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COUPLES' LABOUR SUPPLY RESPONSES TO JOB LOSS: GROWTH AND RECESSION COMPARED*

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We examine whether couples in the UK increase labour supply to cushion the fall in earnings from a job loss, comparing periods of growth and recession. We consider both male and female earners and various dimensions of labour supply adjustment. We find evidence of labour supply reactions, but they can be negative as well as positive, particularly at the extensive margin. During the recession, household reactions are either unchanged or couples increase their labour market attachment, with bigger positive reactions and smaller negative ones. People do not react in advance of job losses, suggesting that unemployment is a surprise.

1 Introduction

One advantage of living in a couple rather than alone is that economic risks can be shared. When a single person loses their job they have to fall back on personal savings, unemployment insurance or external support networks to maintain a minimum level of consumption. When a member of a couple loses their job, there is an additional margin of adjustment: the other partner

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can increase their labour supply. In this paper, we investigate this household insurance mechanism, with a focus on the role it played during the Great Recession and its aftermath (2008–11), as compared to the preceding period of economic growth (from 1992 until 2007).

While previous studies have investigated couples' labour supply reactions to job loss, few have explicitly considered recessions, which is precisely when the number of job losses peaks and additional labour income is arguably of most value to households. After falling from 9.9 per cent in 1992 to 5.3 per cent in 2007 just before the Great Recession, the UK unemployment rate rose back to 8.1 per cent in 2011 (ONS, 2013). This represented a major shock to households that affected both male and female earners. To our knowledge, only one previous study (Harkness and Evans, 2011) has looked at UK couples' labour supply reactions during the Great Recession, and this looked only at the first phase of the downturn (2008–9), which was dominated by men's job losses.[1] We provide a longer view by considering the recession and subsequent period of stagnation up until 2011. In addition, ours is one of the first studies to also examine how men react to their female partner's job loss—previously the exclusive focus of the literature was on how women react to their male partners' job loss. Such a focus appears unwarranted now that the vast majority of working couples contain two earners. In contrast with the previous literature, we also explicitly compare the behaviour of single and dual earner couples, examining their responses along multiple dimensions. Previous work has emphasized the need to examine the dynamics and timing of labour supply responses, and thus we use panel data from the UK Quarterly Labour Force Survey (LFS).

In the next section, we discuss the background and previous literature on household responses to employment shocks. We discuss the data and descriptive statistics in Section 3 and our methodology in Section 4. Section 5 discusses the results while Section 6 concludes.

2 Background

It has long been recognized that individuals and households can partially insure themselves against the income shocks from job loss by running down savings, borrowing or delaying purchase of durable goods (Attanasio et al., 2005; Benito and Saleheen, 2013). But the household, as opposed to the individual, benefits from an additional margin of adjustment: one member of the household may be able to take on additional work to compensate for another's job loss. This labour supply reaction is termed the added worker effect (AWE) and was identified as long ago as the 1940s (Gong, 2011).

[1]The unemployment rate of men rose by 2.4 per cent points (pp) between 2008 and 2009, compared with 1.3pp for women. Thereafter men's unemployment stabilised at 8.6%, while women's unemployment rose by a further 0.8pp, reaching 7.3% in 2011.

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Numerous studies have investigated the AWE since the advent of large-scale micro data in the early 1980s, focussing in particular on the response of women to their partner's job loss. While some studies conclude there is no AWE (Layard et al., 1980; Maloney, 1991; Spletzer, 1997; Bingley and Walker, 2001), others have found that women variously respond to a partner's job loss by looking for work (Lundberg, 1985; Mattingly and Smith, 2010), starting work (Lundberg, 1985; Juhn and Potter, 2007; Kohara, 2010; Mattingly and Smith, 2010) or increasing their work hours (Gong, 2011; Harkness and Evans, 2011). For the UK, there is little evidence for the AWE from previous studies, although most date from well over a decade ago. Layard et al. (1980) found that women with unemployed husbands were less, not more, likely to work than (observationally) similar women with employed husbands. Two other studies concluded that a husband's long-term unemployment reduced women's transitions into work from inactivity (McGinnity, 2002) and increased the likelihood of women choosing not to participate (Bingley and Walker, 2001). The dominant explanation for these 'reverse' AWEs is the disincentive effect of means-tested benefits when a partner loses their job. As Harkness and Evans (2011) note, the benefit system in the UK has been reformed in recent years to 'make work pay'; nevertheless, even in their study covering 2006–9 they still find a husband's nonemployment is associated with a lower probability of his partner being in work (although a partner already in work is more likely to increase her hours).

There are a number of reasons why AWE estimates may depend on economic context and thus vary across studies. Within a standard lifecycle framework with no credit constraints, the AWE is predicted to be small or nonexistent when job losses are known to be likely, e.g. as part of the inherent risk associated with an occupation or industry. In this scenario, a job loss is just a transient shock that does not change expected future earnings, and so couples cover the temporary income loss by borrowing or dissaving. However, the prediction changes if the job loss comes as a shock: in this case it is 'new information' that signals probable lower earnings in future (see Stephens, 2002, who notes evidence that displaced workers suffer permanent earnings losses), and it is optimal for the partner to permanently increase their labour supply to compensate. If, in addition, couples face credit constraints and so cannot smooth consumption by borrowing, then even expected job losses will lead partners to increase their labour supply (although the increase will only last until the unemployed partner regains a job).

Against this, there are a number of factors that may dampen reactions to job loss: couples may be able to rely on other income sources, most obviously unemployment insurance (Cullen and Gruber, 2000); or the two partners' non-market time may be complementary so a job loss raises the value of the other partner's non-market time (Maloney, 1991). A job loss by

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one partner may also be a sign of weakness in the local labour market, which can lead to an opposing discouraged worker effect (DWE) whereby the other partner is less likely to enter the labour market or find work (Layard et al., 1980). And if there are labour market frictions individuals may not be able to move into work straightaway and thus the measured reaction may be muted or delayed.

Since the balance of these factors generally changes during recessionary periods, we may expect to find that the estimated AWE differs between periods of growth and recession, and particularly the Great Recession beginning in 2008 (Mattingly and Smith, 2010; Starr, 2014). First, workers can expect to be unemployed for longer periods during a recession, so a job loss is less likely to be a transient shock. For instance the Great Recession arguably led to a structural change in the economy that caused near-permanent declines in employment in particular sectors such as construction (Starr, 2014). Second, credit is typically less available in recessions—and particularly during the most recent downturn which was sparked by the credit crunch (Kamath et al., 2011). Third, the Great Recession was not forecast, so couples are more likely to have to resort to increased labour supply rather than savings to maintain their consumption. Fourth, the UK recession disproportionately hit men's jobs in its first phase (2008–9), thus the female partners of unemployed men may have been able to take up the slack. However, opposing these four factors, there may also be a larger DWE if the lower overall level of labour demand in a recession reduces the likelihood of a partner finding work. Therefore, on balance, the size of the net effect becomes an empirical question.

Only a handful of previous studies have compared recessions and periods of growth (only one for the UK). Juhn and Potter (2007), using US data covering 1968–2005, found that the AWE was higher during periods when the economy was moving into recession (although the difference from other periods was not statistically significant). Mattingly and Smith (2010), comparing 2004–5 and 2008–9 in the USA, found that the AWE was larger during 2008–9 (the recession); in particular women whose partners had lost their jobs were more likely to succeed in finding work (possibly because they were prepared to consider lower quality jobs). In one of the rare papers to look at the AWE for both men and women, Starr (2014) compared the employment rates of individuals with workless spouses against other individuals, and looked to see how these rates changed over 2005–9 in the USA. Consistent with a stronger AWE during the recession, the employment rates of women with workless husbands rose during the recession, while employment fell for other women. Similar, but substantially weaker, effects were found for men. Like the US studies, Parker and Skoufias (2004), who compared the Mexican Peso crisis with a period of prosperity, also concluded that the AWE was stronger during a recession. Most recently, a cross-country EU study by Bredtmann et al. (2014) found that the AWE was larger at higher levels of unemployment.

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For the UK, Harkness and Evans (2011), using data from 2006–9, found that the women partnered with nonworking men were less likely to be in work, but that this negative association was reduced during 2008–9 (the recession). They found similar, but weaker relationships, using transitions data, concluding that job retention among women whose partners lost their jobs was higher in the recession than before. Compared to Harkness' and Evans' study, we use more years of data (starting from 1995 and covering the downturn until 2011), we examine men's reactions to their female partners' job loss, and we decompose labour market entry into job finding and search.[2]

3 Data and Descriptive Statistics

To analyse couples' response to job loss over the business cycle we use the quarterly UK LFS for the period 1992q2–2011q1. The LFS is a survey of households which collects a large amount of individual and household characteristics, with focus on labour market variables such as education, employment status, job search activities and job characteristics. The LFS interviews every adult member of the household and allows us to match couples as well as other adults living in the same household.

The LFS has a rotating panel structure in which all adults in each household are interviewed for up to five successive quarters. This allows us to analyse quarter-on-quarter changes in the working situation of each member of the household. Our sample includes married or cohabiting couples who participated in the LFS for at least four consecutive quarters, and in which both partners are of working age but at least 23 years old (23–64 for men and 23–59 for women). We restrict the sample to people aged 23 and over to exclude individuals who may have a job but may still be completing their education; educational qualifications therefore become a time-invariant characteristic. As we wish to avoid potential complications arising from the labour supply of other household members, we also exclude from the sample those households in which other members—excluding the two partners—work, either in a paid job or as self-employed. Finally, we exclude those households that are workless for the whole observation period, since they cannot be subject to employment loss. Overall our sample comprises 70 per cent dual-earner households (i.e. in which both partners work), 22 per cent male breadwinner households (only the man works) and 8 per cent female breadwinner households.

The survey asks questions on job search to both employed and unemployed respondents. Hence, besides analysing the probability that the

[2]We also restrict our attention to involuntary job losses, which are most relevant to our investigation of the AWE, whereas Harkness and Evans (2011) consider job losses in general. Voluntary and involuntary job losses may have different effects if, for example, a voluntary job loss is the result of a joint household decision about who should work.

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respondent finds a job following a job loss of the partner, we can also identify whether the respondent is actively searching for a job. This is likely to be particularly important in periods of recession when it becomes harder to find a (new) job. Furthermore, since such questions are also asked to respondents who already have a job, we can analyse whether the impact of the partner's job loss differs among employed and jobless respondents. We identify whether a person is looking for a job on the basis of their answers to three types of questions and classify as searching those who: (i) are looking for employment, either paid employment or are looking for business opportunities or taking steps to open their own business; (ii) have looked for work in the last four weeks, and (iii) mention at least one method of job search. We classify as inactive all those who are not working and not actively looking for employment opportunities (according to criteria 1–3 above). Among jobless respondents, we define as searching all those who are unemployed (and therefore searching by definition), or who are classified as inactive, e.g. because they are not readily available to start a job, but are actively searching.

For respondents who already have a job we also analyse whether the partner's job loss is correlated with a change in working hours or with a different probability of quitting the current job voluntarily. We classify as voluntary quits those cases where the reason for leaving the previous job was: resigned; gave up job for health reasons; took early retirement; retired (at or after statutory retirement age); gave up job for family or personal reasons; and other reasons. Throughout the analysis our main explanatory variable is a dummy which has value one for all those respondents whose partner experienced an involuntary job loss (i.e. when the reason to leave the job was: dismissed; made redundant/took voluntary redundancy; or temporary job finished), and zero for those whose partner did not experience any change or quit their job voluntarily. Since the variable we use to identify the reason for the job loss is available only from the second quarter of 1995, our empirical models focus on this shorter time period, while the descriptive statistics use the longest period, starting in 1992, wherever possible.

Figure 1 shows the proportion of employed LFS respondents who lose their job involuntarily by the following quarter. Before the recession (2007–8) there are only minor differences between men and women and a flatter profile of job losses over time. However, with the onset of the recession the proportion of job losses increases sharply for both men and women, although the increase for men is much larger than the increase for women. Following these increases, however, job losses return to near previous levels so that the proportions in 2009 are similar or smaller than those in 1995. Our investigation of the AWE exploits both the spike in involuntary job losses that occurred post-2007 and the fact that households suffering job losses during this period were facing a much tougher economic environment than their counterparts in the preceding years.

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FIG. 1. Quarterly Job Losses Over the Business Cycle

Descriptive statistics by type of household are shown in Table 1. In our data dual earner couples represent the majority of households (about 70 per cent of the total), with almost 22 per cent male breadwinner and less than 8 per cent female breadwinner households. Female breadwinner households are on average older than the other types of households (the average age of both the man and the woman is higher) and less likely to have dependent children. In dual earner households both man and woman are more likely to have higher qualification levels, male breadwinner households seem to be characterized by higher education for men while the opposite may be true for female breadwinner households (e.g. female breadwinners are more likely to be qualified to National Vocational Qualification (NVQ) level 4+ than their partners, and a relatively large share of men in these households have no qualifications). Perhaps not surprisingly, homeownership is higher among dual earner couples, while we do not find any relevant difference among single earner households.

Women in female breadwinner households are paid comparatively less per hour than those in dual earner households, are more likely to work part-time, in temporary jobs and in the public sector. Men in male breadwinner households are paid comparatively more per hour than those in dual earner households (as well as women in female breadwinner households), are more likely to work part-time, in temporary jobs and less likely to work in the public sector.

Table 2 shows transitions across types of households. Proportionally there are few transitions among working households, although they are relevant numerically (and it should be borne in mind they are quarterly transitions). Almost 89 per cent of male breadwinner households and about 83 per cent of female breadwinner households do not make any transitions. Most transitions are from single to dual earner households: almost 13 per

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Table 1
Descriptive Statistics by Type of Household (1992–2011)

	Male breadwinner	*Female breadwinner*	*Dual earner*
Dependent children	0.683	0.341	0.517
Other dependants	0.017	0.017	0.011
Home owners	0.742	0.746	0.865
Woman's characteristics			
Age	39.6	46.5	39.1
NVQ level 4+	0.196	0.256	0.329
NVQ level 3	0.121	0.105	0.139
NVQ level 2 + Apprenticeship	0.325	0.275	0.323
Other qualifications	0.139	0.141	0.102
No qualifications	0.218	0.224	0.107
Hourly wage (no self-employed)		8.71	9.30
Paid hours		28.6	29.8
Part-time		0.477	0.445
Temporary job		0.065	0.058
Public sector		0.415	0.397
Man's characteristics			
Age	41.8	49.8	41.2
NVQ level 4+	0.300	0.216	0.324
NVQ level 3	0.207	0.212	0.234
NVQ level 2 + Apprenticeship	0.230	0.228	0.253
Other qualifications	0.149	0.129	0.108
No qualifications	0.114	0.216	0.081
Hourly wage (no self-employed)	13.03		12.11
Paid hours	41.5		41.7
Part-time	0.067		0.036
Temporary job	0.045		0.033
Public sector	0.184		0.232
Observations	186,611	65,063	602,240
Observations[a] (wage—women)		17,401	169,121
Observations[a] (wage—men)	47,826		163,832

The number of observations pools all years and only includes household with information on all characteristics shown in this table (with the exception of wages).
[a]In the Labour Force Survey wage data are collected only in the first and fifth interview, thus reducing the number of observations for which such data are available. Observations on the other characteristics pool all five waves of data.

cent of female breadwinners and almost 9 per cent of male breadwinners. Some 4 per cent (= 3.4 + 0.6) of female breadwinner households experience a job loss, of which 15 per cent (= 0.6/4) transition to male breadwinner households (consistent with AWE behaviour) while the remainder are workless. Among male breadwinner households, 2.5 per cent lose their jobs and in 7 per cent (= 0.2/2.5) of these the male earner is replaced by the female. There are essentially no transitions for dual earner households: about 2.48 per cent transition to male breadwinner, 1.27 per cent transition into female breadwinner and 0.13 per cent transition into workless households.

When it takes longer to find a job, single earner households in which the breadwinner loses his or her job will transition into workless households. The last row of Table 2 focus on such workless households (those that are

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TABLE 2
QUARTERLY TRANSITIONS ACROSS TYPES OF HOUSEHOLDS (1992–2011)

	Male breadwinner t	*Female breadwinner t*	*Dual earners t*	*Workless t*	*Total*	*Obs.*
Male breadwinner $t-1$	88.83	0.18	8.66	2.34	100	209,758
Female breadwinner $t-1$	0.59	83.35	12.68	3.37	100	59,606
Dual earners $t-1$	2.48	1.27	96.12	0.13	100	687,894
Workless $t-1$	26.56	10.24	4.39	58.8	100	16,936
Total (per cent)	21.38	6.21	70.59	1.83	100	
Observations	208,247	60,509	687,658	17,780		974,194

This pools all years and only includes households with information on contiguous years and with information on household and individual characteristics shown in Table 1 (with the exception of wages and all other job characteristics). Households that are workless for the whole period of observation are excluded.

workless at time $t-1$—note that households that are workless over the whole period of analysis are excluded). Among these, less than 60 per cent are still workless in the following quarter (t): almost 27 per cent transition into male breadwinner, about 10 per cent transition into female breadwinner and about 4 per cent transition into dual earner households. Hence, worklessness, in our sample, is likely to be a relatively short-lived condition.

4 METHOD

The literature has used a variety of methods to estimate the effect of unemployment on spousal labour supply, which can essentially be divided into three types. Early studies (e.g. Layard et al., 1980; Bingley and Walker, 2001) tended to use cross-sectional methods and analyse employment in levels; but unless unemployment is endogenized (Cullen and Gruber, 2000; Bingley and Walker, 2001) these methods are vulnerable to unobserved permanent differences between couples that are correlated with both the risk of unemployment and labour supply. Moreover, these studies identify the effect of the state of ongoing unemployment rather than the shock of job loss.[3]

The second type of study also analyses labour supply in levels but controls for fixed effects (FE). The focus here is on the effect of job loss (rather than unemployment in levels), consistent with the interpretation of the AWE in the structural lifecycle model. The FE approach is well suited to estimating a structural lifecycle model, which implies the existence of an unobserved couple-specific effect (the initial marginal utility of wealth). Stephens (2002) presents a structural model as the basis for FE estimates

[3]McGinnity (2002) looks at the effect of the state of unemployment on the spouse's transitions in and out of the labour market. More recently Harkness and Evans (2011) included an analysis of the relationship between men's non-employment and their partners' employment.

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of women's annual leisure hours (defined as annual work hours subtracted from total available hours). More recent studies in this spirit include Gong (2011), who models labour force participation and full-time employment using FE linear probability models (LPM). Hardoy and Schøne (2014) also estimate FE specifications to explain employment (using a LPM) and annual income, although their specifications are not derived from a structural model.

Rather than looking at labour supply in levels, the third type of study focuses directly on transitions in employment or in participation (Parker and Skoufias, 2004; Juhn and Potter, 2007; Mattingly and Smith, 2010; Harkness and Evans, 2011; Bredtmann et al., 2014) or on changes in work hours (Kohara, 2010; Benito and Saleheen, 2013). Equations are generally specified as transitions models in reduced form, which allows for possible departures (discussed earlier) from the standard lifecycle model, as well as for alternative models based on social roles (see the discussion in Starr, 2014). As in the second type of study, unemployment is represented by a set of job loss dummies. While the estimated coefficients in these studies do not correspond to a well-defined structural AWE parameter, they do illustrate the net effect of different factors affecting the size of the AWE.

Most recent studies are of the third type and we follow this reduced-form approach in our analysis, estimating quarterly transition and change models for the following outcomes: becoming active, where we distinguish between job search, job finding and joining the labour force (starting a job search or finding a job); and, for dual-earner households, job retention, on-the-job-search and changes in hours worked. For simplicity, and to avoid situations in which both partners influence each other's behaviour, we exclude from the analysis the small proportion (less than 0.2 per cent) of cases in which both partners experience an involuntary job loss within the same quarter.

We start by focusing on male breadwinner households and by estimating models for the probability that the female partner enters the labour market in response to the male partner's job loss:

$$A_{it} = \Delta X'_{it}\beta_{11} + \sum_{k=-1}^{1} \beta_{12}^{k} P_{it+k} + \varepsilon_{1it} \tag{1}$$

The sample here includes only women who are inactive and not searching for a job at $t-1$: the dependent variable A_{it} is zero for women who are inactive and not searching for a job both at $t-1$ and t and one for those who are inactive at time $t-1$ but become active at time t. Here we define activity as being either employed, self-employed, unemployed or engaging in job search. Although information on job search of people other than the unemployed is rarely available in surveys, we believe it is important to include it in the dependent variable as a possible outcome of a partner's job loss. Given

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the sample restriction (women inactive at $t-1$), A_{it} can also be derived as the first difference of activity status (there is either no change or a change from inactivity to activity). But as we are modelling a transition in one direction only, we avoid delta notation (A_{it} cannot take negative values in this sample).[4] By contrast, the control variables X_{it} enter explicitly as first differences (note that the parameters in our models have two subscripts: the first refers to the model number and the second refers to the matrix of covariates). The transitions approach effectively removes time-invariant unobserved couple characteristics affecting employment levels.

In line with the third type of AWE study, focussing directly on the effect of job loss on transitions, the three dummies P_{it+k} are for changes in the employment situation of the partner. A spouse may react immediately to her partner's job loss, or even before if there is advance warning (Stephens, 2002; Gong, 2011). Alternatively it may take time for her to find a job if there are labour market frictions. Stephens (2002) finds small increases in wives' labour supply before a job loss and larger, persistent increases beginning with the job loss itself. There is some weak evidence that wives react further in advance of plant closings than layoffs, which it is argued are less publicized in advance.

We test whether there is a lagged response to partner's job loss with a dummy for whether the partner lost the job involuntarily between $t-2$ and $t-1$ (P_{it-1}); whether there is an immediate response with a dummy for whether the partner lost the job involuntarily between $t-1$ and t (P_{it}); and whether there is an anticipation effect by including a dummy for whether the partner lost the job involuntarily between t and $t+1$ (P_{it+1}). We look at the effect of involuntary job loss only, since a voluntary job quit may not prompt a response by the spouse (which would understate the true AWE) or the causality may be reversed if a husband is enabled to leave his job because his wife has increased her labour supply (potentially overstating the true AWE).[5] Some endogeneity may remain if some job losses recorded as involuntary are in fact voluntary (measurement error); or if unobserved couple characteristics affecting the partner's job transition probabilities (as opposed to employment levels) are correlated with job loss (Spletzer, 1997).

We allow for differences between recession and growth periods by including interactions between these three job loss dummies and a dummy identifying whether the change happens in a period of recession (i.e. if t is between 2008 and 2011). This allows us to test whether the coefficients β_{12}^{k}

[4]Similar reasoning applies to the outcomes of equations (2)-(4) and (6), The dependent variable in equation (5) is the change in hours ΔH_{it}.

[5]While most studies focus on involuntary job losses, or moves from employment to unemployment, others look at any job loss, and indeed Mattingly and Smith (2010) argue that transitions to inactivity should also be included because husbands may be discouraged from looking for work or be forced retirees.

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are different in periods of growth and of recession (similar to Juhn and Potter, 2007; Mattingly and Smith, 2010 among others).[6]

In X_{it} we include individual and household variables to control for wages and taste for leisure. We control for taste for leisure with one dummy for whether there are dependent children, one for whether there are other dependants and one for homeowners. We also include the square of age of the individual respondent and of the partner (the linear age term becomes a constant equal to one when first differences are taken) which, together with the homeownership dummy, should control for income and wealth (as the equations are gender-specific, we do assume that the income determination process is the same across men and women). Time-invariant characteristics, such as education, are not included as regressors because they drop out in first differencing.

In X_{it} we also include a dummy for whether year t was a year of recession or not and the unemployment rate at the level of Government Office Regions for England, plus Scotland, Wales and Northern Ireland. The regional unemployment rate is computed from the LFS using sample weights and should help us correct for the general conditions of the labour market in the region that may have an effect on the probability of finding a job and on the DWE. The recession dummy and the regional unemployment rates are not taken in differences since we want to isolate the impact of the recession.

We also wish to examine whether labour market entry is manifested as job search or job entry. Hence, we also estimate models similar to equation (1) with slightly different dependent variables:

$$F_{it} = \Delta X'_{it}\beta_{21} + \sum_{k=-1}^{1} \beta_{22}^{k} P_{it+k} + \varepsilon_{2it} \tag{2}$$

$$S_{it} = \Delta X'_{it}\beta_{31} + \sum_{k=-1}^{1} \beta_{32}^{k} P_{it+k} + \varepsilon_{3it} \tag{3}$$

where F_{it} represents job finding and S_{it} represents job search. Similarly to model (1), the samples for models (2) and (3) include only women who are inactive and not searching at time $t-1$. F_{it} is zero for women who are inactive and not searching for a job at $t-1$ and do not have a job at t (whether they have begun searching or are still inactive); and one for those who are

[6]The probability of finding a job partly depends on changes in labour supply and demand. Differences between supply and demand are likely to be relevant mostly when comparing periods of growth and recession. Our models include a dummy for the recession period, which should pick up most of these differences. Similarly, changes in the benefit system that took place during the recession should be picked up by the recession dummy as we do not have any evidence that such changes had differential impacts on those households in which one of the partners experienced a job loss.

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inactive at time $t-1$ but have a job at time t. S_{it} is zero for women who are inactive at $t-1$ and have either found a job or are still inactive at t; and one for those who are inactive at time $t-1$ and do not have a job but are actively searching for one at time t. P_{it+k} and X_{it} are the same as in equation (1).

We then estimate a second set of models with focus on female breadwinner households by estimating models similar to those in equations (1)–(3) in which the dependent variables A_{it}, F_{it} and S_{it} represent the man's (rather than woman's) reaction to the job loss of the female (rather than male) partner (P_{it+k}). X_{it} is exactly the same as in equations (1)–(3).

We complement the analysis of single earner couples with a third set of models focusing on dual earner couples. Since in dual earner couples both partners work, here we can observe different types of reactions compared to the previous models and focus on: on-the-job search, changes in hours worked and job retention. Once again, we start by investigating the woman's reaction to the man's job loss and estimate a model for on-the-job search. Women may start looking for a new or an additional job as a response to their partner job loss by looking for a higher paying job. Those working part-time and who are not able to increase their working hours in their current job may start looking for a full-time job. Hence:

$$OTJS_{it} = \Delta X'_{it}\beta_{41} + \sum_{k=-1}^{1} \beta_{42}^{k} P_{it+k} + \varepsilon_{4it} \tag{4}$$

where $OTJS_{it}$ represents on-the-job search. Here we focus on the sample of women who are employed (either in a paid job or as self-employed) at both $t-1$ and t and who are not engaging in on-the-job search at $t-1$. Hence, $OTJS_{it}$ is a dummy which is zero for women working and not engaging in on-the-job search both at time $t-1$ and t and one for women working and not engaging in on-the-job search at $t-1$ but working and engaging in on-the-job search at t. P_{it+k} and X_{it} are the same as in equations (1)–(3).

Rather than start searching for a new or an additional job, those who already have a job may respond to their partner's job loss by changing the number of paid hours they work.

$$\Delta H_{it} = \Delta X'_{it}\beta_{51} + \sum_{k=-1}^{1} \beta_{52}^{k} P_{it+k} + \varepsilon_{5it} \tag{5}$$

where the sample includes women who work both at $t-1$ and at t, either engaging in on-the-job search or not, and who report information on hours worked both at $t-1$ and t (this additional restriction excludes the self-employed, for which we have no data on hours worked). ΔH_{it} is the change in the number of paid hours between $t-1$ and t. P_{it+k} and X_{it} are the same as in the previous models. Here we include both women who remain in the

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same job and those who change job since it is possible that the job change is related to the desire for changes in working hours. It is plausible that women who cannot easily change their working hours within the same job will move to a new job offering the desired number of working hours. There are too few job changes to allow us to have separate estimations for new jobs.

Finally we analyse job retention as people may be less likely to quit their job voluntarily as a response to partner's involuntary job loss:

$$Q_{it} = \Delta X'_{it}\beta_{61} + \sum_{k=-1}^{1} \beta_{62}^{k} P_{it+k} + \varepsilon_{6it} \tag{6}$$

The sample here includes women who had a job at time $t-1$ and who, at time t where either still employed or had lost or quit their job: Q_{it} is zero for women who work both at $t-1$ and at t and one for those who work at $t-1$ but voluntarily quit their job (into inactivity) by time t. Those who lost their job involuntarily are coded as zero. In addition, since compared to prime age workers, those who are close to retirement age may react in a systematically different way to a job loss of their partners, here we only include respondents who are younger than 55 years of age. P_{it+k} and X_{it} are the same as in the previous models.

Finally, we analyse men's reaction to women's job loss in dual earner couples. We do this by estimating equations (4)–(6) in which the dependent variables $OTJS_{it}$, ΔH_{it} and Q_{it} represent the man's (rather than woman's) reaction to the job loss of the female (rather than male) partner (P_{it+k}). X_{it} is the same as in equations (1)–(3).

All models discussed in this section are estimated using OLS since unobserved heterogeneity cannot be removed by differencing in non-linear models (logit or probit) and given the non-linearity the results would be more difficult to interpret.[7]

5 Results

5.1 Single Earner Couples

We begin by looking at male breadwinner households which have traditionally been the focus of the AWE literature. Specifically we consider those households in which the woman was not working and not searching for a job at $t-1$ and examine her response at time t to her partner's job loss at $t-1$, t or $t+1$. The results are reported in Table 3. The first two columns show the impact that the man's job loss has on the probability that the woman moves into a job or starts actively searching for a job, while the last two columns separate the two actions (finding a job and starts searching).

[7]Non-linear models are preferred for predicting probabilities but our focus is on marginal effects.

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TABLE 3
WOMEN'S REACTION TO MEN'S JOB LOSS IN MALE BREADWINNER HOUSEHOLDS (ONLY MAN WORKS AT $t-1$)

Sample: women inactive at t−1	*(1) Start searching or find a job*	*(2) Find a job*	*(3) Start searching*
Man's job loss $t-1$	0.009	−0.009	0.018**
	(0.012)	(0.008)	(0.009)
Man's job loss t	0.002	−0.016**	0.018**
	(0.011)	(0.008)	(0.009)
Man's job loss $t+1$	−0.009	−0.013	0.004
	(0.011)	(0.008)	(0.008)
Man's job loss $t-1$ × Recession	0.020	−0.020	0.040
	(0.030)	(0.014)	(0.027)
Man's job loss t × Recession	0.046	0.030	0.015
	(0.031)	(0.022)	(0.023)
Man's job loss $t+1$ × Recession	0.033	0.019	0.014
	(0.030)	(0.022)	(0.022)
Δ age square of man	−0.013***	−0.009***	−0.005***
	(0.002)	(0.002)	(0.001)
Δ age square woman	−0.014***	−0.006***	−0.008***
	(0.002)	(0.002)	(0.001)
Δ dependent children	0.029*	0.020	0.009
	(0.016)	(0.014)	(0.009)
Δ other dependants	0.001	0.018	−0.016
	(0.026)	(0.019)	(0.018)
Δ home owners	−0.017	−0.004	−0.013
	(0.027)	(0.022)	(0.018)
Recession at time t	−0.013***	−0.012***	−0.002
	(0.003)	(0.002)	(0.002)
Regional unemployment (0−1)	−0.044	−0.182***	0.138***
	(0.061)	(0.049)	(0.039)
Intercept	0.100***	0.072***	0.028***
	(0.004)	(0.003)	(0.002)
Observations	71,882	71,882	71,882
Mean of dependent variable	0.089	0.056	0.034

Coefficients of linear models; robust standard errors in parenthesis.
* Significant at 10 per cent, ** Significant at 5 per cent, *** Significant at 1 per cent.

The combined labour market entry variable and job finding are both common outcomes in the literature, while the job search variable picks up unsuccessful searches lasting at least a quarter (shorter, successful searches are picked up in the job finding variable). Because longer periods of search are more common in a recession, we do not compare search activity across growth and recession periods, but only make descriptive comparisons of search versus job finding within periods. The last row of each table shows the mean of the dependent variables. This gives an idea of the probability of the event itself.

The control variables generally have the expected signs (thus labour supply appears lower among homeowners, perhaps a wealth effect) although they are often not significant. There is strong evidence that

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regional economic conditions affect labour supply as expected: higher regional unemployment is associated with more (unsuccessful) searching and less job finding. We find no impact of a partner's job loss in column (1), indicating no AWE in terms of labour market entry (either in periods of growth or recession).[8] However, we find differences between job finding and job search. Column (3) suggests that women are more likely to start searching (by 1.8pp) when the partner loses his job (either in the same quarter or in the following quarter). In contrast the probability of moving directly into a job—after a short search—is lower (by 1.6pp) in the same quarter when the partner experiences the job loss. These effects are both quite large when compared with the unconditional probabilities of starting to search (3.4 per cent) and finding a job (5.6 per cent) reported in the last row of Table 3.

This 'reverse AWE' in terms of employment is consistent with some previous studies of the UK which argue that the means-tested benefit system makes work less attractive to the spouse of an unemployed partner because his benefits are reduced as her earnings increase (see McGinnity, 2002 for the UK and Bredtmann et al., 2014 for UK and Ireland combined). It may only be worth the woman working if she can earn enough to compensate for benefit reductions—so while her partner's job loss triggers an increase in search, it takes longer to find an acceptable job.

We find no evidence of any anticipation effect for any of our outcomes and no additional impact of the recession. Nevertheless, the recession dummy confirms that it is harder for women to find a job during a recession, while it does not seem to have any relevant impact on the probability to start searching.

We next turn to female breadwinner households, which have rarely been analysed in the AWE literature, and, to our knowledge, never for the UK. Table 4 considers men who have no job and are not searching in $t-1$ and their reaction to their partner's job loss. Compared with their female counterparts, they are more sensitive to family structure: having dependent children is strongly associated with higher labour supply and having other dependents with less job entry. As for women, higher regional unemployment predicts more job search and less job finding. Column (1) suggests that men are more likely to enter the labour market as a response to their partner's job loss (by 5.6pp), and the response appears with a lag. As for male breadwinner households, reactions do not change in the recession, but in contrast we find a conventional positive AWE rather than the reverse

[8]Redundancy payments may ease the budget constraint and reduce the AWE. However, the small or nonexistent impacts shown in Table 3 are not due to the receipt of redundancy payment; the results do not change if we exclude from the analysis the small number of people who have received any type of redundancy payment or if we exclude all women who become self-employed.

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TABLE 4
MEN'S REACTION TO WOMEN'S JOB LOSS IN FEMALE BREADWINNER HOUSEHOLDS (ONLY WOMAN WORKS AT $t-1$)

Sample: men inactive at t−1	*(1) Start searching or find a job*	*(2) Find a job*	*(3) Start searching*
Woman's job loss $t-1$	0.056**	0.055**	0.001
	(0.025)	(0.022)	(0.013)
Woman's job loss t	0.000	0.004	−0.003
	(0.023)	(0.020)	(0.014)
Woman's job loss $t+1$	0.021	0.009	0.013
	(0.026)	(0.021)	(0.017)
Woman's job loss $t-1$ × Recession	0.045	−0.069*	0.114*
	(0.069)	(0.042)	(0.059)
Woman's job loss t × Recession	0.088	0.013	0.075
	(0.068)	(0.049)	(0.053)
Woman's job loss $t+1$ × Recession	−0.058	−0.039	−0.019
	(0.047)	(0.035)	(0.032)
Δ age square of man	−0.020***	−0.007**	−0.013***
	(0.004)	(0.003)	(0.002)
Δ age square woman	−0.014***	−0.011***	−0.003
	(0.004)	(0.004)	(0.003)
Δ dependent children	0.155***	0.104***	0.051*
	(0.042)	(0.037)	(0.027)
Δ other dependants	−0.091*	−0.074*	−0.017
	(0.051)	(0.043)	(0.032)
Δ home owners	−0.026	−0.016	−0.011
	(0.058)	(0.043)	(0.043)
Recession at time t	−0.003	0.001	−0.004
	(0.006)	(0.005)	(0.004)
Regional unemployment (0−1)	−0.008	−0.223**	0.215***
	(0.128)	(0.102)	(0.083)
Intercept	0.114***	0.083***	0.031***
	(0.008)	(0.007)	(0.005)
Observations	20,307	20,307	20,307
Mean of dependent variable	0.105	0.066	0.039

Coefficients of linear models; robust standard errors in parenthesis.
* Significant at 10 per cent, ** Significant at 5 per cent, *** Significant at 1 per cent.

AWE. This may be because, compared with women in male breadwinner households, men are more likely to move into full-time jobs with earnings that exceed any benefit loss.

Columns (2) and (3) separate job finding and job search and show the relationship between these two outcomes. Men are more likely to find a job one quarter after their spouse loses her job; however, the effect disappears during periods of recession (column (2)). It is also during a recession that we see an increase in job search, reflecting an increase in the difficulty to find a job. In all cases, however, men seem to respond with a lag. Also as in male breadwinner households, we do not see evidence that couples react to job losses ahead of time.

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Table 5
Women's Reaction to Men's Job Loss in Dual Earner Households (Both Man and Woman Work at $t-1$)

Sample: women working at $t-1$	*(1) Start searching on-the-job*	*(2) Change in hours*	*(3) Voluntarily quit*
Man's job loss $t-1$	0.002	−0.119	0.018***
	(0.006)	(0.166)	(0.006)
Man's job loss t	0.019***	−0.043	0.009
	(0.007)	(0.169)	(0.005)
Man's job loss $t+1$	−0.002	−0.034	−0.000
	(0.006)	(0.161)	(0.005)
Man's job loss $t-1$ × Recession	−0.003	0.624*	−0.027***
	(0.013)	(0.332)	(0.008)
Man's job loss t × Recession	0.003	−0.388	−0.006
	(0.015)	(0.344)	(0.009)
Man's job loss $t+1$ × Recession	0.007	0.505*	0.008
	(0.013)	(0.287)	(0.011)
Δ age square of man	−0.005***	0.014	−0.001
	(0.001)	(0.026)	(0.001)
Δ age square woman	−0.006***	−0.004	−0.001
	(0.001)	(0.027)	(0.001)
Δ dependent children	−0.015***	−0.144	0.039***
	(0.003)	(0.111)	(0.005)
Δ other dependants	−0.001	−0.050	−0.006
	(0.011)	(0.307)	(0.010)
Δ home owners	0.023*	−0.069	−0.009
	(0.014)	(0.300)	(0.011)
Recession at time t	−0.003**	−0.040	−0.006***
	(0.001)	(0.025)	(0.001)
Regional unemployment $(0-1)$	0.120***	1.113*	−0.030*
	(0.024)	(0.585)	(0.018)
Intercept	0.037***	−0.124***	0.022***
	(0.001)	(0.037)	(0.001)
Observations	242,983	209,666	215,793
Mean of dependent variable	0.041	−0.061	0.019

Coefficients of linear models; robust standard errors in parenthesis; hours worked are not available for the self-employed.
* Significant at 10 per cent, ** Significant at 5 per cent, *** Significant at 1 per cent.

5.2 *Dual-Earner Couples*

Next we turn to look at dual-earner couples, beginning with women's reactions to their male partners' job loss. The first column of Table 5 shows the impact that a job loss of the partner has on the probability of starting to search for a new or an additional job; the second column shows the impact on a change in hours worked; while the third shows the impact on the probability of giving up the job voluntarily. Women are more likely to begin on-the-job search if their partner loses his job (we investigate below whether this concerns full or part-time workers). The impact is contemporaneous (women whose partners have just lost their job are 1.9pp more likely to

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TABLE 6
WOMEN'S REACTION TO MEN'S JOB LOSS IN DUAL EARNER HOUSEHOLDS (BOTH MAN AND WOMAN WORK AT $t-1$)—WOMEN WORKING PART-TIME VS. FULL-TIME AT $t-1$

	(1) Start searching on-the-job		*(2) Change in hours*		*(3) Voluntarily quit*	
Sample: women working at $t-1$	*Part-time*	*Full-time*	*Part-time*	*Full-time*	*Part-time*	*Full-time*
Man's job loss $t-1$	−0.004	0.007	0.265	−0.394*	0.029***	0.011*
	(0.008)	(0.009)	(0.243)	(0.224)	(0.011)	(0.006)
Man's job loss t	0.023**	0.015	0.287	−0.327	0.007	0.011*
	(0.010)	(0.010)	(0.218)	(0.250)	(0.009)	(0.006)
Man's job loss $t+1$	0.004	−0.007	0.058	−0.058	−0.002	0.002
	(0.009)	(0.008)	(0.204)	(0.237)	(0.008)	(0.005)
Man's job loss $t-1$ × Recession	−0.017	0.004	0.487	0.856**	−0.048***	−0.013
	(0.016)	(0.019)	(0.544)	(0.418)	(0.011)	(0.009)
Man's job loss t × Recession	0.033	−0.019	−0.656	−0.112	−0.006	−0.007
	(0.027)	(0.017)	(0.481)	(0.482)	(0.016)	(0.011)
Man's job loss $t+1$ × Recession	0.009	0.004	0.210	0.670	−0.001	0.015
	(0.020)	(0.017)	(0.347)	(0.452)	(0.015)	(0.015)
Δ age square of man	−0.004***	−0.005***	−0.001	−0.005	−0.002	−0.000
	(0.001)	(0.001)	(0.033)	(0.039)	(0.001)	(0.001)
Δ age square woman	−0.004***	−0.007***	−0.078**	0.042	0.000	−0.002**
	(0.001)	(0.001)	(0.035)	(0.041)	(0.001)	(0.001)
Δ dependent children	−0.008	−0.018***	−0.152	0.127	0.047***	0.041***
	(0.009)	(0.004)	(0.223)	(0.127)	(0.012)	(0.005)
Δ other dependants	0.020	−0.017	−0.666	0.373	−0.022	0.006
	(0.016)	(0.016)	(0.435)	(0.417)	(0.020)	(0.008)
Δ home owners	0.026	0.021	0.342	−0.530	−0.011	−0.007
	(0.020)	(0.019)	(0.365)	(0.466)	(0.019)	(0.010)
Recession at time t	−0.002	−0.003**	−0.083**	0.020	−0.009***	−0.004***
	(0.002)	(0.002)	(0.035)	(0.036)	(0.001)	(0.001)
Regional unempl. (0−1)	0.189***	0.053	2.823***	0.947	−0.033	0.000
	(0.034)	(0.033)	(0.814)	(0.829)	(0.031)	(0.019)
Intercept	0.029***	0.044***	0.220***	−0.516***	0.030***	0.013***
	(0.002)	(0.002)	(0.050)	(0.054)	(0.002)	(0.001)
Observations	115,792	127,160	100,059	109,591	100,403	115,363
Mean of dependent variable	0.039	0.043	0.362	−0.449	0.027	0.012

Coefficients of linear models; robust standard errors in parenthesis.
* Significant at 10 per cent, ** Significant at 5 per cent, *** Significant at 1 per cent.

search) and there is no evidence that it differed during the recent recession. We also find that women seem to increase the number of hours worked (by around half an hour) during a recession (but not during the growth period), both with a lag, and in anticipation of the partner's job loss. This evidence of positive AWEs on the intensive margin is consistent with evidence from

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the few previous studies that include dual-earner couples (e.g. Gong, 2011; Harkness and Evans, 2011).

The last column of Table 5 also suggests that women are more likely to quit their job voluntarily as a response to their partner's job loss; a lagged effect of 1.8pp. Again we see evidence of a 'reverse AWE' at the extensive margin, this time among dual-earner couples. One explanation may be incentives in the means-tested benefit system as discussed, but the results is also consistent with the two partners' non-market time being complementary, i.e. partners enjoy spending time together or they are more productive in home production together than alone.[9] Previous evidence about retirement behaviour and the intra-household effects of work hours reduction policies suggests that complementary leisure leads people to work less if their partners also work less (Blau, 1998; Goux et al., 2014). Since in our models we only include people younger than 55, our results suggest that this may apply also to younger couples.[10] However, the recession reduces the rate of voluntary quits. Women are 0.6pp less likely to quit during recession and also on average less, not more, likely to quit as a lagged response to partner's job loss: the total lagged response in times of recession is −0.9pp (= 1.8–2.7).

We may expect women's reactions to the partner's job loss to differ depending on the type of job she was working in at $t-1$: we may see no AWE for women working full-time (Bredtmann et al., 2014; Hardoy and Schøne, 2014), while we may expect a bigger impact of partner's job loss on women working part-time (less than 30 hours per week). Table 6 replicates the models in Table 5, but separately for women who were working part- and full-time in $t-1$.

The results suggest that it is indeed women working part-time who are more likely to start engaging in on-the-job search as a reaction to their partner's job loss. This is not surprising since we also found a search AWE among women in male breadwinner households (Table 3), and households with a part-time worker are closer to being single-earner households than are dual full-time households. In contrast, we find that hours responses are driven by women in full-time work: curiously, they decrease their working hours as a lagged response to the partner's job loss during a period of

[9]Although the job loss is involuntary and the transitions analysis should remove time-invariant heterogeneity, there could be some upward bias from assortative mating if men are more likely to lose their jobs tend to be married to women who are more likely to quit their job.

[10]Some support for a role for benefits is that the effect may be stronger among lower-income households. Models estimated separately by men's education (not shown here but available on request) show regression coefficients that are slightly larger for men with low—rather than high—education. The results for women confirm that women with lower education are much more likely to quit their job in response to a partner's job loss than women with high education.

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growth, while hours increase if the partner's job loss happens during a recession.[11]

Both part-time and full-time workers seem more likely to voluntarily quit their job as a response to their partner's job loss, but again it is part-time workers who have the larger responses (2.9pp vs. 1.1pp). While women working full-time show both a contemporaneous and a lagged response, those working part-time show only a lagged response. In addition, for women working part-time, the positive quit effect is reversed if the partner's job loss happens during the recession.

Finally we consider men's reactions to a woman's job loss in dual earner couples: Table 7 analyses men who have a job in $t-1$ and their reaction to their partner's job loss.

Men who have a job do seem to react to a job loss of their partner by starting to engage in on-the-job search, but not by changing the number of hours worked. Moreover, the last column of the table suggests that, as for women, on average men's attachment to the labour market may decrease, not increase, when their partner loses her job: men are 1.3pp more likely to voluntarily quit their job as a response to their partner's job loss (but unlike women there is no difference during the recession).[12]

5.3 Sensitivity Analyses

There are two potential concerns related to our treatment of dynamic effects.[13] The first is that by estimating the anticipated and lagged impact of a partner's job loss, we limit our analysis to couples who are in the sample for at least four consecutive quarters. If those who are in the sample for at least four quarters are not a random sample our results may be biased. To check if this is the case we have re-estimated our models excluding the lags and leads. We first re-estimate the models on the restricted sample of couples who are observed for at least four consecutive quarters, and then on the full sample including also those couples who have been in the sample for a shorter period of time. The sign and magnitude of the coefficients does not vary across specifications and the increase in the sample size for the model based on the larger sample tends to increase the level of statistical significance of our results.

[11]The results are almost identical if we restrict the sample to women remaining in the same job, so the findings are not driven by the different requirements of a new job.

[12]Although the proportion of men working part-time is rather small (about 5%) for completeness we have estimated the models separate for part-time and full-time workers (the results are not shown here but available on request). We find some evidence that men working full-time are more likely to start search for a job in response to the partner's job loss and are more likely to decrease their working hours during periods of growth. While men working part-time are less likely to quit when the partner loses her job, those working full-time are more likely to quit.

[13]The results of the all sensitivity checks described here are available on request.

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TABLE 7
MEN'S REACTION TO WOMEN'S JOB LOSS IN DUAL EARNER HOUSEHOLDS (BOTH MAN AND WOMAN WORK AT $t-1$)

Sample: men working at $t-1$	*(1) Start searching on-the-job*	*(2) Change in hours*	*(3) Voluntarily quit*
Woman's job loss $t-1$	0.003	−0.249	0.001
	(0.005)	(0.169)	(0.002)
Woman's job loss t	0.011*	0.165	0.013***
	(0.006)	(0.177)	(0.004)
Woman's job loss $t+1$	0.008	−0.177	0.002
	(0.006)	(0.169)	(0.003)
Woman's job loss $t-1$ × Recession	0.000	0.001	0.001
	(0.012)	(0.029)	(0.006)
Woman's job loss t × Recession	0.013	0.006	−0.001
	(0.014)	(0.030)	(0.009)
Woman's job loss $t+1$ × Recession	0.020	0.120	−0.001
	(0.015)	(0.123)	(0.006)
Δ age square of man	−0.006***	0.531*	0.001
	(0.001)	(0.279)	(0.000)
Δ age square woman	−0.006***	−0.136	0.001
	(0.001)	(0.337)	(0.000)
Δ dependent children	0.011**	0.028	0.001
	(0.005)	(0.028)	(0.002)
Δ other dependants	0.000	1.140*	−0.012**
	(0.010)	(0.639)	(0.005)
Δ home owners	0.007	0.220	0.001
	(0.011)	(0.374)	(0.004)
Recession at time t	−0.009***	−0.585	−0.001
	(0.001)	(0.401)	(0.000)
Regional unemployment (0–1)	0.239***	0.368	0.034***
	(0.023)	(0.345)	(0.009)
Intercept	0.035***	−0.232***	0.004***
	(0.001)	(0.040)	(0.001)
Observations	297,152	248,182	246,258
Mean of dependent variable	0.046	−0.158	0.006

Coefficients of linear models; robust standard errors in parenthesis.
* Significant at 10 per cent, ** Significant at 5 per cent, *** Significant at 1 per cent.

The second concern is that we may be underestimating any job finding effects because our time window only extends back by one quarter. We therefore re-estimated our models excluding the lead ($t+1$) and including an additional two-quarter lag of job loss ($t-2$). We find similar results as previously with no additional effect at $t-2$, thus it does not appear that we are missing large job finding effects because of our short time window.

6 DISCUSSION AND CONCLUSIONS

We have examined how couples' labour supply behaviour in the UK responds to a job loss by one partner, comparing the period of growth of 1995–2007 to the Great Recession and its aftermath of 2008–11. Unlike most previous studies, we have looked at the reactions of both women and men to their partners'

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job loss. We have investigated couples' reactions along various dimensions and tested whether couples react in advance of job losses or with a delay.

We find that women in male breadwinner households whose partners lose their jobs are not more likely to enter the labour market than those whose partner does not experience a job loss. However, this null effect decomposes into a positive job search effect and a negative job entry effect. These findings are consistent with previous UK studies that find little evidence of a conventional AWE—if anything there appears to be a 'reverse AWE' such that women are less likely to join the labour market or find employment when their partners lose their job (possibly because of incentives in the benefit system). A possible explanation of our result is that a partner's job loss triggers the start of a job search by the woman, but she then takes longer to find a job that pays enough to cover any loss of benefit.

For men in female breadwinner households (not analysed in previous studies), the story is a little different. Here we do find an overall positive AWE, which is reflected in increased job finding in the growth period and increased but unsuccessful search in the recession. The fact that the AWE is positive does not fit the benefit story, but this may be because men tend to move into higher paying full-time work.

We also find evidence of labour supply responses at the other extensive margin, voluntary quits among dual earner couples. Similar to male breadwinner couples, the response is negative: it seems that a person's job loss may be a trigger for the other partner to stop work too. One reason could again be benefit incentives but the effect is also consistent with the idea that couples' non-market time is complementary.[14] Both men and women react but the largest effects are among women working part-time. In contrast to single earner households, these effects are reversed during the recession, such that women working part-time are less likely to quit voluntarily following their partner's job loss (they are also less likely to quit overall in the recession).

Both men and women who already have a job react to their partner's job loss by engaging in on-the-job search, again with the largest effects being among part-time women. Women working full-time instead increase their hours if the job loss happens during a recession (but decrease them in periods of growth).

While reactions are often delayed or contemporaneous, we find little evidence that people act in advance of job losses, suggesting that unemployment typically comes as a surprise. Previous studies similarly found no evidence of anticipatory effects (Gong, 2011) or only relatively small effects (Stephens, 2002) but they looked at job losses a year ahead. We have

[14]We do not have enough details on the reasons why workers quit their jobs, so a more thorough analysis of the possible mechanisms behind these results is left for future research.

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supplied additional evidence that even job losses in the next quarter do not appear to be anticipated.

What role does the recession play in couples' responses? We hypothesized that the recession might increase couples' recourse to the labour market following a job loss, as has been found in some international (mainly US) evidence. The results are somewhat mixed and depend on which margin we look at. The clearest difference we find between recession and growth is in (part-time) women's voluntary quit behaviour. Following their partner's job loss during the growth period, women are 1.8pp more likely to quit, but during the recession they are 0.9pp less likely to quit their job. In other words, the reverse (voluntary quit) AWE is overturned during recession as households seek to maintain their labour market attachment (consistent with previous UK evidence reported by Harkness and Evans, 2011).

On the other hand, among breadwinner households the AWE in terms of overall labour market entry is the same in the recession as in the growth period. The only difference (among female breadwinner households) is that it is manifested as job finding during growth and (unsuccessful) search during recession. Among dual-earner couples, while the job search response is the same in both periods, women appear more likely to increase their hours in a recession in response to their partner's job loss.

Overall then, we find no evidence that AWEs were smaller (or the reverse AWE bigger) in the recession: there was either no difference or households reacted by increasing their attachment to the labour market. This does not always mean that households were successful in restoring labour earnings following a partner's job loss. As we have shown, the AWE may well show up as an increase in search activity rather than job entry. Our findings illustrate the importance of analysing the different potential margins of couples' labour supply adjustments. A fruitful avenue for future research would be to look at dual earner couples in more detail. They have been largely ignored in the previous literature even though they now make up the bulk of households, and their quitting behaviour has rarely been addressed. Much could be learned from studies across different institutional contexts.

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