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Estimating the Wage Elasticity of Labour Supply to a Firm: Is there Monopsony Down-under?

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Abstract

In this paper we estimate the elasticity of the labour supply to a firm, using data from the Household, Income and Labour Dynamics in Australia (HILDA) Survey. Estimation of this elasticity is of particular interest because of its relevance to the debate about the competitiveness of labour markets. The essence of monopsonistically competitive labour markets is that labour supply to a firm is *imperfectly* elastic with respect to the wage rate. The intuition is that, where workers have heterogeneous preferences or face mobility costs, firms can offer lower wages without immediately losing their workforce. This is in contrast to the perfectly competitive extreme, in which the elasticity is infinite. Therefore a simple test of whether labour markets are perfectly or imperfectly competitive involves estimating the elasticity of the labour supply to a firm. We do this, following the modelling strategy of Manning (2003), and find that the Australian wage elasticity of labour supply to a firm is around 0.71, only slightly smaller than the figure of 0.75 reported for the UK. These estimates are so far from the perfectly competitive assumption of an infinite elasticity that it would be difficult to make a case that labour markets are perfectly competitive.

***JEL* Classification:** J42, J21, J71

Keywords: monopsony, imperfect competition, separation, labour supply elasticity

I. Introduction

Are labour markets competitive or are they characterised by frictions that essentially render them imperfectly competitive? This question can be addressed by estimating the elasticity of labour supply to a firm, as suggested by the dynamic monopsony framework. The essence of monopsonistically competitive or oligopsonistic labour markets is that labour supply to a firm is *imperfectly* elastic with respect to the wage rate. The intuition is that, where workers have heterogeneous preferences or face mobility costs, firms can offer lower wages without immediately losing their workforce. This is in contrast to the perfectly competitive extreme, in which the elasticity is *infinite*. Monopsony theory suggests that the lower the ability of a worker to exploit outside options and move from job to job, the further will that worker's wage be below his or her marginal product, and the greater the share of rents that employer can appropriate from the worker. In short, labour markets frictions may generate a surplus that can be appropriated by wage-setting employers. To address this question, our paper estimates the elasticity of the labour supply to a firm. We do this using data from the first seven waves of the Household, Income and Labour Dynamics in Australia (HILDA) Survey, a panel survey that started in 2001.

There are a number of reasons why labour markets might be frictional or imperfectly competitive. Two important examples include heterogenous preferences for non-wage characteristics of jobs (Bhaskar and To, 1999; Hamilton, Thisse and Zenou, 2000) or search frictions (Albrecht and Axell, 1984; Burdett and Mortensen, 1998; Manning, 2003). According to Bhaskar and To (1999), workers have idiosyncratic preferences over employment at different firms, and these preferences are private information. Thus a firm's wage offer depends on how much he or she believes the employee prefers working there, rather than elsewhere. To support

this argument, Bhaskar and To (1999) cite various empirical studies. They then show that equilibrium implies a firm offers a wage below marginal product, where the firm's trade-off is between offering an even lower wage and an increased probability that the worker chooses to work elsewhere (see also Bhaskar, Manning and To, 2002). The dynamic monopsony models produce related predictions. Following the approach of Manning (2003), it is these that we investigate in the remainder of the paper.

To foreshadow our main results, we find that the Australian wage elasticity of labour supply to a firm is around 0.71. This is only slightly smaller than the figure of 0.75 reported for the UK. In contrast, Manning's reported elasticity of labour supply for the US is 1.38 using the Panel Study of Income Dynamics (PSID) data and 0.68 using the National Longitudinal Survey of Youth (NLSY) data. All these estimates are so far from the perfectly competitive assumption of an infinite elasticity that it would be difficult to make a case that labour markets are perfectly competitive.

The next section of the paper outlines the model and methodology, while Section III describes the data. Section IV presents estimates of the separation elasticity and Section V gives the implied elasticity of labour supply to a firm. A comparison is also made between our estimates and those obtained by Manning (2003) using comparable data for the US and the UK. Since the HILDA Survey used in our analysis is very similar in structure to the British Household Panel Survey (BHPS) and to the US Panel Study of Income Dynamics (PSID), this comparison is particularly relevant. Section VI discusses gender differences in the wage elasticity of separations and compares the Australian estimates with those found in the US and the UK. The final section concludes.

II. Methodology

In deriving empirical predictions from a dynamic monopsony model based on Burdett and Mortensen (1998), we closely follow Manning (2003: Chapter 4). Denote separation and recruitment rates respectively by:

$$s(w) = \delta + \lambda[1 - F(w)]$$
$$R(w) = R^u + \lambda \int^{w} f(x)N(x)dx \qquad (1)$$

Here $s(w)$ is the separation rate from a firm that pays wage w, δ is the exogenous rate at which workers leave employment for non-employment, and λ is the arrival rate of job offers from the distribution of wage offers $F(w)$. The flow of recruits to the firm is denoted by $R(w)$, while R^u represents recruits from non-employment and $N(w)$ is the firm's employment level. In steady state the total number of separations is equal to the number of recruits. Differentiation with respect to w of each of the two equations above, and use of the steady state condition that $s(w)N(w) = R(w)$, yields the following

$$\varepsilon_{sw} = -\varepsilon_{Rw} \qquad (2)$$

which states that the separation elasticity ε_{sw} equals the negative of the recruitment elasticity ε_{Rw}. Rearrangement of the steady state condition yields $N(w)=R(w)/s(w)$. After taking logs of this, simplifying, and using (2), one obtains the following expression for the elasticity of labour supply ε_{Nw}

$$\varepsilon_{Nw} = \varepsilon_{Rw} - \varepsilon_{sw} = -2\varepsilon_{sw} \qquad (3)$$

Thus estimating the separation elasticity and doubling it will provide an estimate of the elasticity of labour supply.

III. Data

Our estimates of the various elasticities are obtained using data from waves 1 to 7 of the Household, Income and Labour Dynamics in Australia (HILDA) Survey. The HILDA Survey distinguishes between employment-related and personal reasons why a respondent stopped work in the last job, with detailed reasons given in each category. It is therefore possible to differentiate between transitions that are job-to-job and those that are job to non-employment.[2] Some further details are provided at the start of Data Appendix A.

The Household, Income and Labour Dynamics in Australia (HILDA) Survey is a nationally representative random-sample panel survey of private households in Australia. All members of households providing at least one interview in wave 1 formed the basis of the panel followed in each subsequent wave. The sample has been gradually extended to include new household members resulting from changes in the composition of the original households. The HILDA survey data have been collected annually in a standardised format since 2001.[3] This dataset has several advantages for our purposes. First, it is a remarkably rich source of information on education and other relevant attributes including demographics. Clearly the richer the set of controls, the lower is unobserved heterogeneity. Second, the data trace the same individuals over time, allowing us to measure job separations and where the worker went after separation.

[2] The data also distinguish between job-to-job transitions that are voluntary or involuntary.

[3] Wave 1 included 13,969 respondents aged 15 and older distributed across 7682 households. Further details of the survey are provided in Watson (2008) and Wooden and Watson (2007).

We applied the following restrictions to the data to generate a sample of individuals who were: (i) present in two or more adjacent waves; (ii) in continuing employment (not in self-employment or on a casual or fixed-term contract) at the first of each pair of waves; and (iii) receiving an hourly real wage w in the range $1<w<100$.[4] In addition, we dropped all pairs of waves in which the individual was younger than 25 or older than 55 in the second wave of the wave-pair.[5] We also restricted the subsample to exclude workers who are in the armed forces, reporting over 100 working hours per week (hours are used to derive hourly wages), and full-time students. After applying these restrictions, we obtained an estimating sample comprising 14,887 person-year observations, of which 8,106 are male and 6,781 female. Table A.1 in the Data Appendix provides details of restrictions that were applied to the data in order to obtain our estimating sample and the number of cases lost as each restriction was applied.

Table 1 presents summary statistics for the principal variables of interest. To calculate separations, we used our sample of pairs of waves containing individuals in continuous employment at time t, and then we checked where they were at time $t+1$. The first row displays the mean yearly job-separation rates for all forms of separation. The first column shows this was 0.139 for the combined sample of men and women. That is, on average every year around 13.9% of the sample of all workers in continuing jobs left that job for either another job or for non-employment. Next we disaggregate by gender. For men, the separation rate is 0.133 and for women it is slightly higher at 0.144. The second and third rows look at separations to employment and non-employment respectively. We now see that the average separation rate

[4] The *hourly wage rate* is that which is paid in the main job. To calculate this, we used the HILDA derived variables for the current weekly gross wages and salary for the main job, and for hours worked per week in the main job during the survey week (for more details, see Watson, 2008). We deflated wages to 2001 (wave 1) levels using the headline Consumer Price Index (CPI) from the Australian Bureau of Statistics.

[5] For example, if a person was 55 years old in wave 2, then the pair wave1 and wave2 would be included but not the subsequent ones (wave2 and wave3), and so on.

each year to *employment* was 10.7%. The male rate is slightly higher at 11.4% than the female of 9.7%. Separations to *non-employment* are much lower, being 3.2% for men and women combined. When this is disaggregated by gender, each year just 1.9% of men move into non-employment as compared with 4.7% of women. The difference between the male and female mean separations is presented in the last column. In all cases, the difference between these two means is statistically significant at the 5 percent level at least. Lastly, note that, conditional on job separation, around 0.77 of cases went to another job while the remainder went to non-employment. For women, the exit rate into another job is proportionately smaller (at 0.674) than for men, for whom it is 0.857.

[Insert Table 1 near here]

It is interesting that these job-separation rates from the HILDA Survey data are lower than those found in both the USA and the UK (see Manning, 2003). While the mean separation rate in Australia is just under 14%, in Britain it is 19% and in the US it is 21%.

Table 1 also displays means of some other relevant variables. For our sample of all employees in continuing jobs, the hourly wage rate in 2001 values was A$21.23, while for men it was A$22.54 and for women A$19.65. These raw wage data indicate that Australian women in continuing jobs are earning around 87% of the male wage on average. The women in our sample are a few months older than the men, but they have just over two years less labour market experience and their job tenure is shorter by over one year. Finally, note from the last panel of Table 1 that each pair of years represents around the same proportion of the sample, at between 16% and 17%.

IV. Estimating the wage elasticity of separation

To obtain the wage elasticity of separation, we estimate logit models of the probability of separating from a continuing job. Thus the dependent variable measures job terminations or separations from continuing employment in year *t* to either another job or to nonwork in year *t+1*.

Assume that the two types of separation conditional on ***x*** are independent. Given this, it is straightforward to show that separations to another job or to non-employment can be estimated separately, and that is what we do in this paper.[6] To estimate the elasticity of separation *to another job*, we use our sample of individuals who have been in continuous employment at time *t* and the dependent variable is the probability of whether or not the person leaves to another job at time *t+1*. To estimate the elasticity of separation to *non-employment*, we use the sample of individuals who have been in continuous employment at time *t* and the dependent variable is the probability of whether or not the person leaves to non-employment at time *t+1*. For each, we compute, from the estimated coefficient to the log wages, the wage elasticity calculated at the sample mean of the explanatory variables. The combined elasticity is the weighted average of these two elasticities, with the weight given by the fraction of separations into non-employment.[7]

We estimate separation elasticities for three separate subsamples of data: men only, women only, and the combined sample of men and women, all as shown in Table 2. For each estimating sample we estimate three separate specifications: (i) without controls; (ii) with controls excluding job tenure; and (iii) with all controls including job tenure. First consider the estimates of the separation elasticity calculated for *any* exit (either to another job or to non-employment), and presented in the Panel A of Table 2. For the *combined sample* of men and

[6] See Manning (2003: page 101). This is analogous to estimation in a competing risks framework.

[7] We also estimated all our models using probit regression, producing broadly similar elasticities to those reported here. Ransom and Oaxaca (2005) discuss in some detail methods of imputing the elasticity. We use the method they label as Method A.

women (see the third column), and from the first specification with no controls, the elasticity is found to be -0.425. Once we incorporate controls (including the usual human capital measures but not job tenure), the elasticity drops to -0.361. A one percent fall in the wage rate is associated with an increase in job separations of around one third of one percent, *ceteris paribus*.[8] (Appendix Table A.2 provides the full set of estimates for the pooled sample. These controls are predetermined, being measured in the wave before the transition takes place.) Although there are good arguments for excluding tenure from the estimation, we present in the last row of Panel A of Table 2 the separation elasticity from a specification with tenure included. [9] The elasticity almost halves, now becoming only -0.211.[10]

[Insert Table 2 near here]

Next consider the estimates of the separation elasticity for the *separate male and female subsamples*, calculated for any exit, and presented in the first two columns of Panel A. The second row of estimates, our preferred specification, shows the wage elasticity of job separation to be -0.389 for men and -0.31 for women.

Now turn to the disaggregated separation elasticities to another job and to non-employment respectively, shown in Panels B and C of Table 2. These reveal that women are more sensitive to wages when shifting to another job than are men, but that men are more sensitive when shifting to non-employment. The finding that the female wage elasticity of

[8] Controls are gender, age, experience, experience squared, number of children, and dummies for health status, non-English speaking background, marriage or cohabitation, highest educational qualification, state and urban.

[9] As job tenure and wages are positively correlated with one another and negatively correlated with job separations, the inclusion of job tenure will reduce the wage elasticity. In that case, why include it at all? As noted by Manning (2003), one might want to capture the possibility that higher wages affect separations both directly and indirectly through job tenure. But on the other hand, if there are seniority wage scales whereby workers advance automatically up the wage scale as the job-years roll by, an apparent relationship between separations and wages may be spurious. The inclusion of tenure captures this seniority-scale effect and hence spurious correlation of wages and employment will be removed.

[10] Tenure and tenure squared are significant in all regressions (negative and positive respectively). As expected, the inclusion of job tenure always considerably reduces the estimated wage elasticity.

separation is not significantly different from zero is striking, suggesting as it does that Australian women are making decisions to leave a continuing job entirely on nonwage considerations. However, Australian men are not.

That there is not a larger increase in separations in response to lower wages suggests that other factors are keeping workers at the firm, factors that we have not been able to control for in spite of our excellent data. Of course this is in accord with the assumptions of much of the 'new monopsony' theory - that there are labour market frictions, search costs and non-pecuniary factors keeping workers in a job and consequently allowing the employer to extract some rents. For example, as noted in the Introduction, Bhaskar and To (1999) assume workers have idiosyncratic preferences over employment at different firms, and those preferences are private information. Thus a firm's wage offer depends on how much he/she believes the employee prefers working there rather than elsewhere. Bhaskar and To (1999) cite various empirical studies supporting the assumption that workers have heterogeneous preferences for non-wage characteristics. Bhaskar et al. (2002) further note that this assumption can usefully summarise the variety of reasons for imperfect competition in the labour market. Specifically, equilibrium implies a firm offers a wage below marginal product, where the firm's trade-off is between offering an even lower wage and an increased probability that the worker chooses to work elsewhere.

Using these elasticities of separation with respect to the wage rate, we can now impute the wage-elasticity of labour supply to the firm. The results of this exercise are presented in the following section.

V. Estimating the wage elasticity of labour supply to the firm

To obtain the wage elasticity of the labour supply the firm faces, we use equation (3) above. This states that the negative of the elasticity of the labour supply is given by twice the elasticity of the steady state separation rate with respect to the wage. These results are given in Table 3, which repeats, for ease of reference, the elasticities of separation with respect to the wage rate reported in Table 2.

[Insert Table 3 near here]

Panel B of Table 3 reports the wage elasticity of the firm's labour supply for the case where all separations are combined. We include this for interest only, as our preferred estimates are those given in Panel F at the bottom of the table. These utilise the disaggregated separation elasticities to another job or to non-employment, which are then weighted by their shares to construct the wage elasticity of the labour supply. For the specification which includes all the controls except job tenure, the wage elasticity of labour supply is 0.709 for the combined sample, and is 0.76 for men and 0.61 for women.[11]

[Insert Table 4 near here]

Our estimates from Australian data are only slightly smaller than those reported for the UK by Manning (2003: Table 4.10). Manning finds an elasticity of labour supply of 0.75 using both the British Household Panel Survey (BHPS) and the UK Labour Force Surveys (LFS), while ours is 0.71. In contrast, his reported elasticity of labour supply for the US is 1.38 using the

[11] Such gender differences are consistent with other studies, although the magnitude differs. For example, Ransom and Oaxaca (2005), using US data from a chain of grocery stores, estimate elasticities of labour supply to the firm of around 2.7 for men and 1.5 for women. Barth and Dale-Olsen (2009) investigate the evidence for monopsonistic discrimination by gender, using linked employer-employee data for Norway. Their results suggest that a proportion of the gender gap might be attributable to gender differences in labour market frictions. They find elasticities of between 0.8 and 1.7 for different groups.

Panel Study of Income Dynamics (PSID) data and 0.68 using the National Longitudinal Survey of Youth (NLSY) data. Table 4 reports this comparison.

VI. A cross-country comparison of separation elasticities by gender

We now briefly compare our *separation* elasticities obtained using the HILDA Survey data with those found by Manning (2003: Table 7.7) for the UK and the US, focusing on the gender differences. These are summarized in Table 5, with standard errors given in parentheses. Notice that including controls in the HILDA data reduces the estimated wage elasticity in almost all cases but by a smaller extent than BHPS.

[Insert Table 5 near here]

For the sample of men and women pooled, the elasticities for both separations to employment and non-employment are sensitive to the wage. However, contrary to the BHPS estimates, we find with HILDA that the latter is smaller than the former. Moreover, even though our estimates from the samples with *men and women pooled* are remarkably similar, as Table 4 indicated, there are some striking gender differences when we disaggregate by gender.

First, comparing the BHPS and HILDA estimates, we see that the British female separation elasticities to other jobs are smaller than the male in absolute terms. While we expected the absolute value of the male elasticity to be greater than the female for separations to other jobs, this was not found with the HILDA data. However the difference is not large.

Second, according to the BHPS, male and female separation elasticities to non-employment are not so very different, although they are smaller in absolute terms for women than for men. However the HILDA estimates find a big difference. Indeed, the HILDA data suggest that, while the *male* elasticities of separation to non-employment are not so different to

those from the BHPS, the HILDA female wage elasticities of separation to non-employment are close to zero. Indeed, as noted in Section IV, Australian women appear to make decisions to leave a continuing job entirely on nonwage considerations, whereas men do not. While exploring these comparisons further would represent an interesting research project for the future, it is beyond the scope on the present paper.

VII. Conclusions

Are labour markets competitive or are they characterised by frictions that essentially render them imperfectly competitive? We addressed this question through estimation of the elasticity of labour supply to a firm, using the Household, Income and Labour Dynamics in Australia (HILDA) Survey, a panel survey with rich information about worker turnover as well as individual and firm-level attributes.

The essence of monopsonistically competitive or oligopsonistic labour markets is that labour supply to a firm is *imperfectly* elastic with respect to the wage rate. The intuition is that, where workers have heterogeneous preferences or face mobility costs, firms can offer lower wages without immediately losing their workforce. This is in contrast to the perfectly competitive extreme, in which the elasticity is *infinite*. Therefore a simple test of whether labour markets are perfectly or imperfectly competitive involves estimating the wage elasticity of the labour supply to a firm. We did this following the modelling strategy of Manning (2003), and found that the Australian wage elasticity of labour supply is around 0.71, only slightly smaller than the figure of 0.75 reported for the UK.

While in an ideal world one would prefer to estimate the wage elasticity of the labour supply to a firm using data from a natural experiment in which there is an exogenous change in

an individual firm's wages, such data are extremely rare.[12] Our estimates for Australia, in common with those from earlier research using the same modeling strategy, may well be downward-biased for the reasons detailed in Manning (2003). However, these estimates are so far from the perfectly competitive prediction of an infinite elasticity that it would be difficult to make a case that labour markets are perfectly competitive. It is interesting that a parallel stream of the labour economics literature, focusing on employer-provided training and the conditions under which firms will finance it, has reached a similar conclusion.[13]

[12] Though are becoming less rare as some firms have lowered wages in response to the global financial crisis.
[13] For overviews, see Acemoglu and Pischke (1999) and more recently Booth and Bryan (2005).

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Table 1: Summary Statistics of Main Variables, HILDA Survey

	All		Males		Females		Difference
	Mean	St Dev	Mean	St Dev	Mean	St Dev	(M-F)
Separations							
All separations	0.139	0.346	0.133	0.34	0.144	0.352	-0.011**
Separations to employment	0.107	0.309	0.114	0.318	0.097	0.297	0.017***
Separations to non-employment	0.032	0.176	0.019	0.137	0.047	0.212	-0.028***
Hourly salary	21.23	9.06	22.54	10.00	19.65	7.48	2.89***
Control variables							
Age	40.20	8.42	40.04	8.32	40.40	8.53	-0.36***
Experience	20.34	9.13	21.32	9.37	19.16	8.69	2.16***
Tenure	7.64	7.61	8.18	8.12	6.98	6.89	1.2***
Sample							
Sample size	14,887		8,106		6,781		
Fraction of sample from each pair of years:							
2001-2	0.169		0.173		0.165		
2002-3	0.167		0.167		0.167		
2003-4	0.168		0.169		0.168		
2004-5	0.166		0.167		0.164		
2005-6	0.164		0.162		0.166		
2006-7	0.166		0.162		0.17		

Notes: (1) Asterisks denote level of significance of a mean comparison t-test: *10%, **5%, ***1%.

Table 2: Wage Elasticities of Separation, HILDA Survey

	Males	Females	All
A. All separations			
Mean separation rate	0.133	0.144	0.139
No controls	-0.435***(0.066)	-0.41***(0.081)	-0.425***(0.051)
With controls	-0.389***(0.077)	-0.31***(0.097)	-0.361***(0.06)
Tenure controls	-0.245***(0.081)	-0.151 (0.102)	-0.211***(0.063)
B. Separations to employment			
Mean separation rate	0.114	0.097	0.107
No controls	-0.383***(0.072)	-0.515***(0.099)	-0.43***(0.059)
With controls	-0.345***(0.085)	-0.449***(0.119)	-0.376***(0.068)
Tenure controls	-0.187** (0.09)	-0.265**(0.126)	-0.204***(0.073)
C. Separations to non-employment			
Mean separation rate	0.019	0.047	0.032
No controls	-0.685***(0.167)	-0.18(0.149)	-0.399***(0.114)
With controls	-0.591***(0.194)	-0.008 (0.181)	-0.282**(0.134)
Tenure controls	-0.492** (0.201)	-0.079 (0.183)	-0.207 (0.137)
Observations	8,106	6,781	14,887

Notes: (1) Asterisks denote level of significance: *10%, **5%, ***1%. (2) Standard errors in parenthesis. (3) The rows headed 'no controls' only include the wage reported in the previous wave and a female dummy for the pooled regressions. The rows marked 'with controls' include health, education, marital status, children, region, experience, experience squared, age bands, non-english speaking background, and a female dummy for the pooled regressions. The rows headed 'tenure controls' include tenure and tenure squared.

Table 3: The Elasticity of the Labour Supply Curve, HILDA Survey

	Males	Females	All
A. Elasticity of separations (all)			
No controls	-0.435	-0.41	-0.425
With controls	-0.389	-0.31	-0.361
With controls including tenure	-0.245	-0.151	-0.211
B. Elasticity of labour supply (Method 1)			
No controls	0.87	0.82	0.85
With controls	0.778	0.62	0.722
With controls including tenure	0.490	0.302	0.422
C. Elasticity of separations to employment			
No controls	-0.383	-0.515	-0.43
With controls	-0.345	-0.449	-0.376
With controls including tenure	-0.187	-0.265	-0.204
D. Elasticity of separations to non-employment			
No controls	-0.685	-0.18	-0.399
With controls	-0.591	-0.008	-0.282
With controls including tenure	-0.492	-0.079	-0.207
E. Share of separations that are to employment	0.857	0.674	0.770
F. Elasticity of labour supply (Method 2)			
No controls	0.852	0.812	0.846
With controls	0.76	0.61	0.709
With controls including tenure	0.461	0.409	0.409

Notes: (i) Method 1 uses the elasticity of all separations to estimate the elasticity of the labour supply curve to a firm, while Method 2 utilises the disaggregated separations to another job or to non-employment and the two elasticities are weighted by their shares to construct the elasticity of the labour supply. (ii) Controls are listed at the bottom of Table 2.

Table 4: Separation and Labour Suppy Elasticities: Comparing Australia with Britain and the US.

	USA		UK		Australia
Dataset	**PSID**	**NLSY**	**BHPS**	**LFS**	**HILDA**
Elasticity of separations to employment	0.867	0.359	0.631	0.529	0.376
Elasticity of separations to non-employment	0.892	0.85	0.632	0.578	0.282
Share of separations to employment	0.620	0.78	0.63	0.56	0.77
Elasticity of labour supply curve	1.38	0.68	0.75	0.75	0.709

Notes: (i) The HILDA estimates taken from our Tables 2 and 3, and the other estimates from Manning (2003) Table 4.10. (ii) We have omitted the negative from our separation elasticities for ease of comparison.

Table 5: Separation and Labour Suppy Elasticities: Comparing Australia with Britain and the US.

	Males			Females			All		
	HILDA	**BHPS**	**PSID**	**HILDA**	**BHPS**	**PSID**	**HILDA**	**BHPS**	**PSID**
A. All Separations									
Mean separation rate	0.133	No inf.	No inf.	0.144	No inf.	No inf.	0.139	0.19	0.21
No controls	-0.435 (0.066)	-0.968 (0.058)	-1.005 (0.055)	-0.41 (0.081)	-0.901 (0.091)	-0.971 (0.034)	-0.425 (0.051)	-0.798 (0.032)	-0.944 (0.03)
With controls	-0.389 (0.077)	-0.742 (0.078)	-0.880 (0.058)	-0.31 (0.097)	-0.566 (0.120)	-1.055 (0.045)	-0.361 (0.06)	-0.720 (0.041)	-0.973 (0.041)
Tenure controls	-0.245 (0.081)	No inf.	No inf.	-0.151 (0.102)	No inf.	No inf.	-0.211 (0.063)	-0.503 (0.064)	-0.575 (0.037)
B. Separations to employment									
Mean separation rate	0.114	No inf.	No inf.	0.097	No inf.	No inf.	0.107	0.12	0.12
No controls	-0.383 (0.072)	-0.914 (0.079)	-0.927 (0.054)	-0.515 (0.099)	-0.886 (0.131)	-0.744 (0.042)	-0.43 (0.059)	-0.631 (0.038)	-0.759 (0.050)
With controls	-0.345 (0.085)	-0.753 (0.107)	-0.889 (0.038)	-0.449 (0.119)	-0.471 (0.172)	-0.936 (0.055)	-0.376 (0.068)	-0.688 (0.049)	-0.867 (0.038)
Tenure controls	-0.187 (0.09)	No inf.	No inf.	-0.265 (0.126)	No inf.	No inf.	-0.204 (0.073)	-0.429 (0.050)	-0.450 (0.042)
C. Separations to non-employment									
Mean separation rate	0.019	No inf.	No inf.	0.047	No inf.	No inf.	0.032	0.07	0.08
No controls	-0.685 (0.167)	-1.042 (0.081)	-1.046 (0.088)	-0.18 (0.149)	-0.917 (0.118)	-1.059 (0.039)	-0.399 (0.114)	-0.916 (0.048)	-1.010 (0.067)
With controls	-0.591 (0.194)	-0.735 (0.110)	-0.868 (0.085)	-0.008 (0.181)	-0.677 (0.162)	-1.101 (0.048)	-0.282 (0.134)	-0.632 (0.066)	-0.892 (0.087)
Tenure controls	-0.492 (0.201)	No inf.	No inf.	-0.079 (0.183)	No inf.	No inf.	-0.207 (0.137)	-0.493 (0.071)	-0.569 (0.068)

Note: No inf. stands for no information.

Data Appendix A

A. Construction of Separation Variables

Separation to other jobs:

HILDA asks the following question of those who were employed last wave:

> Do you still work for the same employer? (if one employer only)
> Thinking of main job, do you still work for the same employer? (if more than one employer)

If the respondent answered NO to the relevant of the above questions, it was coded as a *separation to employment* case.

Separation to non-employment:

HILDA asks the following question to those not working:

> Were you employed when last interviewed?

If the respondent answered YES, it was coded as a *separation to non-employment* case.

Appendix Table A.1: Sample Construction and Data Restrictions

Restriction	Male	Female	Male + Female
All sample	42,874	47,725	90,599
Not in armed forces, full-time student or working>100hours	37,642	40,021	77,663
Not self-employed	31,140	36,522	67,662
1<hrsalary<99	28,693	33,702	62,395
Permanent employee in wave t-1 (and 25-55 yrs old in wave t)	8,106	6,781	14,887

Appendix Table A.2:
Full set of estimates from Separation Logits, Men and Women Combined Exits

	Male	Female	All
A. All separations			
No controls			
Log wage	-0.501*** (0.076)	-0.479*** (0.094)	-0.492*** (0.059)
Female	N/A	N/A	0.044 (0.048)
Pseudo R^2	0.0068	0.0046	0.0061
With controls			
Log wage	-0.443*** (0.08)	-0.357*** (0.112)	-0.414*** (0.06)
Female	N/A	N/A	0.030 (0.0516)
Health	-0.03*** (0.01)	0.004 (0.013)	-0.018** (0.008)
Marital Status			
Married	0.099 (0.107)	0.059 (0.118)	0.075 (0.079)
Cohabiting	0.282** (0.116)	0.345*** (0.13)	0.304*** (0.086)
Widow/Divorced	0.471*** (0.154)	0.25* (0.148)	0.333*** (0.105)
Number of kids	0.017 (0.032)	0.116*** (0.037)	0.051** (0.024)
Experience	-0.039** (0.017)	-0.071*** (0.019)	-0.056*** (0.012)
Experience squared	0.000 (0.000)	0.001*** (0.001)	0.001** (0.000)
Education (lagged 1 year)			
Postgraduate	-0.083 (0.146)	0.207 (0.138)	0.087 (0.098)
Bachelor	0.001 (0.123)	0.058 (0.124)	0.052 (0.086)
Advanced Diploma	0.021 (0.097)	0.309*** (0.107)	0.156** (0.071)
Year 12	-0.056 (0.128)	0.303** (0.121)	0.143* (0.087)
State			
South Australia	-0.457* (0.242)	-0.322 (0 .249)	-0.386** (0.173)
Western Australia	0.089 (0.227)	-0.179 (0.243)	-0.047 (0.165)
Northern Territory	0.915** (0.389)	0.187 (0.399)	0.556** (0.277)
Victoria	-0.316 (0.217)	-0.3 (0.227)	-0.309** (0.156)
New South Wales	-0.027 (0.213)	-0.511** (0.227)	-0.251 (0 .155)
Queensland	0.002 (0.218)	-0.155 (0.23)	-0.082 (0.158)
Tasmania	-0.429 (0.315)	-0.378 (0.306)	-0.402 (0.218)
Urban	0.186** (0.079)	0.007 (0.083)	0.101* (0.057)
Age			
30-34	0.057 (0.115)	-0.009 (0.123)	0.024 (0.083)
35-39	0.021 (0.136)	-0.261* (0.147)	-0.093 (0.099)
40-44	-0.150 (0.162)	-0.69*** (0.169)	-0.403*** (0.115)
45-49	-0.187 (0.2017)	-0.909*** (0.193)	-0.56 (0.134)
50-55	-0.006 (0.264)	-0.899 *** (0.225)	-0.501 (0.162)
Non-english speaking background	0.034 (0.122)	-0.162 (0.127)	-0.054 (0.088)
Pseudo R^2	0.0403	0.0466	0.0390
With controls including tenure			
Log wage	-0.274*** (0.091)	-0.172 (0.116)	-0.239*** (0.071)
Tenure	-0.197*** (0.015)	-0.158*** (0.018)	-0.18*** (0.011)
Tenure squared	0.005*** (0.001)	0.003*** (0.001)	0.004*** (0.000)
Female	N/A	N/A	0.03 (0.052)
Health	-0.024** (0.010)	0.006 (0.013)	-0.014* (0.008)

Marital Status			
Married	0.078 (0.109)	0.107 (0.119)	0.092 (0.0797)
Cohabiting	0.237** (0.117)	0.278** (0.131)	0.251*** (0.087)
Widow/Divorced	0.417*** (0.157)	0.216 (0.151)	0.292*** (0.107)
Number of kids	0.011 (0.032)	0.091** (0.037)	0.036 (0.024)
Experience	-0.006 (0.017)	-0.037* (0.019)	-0.02 (0.013)
Experience squared	-0.000 (0.000)	0.002* (0.001)	0.000 (0.000)
Education (lagged 1 year)			
Postgraduate	-0.064 (0.148)	0.248* (0.141)	0.12 (0.100)
Bachelor	-0.003 (0.126)	0.068 (0.126)	0.051 (0.0880)
Advanced Diploma	-0.003 (0.098)	0.264** (0.1082)	0.119* (0.072)
Year 12	-0.037 (0.130)	0.302** (0.123)	0.145 (0.089)
State			
South Australia	-0.479* (0.248)	-0.242 (0.252)	-0.353** (0.176)
Western Australia	-0.063 (0.234)	-0.176 (0.245)	-0.120 (0.169)
Northern Territory	0.671 (0.395)	0.259 (0.41)	0.502* (0.283)
Victoria	-0.415* (0.223)	-0.272 (0.229)	-0.342** (0.159)
New South Wales	-0.163 (0.22)	-0.464** (0.228)	-0.295* (0.158)
Queensland	-0.125 (0.225)	-0.140 (0.232)	-0.137 (0.161)
Tasmania	-0.435 (0.323)	-0.306 (0.31)	-0.354 (0.222)
Urban	0.138* (0.081)	-0.053 (0.085)	0.044 (0.058)
Age			
30-34	0.026 (0.117)	0.006 (0.124)	0.014 (0.084)
35-39	0.002 (0.139)	-0.23 (0.149)	-0.092 (0.100)
40-44	-0.147 (0.164)	-0.649 (0.171)	-0.388*** (0.116)
45-49	-0.113 (0.204)	-0.814*** (0.195)	-0.48*** (0.136)
50-55	-0.033 (0.269)	-0.715*** (0.229)	-0.414** (0.166)
Non-english speaking background	-0.099 (0.124)	-0.197 (0.128)	-0.124 (0.088)
Pseudo R^2	0.0855	0.0748	0.0768
B. Separations to employment			
No controls			
Log wage	-0.432*** (0.081)	-0.569*** (0.11)	-0.48*** (0.065)
Female			-0.228*** (0.054)
Pseudo R^2	0.0049	0.0061	0.0063
With controls			
Log wage	-0.384*** (0.094)	-0.492*** (0.13)	-0.416*** (0 .076)
Female	N/A	N/A	-0.249*** (0.058)
Health	-0.038*** (0.010)	-0.033** (0.014)	-0.036*** (0.008)
Marital Status			
Married	0.221* (0.115)	-0.314** (0.133)	-0.009 (0.087)
Cohabiting	0.304** (0.124)	0.234* (0.142)	0.28*** (0.093)
Widow/Divorced	0.472*** (0.169)	0.093 (0.164)	0.318*** (0.116)
Number of kids	0.014 (0.034)	0.049 (0.044)	0.024 (0.027)
Experience	-0.047** (0.018)	-0.027 (0.023)	-0.036** (0.014)
Experience squared	0.000 (0.001)	0.000 (0.001)	0.000 (0.000)
Education (lagged 1			

year)			
Postgraduate	0.106 (0.155)	0.053 (0.168)	0.105 (0.112)
Bachelor	0.07 (0.134)	0.142 (0.145)	0.123 (0.097)
Advanced Diploma	0.092 (0.106)	0.266** (0.126)	0.178** (0.08)
Year 12	0.034 (0.138)	0.274 * (0.143)	0.169** (0.098)
State			
South Australia	-0.359 (0.257)	-0.409 (0.293)	-0.367* (0.192)
Western Australia	0.161 (0.241)	-0.329 (0.287)	-0.033 (0.184)
Northern Territory	1.045** (0.406)	0.689 (0.429)	0.886*** (0.293)
Victoria	-0.359 (0.232)	-0.33 (0.265)	-0.329* (0.174)
New South Wales	-0.045 (0.228)	-0.55** (0.266)	-0.24 (0.172)
Queensland	0.014 (0.233)	-0.117 (0.268)	-0.026 (0.175)
Tasmania	-0.492 (0.346)	-0.393 (0.367)	-0.428* (0.25)
Urban	0.208** (0.086)	0.174* (0 .100)	0.201*** (0.065)
Age			
30-34	-0.045 (0.121)	-0.101 (0.148)	-0.054 (0.093)
35-39	-0.048 (0.143)	-0.109 (0.175)	-0.05 90.109)
40-44	-0.283 (0.173)	-0.405** (0.199)	-0.31** (0.128)
45-49	-0.49** (0.221)	-0.653*** (0.231)	-0.533*** (0.153)
50-55	-0.547* (0.297)	-0.762*** (0.273)	-0.593*** (0.189)
Non-english speaking background	0.074 (0.129)	-0.252 (0.155)	-0.077 (0.098)
Pseudo R^2	0.0470	0.0409	0.0406
With controls including tenure			
Log wage	-0.205** (0.098)	-0.286** (0.136)	-0.222*** (0.079)
Tenure	-0.193*** (0.0174)	-0.182*** (0.023)	-0.192*** (0.014)
Tenure squared	0.004*** (0.001)	0.003*** (0.001)	0.004*** (0.001)
Female	N/A	N/A	-0.258*** (0.059)
Health	-0.033*** (0.011)	-0.03** (0.014)	-0.032*** (0.008)
Marital Status			
Married	0.207* (0.117)	-0.267** (0.134)	0.001 (0.088)
Cohabiting	0.259** (0.126)	0.147 (0.144)	0.222** (0.095)
Widow/Divorced	0.435** (0.172)	0.049 (0.167)	0.275** (0.119)
Number of kids	0.009 (0.035)	0.011 (0.044)	0.008 (0.027)
Experience	-0.016 (0.019)	0.013 (0.024)	-0.000 (0.014)
Experience squared	0.000 (0.001)	-0.000 (0.001)	0.000 (0.000)
Education (lagged 1 year)			
Postgraduate	0.13 (0.157)	0.106 (0.172)	0.144 (0.114)
Bachelor	0.069 (0.136)	0.15 (0.148)	0.124 (0.099)
Advanced Diploma	0.069 (0.108)	0.199 (0.127)	0.139* (0.081)
Year 12	0.062 (0.140)	0.262* (0.145)	0.175* (0.099)
State			
South Australia	-0.363 (0 .263)	-0.298 (0.296)	-0.329* (0.196)
Western Australia	0.019 (0.248)	-0.339 (0.29)	-0.12 (0.188)
Northern Territory	0.828** (0.411)	0.838* (0.443)	0.834*** (0.299)
Victoria	-0.454* (0.238)	-0.305 (0.268)	-0.373** (0.177)
New South Wales	-0.179 (0.234)	-0.493* (0.268)	-0.297* (0.176)
Queensland	-0.100 (0.239)	-0.105 (0.271)	-0.089 (0.179)
Tasmania	-0.467 (0.353)	-0.315 (0.371)	-0.373 (0.254)

Urban	0.167* (0.088)	0.099 (0.103)	0.143** (0.066)
Age			
30-34	-0.081 (0.122)	-0.087 (0.149)	-0.071 (0.094)
35-39	-0.072 (0.146)	-0.065 (0.177)	-0.056 (0.111)
40-44	-0.286 (0.175)	-0.348* (0.203)	-0.298** (0.129)
45-49	-0.424* (0.224)	-0.536** (0.233)	-0.449*** (0.155)
50-55	-0.584* (0.303)	-0.543* (0.278)	-0.524*** (0.194)
Non-english speaking background	-0.066 (0.131)	-0.285* (0.156)	-0.165* (0.099)
Pseudo R^2	0.0946	0.0810	0.0863

C. Separations to non-employment

No controls

Log wage	-0.698*** (0.17)	-0.189 (0.157)	-0.411*** (0.117)
Female	N/A	N/A	0.887*** (0.1)
Pseudo R^2	0.0099	0.0006	0.0252

With controls

Log wage	-0.6*** (0.197)	0.009 (0.187)	-0.29** (0.138)
Female	N/A	N/A	0.912*** (0.106)
Health	0.028 (0.028)	0.109*** (0.029)	0.071*** (0.02)
Marital Status			
Married	-0.605** (0.26)	0.985*** (0.243)	0.363** (0.167)
Cohabiting	0.073 (0.269)	0.656** (0.271)	0.343* (0.185)
Widow/Divorced	0.195 (0.327)	0.699** (0.303)	0.375* (0.217)
Number of kids	0.034 (0.074)	0.233*** (0.058)	0.127*** (0.045)
Experience	0.013 (0.041)	-0.126*** (0.028)	-0.096*** (0.022)
Experience squared	-0.002 (0.001)	0.003*** (0.001)	0.002*** (0.001)
Education (lagged 1 year)			
Postgraduate	-1.259*** (0.44)	0.404* (0.222)	0.064 (0.185)
Bachelor	-0.286 (0.284)	-0.128 (0.213)	-0.132 (0.167)
Advanced Diploma	-0.272 (0.209)	0.301* (0.18)	0.085 (0.136)
Year 12	-0.426 (0.309)	0.257 (0.203)	0.055 (0.165)
State			
South Australia	-1.098* (0.65)	-0.115 (0.407)	-0.351 (0.339)
Western Australia	-0.462 (0.593)	0.1042 (0.393)	-0.086 (0.3236)
Northern Territory	-0.309 (1.154)	-1.702 (1.086)	-1.144 (0.783)
Victoria	-0.094 (0.5390)	-0.181 (0.373)	-0.167 (0.303)
New South Wales	0.0077 (0.535)	-0.352 (0.371)	-0.233 (0.302)
Queensland	-0.126 (0.547)	-0.23 (0.38)	-0.229 (0.309)
Tasmania	-0.167 (0.712)	-0.234 (0.489)	-0.243 (0.399)
Urban	0.025 (0.188)	-0.286** (0.133)	-0.199* (0.107)
Age			
30-34	0.679** (0.321)	0.063 (0.187)	0.227 (0.157)
35-39	0.386 (0.381)	-0.600*** (0.233)	-0.273 (0.193)
40-44	0.571 (0.418)	-1.292*** (0.282)	-0.731*** (0.227)
45-49	1.294*** (0.453)	-1.379*** (0.318)	-0.623* (0.25)
50-55	2.187*** (0.539)	-1.049*** (0.353)	-0.326 (0.286)
Non-english speaking	-0.185 (0.329)	0.032 (0.198)	0.026 (0.167)

background			
Pseudo R^2	0.0449	0.0800	0.0563
With controls including tenure			
Log wage	-0.499** (0.204)	0.082 (0.19)	-0.212 (0.14)
Tenure	-0.138*** (0.033)	-0.064** (0.027)	-0.093*** (0 .02)
Tenure squared	0.004*** (0.001)	0.002* (0.001)	0.003*** (0.001)
Health	0.033 (0.028)	0.109*** (0.029)	0.071*** (0.02)
Female	N/A	N/A	0.916*** (0.106)
Marital Status			
Married	-0.634** (0.261)	1.008*** (0.243)	0.388** (0.167)
Cohabiting	0.033 (0.269)	0.639** (0.271)	0.323* (0.186)
Widow/Divorced	0.095 (0.33)	0.689** (0.304)	0.36* (0.217)
Number of kids	0.026 (0.073)	0.227*** (0.058)	0.119*** (0.045)
Experience	0.039 (0.042)	-0.112*** (0.029)	-0.076*** (0.022)
Experience squared	-0.0028* (0.001)	0.002*** (0.001)	0.001** (0.001)
Education (lagged 1 year)			
Postgraduate	-1.227*** (0.044)	0.409* (0.223)	0.065 (0.186)
Bachelor	-0.286 (0.286)	-0.127 (0.213)	-0.143 (0.167)
Advanced Diploma	-0.277 (0.209)	0.284 (0.181)	0.06 (0.136)
Year 12	-0.431 (0.309)	0.256 (0.203)	0.044 (0.165)
State			
South Australia	-1.119* (0.649)	-0.094 (0.408)	-0.33 (0.339)
Western Australia	-0.577 (0.594)	0.11 (0.394)	-0.101 (0.324)
Northern Territory	-0.545 (1.16)	-1.709 (1.087)	-1.169 (0.784)
Victoria	-0.167 (0.54)	-0.167 (0.373)	-0.163 (0.304)
New South Wales	-0.089 (0.537)	-0.335 (0.371)	-0.234 (0.302)
Queensland	-0.234 (0.549)	-0.219 (0.38)	-0.24 (0.309)
Tasmania	-0.231 (0.713)	-0.199 (0.49)	-0.213 (0.4)
Urban	-0.023 (0.189)	-0.299 (0.133)	-0.221** (0.108)
Age			
30-34	0.665** (0.322)	0.07 (0.186)	0.229 (0.157)
35-39	0.386 (0.384)	-0.589** (0.234)	-0.261 (0.194)
40-44	0.591 (0.419)	-1.272*** (0.283)	-0.71*** (0.227)
45-49	1.365*** (0.455)	-1.338*** (0.319)	-0.572** (0.251)
50-55	2.151*** (0.541)	-0.977*** (0.355)	-0.261 (0.288)
Non-english speaking background	-0.241 (0.33)	0.021 (0.198)	0.013 (0.168)
Pseudo R^2	0.0576	0.0826	0.0617
N. of obs	8,106	6,781	14,887

Notes: (1) Asterisks denote level of significance: *10%, **5%, ***1%. (2)Standard errors in parenthesis.