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Fertility and Economic Instability: The Role of Unemployment and Job Displacement *

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Abstract

We study the effect of job displacement on fertility in a sample of white collar women in Austria. Using instrumental variables methods we show that unemployment incidence as such has no negative effect on fertility decisions, but the very fact of being displaced from a career-oriented job has; fertility rates for women affected by a plant closure are significantly below those of a control group, even after six years.

Keywords: fertility, unemployment, plant closings, human capital
JEL classification: J13, J64, J65, J24

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1 Introduction

Standard microeconomic models of fertility predict that during periods of high and rising unemployment the fall in the opportunity costs of childbearing should induce an increase in the demand for children. In other words, fertility should be *counter-cyclical*. Butz and Ward (1979) pointed out this theoretical mechanism several decades ago on the basis of empirical observations that maternal employment and earnings were negatively associated to fertility (Heckman and Willis, 1975) and that women's labor force participation and fertility were strongly and negatively correlated at the aggregate level.

However, by the end of the 90s, it started to become evident that the cross-country correlation between fertility and female labor market activity had turned positive. At the same time, this phenomenon coincided with rising and persistent levels of unemployment (Ahn and Mira, 2002; Bettio and Villa, 1998; Engelhardt and Prskawetz, 2004). The theoretical mechanism that at high levels of female earnings the own-income effect could overcome the substitution effect – thus giving rise to *pro-cyclical* fertility – emerged as a plausible explanation.[1] Subsequent empirical analysis aimed at capturing the effect of unemployment on fertility showed a strong negative relationship between these two variables (Adsera, 2005).[2]

The literature on labor market conditions and fertility has always been aware that unemployment is only one particular aspect of the more general problem, which we call labor market "instability" and which might be at the roots of the observed trends in fertility rates. Studies using aggregate unemployment rates to explain individual fertility behavior are, to some extent, capturing the instability as well. A high aggregate unemployment may increase the individual unemployment incidence, or the risk of losing a job in the near future, and at the same time decrease the likelihood of future wage

[1] Perry (2003) shows that in the US college-educated females' fertility behaves pro-cyclically whereas Dehejia and Lleras-Muney (2004) report several examples of pro-cyclical fertility, mainly in more developed countries.

[2] Kravdal (2002) for Norway or Meron et al. (2002) for France calculate the effect of individual unemployment experience on fertility and show small negative effects.

increases (Adsera and Menendez, 2011). However, empirical attempts to isolate the channels through which labor market uncertainty affects fertility or to identify the effects of labor market institutions increasing uncertainty – such as temporary contracts, part-time work, or flexible jobs – have been rather isolated (Adsera, 2011; De la Rica, 2005; Gonzalez and Jurado-Guerrero, 2006). [3]

In this paper we look at the effects of job displacement on fertility in a sample of white collar women working in Austria during the period between 1990 and 1998. We focus our attention on displacements from firm closures and on white collar women are most likely to suffer an increase in career instability from an involuntary job separation. We exploit the fact that job displacement is not automatically followed by a period of unemployment, but that it always represents an involuntary job separation. This allows us to disentangle the effect of job loss from the effect of unemployment as such and consequent loss of earnings. To account for the endogeneity of unemployment we use an instrumental variable strategy, based on the observation that high fluctuations in unemployment at the seasonal and industry level in Austria exogenously drive unemployment experience after job displacement. Our results show that an involuntary job loss exerts a negative effect on fertility, while variation in unemployment experience does not have an additional impact. We interpret this as evidence that displacement from a career-oriented job might play an important role in determining the demand for children even in the absence of significant income and substitution motives. This is consistent with recent evidence presented in Del Bono et al. (2011) and Huttunen and Kellokumpu (2010), who examine the effect of plant closures on women's fertility and show that the main effects of job displacement are to be found among women in highly-skilled occupations or with higher levels of education.

[3] See Kohler and Kohler (2002), Ranjan (1999) or Kreyenfeld (2010) for studies trying to associate the fertility decline in (Eastern) Europe with general economic uncertainty.

2 Data and Empirical Setup

Our analysis is based on the *Austrian Social Security Database* (ASSD) which covers all private sector workers between 1972 and 2002. The data include daily information on employment and registered unemployment status, total annual earnings paid by each employer, and various characteristics of the workers and their jobs (Zweimüller et al., 2009). The availability of employer identifiers creates a linked worker-firm component in the ASSD, which we exploit to define firms. In our sample we consider firms that have at least one employed worker on the payroll on any of four sampling dates (February 10, May 10, August 10, and November 10) over the years 1990 to 1998. Firm exit dates are defined as the last quarter date in which a firm employs at least one worker. To define firm closures we apply three selection criteria: First, we exclude firm exits, where more than 50% of the workforce in the last year jointly transits to the same new employer. Second, we exclude firms operating in agriculture, construction, and tourism industries. These sectors are characterized by a high share of seasonal employment which makes it difficult to identify firm entries and exits. Third, we only consider firms with 5 or more employees on one quarter date during 1972-2002, and restrict the sample to firms with more than 3 workers in the closing quarter, because based on the worker-flow approach we cannot identify firm closures for very small firms.

Based on this sample of firms we consider all women between 18 and 35 years, employed in white collar jobs between quarter 1/1990 and quarter 4/1998, and having at least one year of tenure in the current firm. We focus on women working in white collar jobs, because for these women firm-specific human capital or ability are likely to be more relevant determinants of productivity and an involuntary job separation will be more costly. Blue collar jobs are relatively rare among women in Austria, and confined to manual occupations in low ranking positions, with modest salaries, and with high job-turnover even in the absence of firm closure. We define as *displaced* all women working in a closing firm the quarter before closure [4] and as *control* all women who are not

[4]Because of the downsizing and restructuring in the period prior to firm closure, a non-randomly

affected by a firm closure, i.e. working in a control firm in any reference quarter; from the controls we take a 5% sample. The final sample therefore consists of 6,431 observations of women in the *displaced* group and 157,883 observations of women in the *control* group.

To derive a measure of fertility for every woman in the labor force, we merge the ASSD with child benefit records from the Ministry of Finance, which contain all births from 1975 to 2005. Notice that throughout our analysis we exclude women who are pregnant, i.e. observed as giving birth within 6 months of the reference date. Our outcome of interest is the number of births per woman after the reference date. Since job displacement might affect the total number of children as well as the timing of fertility, we look at the path of birth rates up to 10 years following the reference date. [5]

To show the effects of firm closure on labor market and fertility outcomes, we start with a graphical event study, where we pool all observations at the reference date and plot the means of the outcome variables each quarter before and after the reference date separately for the displaced and control groups. Looking at the period before the reference date establishes the a priori comparability of different groups. This is an important check as closing firms may differ from surviving firms and women with different unobserved characteristics might select into more or less "risky" firms in terms of their likelihood to close down.

Figure 1 shows the effects on labor market outcomes. We plot days employed per quarter in the 20 quarters before and up to 12 quarters after the reference date in the first graph. Employment for both the displaced and control groups is at 100% in quarters -3 to zero due to our one year tenure requirement. Before that employment is lower in both

selected pool of workers may be left at the closing date. To deal with selection over the firm closure process, the literature typically suggests to include worker separations from a longer period prior to the firm closure date (Dustmann and Meghir, 2005; Eliason and Storrie, 2006). This type of solution turns out to be infeasible in our application, however. All women who give birth are required by law to leave their jobs for at least four months, which means that we must avoid definitions of displacement that are likely to include voluntary quits. Del Bono et al. (2011) show evidence that the labor market and fertility histories of women employed in the firm one year before closure do not differ significantly from those of women in the displaced group.

[5] See Table 1 for descriptive statistics.

groups. Notably, the displaced group has smaller employment in all quarters, but the difference is minor, accounting for 2 or 3 days per quarter at most. After the reference date we see a huge drop in employment in the displaced group to an employment rate of approximately 75%. Employment in the control group declines gradually, reflecting the loose labor market attachment of young women in Austria. By the end of the 4th year after the reference date there is still a significant difference in employment between the displaced and control women. The reverse picture is shown for unemployment in the second graph. While unemployment is low in both groups before the reference date it shoots up after displacement. The results for earnings, shown in the third graph very closely resemble employment, which indicates that earnings losses from job displacement are mostly driven by lower employment rather than wage reductions.

Figure 2 plots the average yearly numbers of births in the 14 years before the reference date and 10 years afterwards. The mean number of births per year is age adjusted, i.e. it is based on the residuals of a regression of the number of births on age of the mother and its square. The graph shows that the average number of births per woman decreases rapidly up to the reference date, when it becomes zero, and then shoots up dramatically. This pattern is a consequence of the fact that we select only women with at least one year of tenure at the reference date. This means that all women must have been working during the year before closure and therefore, by construction, they cannot have any children between year -1 and year 0. As these women are also more likely to have been in employment in the periods leading to the reference date, we observe a decreasing birth rate in the years preceding closure. The jump in the probability of a birth after the reference date is also a consequence of our tenure requirement. Conditional on not having had a birth in the last year, these women are more likely to have a child in the following period. This graph nicely shows the strong similarity of displaced and control groups before the reference date. The most interesting feature in Figure 2, however, is the difference in fertility between displaced and control women after job loss, which shows very clearly that fertility is strongly reduced after a plant closure.

3 Career Interruption versus Unemployment

Job displacement can affect fertility decisions through different channels. The first mechanism we consider here is whether it impacts fertility through unemployment (see Figure 2). Table 2 shows the relationship between unemployment and fertility in our data. In the top panel we define unemployment via a dummy, which assumes value 1 if the individual is unemployed for at least one day during the first year since the reference date (unemployment incidence) while in the bottom panel the percentage of unemployment days experienced in the first year after the reference date is used.

The first two columns of the table simply show the coefficient of an OLS regression of number of births – after 3 and 6 years – on the different measures of unemployment. As we can see in Panel A, a woman experiencing a spell of unemployment in the year after the reference date has much lower fertility than a woman experiencing no unemployment, and she will have 17.4 to 15.8% less children in the next 3 and 6 years, respectively. In Panel B we report the effect of an increase in unemployment as a percentage of the first year after the reference date. Here the results show that a 10% increase in unemployment reduces fertility by 0.003 or 1.6% after 3 years. The effect is larger after 6 years, with a decrease of 0.010 children or 2.3%.[6]

There are, however, serious doubts about whether individual unemployment can be considered exogenous with respect to fertility. We could have a problem of reverse causality, if fertility decisions have an impact on unemployment. For example, women planning to have a child in the near future, might be more likely to lose their job, either because they become less productive or because managers might target these women for temporary layoffs. In addition, there might be unobservable characteristics determining unemployment and fertility at the same time. For instance, women with a high propensity to have children might seek less demanding jobs and careers with lower returns and higher employment uncertainty. Both biases would work in the same direction and induce a

[6]The average number of children is 0.19 and 0.43 after 3 and 6 years since the reference date, respectively.

bias towards zero in the estimates. Alternatively, it is possible that women who plan to start a family might seek more stable careers and job security. In this case the coefficient on unemployment could be biased away from zero.

In the next two columns we use exogenous variation in unemployment brought about by job displacement to obtain a consistent estimate of the effects of unemployment on fertility. The estimation is by two-stage least squares (2SLS), where the first stage regresses the relevant measure of unemployment on a dummy variable which assumes the value 1 if the woman had been displaced by a firm closure at the reference date.[7] Once again, estimation results indicate a significant and negative impact of unemployment on fertility. The magnitude of the effect is now larger than before, particularly when considering the first measure of unemployment. Although the standard errors also increase, we can in general significantly distinguish the 2SLS from the OLS estimates. Overall these results could be taken as evidence that unemployment has a true and non-negligible effect on fertility. Notice that the 2SLS estimates indicate that the OLS coefficients on unemployment are biased towards zero.

The instrumental variables estimates in Table 2 show that based on variation due to an unexpected job loss, unemployment has a strong and negative effect on fertility. What we want to examine next, is whether it is the job loss experience per se, or the unemployment experience that lead to a fertility reduction. Del Bono et al. (2011) study the direct effects of job displacement on fertility and demonstrate that these are very heterogeneous according to women's occupational status and wage trajectories, with negative effects holding mainly for high wage women and women experiencing steeper wage profiles before displacement. Del Bono et al. (2011) discuss theoretical explanations for their findings and argue that an important reason why white collar women's fertility drops after a plant closure is that job displacement causes the need to find a new job and start a new career. These *employability* and *career* effects operate in addition to the income effect arising from unemployment, and might be a primary channel through

[7]The full results of this specification are available on request from the authors.

which job displacement affects fertility.

In order to test for the existence of an effect of job displacement which is independent of its consequences in terms of unemployment, we exploit the fact that a large share of women affected by firm closure do not experience any unemployment. In our sample of white collar women, for example, only 32.7% are unemployed in the first year after firm closure (as compared to 6.5% of the control group), i.e. more than 2/3 of women in our displaced group experience a job-to-job transition. Our primary strategy is to compare fertility outcomes of women who experience unemployment and who do not experience unemployment after displacement.

Regression models considering the separate effect of plant closure and unemployment on fertility are shown in Table 3. The first two columns report OLS estimates, for different measures of fertility (3 years and 6 years after the reference date), and the two different measures of unemployment (top and bottom panel, as in Table 2). Both firm closure and unemployment exhibit a negative coefficient, so both tend to be associated to lower fertility. The coefficient on firm closure is rather low and not significantly different from zero in Panel A, while it is larger and significant in Panel B, where we adopt a different definition of unemployment. However, unemployment experience is likely to be endogenous for the reasons mentioned above. We therefore move on to a different specification, where we use the interaction between firm closure and years, quarters, regions and industries to predict unemployment. These 2SLS estimates are presented in columns 3 and 4. Columns 5 and 6 show an alternative specification which uses also a triple interaction between firm closure and industry and quarter dummies in the first stage regression. The rationale behind our choice of instruments is that while we expect that the effects of firm closure on fertility which operate via unemployment may vary with time, industry and region – as unemployment rates differ significantly along these dimensions, its direct effect should be largely independent of this variation. Moreover it is reasonable to assume that variation in the effects of firm closure by time, industry and region operates through labour market variables, such as unemployment

rates, and does not directly affect fertility outcomes. The danger with such a strategy is that these variables might be weak instruments, i.e. show a low partial correlation with unemployment. However, the F-statistics shown at the bottom of each panel demonstrate otherwise.

Once we take into account the endogeneity of unemployment something really interesting happens to our estimates. While the coefficient on firm closure remains negative, becomes larger in magnitude and usually stays significant, the coefficient of unemployment changes sign (becomes positive) and becomes insignificantly different from zero in all our specifications. These results imply that when comparing displaced women by their unemployment experience, we find no indication that those with positive unemployment or those with higher rates of unemployment experience a decrease in fertility. The main negative effect comes through the job loss experience per se. This is consistent with the evidence in Del Bono et al. (2011), who interpret the effects of job displacement on fertility in terms of *employability* and *career* effects rather than *income* effects.

4 Conclusions

In this paper we have shed new light on the impact of labor market instability and unemployment on women's fertility decisions. Our analysis shows that unemployment is, in fact, highly negatively correlated to fertility rates of Austrian white-collar women. However, if we separate the effect of job loss from that of unemployment - taking the endogeneity of unemployment into account with IV strategies, we find that the direct impact of unemployment disappears but the job loss channel remains strongly significant. These results are compatible with a model of fertility which does not stress income or substitution effects, but career-interrupting effects of a job loss. These effects are the more relevant in firm closure cases, because in such situations a return to the old job is impossible and the affected women have to reorient themselves towards a different career.

We conclude that unemployment while being easily available in typical datasets, is only an imperfect measure of the type of labor market instability that is relevant for fertility decisions. To understand trends in fertility across countries we must also look at other indicators such as prevalence of temporary contracts, or the difficulty for young workers to enter the regular labor market.

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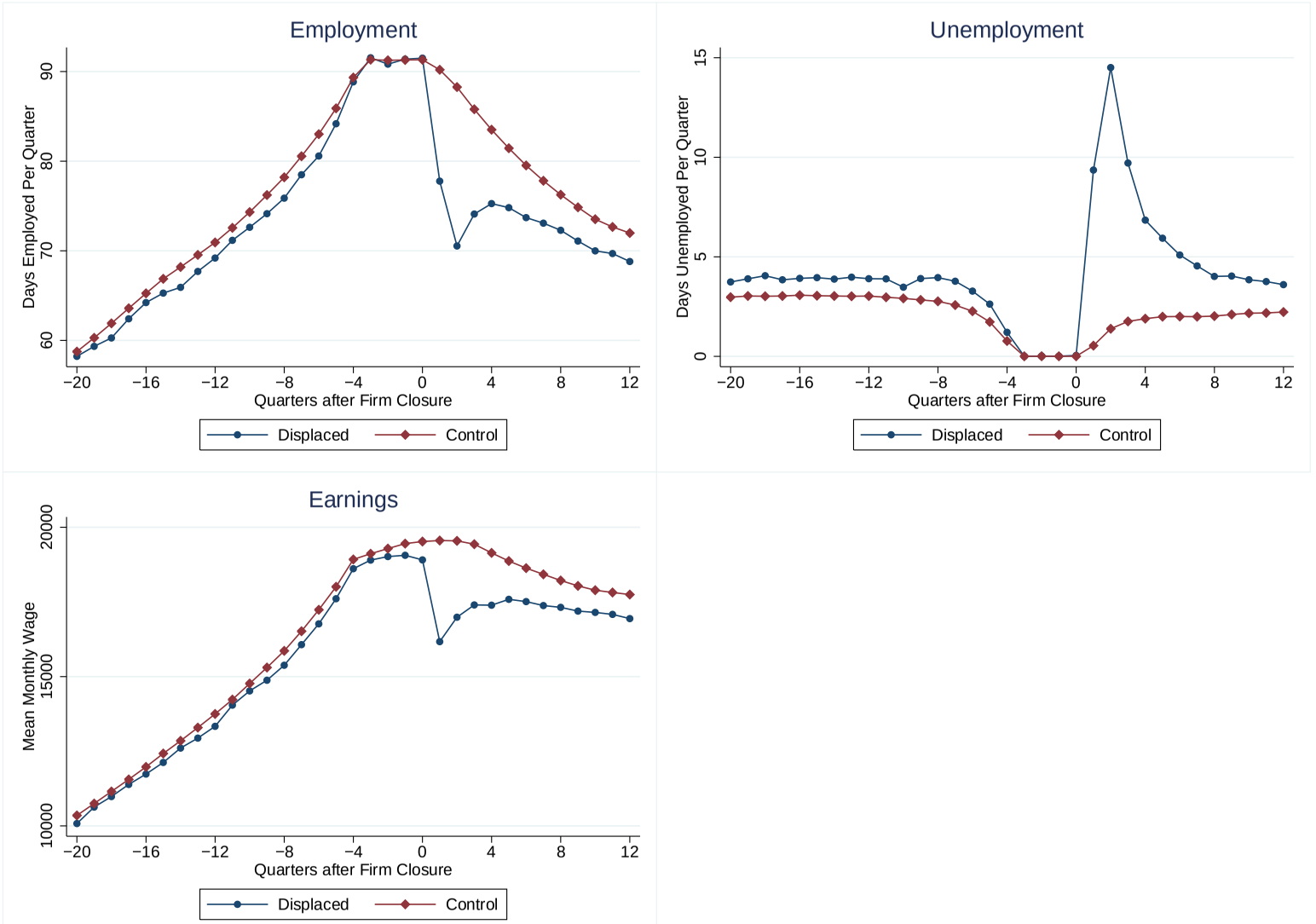
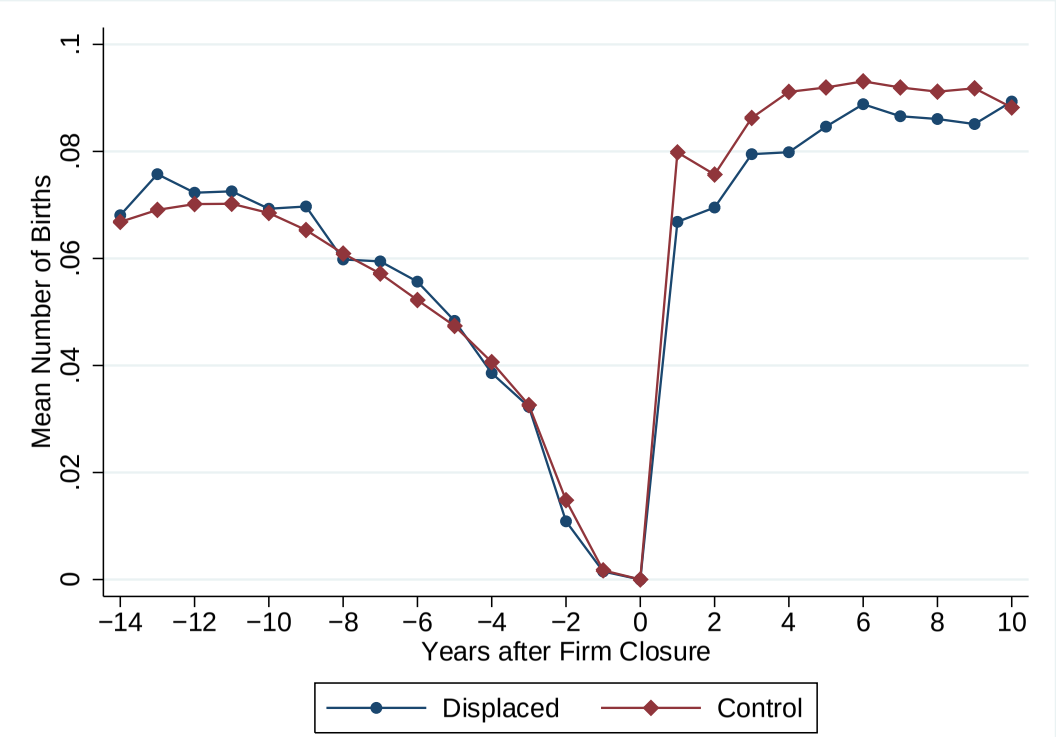
Figure 1: The impact of plant closure on employment, unemployment and earnings



Notes: Upper panel: Comparison between the average number of days employed/unemployed of displaced and control women by quarter, before and after the reference date. Lower panel: average monthly earnings.

Figure 2: Average number of births by year



Notes: Comparison between the average number of births of displaced and control women by quarter, before and after the reference date. Number of births is age-adjusted.

Table 1: Individual Characteristics

	Control group		Displaced group		All	
	mean	sd.	mean	sd.	mean	sd.
Age	27.07	4.67	27.28	4.65	27.08	4.67
Austrian	0.98	0.14	0.97	0.18	0.98	0.14
Experience (months)	103.80	53.14	105.98	53.99	103.89	53.18
Tenure (months)	49.50	37.43	43.22	35.16	49.26	37.36
Age at labor market entry	16.90	2.42	16.87	2.60	16.90	2.43
Apprenticeship	0.35	0.48	0.41	0.49	0.36	0.48
Earnings 1 year before	734.10	273.52	720.11	292.92	733.55	274.32
Earnings 2 years before	696.00	262.51	688.05	279.47	695.69	263.20
Earnings 3 years before	606.77	307.13	594.02	326.25	606.27	307.91
Earnings 4 years before	536.71	322.00	526.29	332.20	536.31	322.41
% employment 2 years before	0.93	0.20	0.91	0.22	0.93	0.20
% employment 3 years before	0.83	0.33	0.80	0.35	0.82	0.34
% employment 4 years before	0.75	0.39	0.73	0.40	0.75	0.39
Number of previous children	0.38	0.71	0.42	0.72	0.39	0.71
% unemployment 1 year after	0.02	0.08	0.11	0.21	0.02	0.09
Any unemployment 1 year after	0.06	0.25	0.33	0.47	0.08	0.26
Births next 3 years	0.19	0.44	0.17	0.41	0.19	0.43
Births next 6 years	0.43	0.68	0.38	0.65	0.43	0.68
Observations	157784		6431		164215	

Notes: Variable means, standard deviations in parentheses. Displaced group includes women aged 18 to 35 with at least one year of tenure in closing firms at the closure date. Control group is a 5% random subsample of women aged 18 to 35 with at least one year of tenure in firms that do not close within the next 2 years of the reference date. The outcome includes the number of children born between 6 months and 3 (or 6) years after the reference date.

Table 2: Effects of unemployment on fertility

	OLS		2SLS	
	Births next 3 years	Births next 6 years	Births next 3 years	Births next 6 years
Panel A: any unemployment in the first year				
Unemployment	-0.0330**	-0.0680**	-0.0667*	-0.1222**
	(0.0039)	(0.0062)	(0.0207)	(0.0321)
t-test		77.033		77.03
R^2	0.0365	0.0814	0.0351	0.0810
Observations	164,215	164,215	164,215	164,215
Panel B: % unemployment days in the first year				
Unemployment	-0.0003*	-0.0010**	0.0018*	0.0033**
	(0.0001)	(0.0002)	(0.0006)	(0.0009)
t-test		83.83		83.83
R^2	0.0352	0.0810	0.0342	0.0801
Observations	164,215	164,215	164,215	164,215

Notes: Estimations from OLS and 2SLS regressions, where the unemployment variable is instrumented by firm closure dummy (t-statistics shown). Unemployment is measured by an indicator for being unemployed in the first year since the reference date (Panel A) and by the percentage of time unemployed in the first year after the reference date (Panel B). Displaced group includes white-collar women aged 18-35 with at least one year of tenure in closing firms at the closure date. Control group is a 5% random subsample of white-collar women aged 18-35 with at least one year of tenure in firms that do not close within the next 2 years of the reference date. The outcome variable births next 3 (6) years measures the number of children born between 6 and 36 (72) months after the reference date. Covariates include: maternal age and its square, tenure, experience, indicator for apprenticeship education, previous earnings, previous employment, number of previous children, year, quarter, region and industry dummies. Robust standard errors clustered at the individual level reported. Symbols:** significant at 1%;* significant at 5%.

Table 3: Pure displacement versus unemployment effect on fertility

	OLS		2SLS Model 1		2SLS Model 2	
	Births next 3 years	Births next 6 years	Births next 3 years	Births next 6 years	Births next 3 years	Births next 6 years
Panel A: any unemployment in the first year						
Firm closure	-0.0088	-0.0142	-0.0225	-0.0424*	-0.0291*	-0.0377*
	(0.0053)	(0.0083)	(0.0120)	(0.0191)	(0.0126)	(0.0194)
Unemployment	-0.0318**	-0.0661**	0.0224	0.0457	0.0458	0.0271
	(0.0040)	(0.0063)	(0.0456)	(0.0692)	(0.0456)	(0.0708)
F-stat			71.65		67.55	
R^2	0.0356	0.0815	0.0345	0.0800	0.0333	0.0802
Observations	164,215	164,215	164,215	164,215	164,215	164,215
Panel B: % unemployment days in the first year						
Firm closure	-0.0147*	-0.0220*	-0.0178	-0.0356*	-0.0226*	-0.0318
	(0.0053)	(0.0083)	(0.0115)	(0.0176)	(0.0114)	(0.0175)
Unemployment	-0.0002	-0.0010**	0.0001	0.0005	0.0006	0.0001
	(0.0001)	(0.0002)	(0.0011)	(0.0017)	(0.0011)	(0.017)
F-stat			108.73		107.86	
R^2	0.0352	0.0810	0.0353	0.0806	0.0349	0.0808
Observations	164,215	164,215	164,215	164,215	164,215	164,215
Observations	164,215	164,215	164,215	164,215	164,215	164,215

Notes: Estimations from OLS and 2SLS regressions, where the unemployment variable is instrumented by firm closure interacted with 8 year, 3 quarter, 3 industry, and 5 region dummies (Model 1), as well as industry and quarter interactions (Model 2). F-statistics refer to the joint significance of the excluded instruments in the first stage regression. Unemployment is measured by an indicator for being unemployed in the first year since the reference date (Panel A) and by the percentage of time unemployed in the first year after the reference date (Panel B). Displaced group includes white-collar women aged 18-35 with at least one year of tenure in closing firms at the closure date. Control group is a 5% random subsample of white-collar women aged 18-35 with at least one year of tenure in firms that do not close within the next 2 years of the reference date. The outcome variable births next 3 (6) years measures the number of children born between 6 and 36 (72) months after the reference date. Covariates include: maternal age and its square, tenure, experience, indicator for apprenticeship education, previous earnings, previous employment, number of previous children, year, quarter, region and industry dummies. Robust standard errors clustered at the individual level reported. Symbols:** significant at 1%;* significant at 5%.