(6.46)
Tenure (yrs)	6.92	6.92	9.66	8.77
	[4.58]	[4.73]	[6.86]	[8.11]
	(6.24)	(6.06)	(6.91)	(6.70)
Number of previous jobs	4.44	4.11	2.90	3.14
	(4.34)	(4.17)	(3.29)	(3.49)
Number of previous mass layoffs	1.41	1.92	0.53	1.94
	(2.26)	(2.39)	(1.31)	(2.46)
Share blue collar	0.47	0.48	0.38	0.44
	(0.50)	(0.50)	(0.49)	(0.50)
Real Monthly Earnings (€)	2443.16	2500.61	2706.99	2672.92
	[2319.86]	[2455.63]	[2722.46]	[2649.97]
	(918.09)	(776.33)	(725.15)	(722.34)
Censored earnings	0.16	0.20	0.25	0.24
	(0.37)	(0.40)	(0.43)	(0.43)
II. Wife				
Age (yrs)	36.66	36.39	36.99	37.40
	[36.38]	[35.97]	[36.77]	[37.23]
	(6.14)	(6.20)	(6.14)	(6.13)
Experience in employment (yrs)	9.50	9.41	9.95	9.72
	[8.50]	[8.37]	[8.94]	[8.73]
	(6.15)	(6.06)	(6.28)	(6.19)
Number previous jobs	1.57	1.52	1.49	1.53
	(2.64)	(2.49)	(2.46)	(2.56)
Employed	0.49	0.50	0.50	0.50
	(0.50)	(0.50)	(0.50)	(0.50)
Blue collar | employed	0.31	0.31	0.28	0.31
	(0.46)	(0.46)	(0.45)	(0.46)
Real monthly earnings (€) | employed	1320.50	1343.11	1321.56	1320.63
	[1196.09]	[1232.67]	[1181.57]	[1207.13]
	(788.78)	(800.86)	(806.11)	(795.31)
Earnings rel. to husband | employed	0.63	0.61	0.52	0.53
	(0.67)	(0.66)	(0.39)	(0.44)
Censored earnings | employed	0.02	0.02	0.02	0.02
	(0.13)	(0.15)	(0.14)	(0.14)
III. Household composition				
Marriage duration (yrs)	12.20	12.00	13.06	12.84
	[11.20]	[10.93]	[12.40]	[12.13]
	(6.80)	(6.76)	(6.92)	(6.84)
Number of children	1.39	1.38	1.41	1.38
	(1.00)	(1.00)	(0.99)	(0.99)
Share with youngest child 0–2	0.18	0.19	0.16	0.16
	(0.38)	(0.39)	(0.37)	(0.37)
Share with youngest child 3–9	0.36	0.36	0.35	0.35
	(0.48)	(0.48)	(0.48)	(0.48)
Share with youngest child 10–16	0.20	0.20	0.22	0.22
	(0.40)	(0.40)	(0.41)	(0.41)

Continued on next page.

Table B2 — continued from previous page.

	Displaced		Control	
	Closure (1)	Mass layoff (2)	Group 1 (3)	Group 2 (4)
IV. Employer (husband)				
Firm size	51.94	244.39	397.15	326.87
	[20.00]	[138.00]	[135.00]	[239.00]
	(97.79)	(312.98)	(771.13)	(315.70)
Turnover	0.25	0.19	0.14	0.17
	[0.16]	[0.14]	[0.10]	[0.13]
	(0.34)	(0.24)	(0.22)	(0.19)
Mean monthly wage	1903.49	2072.28	2232.27	2160.57
	[1878.23]	[2025.60]	[2191.31]	[2106.37]
	(553.48)	(582.05)	(597.37)	(551.37)
Industry				
Manufacturing	0.41	0.46	0.47	0.59
	(0.49)	(0.50)	(0.50)	(0.49)
Sales	0.29	0.23	0.20	0.17
	(0.45)	(0.42)	(0.40)	(0.38)
Transport	0.10	0.06	0.06	0.05
	(0.30)	(0.24)	(0.23)	(0.22)
Services	0.19	0.25	0.28	0.19
	(0.40)	(0.43)	(0.45)	(0.39)
Region				
Vienna	0.22	0.24	0.15	0.20
	(0.41)	(0.43)	(0.36)	(0.40)
Eastern Austria w/o Vienna	0.22	0.20	0.20	0.22
	(0.41)	(0.40)	(0.40)	(0.41)
Southern Austria	0.21	0.19	0.20	0.22
	(0.40)	(0.39)	(0.40)	(0.41)
Western Austria	0.35	0.36	0.44	0.36
	(0.48)	(0.48)	(0.50)	(0.48)
Observations	18,466	30,027	58,518	61,360

*N*ote: Statistics depicted are means with standard deviations in parentheses. Medians are presented in brackets. Column (1) refers to households with a husband displaced through a plant closure, column (2) to those with a husband displaced through a mass layoff in the quarter after the reference date. Column (3) refers to a 10% random subsample of households with husbands without a firm event in the quarter after the reference date. Households in column (4) are a 40% random sample of non-displaced husbands employed at a firm where other workers are displaced from a mass layoff in the quarter following the reference date. There is one observation per household-event. All variables (except firm size, turnover, and mean monthly wage) are measured at the reference date (one year before the reference date, respectively). All households fulfill the following requirements: Husband and wife are aged 25–55 and 25–50, respectively, at the reference date. They are married for at least two years and husbands have at least one year of tenure at the reference date.

Table B3: Effects of husband's displacement on household labor market outcomes with CG2 and CG3

	CG2		CG3
	Husband	Wife	Wife
	(1)	(2)	(3)
A. Employment			
Displaced×Post	-0.162	0.008	0.006
	(0.002)	(0.002)	(0.003)
$\eta^{\text{participation}}$		-0.036	
		(0.010)	
Pre-event mean	1	0.486	0.468
B. Earnings			
Displaced×Post	-542.040	9.251	13.064
	(5.819)	(3.402)	(4.402)
Pre-event mean	2463.521	647.718	613.938
C. Job Search			
Displaced×Post		0.003	0.005
		(0.001)	(0.002)
Pre-event mean		0.041	0.039
Households	93,666		45,886
Observations	4,502,579		2,161,764

Notes: This table displays the impact of husband's displacement on household labor market outcomes based on equation (2), which includes displaced group, distance to event, and industry×quarter fixed effects. In Panel A (C) the dependent variable is equal to one if the individual in household i is employed (unemployed) in a given quarter. In Panel B it equals monthly earnings in Euro (2000 prices), with zeros for those not employed. Column (1) and (2) ((3) and (4)) compare individuals in households with a displacement to a reweighted control group with no firm event (with households in which husbands keep their jobs during a mass layoff). In column (5), we match to displaced households a control group of households from the same marriage cohort that experience displacement four years after the reference date. *Displaced×Post* measures the average difference in the outcome variable between displaced and control groups relative to the reference date in the twenty quarters after the reference quarter. $\eta^{\text{participation}}$ is the implied participation elasticity of wives with respect to the earnings of their husbands. *Pre-event mean* refers to the mean of the dependent variable in the year before the reference date. Standard errors are bootstrapped (500 replications, with clustering at the household level) and reported in parentheses.

Table B4: Displacement effects by wife's employment status prior reference date with CG2

Outcome	Wife employed			Wife not employed		
	Husband Earnings	Wife P(employed)	Earnings	Husband Earnings	Wife P(employed)	Earnings
	(1)	(2)	(3)	(4)	(5)	(6)
Displaced×Post	-549.422	-0.005	-4.631	-536.040	0.015	16.705
	(8.979)	(0.003)	(5.207)	(7.539)	(0.003)	(4.479)
$\eta^{\text{participation}}$					-0.069	
					(0.015)	
Pre-event mean	2495.640	1	1365.551	2441.058	0.113	124.521
Households	40,492			55,237		

Notes: This table displays the impact of husband's displacement on own earnings, spousal employment and earnings by the employment status of the wife before the reference date. The left panel refers to the group of households in which the wife was employed in all four quarters before the reference date. The panel to the right refers to the group of households in which the wife was not employed in any of the four quarters before the reference date. Cluster-robust (at the household level) standard errors are bootstrapped (500 replications) and reported in parentheses.

Table B5: Effects of husband's displacement on household income with CG2

	Prob. of HH receiving		Monthly household income		
	UI	UA	Gross	Net	Net + benefits
	(1)	(2)	(3)	(4)	(5)
Displaced×Post	0.066	0.021	-711.089	-440.991	-401.297
	(0.003)	(0.002)	(17.695)	(11.046)	(10.789)
Pre-event mean	0.040	0.015	3679.622	2500.192	2514.904
Households	34,031				

Notes: This table displays the impact of husband's displacement on household income measures based on (2) for the subsample of households with a reference date in 2001 or later. The dependent variable is equal to one if the household receives unemployment insurance benefits and unemployment assistance in column (1) and (2), respectively. In column (3), the outcome is household gross earnings (sum of the couple's labor earnings). Household net earnings in column (4) are gross earnings minus social security contributions and payroll taxes. In column (5), we add unemployment benefits and assistance to the former. All income variables are measured in Euro (2000 prices) on a monthly basis. In Panel A (B) we compare individuals in households with a displacement to a reweighted control group of households with no firm event (with households in which husbands keep their jobs during a mass layoff). Standard errors are bootstrapped (500 replications, with clustering at the household level) and reported in parentheses.

Table B6: Effects of husband's displacement on divorce and fertility with CG2

	P(Divorce)	No. of births
	(1)	(2)
Displaced×Post	-0.001	-0.000
	(0.001)	(0.001)
Pre-event mean	0.000	0.014
Households	93,666	

Notes: This table displays the impact of husband's displacement on the risk to be divorced in a given quarter in column (1) and the number of births per quarter in (2). The upper (lower) panel compare households with a displacement to a reweighted control group with no firm event (with households in which husbands keep their jobs during a mass layoff). Standard errors are clustered at the household level and reported in parentheses.

Table B7: Wife's employment response by age of youngest child with CG2 and CG3

	0–2 years	3–9 years	10–15 years	None younger than 16 years
	(1)	(2)	(3)	(4)
A. Control group 2				
Displaced×Post	0.005	0.007	0.015	0.005
	(0.007)	(0.004)	(0.004)	(0.004)
$\eta^{\text{participation}}$	-0.028	-0.034	-0.065	-0.019
	(0.034)	(0.019)	(0.019)	(0.016)
Pre-event mean	0.181	0.465	0.585	0.661
Earnings rel. to husband | employed	0.482	0.515	0.535	0.662
Households	17,623	34,883	20,560	25,153
B. Control group 3				
Displaced×Post	-0.002	0.015	0.012	0.010
	(0.008)	(0.005)	(0.007)	(0.007)
Pre-event mean	0.178	0.448	0.567	0.657
Households	11,949	20,653	10,860	11,559

Notes: This table displays the impact of husband's displacement on spousal employment for subgroups defined by the age of the youngest child at the reference date. The first (second) panel compare households with a displacement to a reweighted control group with no firm event (with households in which husbands keep their jobs during a mass layoff). The third panel compares the displaced group to a control group of households that experience displacement four years after that date. Standard errors are bootstrapped (500 replications, with clustering at the household level) and reported in parentheses.

Table B8: Displacement effects by plant wage level and unemployment rate at reference date with CG2

	Below median			Above median		
Outcome	Husband	Wife		Husband	Wife	
	Earnings	P(employed)	Earnings	Earnings	P(employed)	Earnings
	(1)	(2)	(3)	(4)	(5)	(6)
A. Subgroups by plant wage level at reference date						
Displaced×Post	-492.264	0.005	1.543	-651.488	0.013	16.383
	(9.444)	(0.004)	(5.890)	(10.896)	(0.004)	(5.973)
$\eta^{\text{participation}}$		-0.023			-0.056	
		(0.018)			(0.015)	
Pre-event mean	2279.030	0.508	678.837	2789.954	0.506	689.219
Households	37,821			34,844		
B. Subgroups by male unemployment rate at reference date						
Displaced×Post	-550.786	0.010	12.033	-540.268	0.006	6.975
	(8.944)	(0.003)	(4.662)	(8.183)	(0.003)	(5.086)
$\eta^{\text{participation}}$		-0.048			-0.026	
		(0.016)			(0.016)	
Pre-event mean	2478.804	0.465	605.749	2494.340	0.505	689.418
Households	46,973			46,544		

Notes: This table displays the impact of husband's displacement on own earnings, spousal employment and earnings for different subgroups. In Panel A the wage level at plants are employer-specific fixed effects estimated based on the AKM approach (Abowd et al., 1999) (see Appendix D for details). These estimates are available only after 1994. In Panel B the male unemployment rate is measured at the husband's employment district in the year of the reference date. Standard errors are bootstrapped (500 replications, with clustering at the household level) and reported in parentheses.

Table B9: Effects of husband's displacement on household employment

	Control group 1		Control group 2		Control group 3
	Husband	Wife	Husband	Wife	Wife
	(1)	(2)	(3)	(4)	(5)
Prior event					
δ_{-5}	-0.008	0.002	-0.009	-0.002	
	(0.002)	(0.004)	(0.001)	(0.003)	
δ_{-4}	-0.003	0.002	-0.004	0.002	-0.004
	(0.001)	(0.004)	(0.001)	(0.003)	(0.005)
δ_{-3}	-0.002	0.001	-0.005	0.001	-0.002
	(0.001)	(0.004)	(0.001)	(0.003)	(0.004)
δ_{-2}	-0.002	-0.000	-0.003	-0.000	0.001
	(0.001)	(0.003)	(0.001)	(0.003)	(0.004)
δ_{-1}	-0.000	0.001	0.000	-0.001	-0.000
	(0.000)	(0.002)	(0.000)	(0.002)	(0.002)
Post event					
δ_1	-0.280	0.004	-0.278	0.004	0.005
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
δ_2	-0.173	0.009	-0.162	0.007	0.007
	(0.002)	(0.003)	(0.002)	(0.002)	(0.003)
δ_3	-0.144	0.013	-0.132	0.009	0.008
	(0.003)	(0.003)	(0.002)	(0.003)	(0.004)
δ_4	-0.131	0.014	-0.123	0.009	0.006
	(0.003)	(0.004)	(0.002)	(0.003)	(0.004)
δ_5	-0.123	0.013	-0.116	0.010	
	(0.003)	(0.004)	(0.003)	(0.003)	
Pre-event mean	1	0.490	1	0.486	0.468
Households	101,609		93,666		45,886
Observations	4,386,508		4,502,579		2,161,764

Notes: This table displays the impact of husband's displacement on own and spousal employment based on the equation specified in Appendix Table A4. The dependent variable is equal to one if husband/wife in household i is employed in a given quarter. Column (1) and (2) ((3) and (4)) compare individuals in households with a displacement to a reweighted control group with no firm event (with households in which husbands keep their jobs during a mass layoff). In column (5), we match to displaced households a control group of households from the same marriage cohort that experience displacement four years after the reference date. The coefficient δ_l measures the average difference between employment in displaced and reweighted control groups l years to the reference quarter relative to the difference at the reference quarter. *Pre-event mean* refers to the mean employment in the year before the reference date. Standard errors are bootstrapped (500 replications, with clustering at the household level) and reported in parentheses.

Table B10: Effects of husband's displacement on household earnings

	Control group 1		Control group 2		Control group 3
	Husband	Wife	Husband	Wife	Wife
	(1)	(2)	(3)	(4)	(5)
Prior event					
δ_{-5}	-6.642	5.572	-3.709	-4.608	
	(4.983)	(6.223)	(5.540)	(4.848)	
δ_{-4}	9.554	4.556	5.236	0.606	-3.661
	(3.833)	(5.853)	(5.202)	(4.679)	(6.814)
δ_{-3}	9.840	1.943	2.542	-1.637	-1.202
	(3.538)	(5.389)	(4.639)	(4.155)	(5.982)
δ_{-2}	9.687	-1.050	5.231	-1.866	4.143
	(3.011)	(4.360)	(3.686)	(3.671)	(4.908)
δ_{-1}	-2.522	-0.694	-1.990	-1.148	1.391
	(1.702)	(2.647)	(1.925)	(2.457)	(3.001)
Post event					
δ_1	-810.046	5.201	-783.445	5.618	11.390
	(6.049)	(2.696)	(5.564)	(2.283)	(3.153)
δ_2	-612.960	9.363	-554.224	7.261	11.581
	(6.611)	(4.071)	(6.382)	(3.552)	(4.768)
δ_3	-554.129	13.180	-482.088	9.510	15.370
	(7.308)	(4.547)	(6.944)	(4.120)	(5.643)
δ_4	-523.447	15.659	-454.925	10.312	14.027
	(8.092)	(5.122)	(7.372)	(4.600)	(6.212)
δ_5	-504.559	12.939	-434.683	13.541	
	(8.370)	(5.385)	(7.774)	(4.923)	
Pre-event mean	2458.082	658.549	2463.521	647.718	613.938
Households	101,609		93,666		45,886
Observations	4,386,508		4,502,579		2,161,764

Notes: This table displays the impact of husband's displacement on own and spousal monthly earnings in Euro (2000 prices) based on the equation specified in Appendix Table A4. The dependent variable is set to zero if an individual is not employed. This table is constructed in the same way as Table B9. *Pre-event mean* refers to the mean earnings in the year before the reference date. Standard errors are bootstrapped (500 replications, with clustering at the household level) and reported in parentheses.

Table B11: Effects of husband's displacement on wife's job search

	Control group 1	Control group 2	Control group 3
	(1)	(2)	(3)
Prior event			
δ_{-5}	0.002	-0.001	
	(0.002)	(0.002)	
δ_{-4}	0.001	-0.003	-0.001
	(0.002)	(0.002)	(0.002)
δ_{-3}	0.001	-0.001	-0.000
	(0.002)	(0.002)	(0.002)
δ_{-2}	0.001	-0.000	0.001
	(0.001)	(0.001)	(0.002)
δ_0	0.003	0.003	0.002
	(0.001)	(0.001)	(0.002)
Post event			
δ_1	0.009	0.005	0.007
	(0.002)	(0.002)	(0.002)
δ_2	0.007	0.003	0.005
	(0.002)	(0.002)	(0.002)
δ_3	0.007	0.001	0.006
	(0.002)	(0.002)	(0.002)
δ_4	0.007	0.002	0.005
	(0.002)	(0.002)	(0.002)
δ_5	0.007	0.002	
	(0.002)	(0.002)	
Pre-event mean	0.041	0.041	0.039
Households	101,609	93,666	45,886
Observations	4,386,508	4,502,579	2,161,764

Notes: This table displays the impact of husband's displacement on spousal unemployment. The dependent variable is equal to one if the wife in household i is unemployed in a given quarter. The estimation is based on an adapted version of the equation specified in Appendix Table A4, in which the coefficients δ_l measure the average difference between displaced and reweighted control group relative to the quarter *one year before* the reference date. *Pre-event mean* refers to the mean unemployment in the year before the reference date. Standard errors are bootstrapped (500 replications, with clustering at the household level) and reported in parentheses.

Table B12: Effects of husband's displacement on household income with CG2

	Prob. of HH receiving		Monthly household income		
	UI	UA	Gross	Net	Net + benefits
	(1)	(2)	(3)	(4)	(5)
Prior event					
δ_{-1}	-0.002	0.001	-42.231	-18.200	-17.807
	(0.002)	(0.001)	(7.563)	(4.935)	(4.850)
Post event					
δ_1	0.217	0.013	-829.348	-530.235	-423.316
	(0.003)	(0.001)	(13.795)	(8.667)	(8.138)
δ_2	0.055	0.035	-754.309	-467.076	-427.325
	(0.003)	(0.002)	(18.595)	(11.692)	(11.333)
δ_3	0.026	0.023	-703.547	-434.679	-412.512
	(0.003)	(0.002)	(20.218)	(12.712)	(12.363)
δ_4	0.018	0.017	-658.016	-401.865	-385.809
	(0.003)	(0.002)	(21.624)	(13.554)	(13.252)
δ_5	0.015	0.015	-610.017	-370.923	-357.572
	(0.003)	(0.002)	(22.906)	(14.353)	(14.074)
Displaced×Post	0.066	0.021	-711.126	-441.015	-401.320
	(0.003)	(0.002)	(17.695)	(11.046)	(10.789)
Pre-event mean	0.040	0.015	3679.622	2500.192	2514.904
Households	34,031				
Observations	947,225				

Notes: This table displays the impact of husband's displacement on household income measures based on the equation specified in Appendix Table A4 for the subsample of households with a reference date in 2001 or later. The dependent variable is equal to one if the household receives unemployment insurance benefits and unemployment assistance in column (1) and (2), respectively. In column (3), the outcome is household gross earnings (sum of the couple's labor earnings). Household net earnings in column (5) are gross earnings minus social security contributions and payroll taxes. In column (6), we add unemployment benefits and assistance to the former. All income variables are measured in Euro (2000 prices) on a monthly basis. We compare individuals in households with a displacement to a reweighted control group of households with husbands who keep their job during during a mass layoff event at the reference date. The coefficient δ_l measures the average difference between outcomes in the displaced and the reweighted control group l years to the reference date relative to the corresponding difference at the reference quarter. *Pre-event mean* refers to the mean outcome in the year before the reference date. Standard errors are clustered at the household level and reported in parentheses.

Table B13: Displacement effects by youngest child with CG2 and CG3

Outcome	Husband	Wife	
	Earnings	P(employed)	Earnings
	(1)	(2)	(3)
Control group 1			
age 0-2	-509.588	0.011	8.020
	(15.118)	(0.008)	(11.793)
age 3-9	-552.933	0.008	12.989
	(10.531)	(0.005)	(6.477)
age 10-15	-652.092	0.009	6.246
	(14.648)	(0.005)	(7.414)
No child	-707.236	0.001	-6.024
	(12.433)	(0.005)	(8.154)
Control group 2			
age 0-2t	-473.827	0.005	6.987
	(13.840)	(0.007)	(9.986)
age 3-9	-501.608	0.007	11.124
	(10.004)	(0.004)	(5.325)
age 10-15	-585.778	0.015	14.917
	(13.394)	(0.004)	(6.393)
No child	-615.438	0.005	0.325
	(12.210)	(0.004)	(7.418)
Control group 3			
age 0-2	-625.171	-0.002	23.838
	(13.676)	(0.008)	(11.134)
age 3-9	-680.377	0.015	22.083
	(9.879)	(0.005)	(6.675)
age 10-15	-779.183	0.012	15.666
	(13.541)	(0.007)	(8.556)
No child	-844.417	0.010	11.962
	(13.031)	(0.007)	(11.578)

Notes: This table displays the impact of husband's displacement for subgroups defined by the age of the youngest child at the reference date. It is similar to Table 4, but it additionally includes the effects on husband's earnings (1) and wife's earnings (3). The estimates measure the average difference in the corresponding outcome variable between displaced and reweighted control groups after the reference quarter rel. to the difference at the reference date.

Table B14: Displacement effects by wife's earnings potential with CG2

Outcome	Low			High		
	Husband	Wife		Husband	Wife	
	Earnings	P(employed)	Earnings	Earnings	P(employed)	Earnings
	(1)	(2)	(3)	(4)	(5)	(6)
Measure 1: Earnings before marriage						
Displaced×Post	-511.571	0.007	6.612	-591.763	0.010	13.897
	(6.587)	(0.003)	(3.848)	(15.434)	(0.005)	(9.707)
$\eta^{\text{participation}}$		-0.033			-0.047	
		(0.014)			(0.024)	
Pre-event mean	2390.620	0.456	544.335	2717.717	0.579	1002.762
Households	63,866			18,032		
Measure 2: Experience before marriage						
Displaced×Post	-518.182	0.006	6.611	-539.475	0.010	9.433
	(8.613)	(0.004)	(5.680)	(9.089)	(0.003)	(5.340)
$\eta^{\text{participation}}$		-0.026			-0.046	
		(0.018)			(0.016)	
Pre-event mean	2428.900	0.458	581.638	2496.457	0.507	706.263
Households	40,263			41,594		
Measure 3: Education						
Displaced×Post	-453.777	0.008	7.848	-619.957	0.010	13.339
	(8.453)	(0.004)	(4.808)	(12.191)	(0.005)	(8.780)
$\eta^{\text{participation}}$		-0.042			-0.043	
		(0.020)			(0.020)	
Pre-event mean	2315.499	0.399	457.785	2696.063	0.500	697.475
Households	40,210			26,240		

Notes: This table displays the impact of husband's displacement on own earnings, spousal employment and earnings by measures of wife's earnings potential. Measure 1: High indicates that the wife earned more than 33% of the wage of husbands in the year before marriage. Measure 2: High indicates above median experience compared to other wives in the year before marriage. Measure 3: High indicates that the completed education of the wife is beyond compulsory schooling and apprenticeship education. Pre-marriage wage and experience are only available for those married after 1974. Education is only available for women with children. Standard errors are bootstrapped (500 replications, with clustering at the household level) and reported in parentheses.

C Further robustness analysis

In this section, we briefly summarize robustness checks using alternative definitions of displaced and control workers and variations in the weighting procedure.

We start with sensitivity checks of our estimations using control group 1 and 2. The corresponding results are presented in Figure C1 and in TableC1. First, we use an alternative, more restrictive measure to identify mass layoffs. Now firms experience a mass layoff, if at least ten and at most fifty percent of all workers are displaced from one quarter to the other.[2] The graphical evidence (see Figure C1a) and the corresponding estimates (see column (1) of Table C1) illustrate that our main estimation results are robust to a change in the definition of mass layoffs. Second, we match (in addition to the variables used in the main specification, see Appendix Figure A7) also on employment outcomes of wives up to one year before the reference date. The resulting estimates (see Figure C1b and column (2) of Table C1) are similar and not statistically significantly different from the ones in the main specification. Third, we focus on displaced workers from plant closures. Workers who got displaced due to a mass layoff events are more prone to selection issues, since the underlying process determining leavers and stayers within struggling firms might be endogenous to workers' labor market outcomes. In contrast, there is no selection within a firm when it closes down, since all employees are eventually displaced. The resulting estimates (see Figure C1c and column (3) of Table C1) are slightly smaller and not as precisely estimated as in the main specification, but they are indicating that results are robust. Fourth, we focus alternatively on displaced workers from mass layoffs and exclude those from plant closures. Cases from plant closure might be more selective at the firm level. For instance, we can observe that these firms are typically much smaller than other firms with a mass layoff event or no event at all (see Figure A5). In addition, we also match on the firm size up to one year before the reference quarter. The resulting estimates (see Figure C1d

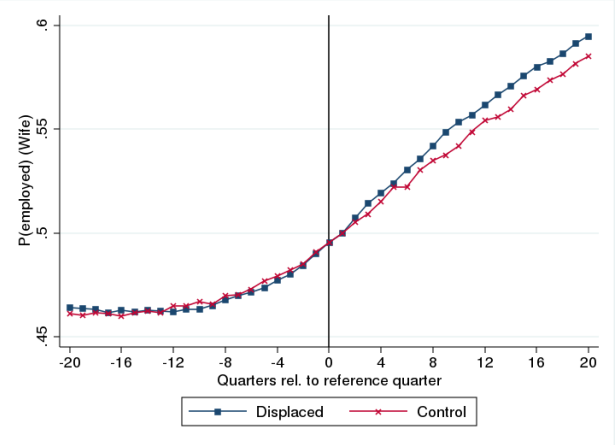
[2] Again, this relative cutoff applies to all establishments with 100 to 600 workers in the base quarter. For smaller firms, the cutoffs are more than 6 workers leaving in firms with less than 20 employees and more than 10 if the establishment has more than 20 and less than 100 workers. For establishments with more than 600 workers, at least 60 employees have to leave the firm in order to make it count as mass layoff.

and column (4) of Table C1) are very comparable to those from our main results. In the main analysis, we work with a different requirement regarding the minimum size of mass layoff firms than, for example, Jacobson et al. (1993). This is because Austrian firms tend to be very small. As a robustness check, we estimate our model for the sample of mass layoff firms with more than 50 workers at the time of the event. Figure C1e and column (6) of Table C1 show the corresponding results. Compared to the model that includes all mass layoff firms in column (4), this reduces our sample size by about 14%. At the same time the response of wives to their husbands' displacement does hardly change using the more restrictive requirement on mass layoff firm size. In Figure C1f and in column (7) of Table C1 we focus on a sample of households where husbands have at least three years of tenure at the reference date. The response of wives to their husbands' displacement is insensitive to a change in the tenure requirement.

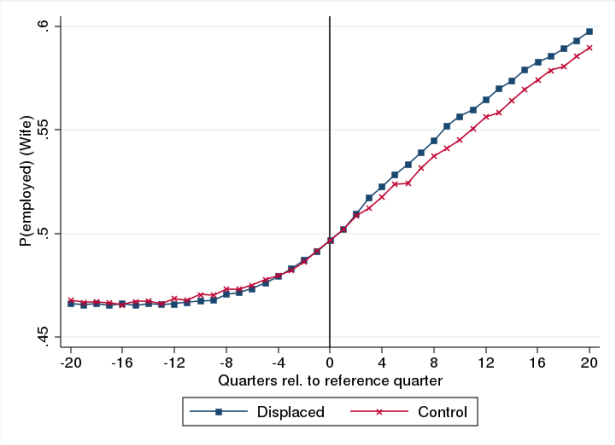
We now explore the robustness of our estimation result based on control group 3. This approach exploits the timing of displacement and requires the choice of a duration Δ between the events of the households in the treatment and the control group. Importantly, there is a trade-off in this choice: With a smaller Δ, the treatment and control group's displacement is closer in time and there are hence more likely to be comparable. A larger distance in the date of event allows us to compare outcomes of the two groups for more periods (Fadlon and Nielsen, 2017). In our baseline specification we choose a Δ of 16 quarters. Now we consider values of 4, 8, and 12. It turns out that the specific choice of Δ is not crucial (see Figure C2 and Table C2).

Figure C1: Displaced husband's wife employment, robustness checks

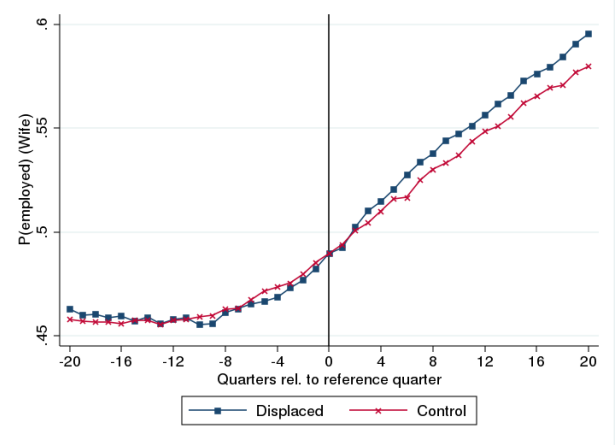
(a) Stricter mass layoff cutoffs



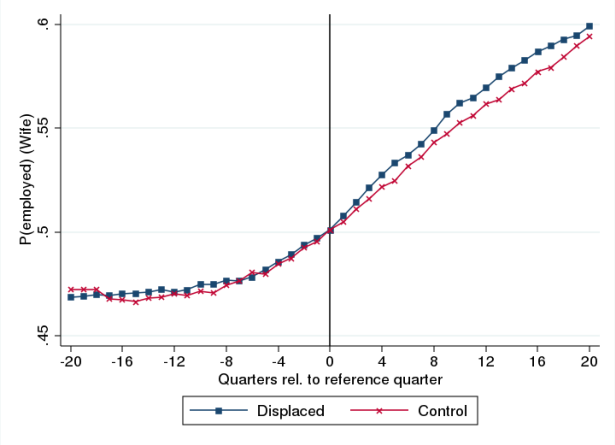
(b) Reweighting includes wives' pre-event employment



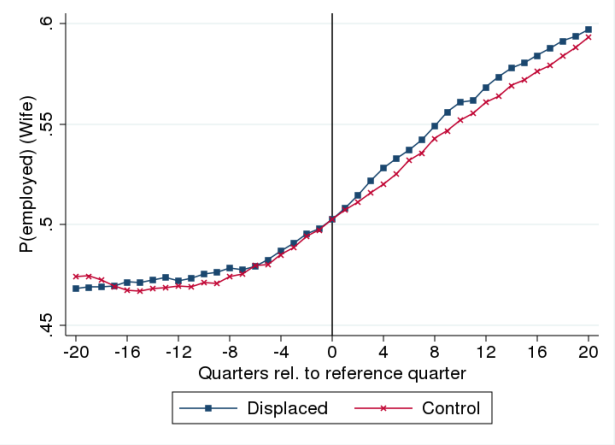
(c) Displaced from plant closures only



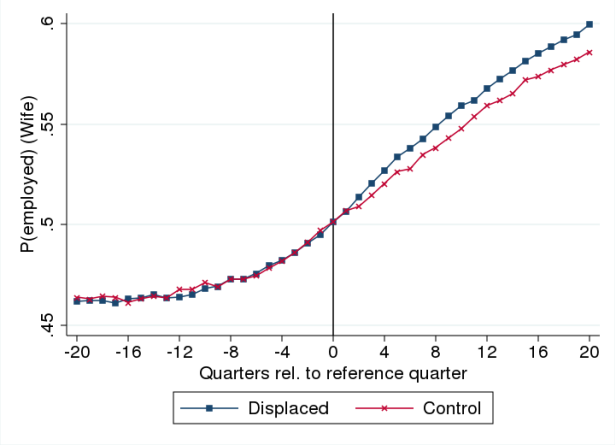
(d) Displaced and non-displaced from mass layoff firms only



(e) Displaced and non-displaced from mass layoff firms with more than 50 employees only



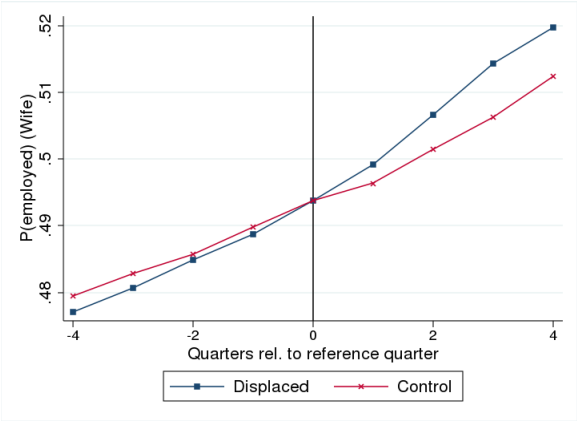
(f) Husbands required to have 3 years of tenure at reference date



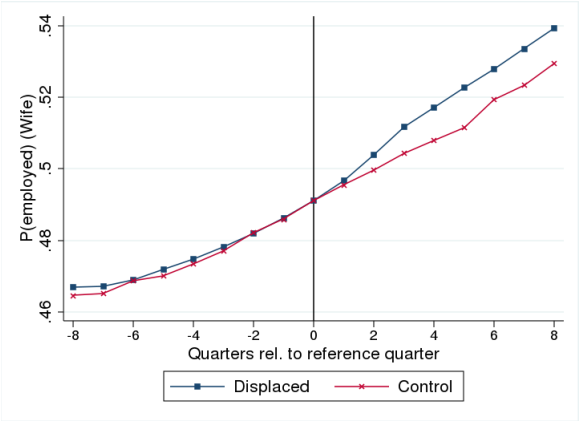
Notes: This figure provides robustness checks to Figure 4a and B4a. In Panel (a), we apply a stricter cutoff for mass layoffs. In Panel (b), we additionally include employment outcomes of wives (up to one year before the reference date) in the weighting procedure. In Panel (c), the group of displaced workers includes only those with a displacement due to a plant closure. In Panel (d), we only look at displaced and non-displaced workers at firms that have a mass layoff in the quarter after the reference date. We also match on the firm size up to one year before the reference quarter. In Panel (e), we look at displaced and non-displaced workers at firms that have a mass layoff and have more than 50 employees in the quarter after the reference date. In Panel (f), we only look at households where husbands have 3 years tenure at the reference date. The graphs are constructed in the same way as in Figure 4a.

Figure C2: Displaced husband's wife employment, robustness checks (cont'd)

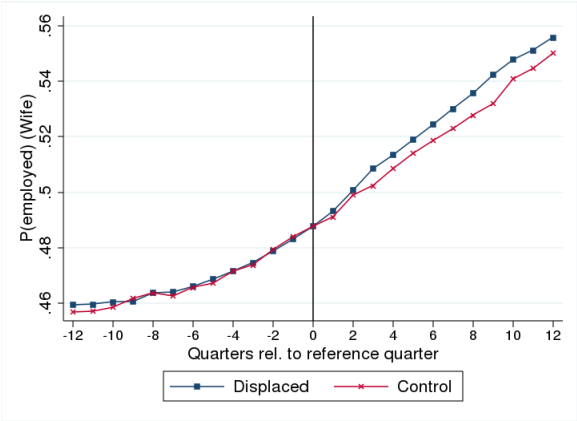
(a) Control group displaced in $\Delta = 4$



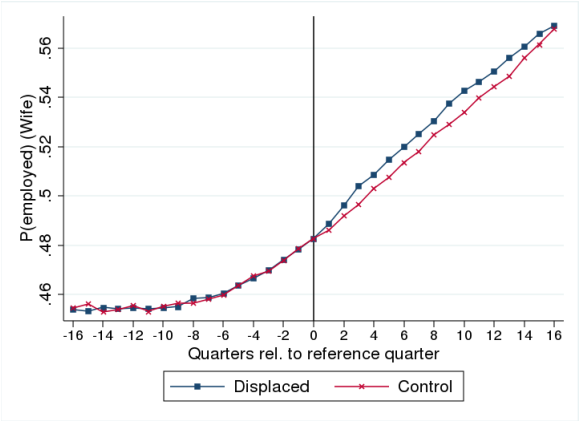
(b) Control group displaced in $\Delta = 8$



(c) Control group displaced in $\Delta = 12$



(d) Control group displaced in $\Delta = 16$



Notes: This figure provides robustness checks to Figure B4b by showing the effect of husband's displacement on wife's employment for different choices of Δ. We compare wives of men that are displaced at the reference date (blue, square) to that of men displaced Δ quarters after that date (red, x). The employment pattern of the control group is adjusted by its mean difference relative to the displaced group.

Table C1: Robustness checks for control group 1 and 2

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Prior event							
δ_{-5}	0.001	-0.002	0.002	-0.002	0.003	-0.004	-0.002
	(0.005)	(0.004)	(0.005)	(0.004)	(0.003)	(0.004)	(0.005)
δ_{-4}	0.001	-0.001	0.001	0.003	0.003	0.004	0.001
	(0.004)	(0.004)	(0.005)	(0.004)	(0.003)	(0.004)	(0.004)
δ_{-3}	-0.002	-0.002	- 0.002	0.003	0.002	0.004	0.002
	(0.004)	(0.004)	(0.005)	(0.004)	(0.003)	(0.004)	(0.004)
δ_{-2}	-0.002	-0.002	0.002	0.000	0.001	0.002	0.001
	(0.003)	(0.003)	(0.004)	(0.003)	(0.002)	(0.003)	(0.003)
δ_{-1}	-0.001	0.000	-0.003	0.001	0.000	0.001	-0.000
	(0.002)	(0.002)	(0.003)	(0.002)	(0.002)	(0.002)	(0.002)
Post event							
δ_1	0.003	0.003	0.003	0.004	0.004	0.005	0.004
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
δ_2	0.006	0.007	0.007	0.006	0.009	0.006	0.009
	(0.003)	(0.003)	(0.003)	(0.003)	(0.002)	(0.003)	(0.003)
δ_3	0.010	0.010	0.009	0.008	0.011	0.008	0.010
	(0.004)	(0.003)	(0.003)	(0.004)	(0.003)	(0.004)	(0.004)
δ_4	0.011	0.010	0.011	0.010	0.011	0.008	0.011
	(0.004)	(0.004)	(0.004)	(0.004)	(0.003)	(0.004)	(0.004)
δ_5	0.010	0.008	0.007	0.007	0.010	0.006	0.013
	(0.004)	(0.004)	(0.004)	(0.004)	(0.003)	(0.004)	(0.004)
Pre-event mean	0.489	0.486	0.484	0.470	0.485	0.488	0.492
Households	87,876	101,609	70,942	75,212	100,036	64,741	74,856
Observations	3,823,455	4,387,451	3,123,503	3,745,965	4,320,949	3,293,776	3,239,533

Notes: This table reports different robustness checks to the results in Table A4 that are based on control group 1 and 2. The dependent variable is equal to one if wife in household i is employed in a given quarter. The coefficient δ_l measures the average difference between employment in the displaced and the control group l years to the reference date relative to the corresponding difference at the reference date. *Pre-event mean* refers to the mean employment in the year before the reference date. In the robustness checks, we vary the approaches used in Table A4 in the following ways: (1) We compare displaced and control group 2 with higher mass layoff cutoffs requirements, (2) We additionally balance displaced and control group 1 with respect to the pre-event employment outcomes of wives, (3) We only include individuals affected by a plant closure in the displaced group and compare them to controls with no firm event, (4) We only take displaced and non-displaced husbands from mass layoffs and additionally balance them with respect to husband's employer size, (5) Instead of matching, we control for the variables included the weighting procedure by including them in a simple regression model, (6) We only take displaced and non-displaced husbands from mass layoffs with firms with more than 50 employees at the reference date, (7) We only include households where husbands have at least 3 years tenure at the reference date. Standard errors are bootstrapped (500 replications, with clustering at the household level) and reported in parentheses.

Table C2: Robustness checks for control group 3

	$\Delta = 4$	$\Delta = 8$	$\Delta = 12$
	(1)	(2)	(3)
Prior event			
δ_{-3}			0.001
			(0.004)
δ_{-2}		0.002	-0.000
		(0.003)	(0.002)
δ_{-1}	-0.001	0.001	0.001
	(0.002)	(0.002)	(0.003)
Post event			
δ_1	0.006	0.006	0.004
	(0.002)	(0.002)	(0.002)
δ_2		0.010	0.007
		(0.003)	(0.003)
δ_3			0.008
			(0.004)
Pre-event mean	0.482	0.478	0.474
Households	46,804	46,336	45,548
Observations	767,799	1,326,493	1,781,925

Notes: This table illustrates the robustness of results for control group 3 in Table B9 to different choices of Δ. Column (1) shows the effect of husband's displacement on wife's employment comparing households that experience displacement at the reference date to those displaced 4 quarter in the future. Column (2) and (3) refer to estimations using as a control group those displaced 8 and 12 quarter in the future, respectively. The dependent variable is equal to one if wife in household i is employed in a given quarter. The coefficient δ_l measures the average difference between employment in the displaced and the control group l years to the reference date relative to the corresponding difference at the reference quarter. *Pre-event mean* refers to the mean employment before the reference date. Standard errors are bootstrapped (500 replications, with clustering at the household level) and reported in parentheses.

D AKM estimation

This appendix describes the estimation of the employer fixed effects for daily earnings, which are used in Section 6.3.3. Firm fixed effect are obtained from estimating the AKM decomposition (Abowd et al., 1999):

$$Y = X\beta + D\theta + F\psi + \epsilon \tag{1}$$

where Y denotes the vector of log daily earnings that worker i earns at firm j in period t, X is a matrix of time-varying covariates, D is a matrix containing indicator variables for each worker, while F is the corresponding matrix of indicators for the firm at which i works at date t. The covariates included in the model comprise a blue-collar dummy, education dummies, a full set of cohort dummies indicating the first year in which we observe a worker in the Austrian Social Security Data (henceforth ASSD), a full set of experience dummies interacted with age at which workers enter the workforce, and a dummy indicating that the worker was born before 1957.

To estimate the AKM model, we use the following sample from the the ASSD. The sample includes employment spells of men for the period between 1994 to 2012. We first restrict the sample to one spell per year and firm-employee pair that last at least 30 days. We further limit the sample to individuals aged between 16 and 65 after the beginning of a stable labor market career and keep only spells with valid wage information. Since the unit of observation is the worker-year, we keep for each worker only the job with the highest total earnings per year. Finally, we exclude all displaced and control workers of the main sample in the paper (displaced and control group 1 and 2 workers as defined in Sections 3.1 and 4, respectively). These workers account for 9.5% of all observations.

We have 26,382,267 worker-year observations on 2,634,741 workers employed at 476,828 firms. The largest connected set contains 432,440 firms. Restricting the sample to the largest connected set of firms, we remain with 26,113,837 worker-year observations on 2,590,070 workers who have 4,451,675 job-to-job transitions.

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