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The added worker effect differentiated by gender and partnership status: Evidence from involuntary job loss

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SOEP – The German Socio-Economic Panel study at DIW Berlin

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The Added Worker Effect Differentiated by Gender and Partnership Status – Evidence from Involuntary Job Loss

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Abstract

This paper examines the added worker effect (AWE), which refers to the increase of labor supply of individuals in response to a sudden financial shock in family income, that is, unemployment of their partner. While previous empirical studies focus on married women's response to those shocks, I explicitly analyze the spillover effects of unemployment on both women and men and I also differentiate according to their partnership status (marriage vs. cohabitation). My aim is to evaluate whether intra-household adaptation mechanisms differ by gender and by partnership status. The underlying method is a difference-in-differences setting in combination with an entropy balancing matching procedure. The paper considers plant closures and employer terminations as exogenous forms of unemployment. Using longitudinal data from the German Socio-Economic Panel (SOEP) study from 1991 through 2013, the empirical investigation finds evidence of the existence of an AWE. The effect is largest when a woman enters unemployment and is mainly driven by changes on the intensive margin (increase of hours).

Keywords: Added worker effect, plant closure, unemployment, entropy balancing, intra-household adaptation.

JEL Classification: D13, J12, J22

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1 Introduction

This paper investigates the added worker effect (AWE) and delivers new insights by considering married and unmarried partnerships as well as gender differences. The AWE refers to the increase of labor supply by individuals in response to a sudden financial shock in family income, that is, unemployment of their partner. Theoretically, the implicit assumption is a hierarchical structure of labor supply within households. This means that one household member serves as the primary earner, the (male) breadwinner, who is permanently attached to the labor market, while the (female) partner typically acts as a secondary earner with transitory attachment to the labor force (Maloney, 1991).

This male breadwinner and female homemaker model (Becker, 1985) has changed since the 1980s. Women’s work behavior has made a dramatic transition over the last three decades, with increasing numbers of women moving out of unpaid housework and into the labor market (Merz, 2008). Another significant societal change is the rising prevalence of cohabitation as opposed to marriage (Adamopoulou, 2010). It is reasonable to expect that both changes have an impact on the AWE. First, transitions in relationship dynamics have changed the role that each household member plays. If women do not solely serve as secondary workers, but rather as equal or even as primary workers, then a female partner’s unemployment might significantly reduce the family income and hence lead the male partner to work more. Going one step further, the response of male partners might be even larger, since it is potentially easier for them to adjust their labor supply because women still bear more of the load of social responsibilities (e.g., childcare or elderly care). Second, distinguishing between married and cohabiting partnerships is important in detecting and explaining the AWE: Cohabiting partnerships are characterized by more pronounced individualism and independence of the female partners (Morissette et al., 2012). This again influences women’s work behavior and potentially increases equality in terms of labor supply within partnerships (Jepsen and Jepsen, 2002), which in turn might also produce different types of added worker behavior between married and cohabiting couples. One can assume that the greater equality and independence among cohabiting partners might lead to a lower AWE. In addition, the presumed self-insurance mechanism within

marriage (Lundberg, 1985) might be less distinct. Despite these arguments, no systematic research has been done so far on differences between married and cohabiting couples or gender differences in analyzing the AWE. The present study therefore adjusts the AWE framework to contemporary societal conditions by including married and unmarried partnerships as well as both women and men as potential added workers. With this unique approach, the paper provides an important extension to the existing literature and closes a research gap.

Following the arguments outlined above, this study seeks answers to the following questions: First, is there any response of the unaffected partner to the negative shock of displacement of his/her partner and the subsequent income loss? Second, if there is a response, how can it be characterized? Is the unaffected partner more likely to respond at the intensive or the extensive margin? Does that partner adjust his or her actual or desired labor supply? Third, are there any gender differences in the response? Fourth and finally, do married and unmarried unaffected partners respond differently to the shock and is the self-insurance mechanism, which is a driving force of AWE within marriage, also applicable to cohabiting partnerships? In answering those questions, the empirical analysis relies on longitudinal data from the German Socio-Economic Panel (SOEP) study from 1991 through 2013. I find evidence of the existence of an AWE, that is, the AWE is observable for the pooled sample (all) and also for women, men and married couples. Only for cohabiting couples is the result insignificant (considering combined outcome). The effect is largest when a woman enters unemployment and is primarily driven by changes on the intensive margin for all subgroups (increase of hours).

My study contributes to the empirical AWE literature in several ways: I only consider unemployment due to involuntary job loss resulting from termination by the employer and plant closures. This is useful for the estimation in two ways. On the one hand, I focus mainly on exogenous shocks and, on the other hand, I concentrate on the types of job loss that are most likely to result in a negative impact on family income. Other types of job loss, such as own quits, retiring, or seasonal employment, cannot be considered exogenous, since they are known beforehand and also might not result in a financial

breakdown. Further, in contrast to the previous literature, this study extends the horizon to unmarried partnerships and also includes job loss of women. Both contributions give credit to contemporary societies, where marriage is no longer the only accepted form of partnership and women are no longer certainly secondary workers. Instead partners are more equal or even have reversed gender roles. Lastly, I use a combination of matching and difference-in-differences (DiD) estimation to identify causal effects.

The paper proceeds as follows. Section 2 presents background information on the theoretical framework and literature. Section 3 explains the empirical setting. This is followed in section 4 by a description of the underlying data. Section 5 proceeds through illustrating the estimation results and finally, section 6 concludes the paper.

2 Background

2.1 Theoretical Framework

The theoretical literature dates back to Woytinsky (1942) and Humphrey (1940). Since their groundbreaking attempt to explain intra-household adaptations in cases of unemployment, the theory has been developed further by both labor and macro economists. Mincer (1962), for example, argues that unemployment by the primary earner leads to an income effect. In addition, Maloney (1987) considers a cross-substitution effect.

Based on those specifications, the AWE can be theoretically explained by the life-cycle model, where the household jointly maximizes lifetime utility. In this framework, involuntary unemployment of the primary earner (usually male) potentially increases the labor supply of the secondary earner (usually female) due to the aforementioned income and cross-substitution effects. The income effect posits that the total household income under unemployment of the primary earner is lower than it would be otherwise. It might therefore be preferable for the female partner to temporarily increase her labor supply (Mincer, 1962). This approach assumes that the household was not previously aware that unemployment would occur. In addition, according to the cross-substitution effect, unemployment forces the primary earner to consume more non-market time than desired,

which may result in a takeover of a greater share of housework, allowing the secondary earner to increase his or her labor supply (Maloney, 1987).

2.2 Empirical Literature

The empirical literature on the existence and magnitude of AWE has produced inconsistent findings. Most researchers focus on the labor supply of wives in the United States, finding the AWE to either be small or non-existent (Lundberg, 1985; Maloney, 1987; Spletzer, 1997; Cullen and Gruber, 2000). In contrast, Stephens (2002) and Kohara (2008) report more considerable results using panel data for the US and Japan, respectively. But in general, the evidence of AWE is rather small, so it is still an open question why the theoretically well established AWE can not be empirically proven. The most common explanation is that the AWE is offset by the discouraged worker effect, which states that unemployment sends negative signals of poor job perspectives and discourages wives from even looking for jobs (Humphrey, 1940; Maloney, 1991). In addition, Cullen and Gruber (2000) discuss the possible influence of assortative mating in tastes for work on AWE. If wives of men who lost their job have a different taste for work than wives whose husbands did not lose their jobs, then this could bias the AWE findings. Furthermore, most studies focus on actual labor supply, but as Basu et al. (1999) points out, it might be more accurate to consider desired labor supply as well. Due to market conditions, a secondary earner might not be able to actually get a job but nevertheless might look for one. Unemployment insurance is another potentially important factor. Especially in developed countries with efficient public insurance systems, it is likely that at least a fraction of the AWE is crowded out by the social insurance, making it essentially unnecessary for wives to compensate for the loss of income (Cullen and Gruber, 2000). Finally, it has been proven that the AWE is cyclical. In times of recessions, women are more likely to increase their labor supply (Mattingly and Smith, 2010).

The aforementioned literature on AWE is highly relevant to this paper, but other indirectly related strands of literature are also important. These include, for example, the literature on the impact of unemployment on different outcomes such as happiness,

health, crime or subsequent earnings (e.g., Huttunen et al. (2011); Siedler (2011)) and the literature on the differences between married and cohabiting couples (e.g., Jepsen and Jepsen (2002); Morissette et al. (2012)).

3 Empirical Setting

The estimation of the AWE relies on a difference-in-differences estimation (DiD) setting in combination with a matching procedure. DiD has become widespread since the work of Ashenfelter and Card (1985). In its basic setting DiD consists of two groups, with only one group exposed to a treatment. The treatment effect is modeled by estimating the difference between both groups outcomes. The main advantage of this strategy is that the unobserved variables that remain constant over time (e.g. personality traits) and that are correlated with both selection decisions (whether an individual belongs to the treatment or the control group) and the outcome variable (labor supply decision of the partner) will not bias the estimates. The key assumption of DiD is that the average change of outcome would be the same for both the control group and the treatment group if the latter had not been treated. According to Dee and Fu (2004) the violation of this assumption can be minimized by a careful selection of explanatory variables. Another possibility to adjust the DiD sample is by using matching techniques. The aim of those techniques is to find similar couples for the treatment and control group. Abadie (2005), for example, proposes using propensity score matching.¹ But instead of using propensity scores, which does not guarantee that the individual pairs will be well-matched on the full set of covariates (Stuart et al., 2009), I apply entropy balancing, a newly developed approach by Hainmüller (2012) and Hainmüller and Xu (2013). An advantage of entropy balancing is that control group observations are re-weighted in such a way that they satisfy pre-specified balancing requirements (Marcus, 2013). Another benefit of entropy balancing is the improvement of the balance of all conditioning variables compared to other preprocessing methods, which often leave several covariates imbalanced or even

¹The propensity score is the probability of receiving the treatment conditional on the covariates. (Rosenbaum and Rubin, 1983)

decrease the balance of some covariates (Hainmüller, 2012).

My estimation strategy consists of two steps. First, I implement entropy balancing for the whole sample. In addition, to make sure that gender and marital status is a perfect match on the treated individuals, I also implement entropy balancing separately for women and men as well as for married and cohabiting couples. Second, the regression step uses the weights obtained in the first step to regress the labor supply behavior of the unaffected partner on the treatment indicator in a DiD setting. All conditional variables of the matching step are also used as covariates in the regression step. In the DiD step, I focus on the average treatment effect on the treated (ATT), which is the change in labor supply behavior of individuals whose partners face involuntary unemployment (the average change from treatment for those who actually were treated).

$$ATT = E[Y_{1i} - Y_{0i}|D_i = 1] = E[Y_{1i}|D_i = 1] - E[Y_{0i}|D_i = 1] \quad (1)$$

where Y_{1i} denotes the potential labor supply of individual i if the partner faces unemployment and Y_{0i} denotes the potential labor supply of individual i if not. D_i refers to a dummy variable, indicating the treatment (involuntary unemployment of one partner due to plant closure or dismissal). $E[.]$ labels the mathematical expectation operator, that is, the population average of a random variable. The above expression highlights the counter-factual nature of a causal effect, meaning that Y_{0i} is unobservable for the treated and Y_{1i} is unobservable for individuals without treatment.

In order to identify the effects, I need to assume that no unobserved variable exists that can simultaneously influence changes in the outcome and the probability of being in the treatment group (involuntary unemployment of a partner). In other words, treatment and control group follow the same trend in the absence of treatment.

$$ATT = E[Y_{1i} - Y_{0i}|D_i = 1] = E[Y_{1i} - Y_{0i}|D_i = 0] \quad (2)$$

For the purpose of combining matching and DiD, I need to include the weights from the entropy balancing procedure in the estimation of the ATT. This results in the following

formal definition:

$$ATT = E[Y_{1i} - Y_{0i}|W_{EB}(X), D_i = 1] = E[Y_{1i} - Y_{0i}|W_{EB}(X), D_i = 0] \quad (3)$$

where $W_{EB}(X)$ denotes the weights obtained from the entropy balancing procedure on the conditioning variables (X) from the first step.

4 Data

4.1 Sample Composition

This paper uses data from the German Socio-Economic Panel Study (SOEP, v30), which is an annual representative longitudinal survey of private households in Germany that started in 1984 (Wagner et al., 2007). I use an unbalanced panel starting after the 1991 German reunification through the most recent available 2013 wave (SOEP, 2014). The SOEP provides information on a wide range of economic and social indicators including demographics, education, employment and earnings, household composition and subjective well-being. It surveys not only households, but also individual household members, which allows me to identify relationships among individuals belonging to the same household. Therefore, I am able to reshape the data into an individual-partner structure. Its longitudinal character, which ensures the observation of the outcome variable before and after the treatment is also an attractive feature. In addition, the SOEP distinguishes between underlying causes of unemployment and different kinds of partnerships (marriage and cohabitation), information that is critical for this study.

4.2 Treatment and Control Group

An exogenous source of variation in the explanatory variable is essential to determine the purpose of treatment within a quasi-natural experiment setting. The aim of this study is to define a setting in which unemployment due to involuntary job loss of one household member can be used to analyze its impact on partner's labor supply. Other causes of

unemployment might be endogenous, for example, quitting (voluntary job loss) might occur due to personal tastes and do not necessarily result in a financial crisis, which in turn is necessary for any intra-household response. In order to fulfill those claims, I use involuntary job loss due to plant closures or termination by the employer as exogenous sources of unemployment.²

Treatment and control group couples lived together in the same household, before (t_0) and after (t_1) the treatment. At the same time, I differentiate between married and cohabiting couples. However, I do not specify the number of years a couple had to live together. Both partners need to have provided valid labor supply information in both years.

The treatment group comprises couples, in which one partner is faced with involuntary unemployment due to plant closure or termination by the employer between two survey years. The treatment variable is an indicator taking on the value 1 if the respondent is registered as unemployed and states that he/she lost his/her last job due to plant closure or termination. Treated individuals are between 18 and 60 years of age and worked in dependent employment before the job loss. The indirectly affected partner of the treated individual has the same age restrictions, but irrespective of employment status. However, I consider only couples in which only one partner experienced involuntary job loss, since I am analyzing cross effects, which should not be influenced by personal experiences. In addition, in couples in which both partners experienced involuntary job loss, it would be uncertain for whom the income effect is accounted. In addition, same-sex couples are excluded from the sample, because I am seeking to analyze gender differences in the response to one partner's job loss.³

The control group consists of couples, in which the potentially affected partner (who is of the same sex as a counterpart in the treatment group) remains employed. In other words, the control group consists of households without any job loss experience. Besides

²The most appropriate way would be to focus solely on plant closures, but due to data insufficiencies, I need to include termination by the employer as second source of unemployment. For comparison, I discuss quitting, annulment contract, and temporary contract in the robustness section.

³While 15 couples experience simultaneous job loss and 58 same-sex couples are included in the whole sample, none are represented in the treatment group.

that difference, couples in the control group are subject to the same restrictions as the treatment group. Thus, the change or desired change in labor supply of individuals whose partners did not lose their job (control group) identify what the situation would have been for individuals whose partners lost their job (treatment group) in the absence of job loss and unemployment.

In total, I have 1,633 treated couples. Out of those 1,633 treatments, 402 individuals (directly affected partner) lost their job due to plant closure. Further, 988 men and 645 women are treated. Out of those couples in which the man enters unemployment, 823 are married and 165 are cohabiting. For women, 545 are married and 100 are cohabiting. In comparison, I have about 153,000 person-year observations in the control group.

4.3 Outcome

This paper focuses on the labor supply outcomes of individuals whose partners suffer from job loss due to plant closures or termination by the employer. A diverse range of reactions to an external shock that decreases the household income are possible. To explore the implications of job loss on the partner’s work behavior, this study does not focus solely on one particular change in labor supply behavior. Instead it combines changes at the extensive and intensive margins as well as realized and potential changes. Table 1 clarifies the components of AWE. All four subgroups consider the transitions of labor force participation and working hours between two periods.

The extensive margin denotes the labor force participation and the intensive margin the number of work hours. In addition, the realized change describes an actual change between two periods, whereas the potential change denotes a desire to change the labor supply without the possibility of making this change. The outcome variable AWE consists of all possible combinations, whereby it is not possible to combine extensive with intensive margin or realized with potential change. ‘Start working’ denotes the transition from non-participating to participating. ‘Starting a second job’ occurs when an individual is already participating in the labor market but gets a second job. ‘Increase hours’ means an increase of at least one hour in (t_1) and ‘working full-time’ means an individual changed

Table 1: Components of AWE

	(t_0)	(t_1)
Realized change	not working	start working
	working	second job
	working	increase hours
	working part-time	working full-time
Potential change	not working	wants to start working
	working	wants to increase hours
Extensive Margin	not working	start working
	working	second job
	not working	wants to start working
Intensive Margin	working	increase hours
	working part-time	working full-time
	working	wants to increase hours

Source: Own presentation.

from working less than 35 hours per week (part-time) to more than 35 hours per week (full-time).⁴ ‘Wants to start working’ is constructed by combining: likely or most certainly wants to start working in the future plus the desire to start immediately or within the next year. Finally, ‘wants to increase hours’ is realized if an individual’s desired hours in (t_1) are higher than the actual hours in (t_0) .

4.4 Covariates

A set of covariates is included in the estimation. These variables are in line with other studies on the AWE (Stephens, 2002; Bredtmann et al., 2014; Kohara, 2008) and include demographics, labor market characteristics, and educational data. Covariates are either given on an individual level, partner level or household level and contain pre-treatment values. The variables used are: age, age², sex, marital status, education in years, number of children in the household, actual working hours, length of time with the firm, labor income, labor income², full-time and part-time experience in years, unemployment bene-

⁴Some respondents do not answer the question of how many hours they work, but answer the employment status question. For those the transition from part-time to full-time is used instead of the actual change in hours (579 observations).

fit, size and sector of the company, unemployment rate on federal state level, a maximum set of year and federal state dummies, as well as dummy variables indicating blue- or white-collar worker and German nationality. In addition, partner variables are included as well. These consists of age, age², actual working hours, full-time and part-time experience in years, education in years, labor income, labor income² and an indicator of not being employed. A full list, including the definition of the variables used, is provided in Table 6 in the Appendix.

4.5 Descriptive Statistics

The summary statistics of selected characteristics for treated as well as control (unmatched) couples are presented in Table 2. They include individuals and partner characteristics and also household and regional (federal state level) characteristics.⁵ Summary statistics are obtained before matching.

Treatment group and control group columns display means of selected covariates. The difference column illustrates the differences in means between treatment and control group and tests for their significance. Age for both partners and number of children in the household do not display significant differences. However, treatment and control groups differ significantly in many other respects. On the individual level, treated individuals are less likely German, have less education, earn less and work more hours than their untreated counterparts. The indirectly affected partner in the treatment group has significantly fewer years of education ,earns less and also works less hours compared to the control group. Considering the household, the unemployment rate and the female labor force participation (LFP) rate (both on the federal state level) are higher in the treatment group than in the control group. However, this is a problem in the classical DiD model, but after reweighting the control group observations using entropy balancing, the means in the control group equal the means in the treatment group.⁶ Clearly, after matching, the differences are no longer statistically significant, suggesting that matching

⁵Summary statistics for subgroups (women, men, marriage and cohabitation) are presented in the Appendix.

⁶See Appendix for detailed summary statistics before and after matching.

Table 2: Summary Statistics for Selected Characteristics

	Treatment group	Control group (unmatched)	Difference
All			
Individual characteristics			
Age	41.9	41.5	-0.3
German	0.8	0.9	0.0**
Years of education	11.2	11.8	0.5***
Labor income	19413.4	21811.6	2398.3***
Work hours	40.3	28.3	-12.0***
Partner characteristics			
Age partner	41.2	41.5	0.4
Years of education partner	11.4	11.8	0.4***
Labor income partner	15705.7	21850.5	6144.8***
Work hours partner	26.1	28.5	2.4***
Household and regional characteristics			
Number of children	0.9	0.9	0.0
Unemploymentrate	12.3	10.7	-1.7***
Female LFP	67.3	65.8	-1.5***
N	1633	152735	

Notes: The table shows the means of selected variables before treatment for treated individuals and unmatched controls. The difference column outlines the difference in means between treatment and control group. Asterisks indicate the significance level of the differences (t-test): * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Source: SOEPv30 waves 1991 through 2013, own calculations.

helps reduce the bias associated with observable characteristics.

5 Results

5.1 Estimation Results

The estimated coefficients of an involuntary job loss on the work behavior of partners are presented in Table 3. The columns denote the treated individual and the rows display the ATT for their partners (denoted AWE). Column by column, the table shows the results for all couples as well as separately for gender (women and men) and partnership status (married and cohabiting) subgroups. Whereas in the latter case, the focus is on

institutional differences, that is, marriage as a legal form of partnership with a proven insurance mechanism against cohabitation with potentially less binding constraints. It therefore does not distinguish between gender.⁷

Panel A combines all possible outcomes⁸, whereas the following panels use a decomposition into its four overlapping categories (realized and potential changes as well as extensive and intensive margins) to determine which of them exhibits the greatest impact of the treatment variable. It would be more appropriate to decompose the outcome into its individual components (compare Table 1), but due to a rather small number of observations in each subcategory, especially when considering only 'start working', I refrain from making a detailed decomposition.

Considering panel A, the transitions of the combined outcome in response to the involuntary job loss of the directly affected partner, estimates show significant positive effects for all specifications except cohabitation. The individuals whose partners involuntarily lost their job, compared to those whose partners did not, are about 5 percentage points more likely to increase labor supply, considering all couples. Surprisingly, there is not a large gender gap. Following the traditional role allocation within households, one might expect a larger impact if men lost their jobs since women are traditionally less likely to be the main earners in the household, and by implication, are more able to increase their labor supply. But contrary to this view, the analysis even shows a slightly higher impact on male partner's probability to increase his labor supply if the female partner lost her job. Looking at the result from a different angle, it becomes less surprising: Even though women might be less attached to the labor market, it is presumably easier for men to adjust their labor supply, since they are likely to have less childcare responsibilities (Kümmerling et al., 2008). In addition, men have presumably more possibilities on the labor market. This underlines my assumption that the distribution of roles within households has changed, and that women no longer solely act as secondary

⁷However, gender differences within different types of partnerships may be considered likely, and would therefore be desirable to analyze, but the underlying sample does not allow for further in-depth analysis.

⁸All possible transitions from (t_0) to (t_1) : start working, start second job, increase hours, work full-time, want to start working and want to increase hours. For reference, see Table 1.

earners. Distinguishing between married and cohabiting couples reveals that the effect is insignificant for cohabiting couples, indicating that the insurance mechanism is indeed a phenomenon bound to marriage. Furthermore, the traditional division of labor is less widespread among cohabiting couples. Instead, cohabiting women work more hours than married women, and try to match their partners' wages (Triebe, 2014). Therefore, if both partners work a relatively high number of hours, there is simply less room for adjustments.

Table 3: Main Added Worker Effects

Treated Individual	All	Men	Women	Marriage	Cohabitation
Panel A					
Combined outcome					
AWE	0.054***	0.051***	0.056**	0.046***	0.069
partner	(0.016)	(0.020)	(0.024)	(0.017)	(0.043)
Panel B					
Realized change					
AWE	0.033**	0.028	0.043*	0.026*	0.060
partner	(0.014)	(0.017)	(0.023)	(0.015)	(0.038)
Potential change					
AWE	0.035***	0.035**	0.034*	0.027*	0.062*
partner	(0.013)	(0.018)	(0.019)	(0.014)	(0.037)
Panel C					
Extensive change					
AWE	0.013	0.019	-0.006	0.010	0.007
partner	(0.012)	(0.015)	(0.015)	(0.012)	(0.032)
Intensive change					
AWE	0.046***	0.044**	0.050**	0.040**	0.073*
partner	(0.015)	(0.018)	(0.023)	(0.016)	(0.038)
N	96417	55568	40849	82159	14258
N treated	1360	847	513	1137	223

Notes: The table shows the effect of one partner's involuntary job loss on the work behavior of the other partner (AWE). Columns denote the treated individuals. All cells present the ATT and its clustered (household level) respectively robust standard error (for men and women) in parentheses. All specifications combine a matching procedure with the DiD technique and include the whole set of covariates. Panel A displays the AWE for the combined outcome categories (start working, start second job, work full-time, and increase hours, plus want to start working and want to increase hours). Panel B subdivides the results into realized and potential changes and panel C subdivides the results into the extensive and intensive margins. N refers to the number of individuals (treated and control). N treated denotes the number of treated individuals. * p<0.1, ** p<0.05, *** p<0.01.

Source: SOEPv30 waves 1991 through 2013, own calculations.

Panel B distinguishes between realized and potential changes and the results suggest

that both specifications have significant impacts on the AWE, with the realized change being less significant and smaller in magnitude or even insignificant considering men and cohabitation. It has to be considered that the two effects are based on rather different groups. One group actually changed something in their work behavior, whereas the second group merely stated the desire to increase their labor supply. Giving such an answer in a questionnaire may be easier than actually following through, and in some cases may be simply a way of convincing oneself about the prospect of working. Also, a potential measurement error cannot be excluded, since the group of individuals who just stated that they wanted to increase labor supply could consist both of those who are willing, but due to external circumstances simply unable to do so immediately and, as noted before, of those who simply feel better by stating a desire to increase their labor supply but who do not actually intend to do so. The latter group can be seen as a special group that potentially differs in other characteristics as well. The difference if women are the ones who are indirectly affected by partner's job loss can additionally be explained by the fact that it is harder for women to increase their labor supply due to different labor market constraints and family ties (e.g., gender gap and children). The cohabitation effects suggest, that the insurance mechanism may work for cohabiting couples as well, and that it even has larger effects, but that the realized change is insignificant. This might be correlated with the small number of treated cases.

The last panel distinguishes between transitions on the extensive and intensive margins. Both specifications combine realized as well as potential changes. On the one hand, considering only the extensive change yields no significant results.⁹ On the other hand, the effect of job loss on the intensive margin is significant for all subgroups. The step from not working to working, independently of whether this is potential or realized, seems to be more difficult to take than transitions on the intensive margin, probably since the resulting modifications in work-life balance are more negligible when only changing the number of work hours. In addition, transaction costs and sunk costs of job search are lower for the intensive change.

⁹This category has only 272 transitions in the treated case.

So far, the estimates display AWE effects for couples in which one partner involuntarily lost his or her job. The results clearly point to a positive impact on the partner’s labor supply behavior. However, it is important to consider heterogeneous effects of the treatment, that is, to observe how the job loss has affected particular subgroups and outcomes (e.g., solely starting to work or increasing hours) differently. This may reveal different mechanisms by which the treatment impacts a partner’s work behavior. Albeit, due to the rather small number of observations, especially when considering cohabiting couples, I refrain from more detailed inspections of heterogeneous effects.¹⁰ Some considerations that may have an impact on the outcome will be discussed in section 5.2.

5.2 Robustness and Sensitivity

This section performs different robustness and sensitivity checks to test the plausibility of the results. A first set considers different treatment group specifications, including considerations regarding unemployment. A second set compares different methodological approaches and runs a placebo regression, and a third set tests the sensitivity towards different subgroups that may potentially affect the outcome.

Treatment group specifications

The first set of robustness checks considers different treatment group specifications. As stated in section 3 and section 4, to identify an AWE, one has to have a reduction in available household income due to unemployment. Since it is more likely to identify this reduction (and the resulting AWE) if the unemployment results from involuntary job loss, the treatment group in the main estimation only consists of job loss due to plant closure or termination by the employer. In contrast, these sensitivity checks use firstly other reasons of unemployment (quitting, temporary contract and annulment contract), and secondly, involuntary job loss as it is used in the main specification, but depending on different unemployment specifications (irrespective of whether job loss was followed

¹⁰Nevertheless, I did carry out a tentative analysis. Investigations of differential impacts of the job loss regarding marital status, sex, distance to job loss, region (former East and West Germany), high unemployment rate, high female labor force participation and high education do not produce any differential evidence. Tables are available from the author upon request.

by an unemployment spell, no unemployment spell, and unemployment spells of up to 5 years after job loss). The results for the combined outcomes are displayed in Table 4.

Table 4: Added Worker Effect – Different Treatment Group Definitions

Treated Individual	All	Men	Women	Marriage	Cohabitation
Different reasons of unemployment					
Quitting					
AWE	0.060*	0.033	0.110**	0.089**	-0.052
partner	(0.036)	(0.051)	(0.046)	(0.038)	(0.075)
N	68928	42386	26541	59974	8954
N treated	338	180	158	277	61
Temporary contract					
AWE	-0.013	0.033	0.027	-0.021	0.072
partner	(0.038)	(0.057)	(0.062)	(0.042)	(0.071)
N	69032	42431	26601	60051	8981
N treated	444	226	218	356	88
Annulment contract					
AWE	0.011	-0.013	-0.038	0.030	0.258
partner	(0.070)	(0.075)	(0.079)	(0.089)	(0.193)
N	68746	42300	26446	59829	8917
N treated	156	93	63	132	24
Involuntary job loss and different unemployment specifications					
Irrespective of unemployment after job loss					
AWE	0.020*	0.025*	0.011	0.022*	0.014
partner	(0.011)	(0.014)	(0.018)	(0.012)	(0.027)
N	72073	44107	27966	62630	9443
N treated	2749	1767	982	2261	488
No unemployment after job loss					
AWE	0.028	0.024	0.032	0.032	0.028
partner	(0.031)	(0.037)	(0.047)	(0.036)	(0.060)
N	68935	42419	26516	59961	8974
N treated	345	212	133	264	81
Unemployed up to 5 periods after job loss					
AWE	0.054***	0.054***	0.053**	0.049***	0.045
partner	(0.016)	(0.020)	(0.025)	(0.017)	(0.046)
N	96417	55568	40849	82159	14258
N treated	1446	886	560	1211	235

Notes: The table shows the effect of one partner's involuntary job loss on the work behavior of the other partner. All cells present the ATT and its clustered (household level) respectively robust standard error (for men and women) in parentheses. The underlying method is the Matching/DiD procedure. Columns denote the treated individuals. The first panel considers different reasons for unemployment and the second panel shows different unemployment specifications while only involuntary job loss is considered. N refers to the number of treated individuals. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Source: SOEPv30 waves 1991 through 2013, own calculations.

The first panel displays different reasons for unemployment. The results are overall as expected. Nevertheless, quitting provides mixed results. While no significant impact is observable for men and cohabiting couples, we see significant positive results for women and married couples. A potential explanation is that voluntary job loss has probably been agreed upon in advance within the household, and may therefore be less detrimental. If a job loss is expected and voluntary, it is likely that either adaptations within the household were made before quitting (that is, as soon as the decision was made) or that a new job is on the horizon. In addition, quitting is less likely to be accompanied by a financial shock. However, less voluntary reasons for quitting need to be considered as well, such as harassment, care of family members, or childcare responsibilities. The latter two especially tend to be more frequent among women, and childcare responsibilities are more likely within marriage. This may drive male partners or husbands of women who experienced job loss to increase their own labor supply significantly, even in cases where the job loss was voluntary. The ending of temporary contracts and annulment contracts show no significant results. These kinds of unemployment are in fact expected, but cannot be defined as voluntary or involuntary. It is highly likely that specific adaptations have been made within households before the job loss to compensate for upcoming unemployment.

The second panel shows involuntary job loss with different unemployment specifications. As stated above, one main assumption underlying the assumed necessity for the unaffected partner to adapt his or her labor supply behavior is a reduction of the available household income. If the job loss is irrespective of subsequent unemployment, the analysis reveals slightly significant results for men and marriage. In addition, the magnitude is smaller compared to the main effects, indicating that unemployment specifications do matter. This assumption is confirmed by the next specification, in which the individual is employed immediately after the job loss, where no significant impacts can be observed. An explanation could be that finding new employment immediately after job loss could make a reduction in household income less likely to be observable. The last row depicts a long-run approach to unemployment. Following Stephens (2002), it is unlikely that the response of an individual to a partner's job loss is always immediate. Reasons include

the likeliness that the effort of increasing labor supply is lagged, rather than immediate, due to market conditions and the adjustment process. The indicator includes, in addition to the current unemployment period, up to five years in which the partner of a person who has directly experienced job loss could adjust his or her labor supply behavior.¹¹ The results are in magnitude and significance level comparable to the main added worker effect, supporting Stephens’s (2002) assumption of long-run effects.

Different methodological approaches

A second set of robustness checks considers different matching methods. Instead of entropy balancing, the matching in the first panel relies on different propensity score matching specifications. One-to-one matching uses the nearest neighbor with replacement. In comparison, K-nearest neighbor matching uses the five nearest neighbors with replacement and for kernel matching, I use Epanechnikov kernel with a bandwidth of 0.06. All three specifications are under the assumption of common support. However, in comparison to entropy balancing, propensity score does not assign equal weights to each matched counterpart. Propensity score matching in fact does not guarantee that the individual pairs will be well-matched on the full set of covariates, only that groups of individuals with similar propensity scores will have similar covariate distributions (Stuart et al., 2009). Results are provided for the combined outcome only. All three specifications result in significant results for all subgroups (including cohabitation) and the magnitude is higher than with entropy balancing. This may be related to the above mentioned differences between both matching techniques.

The second panel in this set of robustness checks gives the results of a placebo regression. All matching procedures (entropy balancing as well as propensity score methods) assume, that all conditional variables which simultaneously influence transitions in unemployment due to plant closure and termination by the employer and partner’s labor supply, are included. This assumption cannot be directly tested, but the use of a placebo

¹¹These long-term effects could last as long as five years after the treatment (Stephens, 2002). An additional control variable, distance to treatment, is included in this specification. Couples are only considered as long as the directly affected partner remains unemployed. The average number of years an individual stays unemployed after job loss is three years, including the year of job loss.

Table 5: Added Worker Effect – Different Methods

Treated Individual	All	Men	Women	Marriage	Cohabitation
Propensity score matching					
One-to-one matching					
AWE	0.089***	0.083***	0.078***	0.083***	0.099**
partner	(0.019)	(0.024)	(0.031)	(0.021)	(0.048)
N	96417	55568	40849	82159	14258
N treated	1360	847	513	1137	223
K-nearest neighbor matching					
AWE	0.077***	0.075***	0.058**	0.067***	0.14***
partner	(0.014)	(0.019)	(0.024)	(0.016)	(0.037)
N	96417	55568	40849	82159	14258
N treated	1360	847	513	1137	223
Kernel matching					
AWE	0.082***	0.085***	0.077***	0.070***	0.14***
partner	(0.014)	(0.017)	(0.022)	(0.015)	(0.033)
N	96417	55568	40849	82159	14258
N treated	1360	847	513	1137	223
Placebo Regression					
One period earlier (Entropy balancing)					
AWE	0.004	0.024	-0.031	0.006	-0.035
partner	(0.017)	(0.021)	(0.027)	(0.018)	(0.041)
N	96417	55568	40849	82159	14258
N treated	1076	674	402	919	157

Notes: The table shows the effect of one partner's involuntary job loss on the work behavior of the other partner. All cells present the ATT and its clustered (household level) respectively robust standard error (for men and women) in parentheses. The underlying method is the Matching/DiD procedure. Columns denote the treated individuals. The first panel considers different propensity score matching techniques and the second panel performs a placebo regression. N refers to the number of individuals (treated and control). * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Source: SOEPv30 waves 1991 through 2013, own calculations.

regression can add more plausibility. I am using a placebo regression in which I pretend that the treatment happened one year earlier. To calculate the effects, I perform entropy balancing according to the main specification but with data from one year before. Table 5 displays insignificant results, indicating that the placebo treatment does not influence the labor supply of the partner. With this result, the placebo regression adds credibility to the assumption that treatment and control group follow the same trend before the treatment. In addition, it clarifies that the effects are not driven by other unobserved variables.

Different subgroups

Finally, I also perform some sensitivity checks, considering different sample specifications to test whether they reveal different outcomes (realized and potential labor supply behavior of the unaffected partner). In particular, I consider the sensitivity of partner characteristics, distinguishing between high and low partner earnings prior to the loss and between old and young partners. In addition, I also perform sensitivity checks of household and timing characteristics. Here, I distinguish between the 1990s and 2000s, poor and wealthy couples, and partners working in the same or a different industry. In all these specifications, I expect the willingness of indirectly affected partners to increase their labor supply in response to the other partner's unemployment to differ: for example, older partners are presumably less likely to increase their labor supply than younger partners. However, due to the rather small number of treated couples in some specifications, the results should be interpreted with caution. I present the results in Table 8 and in Table 9 of the Appendix.

The first panel investigates the earnings of the indirectly affected partner prior to the job loss of the other partner. 'Low' denotes all partners whose income is up to 50% of the earnings distribution and 'high' denotes partners whose income is above 75% of the earnings distribution. This has been done, on the one hand, based on the assumption that partners with a lower than average initial income are more willing to adjust their labor supply, since it is likely that such households need the additional income. On the other hand, it is reasonable to assume that individuals with a higher initial income do not have a high incentive to increase their labor supply, since the financial consequences of job loss can potentially be compensated without taking another job, or since they may already be in a full-time position. One problem that arises in separating according to partner earnings is that for directly affected men, high income female partners are scarce, and the same is true for cohabiting couples with both high and low incomes. Therefore, results are only shown for the remaining subgroups and they confirm the aforementioned assumptions. Partners with low initial earnings (less than 50% of the earnings distribution) significantly increase their labor supply in response to the other

partner's job loss, while high income partners (upper 25% of the earnings distribution) do not show significant results.

Considering the age of the responding partners yields higher significant results for partners aged 18 to 50 than for older individuals (51 to 60). Even though older partners do significantly increase their labor supply, it is at a lower magnitude and a lower significance level. Older individuals are presumably less willing to change their labor supply and, in addition, they are potentially more settled with less responsibilities (e.g., childcare), which makes it less necessary for them to adjust their labor supply.

The analysis over time gives further insights. A differentiation into 1991-2002 and 2003-2013 yields a higher effect in significance and magnitude for the last 10 years. The effect for the pooled sample is doubled between both decades. Interestingly, while in the 1990s, a significant effect is observable when women enter unemployment, it is the other way around in the 2000s, when women increase their labor supply by almost nine percentage points if their partner loses his job. This might be consistent with the increasing female labor supply in general.

Wealth questions were solely asked in the SOEP questionnaires in 2002, 2007 and 2012. I only consider the whole sample due to the small number of observations. Individuals living in 'poor' households (less than or equal than 50% of the wealth distribution) significantly increase labor supply in response to unemployment, whereas wealthier couples (more than 50% of the wealth distribution) do not significantly respond. The underlying explanation is comparable to that of high pre-displacement earnings. Wealthier couples simply do not need to adjust their labor supply in case of job loss because their initial wealth is potentially high enough to compensate for any financial shock.

Finally, I consider the economic sector of both partners. Again, due to the rather small number of observations, I only consider the whole sample. If both partners work in different sectors, the indirectly affected partner significantly increases his or her labor supply, whereas the result is insignificant if they are working in the same sector. The possibility of increasing labor supply therefore highly depends on whether both partners work in the same economic sector. It can be assumed that if the layoff or plant closure

is related to sector specific characteristics, it is highly unlikely that the partner will find a new job in that same sector or be able to increase his or her hours.

5.3 Discussion of Results

The previous sections reported clear evidence of the AWE. Furthermore, distinct differences between the subgroups became obvious. Nevertheless, the afore mentioned results cannot be seen without hurdles. Even though the results are robust according to different specifications and methods, the estimates might be biased. Biases might occur due to measurement error or sample attrition. First of all, the effect of the treatment is measured after the treatment, which might lead to a measurement error since the expectation of job loss may lead to a labor supply adaption even before the job loss occurs (Stephens, 2002). If this holds true, the estimated AWE effect would be downward-biased. This anticipation effect would additionally contradict the assumption of the treatment being an exogenous shock. However, the placebo regression in the robustness section indicates that treated and matched controls do not differ with respect to their labor supply trend before the treatment. This further suggests that the job loss was not known before the treatment. Another measurement issue might be related to assortative mating. According to Allegretto (2002), individuals select their mates in a non-random manner but based on specific characteristics, including labor market characteristics. Following this assumption, it is likely that individuals with a higher probability of becoming unemployed choose their partner accordingly, resulting in a lower willingness of the partner to adjust his or her own labor supply in case of job loss of the other partner. Finally, the aforementioned discouraged worker effect might lead to an offsetting of the AWE, since unemployment might discourage the unaffected partner from even looking for jobs due to negative signals of the job loss (Humphrey, 1940; Maloney, 1991).

Second, panel studies often suffer from sample attrition between two survey years, which may have negative consequences for the informational content of a study. One factor of panel attrition is mortality, which might be of importance in the present study. Couples experiencing a greater negative impact due to unemployment (e.g., poorer or

younger couples) might be more likely to drop out of the sample.¹² This might result in an underestimation of the true effect as a greater negative impact of unemployment results in a higher probability of adjustments within the partnership, that is, higher AWE. In contrast, random panel attrition should not influence the estimation effect. Further, unemployment may also increase real mortality, since it increases the probability of separation while this in turn increases drop outs of the survey (Ratcliffe et al., 2008).

In addition to potential biases, the data source should be considered. The SOEP is a relatively large database and very suitable for the analysis performed here because of its wide range of indicators, its longitudinal character, and its questionnaire design. Nevertheless, it does not contain enough observations to analyze the pure impact of plant closures on AWE. The advantage of using only plant closures would be to give the estimates a more causal interpretation. Additionally, it is not possible to disentangle the outcome (AWE) completely into its components (see Table 1), again due to the rather small number of observations. But analyzing all components separately would yield further insights into the mechanisms of AWE.

6 Conclusion

The present study refines the AWE framework to reflect important changes in a contemporary society. It contributes to the existing empirical literature by explicitly analyzing the spillover effects of unemployment on women and men, and distinguishes between married and unmarried partnerships. I use longitudinal data from the German Socio-Economic Panel (SOEP) study from 1991 through 2013. My sample consists of married and cohabiting couples in which partners directly affected by unemployment were initially employed. The indirectly affected partners' response (AWE) is measured by transitions either on the intensive margin or the extensive margin. Both transitions can additionally proceed as a realized change (actual change between two periods) or a potential change (desire to change labor supply, but without the possibility to actually make this change).

¹²A significant dependence between labor market durations and attrition is shown, e.g., by Berg and Lindeboom (1998) or Dorsett (2004).

It is important to also consider the potential change, since it can give further insights into labor market mechanisms. Unaffected partners may want to work, or want to work more hours, but labor market constraints, economic downturns, or personal social commitments might hinder them from doing so. The underlying method in analyzing the AWE is a combination of matching (entropy balancing) and DiD estimation. The treatment in the DiD setting is unemployment due to plant closure and termination by the employer (involuntary job loss). Both reasons for unemployment are likely to result in financial problems for the household, and provide an exogenous entry into unemployment, which is necessary for causal interpretations.¹³

It is reasonable to expect that female labor supply transitions from unpaid homework to paid labor market work as well as the increase of unmarried partnerships influence the AWE. Nevertheless, impacts of women on the work behavior of men or differences according to partnership status have, to the author’s knowledge, not been empirically analyzed to date. Therefore, this study provides an important extension to the existing literature and closes a research gap.

The empirical investigation finds evidence for the existence of an added worker effect for all considered subgroups (women, men, cohabiting couples, and married couples). Partners of individuals directly affected by job loss show a significantly higher probability of increasing their labor supply than individuals whose partners remained employed. However, this effect is mainly driven by the potential change on one side and the intensive change on the other side. The latter result is in line with other researchers who find evidence of an AWE when considering the intensive margin (Gong, 2010; Bredtmann et al., 2014). This suggests that the insurance mechanism within households is still functioning in Germany. In general, the AWE is larger when a woman enters unemployment, presumably because it is easier for men to adjust their working hours as they are less responsible for childcare (Kümmerling et al., 2008) and have more possibilities on the labor market. The findings are robust over various specifications, for example, different methods, a placebo regression, and different treatment group variations.

¹³The placebo regression provides an indirect test which shows that this assumption is not violated.

The study highlights that unemployment due to involuntary job loss has consequences for both the directly affected partner and the indirectly affected partner, and indeed for the whole household. It further stresses that previous studies underestimate the true effect as they only consider married women. This study, in contrast, not only shows that the AWE extends beyond married women but also clarifies that the AWE is an important issue even in countries with a strong welfare system. The results have important implications for the design of labor market policies, especially when such policies are gender specific or aimed at couples.¹⁴

¹⁴Policies usually equate couples with married couples, and ignore the fact that mechanisms such as joint taxation for married couples might have a different impact on cohabiting couples (Triebe, 2014).

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A Appendix

Table 6: Variables and Definitions

Variable	Definition
Outcome	
awep	Transition parameter – Transitions of labor supply (realized and potential) of the indirectly affected partner
Treatment	
tutdu	Dummy for unemployment due to involuntary job loss (plant closure or termination by employer)
Individual characteristics	
age	Age
age2	Age, squared
bilzeit	Education in years
tatzeit	Actual working hours per week
erwzeit	Length of time with firm in years
lnlabinc	Individuals labor income (logarithm)
labinc2	Individuals labor income, squared
expft	Work experience full-time in years
exppt	Work experience part-time in years
allbet	Size of the company in terms of employees
branch	Industry/sector of the company, derived from NACE classification
wcollar	Dummy for white collar worker
bcollar	Dummy for blue collar worker
german	Dummy for German nationality
distance	Distance to treatment in years
ubenefit	Unemployment benefit per year
Partner characteristics	
agep	Age
age2p	Age, squared
expftp	Work experience full-time in years
expptp	Work experience part-time in years
notempl	Dummy for not working
bilzeitp	Education in years
lnlabincp	Individuals labor income (logarithm)
labinc2p	Individuals labor income, squared
Household/regional characteristics	
kids	Number of children in the household
bula	Dummies for the 16 German federal states
unemploymentrate	Regional unemployment rate (federal state level)
female_lfp	Female labor force participation rate (federal state level)

Notes: The table displays all used variables and their underlying definitions.

Source: SOEPv29 waves 1991 through 2011.

Table 7: Summary Statistics for Selected Characteristics of Subgroups

	Treatment group	Control group (unmatched)	Control group (matched)	Difference (unmatched)
Women				
Individual characteristics				
Age	41.2	40.3	41.2	-0.9**
German	0.9	0.9	0.9	-0.0
Years of education	11.3	11.6	11.3	0.3***
Labor income	14329.5	12326.3	14329.5	-2003.2***
Work hours	34.4	19.8	34.4	-14.6***
Partner characteristics				
Age partner	43.6	42.8	43.6	-0.7*
Years of education partner	11.5	11.9	11.5	0.4***
Labor income partner	24186.3	31286.3	24186.3	7100.0***
Work hours partner	35.6	36.9	35.6	1.3*
Household and regional characteristics				
Number of children	0.8	0.9	0.8	0.1***
Unemploymentrate	12.1	10.7	12.1	-1.5***
Female LFP	67.8	65.8	67.8	-2.1***
N	645	76539		
Men				
Individual characteristics				
Age	42.3	42.8	42.3	0.5
German	0.8	0.9	0.8	0.0***
Years of education	11.2	11.9	11.2	0.7***
Labor income	22396.9	31348.8	22396.9	8951.9***
Work hours	44.1	36.8	44.1	-7.3***
Partner characteristics				
Age partner	39.6	40.3	39.6	0.7**
Years of education partner	11.3	11.6	11.3	0.4***
Labor income partner	10728.7	12363.0	10728.7	1634.3***
Work hours partner	19.9	20.0	19.9	0.1
Household and regional characteristics				
Number of children	1.0	0.9	1.0	-0.0
Unemploymentrate	12.5	10.7	12.5	-1.8***
Female LFP	67.0	65.8	67.0	-1.2***
N	988	76196		
Cohabitation				
Individual characteristics				
Age	35.2	34.1	35.2	-1.0*
German	0.9	0.9	0.9	0.0
Years of education	11.4	12.2	11.4	0.8***
Labor income	18560.2	20839.2	18560.2	2279.0*
Work hours	41.8	31.7	41.8	-10.1***
Partner characteristics				
Age partner	33.7	34.2	33.7	0.4
Years of education partner	11.7	12.2	11.7	0.5***
Labor income partner	15244.3	20878.6	15244.3	5634.3***
Work hours partner	28.0	31.8	28.0	3.9***
Household and regional characteristics				
Number of children	0.6	0.5	0.6	-0.1***
Unemploymentrate	13.3	11.4	13.3	-2.0***
Female LFP	68.4	67.1	68.4	-1.3***
N	265	22559		
Marriage				
Individual characteristics				
Age	43.2	42.8	43.2	-0.3
German	0.8	0.8	0.8	0.0**
Years of education	11.2	11.7	11.2	0.5***
Labor income	19585.1	21980.1	19585.1	2395.0***
Work hours	40.0	27.7	40.0	-12.3***
Partner characteristics				
Age partner	42.6	42.8	42.6	0.2
Years of education partner	11.3	11.7	11.3	0.4***
Labor income partner	15798.6	22018.8	15798.6	6220.2***
Work hours partner	25.7	27.9	25.7	2.2***
Household and regional characteristics				
Number of children	1.0	1.0	1.0	0.0
Unemploymentrate	12.1	10.5	12.1	-1.6***
Female LFP	67.1	65.6	67.1	-1.5***
N	1368	130176		

Notes: The table shows the means of selected variables before treatment for treated individuals and controls (matched and unmatched). The difference column outlines the differences in means between treatment and control group (before matching). Asterisks indicate the significance level of the differences (t-test): * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Source: SOEPv30 waves 1991 through 2013, own calculations.

Table 8: Added Worker Effect – Sensitivity of Partner Characteristics

Treated Individual	All	Men	Women	Marriage	Cohabitation
Partner earnings prior to job loss					
Low					
AWE	0.059***	0.055**	0.066*	0.055***	
partner	(0.019)	(0.022)	(0.036)	(0.020)	
N	50291	40023	10268	43935	
High					
AWE	0.000		0.068	-0.041	
partner	(0.039)		(0.045)	(0.041)	
N	22546		17172	18874	
Age partner					
Young					
AWE	0.054***	0.052**	0.064*	0.040*	0.089**
partner	(0.020)	(0.024)	(0.033)	(0.022)	(0.040)
N	58417	37071	21346	46512	11905
Old					
AWE	0.054**	0.046	0.058*	0.056**	-0.100
partner	(0.025)	(0.033)	(0.032)	(0.025)	(0.109)
N	38000	18497	19503	35647	2353

Notes: The table shows the effect of one partner's involuntary job loss on the work behavior of the other partner. All cells present the ATT and its clustered (household level) respectively robust standard error (for men and women) in parentheses. The underlying method is the Matching/DiD procedure. Columns denote the treated individuals. The first panel considers partner earning levels prior to the job loss and the second panel distinguishes between young and old unaffected partner. N refers to the number of individuals (treated and control). * p<0.1, ** p<0.05, *** p<0.01.

Source: SOEPv30 waves 1991 through 2013, own calculations.

Table 9: Added Worker Effect – Sensitivity of Household and Timing Characteristics

Treated Individual	All	Men	Women	Marriage	Cohabitation
Timing					
1991-2002					
AWE	0.045**	0.033	0.059**	0.039*	0.056
partner	(0.020)	(0.025)	(0.030)	(0.021)	(0.047)
N	48414	28626	19788	42035	6379
2003-2013					
AWE	0.083***	0.087***	0.069	0.080***	0.057
partner	(0.026)	(0.031)	(0.042)	(0.028)	(0.059)
N	45293	25241	20052	37695	7598
Wealth					
Poor					
AWE	0.080*				
partner	(0.048)				
N	6508				
Wealthy					
AWE	0.070				
partner	(0.061)				
N	7584				
Industry					
Different					
AWE	0.053***				
partner	(0.016)				
N	86027				
Same					
AWE	0.018				
partner	(0.051)				
N	10390				

Notes: The table shows the effect of one partner's involuntary job loss on the work behavior of the other partner. All cells present the ATT and its clustered (household level) respectively robust standard error (for men and women) in parentheses. The underlying method is the Matching/DiD procedure. Columns denote the treated individuals. The first panel subdivides the whole time frame into 2 decades, the second panel considers rich vs. poor households and the last panel considers whether the unaffected partner works in the same or a different sector as the directly affected partner. N refers to the number of individuals (treated and control). * p<0.1, ** p<0.05, *** p<0.01.

Source: SOEPv30 waves 1991 through 2013, own calculations.