



Adjustments in women's labour force participation in response to the deterioration of the labour market situation of the male partner

rEUsilience Working Paper Series: 6

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January 2024



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This project has received funding from the European Union's Horizon Europe research and innovation programme under Grant Agreement No Project 101060410 and Innovate UK, the UK's Innovation Agency.



rEUsilience



Risks, Resources and Inequalities: Increasing Resilience in European Families

Deliverable 3.1

Title: Adjustments in women's labour force participation in response to the deterioration of the labour market situation of the male partner

Date: January 2024

Responsible organisation: University of Warsaw

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Citation: Matysiak, A., Kurowska, A. & Pavelea A.M. (2024) Adjustments in women's labour force participation in response to the deterioration of the labour market situation of the male partner. *rEUsilience Working Paper Series*, 2024:6. DOI: <https://doi.org/10.31235/osf.io/bn4re>

Acknowledgements:



This project has received funding from the European Union's Horizon Europe research and innovation programme under Grant Agreement No Project 101060410 and Innovate UK, the UK's Innovation Agency.

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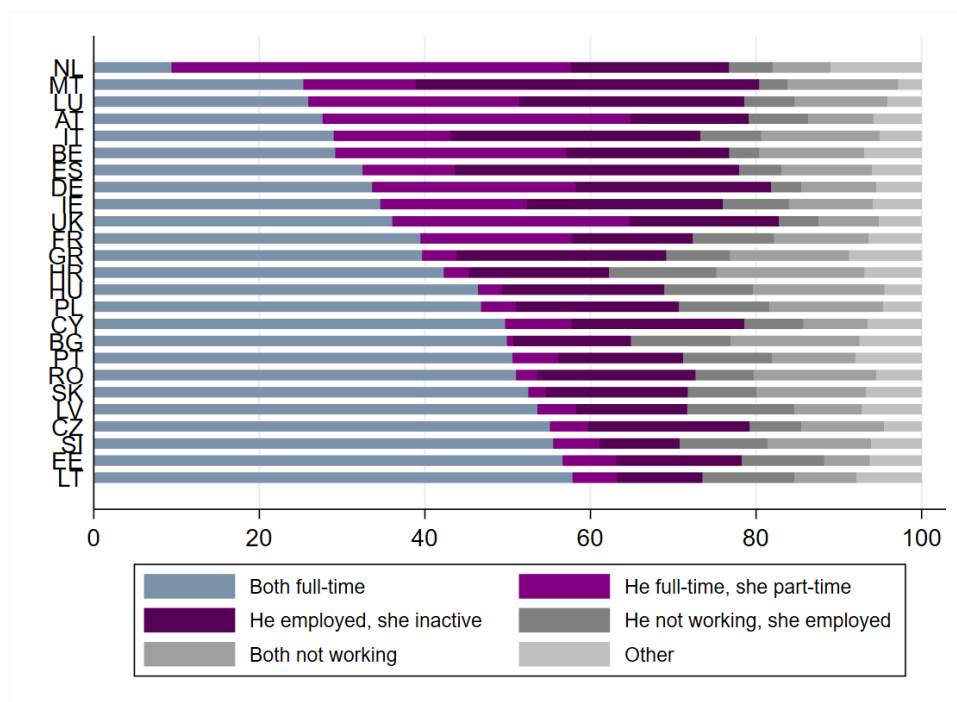
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Introduction

Despite a massive increase in women’s education and employment across all EU Member States, a substantial number of couples live according to the modernised male breadwinner model (in which the male partner is full-time employed and the female partner works part-time) or even traditional male breadwinner model (in which the male partner is full-time employed and the female partner does not work for pay). The proportion of such couples ranges from 20% in some of the Central and Eastern European countries to 50% in Austria or the Netherlands (Figure 1). Couples usually choose these arrangements when they become parents. Even though men have increased their contribution to housework and are taking an increasing proportion (albeit still small) of parental leave (Altintas and Sullivan, 2017; Karu and Tremblay, 2018), women continue to be primary caregivers of young children (Oláh et al., 2021) and reduce their economic activity after they give birth.



Source: compiled by the authors based on EU-LFS data

Figure 1. Distribution of couples (partners aged 25-64) by different employment arrangements, 2005-2019

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At the same time, employment is less stable than it once was. Growing competition in the labour markets, caused by ongoing globalisation, digitalisation, and deregulation reforms undertaken to increase the flexibility of employment relations, have resulted in greater employment instability (Blossfeld and Mills, 2010). Industrial relationships typical for the Fordist production model, based on mutual long-term commitment and employers' responsibility for employment stability, have been replaced by more flexible worker-firm relations which imply more occupational changes, more unstable and temporary job contracts and higher rates of job loss (Berntson et al., 2016; St-Denis and Hollister, 2013).

In these new circumstances, deterioration of men's employment situation - e.g., entry into involuntary nonstandard employment or unemployment - is much more likely. At the same time, this situation is particularly troublesome for families in which a woman is inactive or works part-time, i.e., couples that predominantly rely on one (men's) income. This is because it implies a loss of the major income source or a decline in income provided by the main breadwinner and larger uncertainty about its future. As a result, deterioration of men's employment situation requires developing certain adaptive strategies to cope with the new circumstances.

In this report, we show results of three studies, designed as drafts of three standalone journal articles, in which we examine the adaptive resilience of families, defined as a change in the behaviour of family members as an ex-post response to a negative shock (Keck & Sakdapolrak, 2013; Nieuwenhuis et al., 2023). We focus on one specific adaptive resilience strategy in heterosexual traditional and modernised male breadwinner families. This strategy, we believe, also has a transforming potential, as it activates new labour resources in the family and challenges traditional gender roles. Namely, we investigate whether women increase their labour supply after their male partner enters unemployment or involuntary non-standard employment (temporary or part-time employment). We also investigate whether the policy context affects women's labour supply increase. Our focus is specifically on the role of childcare policies, tax-benefit policies and employment protection legislation, which we believe may incentivise or disincentivise women's reactions.

The structure of the deliverable is presented in Figure 2. The first study investigates whether women increase their labour market supply following their male partner's transition to unemployment. We also examine whether provision of public childcare in the country supports women in increasing their labour supply and whether women react less strongly to men's unemployment in countries with more generous social benefits, as the latter provide a financial cushion in case of a job loss. Last but not least we study whether high marginal tax rates discourage women from increasing their labour supply, thereby reducing the potential for developing the adaptive resilience strategy by the couple which – in our view – may challenge traditional gender roles. The study focuses on 24 EU Member States over the period 2009–2019. It is primarily based on longitudinal EU-SILC data which is used to model women's responses to men's unemployment. The advantage of the EU-SILC data is that it allows us to follow couples for a period of up to three years, which in most cases allows sufficient time for a couple to adjust to the new circumstances after the male partner became unemployed. We also make use of cross-section EU-SILC data as well as EUROMOD (and UKMOD for the United Kingdom) to construct policy indicators. The policy indicators are linked to the EU-SILC data in a multi-level framework so that the moderating effects of specific welfare policies on women's labour supply response to their partners' unemployment can be estimated. The study shows that men's unemployment indeed increases the labour supply of their female partners. This response is relatively weak, however. According to our estimates, the probability that an inactive woman enters economic activity (employment or unemployment) following the unemployment of her male partner is around 6%. Likewise, the probability that a part-time working woman enters full-time employment in

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such circumstances is about 8%. Interestingly, we find that provision of public childcare does not affect the magnitude of woman’s response to men’s unemployment in a significant way. We suspect this may be due to the fact that unemployed men may substitute women in childcare at home when they increase their economic activity. Furthermore, we find that the generosity of social benefit systems has no effect on women’s response. We do, however, find that women living in countries with higher marginal tax rates are less likely to increase their labour supply than women living in countries with lower marginal tax rates.

What we explore in each study?

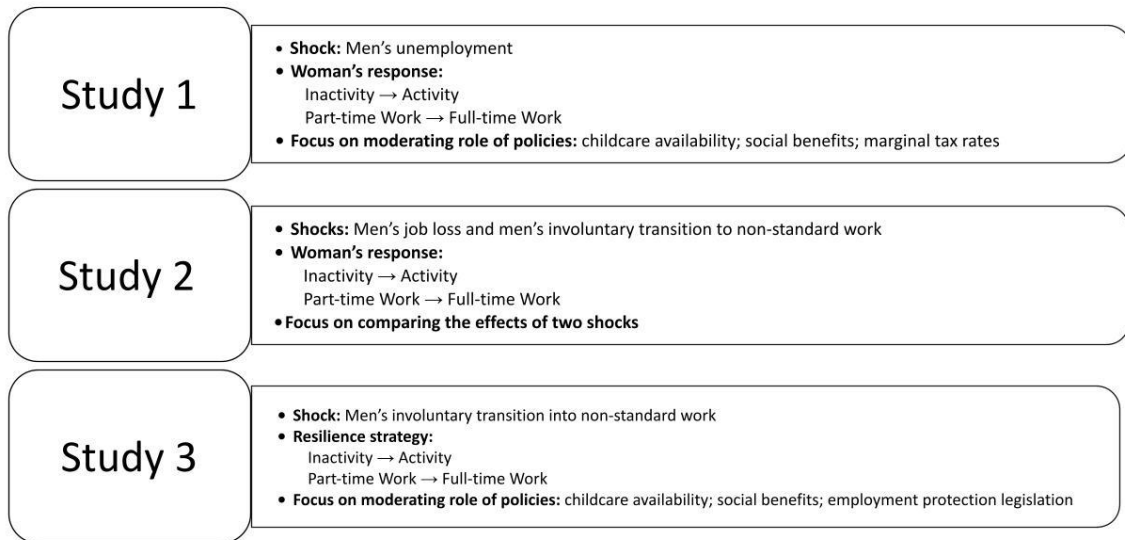


Figure 2. Overview of the three studies that are part of this deliverable.

The second study examines whether women increase their labour supply in reaction to their partner entering involuntary non-standard (part-time and temporary) employment. It compares this reaction to a woman’s response in a situation where the male partner becomes unemployed because of job loss. The aim is to establish which of the two reactions is stronger. In this study, we make use of the data from the European Labour Force Survey (EU-LFS) and cover 24 European countries from 2005-2019. The main advantage of the LFS is that it allows to follow couples in subsequent quarters of the same year and to identify involuntary transitions in the labour market, i.e. job losses and transitions into involuntary non-standard (part-time, temporary) work of the male partner. The disadvantage of the data is, however, that the time span available for observing women’s responses is relatively short (one-quarter in most cases). Our results show that households are confronted with men’s transitions into involuntary non-standard employment as frequently as they are confronted with men’s job loss. We also find that both events elicit an increase in women’s labour supply. Inactive women are as likely to enter economic activity following the job loss of their male partner as they are after his entry into involuntary nonstandard employment. Nonetheless, they are more likely to shift from economic activity to employment or from part-time into full-time employment after their male partner enters involuntary temporary employment. More specifically, his job loss results in an increase in the probability of entering employment among inactive women by about 3%, while his entry into involuntary temporary employment increases this probability by about 7%. The probability of shifting from part-time to full-time employment by a woman

increases by 3% after his job loss and by 10% after his entry into involuntary temporary employment. We also find that woman's reaction is only weakly related to the presence of children at home, except for couples with very young children (aged 0-3).

The third and final study investigates the moderating role of policies on women's response to their partner's involuntary transitions to non-standard (part-time and temporary) employment. More specifically, it focuses on the role of childcare provision, strictness of the employment protection legislation of temporary versus permanent workers (EPL Gap), and social protection of workers, proxied through the generosity of social benefits they stand to receive in case of unemployment. The study covers 15 European countries over the period 2009 – 2019. We use EU LFS data in order to model employment transitions across subsequent quarters of the same year. We link the EU-LFS microdata with policy variables obtained from the OECD data, EU-SILC and Euromod. We use the OECD data to retrieve information on childcare availability and Employment Protection Legislation (EPL). Lastly, we estimate the level of social protection using the tax-simulation tool EUROMOD and the Hypothetical Household Tool it offers. The study demonstrates that childcare availability facilitates an increase in the labour supply of mothers whose partners entered involuntary nonstandard employment, in particular of mothers of young children (aged 0-3) and after the male partner entered temporary employment. We also found that women are more likely to increase their labour supply after their male partner enters involuntary temporary employment in countries where employment of temporary workers is substantially less protected in comparison to permanent workers. Finally, the study shows that woman's response to men's entry to involuntary part-time employment is not affected by the generosity of social benefits the male partner could receive after losing the job.

All three studies were preregistered. The first study was published as a registered report in the journal *Plos One*. The registered report was reviewed by the Editors of the journal and 7 reviewers, accepted after revision and published (doi: <https://doi.org/10.1371/journal.pone.0292749>) on the 28th of November 2023. The other two studies were preregistered in Open Science Framework platform.

His unemployment, her response, and the moderating role of welfare policies in European countries (Study #1)

Theoretical background and hypotheses (#1)

Multiple theoretical frameworks have been proposed to predict women's reaction to the unemployment of their male partner. The economic concept of the 'added-worker effect' presupposes that when the male partner becomes unemployed, the female partner will either enter the labour market if she has been inactive, or will increase her working hours (Lundberg, 1985). The reasons for this increase are twofold. First, a woman may increase her economic activity in order to compensate for the drop in household income and to avoid economic hardship. Second, she may also do so if the relative value of her non-market time is reduced, assuming that her unemployed partner takes up the unpaid work previously done by her (Lundberg, 1985). A similar explanation, the 'time-availability hypothesis', was put forward in the sociological literature (Fauser, 2019). It presupposes that a partner who is less involved in paid work is more available to do housework and childcare, allowing the other partner to spend more time on economic activity. This hypothesis acknowledges the time constraints women face because of their domestic and childcare responsibilities (Pratt and Hanson, 1991), which act as a barrier to their labour-force participation (Van Ham and Mulder, 2005). In any case, be it economic or time-related, these considerations lead to our first hypothesis:

H1. Women will increase their labour market supply in response to their male partner's unemployment

This hypothesis is founded on the assumption that the male partner will take over the household and childcare responsibilities after becoming unemployed. There is evidence, however, that unemployed men do not always substitute their female partners in fulfilling their domestic and care responsibilities (Pailhé and Solaz, 2008; Legerski and Cornwall, 2010) and that they have a tendency to take over only specific and usually non-routine types of childcare/housework tasks (Fauser, 2019). Furthermore, women may even increase the time they spend on housework and/or childcare after their male partner becomes unemployed. Such a reaction, known as 'doing gender' (West and Zimmerman, 1987) or 'gender deviance neutralization' (Evertsson and Neramo, 2004), aims at reinstalling the traditional division of labour where there is a risk it can be violated (Greenstein, 2000). These two mechanisms, man's failure to substitute a woman in her domestic responsibilities and doing gender, may hinder women from increasing their labour supply after their male partner becomes unemployed. This may be particularly the case when there are young children at home, as fathers tend to be more involved in taking care of older children than infants (Kuo, et al., 2018). This leads us to the formulation of the second hypothesis:

H2. Women's labour supply response will be weaker among mothers, especially those who have small children

For mothers, whose male partners may be less likely to take over childcare responsibilities, widely available and affordable childcare services may serve as an alternative opportunity to outsource childcare and increase labour supply. This reasoning is consistent with studies that find positive effects of childcare supply on mother's labour force participation (Figari and Narazani, 2020; Fervers and Kurowska, 2022). Thus, we expect that:

H3. The labour supply response of mothers will be stronger in countries with higher availability of formal childcare

Beyond childcare policies, tax-benefit systems may also affect women's labour market response to the unemployment of their male partners. Generous social transfers (e.g. unemployment benefit, social assistance, family benefits) buffer the income loss and reduce the financial incentive for women to work (Bosch and Van der Klaauw, 2012; Giuliani and Duvander, 2017). Consequently, the more generous the financial transfers, the less likely women are to increase their labour supply in response to the unemployment of their partner. This will be the case, however, provided that the main reason women increase their labour supply following the unemployment of their partners is to compensate for lost income. The effect of the generosity of social transfers has not yet been considered in studies investigating how women respond to their partner's unemployment. Based on these considerations, we formulated the fourth hypothesis:

H4. The labour supply response of women will be weaker in countries where the tax-benefit system is more generous in replacing the income loss caused by the unemployment of the male partner

Finally, a woman's reaction may not only depend on the generosity of the social transfers but also on the eligibility rules and in particular on the amount of income which is "taxed away" (Romich et al., 2007) relative to the earnings she gains after she enters the labour market or expands her working hours. These income losses encompass social benefits which are withdrawn after a woman gets a job (e.g. her unemployment benefits) or after the household income surpasses a certain threshold (e.g. means-tested social benefits) (Leguizamon, 2012; Holt and Romich, 2007). They also cover the taxes or social security contributions which reduce the net additional income she gains from work after increasing her labour supply (Jaumotte, 2003). The proportion of financial resources taken away from the household relative to the net additional income a woman can earn after she increases her labour supply is commonly referred to as the effective marginal tax rates (MTRs) (Maag, 2003). By reducing potential household income gains, high MTRs can disincentivize women from increasing their labour market participation. In Europe, MTRs vary by country and within countries in different time periods (Jara and Tumino, 2013). They range from around 20% in Greece and Portugal and exceed 50% in Denmark and Germany (Jara and Tumino, 2013; Immervoll, 2004). Additionally, in countries such as France, Germany, Portugal and Spain, the tax system disproportionately affects women, who face higher MTRs than men in the same earning group (Immervoll, 2004). In the light of the above, the final hypothesis this study will test is:

H5. The labour supply response of women will be weaker in countries with higher marginal tax rates

Literature review and research objectives (#1)

Previous studies on the response in the labour market supply of women following their partner's becoming unemployed reached conflicting results. Some have concluded that there is no evidence of an increase in women's labour market supply (Maloney, 1990), while others have found evidence of such an increase (Hardoy and Schøne, 2014; Karaoglan and Okten, 2015; Ayhan, 2018; Cardona-Sosa et al., 2018; Martinoty, 2022; Maloney, 1990; Kohara, 2010; Mattingly and Smith, 2010; Schøne and Strøm, 2021; Keldenich and Knabe, 2022), and others provide mixed results (McGinnity, 2002; Prieto-Rodríguez and Rodríguez-Gutiérrez, 2003).

Many studies have concentrated on the role of individual and household characteristics—couples' age, education, occupation or the presence of children—as explanatory factors. In general, they find that older, better-educated women who have more work experience are more likely to increase their labour supply after their partner becomes unemployed (Karaoglan and Okten, 2015; Ayhan, 2018; Mattingly and Smith, 2010; Gong, 2011; Addabbo et al., 2013). This is likely because women with better human capital are more attractive in the labour market and thus it may be easier for them to find (additional) employment (Euwals et al., 2011). Conversely, women with highly educated male partners (i.e. partners with high income potential) are less likely to increase their labour force participation (Karaoglan and Okten, 2015; Ayhan, 2018), although this varies based on the country studied (Prieto-Rodríguez and Rodríguez-Gutiérrez, 2003). Gender norms can explain these varying results, leading to a more traditional division of labour in couples where men have higher income potentials. Lastly, although it might be expected that women with non-western migration background are less likely to increase their labour supply, no consistent evidence for such a pattern was found in previous studies (Hardoy and Schøne, 2014; Cammeraat et al., 2013).

It is less clear how household characteristics, particularly the presence of children, affect women's labour market response after the partner becomes unemployed. In general, an increase in women's labour market participation after their partner becomes unemployed is negatively associated with the number of children (Prieto-Rodríguez and Rodríguez-Gutiérrez, 2003; Maloney, 1990; Cammeraat, Jongen and Koning, 2013) and it is particularly low in households with very young children (Ayhan, 2018; Gong, 2011; Ghignoni and Verashchagina, 2016). This is likely because women with young children face time constraints that prevent them from increasing their labour market supply. However, not all studies find evidence for such a negative association (McGinnity, 2002; Schøne and Strøm, 2021) and some studies even find a slightly higher increase in the labour supply of wives in households with young children (Baldini et al., 2018).

It seems plausible that these differences stem from the variations in the national childcare policies. For instance, Ghignoni and Verashchagina (Ghignoni and Verashchagina, 2016) found that, in Italy, women's response to their partner's unemployment is stronger in regions with higher childcare coverage and in households where grandmothers are present. Conversely, in Austria, a country characterized by a scarce supply of formal childcare, mothers with very young children (under the age of 2) do not increase their labour market supply following the displacement of their husbands (Halla et al., 2020). Nevertheless, until now no study has formally investigated the role played by the cross-country variation in childcare policies.

A more limited number of studies have moved beyond investigating the effect of individual and household level characteristics, by focusing on the regional or country-level characteristics which affect women's response. They have largely concentrated on the role of economic conditions, particularly on how women's response differs before, during

and after economic crises. During economic crises, households have more difficulty accessing credit (Kamath et al., 2011). At such times, women may be more likely to increase their labour supply because borrowing money may not be possible to make up for the lost income. On the other hand, during periods of economic downturn, the unfavourable labour market conditions might discourage women from increasing their labour supply (Bingley and Walker, 2001). Empirical studies have found support for both expectations. Mattingly and Smith (Mattingly and Smith, 2010) concluded that women in the US were more likely to enter the labour market during the 2008 economic crisis, while the likelihood that they increased their working hours after their partner's unemployment remained relatively constant both before and after the crisis. Conversely, Addabbo et al. (2013) concluded that regional unemployment rates were negatively correlated with an increase in the labour market supply of women when their partner became unemployed during the economic crisis. Other comparative studies have examined whether women's response to the unemployment of the male partner varies by country (Prieto-Rodríguez and Rodríguez-Gutiérrez, 2003), welfare state (Bredtmann et al., 2018) and unemployment benefit regime (McGinnity, 2002). Prieto-Rodríguez and Rodríguez-Gutiérrez (2003) investigated women's reactions after their male partner became unemployed in 11 European countries. They found that the reaction depended on the country studied. Women in Italy, Germany, Spain, Portugal and the Netherlands slightly increased their labour market supply, while those in Belgium, Denmark, France, the UK, Greece and Ireland did not. Bredtmann et al. (2018) extended this study by comparing women's responses based on categories of the countries' welfare systems. The women's reactions were markedly different based on the broad categories of countries. In Mediterranean countries, women responded to their partner's becoming unemployed by entering the labour market and increasing their working hours, while in Continental Europe the response was limited to an increase in working hours. In Nordic and Central and Eastern Europe the women's response was limited to entering into unemployment from inactivity. Interestingly, in Anglo-Saxon countries women were less likely to become employed when their partner became unemployed, a fact the authors attributed to the disincentivizing effect of the means-tested benefits in these countries.

McGinnity (2002) studied the role of the unemployment benefit regimes, comparing the response of women whose partners had become unemployed in Britain and West Germany, which have considerably different unemployment benefit provisions. Most importantly, Britain means-tests unemployment benefits on family income; Germany does not. McGinnity found that women in Germany were more likely and in Britain less likely to enter employment when their partner lost their job. The authors attributed these differences in behaviours to the differences in unemployment benefit policies. All in all, the notion that welfare policies moderate women's response to their partner's becoming unemployed has been discussed widely in the literature, but no direct test of this hypothesis has been carried out.

Against this background, this paper seeks to expand the understanding of the direct role of specific policies on the labour market response of the female partner after the male becomes unemployed in the 24 EU member states and the UK over an eleven-year period (2009–2019). More specifically, we focus on the role of tax-benefit systems in incentivizing or disincentivizing the women's response and the role that childcare availability plays in enabling women to increase their labour supply in reaction to men's unemployment. As regards the former, we examine the generosity of social transfers and tax policies in replacing the lost income. We also look at the effective marginal tax rates, which may imply a loss of social transfers or an increase in taxes after a woman increases her labour supply. We study the extensive margin of women's response (entry to employment) as well as the intensive margin (transition from part-time to full-time employment) with the latter particularly relevant for current European societies, where women commonly work part-time (though they do so less than men).

Materials and methods (#1)

Data and sample

The study primarily draws on panel data from the European Union Statistics on Income and Living Conditions survey (EU-SILC). EU-SILC is a four-year rotational panel, where each country's sample is composed of four sub-samples followed for up to four years (exceptions are France and Norway, which use an eight-year rotational panel). Annually, one sub-sample is dropped and replaced with a new one, thus reducing the problems posed by dropouts (Borst and Wirth, 2022). EU-SILC data collection started in 2004 in the EU-15 (except Germany, the Netherlands and the United Kingdom) and in Estonia, Norway and Iceland. The remaining EU-15 countries and NMS-10 (Czechia, Cyprus, Hungary, Lithuania, Latvia, Malta, Poland, Slovenia and Slovakia) joined it in 2005, Bulgaria and Romania and Switzerland in 2007 and Croatia in 2010. The data has been collected annually since then and access to the data is provided by Eurostat upon an acceptance of an official application for the data use (European Commission, 2021).

The main advantage the EU-SILC dataset offers is that it provides data which retrospectively measure the monthly activity status of the household members in the year preceding the survey. This enables us to investigate the response in the labour supply of women after their partner becomes unemployed at a more granular level than would studies which rely on annual data. We restrict the sample to couples surveyed for at least three years, allowing us to analyse employment transitions over a period of two years. We focus on couples in which both are between 25 and 65 years of age, either married or cohabiting and in which the male partner is working in the first month of observation. Out of these couples, we create two subsamples: (a) a sample in which the female partner does not work in the first month of observation (N couple-months: 1.207.260; N couples: 36.601) and (b) a sample in which the female partner works part-time in the first month of observation (N couple-months: 588.492; N couples: 17.037). Given the need to include couples with complete monthly work histories for both partners, we do not have any observations for Finland, Netherlands and Sweden, as for these countries the monthly work histories is only available for one of the partners. As such, our sample includes couples from the other 24 European Union member states and the UK over an eleven-year period (2009–2019).

In addition to the longitudinal EU-SILC, we estimate childcare availability using the cross-sectional EU-SILC data, that include information on formal childcare use, necessary to test H3. Additionally, we use EUROMOD and UKNOD, a tax-benefit microsimulation model, and the Hypothetical Household Tool (HHoT) it provides. EUROMOD enables cross-country comparability in terms of the effects of taxes and benefits on household income for the countries in the EU. UKMODE offers the same but for the UK. Both allow us to estimate the extent to which social transfers and tax reductions replace the income lost by the male partner with his entry to unemployment, which capture the net replacement rates (NRR), in order to test H4, as well as the marginal tax rates (MRTs), which are needed to test H5. However, the HHoT allows us to estimate the NRR and MTRs from 2009 onwards. Lastly, we use Eurostat database and European Values Survey to retrieve country level control variables. Given the data restrictions we focus the analysis on 24 European Union member states and the UK, during the period 2009–2019.

Research design

Micro-level work transitions

Table 1 presents a detailed description of the variables considered. As European countries are generally characterized by a high rate of female labour market participation (Cipollone et al., 2014), we distinguish between two ways women may increase their labour market supply: entering the labour market or increasing their working hours. We consider two measures of increase in the female labour force participation. First, a transition from being out of work (inactive, unemployed) to being employed, either part-time or full-time (NW→E). Second, an increase in working hours through transitions from part-time to full-time employment (PT → FT). The change in women's labour supply is our main dependent variable and it is coded as 1 if there is an increase and 0 if there is no change. The main explanatory variable is the male partner becoming and remaining unemployed, which is equal to 1 in the months he is considered to be unemployed, and 0 otherwise. As unemployment (state of being unemployed) we consider the situation in which the male partner defines himself as unemployed over the period of three or more consecutive months. This is for two reasons. First, a shorter spell may not require the female partner to increase her labour market supply. Second, short-term unemployment may suggest that it was anticipated by the household, with the male already securing a new job before his employment ended or was terminated.

Variable	Variable description	Source
NW→E	Binary variable which takes the value of 1 when women increase their labour supply by switching from not working to employment (part-time or full-time)	EU-SILC
PT → FT	Binary variable which takes the value of 1 when women increase their labour supply by switching from part-time to full-time work	EU-SILC
Unemployment	Binary variable which takes the value of 1 when the male partner is unemployed	EU-SILC
Job loss	Binary variable which takes the value of 1 in the months when the male partner has lost his job (forced redundancy)	EU-SILC
NRRs	Proportion of household disposable income maintained after the male partner has become unemployed ^{1a}	HHoT EUROMOD and UKMOD
MTRs	Proportion of a marginal increase in woman's earnings that is taxed away when a woman makes the transition from a) not working to employment (part-time or full-time) and (b) part-time to full-time work	HHoT EUROMOD and UKMOD

¹ For the continuously employed male partners this takes the value of 100.

Childcare 0 - 3	Percentage of children aged 0 to 3 enrolled in (part-time < 30; full-time = 30 or over hours/week) formal childcare	EU-SILC
Childcare 4 - 6	Percentage of children aged 4 to 6 enrolled in (part-time < 30; full-time = 30 or over hours/week) formal childcare.	
Childcare 7 - 12	Percentage of children aged 7 to 12 enrolled in (part-time < 10; full-time = 10 or over hours/week) formal childcare.	
Household characteristics		
Union	Binary variable which takes the value of 1 when the couple is married	EU-SILC
Children	Number of children below 18 years of age.	EU-SILC
Child 0-3	Binary variable which takes the value of 1 when the couple has a child aged 0 to 3	EU-SILC
Child 4-6	Binary variable which takes the value of 1 when the couple has a child aged 4 and 6	EU-SILC
Child 7-12	Binary variable which takes the value of 1 when the couple has a child age 7 and 12	EU-SILC
Income	Equivalised disposable income (Quintiles)	EU-SILC
Individual control variables		
Age	Age in years	EU-SILC
Education	Categorical variable: 1) low education (ISCED 1-2); 2) medium education (ISCED 3-4); high education (ISCED 5-6)	EU-SILC
Occupation	Categorical variable: 1) blue-collar low (ISCO 8-9); 2) blue-collar high (ISCO 6-7); 3) white-collar low (ISCO 4-5); white-collar high (ISCO 1-3)	EU-SILC
Country control variables		
Unemployment rate	Quarterly unemployment rate (% of total population 20- 64 years)	EUROSTAT
Female employment	Quarterly female employment rate (% of total population 20- 64 years)	EUROSTAT
Women gender role attitudes	Percentage of women by birth cohort who agree with the statement: "men should take the same responsibility as women for children and home"	EVS
Men gender role attitudes	Percentage of men by birth cohort who agree with the statement: "men should take the same responsibility as women for children and home"	EVS

Table 1. List and description of variables (Study#1)

In order to better explain our research design Figure 3 depicts examples of possible employment transitions of the couples. Our focus is on couples in which the man is employed and the female partner is not working or employed part-time in the first month they are surveyed (t_1). During the time of observation the woman can either experience no change in her labour supply, can increase it or her labour supply can decline (if a woman changes from part-time into non-employment). We observe the couple until the last month they are followed in the survey (t_n) or until the man becomes inactive, a woman's labour supply declines or the union dissolves, whichever comes first.

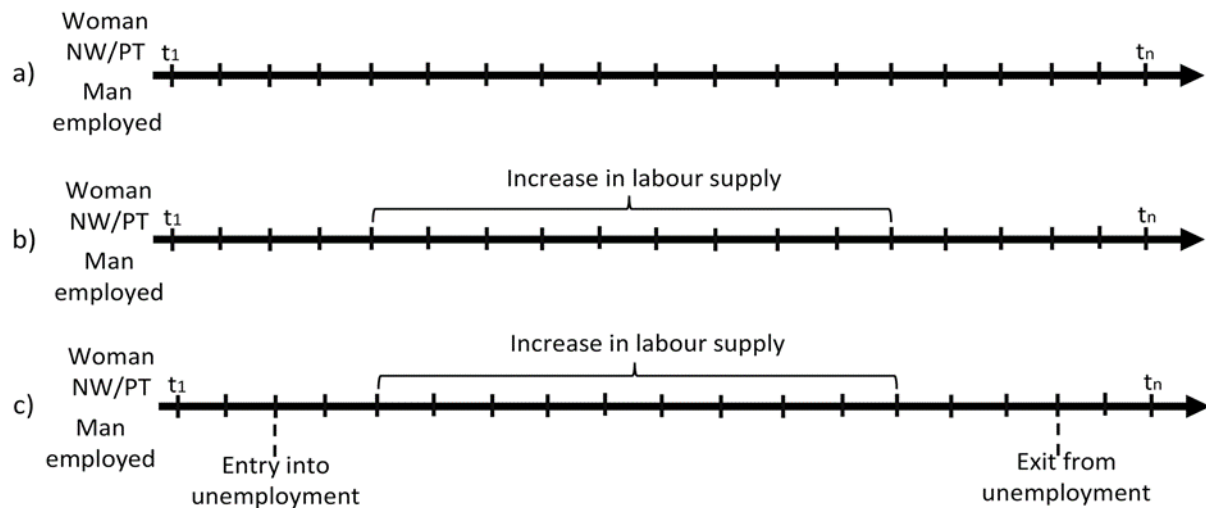


Figure 3. An example of the possible employment transitions of the couples

Country-level indicators

First, in measuring childcare availability we consider three age groups, based on the type of formal childcare they require (0 to 3 years of age, 4 to 6 years of age, and 7 to 12 years of age) and include three types of formal childcare (childcare at day-care centre, education at pre-school, and childcare at centre-based services outside school hours). Given its nature, we do not include education at compulsory school, as there is little variation in enrolment across the studied countries. By making use of the EU-SILC cross-sectional data we compute multiple alternative measures of childcare availability: the percentage of children enrolled in formal childcare out of the corresponding age population; the percentage of children enrolled part-time in formal childcare; the percentage of children enrolled full-time in formal childcare. We use childcare enrolment because it is a widely used measure of availability (Wood and Neels, 2018; Wood, Neels and Vergauwen, 2016).

Next, using the Hypothetical Household Tool (HHoT) in EUROMOD and the UKMOD, we measure the extent to which social transfers and tax reductions replace the income lost by the male partner upon becoming unemployed (NRRs) and the proportion of the household income that is taxed away when the woman enters employment relative to the net additional income a woman earns after she increases her labour supply (MTRs). We employ the HHoT as the EU-SILC longitudinal data we are using is not compatible with EUROMOD and UKMOD. Although EUROMOD/UKMOD can be used with EU-SILC microdata, it relies on the cross-sectional EU-

SILC data, which cannot be linked with the longitudinal EU-SILC data, according to the Eurostat’s principles of micro data use.

As mentioned, EUROMOD and UKMOD are tax-benefit simulation tools which store information on the tax and benefit policies of EU countries and UK—respectively—in specific time periods. As such, it can be used to estimate the consequences tax and benefit policies have on net household incomes. For such an estimation to be possible, detailed data on household composition, earnings of household members and their demographic characteristics are required. We use the HHoT to generate hypothetical household data which will later be inputted into EUROMOD and UKMOD in order to estimate household income after taxes and transfers. Generating multiple types of identical households, which only differ in the employment situations of the partners, will allow us to estimate the NRRs and MTRs. The NRRs (for specific countries and periods) can be computed by relating the net household income of two identical hypothetical households that only differ in the employment situation of the male partner (employed vs. unemployed), as follows:

$$NRR = \frac{Y_{HH}^U}{Y_{HH}^E} * 100 \quad (1)$$

where Y_{HH}^U represents the household disposable income when the male partner is in unemployment, while Y_{HH}^E represents the household disposable income when the male partner is employed. Likewise, the MTRs are assessed as a complement of the ratio of (a) the difference in net household income of two hypothetical households which differ in the employment situation of the female partner but are identical otherwise and (b) a difference in woman’s gross earnings after she increases her labour supply:

$$MTR = (1 - \frac{Y_{HH}^1 - Y_{HH}^0}{E_i^1 - E_i^0}) * 100 \quad (2)$$

where Y_{HH} represents the household disposable income before (0) and after (1) woman’s labour supply increase, while E_i represents the gross earnings of the woman before (0) and after (1) the labour supply increase. In order to estimate the NRRs and MTRs for couples that resemble as much as possible the couples in our EU-SILC dataset, we generate a large number of hypothetical households, based on various characteristics. In generating hypothetical household data, the HHoT requires users to specify the household composition by defining the relationship between the household members (e.g. single/cohabiting, couple with children, couple without children) and the demographic characteristics of the household members. For example, the user can specify, for all household members, the age, economic status (employed, unemployed, inactive), number of hours worked and income from employment (as % of EU-SILC average). For these variables users can also specify the values between which the variables range and the range itself. We take the following variables into account when generating hypothetical data for computing the NRR and MTRs: the marital status of the couple (married or cohabiting), the employment status of the men and women and the number and age of the children. As the number of households generated grows exponentially with the number of categories assumed by each variable we aimed at reducing the number of the categories to a minimum.

Supplementary Table 1 offers an overview of the hypothetical households generated to estimate the NRRs. In this way we estimate the replacement rates after the male becomes unemployed, which differ in the employment situation of the female partner, who can be inactive or unemployed (HH1), and employed part-

time (HH2). We also consider the union type (cohabiting, married) and the number of children and their age, as household composition influences the net household income (Romich et al., 2007). We limit ourselves to generating households with up to 3 children, as most couples have a maximum of 3 children (United Nations, 2019), and we range the age of the children from 0 to 18 years in increments of 3 years. The NRRs corresponding to households with 3 children will also be assigned to households with more than 3 children.

Supplementary Table 2 offers an overview of the hypothetical households generated to estimate MRTs. Here we generate identical households that differ in the employment situation of the female partner in T0 and T1. This allows us to estimate the MTRs associated with the two employment transitions under consideration: NW→E and PT → FT. All couples in EU-SILC are assigned country-period specific MTRs irrespectively whether they increase their labour market supply or not. We assign them two sets of MTRs, one corresponding to transitions from a) not working to part-time employment and b) part-time employment to full-time employment, and in estimating our models we consider both. We generate hypothetical households where the husband is unemployed (HH1) or employed (HH2). The latter values are assigned to the EU-SILC couples where the husband is continuously employed, as their wives might also transition into employment.

When using the HHoT, a series of assumptions have to be made at the individual and household level. When generating hypothetical data to estimate NRRs we assume that the men's employment income is 33% of the country-year average in part-time employment and 67% of the country-year average in full-time employment. In a similar fashion, to estimate MTRs we set women's wage to 33% of the country-year average for part-time employment and 67% of the country-year average for full-time employment. Although the HHoT allows users to also specify expenditures the hypothetical households might have (e.g. rent), we do not use this option. This ensures that the differences in the net household income of hypothetical households that differ only in the partners' employment situation strictly reflect the role of tax and benefit policies. Lastly, EUROMOD and UKMOD assume 100% benefit take-up. It is highly likely that couples rather make use of the social transfers they are eligible to, although this assumption may lead to a small overestimation of the replacement rates and MTRs (Holt and Romich, 2007).

Control variables

Apart from the main variables of interest, we control for a large number of factors that can play a role in the labour market response of women to their partner's unemployment. At the individual level, we control for the age and education of the partners. Regarding occupation, we control for the occupation of the male partner in all models, while we also control for women's occupation when investigating women's transition from part-time to full-time employment. At the household level, we account for the type of union, income, number of children and age of the children. At the country level, we consider the quarterly unemployment rate and quarterly employment rate of females. As mentioned above, high unemployment rates might discourage women from increasing their labour supply (Cammeraat et al., 2023). Additionally, in countries with high levels of female employment there is little space for an increase in women's labour supply in response to the unemployment of male partners. In fact, previous studies found women's response at extensive margin to be weak in such countries (Kohara, 2010; Mattingly and Smith, 2010).

Lastly, we also consider the predominant gender-role attitudes in the country, as studies show that egalitarian gender-role attitudes at the country level are positively associated with female employment (Uunk, 2015). However, time

series data on gender-role attitudes comparable for countries covered by our study are not available. In order to solve this problem we follow Briselli and Gonzalez (2023) who propose to construct country-cohort gender-specific measures of gender role attitudes using data from the European Values Survey 2008 (EVS). Using EVS we compute the country-cohort and gender-specific proportion of respondents who agreed with the statement “men should take the same responsibility as women for children and home” shortly before our observation period (which starts in 2009). In this way, we capture the variation in social acceptance of men’s involvement in childcare and housework across cohorts and countries. This approach assumes variation in gender role attitudes across cohorts, but not within cohorts over time. Although multiple studies found evidence of differences in gender role attitudes across cohorts, there is less evidence that these gender role attitudes are stable within cohorts (Perales et al., 2019).

Model specification

The aim of the study is to estimate the probability of specific employment transitions by females after their partners have become unemployed and the moderating effect of policy variables. We account for the hierarchical structure of our data, with individuals observed in multiple time periods, nested within countries, leading us to employ a multilevel model. More specifically, we estimate mixed effects Linear Probability Models, with random slope at the country level and robust standard errors. The main advantages of Linear Probability Models (LPM) is that they are intuitively meaningful, as their results can be interpreted as differences in probabilities (Hellevik, 2009). Although the use of LPM has been criticized because a predicted probability may fall outside the range 0–1, simulations show that the predicted probabilities from linear and logistic regression analyses are nearly identical (Hellevik, 2009), the only difference residing in the ease of interpreting the results of the former. To test the first hypothesis we estimate the following baseline model:

$$y_{ictm} = \beta_0 + \beta_1 Unemployment_{ictm} + \delta' X_{ict} + \phi' P_{ict} + \gamma' Z_{ct} + U_c + \varepsilon_{ictm} \text{ (Equation 3)}$$

where y_{ictm} is the dummy variable on women’s labour supply increase, which is equal to 1 if the woman i in country c in year t , month m increased her labour market supply by transitioning from not working to employment ($NW \rightarrow E_{ictm}$), in the first specification, or from part-time to full-time work ($PT \rightarrow FT_{ictm}$), in the second specification. $Unemployment_{ictm}$ is the dummy variable on the male partner’s employment status, which equals 1 during the months when the male partner is unemployed. The vector of covariates X_{ict} includes the partners’ and household characteristics, which vary by year. The vector P_{ict} includes the policy variables of interest. As including all policy variables in the model can run the risk of multicollinearity, we will include the policy variables either separately or jointly depending on the VIF. Z_{ct} represents the county-level control variables, and U_c is the country-random effect. To test our other hypotheses, we include interaction terms between $Unemployment_{ictm}$ and the moderator variables of interest, which take the form:

$$y_{ictm} = \beta_0 + \beta_1 Unemployment_{ictm} * Child\ 0 - 3_{ict} + \beta_2 Unemployment_{ictm} * Child\ 4 - 6_{ict} + \beta_3 Unemployment_{ictm} * Child\ 7 - 12_{ict} + \delta' X_{ict} + \phi' P_{ict} + \gamma' Z_{ct} + U_c + \varepsilon_{ictm} \text{ (Equation 4)}$$

$$y_{ictm} = \beta_0 + \beta_1 Unemployment_{ictm} * NRRS_{ictm} + \delta' X_{ict} + \phi' P_{ict} + \gamma' Z_{ct} + U_c + \varepsilon_{ictm} \text{ (Equation 5)}$$

$$y_{ictm} = \beta_0 + \beta_1 Unemployment_{ictm} * MTRS_{ictm} + \delta' X_{ict} + \phi' P_{ict} + \gamma' Z_{ct} + U_c + \varepsilon_{ictm} \text{ (Equation 6)}$$

To test the second hypothesis we interact $Unemployment_{ictm}$ with the dummy variables $Child\ 0 - 3_{ict}$, $Child\ 4 - 6_{ict}$ and $Child\ 7 - 12_{ict}$, which take the value of 1 when the couple has a child in these age categories. We test the third hypothesis by expanding this model and include the interaction with childcare availability for each age group. Lastly, we test hypotheses 4 and 5 by interacting $Unemployment_{ictm}$ with the $NRRs_{ictm}$ and $MTRs_{ictm}$, respectively. We use a significance level of 5% as inference criteria for our hypotheses.

Robustness and sensitivity analyses

Because households may anticipate unemployment, which can affect their response (Stephens, 2002), we have also considered narrowing the analysis to involuntary job losses, as they are less likely to be foreseen. Given the lower risk that involuntary job losses (i.e. when the employee is made redundant by the employer) are anticipated (Halla et al., 2020), in this case we consider all unemployment spells regardless of duration. In identifying a job loss, we combine the monthly activity status variables with data from two other questions: if the respondent had changed their job since the last interview (in the previous 12 months) and the reason for that change that they were “obliged to stop by the employer”. Thus, when the respondent experienced an unemployment spell over the previous 12 months and reported having changed his job because he was “obliged to stop working by the employer”, we assume that the unemployment spell was as a result of a job loss. Here we would stress, however, that focusing on job loss may result in the problems that accompany small sample sizes. Not having been able to work with the dataset prior to undertaking the study, we cannot be sure if we will achieve this aim, and thus we treat this as a supplementary analysis.

Additionally, research shows that an increase in the labour supply of women is most likely to occur when the male partner has been unemployed between three and six months, but not significant when the duration of the man’s unemployment is longer (Cardona-Sosa et al., 2018). Arguably, this might be because long unemployment spells cause households to adapt to the loss of income in other ways, such as by reducing their consumption (Van der Lippe et al., 2018). As such, we will test the sensitivity of the results by considering only unemployment spells that last between three and six months, and unemployment spells that last for more than six months—separately.

We test the sensitivity of our results by considering different specifications for the policy variables of interest. More specifically, we estimate the NRRs and MTRs by using different assumptions concerning the partners’ wage. In this sense, we set the wage of part-time and full-time employment to: a) 25% and respectively 50% of EU-SILC average wage and b) 50% and respectively 100% of EU-SILC average wage.

Results (#1)

Descriptive statistics

We define two samples, which differ in that female partners in *Sample A* do not work in the first month of observation, while female partners in *Sample B* work part-time. The final sample size is 1.192.721 couple-months for *Sample A* and 544.257 couple-months for *Sample B*. Supplementary Table 3 (in the Appendix) offers an overview of the country and years covered in the analysis. Supplementary Table 4 (in the Appendix) presents the descriptive statistics of the couples in our two samples. Although the couples included in both samples are relatively similar in terms of their type of union, number and age of children and the age of the partners, they differ in terms of income, education and occupation. Couples in *Sample A* are in lower income quintiles, while *Sample B* seems to slightly overrepresent high-income couples, as 83% of the couples in this sample pertain to 60% of the richest couples in the entire EU-SILC sample. These differences might reflect disparities in human capital between the two samples, as men and women in *Sample B* have, on average, higher levels of education, and male partners in *Sample B* are primarily in white-collar jobs.

Multivariate analyses

We next present the results from the regression analyses. In line with the Registered Report Protocol (doi: <https://doi.org/10.1371/journal.pone.0292749>), before conducting any analyses, we checked for eventual multicollinearity issues. We particularly anticipated the risk of multicollinearity in the case of the policy variables considered. Indeed, the Variance Inflation Factor indicates multicollinearity issues (VIF scores close to five or above) for our primary variable of interest - men's unemployment, and the policy variables. As estimating all policy variables together could affect the reliability of our results, we decided to estimate the effect of the policy variables separately.

Table 1 presents the results for our first hypothesis (H1), according to which women whose partners became unemployed are more likely to increase their labour supply than women with continuously employed partners. The results support H1. We find that non-working women are 6.41% more likely to become active if their partners become unemployed. Similarly, women employed part-time are 8.15% more likely to increase their working hours when their partner becomes unemployed.

Our second hypothesis (H2) predicted that women's labour supply response, following their partner's unemployment, would be weaker among mothers, especially mothers with small children. We first examined the differences between the labour supply responses of mothers and women without children. To this end, we interacted the unemployment variable with a dummy indicating whether a woman has children aged 18 or less. Next, we examined the differences between the labour supply response of mothers based on the age of their children, by interacting the unemployment variables with the dummy variables indicating the presence of children by age (0-3, 4-6 and 7-12). The main results are presented in Table 2.

In general, we do not find evidence for our hypothesis H2. Among non-working women, the labour market response to the unemployment of the male partner does not depend on their motherhood status. In other words, women without children are as likely to enter the economic activity as mothers in a situation where their male partner becomes unemployed. Furthermore, the labour market response of non-working mothers does not depend on the age of their children.

Among women who work part-time, women's labour market response depends on women's motherhood status but it's different from what we expected. Namely, part-time mothers are more likely to increase labour supply in response to the unemployment of their male partner than women who do not have children.

Explanatory variables	Sample A	Sample B
Men's unemployment	0.0641*** (0.0105)	0.0815*** (0.0172)
Household characteristics		
Married (<i>ref. cohabiting</i>)	-0.0358*** (0.0102)	-0.0093 (0.0042)
Number of children	-0.0129*** (0.0035)	-0.0001 (0.0027)
Child aged 0 to 3	-0.0638** (0.0184)	-0.0340* (0.0141)
Child aged 4 to 6	0.0301* (0.0120)	-0.0096 (0.0078)
Child aged 7 to 12	0.0147 (0.0076)	-0.0121** (0.0047)
Income (<i>ref. Quintile 1</i>)		
Quintile 2	0.0223*** (0.0059)	-0.0065 (0.0087)
Quintile 3	0.0561*** (0.0088)	0.0006 (0.0096)
Quintile 4	0.0823*** (0.0117)	0.0181 (0.0111)
Quintile 5	0.0891*** (0.0109)	0.0284* (0.0112)
Female characteristics		
Age	-0.0030*** (0.0005)	-0.0028*** (0.0005)
Education (<i>ref. low</i>)		
Medium	0.0369*** (0.0082)	0.0084 (0.0071)
High	0.1057*** (0.0109)	0.0293** (0.0092)
Occupation (<i>ref. Blue low skilled</i>)	-	
Blue-collar high skilled		0.0227*

		(0.0110)
White-collar low skilled		0.0218*
		(0.0107)
White-collar high skilled		0.0503***
		(0.0141)
Male characteristics		
Age	-0.0025***	-0.0007
	(0.0004)	(0.0006)
Education (<i>ref. low</i>)		
Medium	0.0062	-0.0078
	(0.0057)	(0.0081)
High	-0.0076	-0.0123*
	(0.0051)	(0.0062)
Occupation (<i>ref. Blue low skilled</i>)		
Blue-collar high skilled	-0.0061	-0.0061
	(0.0078)	(0.0076)
White-collar low skilled	0.0003	-0.0012
	(0.0067)	(0.0063)
White-collar high skilled	-0.0173**	-0.0142*
	(0.0052)	(0.0073)
Country control variables		
Unemployment rate	0.0016	0.0037
	(0.0038)	(0.0037)
Female employment	0.0084*	0.0101*
	(0.0036)	(0.0034)
Women gender role attitudes	0.0015	0.0016
	(0.0014)	(0.0015)
Men gender role attitudes	0.0010	0.0047*
	(0.0013)	(0.0022)
N couple-months	1.192.721	544.257
N couples	36.601	16.931

Note: * 0.05 ** 0.01 *** 0.001; Blue-collar low skilled (ISCO 8-9), Blue-collar high skilled (ISCO 6-7), White-collar low skilled (ISCO 4-5), White-collar high skilled (ISCO 1-3)

Table 2. Labour supply increase of women

Explanatory variables	Sample A	Sample B
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Men's unemployment	0.0564*** (0.0147)	0.0679*** (0.0123)	0.0477* (0.0224)	0.0643*** (0.0164)
Mother	0.0476*** (0.0096)		-0.0043 (0.0076)	
Unemployment*Mother	0.0136 (0.0152)		0.0587* (0.0175)	
Child aged 0 to 3		-0.0634*** (0.0186)		-0.0346*** (0.0140)
Child aged 4 to 6		0.0302* (0.0121)		-0.0099 (0.0080)
Child aged 7 to 12		0.0147 (0.0077)		-0.0125*** (0.0048)
Unemployment * Child 0 to 3		-0.0213 (0.0218)		0.0520 (0.0805)
Unemployment * Child 4 to 6		-0.0043 (0.0186)		0.0283 (0.0365)
Unemployment * Child 7 to 12		0.0008 (0.0177)		0.0243 (0.0274)
N couple-months		1.192.721		544.257
N couples		36.601		16.931

Note: * 0.05 ** 0.01 *** 0.001; the models include the control variables at individual, households and country level.

Table 3. Labour supply increase of women by presence and age of children

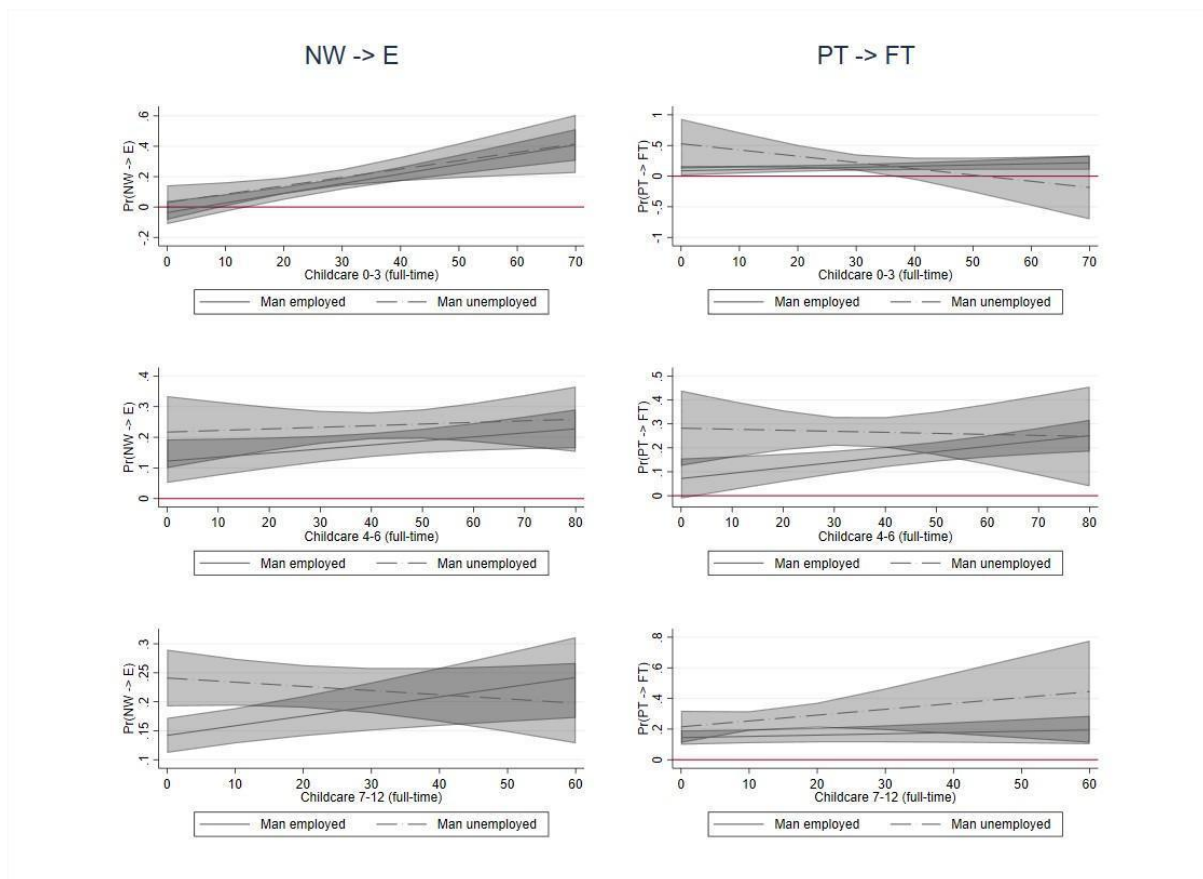
We further expected that the labour supply response of mothers to their partners' unemployment would be stronger in countries with higher availability of formal childcare (hypothesis H3). To test this hypothesis, we interacted men's unemployment with the presence of children by age group and the country-level childcare availability. We considered three alternative measures of childcare availability: a general measure of enrolment in childcare, a measure of part-time enrolment in childcare and a measure of full-time enrolment in childcare. We present the results visually in Figure 4, which includes the predicted probabilities of mothers entering economic activity (left panel) and shifting from part-time to full-time (right panel) by the level of childcare availability (X axis) in two situations: when their partner is continuously employed (solid line) and when their partner becomes unemployed (dotted line). As the results for our general measure of enrolment in childcare are clearly driven by full-time childcare, below we describe the results only for full-time childcare, while the graphs presenting predicted probabilities depending on the overall childcare and part-time childcare are displayed in the Appendix (Supplementary Figures 1 and 2).

We can see that mothers of young children (aged 0-3) whose partners become unemployed are more likely to enter economic activity in countries with better (full-time) childcare availability. A similar relationship is observed among mothers whose partners are employed. This means that while (full-time) childcare availability seems to help mothers

with very young children to enter employment in general, it does not influence the likelihood of their response to their partner becoming unemployed. In other words, childcare availability does not help not-working mothers enter employment more when their partner becomes unemployed than when he remains employed.

Hardly any relationship between (full-time) childcare availability at the country level and the probability of mothers entering economic activity is observed among mothers with children aged 4-6. Contrary to expectations, for children aged 7-12, afterschool childcare availability has a positive effect on the labour supply of mothers with continuously employed partners, but not on the labour supply of mothers with unemployed partners. This has interesting implications. As shown in the bottom part of the left panel of Figure 4, when childcare availability is scarce, women whose partner becomes unemployed are more likely to enter employment than women whose partners remain in employment. However, at higher levels of childcare, the difference between these groups of mothers disappears. We try to explain these unexpected findings in the discussion and conclusion section.

We also find little evidence for our Hypothesis H3 among part-time working mothers. For mothers with children aged 4-6 we find a similar unexpected result as for non-working mothers with older children. Namely, at lower levels of childcare availability part-time working mothers whose partners become unemployed are more likely to increase their working hours than mothers whose partners remain in employment. However, at higher levels of childcare availability we don't see differences in the labour supply of mothers with employed and unemployed partners. Full-time childcare availability for older children does not seem to be related to the probability of shifting from part-time to full-time employment, both among mothers with employed partners and mothers with unemployed partners.



Note: 95% confidence intervals; the models include the control variables at individual, households and country level

Figure 4. Labour supply increase of women by childcare availability (full-time)

We further hypothesized that the generosity of unemployment benefits, captured through NRRs, will be associated with a weaker labour supply response of women (Hypothesis H4). In estimating men's NRRs we accounted for their individual characteristics (their employment - employed, self-employed, part-time, full-time) as well as household characteristics (i.e. marital status; number and age of children; the employment status of their female partner - not working; working part-time) and assumed different wage levels, which are replaced by social benefits. In the most basic scenario, as declared in the Registered Report Protocol, we set the average wage of men at 67 % of a country's EU-SILC average wage for full-time employment and 33% for part-time employment. Using EUROMOD we simulated unemployment spells, in order to estimate the level of NRRs, which we then assigned to the unemployed men in our sample based on their households and individual characteristics. We also planned to test the sensitivity of the results by setting the average wage at both lower (25% and 50% of a country's EU-SILC average wage) and higher levels (50% and 100% of a country's EU-SILC average wage). Additionally, given the overrepresentation of high-income households in Sample B, we decided also to include NRRs for higher wage levels (75% and 150% of a country's EU-SILC average wage; 100% and 200% of a country's EU-SILC average wage).

Table 4 presents the results for the different estimations of NRRs. The NRRs vary only for woman-months for which the man's partner is unemployed, while we assign a constant value for the woman-months for which the man's partner is employed. As a result, the coefficient of NRR informs us about the extent to which a woman's reaction to her

partner's unemployment depends on the increase in NRR by 1%. For both non-working and working women we find that their labour supply response is not associated with the country's NRRs. These results are consistent across all average wage levels used to estimate the NRRs. We must thus conclude that the results do not support H4.

Explanatory variables	Sample A	Sample B
NRRs: 33%(part-time) and 67% (full-time)		
Men's unemployment	0.0790*** (0.0236)	0.1383** (0.0421)
NRRs	0.0003 (0.0004)	0.0016 (0.0010)
NRRs: 25%(part-time) and 50% (full-time)		
Unemployment	0.0742*** (0.0196)	0.1285*** (0.0302)
NRRs	0.0003 (0.0003)	0.0016 (0.0008)
NRRs: 50%(part-time) and 100% (full-time)		
Unemployment	0.0799** (0.0277)	0.1205* (0.0513)
NRRs	0.0003 (0.0004)	0.0009 (0.0010)
NRRs: 75%(part-time) and 150% (full-time)		
	0.0918** (0.0336)	0.0765 (0.0391)
	0.0004 (0.0004)	-0.0001 (0.0007)
NRRs: 100%(part-time) and 200% (full-time)		
Unemployment	0.1084** (0.0392)	0.0751 (0.0386)
NRRs	0.0006 (0.0005)	-0.0001 (0.0007)
N couple-months	1.192.721	544.257
N couples	36.601	16.931

Note: * 0.05 ** 0.01 *** 0.001; the models include the control variables at individual, households and country level.

Table 4. Labour supply increase of women by NRRs

Explanatory variables	Sample A		Sample B
	MTR: IN - 33%	MTR: IN- 67%	MTR: 33%- 67%
Men's unemployment	0.0846*** (0.0220)	0.1070*** (0.0245)	0.0155 (0.0268)

MTRs	0.0019*** (0.0003)	0.0006 0.0000	0.0006 (0.0004)
Men's unemployment*MTRs	-0.0010* (0.0004)	-0.0191** (0.0007)	0.0015** (0.0006)
	MTR: IN - 25%	MTR: IN - 50%	MTR: 25% -50%
Men's unemployment	0.0867** (0.0301)	0.0875*** (0.0157)	0.0499** (0.0155)
MTRs	0.0014*** (0.0002)	0.0025*** (0.0000)	0.0004 (0.0003)
Men's unemployment*MTRs	-0.0007 (0.0004)	-0.0012** (0.0004)	0.0006* (0.003)
	MTR: IN - 50%	MTR: IN - 100%	MTR: 50 - 100%
Men's unemployment	0.0992*** (0.0193)	0.1324*** (0.0316)	0.0496 (0.0392)
MTRs	0.0029*** (0.0005)	0.0053*** (0.0008)	-0.0003 (0.0014)
Men's unemployment*MTRs	-0.0017** (0.0005)	-0.0017** (0.0009)	0.0009 (0.0010)
	MTR: IN - 75%	MTR: IN - 150%	MTR: 75 - 150%
Men's unemployment	0.1010*** (0.0197)	0.1357*** (0.0322)	0.0529 (0.0397)
MTRs	0.0029*** (0.0005)	0.0054*** (0.0008)	-0.0001 (0.0014)
Men's unemployment*MTRs	-0.0017** (0.0006)	-0.0028** (0.0009)	0.0008 (0.0011)
	MTR: IN - 100%	MTR: IN - 200%	MTR: 100 - 200%
Men's unemployment	0.0988*** (0.0226)	0.0787 (0.0430)	0.1181 (0.0843)
MTRs	0.0043*** (0.0005)	0.0077*** (0.0009)	0.0039* (0.0017)
Men's unemployment*MTRs	-0.0016** (0.0006)	-0.0011 (0.0012)	-0.0008 (0.0021)
N couple-months		1.192.721	544.257
N couples		36.601	16.931

Note: * 0.05 ** 0.01 *** 0.001; the models include the control variables at individual, households and country level.

Table 5. Labour supply increase of women by MTRs

Lastly, we have argued that women's labour supply response may also depend on the amount of additional income that is "taxed away" when they increase their labour supply. As such, we hypothesized that women's response to their partner's unemployment would be lower in countries with higher marginal tax rates (Hypothesis 5). To test this hypothesis, we interacted men's unemployment with the MTRs we estimated for women, based on their household (i.e. marital status, number and age of children, the employment status of their male partner) and individual

characteristics (i.e. employment status - not working; working part-time). For non-working women we estimated separately the MTRs for not working women for two transitions, into part-time employment in which they earn 33% of the country's EU-SILC average wage (denoted as MTR: NW - 33%) and into full-time employment in which they earn 67% of the country's EU-SILC average wage (denoted as MTR: NW - 67%). Similarly, for women working part-time, we first estimated the MTRs assuming that they transition from a part-time job earning 33% of the country's EU-SILC average wage to a full-time job earning 67% of the country's EU-SILC average wage (denoted as MTR: 33% - 67%). To test the sensitivity of the results, we set the average wage at both lower (25% and 50% of a country's EU-SILC average wage) and higher levels (50% and 100%; 75% and 150%; 100% and 200% of a country's EU-SILC average wage).

The main results are presented in Table 5. In the case of non-working women (*Sample A*), the evidence confirms our hypothesis H5. Our results show that, regardless of the wage levels used, women's labour supply response to their partner's unemployment is weaker in countries with higher MTRs. More specifically, a one percent increase in MTRs is associated with a reduction between 1% and 2.8% in women's probability of entering employment in reaction to her male partner's unemployment, depending on the wage level considered. For women working part-time (*Sample B*), the results are mixed. For most wage level specifications, however, our results suggest that women labour supply in reaction to their partner's unemployment is not weaker with higher level of their country's MTRs.

Robustness and sensitivity checks

Previous studies show that women's labour supply response is dependent on the length of their partner's unemployment (Cardona-Sosa, Florez and Morales, 2018). In our basic model we start observing women's response after the male partner spent 3 months in unemployment. In order to test the sensitivity of our results, we restricted men's unemployment to short spells that last between three and six months, and long unemployment spells that last for more than six months (baseline models presented in Supplementary Table 5). Generally, differentiating between the length of men's unemployment does not considerably alter the results and our conclusions. Non-working women increase their labour supply following their partner's short and long-term unemployment spells. Compared to the estimated response in the basic model, the response seems to be weaker when we start following women after the partner was in unemployment for more than 3 months (but less than 6) but it becomes similar in magnitude to our basic estimate after the partner spent more than 6 months in unemployment.

A similar pattern is also observed for part-time working women, except for the fact that the estimated response following the man's unemployment of 3-6 months is not significant. We thus conclude that the duration of man's unemployment does not substantially alter our initial findings.

Lastly, as supplementary analysis, we planned to restrict the analyses to unemployment spells due to a job loss. In *Sample A* we identified 1075 couple-months in which the man experienced a job loss, while in *Sample B* there were 258 such instances. As such, the instances of job loss were too low to allow for meaningful analyses.

Conclusion and discussion (#1)

In this study, we investigated the labour supply of women following the unemployment of their partner, with a focus on the moderating role of specific welfare policies. Drawing from previous studies and theoretical arguments, we hypothesized that women will increase their labour supply in response to their partner's unemployment. We examined two potential labour supply responses of women: entering employment, if previously not working, and increasing working hours, by switching from a part-time to a full-time job. Our results show that both non-working and part-time working women respond to their partner's unemployment by increasing their labour supply. More specifically, compared to women whose partner is continuously employed, non-working women are 6.41% more likely to enter employment. In comparison, women employed part-time are 8.15% more likely to increase their working hours as a response to their partner's unemployment.

In our study we expected to find a weaker labour supply response in the case of mothers, especially those with young children. We argued that childcare responsibilities may hinder maternal response and that unemployed men might not substitute their partners in housework and childcare responsibilities (Pailhé and Solaz, 2008; Legerski and Cornwall, 2010). Our results do not support this line of reasoning. We found the labour supply response of non-working mothers to be comparable to the response of women without children. Furthermore, we found the response of part-time working mothers to be stronger than that of part-time working women without children. Additionally, our results show that mothers' labour supply response is not dependent on the age of their children. All these findings suggest that there are factors incentivising mothers to increase their labour supply as a reaction to the unemployment of their male partners. One of them might be that the *income effect* (Lundberg, 1985) may be stronger in case of families with children (as it may be more difficult for them to reduce expenditures after the main male breadwinner becomes unemployed; Van der Lippe et al., 2018). The stronger than expected reaction of mothers to unemployment of their partner, suggest that the family somehow finds a replacement for mothers as the main care providers. It is not clear if it is the unemployed fathers who substitute mothers in childcare and housework as women may rely on informal childcare (Wheelock and Jones, 2002) and take on a double workload (Craig, 2006a) in order to increase their labour supply. Nevertheless, our unexpected findings for the moderating role of childcare policies may actually suggest that unemployed fathers do play a role in replacing mothers in childcare. We found that at lower levels of childcare availability, non-working women with toddlers and whose partners become unemployed are more likely to enter employment than non-working mothers whose partners remain in employment. This may be because the former have access to informal care offered by the unemployed partners while the latter do not. At higher levels of childcare availability, the difference between these groups of mothers disappears. A similar pattern has been found for part-time working mothers with children aged 7-12: those with an unemployed partner were more likely to increase working hours than those with a partner who remains employed. More studies, using other datasets, are however required to explore the role of unemployed fathers in childcare. Such studies would be crucial to deepen the understanding of the gender role transformations in families in reaction to unemployment of the male partner in male breadwinner and one-and-a-half earner model families. These studies could shed more light on the transformative potential of the adaptive resilience strategies explored in this study.

In our study, we also explored whether welfare policies might alter the labour supply response of women by influencing the magnitude of the impact men's unemployment has on household income. In particular, we hypothesized that women's response to their partner's unemployment will be lower in countries with more generous

unemployment benefits. The results do not support this hypothesis, as we consistently find that women's labour supply response is dependent on the generosity of unemployment benefits, as measured through NRRs. In other words, when confronted with the unemployment of the main breadwinner, women respond by entering activity or increasing their working hours regardless of the unemployment benefits received. This has important policy implications. It is often argued that generous unemployment benefits can act as a disincentive to work (Howell and Azizoglu, 2011). We show that generous benefits do not disincentivize women from increasing the labour market supply after their partner becomes unemployed.

Additionally, we argued that welfare policies can discourage women from increasing their labour market supply by "taxing away" the additional income their employment brings to the household. Consequently, we hypothesized that women's response to their partner's unemployment will be lower in countries with higher MTRs. The results confirm our expectation, as we find evidence that higher MTRs disincentivize non-working women from entering employment following their partner's unemployment. More specifically, we find that a one percent increase in MTRs is associated with a reduction between 1% and 2.8% in women's probability of entering employment. However, we don't find evidence for such a disincentivizing effect for part-time working women.

This study is not without limitations. First, households might anticipate the unemployment of the male partner, which affects women's labour supply response (Stephens, 2002). Second, there might be a risk of reversed causality, whereby men whose partners have the possibility of increasing their labour market supply select themselves into unemployment. To account for this, we planned to narrow the analysis to unemployment spells that can be considered an exogenous shock, by focusing on job loss. However, the reduced number of instances of job loss did not allow us to conduct any meaningful analyses. Third, the estimated NRRs and MTRs might differ from the ones couples in our dataset are subject to, as they are highly dependent on the specific household income. In order to increase the reliability of our results we have estimated NRRs and MTRs for households that resemble the characteristics of the households in our dataset. Additionally, we have tested the sensitivity of our results by employing different wage levels in our estimations.

In spite of these limitations, the paper brings important contributions to the literature on the 'added-worker effect', as this is the first study to investigate and offer evidence on the moderating role of welfare policies on women's labour supply response following the unemployment of their partner.

The Added-Worker Effect in Case of Transitions to Involuntary Non-Standard Work and Job Loss in Europe (Study #2)

The pitfalls of non-standard employment

Non-standard employment is usually defined as any form of dependent employment which deviates from the standard work, i.e. based on a permanent full-time contract (Hipp et al 2015). It mostly comprises temporary employment, part-time employment or solo self-employment. Non-standard employment increased considerably in Europe, largely as a result of deregulatory reforms, which were undertaken in many countries in order to grant organisations more flexibility in adjusting the workforce to the rapid changes in product demand in the global economy (Barbieri and Cutuli, 2015). In this section, we review the negative consequences associated with two forms of non-standard employment, which are the focus of our study, namely temporary and part-time employment.

Temporary employment

Temporary employment is inherently less secure than permanent employment, as it implies an *a priori* termination of employment relationships. Consequently, studies show that a large proportion of temporary workers resort to this type of employment when they cannot find a permanent position (Eurofound, 2015), likely as a strategy to avoid periods of unemployment. Studies consistently find that temporary workers experience higher levels of affective job insecurity (i.e. fear of job loss) compared to their permanent counterparts (Keim et al., 2014; Morgenroth et al., 2022) and this insecurity is particularly pronounced for involuntary temporary workers (Kauhanen and Nätti, 2015). The uncertainty associated with temporary employment affects not only workers but also their partners (Inanc, 2018).

These accentuated feelings of job insecurity among temporary workers are justified given that temporary workers indeed are at a higher risk of experiencing unemployment or inactivity (Giesecke and Groß, 2003; Leschke, 2008; Eurofund, 2015). Some researchers (e.g. Matsaganis et al., 2015) even found that temporary workers have lower levels of social insurance benefits coverage when confronted with unemployment, although others found no statistically significant differences between the coverage rates of permanent and temporary contract workers (Leschke, 2008). Finally, temporary employment also has negative financial consequences for workers and their households. Temporary employees earn lower hourly wages than their permanent counterparts, even when controlling for personal and job characteristics (Giesecke and Groß, 2004; Brown and Sessions, 2005; Horemans, 2017; Westhoff, 2022) As a consequence, their households tend to face higher poverty risks (Van Lancker, 2012; Van Lancker, 2013).

Part-time employment

Part-time employment is usually defined as working less than 30 hours a week. Although part-time employment might represent a voluntary choice for those seeking to combine paid work with childcare, based on Eurostat data, in the European Union nearly a third of men with part-time are doing this involuntarily; a phenomenon which is also known as underemployment.

Part-time workers usually earn lower wages compared to full-time employees. This is not only caused by the lower number of working hours, but also because they earn lower hourly wages (Horemans, 2017). The latter seems to be particularly often observed among male workers (Nightingale, 2019). Consequently, part-time workers and their households are at higher risks of poverty than full-time workers (Horemans and Marx 2013). The risk of poverty is particularly high in the case of involuntary part-time workers, which is similar to the poverty risk of the unemployed (Horemans et al., 2016). Part-time workers are also less likely to be covered by unemployment benefits and the amount of benefits they receive is lower (Leschke, 2008). Moreover, part-time work is also associated with higher perceived job insecurity (Burgoon and Dekker, 2010) and lower well-being (Heyes and Tomlinson, 2021). The perceived levels of job insecurity are higher for involuntary part-time workers, compared to full-time employees and voluntary part-time workers, although not as high as that of temporary workers (Kauhanen and Nätti, 2015).

All in all, temporary and part-time workers are confronted with higher levels of subjective insecurity, lower wages, higher levels of employment instability and lower levels of social protection compared to their counterparts with standard employment. Consequently, when households face transition of the male breadwinner into non-standard employment, women might respond by increasing their labour market supply, in order to compensate for the income loss and the increased insecurity.

Theoretical background and hypotheses (#2)

The theoretical framework of the 'added-worker effect' predicts an increase in women's labour supply following the unemployment of their male partner. This increase stems from a need to compensate for the income loss (income effect) and from the possibility of the male partner to substitute the female partner in household production (substitution effect), given his increased time availability (Lundberg, 1985). This mechanism was evidenced in a large number of empirical studies conducted in various country contexts and periods (Kohara, 2010; Karaoglan and Okten, 2015; Hardoy and Schøne, 2014; Triebe, 2015; Ayhan, 2018).

However, a large number of studies showed that young children considerably reduce the probability of a labour supply increase among mothers (Ayhan, 2018; Ghignoni and Verashchagina, 2016; Gong, 2011). This is because men often do not perfectly substitute their female partners at home. There is evidence that men take over only nonroutine types of childcare tasks (Fauser, 2019) and are less involved in solo care (Craig, 2006b). Moreover, mothers sometimes curb fathers' involvement with children (phenomenon known as 'maternal gatekeeping'; Puhlman and Pasley, 2013). This is likely because mothers might hold the belief that they alone are the best able to take care of their children, while viewing fathers as less able to cope with the demands of childcare (McDonald et al., 2005). Consequently, compared to women with no children, mothers might be less likely to increase their labour supply after the male partner becomes unemployed.

We argue that similarly to unemployment/job loss of the main breadwinner, his transition from standard to non-standard employment may also trigger an increase in labour supply of the female partner if she is not employed or works part-time only. This is because his transition into non-standard employment is also likely to elicit a negative income effect (i.e., imply a loss in household income) (Giesecke and Groß, 2004; Brown and Sessions, 2005; Horemans, 2017; Westhoff, 2022), increase the poverty risk (Van Lancker, 2013; Van Lancker, 2012; Horemans et al., 2016) and intensify uncertainty about the future financial situation of the household (Kauhanen and Nätti, 2015). This income effect is, however, likely to be weaker than in case of a job loss which implies a total loss of income from work. Furthermore, the transition into non-standard employment by the male partner may also elicit a weaker substitution effect than his transition into unemployment as in the case of non-standard employment men might not have the time-availability to substitute women. A transition into temporary employment (without a reduction in working hours) will not increase men's time-availability, while in the case of a transition into part-time employment the increase in men's time-availability will be limited. Past research shows that men who work reduced working hours (Norman et al., 2014; Bünning, 2020) are more likely to be involved in caregiving and housework, compared to their standard employed counterparts, but still do less than not employed fathers (Reich, 2014). Thus, it is likely that the man's job loss would imply both higher income loss (i.e. possibly stronger income effect) as well as higher increase in time-availability (i.e. possibly stronger substitution effect) than in case of transition into non-standard employment. Consequently, we expect that:

H1.1: Women will increase their labour market supply following their partner's job loss and involuntary transition into non-standard work.

H1.2: Women's labour supply increase will be stronger in case of men's job loss than in case of his transition to involuntary non-standard employment.

Nevertheless, as men's time-availability, and thus the possibility for substitution women, might depend on the type of non-standard work the man transits to, we formulate the following hypothesis:

H2: Women's labour supply increase will be weaker in case of men's transition to temporary work than in case of his transition to part-time work.

Finally, we also expect a similar effect of the age of the youngest child in the family on the added worker effect in the case of men's transition to non-standard work as it has been evidenced for unemployment/job loss (Ayhan, 2018; Ghignoni and Verashchagina, 2016; Gong, 2011,). This is because maternal gatekeeping and mothers' beliefs that they alone are the best able to take care of their children are inherent to gender roles. Therefore, we formulate our final hypothesis as follows:

H3. The positive effect of men's transition to non-standard work on women's labour supply will be weaker in families with younger children compared to families with older children.

Empirical strategy and data (#2)

Data and sample

We use the EU Labour Force Survey (EU-LFS) microdata. EU-LFS is a large household survey, which was launched 1983 with the purpose of gathering comprehensive information on the employment and labour market dynamics. Between 1998 and 2005, a transition to a quarterly continuous survey took place. As such, since 2005 EU-LFS offers both yearly and quarterly data on persons aged 15 years and over who live in private households. Although the survey includes all EU countries, 4 candidate countries, and 3 European Free Trade Association (EFTA) countries, the quarterly data is not available for all countries covered by EU-LFS.

In the countries in which individuals are surveyed during two or more quarters in a given year, EU-LFS allows us to follow couples longitudinally within a year. Most importantly, EU-LFS includes questions that allow us to identify unemployment spells because of job loss and involuntary transitions into part-time and temporary employment. The fact that the EU-LFS provides us with information on involuntary transitions into unemployment, part-time and temporary employment constitutes a large advantage of this data set. Namely, the focus on involuntary transitions allows us to reduce the reversed causality bias, which could result from the situations in which the female partner plans the expansion of her labour supply and the male partners adjust his economic activity in advance to her plans (e.g. a male partner switches into part-time employment in order to allow the female partner to enter employment or increase the number of working hours).

We select couples (cohabiting or married) in which both partners are aged between 25 and 64 years of age, who are followed for at least two quarters, and have complete information on all our variables of interest. It should be noted that EU-LFS also provides information on whether the respondent is self-employed, but does not allow to identify involuntary self-employment. As self-employment is often motivated by a desire for a professional career and high income (Dawson et al., 2014), we exclude couples where the male partner is self-employed. Additionally, given that we are primarily interested in man's unemployment because of job loss and involuntary transitions into non-standard work, we stop following couples if the man enters spells of unemployment or non-standard employment that cannot be classified as job loss or involuntary transitions into non-standard employment or if the man becomes inactive. We exclude transitions into simultaneously involuntary part-time and involuntary temporary employment, as they are too few to be treated distinctly². Additionally, we also exclude involuntary non-standard work spells following a period of unemployment³. In this way we have valid observations for 24 countries, which all together cover the period 2005-2019. Based on this, we define two samples of couples in which: a) the male partner is in standard (permanent, full-time) employment in the first period of observation and the female partner is outside the labour force (909.616 couple-quarter observations); b) the male partner is in standard employment in the first period of observation and the female partner is in part-time employment (511.072 couple-quarter observations). The descriptive statistics of both samples are presented in Supplementary Table 6, while in Supplementary Table 7 offers an overview of the country and years covered in the analysis.

² 80 transitions in Sample A and 39 transitions in Sample B

³ 70 transitions in Sample A and 43 transitions in Sample B

Variables

We measure the labour supply response of women using data on self-defined economic status. Based on it we define binary variables which indicate whether the female partner increases her labour market supply by: transitioning from inactivity to activity (IN → A), which includes both unemployment and employment; transitioning from inactivity to unemployment (IN → U); transitioning from inactivity to employment (IN → E); transitioning from part-time employment to full-time employment (PT → FT). Man's employment transition between quarters $q-1$ and q is assessed with a categorical variable which assumes the following categories: (1) job loss (SE → Job Loss), (2) transition into involuntary non-standard employment (SE → NSW), (3) no transition (a man remains in standard employment) which is a reference category in all our models. In a second step we distinguish between transitions into different types of non-standard employment, namely: transition to involuntary part-time employment (SE → PT) and transitions into involuntary temporary employment (SE → Temp). The job loss of the male partner is identified on the basis of the self-defined economic status and a variable on the main reason for leaving the last job. Among various reasons for leaving the last job we select the category: 'dismissal or business closed for economic reasons'. Similarly, to identify involuntary part-time and temporary workers we combine the variables regarding the self-defined temporary and part-time employment and the reasons for being in such employment. In line with the existent approach in the literature (Green and Livanos, 2017), we classify transitions into part-time and temporary work as involuntary when the respondents state they could not find a full-time or permanent job.

Variable	Description
Dependent variables	
IN → A	Binary variable: a) the female partner transitions from out of labour force to activity (unemployment or employment) ; b) otherwise
IN → U	Binary variable: a) the female partner transitions from out of labour force to unemployment; b) otherwise
IN → E	Binary variable: a) the female partner transitions from out of labour force to employment; b) otherwise
PT → FT	Binary variable: a) the female partner transitions from part-time to full-time employment; b) otherwise
Men employment	Categorical variable: a) Standard employment in $q-1$ and q (reference); b) Standard employment in $q-1$, unemployed because of dismissal or redundancy in q (SE → Job loss); c) Standard employment in $q-1$, in involuntary non-standard employment in q (SE → NSW)
Explanatory variable	
Men employment	Categorical variable: a) Standard employment in $q-1$ and q (reference); b) Standard employment in $q-1$, unemployed because of dismissal or redundancy in q (SE → Job loss);

- c) Standard employment in $q-1$, in involuntary part-time employment in q (SE → PT)
d) Standard employment in $q-1$, in involuntary temporary employment in q (SE → Temp)

Household characteristics	
Union	Binary variable: a) the couple is married; b) the couple is cohabiting.
Children	Discrete variable equal to the number of persons below the age of 15 in the household
Child 0-3	Binary variable: a) youngest child is aged between 0 and 3; b) otherwise
Child 4-6	Binary variable: a) youngest child is aged between 4 and 6; b) otherwise
Child 7-14	Binary variable: a) youngest child is aged between 7 and 12; b) otherwise
Partners' characteristics	
	Categorical variable:
	a) 25-29 years of age;
	b) 30-34 years of age;
	c) 35-39 years of age;
Age	d) 40-44 years of age;
	e) 45-49 years of age;
	f) 50-54 years of age;
	g) 55-59 years of age;
	h) 60-64 years of age.
	The highest education level attained:
Education	a) low education (ISCED 1-2);
	b) medium education (ISCED 3-4);
	c) high education (ISCED 5-6)
	Type of occupation:
Occupation	a) blue-collar low-skilled (ISCO 8-9);
	b) blue-collar high-skilled (ISCO 6-7);
	c) white-collar low-skilled (ISCO 4-5);
	d) white-collar high-skilled (ISCO 1-3) ⁴
Previous work	Dummy variables: a) The female partner has never been in employment; b) The female partner has already been in employment.
Second job	Dummy variables: a) The male partner has only one job; b) The male partner has more than one job.

Table 6. List and description of variables (Study#2)

We control for both household and partners' characteristics. At household level we control for whether the couple is married, the number of children below the age of 15 present in the household, and dummy variables for the age of the youngest child, namely below the age 3, between the age of 4 and 6, between the age of 7 and 14. For partners' characteristics we include categorical variables for the age, education of both partners, the occupation of the male partner and whether they have a second job. When investigating women's transition from inactivity we control for

⁴ Armed forces (ISCO 10) are excluded.

whether they had a job previously, while when investigating women's transition from part-time employment we control for their occupation. A detailed description of all the variables used and their definitions is provided in Table 6.

Empirical strategy

To compare the probability of an increase in the labour supply of the women following the job loss and transition into involuntary non-standard employment of their partner, we estimate the following equation as a linear probability model:

$$y_{iqc}^m = \beta_0^m + \beta_1^m \text{Man employment}_{iqc} + \delta' X_{iqc}^m + \tau_i^m + \gamma_q^m + \varepsilon_{iqc}^m \quad (\text{Equation 7})$$

which describes women's labour supply response in household i in quarter q , in country c . We estimate multiple models, which differ with respect to the dependent variable, denoted through the subscription m . In the first model ($m=1$), y_{iqc}^m indicates the binary variable that takes the value 1 if the female partner that was out of the labour force (IN) in the quarter $q-1$ transitions into activity (A) in the quarter q , namely into unemployment or employment. In the second and third model, we model the transition of the female partner who was out of the labour force (IN) in quarter $q-1$ into unemployment U (model $m=2$) or employment E (model $m=3$) in the quarter q . In the fourth model ($m=4$), the dependent variable takes the value of 1 if the female partner is employed part-time (PT) in $q-1$ and transitions into full-time employment (FT) in q . The variable $\text{Man employment}_{iqc}$ is the categorical variable that identifies the employment in q of the male partner who is in standard (full-time permanent) employment (SE) in $q-1$. Lastly, the vector of covariates X_{ictq} includes the household and partners' characteristics, while τ_i and γ_q are couple and quarter fixed effects, respectively.

Results (#2)

Descriptive statistics

Figure 5 presents the trends in the percentage of households that experienced men's spells of job loss and involuntary non-standard employment in the two samples: households with a non-working female partner (Sample A) and households with a female partner working part-time (Sample B). The trends are similar in both samples. There is a spike in the percentage of households in which the male partner experienced job loss during the 2008 economic crisis. However, following the economic crisis the percentage of households confronted with men's job loss declines, while there seems to be a slight increase in the percentage of households confronted with men's involuntary non-standard employment. In total, the proportion of the households in which men entered non-standard employment in Sample A was 1.21% and in Sample B 1.32% while involuntary non-standard employment was experienced by men in 0.57% and 0.39% of the households. Similar frequencies were observed in case of men's unemployment and job loss. Namely, 1% of households in sample A and 0.71% of households in sample B experienced men's unemployment, while the percentage of households confronted with unemployment because of job loss is 0.56% and 0.36%, respectively. These numbers are relatively similar to the frequency of unemployment spells observed in previous studies on added-worker effect. For instance, Baldini et al. (2018) found that the percentage of Italian households in their sample confronted

with men's unemployment varied between 1% to 2% yearly. Kohara (2010) found that in Japan 1.5% of the households included in the sample experienced men's involuntary job loss. Similarly to us, Gong (2011) distinguished between general unemployment and unemployment because of a job loss and found that 2.2% of the households in the sample were confronted with men's unemployment and 0.5% with a job loss.

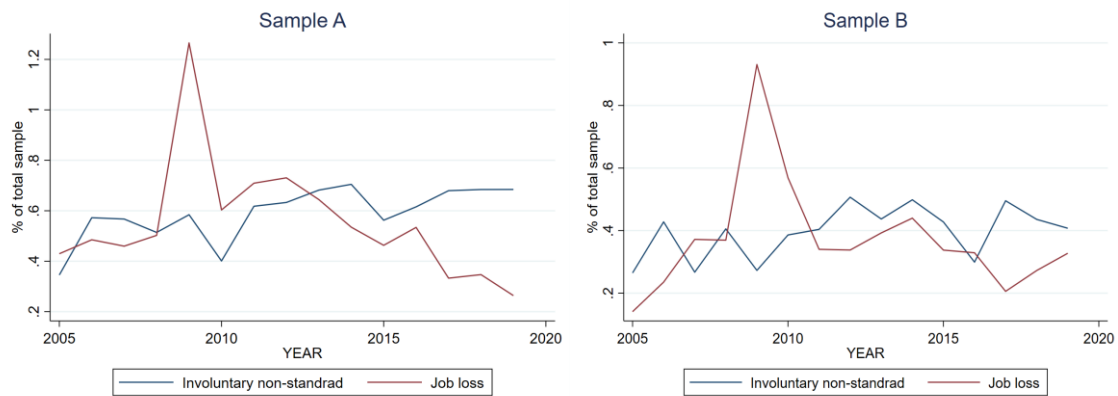


Figure 5 Percentage of households confronted with men's job loss and involuntary non-standard (part-time, temporary) employment

Regression results

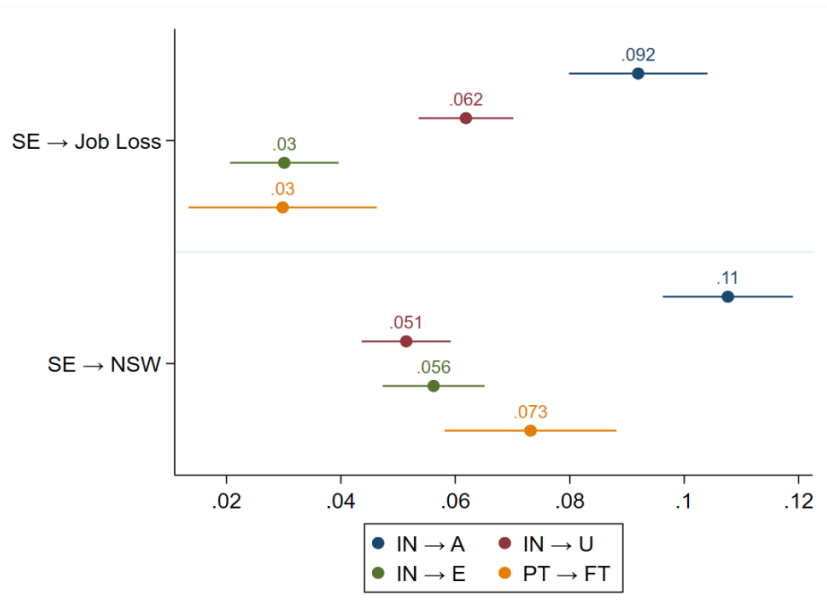
We organise the presentation of our findings in the following way. First, we present the estimates of women's labour supply response to men's job loss and general transition into involuntary non-standard employment. With these findings we address our hypotheses H1.1 and H1.2. In a second step, we compare women's labour supply response to the two types of involuntary non-standard work - part-time and temporary employment - in order to address the hypothesis H2. Lastly, we compare women's labour supply response to their partner's non-standard employment by the age of their youngest child (H3). More specifically, we divide the sample into 4 groups based on the age of the youngest child present in the household: a) below the age of 3; b) between the age of 4 and 6; c) between the age of 7 and 14; d) without children below the age of 15. In all the Tables and Figures we present findings for couples in which a woman is initially inactive (Sample A), in which case she can make a transition from inactivity to activity (IN → A), from inactivity to unemployment (IN → U) and from inactivity to employment (IN → E), and findings for couples in which a woman initially works part-time (Sample B) and can transition into full-time employment (PT → FT).

Women's response to the men's job loss and involuntary non-standard employment

We present the effects of men's job loss and involuntary non-standard employment on women's labour supply in Figure 6 together with 95% confidence intervals so that one can evaluate whether women's responses to man's job loss differ significantly from woman's responses to his transition into non-standard employment. The results show

that women are indeed more likely to increase their labour supply after their male partner enters involuntary non-standard employment than when he remains in standard employment. More specifically, out of the non-working women whose partner shifted into involuntary non-standard employment, 10.76% undertook economic activity (i.e. employment or unemployment). Half of these women entered unemployment (5.14%) and half employment (5.62%). The probability of shifting into full-time work by a part-time working woman after the male partner enters non-standard employment increases as well and this increase amounts to 7.3%.

Women also increase their labour supply after their male partner loses the job. The overall effect of men's job loss on women's entry into economic activity is similar in magnitude (9.2%) to the effect of the men's entry into nonstandard employment. However, women coupled with men who lost the job are more likely to change from economic inactivity to unemployment (6.15%) than into employment (3.01%). Among part-time working women, the probability of shifting into full-time work in response to his job loss is 2.98%. Altogether we thus find that, consistently with the Hypothesis 1.1, women increase their labour market supply in response to the deterioration of man's employment conditions (e.g. job loss and entry into nonstandard employment). By contrast to our Hypothesis 1.2, we establish, however, that women are more likely to respond by entering employment after a period of economic activity or shifting from part-time to full-time employment in case of his transition into nonemployment rather than the job loss.



Notes: Linear regression coefficients and 95% confidence intervals. Models include controls for household characteristics, as well as female and male characteristics.

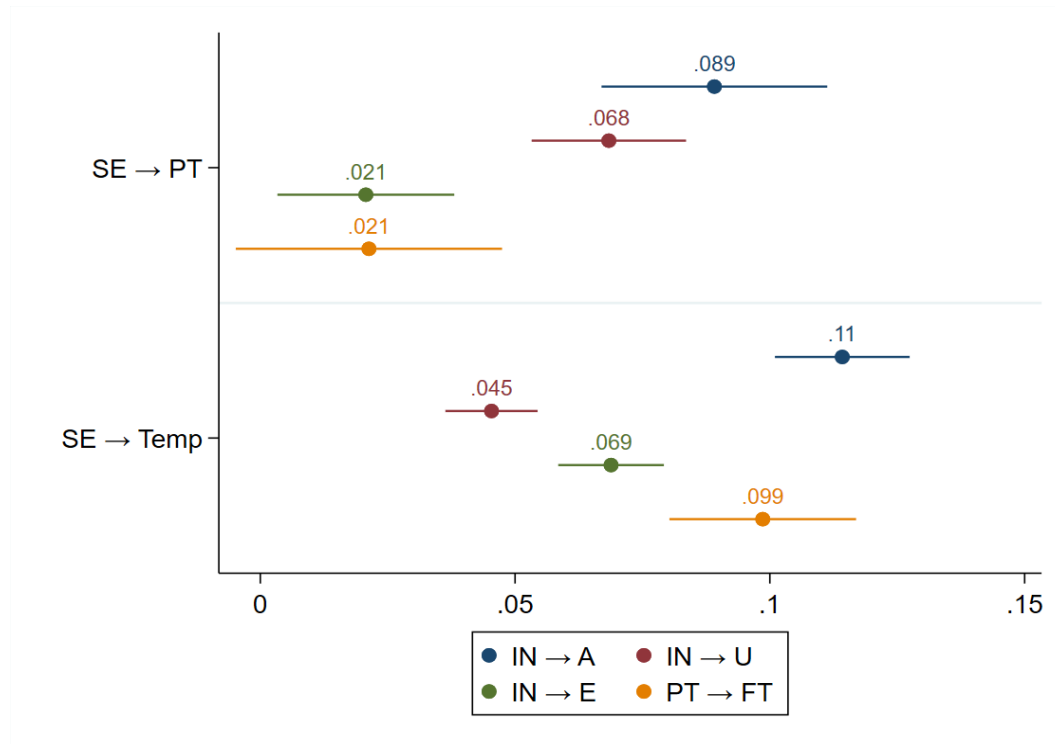
Figure 6 Predicted probabilities of women's labour supply response following men's job loss and involuntary non-standard employment

Women's response to the men's involuntary part-time and temporary employment

Figure 7 presents women's probabilities of labour supply response following their partner's transition into involuntary part-time employment (SE → PT) and involuntary temporary employment (SE → Temp). Our results show that women increase their labour supply in response to both events, but, in contrast to Hypothesis 2, they are more likely to enter employment or shift from part-time to full-time employment when their partner becomes employed temporarily

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rather than part-time. Namely, women whose partner enters temporary employment enter from inactivity into activity with a probability 11% and into employment with a probability 6.9% and the probability that they switch from part-time to a full-time job is 9.9%. For a comparison, these probabilities amount to 8.9%, 6.8% and 2.1% respectively, with the last one being insignificant.



Notes: Linear regression coefficients and 95% confidence intervals. Models include controls for household characteristics, as well as female and male characteristics.

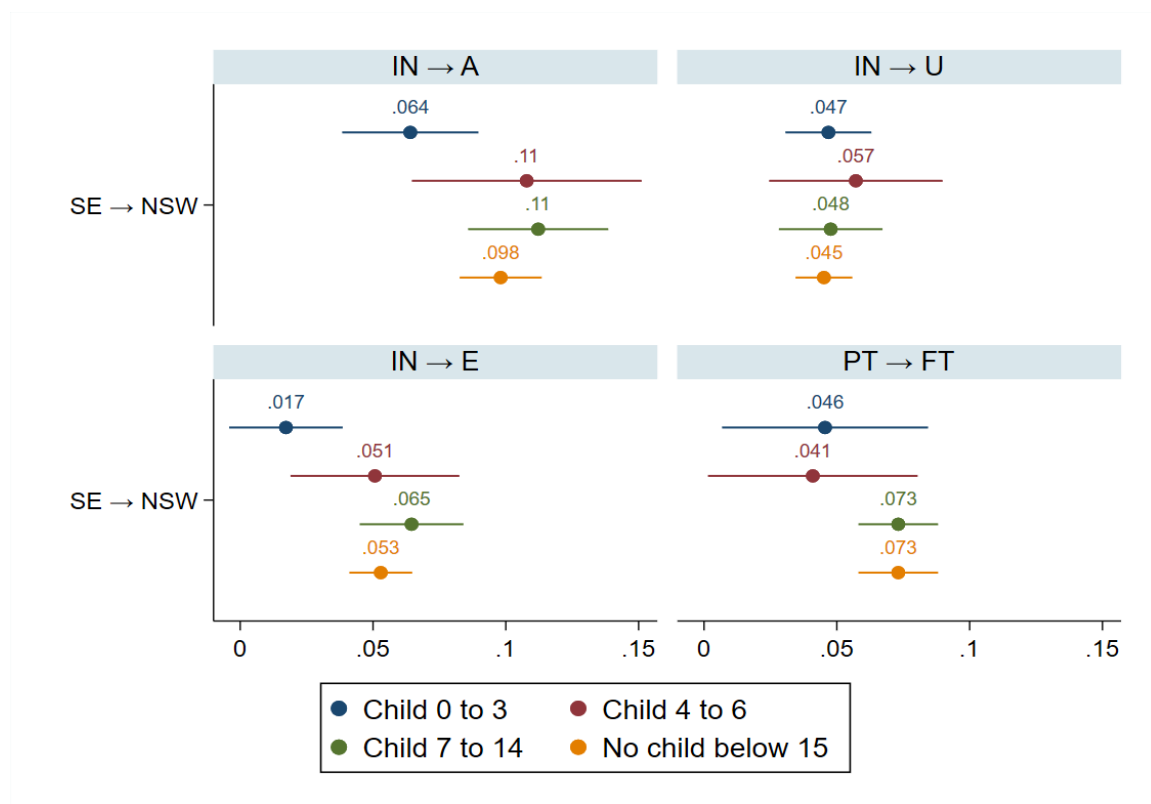
Figure 7 Predicted probabilities of women's labour supply response by type of non-standard employment

Women's response to the men's involuntary non-standard work by age of the youngest child

Finally, we investigate the variation in women's labour supply response to men's involuntary non-standard employment based on the presence and age of children in the household in order to address our Hypothesis 3. Our findings are presented in Figure 8.

We indeed find that women with young children, aged 0-3, are less likely to enter economic activity and in particular employment than mothers with older children as well as women without children aged 15 or less in the household. We do not observe, however, any significant differences in women's entry to activity and employment across mothers with older children. Furthermore, there are no differences in the probabilities of switching from inactivity to unemployment and in the probabilities of switching from part-time to full-time employment among women based on the presence and age of children in the household. We thus conclude that, in contrast to Hypothesis 3, having children and their age has little influence on woman's response to the destandardisation of her partner's employment. The

only exception are inactive women with very young children, aged 0-3, who are indeed less likely to enter employment in such a situation compared to women with older or no children.



Notes: Linear regression coefficients and 95% confidence intervals. Models include controls for household characteristics, as well as female and male characteristics.

Figure 8 Predicted probabilities of women's labour supply response to men's non-standard employment by age of the youngest child

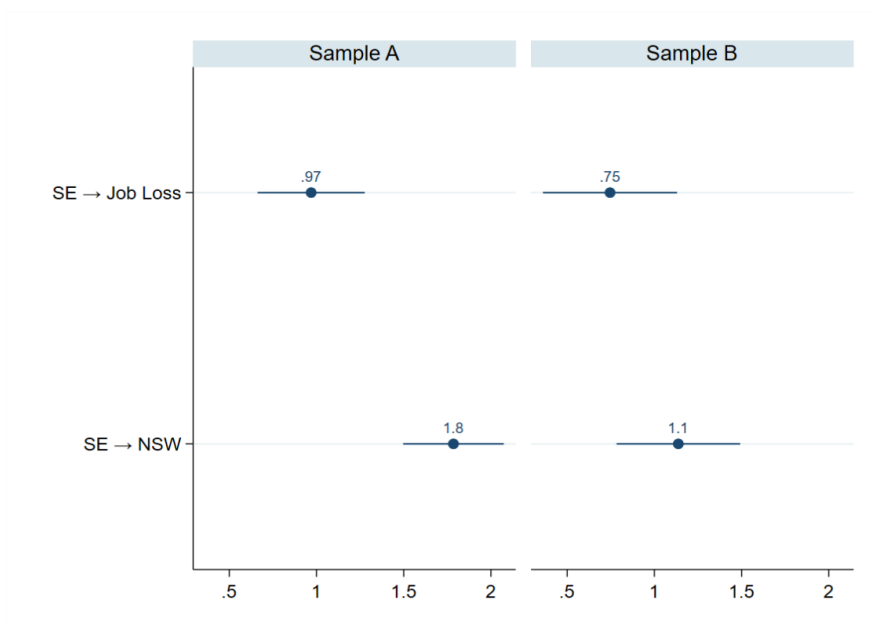
Robustness checks

To test the robustness of our results we employ an additional measure for women's labour supply response, namely we investigate their increase in working hours. To this end we make use of a question that measures the number of hours per week usually worked in the main job. As we are primarily interested in paid employment, we assign 0 hours to inactive and unemployed women. This approach allows us to quantify the effect of men's job loss and non-standard employment on women's number of hours worked. It should be noted that the information on the number of hours worked is not available for all women in our initial samples. Consequently, the number of observations in our two samples is slightly lower (Sample A: 908.971 couple-quarter observations and Sample B: 509.397 couple-quarter observations).

Figure 9 presents the effects of men's job loss and involuntary non-standard employment on women's number of hours worked. We find that women's increase in working hours is significantly higher following his transition into non-

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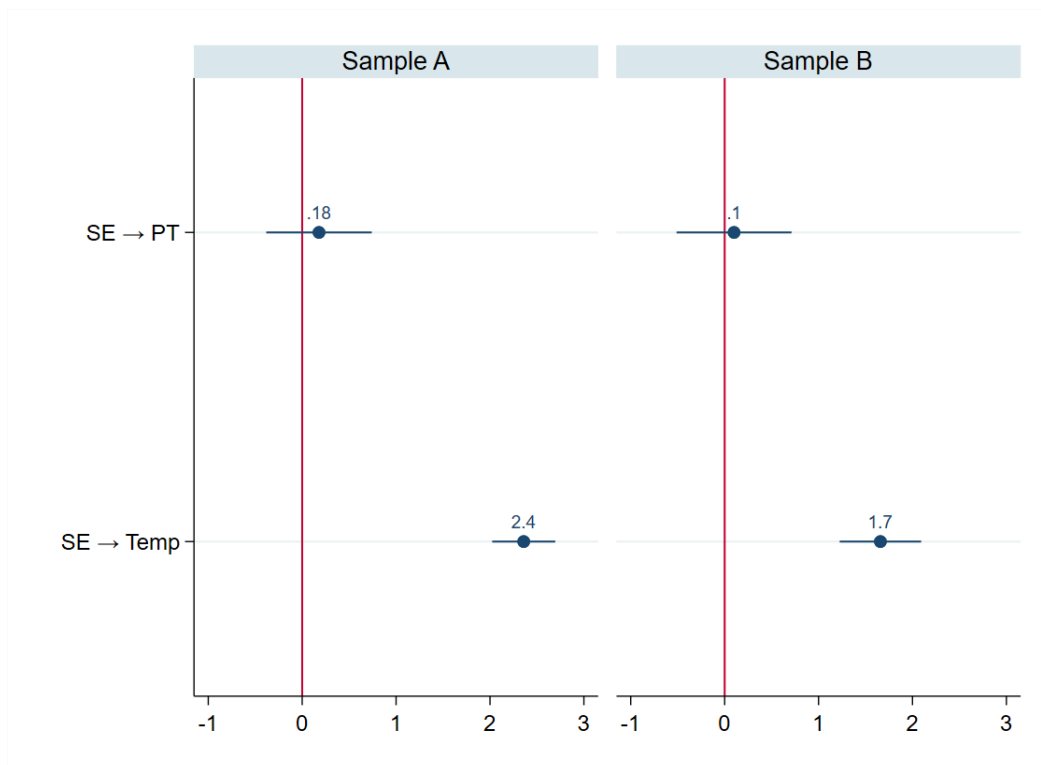
standard employment compared to his job loss. More specifically, women whose partner enters involuntary non-standard employment increase their weekly working hours by 1.8 hours. For comparison, women whose partner loses his job increase their weekly working hours on average by 1 hour. For part-time working women the effect of non-standard employment is slightly smaller (1.1) and not significantly different from the effect of his job loss. Expressed differently, men’s involuntary non-standard work is associated with an increase in women’s annual hours worked by 57-94 h, while men’s job loss with an increase by 39-50 h. In line with our main results, we conclude that compared to job loss, men’s involuntary non-standard employment has a significantly higher effect on inactive women’s weekly working hours.



Notes: Linear regression coefficients and 95% confidence intervals. Models include controls for household characteristics, as well as female and male characteristics.

Figure 9 Predicted increase in women’s weekly working hours following men’s job loss and involuntary non-standard employment

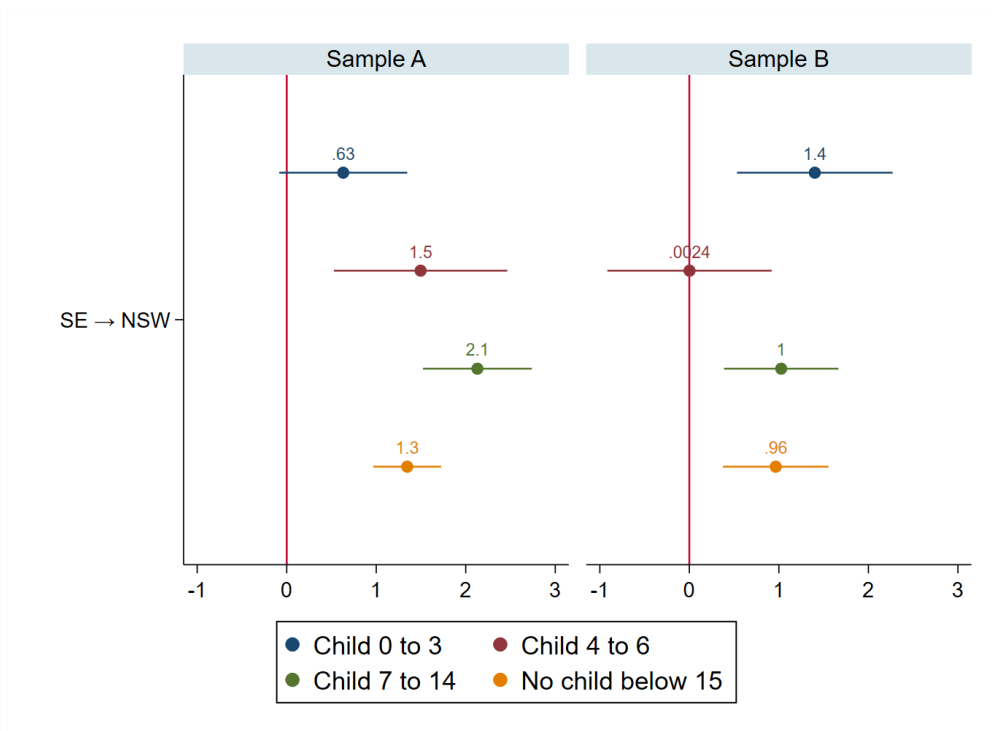
Figure 10 distinguishes between the two types of non-standard employment. Supporting our main results, these results reveal the effect of men’s involuntary non-standard employment on women’s weekly working hours is driven by men’s transition into involuntary temporary employment. We find that men’s involuntary temporary employment is associated with an increase in women's weekly working hours that ranges between 1.7-2.4 h, which translates into an increase of 88-125h in women’s annual hours worked. The effects of men’s involuntary temporary employment are similar or higher compared to the effect of job loss identified by previous studies. For instance, Cammeraat et al. (2023) found that men’s entry into unemployment is associated with an increase in women’s annual working hours by 21–43 h, while Kohara (2010) found that husband’s job loss was associated with an increase in wives’ paid labour by about 2.1-2.8 h per week.



Notes: Linear regression coefficients and 95% confidence intervals. Models include controls for household characteristics, as well as female and male characteristics.

Figure 10 Predicted increase in women's weekly working hours by type of non-standard employment

Lastly Figure 11 presents the predicted increase in women's weekly working hours following men's involuntary non-standard employment by age of the youngest child. For the sample of inactive women we find that the effect of non-standard employment of the male partner on women's weekly working hours seems to be the weakest in households with children below the age of 3 (though it is not significantly lower than in households with older children). Conversely, for the sample of part-time working women we find the same effect to be the highest though still not statistically different from the effect observed for households with older children.



Notes: Linear regression coefficients and 95% confidence intervals. Models include controls for household characteristics, as well as female and male characteristics.

Figure 11 Predicted increase in women's weekly working hours following men's involuntary non-standard employment by age of the youngest child

Conclusion and discussion (#2)

In this study we compared women's labour supply response to men's unemployment because of job loss with men's involuntary non-standard employment. Given the negative consequences non-standard work has on both workers and their households (Horemans, 2017; Leschke, 2008; Boeri et al., 2020; Van Lancker, 2012; Van Lancker, 2013; Coleman-Jensen, 2011), we expected that women will also increase their labour supply after men's transition into involuntary non-standard (i.e. part-time, temporary) employment (H1.1) and that this effect will be stronger in case of men's job loss than in case of his transition to involuntary non-standard employment (H1.2). We also expected to find a weaker response in women's labour supply following men's transition to temporary work compared to his transition to part-time work (H2) due to fewer opportunities for a full-time, though temporarily, employed man to substitute a female partner at home in comparison to the situation when he works part-time. Lastly, we expected the response in women's labour supply to be weaker in families with younger children compared to families with older children (H3).

Our results show that households are confronted with men's transitions into involuntary non-standard employment as frequently as they are confronted with men's job loss. We also find that both events elicit an increase in women's labour supply which is in line with H1.1. Interestingly and contrary to H1.2., we find that women's labour supply

response is stronger following men's involuntary non-standard employment compared to men's job loss. These results suggest that households might perceive men's non-standard employment as a more negative shock compared to men's job loss. This might be explained by differences in the anticipated length of the two shocks. Studies show that unemployed individuals are optimistic about how fast they will find employment (Spinnewijn, 2015). As such, households might perceive men's job loss as a brief period of income loss followed by a return to the initial situation, while non-standard employment might be perceived as a long-lasting change, which implies a chronic decline in household income and persisting uncertainty about future employment and income opportunities.

Furthermore, we also find that men's involuntary temporary employment elicits a stronger labour supply response compared to men's involuntary part-time employment. We argue that the differences in the observed effect stem from a difference in the income loss and perceived insecurity between the two forms of employment. Although both temporary and part-time employment are associated with lower hourly wages (Giesecke and Groß, 2004; Brown and Sessions, 2005; Horemans, 2017; Westhoff, 2022), temporary employment seems to have more severe economic consequences (Giesecke, 2009). Additionally, involuntary temporary workers report a higher perceived threat of unemployment compared to involuntary part-time workers (Kauhanen and Nätti, 2015). However, temporary employment is less likely to allow men to substitute women in household responsibilities compared to part-time employment. Consequently, we conclude that income loss and the perception of uncertainty seems to be more important to women's labour supply increase compared to men's ability of substituting women in housework and childcare.

Lastly, we find that women's probability of becoming active, becoming unemployed, switching from a part-time to a full-time job, or increasing their weekly working hours does not vary based on the age of their children. In other words, contrary to H3, after their partner enters involuntary non-standard employment, women with young children are as likely to spend more time in paid work as women without children than require constant care (over the age of 15). Given the limited possibility of non-standard employed men to substitute women in childcare, we argue that women with young children might rely on informal or formal childcare to enable them to increase the time they spend in paid work. Previous studies have extensively documented the importance of informal (Wheelock and Jones, 2002) and formal (Scherer and Pavolini, 2023) childcare for women's labour force participation. Thus, our results suggest that women's labour supply response to men's non-standard employment might be moderated by childcare availability, which should be explored by future research.

His non-standard work, her increase in labour supply: the moderating role of policies in Europe (Study #3)

Theoretical background and hypotheses (#3)

Non-standard employment and the added-worker effect

In Europe, the consequences of non-standard employment are at the forefront of the social policy debate (Eurofound, 2017). Although often presented as a 'stepping-stone' (Filomena and Picchio, 2021), non-standard jobs are associated with a myriad of negative consequences for both workers and their families (Giesecke and Groß, 2004; Brown and Sessions, 2005; Van Lancker, 2013; Van Lancker, 2012; Horemans, 2017), particularly for those who are involuntarily in these work arrangements. In this paper we focus on two forms of non-standard employment, namely temporary and part-time employment, although we acknowledge that non-standard employment can take multiple forms.

Temporary employment inherently lacks the stability found in permanent positions. Studies consistently indicate that individuals engaged in temporary work are confronted with elevated levels of emotional job insecurity, particularly those who are involuntarily in this working arrangement (Keim et al., 2014; Morgenroth et al., 2022; Kauhanen and Nätti, 2015). The impact extends beyond personal experiences of workers, also affecting the well-being of partners. For instance, men's temporary employment negatively influences their female partners' welfare, paralleling the repercussions of men's unemployment (Inanc, 2018). In addition to these subjective aspects, temporary employment is linked to lower hourly wages, heightening the risk of poverty for both workers and their households, with male breadwinners being particularly affected (Giesecke and Groß, 2004; Brown and Sessions, 2005; Van Lancker, 2013, 2012). Furthermore, the transient nature of such employment increases the likelihood of unemployment or inactivity, amplifying the risk of not being covered by social insurance benefits during periods of joblessness (Leschke, 2008; Eurofund, 2015; Matsaganis et al., 2015).

Part-time employment is also associated with various negative consequences for workers and their households, particularly in the case of men and those who are involuntarily in this work arrangement. Earnings for part-time workers are lower compared to their full-time counterparts, partially due to wage penalties (Horemans, 2017). Men engaged in part-time roles face more substantial wage penalties, contributing to an elevated risk of being low-paid compared to women (Nightingale, 2019). This circumstance places part-time workers and their households at an increased risk of poverty (Horemans and Marx 2013). Despite facing comparable risks of unemployment to full-time workers, part-time workers are less likely to receive adequate unemployment benefits (Leschke, 2008). Involuntary part-time employment is linked to heightened perceived job insecurity and lower levels of well-being, although not as

prominently as in temporary positions (Burgoon and Dekker, 2010; Heyes and Tomlinson, 2021; Kauhanen and Nätti, 2015).

Altogether the financial difficulties, poorer social protection and higher economic uncertainty related to non-standard work may trigger an increase in the labour supply of a woman in response to her male partner falling into involuntary non-standard employment. Against this background, we formulate our first hypothesis:

H1: Women will increase their labour supply after their partner enters involuntary temporary or part-time employment.

The role of childcare policies

Childcare responsibilities are still a barrier for the labour force participation of women (Uunk et al., 2005). In general, mothers are more likely to be inactive or to work a reduced number of hours than men and women without kids (Cukrowska-Torzewska and Matysiak 2020, Matysiak and Cukrowska-Torzewska 2021). Previous studies have demonstrated that, in general, mothers are more likely to be in the labour force in regions or countries with better childcare availability (Scherer and Pavolini, 2023).

Contrary to these studies, in study#1 we found that there are no differences in the probability that inactive mothers and women without children increase their labour market supply following men's unemployment. Additionally, we found that part-time working mothers are more likely to increase their labour market supply compared to part-time working women without children. More importantly, we found that mother's labour supply increase is not dependent on the level of childcare availability. Our findings suggest that unemployed men take over childcare, thus enabling women to increase their labour market supply. This substitution is made possible by his increased time-availability. However, transitions into involuntary non-standard employment do not increase his time-availability, or the increase might be limited (i.e. in the case part-time employment). As a result, involuntary non-standard employed men will have a limited possibility of substituting women in childcare. Consequently, these families might need to rely on external childcare to substitute women, which leads us to formulate the following hypothesis:

H2: The labour supply increase of mothers following their partners' transition into involuntary part-time and temporary work will be stronger in countries with higher childcare availability.

Social security and employment protection regulations

Social and employment policies can also increase the perceived need for a labour supply response from women, by exacerbating the risk associated with men's transition into non-standard employment. A transition into involuntary temporary work can produce more (perceived) insecurity in countries with high levels of protection of permanent workers and low levels of protection of temporary workers. This is the case for several reasons. First, in countries with a large gap in employment protection between permanent and temporary workers it is usually more difficult to enter permanent employment (Barbieri and Cutuli, 2016). This implies that workers who entered temporary employment in these countries are less likely to return to permanent employment than workers in countries where temporary employees are similarly protected against dismissal as permanent workers. Second, temporary workers are more likely

to be fired if employers need to reduce personnel and the costs of dismissing temporary rather than permanent workers are substantially lower. Temporary workers might also be aware of the relatively precarious position they are put in by the institutional arrangements, as research finds that such gaps in protection are associated with a higher perceived level of job insecurity among temporary workers (Balz, 2017). Thus, we expect that:

H3: Women's increase in their labour market supply following their partner's involuntary transition to temporary employment is greater in countries where the difference in job protection between temporary and permanent workers is larger.

Similarly, a transition into part-time employment can pose a higher risk in countries with a reduced level of social protection of these employees. In the European Union, regulations concerning the eligibility conditions for unemployment benefits vary greatly between countries (Spasova et al., 2017). The differences in conditions regarding contributions, wages, and working hours can influence the level of social benefits workers receive in case of unemployment. Compared to their standard counterparts, part-time workers are less likely to be covered by unemployment benefits and the level of benefits received is lower. Leschke (2008) finds that part-time workers have considerably lower odds of receiving benefits in Denmark, United Kingdom and Germany, although the differences are not significant in Spain. Lower coverage by unemployment benefits among part-time workers seem to stem from the number of hours worked, as the odds of receiving benefits increase with the number of hours worked. Additionally, as unemployment benefits are often determined as a percentage of the former wage, part-time workers might receive lower levels of benefits compared to their standard counterparts. Controlling for various covariates, Leschke (2008) finds that in Germany former part-time workers receive unemployment benefits that are on average 165 euros lower compared to those of former full-time employees. Thus, provided that non-standard workers and their households are aware of the benefits they stand to receive, we expect that:

H4: Women will be less likely to increase their labour market supply following their partners' transition into involuntary part-time employment in countries with more generous benefits.

Data and methods (#3)

Data and sample

This study makes use of the European Labour Force Survey (EU-LFS) data. Launched in 1983, LFS is a large household survey that offers detailed yearly information on the employment of household members. Since 2005 the survey also offers quarterly data on household members aged 15 or older, although the quarterly data is not available for all countries covered by EU-LFS. From the perspective of our research objectives EU-LFS offers two important advantages: it allows us to follow couples during consecutive quarters in a year, and it allows us to identify his transitions into involuntary part-time and temporary work and her labour supply increase. We restrict the sample to couples (cohabiting or married) in which the partners are: between 25 and 64 years of age; neither is retired or permanently disabled/unfit to work; followed for at least two quarters; that have complete information on all our variables of interest. Although self-employment is an important type of non-standard work, we exclude couples in which the man is self-employed. This is because EU-LFS data does not allow us to identify the reasons for being in self-employment. We also exclude part-time and temporary employment spells that follow a period of unemployment, as in this case

women's labour supply increase might be attributed to his unemployment. Lastly, we exclude simultaneous spells into part-time and temporary employment. Based on these criteria and based on the country-period availability of our policy variables of interest, we have valid observations for 15⁵ countries over the period 2009-2019.

In order to distinguish between labour supply increase at extensive margin (from inactivity to activity) and intensive margin (from part-time to full-time employment), we define two samples of couples in which: a) the male partner is in standard (permanent, full-time) employment in the first quarter and the female partner is inactive; b) the male partner is in standard employment in the first quarter and the female partner is in part-time employment. We follow couples until the men become unemployed or inactive, which leaves us with 445.267 couple-quarter observations in the first sample and 351.845 couple-quarter observations in the second sample.

Variables

Dependent variables.

We measure women's labour supply increase at extensive and intensive margin through multiple binary dependent variables. At extensive margin we first measure women's transitions from inactivity to activity, which includes both employment and unemployment (IN → A). Next, we differentiate between transitions from inactivity into unemployment (IN → U) and transitions from inactivity into employment (IN → E). At intensive margin we measure women's transitions from part-time to full-time employment (PT → FT).

Explanatory variables.

In measuring men's non-standard employment we first define a categorical variable that identifies men's transitions between quarters q-1 and q, which takes the following categories: (1) transition into involuntary part-time employment (SE → PT), (2) transition into involuntary temporary employment (SE → Temp) (3) no transition (a man remains in standard employment), which is our reference category. In a second step we focus separately on transitions into involuntary part-time and temporary employment. We define two distinct dummy variables, each taking the value of 1 if the man transitions into involuntary part-time or temporary employment, respectively, while standard employment remains the reference category. This is needed as in H2 and H3 we focus separately on each type of non-standard employment. To identify transitions into involuntary part-time and temporary employment, we combine information from two questions. Namely, we use the question on the self-defined temporary and part-time employment and the question on the reasons for being in such employment. In line with the existent approach in the literature (Green and Livanos, 2017), we classify transitions into part-time and temporary work as involuntary when the respondents state they could not find a full-time or permanent job.

Country-level variables.

We link the EU-LFS microdata with policy variables obtained from three data sources: OECD data, EU-SILC and Euromod. We use the OECD data to retrieve information on the protection of permanent and temporary workers.

⁵ Austria, Belgium, Czech Republic, Estonia, France, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Poland, Portugal, Slovenia, Slovakia.

Based on this we compute the gap in protection between permanent and temporary workers, which takes higher values for larger gaps in protection.

With regards to childcare, many of the past studies have mostly focused on early childcare availability, usually measured as childcare enrolment (Morrissey, 2017). Considerably less attention was paid to the availability of childcare for school-aged children (Plantenga and Remery, 2017). Additionally, past studies have focused on general childcare enrolment (Morrissey, 2017), even though full-time childcare might better facilitate women's employment. Consequently, we make use of EU-SILC data to compute indicators for full-time childcare availability, for three age categories, based on the type of childcare they require. More specifically, we compute the percentage of children enrolled in full-time childcare for three age categories: aged 3 or below (≥ 30 hours/week); between 4 and 6 years (≥ 30 hours/week) of age; and between 7 and 12 years of age (≥ 10 hours/week). In generating these indicators, we include three types of formal childcare: at day-care centre; at pre-school, and at centre-based services outside school hours.

Lastly, we proxy the level of social protection through unemployment generosity using the tax-simulation tool EUROMOD together with the HHoT it offers. EUROMOD is a tax-simulation tool which stores information on the tax and benefit policies of EU countries in specific time periods. Consequently, it can be used to estimate the unemployment benefits workers are entitled to in case of unemployment. EUROMOD requires detailed data on household composition, earnings of household members and their demographic characteristics. As EU-LFS data is not compatible with EUROMOD, we use the HHoT to generate hypothetical household data that preambles the households in our EU-LFS dataset, which we input into EUROMOD in order to estimate the unemployment benefits workers are entitled to. In generating hypothetical household data, the HHoT requires users to specify the household composition by defining the relationship between the household members (e.g. single, couple with children, couple without children) and the demographic characteristics of the household members. For example, the user can specify, for all household members, the age, economic status (employed, unemployed, inactive), number of hours worked and income from employment (as % of EU-SILC average). For these variables users can also specify the values between which the variables range and the range itself. We took the following variables into account when generating hypothetical data: the marital status of the couple (married or cohabiting)⁶, the employment status of the men (employed part-time or full-time) and women (inactive or working part-time, based on the labour supply increase examined) and the number (0, 1, 2, 3)⁷ and age of the children (which took the values 2, 7, 12 and 17)⁸. When generating hypothetical data for households where the male is employed full-time we assume that his main employment income before unemployment is 67% of the average EU-SILC wage, while for part-time workers we assume that the income is 33% of the average EU-SILC wage.

⁶ Given the fact that the HHoT does not include the option 'cohabiting' when defining the relationship between the 2 partners, we define them as single.

⁷ As the number of households generated grows exponentially with the number of categories assumed by each variable we aimed at reducing the number of the categories to a minimum. Thus, we limit ourselves to generating households with up to 3 children, as most couples have a maximum of 3 children (United Nations, 2019)

⁸ In specifying the age range we took into account the LFS age groups.

We employ EUROMOD to simulate transitions into unemployment of the male partner using the data generated using the HHoT. In this way we are able to estimate the benefits workers are entitled to. As net replacement rates might not be an adequate indicator for measuring the generosity of benefits for part-time workers (Tamayo and Tumino, 2021), we measure benefits generosity as a percentage of the country-year average wage.

Control variables. We control for a large number of variables, at three levels: individuals, household and country level. At household level we control for the union type (married or cohabiting), number of persons below the age of 15 in the household and the presence of young children, for which we define three dummy variables based on the age of the youngest person in the household: below the age of 3; between 4 and 6 years of age; and between 7 and 12 years of age. At individual level we control for the age and education of both partners, the occupation of the male partner and whether he has a second job. When estimating the labour supply increase of inactive women we control for whether they had a job previously, while in the case of part-time working women we control for their occupation of women. At country level we control for quarterly unemployment and female employment rate, which we retrieve from Eurostat.

Empirical strategy

The hierarchical structure of our data, with individuals observed in multiple time periods, nested within countries, requires the use of a multilevel approach. In the literature on multilevel modelling several studies employing Monte Carlo simulations have drawn attention to potential biases when there is a small number of clusters (Stegmueller, 2013; Bryan and Jenkins, 2016). Our sample includes 15 countries, which is below the number usually suggested by this literature. However, Elff et al. (2021) have improved on previous simulations and show that likelihood-based techniques can achieve accurate inference for contextual effects even when there are as low as five clusters. For this to be possible two steps have to be taken: 1) employing restricted maximum-likelihood estimation, as opposed to the standard maximum-likelihood estimation and 2) using the $m - 1 - 1$ approximation, as opposed to the normal approximation, when computing p-values for contextual variables, interaction terms and the individual variables included in interactions. We follow this approach by using the *mixed* Stata command with the *reml* option and compute the p-values manually using the $m - 1 - 1$ approximation.

For our base model (Hypothesis 0) we estimate mixed effects Linear Probability models that are specified as follows:

$$y_{ictq} = \beta_0 + \beta_1 \text{Transition man}_{ictq} + \delta' X_{ictq} + \gamma' Z_{ctq} + \varepsilon_{ictq} \quad (\text{Equation 8})$$

where y_{ictq} is the dummy variables for an increase in the female partner's labour supply, which are equal to 1 if person i in country c in year t , quarter q , increased her labour market supply by transitioning from inactivity to activity (IN $\rightarrow A_{ictq}$), inactivity to unemployment (IN $\rightarrow U_{ictq}$), inactivity to employment (IN $\rightarrow E_{ictq}$) or from part-time to full-time work (PT $\rightarrow FT_{ictq}$), in the second specification. $\text{Transition man}_{ictq}$ represents a categorical variable that identifies the men who in $q-1$ were in standard employment and in q : transition into involuntary part-time employment (SE \rightarrow PT); transition into involuntary temporary employment (SE \rightarrow Temp; remain in standard employment (i.e. the reference category). The vector of covariates X_{ictq} includes the household and partners' characteristics, while the vector of covariates Z_{ctq} includes our country control variables.

To test Hypothesis 1 we divide the dataset into three samples, based on the age of the youngest child: a) households with the youngest child below the age of 3; b) households with the youngest child aged between 4 and 6; c) households with the youngest child aged between 7 and 12. We then adjust the base model as follows:

$$y_{ictq}^m = \beta_0^m + \beta_1^m \text{Transition man}_{ictq}^m * \text{Childcare}_{ct}^m + \delta' X_{ictq}^m + \gamma' Z_{ctq}^m + \varepsilon_{ictq}^m \text{ (Equation 9)}$$

where subscription m denotes the subset of households based on the age of the youngest child. We measure the moderating effect of childcare availability by interacting the categorical variable that identifies men's transitions into involuntary part-time and temporary employment ($\text{Transition man}_{ictq}^m$), with the measure of childcare availability corresponding to each age group.

Lastly, we test Hypothesis 2 and Hypothesis 3 in similar ways, by estimating the following mixed effects Linear Probability models:

$$y_{ictq} = \beta_0 + \beta_1 SE \rightarrow PT_{ictq} * EPLGap_{ct} + \delta' X_{ictq} + \gamma' Z_{ctq} + \varepsilon_{ictq} \text{ (Equation 10)}$$

$$y_{ictq} = \beta_0 + \beta_1 SE \rightarrow Temp_{ictq} * Benefits generosity_{ct} + \delta' X_{ictq} + \gamma' Z_{ctq} + \varepsilon_{ictq} \text{ (Equation 11)}$$

where $SE \rightarrow PT_{ictq}$ and $SE \rightarrow Temp_{ictq}$ and represent dummy variables that separately identify men's transitions between into involuntary part-time and temporary employment, respectively. To test our hypotheses we interact these variables with the indicators on Employment Protection Legislation gap and benefits generosity.

Results (#3)

Descriptive statistics

Supplementary Table 8 (in Appendix) presents the characteristics of the couples in our two samples, while in Supplementary Table 9 (also in Appendix) we offer an overview of the country and years covered in the analyses. The samples are relatively similar with respect to the number of children and the age of the partners. However, there seems to be differences between the two samples in terms of human capital, as both the male and female partners in the couples in *Sample B* are more likely to be medium (ISCED 3-4) or highly educated (ISCED 5-6). Additionally, a larger proportion of men in *Sample B* have white-collar high-skilled jobs (ISCO 1-3).

The samples also differ slightly in terms of the incidence of men's transition into non-standard employment. Among the households in *Sample A*, 0.26% experienced men's involuntary part-time employment, while 0.62% faced men's involuntary temporary employment. In the case of *Sample B*, the incidence is lower, with 0.18% and 0.33% of the households being confronted with men's involuntary part-time and temporary employment, respectively. The incidence of non-standard employment we identify (0.88% in *Sample A* and 0.51% in *Sample B*) is relatively similar to the incidence of job loss identified by other studies on women's added-worker effect. Gong (2011) found that 0.5% of the households were confronted with men's job loss, while Kohara (2010) found that 1.5% of the households included in the sample experienced men's involuntary job loss.

Baseline results

Table 7 presents the estimated probabilities of an increase in the labour supply of women in response to their male partner's transition from standard employment to involuntary part-time or temporary employment. In line with Hypothesis H1, we find that women increase their labour supply following men's transition into involuntary part-time or temporary employment. More specifically, compared to women with partners remaining in standard employment, inactive women whose partner transitions into involuntary part-time employment are 10.1% more likely to become active, which mostly stems from entering unemployment. Furthermore, part-time working women whose partner transitions into involuntary part-time employment are 4.3% more likely to switch to a full-time job than part-time working women with partners remaining in standard employment.

Women's labour supply increase is even stronger following men's transition into involuntary temporary employment. Compared to women with partners remaining in standard employment, inactive women whose partner transitions into temporary employment are 14.7 % more likely to become active, which mostly stems from entering unemployment. Furthermore, part-time working women whose partner transitions into involuntary temporary employment are 11.2% more likely to switch to a full-time job than part-time working women with partners remaining in standard employment.

Explanatory variables	Sample A			Sample B
	IN → A	IN → U	IN → E	PT → FT
SE	Ref	Ref	Ref	Ref
SE → PT	0.1012*** (0.0111)	0.0686*** (0.0075)	0.0326*** (0.0086)	0.0427*** (0.0117)
SE → Temp	0.1466*** (0.0073)	0.0575*** (0.0063)	0.0891*** (0.0056)	0.1117*** (0.0087)
Household characteristics				
Married (<i>ref. cohabiting</i>)	-0.0350*** (0.0013)	-0.0154*** (0.0009)	-0.0197*** (0.0010)	-0.0085*** (0.0009)
Number of children	-0.0124*** (0.0006)	-0.0053*** (0.0004)	-0.0071*** (0.0004)	-0.0048*** (0.0006)
Child 0 to 3	-0.0097*** (0.0017)	-0.0099*** (0.0011)	0.0002 (0.0013)	-0.0014 (0.0015)
Child 4 to 6	0.0017 (0.0018)	0.0030* (0.0012)	-0.0013 (0.0014)	-0.0091*** (0.0015)
Child 7 to 14	0.0069*** (0.0014)	0.0050*** (0.0010)	0.0018 (0.0011)	-0.0035** (0.0012)
Female characteristics				
Age (<i>ref 25-29 years</i>)				
30-34 years	0.0074*** (0.0016)	-0.0014 (0.0011)	0.0089*** (0.0012)	-0.0080*** (0.0018)
35-39 years	0.0093*** (0.0018)	-0.0002 (0.0012)	0.0095*** (0.0014)	-0.0135*** (0.0020)
40-44 years	-0.0006 (0.0020)	-0.0053*** (0.0014)	0.0048** (0.0016)	-0.0169*** (0.0021)

45-49 years	-0.0120*** (0.0023)	-0.0106*** (0.0015)	-0.0013 (0.0018)	-0.0228*** (0.0022)
50-54 years	-0.0263*** (0.0025)	-0.0172*** (0.0017)	-0.0091*** (0.0020)	-0.0251*** (0.0024)
55-59 years	-0.0449*** (0.0028)	-0.0239*** (0.0019)	-0.0210*** (0.0022)	-0.0272*** (0.0027)
60-64 years	-0.0592*** (0.0037)	-0.0325*** (0.0025)	-0.0267*** (0.0029)	-0.0354*** (0.0038)
Education (<i>ref. low</i>)				
Medium	0.0160*** (0.0010)	0.0062*** (0.0006)	0.0098*** (0.0007)	0.0001 (0.0009)
High	0.0413 (0.0014)	0.0120*** (0.0009)	0.0293*** (0.0011)	0.0108*** (0.0012)
Occupation (<i>ref. Blue-collar low</i>)				
Blue-collar high	-	-	-	0.0278*** (0.0018)
White-collar low	-	-	-	0.0059*** (0.0009)
White-collar high	-	-	-	0.0152*** (0.0011)
Previous work (<i>ref never in employment</i>)	0.0398*** (0.0009)	0.0187*** (0.0006)	0.0211*** (0.0007)	-

Male characteristics

Age (<i>ref 25-29 years</i>)				
30-34 years	0.0054* (0.0022)	0.0044** (0.0015)	0.0010 (0.0017)	-0.0037 (0.0023)
35-39 years	0.0035 (0.0023)	0.0047** (0.0015)	-0.0012 (0.0018)	-0.0014 (0.0025)
40-44 years	0.0013 (0.0025)	0.0037* (0.0017)	-0.0024 (0.0019)	-0.0014 (0.0026)
45-49 years	-0.0061* (0.0026)	0.0013 (0.0018)	-0.0074*** (0.0020)	-0.0019 (0.0027)
50-54 years	-0.0087** (0.0028)	-0.0011 (0.0019)	-0.0075*** (0.0022)	-0.0013 (0.0028)
55-59 years	-0.0106 (0.0030)	-0.0045* (0.0020)	-0.0061** (0.0023)	-0.0017 (0.0029)
60-64 years	-0.0085* (0.0034)	-0.0046* (0.0023)	-0.0039 (0.0026)	-0.0038 (0.0035)
Education (<i>ref. low</i>)				
Medium	-0.0008 (0.0010)	-0.0003 (0.0007)	-0.0006 (0.0008)	0.0003 (0.0009)

High	-0.0072*** (0.0015)	-0.0033** (0.0010)	-0.0038** (0.0011)	-0.0003 (0.0012)
Occupation (ref. Blue-collar low)				
Blue-collar high	-0.0012 (0.0010)	-0.0020** (0.0007)	0.0008 (0.0008)	-0.0031** (0.0010)
White-collar low	-0.0006 (0.0012)	-0.0021* (0.0008)	0.0015 (0.0009)	-0.0010 (0.0011)
White-collar high	-0.0055*** (0.0011)	-0.0061*** (0.0008)	0.0005 (0.0009)	-0.0030** (0.0010)
Second job (ref one job)	0.0261*** (0.0026)	-0.0059** (0.0017)	0.0319*** (0.0020)	0.0003 (0.0017)
Country control variables				
Female participation	0.0026*** (0.0002)	0.0017*** (0.0001)	0.0009*** (0.0001)	0.0019*** (0.0002)
Unemployment	0.0021*** (0.0003)	0.0024*** (0.0002)	-0.0003 (0.0002)	-0.0004 (0.0003)
N couple-months	445.266			351.844
N couples	185.259			138.164

Note: * p> 0.05 **p> 0.01 ***p> 0.001; IN → A represents women's transitions from inactivity to activity (unemployment or employment); N → U represents women's transitions from inactivity to unemployment; IN → E represents women's transitions from inactivity to employment; PT → FT represents women's transitions from part-time to full-time work.

Table 7. Women's labour supply response to their partner's and involuntary part-time and temporary employment

Childcare availability

In hypothesis H2 we expected that the labour supply increase of mothers following their partners' transition into involuntary part-time and temporary work will be higher in countries with higher childcare availability. Table 8 presents the results of the moderation analyses. It appears that the moderating effect of childcare availability is rather in line with our expectations but differs by age group and by the type of non-standard employment transition of the male partner.

We find that childcare availability has a positive effect on the labour supply response of mothers (particularly entry to employment) with the youngest child below the age of 3, following their partner's transition into involuntary temporary employment. We also find a positive effect of childcare availability on the labour supply response of mothers with the youngest child between the age of 7 and 12, following both their partner's transition into involuntary part-time and temporary employment. The results are less consistent for mothers with the youngest child aged between 4 and 6.

Explanatory variables	Sample A	Sample B
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	IN → A	IN → U	IN → E	PT → FT
Households with the youngest child below the age of 3				
SE	Ref	Ref	Ref	Ref
SE → PT	0.0544 (0.0626)	0.0862* (0.0380)	-0.0316 (0.0516)	0.0200 (0.0806)
SE → Temp	-0.0120 (0.0312)	0.0163 (0.0189)	-0.0283 (0.0257)	0.0877 (0.0639)
Childcare (0-3)	-0.0004 (0.0002)	0.0002 (0.0002)	-0.0005* (0.0002)	-0.0011** (0.0003)
SE → PT * Childcare (0-3)	0.0020 (0.0022)	0.0006 (0.0013)	0.0014 (0.0018)	0.0009 (0.0034)
SE → Temp * Childcare (0-3)	0.0043** (0.0010)	0.0007 (0.0006)	0.0036** (0.0009)	0.0007 (0.0019)
N couple-months		140.668		65.427
N couples		58.745		28.032
Households with the youngest children between 4 and 6				
SE	Ref	Ref	Ref	Ref
SE → PT	0.1004 (0.1240)	-0.0032 (0.0899)	0.1034 (0.0902)	0.3620** (0.0991)
SE → Temp	0.3527** (0.0825)	0.1689* (0.0598)	0.1840** (0.0600)	-0.1276 (0.0694)
Childcare (4-6)	-0.0003 (0.0003)	-0.0001 (0.0002)	-0.0001 (0.0002)	-0.0001 (0.0002)
SE → PT * Childcare (4-6)	-0.0007 (0.0025)	0.0010 (0.0018)	-0.0017 (0.0018)	-0.0055* (0.0021)
SE → Temp * Childcare (4-6)	-0.0032* (0.0014)	-0.0012 (0.0010)	-0.0020 (0.0010)	0.0034* (0.0013)
N couple-months		48.338		46.222
N couples		23.550		21.147
Households with the youngest children between 7 and 12				
SE	Ref	Ref	Ref	Ref
SE → PT	0.0064 (0.0336)	0.0592* (0.0244)	-0.0527 (0.0243)	0.0461 (0.0399)
SE → Temp	0.1280*** (0.0269)	0.0801** (0.0195)	0.0480* (0.0195)	0.0479 (0.031)
Childcare (7-12)	0.0001 (0.0001)	0.0005 (0.0001)	0.0001 (0.0001)	-0.0009*** (0.0001)

SE → PT * Childcare (7-12)	0.0152*** (0.0023)	0.0024 (0.0017)	0.0128*** (0.0017)	-0.0026 (0.0032)
SE → Temp * Childcare (7-12)	0.0034 (0.0017)	-0.0005 (0.0012)	0.0040** (0.0012)	0.0025 (0.0023)
N couple-months		71.207		77.211
N couples		32.595		32.806

Note: * p> 0.05 **p> 0.01 ***p> 0.001; IN → A represents women's transitions from inactivity to activity (unemployment or employment); N → U represents women's transitions from inactivity to unemployment; IN → E represents women's transitions from inactivity to employment; PT → FT represents women's transitions from part-time to full-time work.

Table 8. The moderating effect of childcare availability on women's labour supply response

Employment and Social protection

Finally, we argued that policies can also moderate the increase in women's labour supply by increasing the risk posed by men's transition into non-standard employment. Hypothesis H3 was based on the argument that gaps in the level of employment protection between permanent and temporary employees increase the objective and subjective risk related to temporary employment. Thus, we expected that in countries with higher employment protection gaps women will be more likely to increase their labour market supply in response to their partner's transition into temporary employment. Table 9 presents the results of respective analyses. In line with hypothesis H3 we find that inactive women are more likely to increase their labour supply in countries with higher EPL gaps. However, the labour supply increase of part-time working women seems not to depend on the EPL gaps.

Explanatory variables	Sample A			Sample B
	IN → A	IN → U	IN → E	PT → FT
SE	Ref	Ref	Ref	Ref
SE → Temp	0.1122*** (0.0119)	0.0419*** (0.0080)	0.0704*** (0.0092)	0.1183*** (0.0117)
EPL Gap	0.0062*** (0.0014)	0.0022* (0.0009)	0.0041** (0.0011)	0.0013 (0.0014)
SE → Temp * EPL Gap	0.0398** (0.0108)	0.0181* (0.0073)	0.0217* (0.0083)	-0.0087 (0.0102)
N couple-months		444.782		351.595

Note: * p> 0.05 **p> 0.01 ***p> 0.001; IN → A represents women's transitions from inactivity to activity (unemployment or employment); IN → U represents women's transitions from inactivity to unemployment; IN → E represents women's transitions from inactivity to employment; PT → FT represents women's transitions from part-time to full-time work.

Table 9. The moderating effect of the ELP Gap on women's labour supply response

We also hypothesized that women will be less likely to increase their labour market supply following their partners' transition into involuntary part-time in countries with more generous benefits (hypothesis H4). The results, included in Table 10, do not support this expectation. We find that the labour supply response to their partner's involuntary part-time employment is not dependent on the generosity of benefits. However, the generosity of benefits is generally associated with a lower labour supply of women in general.

Explanatory variables	Sample A			Sample B
	IN → A	IN → U	IN → E	PT → FT
SE	Ref	Ref	Ref	Ref
SE → PT	0.1024*** (0.0152)	0.0659*** (0.0103)	0.0365** (0.0117)	0.0376 (0.1989)
Benefits generosity	-0.0003*** (0.0005)	-0.0001*** (0.0001)	-0.0002*** (0.0000)	-0.0003*** (0.0000)
SE → PT * Benefits generosity	-0.0001 (0.0005)	0.0001 (0.0004)	-0.0003 (0.0004)	0.0002 (0.0008)
N couple-months		444.126		351.395

Note: * p > 0.05 ** p > 0.01 *** p > 0.001; IN → A represents women's transitions from inactivity to activity (unemployment or employment); IN → U represents women's transitions from inactivity to unemployment; IN → E represents women's transitions from inactivity to employment; PT → FT represents women's transitions from part-time to full-time work.

Table 10. The moderating effect of benefits generosity on women's labour supply response

Conclusion and discussion (#3)

The present study builds on the substantial literature on the negative effects of non-standard work, which might also have consequences at the household level. More specifically, the traditional gendered division of household responsibilities might no longer be feasible, given the increased instability and insecurity associated with this type of work. In this context, other household members might increase their labour supply in order to mitigate the potential income loss and uncertainty. Such a reaction has been termed in the literature as the *added-worker effect*, but was mostly used to describe an increase in woman's labour supply in response to the man's unemployment (Kohara, 2010; Hardoy and Schøne, 2014; Triebe, 2015; Ayhan, 2018; Halla et al., 2020; Baldini et al., 2018; Cammeraat et al, 2023). It has not yet been applied to men's transitions into non-standard employment. There has only been initial evidence suggesting that men's non-standard employment is associated with women's labour force participation. Karaoglan and Okten (2015) showed that women in Turkey with an involuntary part-time working partner are 7% more likely to be in the labour force compared to women whose partner is employed full-time. However, this study relied on cross-sectional data, which does not allow to draw any causal inferences. In our study we investigated this phenomenon on European countries, taking advantage of longitudinal data from EU-LFS. Furthermore, we explored the moderating role of policies, namely childcare policies as well as employment and social protection policies.

First, we hypothesized that mothers' labour supply response to their partners' transition into involuntary part-time and temporary work will be higher in countries with higher childcare availability. Our results highlight the importance of distinguishing between the age of children and types of childcare, as we find that the effect of childcare availability depends on these. More specifically, we find support for our hypothesis in the case of mothers with the youngest child below the age of 3 and mothers with children aged 7 to 12, while the results are less conclusive for mothers with children aged 4 to 6. Generally, our results show that an increase in the percentage of children enrolled in childcare is associated with an increase in women's probability of increasing their labour supply.

Second, we expected that women's labour supply response to partner's transitions into involuntary temporary employment will be higher in countries with higher employment protection gaps between permanent and temporary employees (EPL gaps). Results support our expectations, as we find that inactive women are more likely to increase their labour supply in countries with higher EPL gaps. In contrast, the labour supply response of part-time working women seems not to be dependent on the level of EPL gaps. This is possibly because households that rely entirely on the male partner's income might perceive the objective and subjective risk related to temporary employment as more severe compared to households in which the woman is employed, albeit part-time.

Lastly, we expected that in countries with more generous benefits part-time employment women will be less likely to increase their labour market supply following their partners' transition into involuntary part-time. We do not find evidence that would support this hypothesis.

Conclusions

Earnings constitute one of the most important sources of income for most of the European families. In this context, growing instability of employment relations and the spread of nonstandard employment – which is usually less secure and less paid than standard employment – pose serious financial risks to families. These risks are particularly severe for families which largely rely on one income, namely the traditional and modernised male breadwinner couples in which women either have no job or work part-time. Such couples, still constitute around 20%-50% of couples in the European Union. They are particularly common among adults in childbearing and childrearing ages. They are

⁶¹ Adjustments in women's labour force participation in response to the deterioration of the labour market situation of the male partner

confronted with increased care demands in parallel to the necessity of providing financial security to dependent children.

In this report, we examined one particular resilience strategy which the traditional and modernised male breadwinner couples develop in response to negative shock in form of unemployment or transition into involuntary nonstandard employment of the male partner. Resilient strategies in families when confronted with a negative employment/income shock may be diverse. They may entail a decline in consumption, reliance on welfare benefits and/or support from other family members as well as an increase in the labour supply by the female partner. Consistently with the project proposal, our focus was explicitly on the latter strategy though we admit that the remaining strategies are important as well and require a separate investigation. Our report thus addresses the first research objective formulated in Work Package 3 “Coping Strategies of Families in Changing Labour Markets” which was to study the adjustments in women’s labour force participation in response to the deterioration of the labour market situation of the male partner. This research objective was addressed in a series of three empirical studies in which we examined whether and to what extent female partners increased their labour force participation following unemployment of the male partner and his transition into involuntary nonstandard employment (which we defined as temporary or part-time work). We also explored the role of policies in altering the strength of her labour market response to the deterioration of his employment situation.

Our findings suggest that women living in traditional and modernised male breadwinner couples indeed react to the deterioration in men’s employment situation though this reaction is relatively weak. Namely, the probability that an inactive woman enters economic activity after the male partner loses a job is around 9.2% (6.4% after he enters unemployment). Out of these women, the majority only starts seeking a job (i.e. they enter unemployment) and the probability that they enter employment is only 3%. Likewise, only 3% of women who worked part-time moved into full-time employment after their male partner lost the job (8% after he became unemployed). Men’s entry into involuntary nonstandard employment evokes similar reactions among women, except for the fact that inactive women are more likely to shift into employment rather than unemployment and the probability of entering full-time work among part-time workers is a bit larger (around 7.3%).

Several reasons may be related to the fact that the magnitude of woman’s response is relatively weak. One may be related to the duration of the time period in which we were able to observe woman’s reactions. In studies 2 and 3, based on EU LFS, we were able to observe women’s reactions mostly within only one quarter after the male partner lost the job or entered involuntary nonstandard employment. One quarter may not be enough for a woman to adjust to the new life circumstances. Nonetheless, in the first study based on EU SILC, we started observing women’s reactions after the male partner was in unemployment for at least 3 months and we followed them for maximum 3 years. In the same study, we also performed a robustness check in which we examined women’s reactions following man’s unemployment which lasted more than 3 and up to 6 months at least or 6 months and longer. Our estimates of women’s reactions to man’s unemployment from the first study and the additional robustness checks are not substantially higher than the estimates obtained from the study based on the EU LFS data. This leads us to the conclusion that the findings are unlikely to be substantially driven by our research design.

Childcare obligations could potentially constitute another barrier to an increase in woman’s economic activity following the deterioration of the employment situation of their male partner. Interestingly, we found that parenthood did not hamper woman’s response in case of his job loss or unemployment. Consequently, childcare

availability did not facilitate woman's response in this particular case either. We found, however, that having young children (aged 0-3) inhibits woman's entry into employment after the male partner enters involuntary nonstandard employment (in particular temporary employment) and that provision of public childcare is helpful in that respect, by reducing the care demands on women and allowing them to increase their labour supply. All in all, our findings suggest that childcare obligations constitute no serious obstacle to woman's increase in labour supply after the male partner becomes unemployed as he likely increases his involvement at home and takes over at least some of the childcare obligations. This does not happen, however, in a situation in which the male partner continues working for pay but is in a less secure position in the labour market (e.g. in temporary employment). Availability of public childcare thus plays a pivotal role in this situation, allowing a mother to increase her labour supply and thereby strengthening resilience of the family against the labour market risks. Childcare availability may also play a crucial role for couples in which the female partner overtakes breadwinning following a job loss by the male partner. It may allow the male partner to regain employment and the female partner to continue working. In that case the seemingly adaptive resilience strategy adopted by a woman (after his job loss) could have a transformative potential, providing the couple with more resilience against the labour market shocks in the future.

Women's responses to the deterioration of men's employment situation could also be influenced by other country-specific policies, such as generosity of social benefits, magnitude of the marginal tax rates or the extent to which certain types of workers are protected against a job loss. Our findings definitely exclude the possibility that women are less likely to react to the deterioration of his labour market conditions in countries with more generous social benefits. Neither in case of his job loss nor his transition into nonstandard employment did we find women to be less likely to increase their labour supply in countries with more generous social benefits compared to countries where the benefits are lower. We did, however, find that high marginal tax rates discourage women from entering the labour market or expanding the number of hours worked in the market following the unemployment of the male partner. These findings imply that it is not the social benefits themselves but rather the eligibility rules to social benefits (e.g. means-testing) coupled with strongly progressive tax systems which create barriers to women's labour supply, thereby reducing family resilience against the negative labour market shocks. In other words, in countries in which large proportion of female income is taxed away when a woman increases her labour supply – either because of taxation or because the couple loses access to some social benefits – the income a woman can gain by entering employment or shifting into full-time work does not sufficiently compensate the effort such an adjustment requires from a woman. In a longer term, it can, however, be a source of a risk for a couple if he continues to be unemployed or his new job is less stable and less paid than the previous one.

Finally, we also examined the role of the employment protection legislation for moderating the magnitude of her response to his entry into involuntary temporary employment. Consistently with our expectations, we indeed found that inactive women are more likely to increase their labour supply in response to his transition from permanent to temporary employment in countries where temporary workers are less protected against the job loss than permanent workers. In countries with high gap in employment protection legislation between permanent and temporary workers (EPL gap), the chances for a man to regain unlimited-term contract are much more constrained than in countries with low EPL gaps. This provides stronger incentives for women to increase their labour supply and secure the household income. Still, provision of public childcare is necessary for this adjustment to take place if the couple has dependent children at home.

Overall, we find women to increase their labour supply in response to the deterioration in men's employment situation and that this response depends on numerous country-specific policies such as childcare availability, marginal tax rates and employment protection legislation though not the generosity of social benefits. Irrespectively of that, we also find that the response was rather small. That may be due to the fact that women in traditional and modernised male breadwinner couples face some barriers to economic activity in general and these barriers prevent women from increasing their labour supply irrespectively of his employment situation. One of such reasons can be the length of the childcare-related career breaks. It is evident from research that women face larger difficulties with re-entering the labour market the longer time they spend outside of the labour market to take care of their children, either due to the depreciation of their human capital or due to stigma against workers who experienced long career breaks. Long career breaks of one of the partners can thus expose families to labour market risks, especially given the fact that the deterioration of employment conditions of the partner who was active in the labour market and responsible for income provision is increasingly common in contemporary labour markets. More equal division of childcare-related obligations as well as more support for economic activity of parents (e.g. in form of public childcare provision of high quality) can thus protect families from labour market shocks and thus increase their resilience.

Last but not least, our research demonstrated that women did not increase their labour market supply after his employment situation deteriorated in the substantial proportion of couples. These couples must have developed other resilience strategies. These strategies could involve increased efforts to re-enter the labour market or regain better (more stable and better paid) employment by the male partner, reduction in consumption expenditure and/or increased reliance on social support from the state or kins. They were not a subject of investigation in this particular study, but clearly require more attention in future research.

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Appendix



Supplementary Table 1. Hypothetical Household characteristics for calculating income replacement rates

Variables	HH1	HH2
Without children	-	-
Age first child	Range: 0-18; Level: 3	Range: 0-18; Level: 3
Age second child	Range: 0-18; Level: 3	Range: 0-18; Level: 3
Age third child	Range: 0-18; Level: 3	Range: 0-18; Level: 3
Union type	Married or cohabiting	Married or cohabiting
Activity partner	Not working	Employed part-time
Transition	T0:Employed (part-time or full-time) T1: Unemployed	T0:Employed (part-time or full-time) T1: Unemployed

Supplementary Table 2 Hypothetical Household characteristics for calculating MTRs

Variables	HH1	HH2
Without children	-	-
Age first child	Range: 0-18; Level: 3	Range: 0-18 Level: 3
Age second child	Range: 0-18; Level: 3	Range: 0-18 Level: 3
Age third child	Range: 0-18; Level: 3	Range: 0-18 Level: 3
Union type	Married or cohabiting	Married or cohabiting
Activity partner	Unemployed	Employed
Transition 1	T0: Not working T1: Employed part-time or full-time	T0: Not working T1: Employed part-time or full-time
Transition 2	T0: Employed part-time T1: Employed full-time	T0: Employed part-time T1: Employed full-time

Supplementary Table 3. Overview of Countries Included in the analyses #study1

Country	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
AT	X	X	X	X	X	X	X	X	X	X	X
BE	X	X	X	X	X	X	X	X	X	X	X
BG	X	X	X	X	X	X	X	X	X	X	X
CY	X	X	X	X	X	X	X	X	X	X	X
CZ	X	X	X	0	X	X	X	X	X	X	X
DE	0	0	0	0	0	0	X	X	X	0	0
DK	0	0	0	0	0	0	X	X	X	X	0
EE	X	X	X	X	X	X	X	X	X	X	X
ES	X	X	X	X	X	X	X	X	X	X	X
FR	X	X	X	X	X	X	X	X	X	X	X
GR	X	X	X	X	X	X	X	X	X	X	X
HR	0	0	X	X	X	X	X	X	X	X	X
HU	X	X	X	X	X	X	X	X	X	X	X
IE	X	X	X	X	X	X	X	X	X	X	X
IT	X	X	X	X	X	X	X	X	X	X	0
LT	X	X	X	X	X	X	X	X	X	X	X
LU	0	0	0	0	0	0	0	0	0	0	0
LV	X	X	X	X	X	X	X	X	X	X	0
MT	X	X	X	X	X	X	X	X	X	X	X
PL	X	X	X	X	X	X	X	X	X	X	X
PT	X	X	X	X	X	X	X	X	X	X	X
RO	X	X	X	X	X	X	X	X	X	X	X
SI	X	X	X	X	X	X	X	X	X	X	X
SK	X	X	X	X	X	X	X	X	X	X	X
UK	X	X	X	X	X	X	X	X	X	X	0

Notes: Overview of countries included in the analysis, where “X” denotes that a country is included in the analysis and “0” denotes that a country is not included in the analysis. The structure of country-years covered in the analysis is determined by the EU-SILC monthly data availability. Additionally, we dropped observations for Croatia for the years 2009 and 2010, as EUROMOD includes Croatia from 2011 onwards.

Supplementary Table 4. Sample descriptive statistics (Study#1)

Explanatory variables		Sample A		Sample B	
		Mean	SD	Mean	SD
Household characteristics					
Married		0.906	0.292	0.877	0.329
Number of children		1.140	1.127	1.144	1.022
Children aged 0 to 3		0.193	0.394	0.125	0.331
Children aged 4 to 6		0.188	0.391	0.177	0.382
Children aged 7 to 12		0.292	0.455	0.330	0.470
Income	Quintile 1	0.130	0.336	0.051	0.220
	Quintile 2	0.234	0.423	0.119	0.324
	Quintile 3	0.257	0.437	0.230	0.421
	Quintile 4	0.212	0.409	0.300	0.458
	Quintile 5	0.167	0.373	0.300	0.458
Female partner					
Age		43.073	9.233	44.009	8.313
Education	Low	0.346	0.476	0.205	0.404
	Medium	0.469	0.499	0.464	0.499
	High	0.185	0.388	0.332	0.471
Occupation	Blue-collar low	-	-	0.132	0.339
	Blue-collar high	-	-	0.125	0.330
	White-collar low	-	-	0.390	0.488
	White-collar high	-	-	0.354	0.478
Male partner					
Age		45.999	9.134	46.240	8.392
Education	Low	0.314	0.464	0.215	0.411
	Medium	0.485	0.500	0.464	0.499
	High	0.202	0.401	0.322	0.467
Occupation	Blue-collar low	0.172	0.377	0.124	0.330
	Blue-collar high	0.388	0.487	0.303	0.459
	White-collar low	0.145	0.352	0.133	0.340
	White-collar high	0.295	0.456	0.440	0.496
N couple-months		1.192.721		544.257	
N couples		36.601		16.931	

Note: The final sample size is smaller than the one initially computed because we censor couples when men become inactive or a women's labour supply declines.

Supplementary Table 5 Estimated change in women's labour supply depending on the duration of men's unemployment (3 months, more than 3 up to 6 months and over 6 months)

Explanatory variables	3 months		more than 3 up to 6 months		over 6 months	
	Sample A	Sample B	Sample A	Sample B	Sample A	Sample B
Men's unemployment	0.0641*** (0.0105)	0.0815*** (0.0172)	0.0313*** (0.0083)	0.036 (0.0231)	0.0718*** (0.0132)	0.0929*** (0.0187)
Household characteristics						
Married (<i>ref. cohabiting</i>)	-0.0358*** (0.0102)	-0.0093 (0.0042)	-0.0365*** (0.0101)	-0.0097* (0.0039)	-0.0357*** (0.0102)	-0.0095* (0.0042)
Number of children	-0.0129*** (0.0035)	-0.0001 (0.0027)	-0.0129*** (0.0036)	-0.0003 (0.0028)	-0.0129*** (0.0035)	-0.0001 (0.0028)
Child aged 0 to 3	-0.0638** (0.0184)	-0.0340* (0.0141)	-0.0631** (0.0187)	-0.0343* (0.0142)	-0.0634** (0.0184)	-0.0342* (0.0142)
Child aged 4 to 6	0.0301* (0.012)	-0.0096 (0.0078)	0.0305* (0.012)	-0.0095 (0.008)	0.0304* (0.012)	-0.0098 (0.0077)
Child aged 7 to 12	0.0147 (0.0076)	-0.0121** (0.0047)	0.0149 (0.0078)	-0.0123** (0.005)	-0.0149* (0.0076)	-0.0122** (0.0047)
Income (<i>ref. Quintile 1</i>)						
Quintile 2	0.0223*** (0.0059)	-0.0065 (0.0087)	0.01988*** (0.0059)	-0.0059 (0.0085)	0.0221*** (0.006)	-0.0068 (0.0085)
Quintile 3	0.0561*** (0.0088)	0.0006 (0.0096)	0.0548*** (0.0088)	-0.0007 (0.0095)	0.0559*** (0.0089)	-0.0002 (0.0095)
Quintile 4	0.0823*** (0.0117)	0.0181 (0.0111)	0.0811*** (0.0115)	0.0174 (0.011)	0.0824*** (0.0117)	0.0174 (0.0111)
Quintile 5	0.0891*** (0.0109)	0.0284* (0.0112)	0.0885*** (0.0109)	0.0282* (0.0111)	0.0890*** (0.0109)	0.0277* (0.011)
Female characteristics						
Age	-0.0030*** (0.0005)	-0.0028*** (0.0005)	-0.0030*** (0.0005)	-0.0027*** (0.0005)	-0.0030*** (0.0005)	-0.0028*** (0.0005)
Education (<i>ref. low</i>)						
Medium	0.0369*** (0.0082)	0.0084 (0.0071)	0.0357*** (0.0082)	0.0081 (0.007)	0.0368*** (0.0082)	0.0081 (0.0072)
High	0.1057*** (0.0109)	0.0293** (0.0092)	0.1037*** (0.0115)	0.0285** (0.0088)	0.1054*** (0.009)	0.0288** (0.0093)

Occupation (<i>ref. Blue low skilled</i>)	-	-	-	-	-	-
Blue-collar high skilled	0.0227*		0.0216		0.0226*	
	(0.011)		(0.0111)		(0.0109)	
White-collar low skilled	0.0218*		0.021		0.0221*	
	(0.0107)		(0.011)		(0.0107)	
White-collar high skilled	0.0503***		0.0503***		0.0507***	
	(0.0141)		(0.0144)		(0.0141)	

Male characteristics

Age	-0.0025***	-0.0007	-0.0024***	-0.0008	-0.0025***	-0.0008
	(0.0004)	(0.0006)	(0.0004)	(0.0006)	(0.0004)	(0.0006)
Education (<i>ref. low</i>)						
Medium	0.0062	-0.0078	0.006	-0.0087	0.0062	-0.0074
	(0.0057)	(0.0081)	(0.0059)	(0.0084)	(0.0058)	(0.0081)
High	-0.0076	-0.0123*	-0.0079	-0.0133*	-0.0078	-0.0119
	(0.0051)	(0.0062)	(0.0054)	(0.0066)	(0.0051)	(0.0062)

Occupation (ref. Blue low skilled)

Blue-collar high skilled	-0.0061	-0.0061	-0.0051	-0.0053	-0.0062	-0.0062
	(0.0078)	(0.0076)	(0.0079)	(0.0077)	(0.0079)	(0.0076)
White-collar low skilled	0.0003	-0.0012	0.0004	-0.0005	0.0002	-0.0014
	(0.0067)	(0.0063)	(0.0066)	(0.0062)	(0.0068)	(0.0063)
White-collar high skilled	-0.0173**	-0.0142*	-0.0160**	-0.0145*	-0.0173**	-0.0145*
	(0.0052)	(0.0073)	(0.0047)	(0.0073)	(0.0052)	(0.0072)

Country control variables

Unemployment rate	0.0016	0.0037	0.0013	0.0032	0.0016	0.0037
	(0.0038)	(0.0037)	(0.0039)	(0.0036)	(0.0038)	(0.0037)
Female employment	0.0084*	0.0101*	0.0084*	0.0100*	0.0085*	0.0101*
	(0.0036)	(0.0034)	(0.0036)	(0.0034)	(0.0036)	(0.0034)
Women gender role attitudes	0.0015	0.0016	0.0015	0.0015	0.0015	0.0016

	(0.0014)	(0.0015)	(0.0014)	(0.0014)	(0.0014)	(0.0014)
Men gender role attitudes	0.001	0.0047*	0.0009	0.0047*	0.001	0.0047*
	(0.0013)	(0.0022)	(0.0013)	(0.0023)	(0.0013)	(0.0022)
N couple-months	1.192.721	544.257	1.168.164	538.061	1.186.926	542.707
N couples	36.601	16.931	36.596	16.931	36.601	16.931

Note: * 0.05 ** 0.01 *** 0.001; Blue-collar low skilled (ISCO 8-9), Blue-collar high skilled (ISCO 6-7), White-collar low skilled (ISCO 4-5), White-collar high skilled (ISCO 1-3)

Supplementary Table 6 Sample descriptive statistics (Study#2)

Variable		Sample a		Sample b	
		Mean	SD	Mean	SD
Union	Cohabiting	0.077	0.267	0.142	0.349
	Married	0.923	0.267	0.858	0.349
	Children	0.934	1.083	1.012	0.996
	Child 0-3	0.247	0.431	0.188	0.391
	Child 4-6	0.093	0.290	0.131	0.338
	Child 7-14	0.187	0.390	0.282	0.450
	Female partner				
Age	25-29 years of age	0.089	0.284	0.056	0.229
	30-34 years of age	0.140	0.347	0.131	0.337
	35-39 years of age	0.150	0.357	0.191	0.393
	40-44 years of age	0.144	0.351	0.211	0.408
	45-49 years of age	0.143	0.350	0.190	0.392
	50-54 years of age	0.144	0.351	0.140	0.347
	55-59 years of age	0.128	0.334	0.069	0.253
	60-64 years of age.	0.062	0.242	0.013	0.115
		low education	0.373	0.484	0.225
Education	medium education	0.490	0.500	0.510	0.500
	high education	0.138	0.344	0.265	0.441
Occupation	blue-collar low-skilled	-	-	0.204	0.403
	blue-collar high-skilled	-	-	0.049	0.217
	white-collar low-skilled	-	-	0.418	0.493
	white-collar high-skilled	-	-	0.329	0.470
Previous employment experience	No	0.257	0.437	-	-
	Yes	0.743	0.437	-	-
Male Partner					
Age	25-29 years of age;	0.035	0.185	0.027	0.161
	30-34 years of age	0.106	0.308	0.092	0.289

	35-39 years of age	0.142	0.349	0.163	0.370
	40-44 years of age	0.146	0.353	0.201	0.401
	45-49 years of age	0.147	0.354	0.203	0.402
	50-54 years of age	0.162	0.369	0.172	0.377
	55-59 years of age	0.176	0.381	0.113	0.317
	60-64 years of age.	0.086	0.280	0.029	0.168
Education	low education	0.309	0.462	0.222	0.416
	medium education	0.518	0.500	0.512	0.500
	high education	0.173	0.378	0.266	0.442
Occupation	blue-collar low-skilled	0.301	0.459	0.221	0.415
	blue-collar high-skilled	0.275	0.447	0.214	0.410
	white-collar low-skilled	0.146	0.354	0.144	0.352
	white-collar high-skilled	0.275	0.446	0.419	0.493
Second job	No	0.977	0.151	0.960	0.195
	Yes	0.021	0.144	0.038	0.192
N couple months		909.616	511.072		
N couples		378.281	200.425		

Supplementary Table 7 Overview of Countries Included in the analyses (Study#2)

Country	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
AT	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
BE	X	X	X	X	X	X	X	X	X	X	X	X	0	0	0
BG	X	X	X	0	0	0	0	0	0	0	0	0	0	0	0
CY	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
CZ	X	X	X	X	X	X	0	0	0	0	0	0	0	0	0
EE	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
ES	X	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FR	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
GR	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
HR	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
HU	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
IE	0	0	X	X	X	X	X	X	X	X	X	X	X	X	X
IT	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
LT	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
LU	X	X	0	0	0	0	0	0	0	0	0	0	0	0	0
LV	X	X	X	X	X	X	X	X	X	X	X	X	X	X	0
MT	0	0	0	0	X	X	X	X	X	X	X	X	X	X	X
NL	X	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PL	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
PT	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
RO	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
SI	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
SK	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
UK	0	0	0	X	X	0	0	0	0	0	0	0	0	0	0

Notes: Overview of countries included in the analysis, where “X” denotes that a country is included in the analysis and “0” denotes that a country is not included in the analysis. The structure of country-years covered in the analysis is determined by the LFS quarterly data availability. EU-LFS includes data on Germany for the year 2006, however we dropped it as there were 18 and, respectively, 16 couple-quarter observations in our two samples

Supplementary Table 8 Sample descriptive statistics (Study#3)

Variable		Sample a		Sample b	
		Mean	SD	Mean	SD
Union	Cohabiting	0.099	0.299	0.162	0.369
	Married	0.901	0.299	0.838	0.369
Children		1.145	1.121	1.011	0.998
Child 0-3		0.316	0.465	0.186	0.389
Child 4-6		0.109	0.311	0.131	0.338
Child 7-14		0.160	0.367	0.219	0.414
Female partner					
Age	25-29 years of age	0.102	0.303	0.053	0.224
	30-34 years of age	0.167	0.373	0.124	0.329
	35-39 years of age	0.173	0.378	0.183	0.387
	40-44 years of age	0.159	0.365	0.208	0.406
	45-49 years of age	0.150	0.357	0.197	0.398
	50-54 years of age	0.137	0.344	0.149	0.356
	55-59 years of age	0.090	0.287	0.074	0.261
	60-64 years of age.	0.022	0.148	0.013	0.112
Education	low education	0.364	0.481	0.196	0.397
	medium education	0.471	0.499	0.519	0.500

	high education	0.166	0.372	0.286	0.452
Occupation	blue-collar low-skilled	-	-	0.204	0.403
	blue-collar high-skilled	-	-	0.038	0.191
	white-collar low-skilled	-	-	0.426	0.495
	white-collar high-skilled	-	-	0.332	0.471
Previous employment experience	No	0.270	0.444	-	-
	Yes	0.730	0.444	-	-
	Male Partner				
	25-29 years of age;	0.041	0.197	0.027	0.161
	30-34 years of age	0.125	0.331	0.088	0.283
	35-39 years of age	0.166	0.372	0.155	0.362
	40-44 years of age	0.165	0.371	0.196	0.397
Age	45-49 years of age	0.156	0.363	0.206	0.405
	50-54 years of age	0.155	0.362	0.178	0.382
	55-59 years of age	0.137	0.344	0.120	0.325
	60-64 years of age.	0.055	0.227	0.030	0.172
Education	low education	0.321	0.467	0.195	0.397
	medium education	0.487	0.500	0.524	0.499
	high education	0.192	0.394	0.280	0.449
Occupation	blue-collar low-skilled	0.296	0.456	0.216	0.412

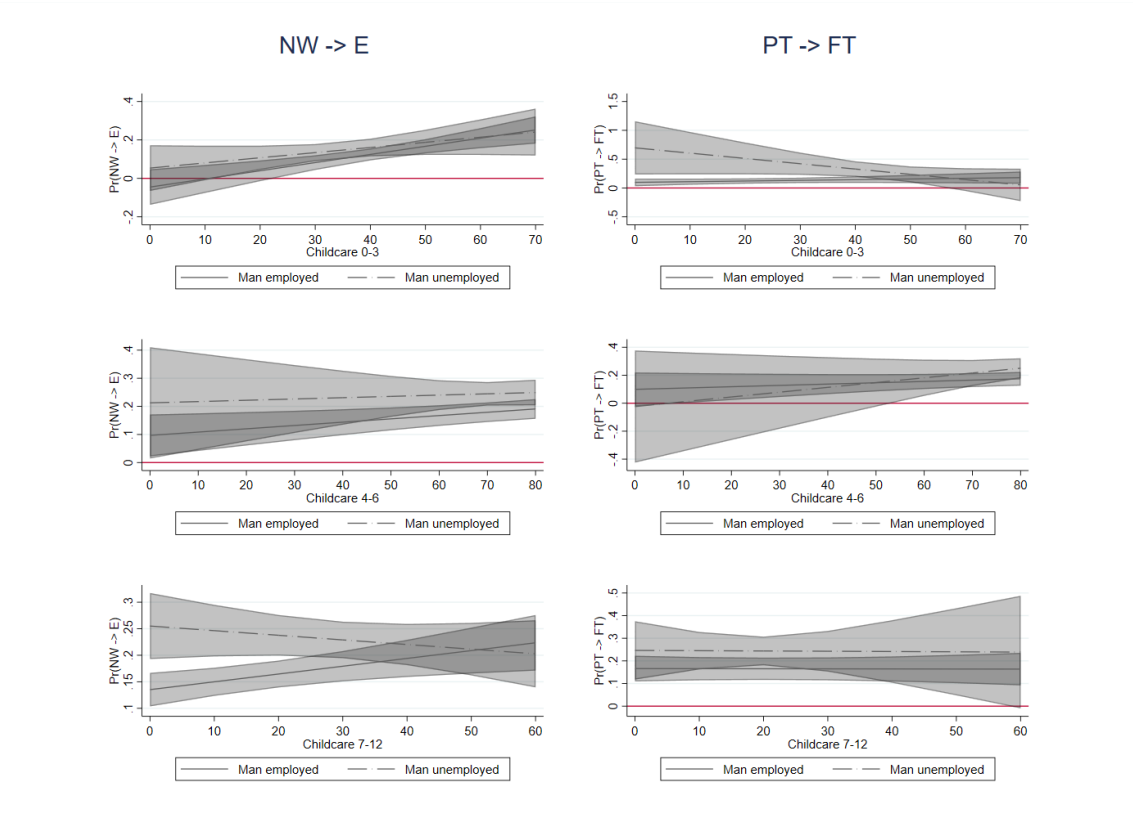
	blue-collar high-skilled	0.263	0.440	0.209	0.407
	white-collar low-skilled	0.152	0.359	0.144	0.351
	white-collar high-skilled	0.289	0.453	0.431	0.495
Second job	No	0.979	0.143	0.965	0.184
	Yes	0.021	0.143	0.035	0.184
N couple-months		445.267		351.845	
N couples		185.259		138.164	

Supplementary Table 9 Overview of Countries Included in the analyses (Study#3)

Country	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
AT	X	X	X	X	X	X	X	X	X	X	X
BE	X	X	X	X	X	X	X	X	0	0	0
CZ	X	X	0	0	0	0	0	0	0	0	0
EE	X	X	X	X	X	X	X	X	X	X	X
FR	X	X	X	X	X	X	X	X	X	X	X
GR	X	X	X	X	X	X	X	X	X	X	X
HU	X	X	X	X	X	X	X	X	X	X	X
IE	X	X	X	X	X	X	X	X	X	X	X
IT	X	X	X	X	X	X	X	X	X	X	X
LT	0	0	0	0	0	X	X	X	X	X	X
LV	0	0	0	X	X	X	X	X	X	X	0
PL	X	X	X	X	X	X	X	X	X	X	X
PT	X	X	X	X	X	X	X	X	X	X	X
SI	X	X	X	X	X	X	X	X	X	X	X
SK	X	X	X	X	X	X	X	X	X	X	X

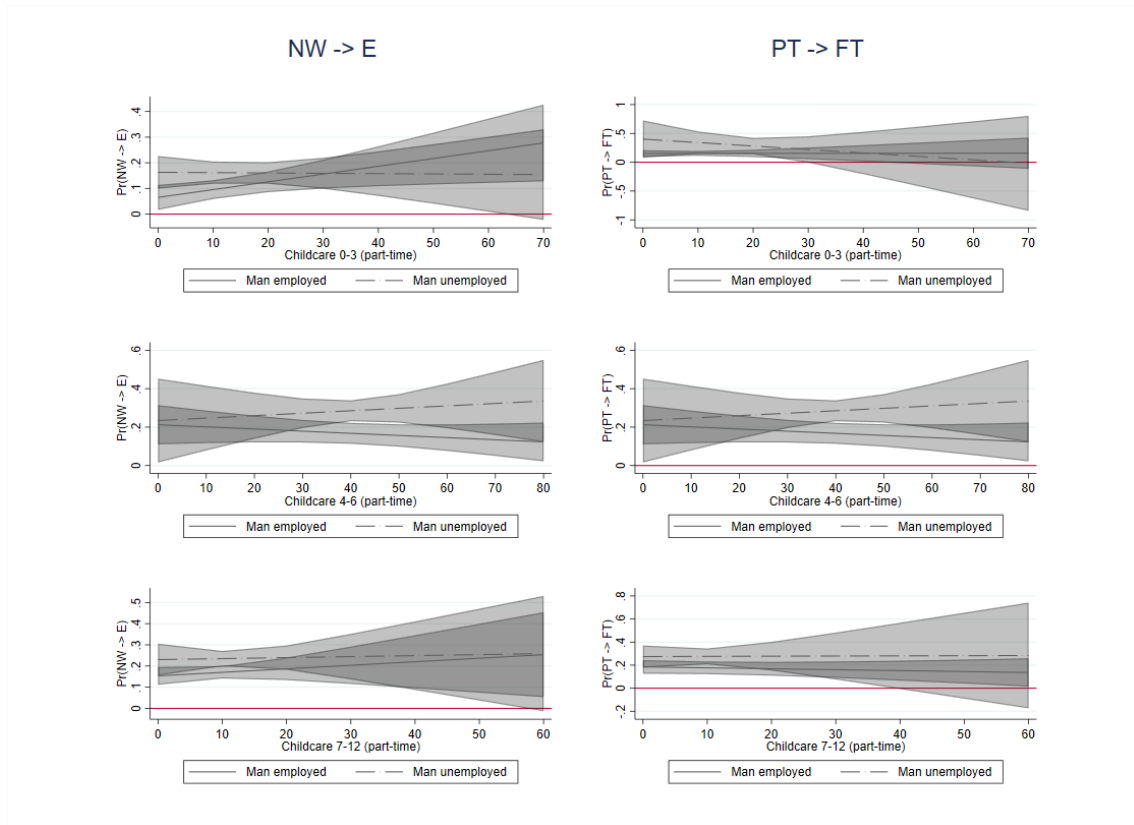
Notes: Overview of countries included in the analysis, where “X” denotes that a country is included in the analysis and “0” denotes that a country is not included in the analysis. The structure of country-years covered in the analysis is determined by the LFS quarterly data availability and the availability of our policy variables.

Supplementary Figure 1 Labour supply increase of women by childcare availability (general)



Note: 95% confidence intervals; the models include the control variables at individual, households and country level

Supplementary Figure 2. Labour supply increase of women by childcare availability (part-time)



Note: 95% confidence intervals; the models include the control variables at individual, households and country level



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This project has received funding from the European Union's Horizon Europe research and innovation programme under Grant Agreement No Project 101060410 and Innovate UK, the UK's Innovation Agency.

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