From: [redacted]
To: jobseekersinquiry
Subject: Re: Inquiry into sustainable employment for disadvantaged jobseekers - Proof transcript for correction.
Date: Sunday, 15 September 2019 7:49:19 PM
Attachments: [redacted]

Thank you for your email. I have made a small correction to page 14 of the proof transcript (scanned page attached with change in my handwriting and signed as requested). I have also attached two papers on the scarring effects of persistent unemployment and insecure employment.

I draw the Committee's attention to the following sections of each paper:

Mavromaras, KG, Sloane, PJ & Wei, Z, 2015, 'The Scarring Effects of Unemployment, Low Pay and Skills Under-utilisation in Australia Compared', *Applied Economics*, 2015, 47(23), pp2413-2429
(pages 2423-2424)
"Our findings indicate that there exists a dynamic relationship not only between past and present unemployment, but also between past skills underutilization and present unemployment, though the latter effect appears to be relatively weaker. The conventional explanation for the dynamic effect of unemployment is that when a person is unemployed, some of their skills may be lost or the fact of being unemployed may signal such a loss to potential employers. The outcome is that the probability of re-employment becomes lower for these reasons. In an analogous way, one can think of a skills under-utilized employee, as an employee who is under-employed, and may be perceived as more likely to have lost some valuable skills. This perception may not matter if the worker concerned remains employed and in the same job. However, should these workers need to get another job (either because of a quit or a layoff), they may find it harder to find a new job because of the signal their previous under-utilized job conveys to perspective employers. This effect is revealed by the estimation of the difference in the probability of being unemployed between those who are under-utilized and those who are well-matched.
Our results show that the (small) probability of being unemployed is close to 40% higher for those who were previously under-utilized than those who were well-matched. Given the considerable extent of skills under-utilization among those employed (from 14.7% for university graduates to 27% for those who completed secondary school), this is a finding of policy significance."

Francis Green, 2011, Unpacking the misery multiplier: How employability modifies the impacts of unemployment and job insecurity on life satisfaction and mental health' *Journal of Health Economics* Volume 30, Issue 2, March 2011, Pages 265-276
(page 265)
"At the same time, a large number of psychological studies and a few in economics have found that job insecurity itself also generates substantial losses in well-being. Within both literatures, some studies have uncovered heterogeneous effects associated with scarring and social norms, or across different socio-economic groups."

Please don't hesitate to contact me again if you need further clarification.

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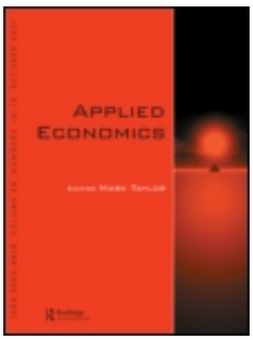

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The scarring effects of unemployment, low pay and skills under-utilization in Australia compared

Kostas Mavromaras, Peter Sloane & Zhang Wei

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The scarring effects of unemployment, low pay and skills under-utilization in Australia compared

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There is a substantial literature on the scarring effects of unemployment on future employment prospects and a smaller one on the scarring effects of low pay, but the possibility that skills mismatch, in the form of skills under-utilization, may have similar detrimental effects has not been considered before. We use the Household, Income and Labour Dynamics in Australia panel to investigate the dynamics of unemployment, low pay and skills under-utilization, including differences by gender and education. We show that, in addition to earlier evidence on wage penalties and reduced job satisfaction, skills under-utilization scars future employment prospects in a way similar to that of low pay.

Keywords: education pathways; state dependence; dynamic estimation; skills mismatch; job quality; unemployment; low pay

JEL Classification: J24; J31; I21

I. Introduction

Although Australia experienced relatively low unemployment levels of around 5% over most of the last decade, getting unemployed people into work remains a core Australian economic and social policy goal. The old debate about why unemployment can be such a 'sticky' labour market state continues and new debates about what happens to the quality of the jobs obtained by those previously unemployed are emerging. Job quality has proved to be an elusive concept in the economics literature, primarily because of the difficulty of quantifying quality in an objective manner. This article focuses on two direct measures of job quality, namely on whether the job is a low pay job and whether the job under-utilizes the skills of the worker. Both of these measures can be quantified, low pay by the wage and under-utilization by various skills mismatch measures (typically measured by the

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difference between the skills and qualifications needed for and utilized on the job and those possessed by the worker). A policy focus on low pay and its implications has been longstanding and intense, as reflected in minimum wage legislation. Although the policy focus on skills under-utilization as a form of skills mismatch in the workplace has only arisen recently, it is currently at the forefront of the policy agenda of many organizations, based on a recent build up of evidence that skills under-utilization has the potential to influence job quality, lead to losses in productivity and damage competitiveness (see, e.g., European Commission, 2009, 2012; CEDEFOP, 2010, 2012; OECD Desjardins and Rubenson, 2011). Recent notable extensions to the broader theory underlying skills mismatch (Sattinger, 2012) also reflect the increased attention focused on issues relating to skills under-utilization.

It is a well-established result in the literature that adverse labour market circumstances and outcomes may be persistent in the sense that their presence today makes *in itself* their presence tomorrow more likely. For example, being unemployed today may increase the chances of being unemployed tomorrow. Evidence suggests that such persistence is often present over and above all other factors that may influence the probability of being unemployed (Heckman, 1981). Related research suggests that skills under-utilization can be similarly persistent (Mavromaras and McGuinness, 2012; Mavromaras *et al.*, 2012) and that this persistence varies by the education level of the mismatched worker. There is further evidence that the persistence of unemployment is inter-related with the past values of low pay, that is, previous low pay and previous unemployment act together in determining the probability of current unemployment (Stewart, 2007). The study of the inter-related dynamics of unemployment and low pay by Stewart (2007) has revealed that there is a cumulative negative effect from the two types of past disadvantage (unemployment and low pay) that result in an additional adverse impact on current unemployment. There is no similar evidence about whether the self-persistence of unemployment is inter-related with the past values of skills under-utilization in determining the probability of current unemployment, and this paper sets out to fill this gap.

This article focusses on the inter-related dynamics of unemployment, low pay and skills utilization in Australia. In particular, the article examines the extent to which past low pay or past skills under-utilization, combined with the experience of past unemployment, may influence future employment prospects. To do this, the article estimates the likelihood of current unemployment as a result of having been previously unemployed and also of having been previously in low paid or in skills under-utilizing employment, the last of these being where we make our main contribution. The importance of the issue of skills under-utilization is reflected in the fact that over 20% of the sample is under-utilized, compared to the 5 or 6% who are unemployed and 12% who are low paid. We recognize that job quality has positive as well as negative dimensions, but as we are focusing on scarring effects, we do not consider these positive effects further here. Following past research, which shows gender and education level to be both important regarding the outcomes of unemployment, low pay and skills under-utilization and that dynamics can be significant and long-lasting, we carry out and compare separate current unemployment estimations by gender and by individual education level, as well as estimations with longer dynamics.

II. Background

This section outlines the previous literature and explains how this article relates and adds to it. A number of studies have examined the extent of state dependence on employment status. For instance, Heckman (1981) and Hyslop (1999) find significant persistence in employment probabilities among married women in the United States. Similar results of strong state dependence in unemployment have also been found for other countries (Narendranathan and Elias, 1993 and Arulampalam *et al.*, 2000 for the UK; Flaig *et al.*, 1993 and Mühleisen and Zimmermann, 1994 for Germany; Frijters *et al.*, 2009 for Holland). There is also an extensive literature focusing on the state dependence of low quality employment, most of which defines a low quality job as a low paid job. Stewart and Swaffield (1997) find evidence of persistence in low wage employment. Evidence on the persistence of low pay has also been presented by Gosling *et al.* (1997), Sloane and Theodossiou (Sloane and Theodossiou, 1996, 1998) and Clark and Kanellopoulos (2013).

There is evidence that skills under-utilization, manifested by mismatch of skills and/or qualifications, leads to lower wages and job satisfaction (Allen and Van Der Velden, 2001; McGuinness and Wooden, 2009; Green and Zhu, 2010; Mavromaras *et al.*, 2010; Baert *et al.*, 2013). Thus, partitioning the employed population into those with well-utilized skills and those with under-utilized skills can offer one dimension of what is a 'good' and what is a 'bad' job. Mavromaras *et al.* (2012) and Mavromaras and McGuinness (2012) examine the dynamic properties of skills under-utilization in the workplace and show that over-skilling can be persistent and that the extent of revealed state dependence differs by educational pathway.

The evidence above suggests that, although the individual dynamics of several such labour market states have been examined in isolation from one another, the inter-related dynamics between low paid employment and unemployment have been relatively less examined. Stewart (2007) investigates the extent to which low-paid employment negatively affects future employment prospects in the United Kingdom, using random effects dynamic models that control for initial conditions and unobserved heterogeneity. He finds that relative to high-paid jobs, low-paid employment has almost as large an adverse effect as unemployment on future employment prospects. Buddelmeyer *et al.* (2010) apply a similar analytical framework to study this issue in Australia. They find that the adverse effect of low-paid employment on future employment is only significant for females, and it is much weaker than the effect of unemployment on repeat unemployment. As the authors acknowledge, it is not immediately obvious why there should be a stronger scarring effect on women than on men and we investigate this using more waves of the same data set and a different definition of those in the labour force. Cappellari and Jenkins (2008) confirm the above observation of Stewart (2007) by using a multivariate probit model that also controls for selection into employment and for panel attrition. They also find that unemployed men have a greater chance of becoming low paid than high-paid men do. This article follows the analytical framework of Stewart (2007) and Buddelmeyer *et al.* (2010) and finds that the scarring effects of low pay are significant for both men and women and of similar magnitude, though lower than the scarring effects of unemployment.

This article extends the literature into the area of inter-related dynamics of unemployment and skills under-utilization. The intuition behind this investigation is that what we conventionally call skills under-utilization can be defined as partial skills under-utilization, and what we conventionally call unemployment can be defined as complete skills under-utilization. This article focusses on the following questions. First, it asks what effect skills under-utilized in employment have on future employment prospects, relative to well-utilized skills employment. Second, it asks what the effect of unemployment on future repeat unemployment is, relative to well-utilized skills employment. For the sake of completeness, a similar set of questions is asked in relation to low pay dynamics. This is a question that was first examined by Stewart (2007) for the United Kingdom and by Buddelmeyer *et al.* (2010) and only recently by Cai (2014) for Australia. Our results add to this literature by introducing the mismatch dimension to the problem and by using a longer panel version of the Household, Income and Labour Dynamics in Australia (HILDA), which proves useful as it resolves one of the puzzles of the Buddelmeyer *et al.* paper who found gender differences which were difficult to explain and which we conclude have probably been due to small sample sizes. Finally, the article asks whether the inter-related dynamics of unemployment and under-utilized skills employment differ by gender and education pathway.

Our results suggest that, relative to workers with well-utilized skills, workers with under-utilized skills are significantly more likely to be unemployed in the next period, but the likelihood of unemployment in the next period is not as high as for those who are unemployed in the current period (but similar to that of the low paid). The adverse effect of skills under-utilization and unemployment experience on future employment prospects is significant for both males and females with no discernible gender difference. The adverse effect of skills under-utilization and unemployment experience is significant for all educational categories. Unemployment dynamics appear to be stronger than skills under-utilization dynamics, as is the case with unemployment dynamics relative to low pay dynamics. The adverse effects of skills under-utilization and unemployment experience are relatively stronger for those with a higher level of educational qualifications. Our results fall into the

broader job quality literature by generalizing empirically measured job quality to include skills mismatch. They provide support to the policy view that, in the quest for good quality jobs, the pathway of obtaining a low quality job first can be better than the pathway of waiting with no job at all.

III. Data

The article uses the first 10 waves (2001–2010) of the HILDA household panel survey, which surveys the same individual once every year.[1] The sample is restricted to an unbalanced panel of all working-age individuals (16–64 years for males and 16–59 for females) in the labour force who provide complete information on the variables of interest. The self-employed and full-time students are excluded. The sample size we retain is approximately 6000 observations (persons) per wave over 10 years. It should be noted that, in general, panel attrition is not a major problem with this particular data set.[2]

We follow the majority of the literature (referred to above) and use two-thirds of the median gross hourly wage as the threshold to define low-paid employment, to enable us to make comparisons. More specifically, we calculate the median hourly wage using '*gross weekly earnings from main job*' divided by '*hours per week usually worked in main job*' of all working age employees by wave within our HILDA sample and therefore define a person to be in low-paid employment if their hourly wage is less than two-thirds of the median hourly wage and more than zero. The definition of low pay is a relative measure and is not affected by whether we use nominal or real pay. The thresholds of low-paid employment for each wave are shown in Table 1.

The low-pay threshold increases sharply over time as we use nominal wages. The distribution of employment and pay status by gender and education level is shown is Table 2.[3]

The skills under-utilization measure is derived by using the response scored on a seven point scale to the statement '*I use many of my skills and abilities in my current job'*, with a response of 1 corresponding to strongly disagree, up to 7 corresponding to strongly agree. Individuals selecting 1, 2, 3 or 4 on the 1–7 scale are classified as skills under-utilized and those selecting 5 or higher as skills well-matched. The use of a binary indicator of skills under-utilization is in line with existing research and follows sensitivity analyses suggesting that our results are not particularly sensitive to the precise cut off point used in this article. Further, it should be noted that the concepts of low-pay and skills under-utilization are measuring different things; the correlation between the two is only 0.0744.

Table 3 reports the distribution of employment and skills under-utilization status by gender and education level, while splitting the sample into

Table 1. Estimated low-pay thresholds: gross hourly wages in AU$

	Wave 1	Wave 2	Wave 3	Wave 4	Wave 5
Low-pay threshold Hourly earnings	11.33	11.79	12.23	12.61	13.33
	Wave 6	Wave 7	Wave 8	Wave 9	Wave 10
Low-pay threshold Hourly earnings	13.83	14.67	15.35	16.16	16.67

Note: The sample is working age employees from HILDA 2001–2010.

[1] See Watson and Wooden (2004) for a detailed description of the HILDA data.
[2] However, Buddelmeyer *et al.* (2010) report a high level of panel attrition, which they attribute to sample design in which joiners are assigned temporary status and give the appearance of high attrition when this is not really the case. When they use a balanced panel, attrition bias does not appear to affect their key result.
[3] The numbers in Table 1 are slightly smaller than those reported by Buddelmeyer *et al.* (2010). This is because our sample is restricted to working age employees, that is 16–64 years for males and 16–59 for females, while Buddelmeyer *et al.* (2010) focused on all adult workers, aged 21 years or older. The distributions of employment and pay status shown in Table 2 are similar to those reported by Buddelmeyer *et al.* (2010).

Table 2. Employment and pay status by gender and education level

	University graduates	Diplomas	Certificates III/IV	Only completed school	Did not complete school	Total
Males (%)						
Unemployed (U)	2.6	3.9	4.3	6.1	11.5	5.9
Low-paid employee (LP)	3.8	6.1	8.5	19.8	17.7	11.2
High-paid employee (HP)	93.6	90.0	87.2	74.2	70.9	82.9
No. of observations	7591	2700	8936	5068	7769	32 064
Females (%)						
Unemployed (U)	2.3	3.2	5.8	6.3	9.5	5.5
Low-paid employee (LP)	4.3	9.3	15.9	19.1	18.1	12.8
High-paid employee (HP)	93.4	87.5	78.3	74.6	72.3	81.6
No. of observations	9283	3083	4822	5347	7923	30 458
Total (%)						
Unemployed (U)	2.4	3.5	4.8	6.2	10.5	5.7
Low-paid employee (LP)	4.1	7.8	11.1	19.4	17.9	12.0
High-paid employee (HP)	93.5	88.7	84.1	74.4	71.6	82.3
No. of observations	16 874	5783	13 758	10 415	15 692	62 522

Notes: The sample is working age individuals in the labour force from HILDA 2001–2010. The unemployed are defined as those not in employment but looking for work in the previous 4-week period.

Table 3. Employment and skills utilization status by gender and educational attainment[4]

	University graduates	Diplomas	Certificates III/IV	Only completed school	Did not complete school	Total
Males (%)						
Unemployed (U)	2.5	3.7	4.3	6.5	12.3	6.0
Skills under-utilized (OS)	14.6	18.4	17.5	27.5	25.6	20.3
Skills well-matched (WM)	82.9	77.9	78.2	66.0	62.1	73.7
No. of observations	7105	2478	8020	4394	6730	28 727
Females (%)						
Unemployed (U)	2.2	3.1	6.0	6.6	9.6	5.6
Skills under-utilized (OS)	14.7	19.7	21.8	26.9	27.9	21.9
Skills well-matched (WM)	83.0	77.2	72.2	66.5	62.4	72.6
No. of observations	8763	2881	4390	4821	7328	28 183
Total (%)						
Unemployed (U)	2.4	3.4	4.9	6.5	10.9	5.8
Skills under-utilized (OS)	14.7	19.1	19.0	27.2	26.8	21.1
Skills well-matched (WM)	83.0	77.5	76.0	66.3	62.3	73.1
No. of observations	15 868	5359	12 410	9215	14 058	56 910

Note: The sample is working age individuals in the labour force from HILDA 2001–2010.

three mutually exclusive and collectively exhaustive categories: (i) unemployed; (ii) employed with under-utilized skills (1–4 on the scale); and (iii) employed with well-matched skills (5–7 on the scale).

Table 3 shows that the proportion of unemployed workers declines with higher levels of education, starting from 10.9% for secondary school non-completers and dropping to 2.4% for university graduates. In contrast, the proportion of workers with

[4] The Australian post-school education system and degrees highly resemble those of other economically developed countries. Diploma qualifications are essentially high level vocational degrees (delivered by a mix of universities and further education outlets), with a duration between one and 2 years. Certificates III and IV are the backbone of Australian Vocational Education and Training (VET) with a course duration of approximately 6 and 12 months respectively.

Table 4. Transitions in labour force status between $t-1$ and t by education level

	Status at t						
	Employment and pay				Employment and skills utilization		
Status at $t-1$	Unemployed	Low-paid	High-paid		Unemployed	Skills under-utilized	Skills well-matched
University graduates							
Unemployed	21.3	10.8	67.9	Unemployed	22.6	22.6	54.9
Low-paid	3.4	25.3	71.2	Skills under-utilized	2.4	46.4	51.2
High-paid	1.1	2.1	96.8	Skills well-matched	0.9	8.2	90.8
Diplomas							
Unemployed	25.6	11.3	63.2	Unemployed	26.5	21.6	52.0
Low-paid	4.3	38.4	57.3	Skills under-utilized	1.8	51.8	46.4
High-paid	1.6	4.1	94.4	Skills well-matched	1.4	10.8	87.8
Certificates III/IV							
Unemployed	37.5	14.4	48.2	Unemployed	41.2	19.3	39.5
Low-paid	3.7	38.3	58.0	Skills under-utilized	3.1	44.6	52.4
High-paid	1.7	5.3	93.0	Skills well-matched	1.6	13.1	85.3
Only completed school							
Unemployed	32.9	24.8	42.3	Unemployed	36.7	22.8	40.5
Low-paid	3.5	47.4	49.1	Skills under-utilized	3.3	52.9	43.8
High-paid	1.9	7.5	90.6	Skills well-matched	1.9	16.2	81.9
Did not complete school							
Unemployed	47.2	21.1	31.7	Unemployed	53.2	18.8	28.0
Low-paid	6.4	48.0	45.6	Skills under-utilized	3.7	53.6	42.7
High-paid	2.4	8.4	89.2	Skills well-matched	2.4	18.3	79.3
Total							
Unemployed	37.8	18.5	43.7	Unemployed	42.0	20.3	37.7
Low-paid	4.6	42.8	52.6	Skills under-utilized	3.0	50.0	47.0
High-paid	1.7	5.1	93.2	Skills well-matched	1.6	12.8	85.7

Note: The sample is working age individuals in the labour force from HILDA 2002–2010.

well-matched skills and high paid employment both increase with education level. Such an association between skills utilization and education level has been explained in the literature (Mavromaras *et al.*, 2009) by the 'bumping down' principle, which suggests that a lack of demand for high skilled labour leads them to seek lower level jobs, resulting in some lower skilled employees being 'bumped down' into even lower skilled occupations with the level of aggregate displacement increasing as we move down the skills spectrum. This is essentially the point made by Dolado *et al.* (2009), who treat this as an equilibrium outcome, but there are several other potential explanations for this empirical regularity (Sattinger, 2012). Additionally, workers at the lowest end of the skills and qualifications distributions may be more likely to have been forced out of employment and not be able to return for a longer period of time.

Table 4 below describes the patterns of labour force status over time by education level. It shows that in spite of significant transitions between employment and pay status as well as between employment and skill utilization status, these labour force statuses are persistent over time. In general, about 40% of those unemployed at $t-1$ are still unemployed at t, 42.8% of the low paid remain low paid, while among those with well-utilized skills at $t-1$, 85.7% continue to be well-utilized at t.

Moreover, Table 4 shows that a larger proportion of people move into a higher status position than a lower one. In addition, the probability of being unemployed is almost three times as high for those who were low paid in the previous year relative to the high paid, and correspondingly about twice as high for those who were skills under-utilized compared to those who were well-utilized in the previous year. The patterns of labour force status over time also vary

Table 5. Transitions between labour force status over $t-2$, $t-1$ and t by gender (% and numbers)

	Status at t							
	Males				Females			
Status at $t-1$, $t-2$	Un-employed	Skills under-utilized	Skills well-matched	Total cases	Un-employed	Skills under-utilized	Skills well-matched	Total cases
Unemployed at $t-1$, unemployed at $t-2$	63.0	13.5	23.6	208	54.8	18.1	27.1	177
Unemployed at $t-1$, under-utilized at $t-2$	25.8	27.0	47.2	89	24.4	35.9	39.7	78
Unemployed at $t-1$, well-matched at $t-2$	27.9	19.0	53.1	147	16.5	22.6	60.9	133
Under-utilized at $t-1$, unemployed at $t-2$	9.5	47.4	43.1	116	13.0	49.6	37.4	123
Well-matched at $t-1$, unemployed at $t-2$	7.8	19.4	72.8	217	9.5	19.8	70.7	222
Under-utilized at $t-1$, under-utilized at $t-2$	2.2	62.9	34.9	1653	1.9	61.4	36.6	1779
Under-utilized at $t-1$, well-matched at $t-2$	2.6	35.7	61.7	1568	1.5	38.3	60.1	1437
Well-matched at $t-1$, under-utilized at $t-2$	1.6	30.9	67.5	1589	1.6	28.8	69.6	1557
Well-matched at $t-1$, well-matched at $t-2$	1.1	9.4	89.5	10 714	1.1	9.2	89.8	9835
Total cases	441	3272	12 588	16 301	362	3190	11 789	15 341

Notes: The sample is working age individuals in the labour force from HILDA 2003–2010. Transitions are in percentages and in numbers.

significantly by education level. The proportion of those remaining unemployed decreases with education level, while the probability of remaining high paid or well matched increases with education level. In addition, the proportion of people moving into a better status position is positively associated with education level. Table 4 also implies that the bumping down phenomenon is much more substantial in transitions from being well matched towards being skills under-utilized, rising from 8.2% for university graduates to 18.3% for those who did not complete school.

Table 4 suggests that there is a significant amount of exits from good jobs into unemployment and entries into good jobs from unemployment. The former seem more likely to involve voluntary separations (quits) than involuntary departures, especially when the individual is able to locate another good job after a spell of unemployment. Perhaps there were fewer opportunities for training in employment than out of employment. Being in a good job may also signal a more positive message to a future employer than being in a low quality job where lack of use of skills may result in cognitive decline (see De Grip *et al.*, 2008). However, we leave further analysis of these issues to future research.

Table 5 estimates transitions between different labour market states split over $t-2$, $t-1$ and t by gender to motivate our later dynamics estimations. The pattern is similar for men and women. If one is unemployed in both past periods, one is more likely to continue in this state than enter one of the alternatives. Likewise if one is under-utilized in both past periods one is more likely to continue in this state than move into another state. Yet, there is sufficient movement between states to enable estimation to take place.

IV. Methodology

Following Stewart (2007), the article uses a random effects dynamic probit model to estimate the likelihood of unemployment. The outcome variable is

dichotomous: 1 if unemployed and 0 if employed. We write the latent equation as

$$y_{it}^{*} = \gamma_1 y_{it-1} + \gamma_2 LQ_{it-1} + X_{it}^{'}\beta + \alpha_i + u_{it} \qquad (1)$$

where $i = 1,\ldots,N$ denotes individuals observed over $t = 2,\ldots,T$ periods. y_{it}^{*} is the latent dependent variable for being unemployed, with the observable outcome $y_{it} = 1$ if $y_{it}^{*} \geq 0$ and $y_{it} = 0$ otherwise. y_{it-1} represents the lagged dependent outcome variable, and LQ_{it-1} is a dummy variable denoting the lag of low quality employment. Low quality employment is represented by two variables: the first one is being in low paid employment (being paid above the threshold value is the reference category) and the second one is being skills under-utilized (being skills well-matched is the reference category). We estimate the impact of the two types of low quality employment on the probability of unemployment separately, where γ_1 and γ_2 are the two coefficients associated with the estimated lags. X_{it} is a set of control variables which are allowed to be both time-variant and invariant (including age, gender, education level, disability status, marital status, number of children, socio-economic background, ethnic origin, geographic location and the unemployment rate of the region), α_i is the individual-specific random component capturing the effect of time-invariant individual unobserved heterogeneity and u_{it} is an idiosyncratic error term distributed $N\left(0, \sigma_u^2\right)$.[5] Two problems arise if we estimate Equation 1 using a standard random effects framework.

The first problem arises from the assumption of zero correlation between the individual effect α_i and the explanatory variables X_{it} in the random effects model. We resolve this problem by implementing the Mundlak (1978) method, which writes the relationship between α_i and the means of the time-varying x-variables as $\alpha_i = \bar{X}_i^{'}\delta + \varepsilon_i$, where $\varepsilon_i \sim iid$ follows the normal distribution and is independent of X_{it} and u_{it} for all i and t. Mundlak corrections can be applied by including on the right-hand side of Equation 1 the individual (over time) means for all time-varying explanatory variables.

The second problem arises from the possibility that the lagged dependent variable on the right-hand side of Equation 1 may be correlated with the error terms. This is known as the *initial conditions* problem. It has been examined by Heckman (1981), who proposed an estimator incorporating a linear approximation of the latent dependent variable at the initial period, to express the joint probability of the observed sequence of individuals' experiences, given the individual effect α_i. Simpler to compute estimators have been proposed by Orme (1997), Wooldridge (2005) and Arulampalam and Stewart (2009).[6] We follow Wooldridge (2005) combined with Mundlak (1978) and estimate the following equation:

$$y_{it}^{*} = \gamma_1 y_{it-1} + \gamma_2 LQ_{it-1} + X_{it}^{'}\beta + \bar{X}_i^{'}\delta + \theta y_{i1} + \varepsilon_i + u_{it} \qquad (2)$$

where y_{i1} represents the first observation of the binary dependent variable for individual i. All estimation results we present refer to Equation 2.[7]

V. Estimation Results

We start by estimating the random effects dynamic probit model on the whole sample, followed by estimations on sub-samples, initially by gender and later by education level. The impact of low-paid employment and skills under-utilization is estimated, separately. Knowing the crucial differences in the incidence and labour market outcomes of skills under-utilization by education level, we also estimate the model with dynamics of skills under-utilization by education level. The results highlight

[5] Variables and their summary statistics are listed in Appendix Table A1.

[6] Arulampalam and Stewart (2009) put Heckman's and the other estimators cited above to a comparative test. They emphasize the benefits of allowing for correlated random effects obtained from using the Mundlak correction and point out that all estimators provide similar results, except when the number of periods is very small. Given that our panel is sufficiently long at 10 waves, we employ the Wooldridge (2005) method for the purpose of this research, primarily for its considerable computational simplicity.

[7] We also included in estimation an indicator of skills under-utilization in the first job recorded in the sample to deal with issues arising from any correlation between the random effect and skills under-utilization. The resulting estimates showed no discernible change.

the role that education plays in determining the inter-related dynamics of unemployment and skills under-utilized employment. We conclude our estimations by taking a closer look at the (longer and combined) dynamics of unemployment and skills under-utilization.

We augment the presentation of the estimation by calculating several informative predicted probabilities and marginal effects. In Table 6, we present three additional predicted probabilities, the first one for present unemployment conditional on having been unemployed in the previous period (Prob[$U_t|U_{t-1}$]),

Table 6. The impact of previous unemployment and low paid employment on current unemployment probability

	All		Males		Females	
	Coeff.	SE	Coeff.	SE	Coeff.	SE
Unemployed at $t-1$	1.056***	(0.06)	1.023***	(0.08)	1.089***	(0.08)
Low-paid at $t-1$	0.282***	(0.05)	0.274***	(0.07)	0.290***	(0.06)
Initial unemployment	0.916***	(0.06)	0.968***	(0.09)	0.849***	(0.09)
Female	−0.019	(0.04)				
Only completed school	−0.213***	(0.05)	−0.369***	(0.08)	−0.073	(0.07)
Certificates III/IV	−0.158***	(0.05)	−0.223***	(0.07)	−0.087	(0.07)
Diplomas	−0.141**	(0.07)	−0.105	(0.10)	−0.168*	(0.09)
University graduates	−0.310***	(0.05)	−0.335***	(0.08)	−0.271***	(0.07)
Migrants (ESB)	0.106*	(0.06)	0.177**	(0.09)	0.006	(0.09)
Migrants (NESB)	0.227***	(0.06)	0.246***	(0.09)	0.195**	(0.08)
ATSI	0.670***	(0.09)	0.650***	(0.14)	0.648***	(0.12)
Father with a professional job	−0.032	(0.05)	−0.113	(0.08)	0.056	(0.07)
Married	−0.003	(0.07)	0.065	(0.10)	−0.064	(0.10)
Age	−0.033	(0.03)	−0.063	(0.04)	0.003	(0.04)
Age square	0.061*	(0.04)	0.097**	(0.05)	0.018	(0.05)
Disability	0.122**	(0.06)	0.103	(0.08)	0.140*	(0.08)
Urban	0.152	(0.13)	0.293*	(0.17)	−0.068	(0.21)
Children aged under 5	0.111	(0.08)	0.020	(0.11)	0.222*	(0.13)
Children aged [5, 14]	0.113	(0.08)	0.128	(0.11)	0.095	(0.12)
Regional unemployment rate	0.109***	(0.02)	0.116***	(0.03)	0.098**	(0.04)
m (married)	−0.284***	(0.08)	−0.486***	(0.12)	−0.123	(0.12)
m (age)	0.007	(0.03)	0.051	(0.04)	−0.041	(0.05)
m (age square)	−0.037	(0.04)	−0.085*	(0.05)	0.019	(0.06)
m (disability)	0.305***	(0.09)	0.176	(0.13)	0.399***	(0.12)
m (urban)	−0.118	(0.14)	−0.284	(0.18)	0.143	(0.23)
m (children aged under 5)	−0.019	(0.11)	0.130	(0.16)	−0.173	(0.17)
m (children aged [5, 14])	−0.191*	(0.10)	−0.277*	(0.15)	−0.091	(0.14)
m (regional unemployment rate)	−0.044	(0.03)	−0.071	(0.04)	0.002	(0.06)
Constant	−1.983***	(0.25)	−2.085***	(0.34)	−1.988***	(0.39)
No. of observations	41 615		21 693		19 922	
Log-likelihood	−4490.29		−2390.71		−2078.19	
Prob($U_t|U_{t-1}$)	0.123		0.117		0.130	
Prob($U_t|LP_{t-1}$)	0.037		0.039		0.035	
Prob($U_t|HP_{t-1}$)	0.022		0.024		0.020	
Average partial effect						
Prob($U_t|U_{t-1}$) − Prob($U_t|HP_{t-1}$)	0.100***		0.093***		0.110***	
Prob($U_t|LP_{t-1}$) − Prob($U_t|HP_{t-1}$)	0.015***		0.015***		0.015***	
Predicted probabilities ratio						
Prob($U_t|U_{t-1}$)/Prob($U_t|HP_{t-1}$)	5.500		4.825		6.455	
Prob($U_t|LP_{t-1}$)/Prob($U_t|HP_{t-1}$)	1.667		1.597		1.755	
Prob($U_t|U_{t-1}$)/Prob($U_t|LP_{t-1}$)	3.299		3.021		3.678	

Notes: Dependent variable is the probability of unemployment at *t*. *m*(.) denotes Mundlak correction terms. Statistical significance denoted by ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$.

the second one for present unemployment conditional on having been employed below the low pay threshold in the previous period (Prob[U_t|LP_{t-1}]), and the third one for present unemployment conditional on having been employed above the low pay threshold in the previous period (Prob[U_t|HP_{t-1}]). Similar predicted probabilities that condition on skills utilization are presented in Table 7.

We also present in Tables 6 and 7 two types of marginal effects of unemployment and skills under-utilization relative to skills well-utilized employment at t–1 on the probability of unemployment at t,

Table 7. The impacts of previous unemployment and skill under-utilization on current unemployment probability

	All sample		Males		Females	
	Coeff.	SE	Coeff.	SE	Coeff.	SE
Unemployed at $t-1$	0.984***	(0.06)	1.016***	(0.09)	0.960***	(0.09)
Under-utilized at $t-1$	0.201***	(0.04)	0.227***	(0.06)	0.179***	(0.06)
Initial unemployment	1.332***	(0.08)	1.422***	(0.12)	1.213***	(0.10)
Female	−0.028	(0.04)				
Only completed school	−0.245***	(0.06)	−0.465***	(0.10)	−0.070	(0.08)
Certificates III/IV	−0.135**	(0.06)	−0.182**	(0.08)	−0.077	(0.08)
Diplomas	−0.196**	(0.08)	−0.201*	(0.12)	−0.174*	(0.10)
University graduates	−0.338***	(0.06)	−0.317***	(0.09)	−0.330***	(0.08)
Migrants (ESB)	0.140**	(0.07)	0.192*	(0.10)	0.060	(0.10)
Migrants (NESB)	0.257***	(0.07)	0.240**	(0.10)	0.249***	(0.09)
ATSI	0.709***	(0.11)	0.825***	(0.17)	0.585***	(0.14)
Father with a professional job	−0.031	(0.06)	−0.022	(0.09)	−0.033	(0.08)
Married	0.013	(0.08)	0.073	(0.12)	−0.000	(0.12)
Age	−0.058*	(0.03)	−0.060	(0.04)	−0.058	(0.05)
Age square	0.086**	(0.04)	0.086	(0.05)	0.092	(0.06)
Disability	0.158**	(0.07)	0.173*	(0.10)	0.139	(0.09)
Urban	0.130	(0.16)	0.348*	(0.21)	−0.178	(0.23)
Children aged under 5	0.120	(0.09)	−0.055	(0.13)	0.326**	(0.14)
Children aged [5, 14]	0.079	(0.09)	−0.022	(0.13)	0.189	(0.13)
Regional unemployment rate	0.092***	(0.02)	0.094***	(0.03)	0.089**	(0.04)
m (married)	−0.378***	(0.10)	−0.573***	(0.15)	−0.268**	(0.13)
m (age)	0.016	(0.03)	0.028	(0.05)	0.007	(0.05)
m (age square)	−0.040	(0.04)	−0.048	(0.06)	−0.037	(0.06)
m (disability)	0.283***	(0.10)	0.171	(0.15)	0.358***	(0.13)
m (urban)	−0.085	(0.17)	−0.407*	(0.23)	0.347	(0.25)
m (children aged under 5)	0.072	(0.13)	0.246	(0.18)	−0.130	(0.19)
m (children aged [5, 14])	−0.106	(0.11)	−0.025	(0.17)	−0.175	(0.15)
m (regional unemployment rate)	0.002	(0.04)	−0.009	(0.05)	0.014	(0.06)
Constant	−1.989***	(0.27)	−2.084***	(0.37)	−1.948***	(0.41)
No. of observations	39 127		19 924		19 203	
Log-likelihood	−3862.27		−1960.43		−1880.51	
Prob(U_t|U_{t-1})	0.100		0.101		0.101	
Prob(U_t|OS_{t-1})	0.032		0.034		0.030	
Prob(U_t|WM_{t-1})	0.023		0.024		0.021	
Average partial effect						
Prob(U_t|U_{t-1}) − Prob(U_t|WM_{t-1})	0.077***		0.077***		0.080***	
Prob(U_t|OS_{t-1}) − Prob(U_t|WM_{t-1})	0.009***		0.010***		0.008***	
Predicted probabilities ratio						
Prob(U_t|U_{t-1})/Prob(U_t|WM_{t-1})	4.391		4.237		4.723	
Prob(U_t|OS_{t-1})/Prob(U_t|WM_{t-1})	1.394		1.422		1.378	
Prob(U_t|U_{t-1})/Prob(U_t|OS_{t-1})	3.150		2.979		3.426	

Notes: Dependent variable is the probability of unemployment at t. m(.) denotes Mundlak correction terms. Statistical significance denoted by ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$.

following the counterfactual post-estimation approach used by Stewart (2007) and Buddelmeyer *et al.* (2010). The first type is the Average Partial Effect (APE), which is defined as the *difference* between predicted probabilities; the second type is the predicted probability ratios (PPR), which is defined as the *ratio* between predicted probabilities. The predicted probability ratios are particularly useful in the present context because the reference for comparison, that is the predicted probability of unemployment in the present period if in high paid or well-matched employment in the previous period, is often very small (0.022 and 0.023, respectively, for the whole sample).

Results obtained from the whole sample and for men and women separately are reported in Tables 6 and 7. The statistical significance of initial unemployment along with a number of the Mundlak correction terms in Table 6 suggest that the combination of the Wooldridge method with the Mundlak corrections is an appropriate method for the control of initial conditions and individual unobserved heterogeneity. The Mundlak corrections are more significant for the complete sample, indicating that unobserved individual heterogeneity is reduced when we split the sample by gender, or possibly because of the smaller sample size.

Results in Table 6 are in line with the existing literature, suggesting that unemployment is persistent. In other words, for those who were unemployed rather than working in the previous period, their unemployment status leads to a higher likelihood of being unemployed in the present period, not only because of the individual observed and unobserved individual characteristics, but also because they were unemployed in the previous period. Some estimated differences are noteworthy. For example, comparing those who were paid above the threshold pay in the previous period with those who were unemployed in the previous period, we find that the probability of unemployment is higher by 0.100 (or 5.5 times as likely as the PPR estimate shows) for those who were unemployed in the previous period. The difference in unemployment probability between those who were below and above the low pay threshold is similarly shown in Table 6 to be 0.015 (or 1.67 times as likely as the PPR estimate shows).

Table 7 contains findings that are new in the literature and show statistically significant effects of past skills under-utilization on present outcomes. The probability of present unemployment is higher for those who were employed in a skills-underutilized job in the previous period.[8] Compared to those who were employed in a skills well-matched job in the previous period, the probability of present unemployment is higher by 0.077 (or 4.4 times as likely as the PPR estimate shows) than for those who were unemployed in the previous period. While those who were employed in the previous period were not very likely to be unemployed in the next period, those who were skills under-utilized were 1.39 times more likely to become unemployed than those who were skills well-matched. Estimations by gender suggest that the results are very similar for males and females, a finding that is in line with most findings on mismatch, where gender differences are typically small. This finding is in direct contrast to that of Buddelmeyer *et al.* (2010), as discussed earlier. Their suggestion that discrimination in hiring and firing only affects women in the lower end of the earnings distribution seems implausible.

Our findings indicate that there exists a dynamic relationship not only between past and present unemployment, but also between past skills under-utilization and present unemployment, though the latter effect appears to be relatively weaker. The conventional explanation for the dynamic effect of unemployment is that when a person is unemployed, some of their skills may be lost or the fact of being unemployed may signal such a loss to potential employers. The outcome is that the probability of re-employment becomes lower for these reasons. In an analogous way, one can think of a skills under-utilized employee, as an employee who is under-employed, and may be perceived as more likely to have lost some valuable skills. This perception may not matter if the worker concerned remains employed and in the same job. However, should these workers need to get another job (either because of a quit or a layoff), they may find it harder

[8] We estimate an additional model by including 'initial skills under-utilization' as a control variable and find the result does not differ substantially from what was observed in Table 7. The coefficients of 'unemployed at $t-1$' and 'under-utilized at $t-1$' are 0.966*** and 0.166***, respectively, for the whole sample; 1.004*** and 0.200*** for males; 0.938*** and 0.136** for females.

to find a new job because of the signal their previous under-utilized job conveys to perspective employers.[9] This effect is revealed by the estimation of the difference in the probability of being unemployed between those who are under-utilized and those who are well-matched.

Our results show that the (small) probability of being unemployed is close to 40% higher for those who were previously under-utilized than those who were well-matched. Given the considerable extent of skills under-utilization among those employed (from 14.7% for university graduates to 27% for those who completed secondary school), this is a finding of policy significance.

Results from the remaining control variables suggest that disadvantaged groups, such as the very young or the very old, people with a disability or a long-term health condition, migrants and aboriginal and Torres Strait Islanders, are all associated with higher unemployment probabilities. Also, the probability of unemployment in general decreases with the level of education with the sole exception of VET graduates (Diplomas and Certificates III/IV) who are more likely to be unemployed than school completers. The high statistical significance of all education level variables and their differences by gender points to the next estimation step which extends the results in Table 7 by education level. We present the results in Table 8 below.

Table 8 shows that there is a significant and negative effect of past skills under-utilization and an even much stronger negative effect of unemployment experience (relative to skills well-utilized employment) on current employment, for all education levels.[10] Results show two main patterns. The first pattern suggests that the more academic education qualifications (i.e., university degrees and completed school education) are more protective against unemployment than the vocational qualifications or no qualifications at all. All three predicted probabilities of unemployment are lower for university and school graduates. The differences are large. For example, an unemployed university degree holder has a 4.9% probability of remaining unemployed, against a 14.1% probability of a VET (Certificate III/IV) holder. The second pattern suggests that, for all education levels, a well-matched job is protective of future unemployment. For instance, a well-matched university graduate is about half as likely to become unemployed as a mismatched counterpart (0.011/0.022), while a well-matched school non-completer is about 80% as likely to become unemployed as a mismatched counterpart (0.041/0.052). University graduates not only are less likely to remain unemployed, but they also are less likely to become unemployed if they have been in a skills well-utilized job. The converse argument also holds in that these results show that the penalty of mismatch (in the form of increasing unemployment probability relative to a well matched person with the same qualifications) is at its highest for university graduates (1.959 times as likely) and at its lowest for school non-completers (1.26 times as likely). This difference is statistically significant at the 1% level. The two results simply represent the two sides of the same coin. However, these comparisons (between relative positions within education levels) have to be seen in the context of the very different absolute values for each education level. For example, although university graduates have the lowest unemployment probabilities, it is still the case that a university graduate who was previously unemployed is more likely to be unemployed at present than any of the lower qualifications workers who were previously in a well-matched job (this compares a 4.9% probability for the university graduate with a 2%, 2.9% and 4.1% probability for each of the other three education levels).

Having higher educational attainment seems to enhance the probability of employment, but this is true only for those who were employed in the previous period. Among those in well-matched employment in the previous period, the probability of unemployment in the present period is reduced from 0.041 for school non-completers to 0.011 for university graduates.[11] Similarly, for those in under-utilized employment in the previous period, the likelihood of unemployment in the present period

[9] We do not consider here the question of job-to-job mobility, but earlier work (see, e.g., Mavromaras *et al.*, 2013) does not find that skill mismatch itself has a significant effect on voluntary mobility.

[10] One important finding is that for those with diplomas the estimated cross-period correlation between composite error terms, ρ is close to zero, indicating that a low proportion of the error variance is due to an individual unobserved effect ε_i. Under these circumstances, RE estimates will be similar to the pooled estimates and panel estimation methods may be problematic. Therefore, we will not discuss the results for diplomas in more detail here.

[11] The incidence of unemployment between two good jobs is very low – 78 cases out of 16 301 for males and 81 out of 15 341 for females.

Table 8. Random effects dynamic model for unemployment probability by education level

	University graduates		Certificates III/IV		Only completed school		Did not complete school	
	Coeff.	SE	Coeff.	SE	Coeff.	SE	Coeff.	SE
Unemployed at $t-1$	0.790***	(0.16)	1.183***	(0.12)	0.651***	(0.16)	1.066***	(0.11)
Under-utilized at $t-1$	0.344***	(0.09)	0.210**	(0.09)	0.238**	(0.11)	0.180**	(0.09)
Initial unemployment	1.291***	(0.18)	1.058***	(0.14)	1.830***	(0.24)	1.499***	(0.17)
Female	−0.107	(0.09)	−0.027	(0.08)	0.313***	(0.11)	−0.098	(0.09)
Migrants (ESB)	0.097	(0.14)	0.233*	(0.13)	0.217	(0.19)	−0.048	(0.16)
Migrants (NESB)	0.386***	(0.11)	0.372***	(0.13)	0.192	(0.18)	−0.095	(0.21)
ATSI	0.648**	(0.31)	0.856***	(0.19)	0.068	(0.31)	0.914***	(0.20)
Father with a professional job	0.008	(0.09)	−0.168	(0.14)	0.046	(0.14)	0.113	(0.17)
Married	−0.127	(0.19)	−0.097	(0.17)	−0.043	(0.20)	0.231	(0.17)
Age	−0.000	(0.08)	−0.127*	(0.07)	−0.051	(0.08)	−0.089	(0.07)
Age square	0.027	(0.09)	0.156*	(0.09)	0.098	(0.11)	0.119	(0.08)
Disability	0.151	(0.15)	0.231*	(0.12)	0.001	(0.19)	0.097	(0.13)
Urban	0.719	(0.44)	0.378	(0.31)	0.103	(0.45)	−0.125	(0.29)
Children aged under 5	0.154	(0.20)	0.144	(0.18)	0.081	(0.25)	0.000	(0.19)
Children aged [5, 14]	−0.243	(0.19)	0.235	(0.17)	0.164	(0.27)	0.340*	(0.20)
Regional unemployment rate	0.079	(0.05)	0.097**	(0.05)	0.159**	(0.07)	0.054	(0.05)
Constant	−2.914***	(0.80)	−2.366***	(0.56)	−1.783***	(0.65)	−2.545***	(0.50)
No. of observations	11 737		8728		5885		8918	
Log-likelihood	−745.95		−874.04		−624.97		−1223.51	
Prob(U_t|U_{t-1})	0.049		0.141		0.069		0.143	
Prob(U_t|OS_{t-1})	0.022		0.030		0.040		0.052	
Prob(U_t|WM_{t-1})	0.011		0.020		0.029		0.041	
Average partial effect								
Prob(U_t|U_{t-1}) − Prob(U_t|WM_{t-1})	0.038***		0.121***		0.041***		0.102***	
Prob(U_t|OS_{t-1}) − Prob(U_t|WM_{t-1})	0.011***		0.010***		0.011***		0.011***	
Predicted probabilities ratio								
Prob(U_t|U_{t-1})/Prob(U_t|WM_{t-1})	4.303		6.910		2.423		3.467	
Prob(U_t|OS_{t-1})/Prob(U_t|WM_{t-1})	1.959		1.485		1.399		1.260	
Prob(U_t|U_{t-1})/Prob(U_t|OS_{t-1})	2.196		4.653		1.732		2.751	

Notes: Dependent variable is the probability of unemployment at t. Mundlak correction terms are included in the regression but not presented here. Significance is denoted by ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$.

is reduced from 0.052 to 0.022. In contrast, having better qualifications does not necessarily have a positive impact on employment probabilities for those who were previously unemployed. Getting a job is relatively easier for those who hold a university degree or have only completed school rather than holding a certificate III/IV or having not completed school. This finding indicates that the incentive to invest in human capital will be reduced when skills are not effectively used, as periods in unemployment, skills under-utilization and low pay will reduce returns to education to varying degrees.

With regard to the magnitude of the adverse effect of unemployment experience (relative to skills well-utilized employment) on repeat unemployment, VET graduates have the largest effect in terms of the differences (the APE is 0.121 for certificates III/IV). By contrast, the weakest effect is found for university graduates and school completers, with Average

Partial Effects values at 0.038 and 0.041, respectively. However, the ratio measure of the effect on graduates is 4.303, which is higher than those with no post-school qualification (at 3.467) due to a very small probability of unemployment for degree holders who were in a skills well-matched job in the previous period.

Table 8 shows that skills under-utilized employment in the previous period (relative to well-utilized employment) significantly increases the probability of unemployment in the present period for all educational categories. The scales of those effects are similar in terms of Average Predicted Effects (around 0.01), which are small in size but statistically significant. In contrast, Predicted Probabilities Ratios strictly increase with education ranging from 1.260 for school non-completers to 1.959 for university graduates. Our results confirm the view that getting unemployed people into work is a considerable step towards more stable employment as it increases the probability of future employment. Our results add a new dimension to the way the problem of stable employment is understood, however, by providing evidence that only getting a job will not be as beneficial as getting a well matched job, especially for those who have relatively high qualifications, who stand most to lose by getting the wrong job. Those who get into a skills under-utilized job are still much more likely to be unemployed in the next period, compared to those who get a well-matched job. For university graduates, the probability is about twice as high (1.959). For VET graduates, it is about one and half times as high (1.485).

Our final set of estimations examine the impact of the different possible pathways and sequences in the combined dynamics of past skill under-utilization and past unemployment on future employment prospects. To this purpose, we have estimated an otherwise identical model, adding all possible combination of the two lags in both variables. We present the results in Table 9.

Overall, we find that both past unemployment and skills under-utilization have a negative and statistically significant impact on current employability, but the former has a much larger effect. Given the complexity of the model, calculating and presenting the APEs and the PPRs is not practicable, and the best way to present the results in Table 9 is in the form of patterns in the dynamics of unemployment and skill under-utilization and their implications for future employment probabilities. Broadly the results suggest that there is a five-way split on future employment probabilities along the following patterns. First, having no recent unemployment experience means that skills under-utilization causes significant damage, but much less than where there is previous unemployment. Second, some unemployment, even 2 years back, causes significant damage to the probability of employment and the damage does not differ much by whether the previous job was skills under-utilized or well-matched. Third, unemployment in the previous period is really bad for employment

Table 9. The impacts of unemployment and skill under-utilization in the previous two waves on current unemployment probability

	All sample		Males		Females	
	Coeff.	SE	Coeff.	SE	Coeff.	SE
Unemployed($t-1$) and Unemployed($t-2$)	1.82***	(0.10)	1.88***	(0.14)	1.72***	(0.14)
Unemployed($t-1$) and under-utilized($t-2$)	1.24***	(0.14)	1.24***	(0.19)	1.25***	(0.19)
Unemployed($t-1$) and well-matched at $t-2$	1.13***	(0.12)	1.33***	(0.16)	0.89***	(0.17)
Under-utilized($t-1$) and unemployed($t-2$)	0.51***	(0.14)	0.39*	(0.22)	0.61***	(0.18)
Well-matched($t-1$) and unemployed($t-2$)	0.47***	(0.11)	0.50***	(0.16)	0.45***	(0.16)
Under-utilized($t-1$) and under-utilized($t-2$)	0.22***	(0.07)	0.26***	(0.09)	0.19**	(0.09)
Under-utilized($t-1$) and well-matched($t-2$)	0.24***	(0.07)	0.32***	(0.09)	0.13	(0.10)
Well-matched($t-1$) and under-utilized($t-2$)	0.14**	(0.07)	0.15	(0.10)	0.14	(0.10)
No. of observations	29 718		15 290		14 428	
Log-likelihood	−2395.76		−1264.23		−1115.48	

Notes: The dependent variable is the probability of unemployment at t. The control variables included in the regression are the same as those in Table 7. Full estimation results are available by the authors upon request. Significance is denoted by ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$.

prospects, no matter whether two periods back the individual was employed in a skills under-utilized or well-matched job. Fourth, unemployment in both previous periods is by far the worst combination for future employment prospects. Finally, while skills under-utilization is damaging to future employment prospects in a clearly statistically significant way, it is nowhere near as damaging as past or present unemployment. By a considerable margin continued unemployment is shown by the investigation of longer dynamics to be the most damaging pattern.

In conclusion, the analysis of the extended dynamics produces results that are in line with and reinforce the core results of the article. The implication is that the most effective protection against unemployment is having any job, but the analysis also suggests that a skills under-utilized job is worse than a well-matched job for employability. The patterns of the estimated dynamics are in line with and complement the well-established result that low paid jobs are also bad for employability, thus lending empirical support to the proposition that skills under-utilization can be taken as another empirically relevant indicator of low job quality.

VI. Conclusion

This article uses the first 10 waves of the HILDA survey data to investigate the inter-related dynamics of unemployment and skills utilization in the workplace in Australia. In particular, we examine the influence of the scarring effects of experiencing low pay, skills under-utilization and unemployment on the probability of future unemployment. We estimate the random effects dynamic probit model developed by Wooldridge (2005) with Mundlak (1978) corrections, to control for both initial conditions and individual unobserved heterogeneity.

We find that both male and female low paid workers are significantly more likely to be unemployed in the next period relative to high paid workers. Similarly, skills under-utilized workers are significantly more likely to be unemployed in the next period relative to skills well-matched workers. A universal result in our analysis is that the likelihood of unemployment in the next period is higher for those who are unemployed in the current period. Combining these results suggests that there are scarring effects, not only of unemployment, but also of low pay and skills under-utilization on future employment probabilities, though we find, not unexpectedly, that the skills under-utilization effects and the low pay effects are relatively weaker than the unemployment effects. The results on future employment probabilities are confirmed further by the examination of longer and combined dynamics of skills under-utilization and unemployment.

The adverse effect of low pay, skills under-utilization and unemployment experience on future employment prospects is significant for both males and females and we do not find any discernible gender differences. We find significant effects for all education levels, with substantial differences between education levels. Being presently well matched is protective against future unemployment for all education levels, and when mismatched and well-matched workers are compared within each education level, being well matched is most protective against future unemployment for university graduates.

Our results do not contradict the proposition that employment in jobs for which an individual is over-skilled can act as a stepping stone into better jobs, which has recently been shown to be the case for low pay by Cai (2014), using 12 waves of HILDA, but this is not the focus of the current article. In our article, we find that those who were under-utilized at $t-1$ are twice as likely to become unemployed at t as those who were well-matched, but 47.5% of them will become well-matched at t as opposed to 52.6% of the previously low paid. Thus, there is considerable upward mobility which needs to be examined further. When the practical alternative is to remain unemployed, it may pay unemployed workers to avoid prolonged unemployment and accept lower quality jobs in which their skills may not be fully utilized, rather than waiting until a high quality well-matched job arrives. From the point of view of employment policy, our article makes the important distinction between short-term and longer term optimal responses. We offer evidence that, getting individuals out of unemployment is an important policy goal, as remaining unemployed can be highly damaging. The mismatch dynamics literature offers evidence that remaining mismatched can also be damaging. By bringing the two strands of the literature together, our article suggests that empirically the most important consideration appears to be to avoid unemployment, but once this has been fulfilled, the long-term objective of supporting

workers to obtain jobs which are well paid and in which their skills are well utilized may also offer a large potential pay-off.

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Appendix

Table A1. Descriptive statistics

	Mean	SD
Female	0.488	0.500
Only completed school	0.167	0.373
Certificates III/IV	0.220	0.414
Diplomas	0.092	0.289
University graduates	0.270	0.444
Migrants (ESB)	0.093	0.290
Migrants (NESB)	0.103	0.304
ATSI	0.022	0.146
Father with a profession job	0.156	0.363
Married	0.658	0.474
Age	37.753	11.841
Age square/100	15.655	9.130
Disability	0.132	0.339
Urban	0.877	0.329
Children aged under 5	0.125	0.330
Children aged [5, 14]	0.252	0.434
Regional unemployment rate	5.442	1.139

Notes: Pooled data from HILDA 2001–2010. Number of observations is 64 405.

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Unpacking the misery multiplier: How employability modifies the impacts of unemployment and job insecurity on life satisfaction and mental health

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ABSTRACT

Employability strongly moderates the effects of unemployment and of job insecurity on life satisfaction and mental health. Using nationally representative panel data from Australia, I find that an increase in employability from zero to 100% cancels around three quarters, in some cases more, of the detrimental effect of unemployment. Employability also matters for employees: an increase in men's employability from zero to 100% reduces the detrimental effect of job insecurity by more than half. The effects of extreme job insecurity and of unemployment are large and of comparable magnitudes. The findings are used to compute estimates of the well-being trade-off between increases in job insecurity and increases in employability, relevant to the support of "flexicurity" policies, and of the "misery multiplier", the extent to which the effect of a rise in aggregate unemployment on those becoming unemployed is supplemented by the effects on others' insecurity and employability.

1. Introduction

> Luiz Felipe Scolari has shrugged off the pressure mounting on him at Chelsea and declared that another managerial position would always be around the corner for him. "If I lose my job, I have another job . . . . . Maybe tomorrow, maybe after one year or two years. I have worked for 25 years." (Guardian, 14 January, 2009).

It has been firmly established, in a wide range of empirical studies at individual and country levels, that unemployment is detrimental for health and well-being, both in itself and because it entails a loss of income. At the same time, a large number of psychological studies and a few in economics have found that job insecurity itself also generates substantial losses in well-being. Within both literatures, some studies have uncovered heterogeneous effects associated with scarring and social norms, or across different socio-economic groups. The issue which I address in this paper is that an important reason for heterogeneity in the effects of unemployment and job insecurity is rarely recognised in theory or empirically investigated: namely, that employability matters. The Guardian quotation illustrates one instance of this proposition: Chelsea coach Scolari was reported to be unconcerned by his job being at risk because he felt he was very employable. More generally, the effects on well-being of being unemployed or of the fear of job loss are each potentially mitigated if there are good prospects of finding another job: the question is, how much?

The broad term "employability" refers to the ability of an individual to find and sustain employment. A characteristic of the individual in context, employability is indicated by the probability of obtaining employment, though often proxied by measures of its determinants (skills, adaptability and so on). In this paper I develop a simple conceptualisation of the roles of employment insecurity and employability, with two central features. First, it allows for the uncertainty surrounding unemployment and employment to affect well-being both directly and indirectly through its impact on expected income. The direct effects are justified in psychological and social theory, while the indirect effects are economic. Second, the framework allows for the interaction between unemployment and employability, and between job insecurity and the employability of the employed. To empirically implement this framework, the three key variables – employability of the unemployed, job loss

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risk, and the employability of the employed – are directly measured by the subjective expectations of the probabilities of future employment transitions.

An understanding of the role of employability in modifying the detrimental impacts of unemployment and job insecurity is greatly relevant to the formation of unemployment and employment policies. European debate, for example, in recent years has focused on "flexicurity", a strategy to devise employment and welfare legislation that will optimise the ability of employers to redeploy labour (thereby, other things equal, raising job insecurity) while at the same time providing generous support and training for the unemployed (European Commission, 2007). "Flexicurity" policies are argued, not only to be efficient, but also to provide a political compromise by protecting the welfare of the unemployed. There is, however, no empirical evidence through which the impacts of job insecurity and of employability could be compared, and any trade-off evaluated from the perspective of the well-being of workers.

My findings provide new estimates of the impact of unemployment and of job insecurity, in the context of a model that takes account of the effects of the interacting transition risks. These findings are gleaned using fixed effects estimation on panel data, and are therefore more confidently interpreted as causal than in the many cross-section studies in the literature. I examine how the magnitude of the effects of insecurity among employees compares with the effects of being unemployed.

It turns out that, as predicted, unemployed people with little hope of finding a job enjoy the least well-being by a considerable margin, while employed people who are both highly employable and in a secure job enjoy the most. In between there is substantial differentiation according to employability, job insecurity and their interaction. The estimates imply that there are considerable gains from raising the employability of an unemployed person. Meanwhile, high job insecurity substantially lowers subjective well-being, but less so if the employee is more employable. Relative to a secure job the deleterious effects of a high level of job insecurity are comparable in magnitude with the effects of unemployment. I compute crude estimates of the "misery multiplier" ranging between 3.2 and 3.5 – this being the ratio of the total impact of a rise in unemployment on well-being to the impact on just those made unemployed. It is this broader impact of unemployment, deriving from its extended impact on job insecurity and employability, that accounts for the society-wide impact of recessions. The estimates also allow the trade-off between greater job insecurity and improved employability to be computed, thus providing a first step for a potential evaluation of "flexicurity" policy.

The paper proceeds as follows. Section 2 overviews the two literatures on unemployment and job insecurity, and sets up the simple framework and specification that takes account of the interactions among the uncertainties. Section 3 describes the data and Section 4 my findings, and I conclude in Section 5 with the policy implications.

2. Theory and literature

Whether or not they have a job workers face uncertainty: in any given period employees might lose their jobs, while the unemployed might find one. This uncertainty affects well-being both directly, in that it is uncertain whether they will experience the well-being associated with having a job *per se*, and indirectly through its impact on expected income. The aim of this section is to develop a simple framework that allows the separate and interactive effects on well-being of the different elements of this uncertainty to be distinguished.

The welfare-reducing uncertainty surrounding employment is what is typically referred to as employment insecurity. The narrower focus of most studies, however, is on the lack of continuity of the current job, i.e. job insecurity, commonly conceived as the probability of involuntary job loss.[1] The broader concept of employment insecurity also encompasses uncertainty over future prospects in the labour market. Although employment insecurity is an objective concept, it also has an important affective dimension defined by how people perceive the uncertainty. The antecedents and consequences of job insecurity perceptions have received a great deal of attention in psychological studies. By contrast, the economics literature has largely been dominated by studies of objective ex-post indicators, such as redundancy or job loss (e.g. Nickell et al., 2002). Only quite recently has it been established that perceptions of job insecurity are quite well correlated with subsequent job loss frequencies (Campbell et al., 2007; Stephens, 2004; Dickerson and Green, 2009), in effect bridging two literatures.

A robust finding from the psychological literature is that job insecurity is a source of lower health and well-being (for good overviews see Burchell, 1994; Nolan et al., 2000; Wichert, 2002; Cheng and Chan, 2008). This effect holds for a variety of indicators of job insecurity, including the form of employment contract (Kompier et al., 2009). The main rationalisation in psychological theory is the argument that job insecurity is a stressor, leading to work strain. Loss of control over one's work and life situation is at the heart of this process, and the strain may be exacerbated by inability even to assess the chance of job loss. The impact is also interpreted as contributing to a repudiation of the implicit "psychological contract" between worker and employer (Mauno et al., 2005), and the effect of rising insecurity on health has also been seen as part of a shift in power relations (Scott, 2004). The economic rationale, namely that greater job insecurity entails a loss of expected income, is also found in some of the psychological theory, though with less prominence.

It is recognised that the impact of perceived job insecurity on well-being varies both among individuals (Sverke and Hellgren, 2002), and across socio-economic categories, though there are few firmly established regularities across many studies (Nolan et al., 2000). Cheng and Chan (2008) find robust evidence that health outcomes were more severe for older than for younger employees. Mauno et al. (2005) and De Cuyper and De Witte (2007) find that the impact on job satisfaction is notably greater for permanent than for temporary contract workers. An important underlying explanation for these apparent regularities is the perspective from psychology, holding that the impact of insecurity is moderated by an individual's dependency on the current job, which is governed by alternative economic security and the degree of occupational mobility (Greenhalgh and Rosenblatt, 1984). This "dependency perspective" can also be seen as an economic interpretation: it proposes that job loss (hence also job insecurity) has greater effect for individuals who possess fewer transferable skills and are hence less employable. Dependency on one's job is also affected by institutional factors: it has been found that employees in countries with high levels of employment protection legislation (EPL) express lower satisfaction with security (Clark and Postel-Vinay, 2009). The latter finding is interpreted as EPL reducing outflows from unemployment, thereby raising the cost of job loss. Thus, the same risk of job loss has different well-being implications across differing institutional environments.

These findings about the effects of employment insecurity complement others from economics and psychology that unem-

[1] Job insecurity can also involve uncertainty over valued job features within the current job, including fears over promotion/demotion and relocation.

ployment itself is also associated with very substantial reductions in subjective well-being (among others, Warr, 1987; Clark and Oswald, 1994; Bjorklund and Eriksson, 1998; Theodossiou, 1998; Winkelmann and Winkelmann, 1998; Clark et al., 2001; Clark, 2003; Cooper et al., 2008; Kassenboehmer and Haisken-DeNew, 2009). Dolan et al. (2008) provide a good overview of economic studies. The negative impact of unemployment holds even after one controls for the lower income that is associated with being out of work. It is not hard to rationalise the disutility as resulting from the disruption of structured activity, and from the social stigma and loss of identity.[2]

The aggregate detrimental impact of a higher unemployment rate on subjective well-being is found to be especially large, and is explained as deriving partly from the increased numbers of unemployed people, but to a much greater extent from the inferred greater job insecurity of employees (Di Tella et al., 2001, 2003; Luechinger et al., 2008). There is also evidence of some differentiation in the psychological impact of unemployment. For example, the effect of individual unemployment is less pronounced in areas of high unemployment (especially for those unemployed with poor prospects of employment), which is interpreted as a social norm effect (Clark, 2003; Shields and Wheatley-Price, 2005; Stutzer and Lalive, 2004; Powdthavee, 2007; Clark et al., 2010). Unemployment is thought to act as less of a stigma, and less of a threat to one's identity, when others around are also out of work.

Unemployment might also hurt a lot less, however, if there were a good chance of escaping from it soon. Yet the uncertainty aspect of the impact of unemployment on well-being has only barely been touched upon in research. The broad term "employability" refers to the ability of an individual to find and sustain employment. A characteristic of the individual in context, employability is indicated by the probability of obtaining employment, though often proxied by measures of its determinants. The extent to which an unemployed person is employable will affect well-being, again both directly and indirectly because it raises expected income. The direct impact of increased employability derives from the purpose and hope that accompanies job search activities and from the anticipation of the future identity and activities attached to employment. Knabe and Rätzel (2008) report that better job prospects are a source of greater life satisfaction in an analysis of the German Socioeconomic Panel, and in so doing question whether the conclusions of Clark et al. (2001) concerning the impact of past unemployment on well-being are robust once one allows for the impact of future employment prospects.

In a parallel manner, little is known about the impact of employability on well-being among employed people. Employability might matter directly for the employed because it delivers greater control over one's career, or because it could be part of a "new psychological contract" in which the employer helps employees to acquire employment security even if they have less job security (De Cuyper et al., 2008). Lack of employability could also cause employees to become stuck in jobs they do not like, even if those jobs are secure. In support, De Cuyper et al. find a cross-sectional positive association between employability and well-being among Belgian workers. Berntson and Marklund (2007) find a positive association between some indirect employability indicators of employed individuals and mental well-being one year later. However, neither of these studies adequately captures the economic rationale through which employability potentially affects expected income, since they do not allow for any interaction between the impacts of job insecurity and of re-employment difficulty. Moreover, these studies do not control for time-invariant fixed effects which have been found to bias estimates in previous well-being studies (Ferrer-i-Carbonell and Frijters, 2004).

The central objective here, therefore, is to consider two issues:

i. for the employed, how far the ill effects of job insecurity are added to, and compounded by, lack of employability;
ii. how far employability is also important for mitigating the impact of unemployment on well-being.

In addition the aim is to add confirmation to previous findings on the effects of job insecurity and unemployment, but in the context of a broader model which controls for employment insecurity and employability. A subsidiary aim is to consider whether there is a predictable differentiation in the effects of unemployment, employability and insecurity, on well-being across social or economic groups, according to their capacity to cope with the adverse shock of job loss.

The essence of the model, which builds on the literatures described above, views well-being as depending on expected income, job status, employability and employment insecurity. Since expected income itself depends on job status, employability and employment insecurity, these latter three variables affect well-being both directly and indirectly. The form of the impact of uncertainty depends on the current status, whether unemployed or employed. If unemployed, there is uncertainty over whether a job can be found; a greater perceived chance (more employability) increases well-being. If employed, there is a risk of job loss in the current period and, conditional on that, uncertainty over whether the job will be replaced by another job that is as good.

To simplify I assume that well-being can be well enough approximated by a linear function, and that individuals are in either one of two labour market states, employed or unemployed. In each state they form a subjective assessment of the chance of transmission to the other. I assume that the unemployed, other than searching for jobs which they do, can do nothing additional to affect the transition probability. Similarly the employed, other than working diligently which they do, cannot alter the risk of job loss. If they do lose their job, they may get another job giving the same wage as the previous one. But they might not obtain another job this period or, if they do, might have to settle for one with a lower wage.

Thus well-being, Y, is given by:

$$Y = U \cdot \left\{\eta E + \alpha[\eta w_r + (1-\eta)B + OH]\right\} + (1-U) \cdot \left\{I(1-\rho) - \delta(1-\mu) + \alpha[(1-\rho)w + \rho[\mu w + (1-\mu)\theta] + OH]\right\} \quad (1)$$

Here: U is a 0/1 dummy for employed/unemployed; η is employability for the unemployed, i.e. the probability when unemployed of gaining a job at the reservation wage w_r; E is the well-being attached by the unemployed to the prospect of being employed *per se*; α is the weight attached to the monetary component of well-being; B is unemployment benefits; OH is other household income; I is the well-being attached by employees to their current employment[3]; ρ is the risk of involuntary loss; μ is the probability of regaining as good a job as the previous one and is a measure of

[2] These papers also complement the parallel literature that examines the effects of unemployment or of job loss on objective indicators of health (Sullivan and von Wachter, 2009, is a recent example). By contrast, according to Knabe et al. (2010), ëxperienced utility, measured using day reconstruction methods and integrated over a full week, is not reduced by unemployment: even though in similar activities unemployed people are less happy, they are able to spend more time on non-work activities which are more conducive to positive well-being.

[3] I and E are closely related; the difference is that whereas I is the well-being from employment for the employed, E is the prospective well-being from employment for the unemployed.

employability for the employed, and δ is the direct weight attached to employability; w is wages; and θ is the income from benefits and/or a lower quality job, if no equivalent post-displacement job is found.

The first expression is the well-being of someone who is unemployed but might gain a job in the current period at the reservation wage. If she fails to get a job she receives an unemployment benefit as well as other household income; but if she is successful she gains both the wage and the non-pecuniary well-being associated with getting a job *per se.* The second expression is the well-being of an employed person who might lose her job, comprising both direct utility benefits from the work that may be reduced by job insecurity and lack of employability, and indirect benefits deriving from expected income which is also reduced by insecurity.

One advantage of this formulation is that it shows the interaction between the probabilities that an employee faces. Eq. (1) can be re-arranged as follows, in a way which brings out this interaction and generates a model that can be suitably tested with data on the perceived transition probabilities, η, ρ and μ:

$$Y = (1-U)I + U\cdot\eta(\alpha w_r - \alpha B + E) - (1-U)\cdot\rho I - (1-U)\cdot\rho(1-\mu)\alpha(w-\theta) - \delta(1-U)(1-\mu) + \alpha H \quad (2)$$

where H is total household income (including, in addition to other household income, wages if employed, benefits if unemployed).

The fourth expression is the additional loss of well-being from potential job termination arising from the possibility that the post-displacement job is of lower quality or that no new job is found. In the empirical analysis that follows a question arises as to how to include $(w-\theta)$ the potential income loss, since no data items capture this. For the present I simply include this as part of the parameter to be estimated, but I consider an alternative assumption below.

Allowing for other observed and unobserved determinants of well-being, this gives an estimating equation:

$$Y_{it} = aU_{it} + bU_{it}\eta_{it} + c\cdot(1-U_{it})\cdot\rho_{it} + d\cdot(1-U_{it})\cdot\rho_{it}(1-\mu_{it}) + e\cdot(1-U_{it})\cdot(1-\mu_{it}) + f\cdot H_{it} + g\cdot Z_{it} + u_i + \varepsilon_{it} \quad (3)$$

where Z_{it} is a vector of other observed personal characteristics typically found to be related to well-being in previous studies, u_i is an unobserved fixed effect, ε_{it} white noise. The expectations are that: $\hat{a}<0$, $\hat{b}>0$, $\hat{c}<0$, $\hat{d}<0$, $\hat{e}<0$, $\hat{f}>0$.

The existing empirical literature summarised above can be interpreted as confirming the hypotheses that $\hat{a}<0$ and that $\hat{c}<0$ in many different countries and settings, and $\hat{f}>0$ is usually supported though sometimes the impact of income of well-being is weak. Beyond adding further confirmation for those hypotheses, this paper's primary new contributions are to provide estimates for the key parameters which can then inform unemployment and insecurity policies, and specifically to test the three hypotheses for which the evidence cited above is slim or non-existent:[4]

- that well-being is increased by greater employability if unemployed ($\hat{b}>0$);
- that well-being is diminished by lack of employability among the employed ($\hat{e}<0$);
- that the negative impact of job insecurity on well-being is made worse by lack of employability ($\hat{d}<0$).

[4] The hypothesis that $\hat{b}>0$ has been supported with panel data in the case of Germany (Knabe and Rätzel, 2008; Clark et al., 2010) though the magnitude of the marginal effects of an increase in the probability of finding employment are not available. The hypothesis $\hat{e}<0$ is examined as a cross-section association (De Cuyper et al., 2008).

3. Data

Eq. (3) was estimated using panel data from the first seven annual waves of the Household, Income and Labour Dynamics in Australia Survey (HILDA).[5] The survey began with a national probability sample of 7682 households in 2001. All adult household panel members undertake a personal interview and fill in a self-completion questionnaire.[6]

As outcome measures I use two alternative indicators of subjective well-being: life satisfaction and subjective mental health. Life satisfaction is measured through the item in the personal interview: "All things considered, how satisfied are you with your life?". Responses are given on an unanchored scale from 0 to 10, with a sample mean score of 7.84. Within the self-completion questionnaire mental health is computed from five "Short-Form Health Survey" (SF-36) items, which capture feelings in the previous four weeks. The questions ask how much of the time "Have you been a nervous person?"; "Have you felt so down in the dumps that nothing could cheer you up?"; "Have you felt calm and peaceful?"; "Have you felt down?"; "Have you been a happy person?". Responses are on a 6-pt scale from "All of the time" to "None of the time". An additive index is created, with negative items counted negatively, and the score is transformed to a 0–100 scale.[7] Within the sample used the mean value is 74.6 and the standard deviation 16.1.

A distinctive feature of the HILDA data is that it includes direct measures of individuals' perceived probabilities of transition (each way) between employment and unemployment. To capture employability for the unemployed, respondents with this status were asked: "I would like you to think about your employment prospects over the next 12 months. What do you think is the per cent chance you will find a suitable job during the next 12 months?".[8] In seeking answers on a percent scale, HILDA is consistent with the recommendations of Manski (2004). To capture the probability of job loss, ρ, employees were asked: "I would like you to think about your employment prospects over the next 12 months. What do you think is the percent chance that you will lose your job during the next 12 months? By loss of job, I mean getting fired, being laid off or retrenched, being made redundant, or having your contract not renewed." Dickerson and Green (2009) show that the distribution of responses, though overly pessimistic and spiked in places, is reliable in that the perceptions are good predictors of subsequent job loss. The survey also asked employees to report directly on Re-employment Difficulty: "If you were to lose your job during the next 12 months, what is the percent chance that the job you eventually find and accept would be at least as good as your current job, in terms of wages and benefits?" Responses on this scale are slightly optimistic relative to subsequent outcomes, but are also significant predictors of subsequent employment in a good job.

[5] The HILDA Survey Project was initiated and is funded by the Australian Government Department of Families, Housing, Community Services and Indigenous Affairs and is managed by the Melbourne Institute of Applied Economic and Social Research. The findings and views reported in this paper, however, are those of the author and should not be attributed to any of the aforementioned organisations.

[6] Full details are given on the panel website: http://melbourneinstitute.com/hilda/; last accessed 20/4/10.

[7] The SF-36 is validated and widely used for use in clinical practice, policy evaluations and surveys. The scales were computed by HILDA staff using Ware et al. (2000), and have been additionally validated for use in Australian populations (Butterworth and Crosier, 2004). In accordance with the manual, a person-specific raw score was estimated for any scale on which there were valid responses on greater than or equal to half the items, the average being calculated and applied to missing data.

[8] The reference to a "suitable" job is set against immediately prior questions on the reservation wage and preferred hours.

Table 1
Descriptives.

	All		Men		Women	
	Mean	sd	Mean	sd	Mean	sd
Life Satisfaction	7.84	1.41	7.81	1.43	7.86	1.4
Subjective mental health	74.58	16.12	75.78	15.66	73.4	16.47
Unemployed	0.06	0.25	0.07	0.25	0.06	0.24
Employability (of the unemployed)	0.66	0.3	0.66	0.31	0.66	0.3
Probability of job loss	0.1	0.21	0.11	0.21	0.09	0.2
Probability of not finding as good a job	0.35	0.33	0.37	0.34	0.33	0.33
Probability of both the above	0.04	0.10	0.04	0.11	0.03	0.10
Pay (gross weekly, A$)	719.83	586.07	869.01	674.16	567.7	429.49
HH Income (A$000s)[a]	23.06	23.24	27.38	26.61	18.65	18.17
Age	36.11	12.79	36.08	12.88	36.15	12.69
Age squared	1467.66	968.29	1467.74	986.01	1467.59	949.9
Married	0.6	0.49	0.61	0.49	0.59	0.49
No. of children ≤ 14	0.7	1.05	0.67	0.99	0.68	1.02
Regional Australia	0.33	0.47	0.32	0.47	0.33	0.47
Remote Australia	0.02	0.14	0.02	0.14	0.02	0.14
Long-term health condition or disability	0.13	0.34	0.13	0.34	0.13	0.34
Other adult present at interview	0.34	0.47	0.37	0.48	0.31	0.46

Note: The sample is that used for the analyses in Table 3 below, with 49,147 person-year observations. It is not representative of the Australian population in any one year. The means are unweighted.

[a] Equivalised per capita annual household income.

Since only employees are asked the employment insecurity questions the sample is comprised of an unbalanced panel of individuals who are either employees or unemployed. I treat males and females separately, and descriptive statistics on both the outcome variables and all explanatory variables are provided in Table 1. As can be seen, among the unemployed the average expected probability of gaining a suitable job within a year is two thirds. Among employees, the probability of job loss averages out at 1 in 10, and if job loss happens the probability of failing to find as good a job averages at just over a third.

4. Findings

4.1. Core findings

Estimations of life satisfaction depend on whether it is treated as an ordinally comparable variable or as a cardinal variable. There is a trade-off between the possible disadvantage of making the stronger assumption that it is cardinal, and the benefits of being able to allow for unobserved fixed factors that may be correlated with outcomes of interest. Ferrer-i-Carbonell and Frijters (2004) show that it makes little difference in practice whether one assumes cardinal or ordinal responses to life satisfaction questions, and advance possible reasons why; but that it makes a large difference being able to remove the bias associated with unobserved fixed effects, in some cases reversing the signs of coefficients. Added to the presentational advantage that marginal effects are transparent in regression models but in ordinal models need careful interpretation, this paper therefore uses the cardinal assumption. The main findings are presented in Tables 2 and 3, for the two outcomes life satisfaction and for mental health, respectively. In each table, columns (1) and (4) present the random effects estimates of the impacts of employability and employment insecurity on life satisfaction/mental health.

As can be seen, all the hypotheses about the impact on well-being are supported. First, it is confirmed that $\hat{a} < 0$, for both males and females. Second, as predicted in Eq. (1) employability for the unemployed has a strong positive impact on well-being ($\hat{b} > 0$). At the average employability of 0.66 for both sexes, these two results mean that the average impact of unemployment on well-being is negative (and significant at $p = 0.01$), in confirmation of previous studies.[9] Third, also in confirmation of earlier work, the risk of job loss is a direct source of loss of life satisfaction and mental health ($\hat{c} < 0$). Fourth, there is the predicted interaction between the probability of job loss and re-employment difficulty ($\hat{d} < 0$); though in the case of males the estimated effect on mental health is not significantly different from zero. In other words, the impact of job insecurity is greater where an employee perceives a lower chance of regaining as good a job. Fifth, the estimates of the separate effects of re-employment difficulty, independent of job insecurity, are all negative as predicted ($\hat{e} < 0$). Finally, the effect of household income on well-being is positive though relatively small, as has been found in previous work, and in the case of males the impact on life satisfaction is not statistically significant.

The control variables have been included in the equation following a range of other studies of life satisfaction and mental health (e.g. Blanchflower and Oswald, 2008; Wooden et al., 2009). Consistent with these, it is found that life satisfaction and mental health both follow a U-shape with age, are greater for those who are married or co-habiting than for the single, and decrease with a long-term health condition or disability. Those who live in regional Australia (and for women also those who live in a remote Australian region) have higher life satisfaction and mental health than those in the major Australian cities. Men's life satisfaction increases with the number of their dependent children, but not women's. Finally, I included a variable to control for whether another adult is present during the interview, since previous research has found that their presence is liable to generate a social desirability bias. The proposition is that some respondents may not like to reveal their low well-being before their family. There is an upward effect on life satisfaction and also, for males only, an upward effect on reported mental health.[10]

While these controls perform as expected, as in earlier studies only a small proportion of the overall variation of life satisfaction is explained by the variables. There are many other factors that impact on employees' well-being. The effects shown in the table would be biased if excluded factors were correlated with the unemployment and insecurity variables. It is also possible that there is

[9] −0.964 + 0.752*0.66 = −0.496 for men; −0.743 + 0.543*0.66 = −0.385 for women.

[10] This effect on mental health is notable in that the data come from the self-completion questionnaire.

Table 2
Employability, employment security and life satisfaction.

	(1)	(2)	(3)	(4)	(5)	(6)
	Males			Females		
	re	re	fe	re	re	fe
Unemployed	−0.964***	−0.932***	−0.771***	−0.743***	−0.517***	−0.568***
	(0.0790)	(0.0932)	(0.0967)	(0.0795)	(0.0924)	(0.0972)
Employability if unemployed	0.752***	0.755***	0.573***	0.543***	0.348***	0.445***
	(0.101)	(0.119)	(0.119)	(0.103)	(0.120)	(0.121)
Probability of job loss	−0.319***	−0.190***	−0.232***	−0.350***	−0.344***	−0.247***
	(0.0515)	(0.0565)	(0.0552)	(0.0529)	(0.0595)	(0.0567)
INTER[a]	−0.363***	−0.471***	−0.284***	−0.224**	−0.193	−0.149
	(0.103)	(0.111)	(0.110)	(0.114)	(0.126)	(0.123)
Re-employment difficulty[b]	−0.122***	−0.0870***	−0.119***	−0.0731***	−0.0753**	−0.0525*
	(0.0287)	(0.0311)	(0.0317)	(0.0281)	(0.0306)	(0.0311)
HH income ($000s)[c]	0.000508	0.000666	0.000312	0.00128**	0.00125*	0.00142*
	(0.000399)	(0.000415)	(0.000472)	(0.000608)	(0.000658)	(0.000736)
Age	−0.136***	−0.125***	−0.149***	−0.0922***	−0.0863***	−0.100***
	(0.00601)	(0.00688)	(0.0125)	(0.00613)	(0.00704)	(0.0128)
Age squared	0.00167***	0.00150***	0.00147***	0.00117***	0.00103***	0.00108***
	(7.66e−05)	(8.51e−05)	(0.000153)	(8.06e−05)	(9.06e−05)	(0.000156)
Highest education level		−0.0218***			−0.0162***	
		(0.00654)			(0.00574)	
Extroversion		0.126***			0.0627***	
		(0.0170)			(0.0149)	
Agreeableness		0.185***			0.134***	
		(0.0201)			(0.0210)	
Conscientiousness		0.0927***			0.0587***	
		(0.0183)			(0.0167)	
Emotional stability		0.161***			0.204***	
		(0.0171)			(0.0168)	
Openness to experience		−0.0973***			−0.0567***	
		(0.0182)			(0.0167)	
Married/co-habiting	0.442***	0.394***	0.392***	0.367***	0.363***	0.279***
	(0.0264)	(0.0297)	(0.0335)	(0.0245)	(0.0275)	(0.0330)
No. of children ≤ 14	0.0446***	0.0453***	0.0559***	0.0111	−0.00301	0.0155
	(0.0113)	(0.0123)	(0.0151)	(0.0120)	(0.0132)	(0.0169)
Regional Australia[d]	0.129***	0.104***	0.0786*	0.174***	0.159***	0.0835*
	(0.0269)	(0.0298)	(0.0448)	(0.0269)	(0.0295)	(0.0476)
Remote Australia[d]	0.115	0.0587	−0.0348	0.208**	0.188**	−0.0274
	(0.0792)	(0.0884)	(0.112)	(0.0819)	(0.0940)	(0.124)
Long-term health condition	−0.126***	−0.104***	−0.0839***	−0.175***	−0.147***	−0.0696**
	(0.0234)	(0.0251)	(0.0256)	(0.0243)	(0.0263)	(0.0270)
Others present in interview	0.0413***	0.0378**	0.0277	0.0621***	0.0419**	0.0426**
	(0.0160)	(0.0174)	(0.0172)	(0.0167)	(0.0184)	(0.0180)
Observations	24813	18610	24813	24334	19009	24334
Number of individuals	6417	3831	6417	6464	4183	6464
R^2 within	0.0259	0.0263	0.0266	0.0133	0.0120	0.0140
R^2 between	0.0751	0.138	0.0278	0.0609	0.110	0.0311
R^2 overall	0.0986	0.202	0.0374	0.0844	0.156	0.0354

The regressions also include a constant and year dummies.
[a] Product of "probability of job loss" and "If job lost, probability of not regaining as good a job".
[b] If job lost, probability of not regaining as good a job.
[c] Equivalised per capita annual household income.
[d] Reference category: major city.
* Indicates 10% statistical significance.
** Indicates 5% statistical significance.
*** Indicates 1% statistical significance.

reverse causation, with lower well-being affecting both employment participation and insecurity.

An employee's personality is one factor that could have an impact on perceptions of employability and insecurity, as well as on life satisfaction. In Wave 5 of the Panel, respondents' personalities were assessed using multiple items from which were derived the "Big 5" personality scales: extroversion, agreeableness, conscientiousness, emotional stability and openness to experience. To see whether personality could be a factor accounting for the observed effects of employability and insecurity, these five indices were introduced in the model, assuming that personality did not change over time. At the same time, another largely time-invariant factor is introduced, namely highest education level. The results are shown in columns (2) and (5). Note that, for this estimation, the sample size is reduced as it can apply only to those who were respondents in Wave 5. As can be seen, each of the five personality dimensions has a significant effect on both expressed life satisfaction and mental health, all positive with the exception of openness to experience. Despite this, the estimated effects of unemployment, employability and the probability of job loss, and the interaction with the difficulty of re-employment, remain highly significant in the expected direction, and are not greatly changed from their values derived from columns (1) and (4). One difference, however, is that in the case of mental health the major part of the difficulty of re-employment effect comes through its interaction with the probability of job loss, instead of directly.

Table 3
Employability, employment security and subjective mental health.

	(1) re Males	(2) re	(3) fe	(4) re Females	(5) re	(6) fe
Unemployed	−8.037***	−5.955***	−5.021***	−8.422***	−6.927***	−4.963***
	(0.934)	(1.063)	(1.156)	(0.991)	(1.108)	(1.228)
Employability if unemployed	4.537***	3.306**	2.556*	5.914***	5.097***	4.100***
	(1.190)	(1.362)	(1.427)	(1.279)	(1.441)	(1.528)
Probability of job loss	−5.113***	−4.043***	−3.934***	−3.137***	−1.729**	−1.329*
	(0.603)	(0.652)	(0.645)	(0.645)	(0.709)	(0.691)
INTER[a]	−1.205	−2.250*	−0.297	−2.641*	−4.167***	−2.481*
	(1.201)	(1.282)	(1.281)	(1.385)	(1.494)	(1.494)
Re-employment difficulty[b]	−0.808**	−0.213	−0.00369	−0.599*	−0.130	0.142
	(0.334)	(0.356)	(0.371)	(0.341)	(0.364)	(0.378)
HH income ($000s)[c]	0.0202***	0.0156***	0.00592	0.0325***	0.0212***	0.00569
	(0.00488)	(0.00505)	(0.00592)	(0.00735)	(0.00776)	(0.00889)
Age	−0.624***	−0.536***	−0.387***	−0.218***	−0.281***	0.0228
	(0.0686)	(0.0745)	(0.147)	(0.0739)	(0.0817)	(0.156)
Age squared	0.00842***	0.00675***	0.00486***	0.00422***	0.00367***	0.00107
	(0.000870)	(0.000920)	(0.00178)	(0.000971)	(0.00105)	(0.00190)
Highest education level		0.00148			0.104	
		(0.0703)			(0.0665)	
Extroversion		1.873***			1.335***	
		(0.178)			(0.171)	
Agreeableness		1.063***			0.532**	
		(0.210)			(0.241)	
Conscientiousness		1.102***			0.693***	
		(0.191)			(0.192)	
Emotional stability		4.303***			4.753***	
		(0.180)			(0.192)	
Openness to experience		−0.689***			−0.728***	
		(0.191)			(0.192)	
Married/co-habiting	2.664***	2.279***	1.874***	1.609***	1.631***	0.740*
	(0.309)	(0.334)	(0.401)	(0.299)	(0.324)	(0.407)
No. of children ≤ 14	0.114	0.123	0.216	0.0697	−0.154	−0.0848
	(0.130)	(0.137)	(0.177)	(0.146)	(0.155)	(0.208)
Regional Australia[d]	0.548*	0.547*	−0.0351	1.851***	1.849***	1.536***
	(0.308)	(0.325)	(0.531)	(0.325)	(0.343)	(0.585)
Remote Australia[d]	0.840	−0.0220	0.367	2.534**	1.709	1.782
	(0.931)	(0.989)	(1.362)	(1.025)	(1.107)	(1.584)
Long-term health condition	−2.342***	−2.243***	−0.931***	−3.364***	−3.285***	−1.503***
	(0.270)	(0.286)	(0.296)	(0.294)	(0.311)	(0.327)
Others present in interview	0.731***	0.674***	0.804***	0.331	0.418*	0.329
	(0.186)	(0.200)	(0.200)	(0.202)	(0.218)	(0.218)
Observations	22091	17615	22091	22329	18165	22329
Number of individuals	6012	3804	6012	6202	4150	6202
R^2 within	0.0101	0.0103	0.0111	0.00495	0.00564	0.00548
R^2 between	0.0813	0.288	0.0679	0.0873	0.260	0.0600
R^2 overall	0.0603	0.198	0.0507	0.0578	0.176	0.0415

The regressions also include a constant and year dummies.
[a] Product of "probability of job loss" and "If job lost, probability of not regaining as good a job".
[b] If job lost, probability of not regaining as good a job.
[c] Equivalised per capita annual household income.
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** Indicates 5% statistical significance.
*** Indicates 1% statistical significance.

There may, however, be other unobserved time invariant factors correlated both with the employability and insecurity variables and with life satisfaction or mental health, in which case the random effects estimator will be inconsistent. Accordingly, columns (3) and (6) present fixed effects panel estimates. These fixed effects estimates are consistent, under the assumption that there are no omitted time-varying factors that are also correlated with the employability and insecurity variables. The point estimates are, in some but not all cases, somewhat lower, than in the random effects model. A Hausman test rejects the hypothesis that the difference in coefficients is unsystematic, and accordingly the fixed effects estimates are preferred.[11] It should be noted, however, that while time-invariant effects have been controlled for it is always possible that there are other time-varying variables associated with both expectations and well-being. There might also be some reverse causation whereby other unobserved sources of changing well-being induce both unemployment and subjective expectations of labour market transitions. Endogenous selection into labour market states could be a further source of bias. To address these issues one would need available some robust instrumental variables, unrelated to well-being, which affect the subjective expectations and the labour market states. In their absence, one has to take the associations shown in the results as highly supportive of the model proposed in Section 2, without definitively proving that the process is causal. With the fixed effects estimates, the broad pattern of findings remains unchanged in that all the core hypotheses are still accepted in the case of life satisfaction, though for mental health

[11] The χ^2 statistic was 105.6 ($p = 0.000$) for men, and 190.6 for women.

the role of re-employment difficulty is significant only for women, through its interaction with the probability of job loss.

How large are the relative effects of unemployment, employability and job insecurity? Consider, first, a male "no-hoper", an unemployed man who perceives that the chance of getting a job in the coming year is zero. (About 1 in 10 of the unemployed think this chance is less than 10%.) Using the preferred fixed effects estimates, such a man's life satisfaction is lower by 0.77, compared with if he were in a secure job with no perceived risk of job loss and highly employable. This is more than one half of the standard deviation of life satisfaction (see Table 1).[12] Consider, what happens if his employability is raised from zero to 100%. His predicted life satisfaction is now only 0.20 (= 0.77 − 0.57) lower than if he were in a secure job[13]. For women, the story is similar. The unemployed no-hoper's well-being is estimated to be 0.57 lower than if she were in a secure job, but if she could expect definitely to get a job within a year, the loss in well-being is reduced by more than three quarters to 0.12. The mitigating effects of employability on mental health are also large. Compared with being in a secure job mental health for "no-hopers" is lowered by 5.02 for men and 4.96 for women, in each case just under a third of the standard deviation of mental health. But for those 100% confident of finding a job within a year the lowering of mental health is 2.47 (=5.021 − 2.556) for men and only a statistically insignificant 0.86 for women. In short, the potential penalty of unemployment is very large, as other studies have found; however, when circumstances allow a person to have complete confidence in gaining a job the adverse effects of unemployment are more than three quarters mitigated.

The effects of insecurity, and the potential mitigating effects of employability, are also substantial. As illustration consider the downward impact of a 10 percentage point rise in job insecurity. For men's life satisfaction the effect would be reduced by more than half from 0.0516 (=0.0232 + 0.0284) to 0.023 when employability for the employed is raised from zero to 100%; for women the impact would be reduced from 0.034 to 0.025. For mental health, the downward impact would be reduced from 0.038 to 0.013 for women; but for men only from 0.423 to 0.394.

Some previous studies have found that the detrimental effects of unemployment or insecurity are greater for men than for women (e.g. Clark, 2003; Theodossiou, 1998). Here, it may be observed, for example, that the point estimate for the negative impact on mental health of unemployment, at the mean level of employability is 3.33 for men and 2.26 for women. However, this gender difference is not statistically significant at conventional levels, and the same holds for life satisfaction, and for the estimates of the impact of job insecurity at the mean level of the difficulty of re-employment. Thus, in contrast with the previous studies, one cannot reject the hypothesis that women and men in Australia with the average level of employability react in the same way to unemployment and insecurity.

Previous studies have commented that job insecurity can be as detrimental for life satisfaction as actually becoming unemployed (Wichert, 2002; Sverke and Hellgren, 2002), and indeed Burchell (1994) finds that men going from unemployment to insecure jobs did not improve their psychological well-being. Can this observation be confirmed here in the case of Australia? The size of the impact of job insecurity depends a great deal on the perceived probability of being able to regain another job as good as the current one. In the baseline case, those who expect to do so with 100% probability – one might dub this the "Scolari case" – the impact of a 100% fear of job loss is just 0.23 and 0.25 for men and women, respectively. But, to take the opposite extreme, where respondents expect that there is no chance of replacing a lost job with one just as good, their life satisfaction is reduced by 0.64 for men and 0.45 for women. These estimates of the extreme downside of insecurity and employability are not far short of the worst unemployment effects. This case would be exemplified by an "insider" threatened with job loss in an insider-outsider segmented labour market.

The most informative comparisons might be made between very insecure employees (for whom $\rho = 1$) of average employability and unemployed people with average employability. Using the descriptives from Table 1, the very insecure male employee's life satisfaction is 0.38 below that of someone in a secure job with no perceived risk of job loss[14] (0.32 for women), whereas the unemployed man with average employability has 0.39 (0.27 for women) less life satisfaction.[15] The comparison for mental health outcomes is similar. Relative to a highly employable man in a secure job, the unemployment man with average employability has 3.33 lower mental health (2.26 for a woman); while the 100% job insecure man with average employability has 4.05 lower mental health (2.10 for a woman). It seems that, when insecurity is extreme, it can be as bad as unemployment in its effects on either life satisfaction or mental health. It should be recalled, however, that only a small proportion of employees report this extreme of job insecurity. Among those who have a positive expectation of job loss, the modal subjective probability is just 10%, and the detrimental impact on well-being of job loss fear at this level is, unsurprisingly, substantially less than that of being unemployed.

4.2. Robustness tests

The broad consistency between the estimates for the two types of outcome in itself should add some confidence in the hypotheses, since the source of the data for mental health is the self-completion questionnaire, while that for life satisfaction comes from the face-to-face interview. In addition to the three models presented above, I carried out several types of sensitivity analysis on the core findings.

First, I included those who were economically inactive in the estimation, this constraining the other variables to have the same impact for all employment and non-employment groups. This showed that, as expected, being inactive is associated with lower well-being relative to being in employment (more so for men than for women), though greater well-being relative to being unemployed. However, the effects of employability and of insecurity among the economically active were close to those reported in Tables 2 and 3. Second, I estimated separate models for employed and unemployed people, allowing the control variable parameters to take on different values. This produced broadly the same conclusions as in the full model, in most cases with only small alterations in the estimates. Third, I added industry dummy variables to the controls. These were found to be largely insignificant, and to make no substantive difference to the core parameter estimates. Fourth, in deriving the estimating model it was in effect assumed that the cost of job loss for those failing to replace with an equivalent job was the same across individuals. However, in practice it will differ, even though we have no direct measures of how. An alternative assumption might be that this cost is proportional to wages, that is, that the potential cost of job loss is greater for those on higher wages.

[12] The marginal impact of becoming unemployed would be less if the job lost carried lower job security.

[13] This difference is statistically significant at the 1% level.

[14] To illustrate the computation, the men's figure is calculated as $0.232 + 0.37 \times (0.284 + 0.119)$.

[15] Computed in the case of men as $0.771 + 0.66 \times 0.573$.

Table 4
Well-being effects, by wealth and education.

	Males			Females		
	Low education	High Education	Difference	Low education	High education	Difference
Life satisfaction						
Education						
Unemployed	−0.939***	−0.548***	−0.391	−0.568***	−0.377**	0.191
	(0.140)	(0.140)	(0.198)	(0.129)	(0.163)	(0.208)
Employability if unemployed	0.806***	0.252	−0.554	0.523***	0.0870	−0.436*
	(0.170)	(0.175)	(0.244)	(0.161)	(0.203)	(0.259)
Employment Insecurity:						
Impact of job insecurity (at mean employment difficulty)	−0.443***	−0.253***	−0.190	−0.186***	−0.369***	−0.183**
	(0.065)	(0.050)	(0.082)	(0.064)	(0.055)	(0.085)
Impact of employment difficulty (at mean job insecurity)	−0.171***	−0.128***	−0.043	−0.027	−0.114***	−0.087
	(0.047)	(0.038)	(0.060)	(0.044)	(0.040)	(0.059)
Observations	11057	13750		12047	12286	
	Below median	Above median	Difference	Below median	Above median	Difference
Wealth						
Unemployed	−0.974***	−0.552***	0.422*	−0.765***	−0.442***	0.323
	(0.131)	(0.179)	(0.222)	(0.132)	(0.170)	(0.215)
Employability if unemployed	0.802***	0.452**	−0.350	0.595***	0.446**	−0.149
	(0.161)	(0.221)	(0.273)	(0.166)	(0.211)	(0.268)
Employment insecurity:						
Impact of job insecurity (at mean employment difficulty)	−0.366***	−0.284***	0.082	−0.312***	−0.302***	0.011
	(0.060)	(0.055)	(0.082)	(0.065)	(0.056)	(0.086)
Impact of employment difficulty (at mean job insecurity)	−0.155***	−0.133***	0.022	−0.090*	−0.050	0.040
	(0.046)	(0.039)	(0.061)	(0.047)	(0.038)	(0.061)
Observations	11907	11220		11140	11590	
	Low Education	High education	Difference	Low education	High education	Difference
Mental health						
Education						
Unemployed	−4.933***	−5.286***	−0.353	−6.469***	−3.184	3.285
	(1.629)	(1.706)	(2.359)	(1.606)	(2.041)	(2.597)
Employability if unemployed	2.806	2.015	−0.791	6.539***	0.727	−5.812*
	(1.986)	(2.131)	(2.913)	(1.993)	(2.551)	(3.237)
Employment insecurity:						
Impact of job insecurity (at mean employment difficulty)	−4.351***	−3.908***	0.443	−3.021***	−1.710***	1.310
	(0.737)	(0.602)	(0.951)	(0.769)	(0.683)	(1.028)
Impact of employment difficulty (at mean job insecurity)	−0.550	0.309	0.860	0.078	−0.281	−0.360
	(0.536)	(0.455)	(0.703)	(0.525)	(0.490)	(0.718)
Observations	9603	12485		10976	11353	
	Below median	Above median	Difference	Below median	Above median	Difference
Wealth						
Unemployed	−4.449***	−6.091***	−1.642*	−6.182***	−5.627**	0.555
	(1.457)	(2.277)	(2.703)	(1.611)	(2.267)	(2.781)
Employability if unemployed	0.984	5.277*	4.293	5.255***	5.193*	−0.062
	(1.810)	(2.811)	(3.343)	(2.002)	(2.837)	(3.472)
Employment insecurity:						
Impact of job insecurity (at mean employment difficulty)	−4.376***	−3.757***	0.619	−2.094	−2.241	−0.147
	(0.670)	(0.687)	(0.960)	(0.764)	(0.725)	(1.053)
Impact of employment difficulty (at mean job insecurity)	0.079	−0.193***	−0.272	0.136	−0.616	−0.751
	(0.520)	(0.483)	(0.710)	(0.555)	(0.492)	(0.742)
Observations	10408	10342		10132	10829	

* Indicates 10% statistical significance.
** Indicates 5% statistical significance.
*** Indicates 1% statistical significance.

With this the interaction term is derived to be a 3-way product of the probability of job loss, the probability of not regaining as good a job, and pay. With this derivation, it is found that the findings on most variables are not substantially changed. The estimated coefficient of the newly defined interaction term is negative as predicted in all cases, but in some cases is not statistically significant.[16]

4.3. Extensions

Other than by gender, variation across other socio-economic groups in the effects of employment insecurity might occur if the groups systematically differed in the well-being they obtain from employment, or in their attitudes to uncertainty, or in their capacity to cope with the event of job loss. In the case of the latter, the HILDA data afforded two indicators which might be argued to afford more support and greater capacity to deal with the events surrounding job loss, and hence less of a detrimental impact on well-being. First, it might be argued that those with greater education can respond better to being unemployed, having more self-confidence and a greater facility to pursue and gain fulfilment from alternative activities. Certainly, differentiation in the effects of unemployment and insecurity have been found in respect of prior education levels (Clark and Oswald, 1994; Sverke and Hellgren, 2002). Second, those with greater household wealth should be less affected by the loss of resources attendant upon unemployment than those with fewer assets – though there is no reason to expect that the psychic costs of unemployment and insecurity should differ systematically between high and low wealth groups.

Table 4 explores the possibility of this differentiation, in respect of both well-being outcomes, life satisfaction and mental health. The reported coefficients derive from the preferred fixed effects specifications, with the same controls as in Tables 2 and 3.

In the first part of each panel, the sample is divided up according to whether highest education was less than, or at least, Year 12. For both sexes the unemployment coefficient on life satisfaction is more negative for the low-educated group, and for males the effect of unemployment is significantly worse than for the high-educated group. However, this difference is compensated by the greater impact of employability among the low-educated. So, it does seem that more education moderates the detrimental effects of being unemployed, and that being employable is very important for the low-educated. By contrast, among the employed there are inconsistent differences across education groups in the effects of employment insecurity. In the case of mental health outcomes, with the exception that among females' employability is more important for the low-educated, most of the differences between the two groups are statistically insignificant. In short, there is some albeit weak evidence of differential effects according to education group, consistent with the idea that more education affords greater capacity to respond to adverse effects.

The lower half of each panel investigates whether differential physical and financial wealth matters. The sample is divided up according to whether household wealth is below or above the median. As can be seen, for males the size of the estimated unemployment effect on life satisfaction at zero employability levels is greater among the low-wealth group; but the opposite is true for the effect on mental health. However, at mean employability levels there are no significant differences according to wealth; and the same holds for all other coefficients. I conclude that, though wealth might in principle provide a material shield against employment insecurity in financial terms, because of the non-pecuniary factors the detrimental effects of unemployment respect no class distinctions on the basis of wealth.[17]

5. Conclusions and implications

Football management is a precarious job, but this did not seem to concern Scolari, even though he may have been feeling quite insecure while his team's performances were below expectations.[18] Scolari's lack of worry appears to exemplify one of my key findings, namely that employability modifies the impact of job insecurity and unemployment. The estimates imply that:

i. Previous studies showing a negative effect on life satisfaction and on subjective mental health of becoming unemployed are confirmed, each by substantial fractions of the respective standard deviations.
ii. However, employability does matter for the unemployed: an increase in employability from zero to 100% cancels more than three quarters of the detrimental effect of unemployment.
iii. Previous studies showing a substantial negative impact of job insecurity on both life satisfaction and mental health are confirmed.
iv. However, employability also matters for employees: for example, an increase in men's employability from zero to 100% reduces the detrimental effect of job insecurity by more than half. Even where there is no job insecurity, more employable persons have greater life satisfaction, though there is no significant effect on mental health in this circumstance.
v. The effects of extreme job insecurity and of unemployment are large and of comparable magnitudes. For example, for someone with average employability, 100% job insecurity lowers life satisfaction to the same extent as unemployment itself. The impact is more than one quarter of the standard deviation of life satisfaction.
vi. There is some evidence that the detrimental effects of unemployment on life satisfaction, and the mitigating effects of employability, are each greater for lower educated workers.

Two main implications follow from these findings. First, they provide an explanation for the phenomenon that I have termed, above, the "misery multiplier", the fact that an increase in unemployment lowers well-being by far more than can be accounted for solely by the increasing distress of those actually unemployed. Di Tella et al. (2003) report a ratio of 4.8 between the total loss of life satisfaction and the loss incurred just by those becoming unemployed. They conjectured that the difference is due to fear of job loss among the employed being raised when the unemployment rate increases.[19] In support it is known that perceptions of job

[16] A log file of all these results is available on request.

[17] Other studies have reported that unemployment has less of an impact on well-being among younger workers (Pichler, 2006; Clark and Oswald, 1994); and that insecurity has a stronger effect on older employees (Cheng and Chan, 2008). It could also be suggested that personality, in particular emotional stability, might affect the response to insecurity. In further results not shown, however, I find that there are no systematic differences according to age or personality.

[18] Scolari did lose his job at Chelsea Football Club a month after expressing this sentiment, but within a further few months was appointed as coach for Uzbekistan league and cup champions Bunyodkor, backed by leading regional oil and gas company Zeromax, with a reported salary making him the world's then highest paid manager. He left Bunyodkor in May 2010 and signed as coach for Brazilian club Palmeiras two weeks later.

[19] Beveridge made a similar point more than half a century ago: "The three million or so unemployed of 1932 means three million lives being wasted in idleness, growing despair and numbing indifference.. . .. Beyond the men and women actually unemployed at any moment, are the millions more at work at that moment but never knowing how long that work or any work for them may last." (Beveridge, 1944: 247–248).

insecurity and employability loosely follow aggregate unemployment rates over the long term and across countries (Green, 2006, 2009). My findings here confirm the conjecture of Di Tella et al., but add the point that a greater aggregate unemployment rate also lowers employability for all citizens. For each additional man made unemployed who was previously in a job with average security and employability, Table 2 estimate implies that life satisfaction falls by 0.32 if he has average employability when unemployed. Suppose that unemployment rises from 5% to 6%, so that out of 100 men, one loses his job, the 5 already unemployed have reduced employability, and the remaining 94 employed men experiencing reduced employment security. A crude estimate of the misery multiplier is obtained by regressing the employability and insecurity indicators against the regional unemployment rate. Using fixed effects estimates, a 1 percentage point rise in the regional unemployment rate is associated with the following effects: −1.04 (0.89) on the perceived percent chance of finding employment (s.e. in parenthesis), 1.34 (0.12) on the perceived probability of job loss, 0.67 (0.06) on the re-employment difficulty, and 1.16 (0.16) on their interaction. Using these figures and Table 2 estimates, the total loss of well-being amounts to 0.95, giving a misery multiplier of 2.99. The equivalent calculation gives 3.23 for women. The misery multiplier in respect of mental health is 2.80 for both sexes. In practice the threats posed by growing aggregate unemployment do not fall equally upon all economically active citizens; yet these sorts of magnitudes help to explain why recessions have such a major impact: a macroeconomic downturn lowers well-being for those thrown into unemployment, but also breeds further employment insecurity which is felt much more broadly.

The second implication concerns contemporary responses to unemployment, in particular "flexicurity" and similar policies around the world in which the aim is to boost the efficiency of the labour market by, on the one hand, removing protections against job loss and, on the other hand, improving support for the unemployed to get back into work and with lower cost. In the framework here, one can think of these policies as raising ρ (the probability of job loss) while also raising η (the probability for the unemployed of finding a job) and μ (the probability of regaining an equivalent-quality job). The policies thus increase the well-being of outsiders, but the impact on that of insiders depends on the relative changes in the transition probabilities and on the parameters. In a general equilibrium, a rise in the probability of job loss would affect the employability of both the unemployed and the employed, as well as the unemployment rate itself. To compute the full effects these inter-dependencies would need to be modelled. Nevertheless, it is informative to deduce the terms of a partial-equilibrium trade-off between higher ρ and higher η and μ, using the fixed effects estimates of the impact on life satisfaction from Table 2. I make the assumptions that the unemployment rate is 10%, and that the mean values of ρ and μ are as given in Table 1, and ask: what increase in both η and μ would be required to "compensate", in the sense of leaving aggregate well-being unchanged, for raising the perceived probability of job loss ρ from 0.10 to 0.11, i.e. by one percentage point? The answers, in percentage points, are: 1.5 (2.5) for men (women) in the case of life satisfaction, and 12.7 (2.5) in the case of mental health.[20] In other words, from the perspective of life satisfaction, the necessary trade-off seems feasible. This conclusion comes from the large impacts of employability on life satisfaction. The trade-off would be yet more attractive if the policy succeeds in lowering unemployment itself. In terms of mental health, though, the trade-off in employability required for men is quite large; this stems from the relatively low impact of employability on the mental health of employed men relative to the high detrimental impact of job insecurity. However, the estimates here are not very precisely determined.

Future research based on the same model of interacting transition risks could investigate the magnitude of the effects of insecurity and employability on consumer spending, marital dissolution and other outcomes. There are also certain limitations to the analysis here that could be addressed in future research. The potential impact of failing to find another job has not been modelled precisely, owing to lack of suitable data; nor has the impact of variable benefit support during a period of unemployment. The indicators of uncertainty could be supplemented by measures of the confidence with which expectations are held, and the consequences of uncertainty might be linked to an individual's degree of risk aversion; and it is also possible that other indicators of insecurity, apart from subjective transition probabilities, might better capture the psychological effects.

[20] To illustrate for males and life satisfaction: the rise in job insecurity lowers total well-being by $\{0.9 \times 0.232 \times 0.01 + 0.9 \times 0.33 \times 0.284 \times 0.01\}$; while increasing employability raises well-being by $\{0.1 \times 0.573z + 0.9 \times 0.10 \times 0.284z + 0.9 \times 0.119z\}$ where z is the increase in employability for both employed and unemployed. Equating these two gives the trade-off value of z necessary to leave well-being unchanged.

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