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Labour supply of households facing a risk of job loss

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# Labour supply of households
# facing a risk of job loss[*]

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## Abstract

The impact of a job loss on partner's labour supply – often called the added worker effect – is a well-studied phenomenon. However, people might already adjust their labour supply when their partner is at risk of losing his/her job. Using Labour Force Survey (LFS) microdata, we quantify this effect for 16 European countries over the period 2005-2020. When a household member is at risk of losing his/her job, the partner is 30% more likely to enter the labour market (extensive margin) and 52% more likely to (want to) increase working hours (intensive margin). These effects are almost as big as those of an actual job loss for the intensive margin, and a bit more than half of those for the extensive margin. Fear of job loss is thus an important additional factor influencing households' labour supply. This is particularly true in periods of crisis, in which the effects of fear of job loss and actual job loss are equally big. Heterogeneity analysis shows that different households adjust their labour supply at different moments, with low-educated people already adjusting when fearing job loss, while the high-educated wait for this risk to materialise.

KEYWORDS: Labour supply, household decisions, risk, added worker effect.

JEL classification: J22, D13.

# 1 Introduction

The household is a key unit for decision-making, not least on its members' employment situation. When the household faces a shock, such as an unexpected job loss by one partner, the other partner can increase his or her labour supply. This provides a form of insurance to the household and can reduce the shock of the job loss. This phenomenon, which has been well-studied both empirically and theoretically, is often called the "added worker effect" (Lundberg, 1985; Stephens, 2002).

Yet households might adjust their labour supply even if there is no actual job loss for any of its members, but the fear of losing their job. Risk and uncertainty are key features of the labour market for many households. Over the period 2005-2015, 6% of European respondents to surveys conducted by Eurofound[1] strongly agreed that they might lose their job in the next six months, with an additional 11% "tending to agree".[2] This figure is likely to be even higher in crisis periods. Large numbers of workers thus fear that they will lose their job and their partners might adjust their labour supply accordingly.

In this paper, we address the question whether people already adjust their labour supply when their partner fears losing their job. Relying on labour force surveys (LFS) for 16 European countries over the period 2005-2020, we find that both at the extensive margin (entering the labour market) and at the intensive margin (raising the number of hours worked) there is a clear increase in labour supply when the partner fears a job loss. In our most demanding specification, a previously inactive partner is 30% (2.4 percentage points) more likely to enter the labour market if his/her partner faces a risk of job loss than couples without that risk. A working partner is 52% (1.9 percentage point) more likely to (be willing to) step up his/her working hours in the event of risk of job loss for a partner than without that risk.

This effect comes on top of the labour supply adjustments when a partner actually loses his or her job. Focusing on unexpected job loss (based on workers being dismissed), we estimate a 52% increase (4.2 percentage points) in the labour supply at the extensive margin and a 61% increase (2.2 percentage points) at the intensive margin for couples experiencing an actual job loss compared to those where the partner has not lost his/her job. In other words, the effect of a risk of job loss is also substantial when compared to the impact following an actual job loss.

Our paper is on the intersection between two sources of literatures: (1) the study of households' labour supply adjustments and (2) precautionary labour supply. The first literature shows that the household is an important unit for decision making and managing risk. Sharing the risk of various shocks makes households less vulnerable than single individuals (Pruitt and Turner, 2020). Blundell *et al.* (2016), for example, show that 63 percent of the "insurance" against a male wage shock in a couple comes from family labour supply.[3]

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[1] The European Foundation for the Improvement of Living and Working Conditions.

[2] Average of Eurofound's European Working Conditions Surveys conducted in 2005, 2010, 2015 in 31 to 35 European countries.

[3] Spousal labour supply could also be adjusted for non-financial reasons. For example, Goux *et al.* (2014) show that when working hours were reduced in France, with no impact on wages, husbands of affected women also reduced their working time, plausibly due to complementarity in partners' leisure.

Job loss is one of the potential shocks to be managed by households and there is extensive literature on how it can affect spousal labour supply. Theoretically, changes in the partner's labour supply arise because of incomplete financial markets and labour market frictions (Mankart and Oikonomou, 2016) or because job loss leads to permanent income losses (Stephens, 2002). The size of the response will then depend on both the size of the income loss and on whether it was anticipated. In the event of an anticipated shock, change in labour supply could already have occurred before the real job loss (Stephens, 2002). In order to accurately measure the impact of job loss, one therefore needs to focus on its unexpected nature. Our approach, focusing only on people who have been fired, enables us to reduce the partner's anticipated reactions.

Empirically, while papers agree on the existence of an added worker effect, they have found mixed results on the size of the effect (Lundberg, 1985; Maloney, 1991; Stephens, 2002). More recently, studying the United States, Mankart and Oikonomou (2016) find that the added worker effect has grown over time (from the 1980s to the 2000s). They argue that this can be explained by changes in the gender pay gap, frictions in the labour market and labour force participation costs of married women. Additionally, the magnitude of the estimated effect depends on the level of social protection in the country studied (Cullen and Gruber, 2000; Birincini, 2019; Bernasconi *et al.,* 2021) and on whether the job loss occurs in a period of crisis (Parker and Skoufias, 2004; Bryan and Longhi, 2013; Bredtmann *et al.*, 2018). Many papers focus on a single country, often the US, but some also compare outcomes in different European countries (McGinnity, 2002; Prieto-Rodriguez and Rodriguez-Guttierez, 2003; Bredtmann *et al.*, 2018). While the early literature focused on inactive wives' entry into the labour market, more recent work has increasingly looked at changes for both men and women, at the extensive and the intensive margin (e.g., Triebe, 2015; Bredtmann *et al.*, 2018).

A second relevant piece of literature is on precautionary labour supply. At the individual level, this research work argues that a person with a higher wage risk should step up his/her labour supply as an insurance mechanism (Pistaferri, 2003; Flodén, 2006). Jessen *et al.* (2018) quantify this effect and find a 2.8% increase in working hours to protect against wage shocks, rising to 6.2% for the self-employed. Likewise, Parker *et al.* (2005) find that wage uncertainty is a key determinant of labour supply for male self-employed in the US.

Based on that mechanism, Ellieroth (2022) extends this logic to the household level. She builds a two-person household model in which partners provide precautionary labour supply in response to their partners' labour market risk. This is compatible with the fact that the cyclicality of hours worked – the difference in hours worked between crisis and non-crisis periods – is substantially lower for married women than for other groups. During crises, married women would boost their labour supply because of the additional risk for their husbands, offsetting other impacts of the crisis. Matching the model with data on transitions between employment, unemployment and inactivity, she finds that this mechanism can account for 62% of married women's low employment cyclicality.

Our paper contributes to those two areas of the literature by providing micro-level evidence on labour supply adjustment within couples when one partner fears losing his/her job. The LFS microdata on which our results are based contains a rich set of work-related questions, which makes it possible to measure the key variable, whether people fear losing their job, as well as a broad set of household, personal and work-related characteristics which serve as

control variables. Additionally, it enables precise measurement of short-term changes at the intensive margin because it not only captures whether people actually increase their working hours but also whether they would like to do so.

One might expect different reactions by gender. Nevertheless, our results show that women and men react similarly to a (risk of) job loss, with the exception that women react more strongly at the intensive margin following a real job loss. As labour supply adjustments have been shown to react with the business cycle, we study to what extent this is also true when the household is fearing employment loss. We find, among other things, that the effect of a risk of job loss is especially important in explaining labour supply in periods of crisis, the effect on the extensive margin being as large as that of actual job loss.

We also study which types of households adjust their labour supply most strongly following both fear of and actual job loss. To do so, we separately analyse couples with and without children and we also consider different levels of education for the partner adapting his/her labour supply. This helps us to understand which households are more constrained in adjusting their labour supply and/or are more sensitive to income shocks. We can also measure how well they can anticipate a job loss by already adjusting the partner's labour supply when they start fearing loss of employment. We find that the effect of the risk of job loss is higher for low-educated individuals, who directly react to a potential job loss, while high-educated individuals are more likely to wait for the actual job loss to materialise before making labour supply adjustments. The presence of children in the household is also a determinant but only when an actual job loss occurs. In this case, the labour supply adjustment at the extensive margin is almost three times bigger for households with children than for non-parent couples.

The rest of the paper is arranged as follows. Sections 2 and 3 give some explanations about the data and descriptive statistics. In Section 4, we provide an overview of the methodology. Results on the consequences of (the risk of) job loss, as well as heterogeneous effects are presented in Section 5. Section 6 concludes.


## 2   Data and definitions

Our paper relies on the EU Labour Force Survey (LFS) microdata provided by Eurostat. LFS provides rich information regarding professional, personal, and household characteristics. Moreover, for a number of countries, individuals are surveyed during two consecutive quarters in a given year. We can therefore use this panel information to, first, define the socio-economic position of one partner and then to analyse the reaction of the other partner during the next quarter. The sample is restricted to couples for whom the partner is identified as a spouse or cohabiting partner, with all needed information on both partners during two consecutive quarters and who are at working age (between 20 and 64 years). We end up with 3.6 million observed couples, where either the man or the woman can be the reference person (at risk of) losing his/her job. Our sample covers 16 European countries[4] over the period 2005-2020.

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[4] Austria, Cyprus, Croatia, Estonia, France, Greece, Hungary, Ireland, Italy, Lithuania, Malta, Poland, Portugal, Romania, Slovenia, Slovakia. The other countries either do not have any household information or provide only partial panel information (only the first interview includes all variables and is followed by shorter follow-up surveys). In both cases, it does not enable us to define our key variables.

For the rest of the paper, we use the following notation:

- $P_1$ is the person losing his/her job or at risk of losing his/her job;
- $P_2$ is the partner adapting his/her labour supply;
- $t_0$ is the quarter before job loss of $P_1$ (job loss occurs somewhere between $t_0$ and $t_1$) or the quarter when there is a risk of job loss;
- $t_1$ is the quarter for which we observe:
    - actual job loss of $P_1$ or the fact that the risk did not materialise ($P_1$ stays employed in $t_1$);
    - labour supply change of $P_2$.

To define job loss and risk of job loss, we first restrict our sample to partners $P_1$ being employed in $t_0$.

For our "job loss" variable, we observe the socio-economic position of $P_1$ in $t_1$. If $P_1$ stays employed in $t_1$, the "job loss" variable takes a zero value. If $P_1$ is no longer employed in $t_1$ (so that he/she is either unemployed or inactive) and the reason[5] for not being employed is dismissal, then the "job loss" variable takes the value one. In other words, we focus our analysis on (mostly) unexpected job losses to avoid any anticipated adaptation of the labour supply of partner $P_2$ before the analysed quarter $t_1$. If loss of employment is expected, households can adjust their consumption and/or labour supply prior to the job loss, and less so at the moment the job is lost (Stephens, 2002).

For our "risk of job loss" variable, we rely on a specific question from the labour force surveys, asking to employed individuals if they are looking for another job because of risk of loss or termination of present job. Our "risk of job loss" variable takes the value zero if the answer is no and one if the answer is yes. For both groups, we restrict the analysis to those who stay employed in $t_1$, so that the measured effect is additional to the impact of job loss because of dismissal and does not reflect any actual loss of job or an anticipated end of contract.

The adjustment of $P_2$'s labour supply is measured both at the extensive and intensive margin. For the extensive margin, we restrict the sample to partner $P_2$ being inactive in $t_0$ and we measure if he/she becomes active (either employed or unemployed) in $t_1$. At the intensive margin, we focus on $P_2$ being employed in $t_0$ and not wanting to adapt his/her working time.[6] We then measure if either he/she declares wanting to adapt his/her working time or effectively stepped up his/her working hours (proxied by a shift from part-time to full-time work) in $t_1$.

The literature usually defines changes at the intensive margin only in terms of actual hours worked, and not based on the willingness to adapt working time. However, for the same reason that a shift to unemployment is usually included in the definition of the extensive margin, it is useful to include wanting to work more hours for the intensive margin. They both capture how much labour people want to supply, which is what we are interested in. Additionally, it takes time for people to actually raise their working hours, meaning that part of the effect of

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[5] In the LFS, when an individual is unemployed or inactive and has a previous work experience, he/she must specify the main reason for leaving the last job. Among those reasons, we can identify "dismissed or made redundant". The other possible reasons are: a job of limited duration has ended, looking after children or incapacitated adults, other personal or family responsibilities, own illness or disability, education or training, early retirement, normal retirement, compulsory military or community service, other reasons.

[6] All employed surveyed individuals have to state whether they wish to work more than the current number of hours. Our measure of the willingness to adapt working time is based on this variable.

a (fear of) job loss would not yet be visible in the short run when focusing only on variation in the number of hours worked. Finally, focusing both on actual and desired labour supply at both the extensive and intensive margin makes those outcomes easier to compare.

# 3  Descriptive statistics

Following a classification made by Bredtmann *et al.* (2018), based on welfare systems, European countries can be grouped into five categories, namely Continental countries (Austria, Belgium, France, Germany, Luxembourg and the Netherlands), Anglo-Saxon countries (Ireland), Mediterranean countries (Cyprus, Greece, Italy, Malta, Portugal and Spain), Eastern Europe (Bulgaria, Croatia, Czechia, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia and Slovenia) and Nordic countries (Denmark, Finland and Sweden).

While in theory Labour Force Surveys are available for all European countries, in practice, our specifications (need for panel information coupled with household information) restrict us to 16 European countries over the period 2005-2020. Among the groups presented above, Nordic countries are missing from our analysis. Apart from this, our dataset is quite representative of the heterogeneity of European countries. In terms of observations, Continental countries are slightly underrepresented compared to population figures (27% in our dataset compared to 43% of the working age population). The Anglo-Saxon region, namely Ireland, as well as Eastern Europe are overrepresented. 7% of observations come from Ireland, while it accounts for only 1% of the working age population in the European Union. For Eastern Europe, 34% of our sample comes from this region against 25% in population figures. The share of Mediterranean countries corresponds to their share in the working age population at 32% (against 31% in the population data).

Based on the definitions presented in Section 2, Table 1 summarises descriptive statistics for both job loss (i.e. $P_1$ is no longer employed in $t_1$ because he/she has been dismissed) and risk of job loss (i.e. $P_1$ is looking for another job because of risk of losing his/her job in the future). On average, across countries and over the studied period, 0.52% of our sample of $P_1$ lost his/her job between $t_0$ and $t_1$ because he/she has been dismissed. This corresponds to 26 110 people. Without restricting ourselves to those who have been dismissed, the number of people losing their job between two quarters is 2.47%. We thus capture one-fifth of the people losing their job. By gender, statistics show a slightly higher rate of job loss due to dismissal for women (0.53%) than for men (0.51%). This gender difference also occurs when looking at the total number of people losing their job, regardless of the reason (2% of men and 3% of women).

Our "risk of job loss" variable takes the value one for 0.22% of our sample, or almost 10 800 individuals. This figure seems small compared to the 6% of people telling the Eurofound survey that they fear losing their job in the next six months. But our variable captures only a part of all people at risk of job loss for two reasons. First, the LFS question is restricted to workers already looking for another job and whose main reason for that is the fear of losing it. Second, for identification reasons, i.e. to exclude real job loss from the analysis, our variable only includes workers who end-up staying employed in the next quarter, so that the risk did not materialise.

Interestingly, unlike job losses, gender differences are the other way round with a higher share of men feeling at risk of losing their job.

**Table 1**
**Share of people ($P_1$) with job loss or risk of job loss**

|  | Job loss | | | Risk of job loss | | |
|---|---|---|---|---|---|---|
|  | **Total** | **Men** | **Women** | **Total** | **Men** | **Women** |
| Aggregate | 0.52% | 0.51% | 0.53% | 0.22% | 0.23% | 0.20% |
| Low-educated | 0.86% | 0.86% | 0.85% | 0.30% | 0.34% | 0.24% |
| Middle-educated | 0.51% | 0.48% | 0.56% | 0.19% | 0.19% | 0.18% |
| High-educated | 0.26% | 0.25% | 0.28% | 0.20% | 0.19% | 0.21% |
| No children | 0.51% | 0.51% | 0.51% | 0.18% | 0.18% | 0.17% |
| Children (<15 years) | 0.53% | 0.52% | 0.55% | 0.26% | 0.27% | 0.23% |
| Young children (< 6 years) | 0.58% | 0.56% | 0.61% | 0.29% | 0.31% | 0.26% |
| Partner ($P_2$) is employed | 0.45% | 0.42% | 0.48% | 0.20% | 0.20% | 0.20% |
| Partner ($P_2$) is unemployed | 0.95% | 0.88% | 1.08% | 0.55% | 0.60% | 0.47% |
| Partner ($P_2$) is inactive | 0.70% | 0.70% | 0.69% | 0.20% | 0.23% | 0.12% |

Source: LFS microdata. 16 European countries over the period 2005-2020.
Note: To distinguish between high-, medium- and low-educated individuals, we rely on the International Standard Classification of Education (ISCED). High-educated individuals are those with a tertiary degree, corresponding to ISCED levels 5 to 8; middle-educated people are those with at most an upper secondary degree corresponding to ISCED levels 3 and 4; and low-educated people are those with a degree up to lower secondary corresponding to an ISCED level between 0 and 2.

Some heterogeneity occurs in descriptive statistics depending on the level of education. Regarding actual job loss, the share is highest for people with at most a lower secondary diploma (low-educated) at 0.86%, while it is average for the middle-educated (upper secondary) at 0.51% and limited for those with a tertiary degree (high-educated) at 0.26%. As for the risk of job loss, the figure is highest for low-educated individuals at 0.3% and similar between middle- and high-educated people at 0.2%.

These calculated shares also vary with the presence of children in the household. Parents tend to face higher levels of job loss and higher risk of job loss, especially when children are less than 6 years old. The difference is more pronounced for women in terms of job loss and for men regarding the risk of job loss.

For an interpretation of the findings presented below, it is relevant to note that possible labour supply adjustments are more limited for men than for women and this both at the extensive and the intensive margin. In fact, while 19% of our sample of $P_2$ is inactive in $t_0$ (conditional on $P_1$ being employed), this share is 26% for women but only 10% for men. At the intensive margin, 69% of $P_2$ women are employed in $t_0$ and 22% have a part-time job. For men, those shares are respectively 86% and 4% of part-time workers. Put differently, a smaller group of men can adjust their labour supply since their level is already high. Moreover, for our analysed groups ($P_2$ being inactive in $t_0$ on the one hand, and $P_2$ being employed in $t_0$ on the other hand)

the share of partners $P_1$ incurring a job loss is different. When both partners are employed, the share of job loss is 0.45%. Conversely, if $P_2$ is inactive, the probability of $P_1$ losing his/her job in $t_0$ is higher at 0.7%. This difference does not appear for the risk of job loss where both groups face a risk of 0.2%.

**Figure 1 -   Change in job loss and risk of job loss over time and by gender**
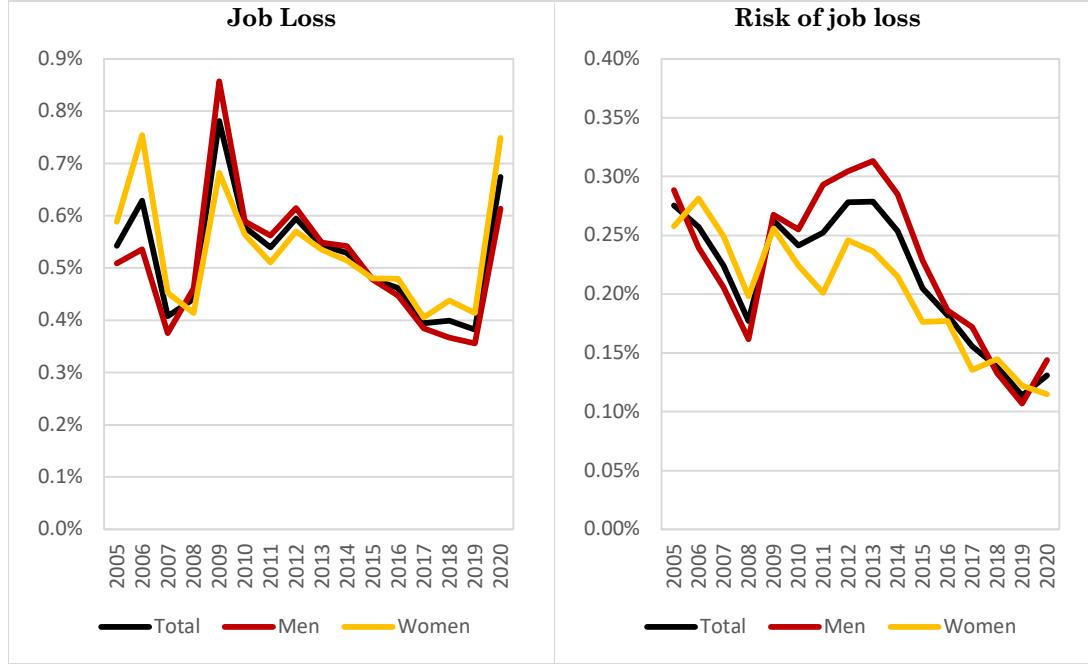


Source: LFS microdata.

Figure 1 shows how job loss and risk of job loss change over time. While not perfectly correlated, we see that both series react to crisis periods (2009, 2013, 2020). The number of people losing their job, or at risk of losing their job, is higher in crisis periods. The number of couples concerned by a potential adjustment of their labour supply is thus larger during recessions. Also note that (risk of) job loss seems to be a bit less associated with the business cycle for women.

## 4   Methodology

We obtain the labour supply adjustments of $P_2$ at the extensive margin through the following equation:

$$\Delta ELS_{P2} = \alpha + \beta_1 \, (risk \; of) \; job \; loss_{P1t1} + \beta_2 (risk \; of) job \; loss_{P1t1} \times gender_{P2}$$
$$+ \, \delta X + \gamma_{jyq} + \varepsilon \tag{1}$$

where $\alpha$ is a constant; ELS is the labour supply of $P_2$ at the extensive margin, i.e. $\Delta ELS_{P2}$ is equal to 1 if $P_2$ shift from inactivity to activity between quarters $t_0$ and $t_1$ and to 0 if $P_2$ stays inactive; job loss is defined as $P_1$ no longer being employed in $t_1$ because of dismissal; risk of job loss is defined as $P_1$ looking for another job in $t_0$ because of risk of loss of the current job but remaining employed in $t_1$; X is a vector of control variables including personal

characteristics (age and level of education of both partners), household characteristics (marital status, number of children, number of children under six years), as well as the interaction between household characteristics and gender of $P_2$, and professional characteristics (sector of activity of $P_1$, existence of a previous work experience for $P_2$ and the sector of this work experience, reason for inactivity of $P_2$ in $t_0$); $\gamma_{jyq}$ is the country-year-quarter fixed effect; $\varepsilon$ is the error term.[7]

The intensive margin is computed using the following equation:

$$\Delta ILS_{P2} = \eta + \theta_1 \ (risk \ of) \ job \ loss_{P1t1} + \theta_2 (risk \ of) job \ loss_{P1t1} \times Gender_{P2}$$
$$+ \lambda Z + \mu_{jyq} + \epsilon \tag{2}$$

where $\eta$ is a constant; ILS is the labour supply of $P_2$ at the intensive margin, i.e. $\Delta ILS_{P2}$ is equal to 1 if either $P_2$ shifted from part-time job to full-time job between quarters $t_0$ and $t_1$ or he/she declares a willingness to work more hours in $t_1$, it is equal to 0 if $P_2$ does not change his/her number of hours worked in $t_1$ compared to $t_0$ and if he/she does not declare any willingness to increase the number of hours work in both quarters; job loss, risk of job loss, and fixed effects are defined as for the extensive margin; control variables are the same except that the previous work experience and reason for inactivity of $P_2$ are replaced by the sector of activity and the reason for working part-time for $P_2$ in $t_0$.

Controls for personal, household and work-related characteristics are common in the literature. Given the multi-year, multi-country nature of our data we also include fixed effects. The country year-quarter fixed effects control for policy changes or shocks at the national level that could simultaneously affect changes in employment outcomes of $P_1$ and in labour supply of $P_2$.

# 5  Empirical findings

Estimations of equation (1) and (2) for both job loss and risk of job loss are presented in Table 2. Panel A presents the aggregate effect and Panel B the impact by gender. Our results show that in a household with $P_1$ being employed and $P_2$ being inactive, if $P_1$ loses his/her job because of dismissal, $P_2$ is 4.2 percentage points more likely to adjust his/her labour supply by becoming active than a comparable inactive partner in a household where the worker did not lose his/her job (see Table 2, Panel A, column 1). Given that in households without job loss the partner adjusts his/her labour supply at the extensive margin in 8% of the cases (baseline), the impact of job loss corresponds to a 52% increase. Regarding the risk of job loss (see Table 2, Panel A, column 2), a partner $P_2$ is 2.4 percentage points more likely to become active if his/her partner ($P_1$) fears to lose her/his job than in household where this risk is not present, which corresponds to a 30% increase compared to the baseline. Since both groups, those who really face a job loss and those who fear losing their job, are made up of distinct individuals in the population, those two effects cumulate at the macroeconomic level.

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[7] Given the presence of fixed effects and the large number of observations, we report results based on a linear probability model. However, a fixed-effects logit specification should give almost identical results. Clustering at the household level also gives almost identical standard errors.

| | Extensive margin | | Intensive margin | |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| **Panel A** | | | | |
| Job loss | 0.0415*** | | 0.0223*** | |
| | (0.0042) | | (0.0021) | |
| Risk of job loss | | 0.0235*** | | 0.0190*** |
| | | (0.0074) | | (0.0032) |
| Control variables | Yes | Yes | Yes | Yes |
| Fixed effects | Yes | Yes | Yes | Yes |
| Number of observations | 822,362 | 816,567 | 3,321,079 | 3,307,970 |
| $R^2$ | 0.131 | 0.131 | 0.068 | 0.067 |
| **Panel B** | | | | |
| Job loss | 0.0436*** | | 0.0291*** | |
| | (0.0049) | | (0.0034) | |
| Job loss*$P_2$Male | -0.0085 | | -0.0126*** | |
| | (0.0095) | | (0.0043) | |
| Risk of job loss | | 0.0236*** | | 0.0191*** |
| | | (0.0079) | | (0.0046) |
| Risk of job loss*$P_2$Male | | -0.0010 | | -0.0001 |
| | | (0.0225) | | (0.0063) |
| Control variables | Yes | Yes | Yes | Yes |
| Fixed effects | Yes | Yes | Yes | Yes |
| Number of observations | 822,362 | 816,567 | 3,321,079 | 3,307,970 |
| $R^2$ | 0.131 | 0.131 | 0.068 | 0.067 |

Note: (robust standard errors), * significant at 90 %, ** significant at 95 %, *** significant at 99 %. Control variables include the age of both partners (by 5-year categories), the level of education of both partners (7 ISCED levels), the martial status of the couple, the number of children (under 15 years), the number of children (under 6 years), the sector of activity of $P_1$ (NACE 1-digit code), for the extensive margin: the existence or not of a previous work experience for $P_2$ and the sector of activity of this experience (NACE 1-digit code), the reason for inactivity of $P_2$ in $t_0$ (lay-off, illness or disability, looking after children or incapacitated adults, other personal or family responsibilities, education or training, retirement, belief that no work is available, other reasons), for the intensive margin: the sector of activity of $P_2$ (NACE 1-digit code), for part-time workers the reason for working part-time (education, illness or disability, looking after children or incapacitated adults, other personal or family responsibilities, could not find a full-time job, other reasons). Fixed-effects include country fixed effects, year-quarter fixed effects and country-year-quarter fixed effects.

Focusing now on households where both partners, $P_1$ and $P_2$, are employed, our results show that when job loss occurs, $P_2$ is more likely to (want to) adapt the number of hours worked, at 2.2 percentage points, than in a household where $P_1$ did not lose his/her job (see Table 2, Panel A, column 3). In the absence of any job loss, shifting from part-time to full-time or

declaring a willingness to increase the number of hours worked occurs in 3.7% of the cases. This means that this probability is 61% higher when the partner loses his/her job. The effect of a risk of job loss is almost as big with a 1.9 percentage point increase or 52% raise (see Table 2, Panel A, column 4).

These effects are similar for men and women (see Table 2, Panel B). As highlighted by Triebe (2015), who also finds few differences in the added worker effect for men and women, one might expect women to adjust their labour supply more easily since they are traditionally not the main earners in the family. On the other hand, women have more household responsibilities, placing greater constraints on the ability to quickly adapt labour supply. The lack of differences is thus compatible with the evolution away from women as secondary earners. The only difference is on the intensive margin following a real job loss, where men are less likely to adapt. This could be due to the much higher propensity share of women working part-time (22% against 4% of men).

Part of the literature analysing households' labour supply links it to the business cycle. Different plausible mechanisms, going in different directions, have been highlighted. During crisis periods, borrowing might be more difficult and unemployment shocks more permanent, which should increase the added worker effect. On the other hand, partners might not enter the labour market because they are discouraged by the lack of available jobs, which has the opposite effect (Bredtmann *et al.*, 2018). Empirically, studies generally find that the added worker effect is stronger in periods of economic downturn (Parker and Skoufias, 2004; Bryan and Longhi, 2013; Bredtmann *et al.*, 2018).

Here, we also analyse whether the adjustment of labour supply of $P_2$ varies depending on the state of the economy and more precisely the state of the labour market. Moreover, we want to test whether the risk of job loss has a higher impact during recessions or during booms. However, the labour market is known to react with some delay to the evolution of GDP. Thus, to test for the abundance or limited availability of jobs, we rely on the evolution of employment according to the national accounts rather than the evolution of GDP.[8] Our "crisis" variable takes the value one if the number of people employed in a given country during a given quarter is lower than the number of people employed in the same country one year earlier. It takes a zero value if this number is stable or rising. On average, across countries, our crisis periods correspond to 2009Q1-2010Q3 (financial crisis), 2013Q1-Q2 (sovereign debt crisis) and 2020Q2-Q4 (COVID-19 crisis).

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[8] As a robustness test, we estimate the same regressions but using the evolution of GDP to define a "crisis". Results are presented in Appendix A3 and are similar to those using employment evolution as a proxy.

Table 3
**Change in labour supply after partner's (risk) of job loss depending on the business cycle**

| | Extensive margin | | | | Intensive margin | | | |
|---|---|---|---|---|---|---|---|---|
| | No crisis | Crisis | No crisis | Crisis | No crisis | Crisis | No crisis | Crisis |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| Job loss | 0.0448*** | 0.0423*** | | | 0.0326*** | 0.0251*** | | |
| | (0.0066) | (0.0074) | | | (0.0046) | (0.0051) | | |
| Job loss*$P_2$Male | -0.0192 | 0.0075 | | | -0.0179*** | -0.0058 | | |
| | (0.0120) | (0.0157) | | | (0.0056) | (0.0067) | | |
| Risk of job loss | | | 0.0121 | 0.0446*** | | | 0.0193*** | 0.0193*** |
| | | | (0.0094) | (0.0141) | | | (0.0059) | (0.0073) |
| Risk of job loss*$P_2$Male | | | 0.0057 | -0.0131 | | | 0.0036 | -0.0097 |
| | | | (0.0262) | (0.0435) | | | (0.0080) | (0.0103) |
| Control variables | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Fixed effects | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Number of observations | 539,545 | 282,817 | 536,188 | 280,379 | 2,296,569 | 1,024,510 | 2,288,667 | 1,019,303 |
| R² | 0.132 | 0.130 | 0.132 | 0.130 | 0.062 | 0.082 | 0.062 | 0.082 |

Note: (robust standard errors), * significant at 90 %, ** significant at 95 %, *** significant at 99 %. Control variables include the age of both partners (by 5-year categories), the level of education of both partners (7 ISCED levels), the martial status of the couple, the number of children (under 15 years), the number of children (under 6 years), the sector of activity of $P_1$ (NACE 1-digit code), for the extensive margin: the existence or not of a previous work experience for $P_2$ and the sector of activity of this experience (NACE 1-digit code), the reason for inactivity of $P_2$ in $t_0$ (lay-off, illness or disability, looking after children or incapacitated adults, other personal or family responsibilities, education or training, retirement, belief that no work is available, other reasons), for the intensive margin: the sector of activity of $P_2$ (NACE 1-digit code), for part-time workers the reason for working part-time (education, illness or disability, looking after children or incapacitated adults, other personal or family responsibilities, could not find a full-time job, other reasons). Fixed effects include country fixed effects, year-quarter fixed effects and country-year-quarter fixed effects. Crises are defined using the evolution of number of employed people. If employment within the country for a given quarter evolved negatively compared to the same quarter one year before, then we consider to be in crisis period. A non-crisis period is defined as a quarter in a given country for which the employment as evolved positively or remained stable compared to one year before.

We re-estimate equations (1) and (2) separately for crisis versus non-crisis periods. Results are presented in Table 3. Even if the number of households affected by a job loss is higher in crisis times (0.67% against 0.45%), in proportion, the reaction of the partner is not significantly different depending on the business cycle at the extensive margin (see Table 3, columns 1 and 2). At the intensive margin, the impact of job loss is a bit smaller in periods of crisis, but the difference is not significant[9] (see Table 3, columns 5 and 6).

In the event of a risk of job loss, the adjustment of partner $P_2$ at the extensive margin is larger during crises and the difference compared to non-crisis times is statistically significant (see Table 3, columns 3 and 4). In fact, in periods of crisis the effect of a risk of job loss is as big as that of a true job loss.[10] In periods of falling employment, if $P_1$ fears losing his/her job, partner $P_2$ enters the labour market more often than in periods of job creation. One potential explanation is that the fear is more credible in times of crisis. Another possibility is that $P_2$ expects it will take longer to find a job and therefore decides to adapt more rapidly. Whatever the reason, the fear of job loss is thus an important determinant of labour supply in periods of crisis.

Finally, gender differences do not seem to be affected by the crisis, the reaction of partner $P_2$ being similar regardless of gender.

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**The added worker effect in Belgium**

Belgium is excluded from our analysis because of data limitations. First of all, Belgium only recently, back in 2017, started to implement a panel design for its LFS study, which limits the period that can be studied and the number of observations available. For this reason, an estimate of the effect of (risk of) job loss in Belgium is too imprecise to be statistically meaningful. Secondly, some panel data are missing. Statbel (the office in charge of collecting the data in Belgium) only uses the full survey when first interviewing respondents, and a shorter follow-up survey in the next rounds. The reason for ending a job (in period $t_1$), a key variable for our identification strategy of job loss, is therefore not available.

Since we cannot identify dismissals, job loss is defined here as any transition from employment to unemployment or inactivity. By way of comparison, we also add the results for the main sample (without Belgium) using the same definition.

Changing the definition in the full sample does not have a big impact. Both at the extensive and intensive margin, the estimated effect becomes a bit smaller for women, and the difference with men remains similar (around 0 at the extensive margin and slightly negative at the intensive margin).

The findings for Belgium and the main sample (using the same definition), are also qualitatively similar, though the results for Belgium are not significant due to the limited number of observations. For women, the estimated effect is somewhat bigger in Belgium at both the extensive margin (3.7 percentage points instead of 2.9 percentage points) and the intensive margin (2.6 instead of 2.4 percentage points). For men, the effect is smaller in

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[9] Based on a regression estimating the overall effect with no distinction between men and women.

[10] The aggregate effect at the extensive margin, with no distinction between men and women, is 4.3 percentage points for both job loss and risk of job loss.

Belgium at the extensive margin, but this difference is imprecisely estimated and should be interpreted with caution.

Although we need to be careful given the data limitations, these results show that both the change in definition and the effects for Belgium give qualitatively similar results. This suggests that the patterns we observe in this study could be similar for Belgium.

**Change in labour supply in the event of a partner's job loss, defined as any transition out of employment**

|  | Extensive margin | | Intensive margin | |
|  | Full sample | Belgium | Full sample | Belgium |
|  | (1) | (2) | (3) | (4) |
| --- | --- | --- | --- | --- |
| Job loss | 0.0291*** | 0.0367 | 0.0242*** | 0.0260 |
|  | (0.0022) | (0.0250) | (0.0017) | (0.0190) |
| Job loss*$P_2$Male | 0.0038 | -0.0188 | -0.0075*** | 0.0040 |
|  | (0.0039) | (0.0403) | (0.0020) | (0.0240) |
| Control variables | Yes | Yes | Yes | Yes |
| Fixed effects | Yes | Yes | Yes | Yes |
| Number of observations | 843,998 | 5,607 | 3,372,535 | 32,404 |
| R² | 0.131 | 0.171 | 0.068 | 0.050 |

Note: (robust standard errors), * significant at 90 %, ** significant at 95 %, *** significant at 99 %. The interaction variable is a (risk of) job loss for $P_1$ interacted with $P_2$ being a man. Control variables include the age of both partners (by 5-year categories), the level of education of both partners (7 ISCED levels), the martial status of the couple, the number of children (under 15 years), the number of children (under 6 years), the sector of activity of $P_1$ (NACE 1-digit code), for the extensive margin: the existence or not of a previous work experience for $P_2$ and the sector of activity of this experience (NACE 1-digit code), the reason for inactivity of $P_2$ in $t_0$ (lay-off, illness or disability, looking after children or incapacitated adults, other personal or family responsibilities, education or training, retirement, belief that no work is available, other reasons), for the intensive margin: the sector of activity of $P_2$ (NACE 1-digit code), for part-time workers the reason for working part-time (education, illness or disability, looking after children or incapacitated adults, other personal or family responsibilities, could not find a full-time job, other reasons). Fixed-effects include country fixed effects, year-quarter fixed effects and country-year-quarter fixed effects. The full sample excludes Belgium.

In addition to the economic environment, the reaction of a partner to a (risk of) job loss for his or her spouse/cohabiting partner could also depend on the presence of children in the household. On the one hand, having children and in particular young children, could make it more difficult for a couple to adjust their labour supply because of limited childcare availability. On the other hand, the presence of children implies more responsibility and a bigger necessity to have sufficient revenue in the household. Moreover, those two effects, going in different directions, can differ depending on the gender of partner $P_2$. The economic literature has indeed shown that the presence of children in the household has different effects on the labour supply of mothers and fathers (see, among others, Blau and Kahn, 2017; Lundborg *et al.*, 2017; Kleven *et al.*, 2019; Nautet and Piton, 2021).

In order to quantify changes in labour supply depending on the presence of children or not in the household, we re-estimate equations (1) and (2) for three subgroups: a group of non-

parents, i.e. no children are recorded in the household (53% of our sample); a group of parents, i.e. there is at least one child who is at most 15 years old in the household (47% of our sample); and a group of parents of young children, i.e. there is at least one child who is at most 6 years old in the household (22% of our sample). Results are presented in Table 4.

Note that by splitting our sample into three different groups, our comparison group (those who are not impacted by a (risk of) job loss differs for each specification. Their probability of adapting their labour supply both at the extensive and at the intensive margin varies depending on the presence of children in the household. Without a (risk of) job loss of partner $P_1$, partner $P_2$ shifts from inactivity to activity in 6.2% of cases if he/she has no children, in 10.2% if he/she has children and in 10.4% of cases if he/she has young children. Adjustment in the (desired) number of hours worked occurs for 3.2% of non-parents, 4.2% in the presence of children and 4.6% in the presence of children under six. In other words, when households do not face any (risk of) job loss, parents are more likely to adapt their labour supply between two quarters than non-parents.

Our results show that the labour supply adjustment of $P_2$ at the extensive margin in case of job loss is almost three times bigger in the presence of children in the household than for couples without children and this difference between both groups is statistically significant[11] (see Table 4, columns 1 to 3). This is similar to Halla *et al.* (2020) who find the biggest adjustment effects for women with children following job loss of a partner in Austria. At the intensive margin, however, the difference is smaller and not statistically significant, so that couples with or without children react similarly when facing a job loss, increasing their number of hours supplied by 3 percentage points[12] (see Table 4, columns 7 to 9).

Of course, the two analyses, at the extensive and the intensive margins, are based on two different groups. While the first is based on couples where $P_2$ is inactive, in the second $P_2$ is already employed. This makes the necessity of adjustment because of the presence of children in the household less likely for the second group than for the first one. It could be that couples where both partners work have larger savings buffer or can live, even with children, with one revenue in the short run. On the other hand, if partner $P_2$ is inactive, the job loss implies a relatively more severe income loss and increases the need to bring in new revenue. This need is even greater with children in the household.

Regarding the risk of job loss, while regressions show a slightly larger coefficient for couples with children (see Table 4, columns 4 to 6 and 10 to 12), these differences are not statistically significant for either the extensive or the intensive margin. Given the constraints, notably concerning childcare, which could explain $P_2$'s inactivity or working-time scheme, it might be more difficult for couples with children to adapt their labour supply so that they do not react to a risk of job loss more than couples without children. Instead, they might wait for the risk to materialise.

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[11] Re-estimating equation (1), with no distinction between men and women, and taking the interaction between job loss and having children gives a coefficient of 0.0394*** and a coefficient of 0.0313*** when considering the interaction with having young children (the omitted category being "No child").

[12] The difference between no children and having young children is significant at the 90% level but remains fairly small at 1 percentage point.

## Table 4
### Change in labour supply after partner's (risk) of job loss depending on the presence of (young) children in the household

| | Extensive margin | | | | | | Intensive margin | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | No child | Children | Young children | No child | Children | Young children | No child | Children | Young children | No child | Children | Young children |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) |
| Job loss | 0.0253*** | 0.0604*** | 0.0626*** | | | | 0.0259*** | 0.0327*** | 0.0335*** | | | |
| | (0.0062) | (0.0075) | (0.0093) | | | | (0.0044) | (0.0053) | (0.0080) | | | |
| Job loss*$P_2$Male | -0.0011 | 0.0154 | 0.0095 | | | | -0.0118** | -0.0140** | -0.0077 | | | |
| | (0.0103) | (0.0252) | (0.0387) | | | | (0.0056) | (0.0066) | (0.0101) | | | |
| Risk of job loss | | | | 0.0141 | 0.0266*** | 0.0215* | | | | 0.0167** | 0.0205*** | 0.0148* |
| | | | | (0.0120) | (0.0103) | (0.0126) | | | | (0.0067) | (0.0064) | (0.0089) |
| Risk of job loss*$P_2$Male | | | | 0.0008 | 0.0253 | 0.0985 | | | | 0.0035 | -0.0024 | 0.0131 |
| | | | | (0.0242) | (0.0545) | (0.1034) | | | | (0.0092) | (0.0086) | (0.0129) |
| Control variables | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Fixed effects | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| N° of observations | 471,211 | 351,151 | 198,773 | 467,965 | 348,602 | 197,232 | 1,747,492 | 1,573,587 | 680,802 | 1,740,772 | 1,567,198 | 677,761 |
| R² | 0.137 | 0.125 | 0.116 | 0.137 | 0.125 | 0.116 | 0.071 | 0.065 | 0.063 | 0.071 | 0.065 | 0.063 |

Note: (robust standard errors), * significant at 90 %, ** significant at 95 %, *** significant at 99 %. Control variables include the age of both partners (by 5-year categories), the level of education of both partners (7 ISCED levels), the martial status of the couple, the sector of activity of $P_1$ (NACE 1-digit code), for the extensive margin: the existence or not of a previous work experience for $P_2$ and the sector of activity of this experience (NACE 1-digit code), the reason for inactivity of $P_2$ in $t_0$ (lay-off, illness or disability, looking after children or incapacitated adults, other personal or family responsibilities, education or training, retirement, belief that no work is available, other reasons), for the intensive margin: the sector of activity of $P_2$ (NACE 1-digit code), for part-time workers the reason for working part-time (education, illness or disability, looking after children or incapacitated adults, other personal or family responsibilities, could not find a full-time job, other reasons). Fixed effects include country fixed effects, year-quarter fixed effects and country-year-quarter fixed effects.

Another source of heterogeneity in the reaction to a (risk of) job loss is based on the level of education of partner $P_2$. Using a Eurostat definition, we construct three education levels. Low-educated individuals are those with at most a lower secondary diploma. They represent 23% of our sample. Middle-educated people, who account for 50% of the sample, have an upper secondary degree. Finally, high-educated individuals, accounting for the remaining 27% of the sample, have a tertiary degree. For those three groups separately, we estimate again equations (1) and (2).

Results, presented in Table 5, show two clear patterns. First, partners with a lower level of education react more, both at the extensive and intensive margins, when their partner faces a risk of job loss[13] (see Table 5, columns 4 and 10). But, secondly, when the real job loss occurs the adjustment at the extensive margin goes in the other direction and increases with the level of education (there is no significant difference at the intensive margin). High-educated female $P_2$ whose partner loses his job are 7 percentage points more likely to become active than high-educated individuals facing no job loss from their partner (see Table 5, column 3). For middle-educated $P_2$, the coefficient is 5.6 percentage point (column 2) and 3.5 for the low-educated (column 1). For men the differences are even more pronounced.

The early adjustment of low-educated partners, already in case of a fear of job loss, could be related to two potential factors: (1) the lower income of the household; and (2) the higher difficulty for them to enter the labour market. The first argument is linked to the fact that couples tend to match in terms of level of education. If partner $P_1$ is low educated, the probability of his/her partner also being low-educated is 61%. Moreover, according to EU-SILC data, over the last decade, the median income of low-educated people in the European Union was only 77% of the aggregate median income, which puts this group at a higher risk of poverty and a lower level of savings.

Second, difficulties to enter the labour market or to adapt their working time are more likely for low-educated workers. As an illustration, in our dataset, 10% of low-educated $P_2$ are inactive because they believe that no work is available for them, this share is 6% for middle-educated and only 3% for high-educated. Regarding the intensive margin, 39% of people with a low level of education work part-time because they could not find a full-time job. The corresponding share is 27% for middle-educated and 19% for high-educated people. Given those constraints, it will take more time for low-educated people to adjust their labour supply. Taking those two stylised facts together can explain our results and the need for low-educated partners to adapt at an early stage when their partner is facing a risk of job loss.

Conversely, middle- and high-educated people face a lower income risk when the partner is at risk of losing his/her job and fewer barriers to entry onto the labour market or they step up their working time so that they can afford to wait for a real job loss before adjusting their labour supply.

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[13] At the intensive margin, this pattern is clear for both men and women, with by far the biggest effect for low-educated men and women. At the extensive margin, the pattern is less clear cut, but the effect is still the largest for low-educated women and middle-educated men.

**Table 5**
**Change in labour supply after partner's (risk) of job loss depending on the level of education of $P_2$**

| | Extensive margin | | | | | | Intensive margin | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Low | Medium | High | Low | Medium | High | Low | Medium | High | Low | Medium | High |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) |
| Job loss | 0.0348*** | 0.0563*** | 0.0701*** | | | | 0.0365*** | 0.0258*** | 0.0293*** | | | |
| | (0.0061) | (0.0084) | (0.0233) | | | | (0.0079) | (0.0045) | (0.0065) | | | |
| Job loss*$P_2$Male | -0.0268* | -0.0062 | -0.0045 | | | | -0.0134 | -0.0121** | -0.0140 | | | |
| | (0.0137) | (0.0142) | (0.0402) | | | | (0.0100) | (0.0055) | (0.0088) | | | |
| Risk of job loss | | | | 0.0428*** | -0.0066 | 0.0336 | | | | 0.0439*** | 0.0122* | 0.0158** |
| | | | | (0.0110) | (0.0117) | (0.0309) | | | | (0.0126) | (0.0064) | (0.0075) |
| Risk of job loss*$P_2$Male | | | | -0.0680** | 0.0769** | -0.0587 | | | | -0.0069 | -0.0014 | 0.0014 |
| | | | | (0.0315) | (0.0335) | (0.0771) | | | | (0.0165) | (0.0085) | (0.0111) |
| Control variables | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Fixed effects | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| N° of observations | 310,559 | 401,967 | 109,836 | 307,531 | 399,573 | 109,463 | 593,418 | 1,682,703 | 1,044,958 | 590,068 | 1,675,780 | 1,042,122 |
| $R^2$ | 0.129 | 0.135 | 0.147 | 0.129 | 0.135 | 0.147 | 0.080 | 0.066 | 0.060 | 0.080 | 0.066 | 0.060 |

Note: (robust standard errors), * significant at 90 %, ** significant at 95 %, *** significant at 99 %. Control variables include the age of both partners (by 5-year categories), the level of education of partner $P_1$ (7 ISCED levels), the martial status of the couple, the number of children (under 15 years), the number of children (under 6 years), the sector of activity of $P_1$ (NACE 1-digit code), for the extensive margin: the existence or not of a previous work experience for $P_2$ and the sector of activity of this experience (NACE 1-digit code), the reason for inactivity of $P_2$ in $t_0$ (lay-off, illness or disability, looking after children or incapacitated adults, other personal or family responsibilities, education or training, retirement, belief that no work is available, other reasons), for the intensive margin: the sector of activity of $P_2$ (NACE 1-digit code), for part-time workers the reason for working part-time (education, illness or disability, looking after children or incapacitated adults, other personal or family responsibilities, could not find a full-time job, other reasons). Fixed effects include country fixed effects, year-quarter fixed effects and country-year-quarter fixed effects.

# 6 Conclusion

In this study, we highlight the importance of uncertainty in household-level labour supply decisions. The effect of a risk of job loss on the partner's labour supply is substantial, both in absolute terms and when compared to the effect of an actual job loss. Quantitatively, we measure a 30% increase in the partner's labour supply at the extensive margin (entering the labour market) and a 52% rise at the intensive margin (the number of hours (wanted to be) worked) when the other partner fears losing his or her job.

This is particularly true in periods of crisis. Since a larger share of people are then (at risk of) losing their job, more partners will necessarily adjust their labour supply. Additionally, however, the effect of fearing a job loss on labour supply is also much bigger during economic downturns. In fact, it is just as big as that following an actual job loss. Risk, or the perception of risk, is thus an important factor in understanding changes in labour supply during crises.

Studies on the added worker effect traditionally focused on the effect of a male job loss on female labour supply, considering women as secondary earners. However, we find similar effects for women and men, in line with trends evolving away from the male-breadwinner model. The only exception is that women are more likely to (want to) raise their working hours following a job loss, which could be due to the still large gender differences in part-time work.

Differences in effects for different groups also provide information on the constraints faced by households. People with children are much more likely to increase their labour supply following a job loss, possibly because the presence of children implies more responsibility and a bigger need of sufficient revenue in the household. However, these families are not more likely to increase their labour supply when only fearing a risk of job loss. This could be because families with children face greater constraints, making adjustments more costly. This suggests that family policies, such as wider childcare availability, are not only useful to increase labour market participation, but also to help households manage labour-market-related risks.

Finally, the level of education also plays a role in labour market adjustments. Low-educated individuals step up their labour supply considerably as soon as they perceive a risk of job loss, while high-educated people wait for their partner's job loss to materialise. The faster reaction by the low-educated could be because a job loss presents a much bigger financial risk (the income loss is proportionally higher and their level of savings is lower), and because it is more difficult for them to find a new job. This underscores the necessity for sufficient social protection for all workers, including low-income workers in non-standard forms of employment, and adequate active labour market policies to help people to rapidly find jobs when needed.

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# Appendix

**Table A1 - Change in labour supply after partner's job loss, with different sets of control variables**

| | Extensive margin | | | Intensive margin | | |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Job loss | 0.0418*** | 0.0436*** | 0.0436*** | 0.0335*** | 0.0312*** | 0.0291*** |
| | (0.0047) | (0.0047) | (0.0049) | (0.0035) | (0.0035) | (0.0034) |
| Job loss*$P_2$Male | 0.0113 | 0.0029 | -0.0085 | -0.0143*** | -0.0150*** | -0.0126*** |
| | (0.0101) | (0.0098) | (0.0095) | (0.0044) | (0.0044) | (0.0043) |
| **Control variables** | | | | | | |
| Personal characteristics of $P_1$ and $P_2$ and household characteristics | no | yes | yes | no | yes | yes |
| Sector of activity of $P_1$ | no | no | yes | no | no | yes |
| Previous work experience of $P_2$ and sector of activity | no | no | yes | no | no | no |
| Reason for inactivity of $P_2$ in $t_0$ | no | no | yes | no | no | no |
| Sector of activity of $P_2$ in $t_0$ | no | no | no | no | no | yes |
| Reason for working part-time for $P_2$ in $t_0$ | no | no | no | no | no | yes |
| Fixed effects | yes | yes | yes | yes | yes | yes |
| Number of observations | 952,079 | 933,425 | 822,362 | 3,342,909 | 3,321,333 | 3,321,079 |
| R² | 0.028 | 0.066 | 0.131 | 0.038 | 0.041 | 0.068 |

Note: (robust standard errors), * significant at 90 %, ** significant at 95 %, *** significant at 99 %. Control variables include the age of both partners (by 5-year categories), the level of education of both partners (7 ISCED levels), the martial status of the couple, the number of children (under 15 years), the number of children (under 6 years), the sector of activity of $P_1$ (NACE 1-digit code), for the extensive margin: the existence or not of a previous work experience for $P_2$ and the sector of activity of this experience (NACE 1-digit code), the reason for inactivity of $P_2$ in $t_0$ (lay-off, illness or disability, looking after children or incapacitated adults, other personal or family responsibilities, education or training, retirement, belief that no work is available, other reasons), for the intensive margin: the sector of activity of $P_2$ (NACE 1-digit code), for part-time workers the reason for working part-time (education, illness or disability, looking after children or incapacitated adults, other personal or family responsibilities, could not find a full-time job, other reasons).

**Table A2 - Change in labour supply if risk of losing job for the partner, with different sets of control variables**

| | Extensive margin | | | Intensive margin | | |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Risk of job loss | 0.0349*** | 0.0245*** | 0.0236*** | 0.0233*** | 0.0205*** | 0.0191*** |
| | (0.0078) | (0.0078) | (0.0079) | (0.0047) | (0.0047) | (0.0046) |
| Risk of job loss*$P_2$Male | 0.0386 | 0.0105 | -0.0010 | -0.0013 | -0.0026 | -0.0001 |
| | (0.0237) | (0.0227) | (0.0225) | (0.0065) | (0.0064) | (0.0063) |
| Control variables | | | | | | |
| Personal characteristics of $P_1$ and $P_2$ and household characteristics | no | yes | yes | no | yes | yes |
| Sector of activity of $P_1$ | no | no | yes | no | no | yes |
| Previous work experience of $P_2$ and sector of activity | no | no | yes | no | no | no |
| Reason for inactivity of $P_2$ in $t_0$ | no | no | yes | no | no | no |
| Sector of activity of $P_2$ in $t_0$ | no | no | no | no | no | yes |
| Reason for working part-time for $P_2$ in $t_0$ | no | no | no | no | no | yes |
| Country fixed effects | yes | yes | yes | yes | yes | yes |
| Year-quarter fixed effects | yes | yes | yes | yes | yes | yes |
| Country-year-quarter fixed effects | yes | yes | yes | yes | yes | yes |
| Number of observations | 945,413 | 926,861 | 816,567 | 3,329,694 | 3,308,223 | 3,307,970 |
| R² | 0.028 | 0.066 | 0.131 | 0.038 | 0.040 | 0.067 |

Note: (robust standard errors), * significant at 90 %, ** significant at 95 %, *** significant at 99 %. Control variables include the age of both partners (by 5-year categories), the level of education of both partners (7 ISCED levels), the martial status of the couple, the number of children (under 15 years), the number of children (under 6 years), the sector of activity of $P_1$ (NACE 1-digit code), for the extensive margin: the existence or not of a previous work experience for $P_2$ and the sector of activity of this experience (NACE 1-digit code), the reason for inactivity of $P_2$ in $t_0$ (lay-off, illness or disability, looking after children or incapacitated adults, other personal or family responsibilities, education or training, retirement, belief that no work is available, other reasons), for the intensive margin: the sector of activity of $P_2$ (NACE 1-digit code), for part-time workers the reason for working part-time (education, illness or disability, looking after children or incapacitated adults, other personal or family responsibilities, could not find a full-time job, other reasons).

**Table A3 - Change in labour supply after partner's (risk) of job loss depending on the business cycle (based on GDP evolution)**

| | Extensive margin | | | | Intensive margin | | | |
|---|---|---|---|---|---|---|---|---|
| | No crisis | Crisis | No crisis | Crisis | No crisis | Crisis | No crisis | Crisis |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| Job loss | 0.0423*** | 0.0466*** | | | 0.0320*** | 0.0246*** | | |
| | (0.0061) | (0.0083) | | | (0.0043) | (0.0057) | | |
| Job loss*$P_2$Male | -0.0108 | -0.0059 | | | -0.0169*** | -0.0055 | | |
| | (0.0114) | (0.0175) | | | (0.0053) | (0.0074) | | |
| Risk of job loss | | | 0.0138 | 0.0412*** | | | 0.0194*** | 0.0186** |
| | | | (0.0098) | (0.0132) | | | (0.0058) | (0.0077) |
| Risk of job loss*$P_2$Male | | | 0.0155 | -0.0416 | | | 0.0017 | -0.0056 |
| | | | (0.0262) | (0.0443) | | | (0.0078) | (0.0109) |
| Control variables | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Fixed effects | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Number of observations | 591,898 | 230,464 | 588,136 | 228,431 | 2,500,033 | 821,046 | 2,491,304 | 816,666 |
| R² | 0.126 | 0.146 | 0.126 | 0.146 | 0.063 | 0.082 | 0.063 | 0.081 |

Note: (robust standard errors), * significant at 90 %, ** significant at 95 %, *** significant at 99 %. Control variables include the age of both partners (by 5-year categories), the level of education of both partners (7 ISCED levels), the martial status of the couple, the number of children (under 15 years), the number of children (under 6 years), the sector of activity of $P_1$ (NACE 1-digit code), for the extensive margin: the existence or not of a previous work experience for $P_2$ and the sector of activity of this experience (NACE 1-digit code), the reason for inactivity of $P_2$ in $t_0$ (lay-off, illness or disability, looking after children or incapacitated adults, other personal or family responsibilities, education or training, retirement, belief that no work is available, other reasons), for the intensive margin: the sector of activity of $P_2$ (NACE 1-digit code), for part-time workers the reason for working part-time (education, illness or disability, looking after children or incapacitated adults, other personal or family responsibilities, could not find a full-time job, other reasons). Fixed effects include country fixed effects, year-quarter fixed effects and country-year-quarter fixed effects. Crises are defined changes in GDP. If GDP within the country for a given quarter evolved negatively compared to the same quarter one year before, then this is considered to be a crisis period. A non-crisis period is defined as a quarter in a given country for which the GDP as evolved positively or remained stable compared to one year before.

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