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Introduction to the Special Issue

Guest Editors: ***Gail Pacheco and Tim Maloney,*** Auckland University of Technology, NZ

This special edition of the Australian Journal of Labour Economics (AJLE) contains a number of articles on temporary employment. Many developed economies have undergone a surge in growth of temporary employment over the last two decades, and both the determinants and implications of this phenomenon are of interest to academics and policymakers. Past literature has often suggested that changes in temporary workforce utilisation are the result of progressive labour market deregulations and shifting preferences towards increased employment flexibility. The push for greater workplace flexibility and the loosening of employment protection legislation is usually heightened at times of high unemployment. For instance, Jahn and Bentzen (2012) contends that the demand for temporary workers is cyclical in nature. Furthermore, Standing (2011, p.11) argues that it is this drive for flexibility that "… has been the major direct cause of the growth of the global precariat". The implications of temporary employment for the productivity, job security and well-being of both temporary and permanent workers are important issues for economists to consider as the debate around further loosening of employment regulations sees no signs of abatement.

This special issue begins by examining two outcomes that are often associated with temporary employment – low job satisfaction and poor health. In the first paper, 'Don't Worry, be Flexible? – Job Satisfaction among Flexible Workers' by Elke Jahn employs longitudinal data to examine the relationship between employment type and job satisfaction. The data stem from the German Socio-Economic Panel and make it possible to distinguish between formal job security (as perceived by the type of employment contract – whether it be permanent or temporary) and perceived job security. The paper concludes that it is the latter form of job security that matters most for job satisfaction.

In the second paper, 'Temporary versus permanent employment: Does health matter?' by Don Webber, Gail Pacheco and Dominic Page make use of New Zealand data to investigate the relationship between health status and employment type. The key contribution of this study is the need to consider sample selection bias in understanding the nature of this relationship. This paper employs a bivariate probit regression and conditional marginal effects to control for the factors that influence employment propensity per se, before identifying the marginal effects of the covariates on employment type. The central covariates of interest are three physical health and three mental health indicators. The results suggest that the majority of health conditions (and mental health indicators in particular) are strongly negatively associated with the likelihood of an individual being employed in full-time work and

under permanent contracts. The role that poor health plays with respect to temporary work appears to be mixed (in terms of whether it is a positive or negative association) and is mostly small in magnitude in this paper.

The third paper, 'The Effect of Job Insecurity on Labour Supply' by H. Xavier Jara from the University of Essex examines the link between job insecurity and labour supply using the British Household Panel Survey. The paper makes use of discrete choice models of labour supply (via estimating a conditional logit model where the choice set is defined in terms of discrete hours alternatives), and then extends this analysis so that the choice set is characterized by bundles of income, hours of work, and job attributes (such as job insecurity). The key finding from this research is that job insecurity has a negative impact on individual's utility, and that using this measure improves the predictive power of the model when included in the analysis. Other findings in the paper point to different wage elasticities for women depending on where their job sits in the insecurity ladder – in particular, showing that those working under good security conditions respond less to wage changes, relative to those occupying insecure jobs.

The fourth and final paper, 'Isolating the Determinants of Temporary Agency Worker Use by Firms: An Analysis of Temporary Agency Workers in Australian Aged Care' of the special edition focusses on a particular type of temporary worker (temporary agency work) and a particular industry (aged care). The analysis is based on a unique Australian employer survey and provides a useful comprehensive portrait of agency workers in the aged care sector. Genevieve Knight and Zhang Wei (from Flinders University) provide results that are consistent with qualitative research in this space. More specifically that temporary agency workers are often used as a way of dealing with skill shortages, and are more likely employed in large firms and less likely employed where staff have to work alone late at night.

All of the articles show that there are a range of potential implications of a growing temporary workforce. They also indicate that there are a myriad of ways empirics can contribute to this debate – data used in the four papers includes both primary and secondary data, longitudinal and cross sectional data sources, and they stem from four distinct countries (Germany, NZ, UK and Australia). In all cases, the context is also important to understand in interpreting the findings as the relevant labour market institutions and openness of employment protection legislation may be key factors in influencing why temporary employment may be growing more so in one economy versus another, and why there are potentially different implications across the world. Future research on this front will not only be context specific, but will be more likely based on longitudinal linked data – so that the researcher may be able to slowly disentangle the causal pathways between temporary employment and the associated outcomes. Such research will then have clearer and more transparent policy implications.

Jahn, E.J. and Bentzen, J. (2012), 'What Drives the Demand for Temporary Agency Workers?', *Labour*, 26(3), 341-355.

Standing, G. (2011), *The Precariat: The New Dangerous Class*, London: Bloomsbury.

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Don't Worry, be Flexible? – Job Satisfaction among Flexible Workers

Elke Jahn, IAB and Bayreuth University

Abstract

This paper investigates whether workers in flexible employment relationships show lower job satisfaction than workers with permanent job contracts. Our results indicate that looking only at formal job security provided by the contract type may lead to misleading conclusions about job satisfaction. Using longitudinal data for Germany, we find that it is not the formal job security provided by the contractual agreement but rather the perceived job security that matters for job satisfaction. Moreover, there is evidence that workers value job characteristics in similar ways across fundamentally different types of job contracts.

Keywords: Job satisfaction, Temporary agency employment, Fixed-term contracts, Working condition

JEL classification: J41, J28, J81

1. Introduction

Research on the determinants of job satisfaction has increased substantially over the past decade. This heightened interest can be attributed partly to the recognition of job satisfaction as a summary measure reflecting how workers value various job characteristics (Hamermesh, 2001). However, it is still unclear whether workers in flexible employment arrangements show lower job satisfaction than those with regular contracts. This is even more surprising in light of the dramatic increase in flexible working arrangements in most European countries over recent years.

When examining the job satisfaction of workers in flexible employment arrangements, two issues are of central research interest. First, are workers in flexible employment relationships indeed less satisfied than workers with permanent contracts? If so, why do they differ? Second, do flexible workers place the same value on job characteristics than workers with permanent contracts? One might hypothesize that workers vary in their motivations for accepting diverse contractual arrangements, with the different commitments between contractual parties and different expectations about the employment relationship these arrangements entail (e.g., Bardasi and Francesconi,

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2004). Knowledge about the job characteristics valued by the flexible workforce will therefore become more and more important as national governments and the European Commission increasingly subject these employment forms to regulation.

This paper extends the existing literature on job satisfaction in a number of ways. It is the first study to comprehensively examine job satisfaction of workers in Germany employed at three different contract types, namely: temporary agency contracts, fixed-term contracts, and permanent contracts. The distinctions among these three employment relationships are important. First, the temporary employment agency is considered by law to be the employer, and therefore determines issues such as wages and terms of employment, while the user company has the right to assign tasks to the temp and to supervise his or her work. In contrast, fixed-term workers are hired directly by the employer, and their contracts are often probationary contracts that can act as stepping-stones to permanent jobs (e.g. Booth *et al*. 2002). Moreover, temporary agency and to some extent fixed-term jobs have been the subject of intense academic debate fuelled by evidence that these workers often have to accept poorer working conditions (e.g., Boeri and Garibaldi, 2009; Jahn *et al*. 2012; Houseman *et al*. 2003).

The present paper shows that distinguishing between contract types provides a more accurate picture of the relationship between job satisfaction and flexible work arrangements. In this respect, Germany is an interesting country, since flexible employment forms have increased substantially in prevalence here over the past decade. For example, the share of fixed term workers among the wage and salary employees increased from 6.1 per cent in 2001 to 9.5 per cent in 2012 (IAB, 2013).[1] During the same period the share of agency workers increased from 1.3 per cent to 3.1 per cent (e.g., Jahn and Weber, 2015).

Second, following Origo and Pagani (2010), this paper argues that looking only at the formal job security provided by the contractual agreement might be misleading. Instead, job satisfaction might be determined not only by formal or objective job security but also by subjective job security. However, Origo and Pagani (2010) are only able to distinguish temporary and permanent contracts and use cross country data. This paper goes a step further and not only distinguishes between different types of flexible employment forms but, by exploiting the panel structure of the data set, controls for unobserved heterogeneity. Controlling for individual specific baseline levels of subjective job security might be important as subjective feelings like job security might merely reflect individual traits (e.g., Börsch-Supan and Jürges, 2006; D'Addio *et al*. 2007). Thus this study should be able to identify the causal effect of the different contract types on job satisfaction. To investigate whether it is the formal or the subjective job security that matters most for job satisfaction, this study assigns to each of the contractual agreements two further categories, perceived secure contracts and perceived insecure contracts.

Finally, the paper investigates whether working conditions affect workers differently depending on their type of contract and subjective job security. Most empirical evidence on this issue is based on subjective evaluations of job dimensions

[1] Due to the dual education system in Germany, apprentices are always employed on a fixed-term basis and are not included in these figures. If apprentices are included the share of fixed-term workers in 2012 would have been about 14 per cent.

(e.g., Bruno *et al*. 2013; de Graaf-Zijl, 2012; Green and Heywood, 2011). Instead of using subjective evaluations of workplace characteristics which might be endogenous, this paper uses objective working conditions to explain job satisfaction. It thus may provide a more sophisticated understanding of how various working conditions influence flexible workers' job satisfaction.

For the empirical analysis, this paper uses the German Socio-Economic Panel (SOEP). The SOEP is very rich in terms of questions, making it possible to include a broad set of workplace controls. Moreover, it has the advantage of making it possible not only to control for time-invariant unobserved heterogeneity by exploiting the panel structure of the data but also to include numerous controls for the employment history of the workers.

The remainder of the paper is organized as follows. After a brief literature survey in section 2, section 3 gives some background information about flexible employment forms in Germany. Section 4 describes the data set and provides some descriptive results. Section 5 outlines the methodological approach. Section 6 discusses the results and section 7 concludes.

2. Previous Research

A growing number of studies have investigated the determinants and consequences of differences in individuals' reported job satisfaction. Research in psychology and sociology has emphasized that job satisfaction depends not only on the remuneration for the job but also on other workplace characteristics like career prospects, job security, job content, autonomy at work, and interpersonal relationships (De Cuyper *et al*. 2008). Most of these studies show that job security and job content are the most influential determinants when it comes to explaining job satisfaction (see, e.g., D'Addio *et al*. 2007; Kalleberg *et al*. 2000; De Cuyper *et al*. 2009 for comprehensive surveys and Wilkin, 2013, for a meta study).

One strand of this literature has focused on job satisfaction of workers with fixed-term contracts. The evidence is somewhat mixed. While some studies show insignificant differences in job satisfaction between workers in permanent jobs and those with fixed-term contracts (e.g. Bardasi and Francesconi, 2004; Boeri and Garibaldi, 2009; Buddelmeyer *et al*. 2013; D'Addio *et al*. 2007), others find significantly lower job satisfaction among fixed-term workers (Booth *et al*. 2002; Clark and Oswald, 1996; de Graaf-Zijl, 2008; Petrongolo, 2004). Using the Eurobarometer, Origo and Pagani (2010) show that in countries with generous unemployment insurance systems, fixed-term workers are not significantly less satisfied with their jobs. However, if unemployment insurance systems only provide basic insurance against unemployment, fixed-term workers are more dissatisfied. Evidence that fixed-term workers in Germany might be even more satisfied with their jobs is provided by Beckmann *et al*. (2007). These findings are contradicted by Chadi and Hetschko (2013) who find that fixed-term workers are less satisfied when taking into account that after a job change job satisfaction increases at first and drops again once the worker has settled down in the new job.

Likely due to the worldwide growth of temporary agency employment over the past years, a new strand of the literature has emerged investigating in addition job

satisfaction of temporary agency workers (Buddelmeyer *et al*. 2013; de Graaf-Zijl, 2012; Green and Heywood, 2011; Wooden and Warren, 2004). All studies indicate that agency workers are significantly less satisfied with their jobs compared to workers with other types of contracts. In Green and Heywood (2011), who investigate the job satisfaction of temporary agency workers in the UK, this effect disappears once fixed effects are introduced. The latter study also looks at satisfaction with job security as a dependent variable, and confirms the usual conjecture that workers in flexible employment arrangements feel less secure.

De Graaf-Zijl (2012), who explains job satisfaction as a composite of various dimensions of satisfaction with other workplace characteristics in the Netherlands, finds that job content and remuneration are the most important determinants of job satisfaction, while job security has only a weak negative influence on the job satisfaction of flexible workers. After controlling for various workplace characteristics, she finds that agency workers are even more satisfied than workers with other contractual arrangements. Green and Heywood (2011) to some extent confirm the results of de Graaf-Zijl (2012) for the UK, finding that after controlling for satisfaction with several different job characteristics flexible workers are more satisfied. Interestingly, they find that flexible workers are generally even more satisfied with their remuneration, working time, and work content than permanent workers. However, in contrast to the Dutch findings, they show that satisfaction with job security is the main determinant of overall job satisfaction. One possible explanation could be that flexible contracts in the UK are more 'flexible' than Dutch flexible contracts, since the unemployment insurance system is less generous and employment protection does not apply to the flexible staff. The fact that flexible contracts might even positively influence overall job satisfaction once the negative influence of job insecurity is controlled for could be consistent with the theory of equalizing differences (e.g., Smith, 1776; Rosen 1987). Wooden and Warren (2004); Buddelmeyer *et al*. (2013) and Green *et al*. (2010) compare job satisfaction of different contingent employment forms in Australia. All studies show, that (male) temporary agency workers have significantly lower level of job satisfaction compared to permanent workers, while they find no differences for workers employed on fixed-term contracts. Latter studies are able to partly explain the lower job satisfaction of agency workers by working non-standard hours.

3. Institutional Background

The paper distinguishes among three types of contracts: open-ended contracts, fixed-term contracts, and temporary agency contracts. In Germany, in contrast to many other countries, all types of employment contracts entitle workers to health insurance, pension benefits, paid vacation, and, if eligible, unemployment benefits.

Two main contractual features differentiate these contract types. First, workers with open-ended and fixed-term contracts work on the premises and under the supervision of their employers. In contrast, temporary agency work is based on a tripartite relationship among three contractual parties – temporary help agencies, temporary agency workers, and user firms – established in a commercial contract. The workers are legally employed by the agency but work on the premises of the user firm. This construct might make it more difficult for a temp agency worker to identify with the contracting employer, to become integrated into the working environment,

and to build social relationships within the firm to which he or she has been assigned. Lack of commitment to the employer and lack of social contacts might in turn reduce satisfaction with the job. As a part of the Hartz reforms, which came into effect between 2002 and 2006, temporary agency employment was subject to re-regulation efforts in 2002 and 2003. Both reforms were designed to enhance flexibility for user firms and, at the same time to increase the remuneration of temporary agency workers. At first sight it is not clear-cut whether these reforms affected job satisfaction of temporary agency workers positively or negatively. Busk *et al*. (2015) show that the change of the law in 2003 decreased agency workers' job satisfaction.

The second important difference between the three work arrangements is the formal level of employment protection. Common to all contract types is the possibility that workers can be dismissed without cause and on short notice during the six-month probationary period. Afterwards, workers with permanent contracts are protected by strict employment protection legislation (Jahn, 2009).

While by definition a permanent contract does not determine when a job will end, a fixed-term contract does. In Germany, fixed-term contracts are heavily regulated and can be prolonged only three times until the total employment duration adds up to 24 months. During the agreed duration of the contract, fixed-term workers enjoy high job security and can usually not be dismissed. In contrast to countries like Spain or France (e.g., Bentolila *et al*. 2012) fixed-term contracts only play a minor role for the flexibility of the firms. Instead, they are often used as a screening device. In 2011 for example, about 56 per cent of them were converted to permanent contracts within one year (IAB, 2012).

The higher formal job insecurity of temporary agency employment is a consequence of the fact that most client firms hire agency workers as a flexibility buffer. Once product demand slows down, agency workers are the first to be laid off. If the agency is not able to find a follow-up assignment, the worker loses the job. Agency workers are less protected for two reasons. First, the duration of employment at the temp agency is very short. The median duration of a temp job is about 12 weeks. Only about 20 per cent of agency workers are employed at the agency more than six months and thus are eligible for at least some employment protection (Antoni and Jahn, 2009). Second, temp agencies can dismiss workers for economic reasons much more easily than direct-hire employers (Jahn, 2009).

The extensive regulation of fixed-term contracts along with the strict employment protection legislation for regular contracts is seen as the main reason why it is increasingly attractive for German user firms to adjust their workforce through temporary agency work (Mitlacher, 2007).

However, despite the formal employment protection, at the microeconomic level, all types of contracts may be subject to perceived job (in)security. For example, an agency worker might feel that his or her job is secure because the agency was able to find follow-up assignments and to bridge periods without assignments, e.g., through training. Fixed-term workers might expect that their contract will lead to permanent employment as the limited duration is often used to prolong the probationary period. In this case, workers might not feel insecure. In contrast, workers with permanent contracts might feel at risk of losing their job when the demand for the employers' products declines or if they are employed at small firms, where employment protection legislation does not apply.

4. Data and Descriptive Analysis

For the empirical analysis, this paper uses the German Socio-Economic Panel (SOEP). The SOEP makes it possible to distinguish among three types of employment contracts, which represent our main variables of interest: full-time or part-time permanent contract (base category), fixed-term contract, and temporary agency contract.[2]

Since earlier waves do not contain information on whether a worker is employed in the temporary help sector, the analysis is conducted over the period 2001-2008, which covers one full business cycle and excludes the turmoil of the financial crisis.[3] The sample is restricted to wage and salary workers aged at least 18 and at most 60 in the last wave of the data. Due to the dual education system in Germany, apprentices are always employed on a fixed-term basis and are therefore dropped. Furthermore, we dropped workers employed in programs of active labour market policy, marginal workers who do not contribute to the social security system, self-employed workers, and those with missing data.[4] The final panel is unbalanced, comprising 1,258 temporary agency work spells, 3,598 fixed-term contract spells, and 53,259 employment spells with open-ended contracts. In total, 928 persons experienced at least one temporary agency spell during the observation period and 2,335 persons one fixed-term spell during their employment career.

The average share of male workers in all flexible jobs is 7.9 per cent, with 5.4 per cent in fixed-term jobs, and 2.5 per cent in agency jobs. In total, about 9.3 per cent of all women work in flexible jobs, 7.4 per cent in fixed-term jobs, and 1.9 per cent in agency jobs (see table 1).[5]

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[2] The SOEP asked whether a worker is employed at a temporary work agency for the first time in 2001. A yes to this question might also indicate that the worker was part of the temp agency staff. Starting in 2003, the SOEP refined this question and asked whether the worker is a temporary agency worker. As a robustness check, main estimations for the period 2003-2008 were performed as well. It turns out that the results do not change. The questionnaires and more detailed information about the SOEP can be found at http://www.diw.de/ and Wagner *et al*. 2007.

[3] During the economic crisis there has been a substantial drop in the number of temporary agency workers. Around 70 per cent of the total job loss during the recession was due to the mass lay-offs in the temporary help service sector. At the beginning of 2009 more than one third of the temporary agency workers had lost their jobs. In contrast to firms in all other sectors the temporary help service sector was not eligible for short-time working benefits at first. To dampen further job loss the sector became access to short-time working benefits about 12-15 months later than the remaining firms, which is the reason we exclude the years during and after the crisis.

[4] Marginal workers earn less than 450 Euros per month and are usually exempted from paying social security contribution. These jobs can be on a fixed term basis, temporary agency jobs, or regular jobs. Approximately one third of the 7.5 million marginal jobs in 2013 are held as secondary jobs, i.e. by workers who do hold in addition a regular job. However, the questions in the SOEP refer to the main job. Information on working conditions and job satisfaction for secondary marginal jobs are thus not available. Consequently we excluded these jobs from the analysis.

[5] According to official statistics, about eight per cent of the wage and salary employees (without apprentices) where employed on a fixed-term basis and three per cent at a temporary work agency in 2008. As all flexible employment contracts have experienced considerable growth during the observation period, it seems that our figures reflect the official figures accurately. As mentioned before, temporary agency contracts can be either permanent or fixed-term. We follow here the literature and define being an agency worker as a mutually exclusive employment status (e.g., Buddelmeyer *et al*. 2013).

Our dependent variable is the overall satisfaction with the present job measured on a Likert scale ranging from 0 (totally unsatisfied) to 10 (totally satisfied). Higher scores reflect higher levels of satisfaction. To measure the degree of subjective job insecurity, we used the question: 'What is your attitude towards the following areas of your life, and one subcategory is 'your job security'? Are you very concerned, somewhat concerned, or not concerned at all about these areas?' We considered a job to be insecure if workers stated that they were 'very concerned' about their job security.

A worker might perceive the job as insecure. However, if it is easy to find a comparable job at another firm, the perceived job insecurity might not strongly affect the worker's job satisfaction. In this case, despite low job security, the worker might have high employment security. In order to control for employment security, the following question was used. 'If you lose your job today, would it be easy, difficult, or almost impossible for you to find a new position that is at least as good as your current one?' If a worker answered that it would be almost impossible to find an equally good job, we considered this as low employment security.

As controls, we used the following socio-economic variables: age (three categories), whether married or not, and whether there is a child below 16 in the household. A substantial body of literature has shown that job satisfaction is strongly correlated with several mental and physical health indicators (see, Faragher *et al*. 2005 for a meta-analysis). The SOEP contains numerous questions on subjective satisfaction with health. However, it has also been shown that subjective assessments of health status are subject to a scale problem (e.g., Fischer and Sousa-Poza, 2007). We therefore included objective measures: a dummy variable indicating whether the worker has been on sick leave for more than six weeks during the past year, a dummy variable indicating whether the worker is disabled, and the number of days spent in hospital.

In addition, five educational variables, the weekly working time, job tenure, a dummy variable indicating whether the worker occasionally works overtime, and a dummy variable indicating whether the individual works as a blue-collar worker were included. Further controls are the accumulated time spent unemployed and employed (in years) since entering the labour force. As firm controls, we use a dummy indicating whether the worker is employed in a public firm and the size of the firm (four categories). The firm size variables serve as a proxy for internal promotion possibilities, training within the firm, and other workplace benefits. Moreover, workers are only covered by employment protection legislation in firms with more than ten employees. To control for the regional business cycle and other demand side factors we use the regional growth rate of the GDP per employee at the state level. Finally, a full set of time dummies is included which capture legal changes due to the Hartz reform.

There is evidence that individuals respond to well-being questions with greater variation during the first few years they are asked than persons who have already answered this questions several times before (e.g., Blanchflower and Oswald, 2011). To deal with this problem, a wave variable is included indicating how often workers have answered the question on job security before.

As controls for the working conditions, the following variables are used: a dummy indicating whether a) the worker is currently employed outside his/her profession (mismatch), b) the worker has low autonomy at work, c) the worker's

actual contractual working time is equal to his or her desired contractual working time, d) the worker is compensated for overtime either monetarily or through time off for overtime, e) the worker receives a bonus (Christmas bonus, 13th month pay, or vacation pay), and the real log hourly wage. Finally, although information about the distance in kilometres to the workplace is available, we use the information on whether the commuting distance to the workplace changed. The reason is that we assume a regularly changing distance to work might dissatisfy workers more than the actual distance itself.[6]

It is also possible that men and women differ in motivations and attitudes towards their employment status. Women might choose casual work to retain career flexibility throughout a significant portion of their working lives (e.g., Kaiser, 2004). Flexible contracts among women might therefore more often be a career choice than the result of lack of alternatives. As has been shown in previous studies, there are indeed significant differences between men and women in this respect (Booth *et al*. 2002; Clark, 1997; Sousa-Poza and Sousa-Poza, 2003). Moreover, tests within the sample reject the hypothesis of a common set of coefficients. As a result, all estimations are carried out separately for men and women.

Table 1 presents the share of workers who feel that their job is insecure, split according to contract type. About one-third of all agency workers consider their jobs insecure, while this is only true for one-quarter of those with fixed-term contracts and for about 15 per cent of those with permanent contracts.

The pattern reverses when one asks the workers about their perceived employment insecurity. Those with permanent contracts are much more worried about their employment security (21 per cent) than fixed-term employees (11 per cent) and temporary agency workers (14 per cent). This may suggest that permanent workers are likely to have more invested in firm-specific human capital, which cannot easily be transferred to other firms.

Table 1 also reports the mean job satisfaction level disaggregated by perceived job security, employment arrangement, and gender over the entire sample period. In line with the previous literature, women are on average happier with their jobs than men (Asadullah and Fernandez, 2006; Booth and van Ours, 2008; Clark, 1997). This is, as table 1 shows, particularly pronounced for agency workers. As expected, agency workers report significantly lower job satisfaction on average than do those with permanent jobs. Female temps who consider their jobs insecure are the exception: they are not significantly more dissatisfied.

As the averages and the *t*-test make clear, the job satisfaction of all workers on fixed-term contracts does not differ significantly from the job satisfaction of permanent workers. Fixed-term workers who feel that their job is insecure report even higher satisfaction levels. Beckmann *et al*. (2007) find a similar pattern based on the same dataset for 2000 for all fixed-term workers. They surmise that these workers value being employed at all more than permanent workers. In addition, they might hope to move up the job ladder and be offered a permanent job, while insecure permanent workers do not feel they have this perspective.

[6] Note that if workers state that their distance to the workplace has changed, no information on the distance in kilometers is available.

Table 1 - Job Satisfaction, Job Security, and Employment Security by Contract Type

	Agency Temp		*Fixed-term*		*Permanent*	
	Mean	*sd*	*Mean*	*sd*	*Mean*	*sd*
Share of workers by contract type (in %)						
Men	2.45		5.41		92.14	
Women	1.92		7.35		90.74	
Share of workers feeling … (in %)						
Men						
Insecure Job	**0.35**	0.48	**0.24**	0.43	0.15	0.36
Insecure Employment	**0.13**	0.34	**0.11**	0.32	0.21	0.41
Women						
Insecure Job	**0.35**	0.48	**0.29**	0.45	0.14	0.34
Insecure Employment	**0.14**	0.35	**0.10**	0.31	0.20	0.40
Mean value of job satisfaction by contract type						
Men						
All	**6.27**	2.30	6.96	2.06	7.04	1.90
Insecure Job	**5.47**	2.51	**6.43**	2.32	6.01	2.23
Secure Job	**6.71**	2.05	7.13	1.93	7.22	1.77
Women						
All	**6.74**	2.33	7.05	2.12	7.00	1.96
Insecure Job	6.42	2.43	**6.53**	2.43	6.00	2.23
Secure Job	**6.92**	2.25	7.26	1.95	7.16	1.86

Notes: Bold coefficients indicate that the *t*-tests for equality of means between permanent employment and flexible work arrangements is significant at least at the five per cent level, weights are used.

Finally, irrespective of the extent of formal employment protection provided by the job contract, workers who perceive their job as insecure report much lower job satisfaction levels. It seems that job insecurity affects job satisfaction of workers with permanent contracts and male agency workers in particular. Their job satisfaction decreases by approximately 17 per cent if they feel that they are at risk of losing their job.

Does perceived job security have consequences for the individual's future labour force status? Table 2 investigates whether subjective appraisals are correlated with what happened to the individuals who were employed in *t* one year later (*t*+1). Table 2 shows that 2.2 per cent of the individuals with secure job prospects in *t* were unemployed and 2.3 per cent were not in the labour force in *t*+1. The analogous figures are 6.8 per cent and 2.4 per cent, respectively, for those who felt their job was insecure. These figures reveal that individuals are able to judge their future employment prospects fairly accurately.[7]

[7] Table A1 in the appendix reports the remaining summary statistics of selected covariates used in the analysis.

Table 2 - Future Labour-force Status and Current Perceptions of Job Insecurity

	Employed in % (t+1)	*Unemployed in % (t+1)*	*Not in labour force in % (t+1)*
Secure job	95.44	2.24	2.32
Insecure job	90.86	6.78	2.36
Pearson chi2	461.57	$p < 0.001$	

Table 3 provides descriptive evidence on main workplace characteristics disaggregated by employment status. About 45 per cent of agency workers report that they are currently not working in the occupation for which they were trained, while this holds for only about 30 to 34 per cent of permanent workers. Flexible workers report lower autonomy at work compared to permanent workers. In general is appears that German workers are not happy with their working time. Only about one-quarter report that their contractually agreed hours are in line with their desired working hours. Women with flexible working arrangements are even less satisfied with their working time than men. Table 3 also shows that male agency workers in particular are required to be much more flexible regarding commuting behaviour.

Table 3 - Working Conditions by Contract Type, Mean

	Agency Temp		*Fixed-term*		*Permanent*	
	Men	*Women*	*Men*	*Women*	*Men*	*Women*
Mismatch	**0.45**	**0.45**	**0.39**	0.31	0.34	0.30
No autonomy at work	**0.31**	**0.27**	**0.21**	0.13	0.13	0.12
Actual ≠ desired working time	0.71	**0.77**	**0.70**	**0.77**	0.73	0.71
Changing distance to workplace	**0.11**	**0.04**	**0.04**	0.02	0.06	0.02
No compensation overtime	**0.08**	**0.07**	**0.18**	**0.13**	0.16	0.11
Bonus payments	**0.50**	**0.50**	**0.55**	**0.55**	0.76	0.77
Hourly wage	**12.84**	**11.38**	**14.22**	**12.07**	18.52	14.43

Notes: Means are reported, standard deviations are available upon request; bold coefficients indicate that the *t*-tests for equality of means between permanent employment and flexible work arrangements is significant at least at the five per cent level, weights are used.

Turning to the monetary variables, Table 3 reveals that agency workers are nearly always compensated (either through extra vacation or financially) if they work extra time. In contrast, almost 20 per cent of the male fixed-term workers do not receive any compensation. Only half of the flexible workers but about 75 per cent of the permanent workers receive an extra bonus in addition to their monthly pay check. Regarding the hourly gross wage, there are substantial differences. Agency workers are paid much less than workers on fixed-term contracts, and the latter are paid less than permanent workers. However, as Jahn and Pozzoli (2013) have shown, wage differentials between agency workers and non-agency workers are at least partly explained by the workers' own education and employment careers.

5. Methodological Approach

There is an intense discussion in the literature on the appropriate approach to evaluate the determinants of individual well-being. The choice between OLS and ordered logit models rests on whether the categories of the job satisfaction are considered cardinal or ordinal. Recently, Ferrer-i-Carbonell and Frijters (2004) and Van Praag and Ferrer-i-Carbonell (2006) tested both methods, and concluded that assuming cardinality or ordinarily in satisfaction surveys makes little difference if fixed-effects methods are used. In the following, the paper uses OLS fixed effects for three reasons. First, this approach is less data consuming compared to ordered logit fixed effects models which uses person-specific cut-off points and thus results in a heavy loss of data. Second, it has been previously shown that this method might lead to biased results (Baetschmann *et al*. 2011). Finally, the results are much easier to interpret.

By using a fixed effects specification, we are able to take into account that individuals may differ with respect to their scale feelings. Subjective feelings like job satisfaction might merely reflect their personalities, fixed psychological factors, or their social and family backgrounds which can be considered as time-invariant (e.g., Börsch-Supan and Jürges, 2006; D'Addio *et al*. 2007). This again makes a fixed effect approach a natural candidate for use, as this approach is able to take into account time-invariant unobserved heterogeneity.

In the baseline estimation, job satisfaction JS_{it} of worker i, $i=1...N$, in year t, $t=1...T$ is explained by the different contract types, where permanent employment acts as a reference category. $A_{it}(F_{it})$ is a dummy variable that is one when the worker holds an agency (fixed-term) contract and zero otherwise. β_1 and β_2 measures the impact of agency work and fixed-term employment, respectively. The vector $\mathbf{X}_{it}$ consists of the socio-economic control variables described in section 4. The baseline estimation displays the differences in job satisfaction of a worker in different contractual arrangements. However, since we did not control for differences in workplace characteristics, the difference in job satisfaction may still be a consequence of the workplace characteristics of the specific job.

In a second step, we add a set of observed workplace characteristics described by the vector $\mathbf{W}_{it}$. In the last specification, the proxies for different levels of security are included. I_{it} controls for the subjective individual job security and E_{it} for perceived employment security.

$$JS_{it} = \beta_1 A_{it} + \beta_2 F_{it} + \boldsymbol{\gamma}\mathbf{X}_{it} + \boldsymbol{\rho}\mathbf{W}_{it} + \kappa I_{it} + \eta E_{it} + \tau_t + \alpha_i + \varepsilon_{it} \quad (1)$$

τ_t is a set of dummy variables for each year in the sample period that capture the general time pattern in the economy. The individual-specific fixed effect α_i is assumed to capture unobserved time-invariant factors as ability, optimism, motivation, or social background, as well as the baseline satisfaction level. The fixed-effects estimator permits the regressors to be correlated with the time-invariant component of the error α_i, but assumes that they are uncorrelated with the idiosyncratic error ε_{it}, for which the usual properties are assumed.

So far, the model only controls for the formal job security inherent in the three contractual types. De facto job security might depend on a number of other factors, e.g., the dismissal behaviour, or the economic situation of the firm in which the worker is employed. We therefore divide the three employment contracts further according

to the perceived job security of the worker, where the indices in equation (2) describe whether the worker perceives his or her job as insecure (I) or secure (S). In this case, P_{it}^{I} is a dummy variable for a worker who is permanent employed but perceives his or her job as insecure. Workers with permanent contracts feeling their jobs are secure serve as the reference category.

$$JS_{it} = \beta_1 A_{it}^{I} + \beta_2 F_{it}^{I} + \beta_3 P_{it}^{I} + \beta_4 A_{it}^{S} + \beta_5 F_{it}^{S} + \boldsymbol{\gamma}\mathbf{X}_{it} + \boldsymbol{\rho}\mathbf{W}_{it} + \eta E_{it} + \tau_t + \alpha_i + \varepsilon_{it} \quad (2)$$

In a final step, we wanted to know whether workplace characteristics affect the job satisfaction of workers in different ways. To test this, we added to equation (2) interaction terms for the contract types with the seven workplace controls.

6. Results

Job Satisfaction by Contract Type and Perceived Job Insecurity

Table 4 reports fixed-effects estimates of the impact of flexible work arrangements on job satisfaction split by gender. For the sake of brevity, only the coefficients of the variables of interest are reported. Apart from the dummies for the contract type as controls, Model 1 includes socio-economic controls as described in section 4. Next, Model 2 also contains the seven workplace characteristics and firm characteristics, and finally, Model 3 adds the two insecurity measures to Model 2.

Table 4 - Job Satisfaction and Flexible Employment Forms, Baseline Estimations, Fixed-effects Estimations

	Men			*Women*		
	1	*2*	*3*	*1*	*2*	*3*
Agency temp	-0.374**	-0.345**	-0.299**	-0.167	-0.144	-0.073
	(0.102)	(0.101)	(0.099)	(0.127)	(0.126)	(0.125)
Fixed-term	-0.145*	-0.110	-0.064	0.066	0.076	0.144*
	(0.069)	(0.068)	(0.068)	(0.070)	(0.070)	(0.069)
Job insecurity			-0.600**			-0.626**
			(0.038)			(0.044)
Employment insecurity			-0.093**			-0.036
			(0.035)			(0.036)
Socio-economic characteristics	Yes	Yes	Yes	Yes	Yes	Yes
Work place characteristics	No	Yes	Yes	No	Yes	Yes
Observations	31,017	31,017	31,017	27,098	27,098	27,098
Individuals	7,370	7,370	7,370	6,865	6,865	6,865
R-squared (within)	0.02	0.03	0.05	0.02	0.03	0.04

Notes: Robust standard errors in parenthesis; **, *, + indicate significance at 1%, 5% and 10% level; socio-economic, firm and work place controls as described in section 4; further controls: real regional GDP, wave, and year dummies.

Turning first to men, table 4 shows that male agency workers, irrespective of the specification, are less satisfied than the reference group of permanent workers. Interestingly, only in Model 1 are workers with fixed-term contracts less satisfied than the reference group. As soon as one controls for job characteristics, the coefficient

becomes insignificant. However, the workplace characteristics are not able to control for differences in job satisfaction between male temps and male permanent workers.[8]

The pattern for women is quite different. Surprisingly, and contrary to the existing literature, female agency workers are as satisfied as permanent female workers. It seems that the inherent flexibility of alternative work arrangements, which might allow women to combine family responsibilities with labour force participation, compensate women for the adverse working conditions that are usually present when working in a flexible employment form. Women with fixed-term contracts are even more satisfied in Model 3.

Model 3 furthermore reveals that perceived job insecurity affects workers' job satisfaction significantly. Particular fears of job loss have a strong effect, lowering job satisfaction by approximately 0.6 points for both men and women. This is in line with the finding in the literature so far (de Graaf-Zijl, 2012; Green *et al*. 2010; Origa and Pagani, 2008). Employment insecurity lowers job satisfaction for men significantly, although the effect is not very pronounced.

Since perceived employment security does not affect job satisfaction strongly, we proceed by dividing the three contact types by their perceived job security. The argument is that it is not just formal employment protection that matters, but also the perceived job security. A permanent worker might have an open-ended contract, but if the economic situation of his or her employer is weak, the job might be at risk. In table 5, the reference category is workers with permanent contracts who perceive their jobs as secure.

Table 5 - Job Satisfaction and Flexible Employment Forms Divided by Job Security, Fixed-effects Estimations

	Men			*Women*		
	1	*2*	*3*	*1*	*2*	*3*
Insecure agency temp	-1,215**	-1,182**	-1,182**	-0.642**	-0.609**	-0.610**
	(0.169)	(0.168)	(0.168)	(0.230)	(0.231)	(0.231)
Insecure fixed-term	-0.707**	-0.668**	-0.671**	-0.375**	-0.366**	-0.368**
	(0.124)	(0.122)	(0.122)	(0.128)	(0.128)	(0.128)
Insecure permanent	-0.604**	-0.588**	-0.589**	-0.661**	-0.653**	-0.654**
	(0.040)	(0.040)	(0.040)	(0.046)	(0.046)	(0.046)
Secure agency temp	-0.200+	-0.173	-0.170	-0.130	-0.110	-0.110
	(0.107)	(0.107)	(0.107)	(0.139)	(0.138)	(0.138)
Secure fixed-term	-0.101	-0.069	-0.069	0.082	0.093	0.093
	(0.074)	(0.074)	(0.074)	(0.073)	(0.073)	(0.073)
Employment insecurity			0.049			0.021
			(0.036)			(0.042)
Socio-economic characteristics	Yes	Yes	Yes	Yes	Yes	Yes
Work place characteristics	No	Yes	Yes	No	Yes	Yes
Observations	31,017	31,017	31,017	27,098	27,098	27,098
Individuals	7,370	7,370	7,370	6,865	6,865	6,865
R-squared (within)	0.04	0.05	0.05	0.04	0.04	0.04

Notes: Robust standard errors in parenthesis; **, *, + indicate significance at 1%, 5% and 10% level; socio-economic, firm and work place controls as described in section 4; further controls: real regional GDP, wave, and year dummies.

[8] Both the socio-economic and workplace characteristics broadly conform to the signs and significances reported in numerous other studies (e.g., Beckmann *et al*. 2007; Clark and Oswald, 1996; Green and Heywood, 2011). The results for the full regressions are available upon request.

In line with the descriptive evidence in table 1, workers who perceive their jobs as insecure are always less satisfied than the workers in the reference group. Insecure male temps are least satisfied, followed by insecure fixed-term workers and permanent workers. This pattern is different for insecure women. Here the insecure permanent workers are least satisfied followed by insecure temps. A *t*-test proves that the coefficients for these two groups differ significantly. However, from an economic point of view the difference is not very pronounced. Among the insecure female workers, the difference to the reference group is lowest for women with fixed-term contracts in all specifications.

One striking result is that the job satisfaction of all workers who feel that their jobs are secure no longer differs from the job satisfaction of those with secure permanent contracts. This result highlights that it is not the formal employment protection that affects job satisfaction but the perceived job security.

The Role of Workplace Characteristics

As argued in the introduction, workers might differ in their valuation of job dimensions across contract types. Reasons could include that workers differ in their expectations about the job or their commitments to the employer. In this case, the results of Model 3 in tables 4 and 5 might be biased, since they assume that workplace characteristics affect workers' job satisfaction in similar ways. In order to test this hypothesis, we introduced interaction terms for the contract types into Model 3 with the workplace characteristics.

Table 6 shows that almost all of the workplace characteristics are significant determinants of job satisfaction. Moreover, women value certain workplace characteristics differently compared to men. However, we rarely find evidence that the contract types are affected in different ways.[9]

Turning first to the mismatch indicator, the results show that women's job satisfaction is negatively affected if they are not working in the profession for which they were trained, while this does not affect men, irrespective of the contract type. This result is somewhat contradictory to the existing literature. Green *et al*. (2010) show that working in jobs that do not allow the worker to use acquired skills greatly impacts job satisfaction of Australian men with casual contracts and fixed-term contracts. However, the use of skills does not influence the job satisfaction of Australian female flexible workers. De Graaf-Zijl (2012) finds that satisfaction with job content is one of the main job domains influencing job satisfaction in the Netherlands. This is independent of the worker's contract type. One possible explanation for the differences in the results might be that both studies rely on subjective evaluations of the job content, while the mismatch variable measures whether workers work in the profession for which they were trained.

[9] One might argue that the insignificant results in table 6 might be a consequence of a low number of observations. We therefore calculated the transition matrix for each workplace characteristic and the respective contract type. The transition matrix indicates that a low number of observations are not the reasons for the insignificant results. We also checked whether results change if we only distinguish among the three contract types and their interactions with the workplace controls. Moreover, we also ran simple OLS regressions which do not rely on workers switching the contractual status. In all cases, the results do hardly change.

Table 6 - Job Satisfaction of Flexible Workers by Workplace Characteristics, Fixed Effects Estimations

Workplace Characteristics	*Men*		*Women*	
Mismatch	-0.036	(0.045)	-0.128*	(0.055)
Insecure agency temp	-0.308	(0.356)	-0.044	(0.497)
Insecure fixed-term	-0.136	(0.274)	0.129	(0.294)
Insecure permanent	0.034	(0.078)	-0.076	(0.099)
Secure agency temp	-0.248	(0.212)	0.282	(0.302)
Secure fixed-term	0.002	(0.161)	0.047	(0.151)
Autonomy at work	-0.226**	(0.061)	-0.157	(0.116)
Insecure agency temp	0.312	(0.341)	-0.610	(0.669)
Insecure fixed-term	0.238	(0.293)	-0.014	(0.337)
Insecure permanent	0.199*	(0.098)	0.044	(0.133)
Secure agency temp	0.304	(0.269)	-0.226	(0.395)
Secure fixed-term	-0.042	(0.209)	-0.316	(0.231)
Actual ≠ desired working time	-0.069**	(0.025)	-0.115**	(0.029)
Insecure agency temp	0.232	(0.308)	0.269	(0.540)
Insecure fixed-term	-0.188	(0.230)	0.379	(0.312)
Insecure permanent	-0.087	(0.076)	-0.002	(0.084)
Secure agency temp	0.160	(0.203)	-0.226	(0.252)
Secure fixed-term	-0.131	(0.129)	-0.130	(0.124)
Changing distance workplace	0.042	(0.068)	-0.010	(0.148)
Insecure agency temp	-0.957+	(0.507)	-0.374	(0.886)
Insecure fixed-term	0.430	(0.443)	-0.296	(0.465)
Insecure permanent	-0.220	(0.148)	-0.056	(0.315)
Secure agency temp	-0.797*	(0.349)	-0.758	(0.570)
Secure fixed-term	-0.410	(0.301)	0.454	(0.475)
No compensation overtime	-0.086*	(0.044)	-0.108*	(0.052)
Insecure agency temp	-0.642+	(0.384)	0.109	(0.369)
Insecure fixed-term	-0.224*	(0.112)	-0.233+	(0.140)
Insecure permanent	-0.096	(0.275)	0.135	(0.396)
Secure agency temp	-0.157	(0.189)	-0.058	(0.196)
Secure fixed-term	-0.642+	(0.384)	0.109	(0.369)
Bonus payment	0.106**	(0.038)	0.138**	(0.044)
Insecure agency temp	0.356	(0.331)	-0.563	(0.444)
Insecure fixed-term	-0.257	(0.216)	0.305	(0.223)
Insecure permanent	0.069	(0.082)	0.048	(0.094)
Secure agency temp	0.028	(0.217)	-0.233	(0.279)
Secure fixed-term	-0.197	(0.137)	-0.062	(0.138)
Log hourly wage	0.361**	(0.064)	0.146*	(0.062)
Insecure agency temp	0.254	(0.558)	0.109	(0.405)
Insecure fixed-term	0.103	(0.327)	-0.611*	(0.305)
Insecure permanent	-0.215*	(0.097)	0.038	(0.109)
Secure agency temp	0.106	(0.197)	0.387	(0.430)
Secure fixed-term	0.003	(0.133)	-0.133	(0.152)
Contract type				
Insecure agency temp	-3.258*	(1.527)	-0.276	(1.953)
Insecure fixed-term	-0.552	(1.042)	1.034	(0.948)
Insecure permanent	-0.079	(0.338)	-0.564	(0.397)
Secure agency temp	-0.743	(0.880)	-0.885	(1.365)
Secure fixed-term	0.741	(0.538)	0.194	(0.509)
Observations	31,017		27,098	
Individuals	7,370		6,865	
R-squared (within)	0.05		0.04	

Notes: Robust standard errors in parenthesis**, *, + indicate significance at 1%, 5% and 10% level; socio-economic and firm controls as described in section 4; further controls further controls: real regional GDP, wave, and year dummies.

A variable that might be closer to the job content is the dummy measuring autonomy at work. Interestingly, low autonomy at work does not affect women's job satisfaction, while it is an important job characteristic for all men. The exception is insecure permanent workers, who barely suffer from low autonomy. It seems that autonomy at work might no longer be an important job domain if the worker fears losing a permanent job.

Dissatisfaction with working time has been proven to be an important aspect of job satisfaction (e.g., Booth and van Ours, 2008). This also holds for German workers. In contrast to Wooden and Warren (2004) and Green *et al*. (2010) the effect is independent of the employment arrangement, respectively. Female workers appear unhappier with their contractually agreed working time than men. To shed more light on this issue, we divided the variable unsatisfied with working time into two dummy variables: desiring more contractual working time, desiring less contractual working time, and having the desired working time as the omitted category. Interestingly, 56 per cent of the women would like to work more hours. However, (unreported further) regressions show that the higher coefficient for women is driven by those who wish to work fewer hours. This might be indicative of traditional gender divisions within households between career and family duties. However, it does not seem that flexible secure or insecure workers' job satisfaction is affected differently.

While changing the distance to the workplace is not an important aspect for most workers, job satisfaction of male agency workers is affected substantially. One explanation could be that agency workers are not compensated if the commuting distance to client firms change, while permanent workers might have their additional travel expenses reimbursed or even get a company car.

The number of overtime hours might affect workers' job satisfaction in different ways depending on whether they receive compensation or not. Table 6 shows that a lack of compensation indeed influences job satisfaction of all workers negatively. This effect is particularly pronounced for male insecure fixed-term workers and, albeit only significant at the ten per cent level, for male secure fixed-term and insecure agency workers. In the case of women, only female insecure fixed-term workers suffer even more if they are not compensated.

That bonus payments might influence job satisfaction of all workers positively is to be expected. However, the results do not show differences between contract types.

It is to be expected that the log hourly wage has a positive effect on job satisfaction. The impact on men's job satisfaction is much greater than on women's. This is in line with the findings of de Graaf-Zijl (2012) and Green *et al*. (2012). However, our estimations show that the effect on male insecure permanent workers is much lower. Job satisfaction of female workers on insecure fixed-term contracts is even negatively affected. De Graaf Zijl (2012) confirms that the wages of female on-call workers affect job satisfaction negatively – even that of agency workers, albeit weakly. These workers would probably be prepared to trade some of their wages for increased job security.

Finally, table 6 shows that after controlling for main workplace characteristics by contract types, only job satisfaction of male insecure agency workers is statistically significant and of negative sign. Compared to the estimates in tables 4 and 5 the

coefficient is only significant at the five per cent level but becomes much larger. This indicates that some of the job characteristics might compensate male insecure temps for a presumably adverse contract type. Moreover, there might be workplace characteristics that the study could not control for. One might be the lack of interpersonal relationships at work or self-esteem derived from the work. These latter factors might more strongly affect job satisfaction of men who are the breadwinners of the family. And indeed, Bruno *et al*. (2013) provide evidence that satisfaction with relationships with colleagues plays a much bigger role for men than for women for Italian fixed-term workers. That these factors do indeed play an important role for temporary agency workers also in Germany has been recently investigated by Gundert and Hohendanner (2014). Workers with temporary agency contracts feel that they are less integrated into the labour market and more socially excluded than workers on fixed-term and permanent contracts.

Robustness Checks

In order to check whether the results are robust, we ran several alternative specifications, see table A2. First of all, we tested whether the results are sensitive regarding the definition of perceived job and employment security. In this case, the variable job insecurity takes on the value one if the worker reported being 'very concerned' or 'somewhat concerned.' The measure for employment security changes accordingly as the answers 'difficult' and 'almost impossible' were treated as employment insecurity. Second, all estimations were performed for full-time workers only. Finally, the sample was limited to workers showing variation in contract status and so determining the coefficient for the contract status. It turns out that the results are hardly affected by the different specifications.

As a final robustness check, we also ran fixed effects P(robit)OLS regressions, as suggested by Van Praag and Ferrer-i-Carbonell *et al*. (2006), which preserve the ordered nature of the information in the fixed effects approach, see table A3. However, using POLS-FE reveals no meaningful differences in significance. To see whether unobserved heterogeneity plays a role, we ran a simple OLS regression as well. In this case, also secure male agency temps are significantly less satisfied with their jobs than individuals with secure permanent jobs, and the coefficients are much larger, indicating that the OLS results might be biased.

7. Conclusions

In order to increase labour market flexibility, most countries have gradually loosened regulations governing flexible employment arrangements during the past decades. However, critics claim that these deregulations have worsened working conditions for flexible workers. Since job satisfaction is considered to be a summary indicator for workplace characteristics, one might expect that the members of the flexible workforce are less satisfied with their jobs.

Most of the previous studies on this subject indeed show that workers on temporary contracts are less satisfied with their jobs than workers with permanent contracts.

This paper questions the assumption that differences in job satisfaction run parallel to differences between these formal contract types. It instead argues that a more appropriate distinction is based on labour market risk. Specifically, this study has shown that it is not the formal security as defined by the contract type or the working conditions alone that matter for job satisfaction but perceived job security. Once one divides the contract types by perceived job security, the job satisfaction ranking no longer clearly coincides with the contract type. Insecure temporary agency workers are much less satisfied with their jobs than workers who hold a fixed-term contract, and the latter group is less satisfied than insecure workers with a permanent contract. If one looks at workers who consider their jobs to be secure, there is no longer any difference between the formal contract types. This indicates that it is not the formal employment arrangement but the perceived job security that determines job satisfaction.

The paper moreover shows that workplace characteristics differ between contractual agreements. However, the paper could only provide little evidence that job characteristics affect workers with different employment status in different ways.

Appendix

Table A1 - Selected Sample Means by Contract Type

	Agency Temp		*Fixed-term*		*Permanent*	
	Mean	*sd*	*Mean*	*sd*	*Mean*	*sd*
Men						
Age	37.20	10.63	34.53	10.11	42.08	9.54
Child	0.34	0.47	0.34	0.47	0.43	0.50
Sick 6 weeks	0.05	0.22	0.04	0.20	0.04	0.21
Days in hospital	0.50	4.20	0.50	3.80	0.65	4.38
Low qualified	0.13	0.33	0.11	0.32	0.10	0.30
Median qualified	0.72	0.45	0.60	0.49	0.67	0.47
High qualified	0.15	0.36	0.29	0.45	0.23	0.42
Exp. unemployment (years)	1.18	2.04	0.85	1.55	0.36	1.01
Exp. Employment (years)	14.32	10.79	11.04	9.91	19.71	10.06
Hourly wage	12.84	8.73	14.22	8.49	18.52	9.18
Weekly working time	37.55	6.14	37.89	6.55	38.72	3.70
Blue-collar worker	0.65	0.48	0.42	0.49	0.41	0.49
Women						
Age	38.69	11.38	34.90	10.09	41.91	9.78
Child	0.33	0.47	0.36	0.48	0.34	0.47
Sick 6 weeks	0.06	0.23	0.03	0.16	0.05	0.21
Days in hospital	0.78	4.06	0.68	3.66	0.63	3.73
Low qualified	0.13	0.34	0.09	0.28	0.10	0.30
Median qualified	0.68	0.47	0.62	0.49	0.67	0.47
High qualified	0.19	0.39	0.30	0.46	0.23	0.42
Exp. unemployment (years)	1.05	1.77	0.90	1.66	0.46	1.22
Exp. employment (years)	13.29	10.43	10.05	8.92	17.90	9.80
Hourly wage	11.38	6.18	12.07	6.24	14.43	6.98
Weekly working time	30.73	9.89	32.07	9.49	31.95	9.06
Blue-collar worker	0.30	0.46	0.18	0.38	0.17	0.37

Notes: Weights are used.

Table A2 - Robustness Checks, Alternative Specifications

	Men			*Women*		
	Alternative Definition	*Full-time*	*Switched Contract*	*Alternative Definition*	*Full- time*	*Switched Contract*
	(1)	*(2)*	*(3)*	*(1)*	*(2)*	*(3)*
Insecure agency temp	-0.825**	-1,196**	-1,148**	-0.424**	-0.507+	-0.736**
	(0.120)	(0.169)	(0.186)	(0.152)	(0.291)	(0.248)
Insecure fixed-term	-0.474**	-0.685**	-0.661**	-0.192*	-0.475**	-0.410**
	(0.081)	(0.124)	(0.134)	(0.081)	(0.158)	(0.138)
Insecure permanent	-0.395**	-0.575**	-0.551**	-0.325**	-0.583**	-0.710**
	(0.028)	(0.040)	(0.099)	(0.031)	(0.059)	(0.121)
Secure agency temp	-0.140	-0.191+	-0.151	-0.158	-0.098	-0.071
	(0.163)	(0.109)	(0.110)	(0.210)	(0.192)	(0.142)
Secure fixed-term	-0.081	-0.074	-0.072	0.073	0.171+	0.054
	(0.103)	(0.077)	(0.076)	(0.110)	(0.098)	(0.078)
Employment insecurity	-0.112**	-0.102**	0.005	-0.065+	-0.092+	-0.079
	(0.035)	(0.035)	(0.101)	(0.036)	(0.050)	(0.103)
Observations	31,017	30,246	5,035	27,098	15,982	4,788
Individuals	7,370	7,210	1,025	6,865	4,485	1,014
R-squared (within)	0.04	0.05	0.06	0.03	0.05	0.06

Notes: Robust standard errors in parenthesis; **, *, + indicate significance at 1%, 5% and 10% level; socio-economic controls and workplace controls as described in section 4; further controls: real regional GDP, wave and year dummies.

Table A3 - Job Satisfaction and Flexible Employment Forms Divided by Job Security, Alternative Methods

	POLS-FE		*OLS*	
	Men	*Women*	*Men*	*Women*
Insecure agency temp	-0.527**	-0.302**	-1,449**	-0.692**
	(0.074)	(0.114)	(0.157)	(0.187)
Insecure fixed-term	-0.306**	-0.165**	-0.760**	-0.504**
	(0.056)	(0.060)	(0.113)	(0.100)
Insecure permanent	-0.260**	-0.293**	-1,067**	-1,026**
	(0.018)	(0.021)	(0.036)	(0.040)
Secure agency temp	-0.089+	-0.052	-0.509**	-0.103
	(0.052)	(0.068)	(0.093)	(0.115)
Secure fixed-term	-0.028	0.060	-0.109+	0.074
	(0.037)	(0.037)	(0.058)	(0.056)
Employment insecurity	-0.036*	-0.013	-0.216**	-0.077*
	(0.017)	(0.018)	(0.030)	(0.032)
Observations	31,017	27,098	31,017	27,098
Individuals	7,370	6,865		
R-squared	0.04	0.04	0.09	0.07

Notes: Robust standard errors in parenthesis; **, *, + indicate significance at 1%, 5% and 10% level; socio-economic controls and workplace controls as described in section 4; further controls: real regional GDP, wave and year dummies.

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Temporary Versus Permanent Employment: Does Health Matter?

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Abstract

Poor health may inhibit active participation in the labour market and restrict the types of employment available to an individual. This paper uses recent survey data from New Zealand and employs a bivariate probit approach (to address sample selection issues) for investigating the relationship between health status and employment type. We find that health issues (and in particular mental health) are negatively related to the likelihood of being employed; and entering full-time and / or permanent employment. The picture with respect to temporary work is a little more fuzzy, with mixed results, and only minimal evidence is found that poor health is positively related to being in temporary employment.

Keywords: Employment, Mental health, Physical health

JEL classification: I1, J24, J29

1. Introduction

There is growing interest in the relationship between employment type and health, with foci on the increasingly precarious nature of work and the impacts of eroding employment security. While there are numerous definitions of temporary employment, as Hardy and Walker (2003) review, temporary work tends to encompass any job that deviates from the definition of permanent employment, in that it is not continuing and it does not necessarily go on for the full year (Campbell, 1994). Temporary work may cover seasonal, contract, casual, fixed-term, etc., and all of these can, in a variety of ways, be described as precarious. On the other hand, permanent work is generally defined as 'Workers who work all year and have an expectation of continuing employment' (Allan *et al*. 1998).

Although a multitude of factors have been linked with the likelihood of being in permanent versus temporary employment, one set of determinants that has not featured prominently in the literature is health. This is surprising considering that several studies

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have focussed on the impact of a change in employment type on health. The nature of the relationship between health and employment type is crucial to understand, because if people with poorer health have a higher propensity to find themselves in less-secure employment then the consequences may mean their overall well-being is affected, and possibly their mental health. To date, the predominant conceptualisations of these insecure employment roles have been either as an opportunity for disabled workers to gain entry to permanent, secure employment, or as a choice whereby such employment offers the flexibility that disabled workers are perceived to require when balancing employment alongside their own health requirements (Seebohm and Secker, 2005). Yet this assertion requires empirical investigation.

This study evaluates the relationship between various physical and mental health issues and participation in the labour market in a range of different types of employment arrangements. Data is sourced from the New Zealand General Social Survey (NZGSS), where we make use of six self-assessed health variables that encompass both physical and mental health. The role that health issues play with regard to temporary employment is investigated here in a more disaggregate fashion by analysing separately five sub-groups of temporary work: fixed term; contract; seasonal; casual; and other temp. The last on this list encompasses temp agency work and any other non-permanent circumstance that doesn't fit neatly into the first four categories. Such finer analysis is an important contribution as a large amount of extant literature focuses only on permanent employment versus the aggregate group of temporary workers (see, for example, Morris and Vekker, 2001) or concentrates on just one category of employment type (see, Güell and Petrongolo, 2007, who investigated determinants of converting fixed term into permanent contracts).

An important consideration in this research vein is sample selection bias. Some factors may determine only whether a person is active in the labour market (employment propensity) or only the employment type when actively in work (full time, seasonal, etc.) while other factors may influence both these issues. In our empirical exercise we employ bivariate probit regression and conditional marginal effects estimation processes to control for those variables that impact on employment propensity before we identify the marginal effects of the covariates on employment type.

The remainder of this paper is consequently organized as follows: Section 2 reviews the literature regarding the nature of the relationship between employment and health. Section 3 outlines the data source and provides details on the six key health identifiers used in this study (three physical health and three mental health variables), and explains the empirical approach adopted in this study. Section 4 reports key results, while section 5 concludes.

2. Literature

Underemployment: Causes and Consequences

While there are important debates over the extent of and reasons behind the increasing amount of non-permanent employment, there is growing evidence that a non-trivial proportion of the workforce can now be described as occupying non-permanent employment (Burgess and de Ruyter, 2000; Vosko, 2007). Although there has been documentation of the phenomenal changes in the labour market towards

either part-time or non-permanent employment types over the last two decades (Segal and Sullivan, 1997; Alba-Ramírez, 1998; Tan and Tan, 2002; De Jong *et al*., 2009), there is a contemporaneous dearth of recognition of the role of health with regard to employment type.

New Zealand (NZ) has a growing profile of temporary workers. Figures from the Department of Labour (2009) reveal that in March 2008, approximately one in 10 (9.4 per cent) employees were working in temporary jobs. Additionally, the Survey for Working Life (conducted by Statistics NZ in March 2008) found that 40 per cent of temporary workers indicated that they would prefer a permanent job, which is an indication that a substantial number of these workers were not satisfied with their current employment type. Underemployment has become a major social issue during the past 20 years. Scheid (1999) highlighted that when workers lose full employment they may accept partial employment, by for example involuntarily working part-time or at lower wages. Inadequate work has been termed 'disguised unemployment' (Robinson, 1936), and is often not reflected well in the standard unemployment statistics.

Much medical and psychological research on un/underemployment has concentrated on both the possible damage to mental health or psychological well-being caused by unemployment and whether health restricts an individual's capability to work; it often overlooks the issue of disadvantaged groups being found in disadvantaged employment (Hammarström and Janlert, 1997). That is, given the common observation that employed individuals are less depressed and show higher self-esteem than their unemployed counterparts, can we attribute this difference to employment type or does a pre-existing difference in mental health influence whether one will obtain and retain employment?

It is widely acknowledged that there are multiple potential channels by which workers find themselves in temporary employment (De Jong *et al*. 2009). The first mechanism involves free choice reasons, i.e. workers choosing temporary placements due to their intrinsic qualities, such as greater levels of freedom and flexibility. A second group of workers are forced into temporary positions due to constraints/obstacles including discriminatory practices that can be faced in finding permanent work. In these cases individuals may choose temporary jobs with the specific aim of attaining a permanent job at a later stage. Using data from the USA's Current Population Survey, Morris and Vekker (2001) found that the majority of temporary workers would have preferred a permanent position (67 per cent); close to a third of the temporary workers (32 per cent) stated that it was the only type of job they could find, and another 8 per cent hoped it would lead to a permanent job. Almost 20 per cent of temporary workers in their study chose this employment pathway due to the constraints faced with working and being in school/training simultaneously. This is clear evidence of underemployment.

Socio-economic Variables

Many studies have found that younger workers are over-represented in temporary jobs (Christensen, 1987; Corsini and Guerrazzi, 2007; Morris and Vekker, 2001; Nollen, 1996). Within the 16-64 age band it is likely that age is an important determinant as it is often correlated with experience and, thus, likely to be positively correlated

with gaining permanent employment. For example, Corsini and Guerrazzi (2007) found the probability of Italian workers moving from temporary to permanent jobs increased with age until the age bracket of 35-44 years, after which it began to decline. They suggest this finding may reflect the higher cost to firms of investing in younger and older workers. Morris and Vekker (2001) further indicate that the trend of younger workers in temporary jobs is also likely, and in the least part, attributable to young people being in school and desiring flexibility in their employment arrangement (see, also Howe, 1986). They also find that even young people not in school are disproportionately in temporary jobs (81 per cent) when they would prefer a permanent one.

Gender is also a crucial factor in determining employment type with women tending to make up the majority of temporary employment (De Cuyper *et al*. 2009; Howe, 1986; Lenz, 1996; Liard and Williams, 1996; Morris and Vekker, 2001; Nollen, 1996; Segal and Sullivan, 1997). Gregory and Connelly (2008) argue that as women reorganise their working lives around the presence of children, their reported job satisfaction is highest when in part time work. Their research also indicates that while part time employment is rapidly expanding amongst men in Britain, it still remains a predominantly female phenomenon with women making up 81 per cent of all part time workers in 2006. It is likely that women find it more difficult to transition into permanent jobs (Alba-Ramírez, 1998; Corsini and Guerrazzi, 2007). For instance, Güell and Petrongolo (2007) found that the likelihood of transitioning from temporary to permanent is increasing for men but decreasing for women.

Explanations for such patterns are the subject of significant debate. Firstly, Polachek (1976) suggests that women in general have different expectations from men and therefore, women make different investment decisions. Since women are often assumed to plan to abstain themselves from work for child bearing they are expected to choose the low occupations and hence in most cases they accumulate less human capital and have lower lifetime earnings as a result. Such explanations continue to be presented by Hakim (2000) in her preference theory, which is heavily influenced by human capital theories. Yet the concept of choice has been challenged (see, Durbin, 2002; Acker, 2006; Walby, 1997); the claim that women choose precarious employment in an attempt to balance work and home life is seen as highly problematic, not least because such choices are constrained by gendered social structures.

Other significant determinants of being in temporary versus permanent employment include education, marital type, and ethnicity. Morris and Vekker (2001) found temporary workers tend to have lower education levels than permanent workers. This result is supported by Bover and Gómez (2004) who showed that having a university degree increases the likelihood of getting into a permanent position, while simultaneously decreasing the probability of attaining a temporary one. In contrast, however, Corsini and Guerrazzi (2007) found that while workers with only compulsory education struggle to find employment, in particular that of permanent employment, workers with a high degree of education are also less likely than their moderately educated counterparts to hold a permanent job. The authors suggest this finding is explained by considering optimal firm/employee behaviour; firms preferring to pay high worth employees on a contract basis, while highly educated employees,

recognising the potential career opportunities that exist for them, also prefer contract work to ensure ease of mobility. Corsini and Guerrazzi (2007) also found that investment in further education with regard to increasing the chance of getting work (secure or otherwise) is significantly greater for young workers, suggesting that firms look for other factors in older workers such as experience. Evidence regarding the role of marital status in determining job type is inconclusive. For instance, while Alba-Ramirez (1998) finds that marriage increases the probability of both men and women obtaining an indefinite contract in Spain, Liard and Williams (1996) argue that married females may prefer temporary work due to their juggling of family and work activities. In terms of ethnicity, there is growing research on this complex issue, such as Morris and Vekker (2001) who found that Blacks had a lower likelihood of being in permanent employment, possibly due to a negative 'minority status' effect on a person's permanent job opportunities.

Health

One set of covariates that has not featured prominently in the employment type literature is health. This is surprising, considering that several studies have focussed on the opposite relationship; i.e. the impact on health as a result of a change in employment type. For example, research by Isaksson and Bellagh (2002), Ferrie *et al*. (1998), Virtanen *et al*. (2003) and Silla *et al*. (2005) investigated health as an outcome variable. Silla *et al*. (2005) found evidence that traditional temporary workers (those low in volition and employability) experienced the lowest health outcomes (in particular, low levels of well-being). Ferrie *et al*. (1998) found that organisational change in jobs and job insecurity triggered longstanding illnesses and minor psychiatric morbidity in both men and women, with men being more susceptible to these conditions than women. Virtanen *et al*. (2003) studied whether changing from a fixed-term to a permanent employment situation was followed by changes in health or health-related behaviours (such as sickness absence). Further research by Virtanen *et al*. (2005) emphasised the need for future work to investigate health status as an antecedent, since many dual labour market theorists argue that those who are healthy are selected for core jobs, while those who are not, are selected for periphery jobs. This approach maintains that the allocation of jobs and resources in a free labour market economy is determined by supply and demand, with the implication that discrimination based on prejudice and stereotypes against certain social groups is irrational and has no place within the functioning of a rational and efficient market as it would be non-competitive. According to this theory, any irrational discrimination against workers is naturally addressed by competitive mechanisms since employers evaluate workers in terms of their individual characteristics as they seek to maximize profit (Reich *et al*. 1972).

MacKay (1998) highlights the concept of unemployment and underemployment as a 'choice'; unemployable through being unduly inflexible. This places the emphasis on the individual, their willingness to accept lower wages, poorer working conditions, or by physically moving location. From this perspective, it is inflexibility on the part of the individual that results in unemployment or unemployability, depoliticising organisational decision-making and exclusionary processes. In addition, for those who are underemployed, such an approach justifies their position in the labour market as a matter of choice or opportunity.

This attitude to exclusion is influenced by medical approaches to health. Here exclusion or propensity for non-permanent employment is an issue of individual deficit. Disability, and specifically mental health, in this context, has been used here to indicate inability or limitations in performing social roles and activities such as in relation to work, or family (Nagi, 1976). From such a perspective, any relationship between health and economic exclusion has been explained as causal; mental health impairs performance at the individual level, and in social performance (Nagi, 1976). Yet empirical evidence regarding the relationship between health status and employment type is scant. Research by Grzywacz and Dooley (2003) creates a continuum of 'good' and 'bad' jobs based on information regarding the psychological, social and economic resources of a worker; and their analysis revealed a consistent association between less than optimal jobs and poorer physical and mental health amongst adults.

3. Data and Method

Given the lack of empirical investigation into the relationship between mental and physical health status and temporary versus permanent employment, this research aims to fill this gap in the NZ literature. Data is sourced from the two most recent waves of the NZGSS (2010 and 2012). These cross sectional surveys are pooled, and provide information on a range of social and demographic characteristics of New Zealanders aged 15 and over. We limit our sample to those within the working age population (15-64) who are employed. This provides a final sample of 9,046. This is fairly evenly divided along the gender line (49 per cent male), and there are three distinct ethnic minorities (relative to the control group of NZ European) of Asian, Maori, and Pacific peoples (8.1, 11.6, and 4.1 per cent, respectively).

For the purpose of this research, the dependent variables of interest are the different categories of employment type. Specifically, understanding the determinants of being in full-time versus part-time work, conditional on being employed; and being in permanent versus temporary (further subdivided into fixed term, contract, seasonal, casual, and other temp) work, again conditional on being employed. These variables, along with the six disaggregated health status indicators, and other covariates used in the upcoming empirical analysis are described in table 1. Roughly 79 per cent of individuals in the sample are employed full-time (30+ hours per week), and 78 per cent are employed by way of permanent contract as opposed to on a temporary basis.

Under each of the health domains (physical and mental), there are aggregate summary scores, and disaggregated distinct health aspects. The aggregate measures are provided for purely informational purposes, as the following analysis focusses on the disaggregate indicators, to ensure attention is paid to which specific aspects of health are most strongly related to employment type. For instance, there are three physical health variables (Health Limiting, Pain and Energy) and three mental health indicators (Depression, Health social, and Health accomplishing). All variables have been coded in a similar fashion (categorical and ordered from one to five) such that the higher the value of the variable, the more detrimental the health of the individual. For instance, a value of five for the Pain variable signifies that during the past four weeks pain played a role of extreme interference with the individual's normal work, including work both within and outside the home. Conversely, a value of one is indicative of

pain having no impact on an individual's normal work. In a similar manner, a value of five for the depressed variable (one of the mental health indicators) signifies that the individual has felt depressed and downhearted all of the time during the past four weeks; whereas a value of one corresponds to them feeling depressed none of the time. A priori we expect a negative relationship between poor health and both full-time and permanent employment.

Table 1 - Descriptive Statistics

Variable	*Definition*	
Job characteristics		
Employed	Dummy variable: 1 for employed; 0 otherwise.	0.739 (0.439)
Full time	= 1 for employed full time (minimum 30 hours per week on average); 0 for part time	0.785 (0.411)
Permanent	= 1 for permanent employment agreement; 0 otherwise	0.781 (0.414)
Fixed term	= 1 for fixed term employment agreement; 0 otherwise	0.034 (0.182)
Contract	= 1 for contract employment agreement; 0 otherwise	0.067 (0.249)
Seasonal	= 1 for seasonal employment agreement; 0 otherwise	0.013 (0.115)
Casual	= 1 for casual employment agreement; 0 otherwise	0.058 (0.234)
Other temp	= 1 for other temporary employment agreements (other than fixed term, contract, seasonal, or casual); 0 otherwise	0.046 (0.210)
Physical health		
Summary physical health	Summary measure of physical health – continuous variable ranging from 0 to 100, standardized against NZ norms. A score above the norm (>50) indicates better physical health than the overall NZ population, and a score below 50 indicates worse physical health.	52.772 (7.139)
Health limiting	Question: During the past four weeks, how much of the time were you limited in the kind of work or other regular daily activities you do as a result of your physical health? Categorical variable: 1 = none of the time; 2 = a little of the time; 3 = some of the time; 4 = most of the time; and 5 = all of the time.	1.409 (0.843)
Pain	Question: During the past four weeks, how much did pain interfere with your normal work including both work outside the home and housework? Categorical variable: 1 = not at all; 2 = a little bit; 3 = moderately; 4 = quite a bit; 5 = extremely.	1.644 (1.050)
Energy	Question: How much of the time during the past four weeks did you have a lot of energy? Categorical variable: 1 = all of the time; ….; 5 = none of the time.	2.331 (0.854)
Mental health		
Summary mental health	Summary measure of mental health – continuous variable ranging from 0 to 100, standardised against NZ norms. A score above the norm (>50) indicates better mental health than the overall NZ population, and a score below 50 indicates worse mental health.	50.771 (8.960)
Health social	Question: During the past four weeks, how much time has your physical health or emotional problems interfered with your social activities, such as visiting friends, relatives, etc. Categorical variable: 1 = none of the time; ...; 5 = all of the time.	1.396 (0.810)
Depressed	Question: How much of the time during the past four weeks have you felt downhearted and depressed? Categorical variable: 1 = none of the time; ...; 5 = all of the time.	1.580 (0.820)

Table 1 - Descriptive Statistics (continued)

Variable	*Definition*	
Health accomplishing	Question: During the past four weeks, how much of the time have you accomplished less than you would like as a result of any emotional problems, such as feeling depressed or anxious? Categorical variable: 1 = none of the time; …; 5 = all of the time.	1.433 (0.786)
Demographic characteristics		
Asian	Dummy variable: 1 = Asian; 0 otherwise	0.081 (0.273)
Maori	Dummy variable: 1 = Maori; 0 otherwise	0.116 (0.320)
Pacific peoples	Dummy variable: 1 = Pacific peoples; 0 otherwise	0.041 (0.197)
Male	Dummy variable: 1 = Male; 0 = Female	0.490 (0.500)
Partnered	Dummy variable: 1 = partnered; 0 = non-partnered	0.637 (0.481)
Children	Dummy variable: 1 = presence of children in household; 0 otherwise	0.491 (0.500)
Educational qualifications		
Qual school	Dummy variable: 1 = highest educational qualification is a school certificate; 0 otherwise	0.455 (0.498)
Qual tertiary	Dummy variable: 1 = highest educational qualification is a post-school diploma or tertiary degree; 0 otherwise	0.293 (0.455)
Qual post grad	Dummy variable: 1 = highest educational qualification is a post graduate qualification; 0 otherwise	0.114 (0.318)
Age categories		
15-19	Dummy variable:1 = aged 15-19 years; 0 otherwise	0.039 (0.193)
20-24	Dummy variable:1 = aged 20-24 years; 0 otherwise	0.063 (0.243)
25-29	Dummy variable:1 = aged 25-29 years; 0 otherwise	0.082 (0.274)
30-34	Dummy variable:1 = aged 30-34 years; 0 otherwise	0.101 (0.302)
35-39	Dummy variable:1 = aged 35-39 years; 0 otherwise	0.122 (0.328)
40-44	Dummy variable:1 = aged 40-44 years; 0 otherwise	0.135 (0.342)
45-49	Dummy variable:1 = aged 45-49 years; 0 otherwise	0.130 (0.337)
50-54	Dummy variable:1 = aged 50-54 years; 0 otherwise	0.125 (0.330)
55-59	Dummy variable:1 = aged 55-59 years; 0 otherwise	0.110 (0.313)
60-64	Dummy variable:1 = aged 60-64 years; 0 otherwise	0.092 (0.289

Note: apart from the mean and standard deviation provided for the 1st variable of *employed*, all other descriptive statistics are provided for the employed group. $N = 9{,}057$.

While we have three disaggregated variables under each of the physical and mental health headings, these categories are by no means mutually exclusive and there may be some overlap. For instance, a respondent could mistake the motive for the question relating to the pain variable as either physical or emotional pain. While all correlations across the health variables are not presented here, we do find that the highest correlation is between health accomplishing and depression at 0.6; both of these indicators being mental health variables. In terms of the descriptive statistics provided in table 1, most New Zealanders rate their health status relatively well. This is shown by the means for the six health indicators being closer to one, rather than five. Assuming we can directly compare the health indicators with each other, the Energy variable has the poorest rating for individuals in this sample, with a mean of 2.33.

Table 2 provides a glimpse into the health status of workers versus non-

workers; full-time versus part-time, and permanent versus a range of temporary contracts. Several patterns are evident within this table. Firstly, across all physical and mental health aspects, individuals not employed have poorer health, relative to those employed. While these means do not in themselves establish a causal link between health and employment type; along with past international literature investigating the general link between health status and employment (see, Ojeda *et al*. 2010; Cai and Kalb, 2006; Pelkowski and Berger, 2004); these statistics add weight to the argument that healthy individuals are selected for employment, and they are also more likely to choose employment whereas people with health issues may choose to focus on dealing with their health issues.

Another clear pattern in table 2 is that part-time workers have inferior health status relative to those in full-time employment. However, without further empirical investigation it is difficult to know which direction causation runs, or if it runs in both directions in a significant manner.

Finally, when comparing permanent workers to the sub-categories of temporary jobs, casual employees appear to have particularly poor health – with the highest means for three out of the six disaggregated health indicators. The lowest means (and therefore best self-assessed health status) were experienced by permanent workers. T-tests were conducted to explore whether the means were significantly different across sub-samples of different employment types. Comparing permanent employment with various temporary categories, it is clear that casual workers stand out as most markedly different to their permanent counterparts, whereas fixed-term workers and contractors have the least significant differences with permanent workers, with respect to individual characteristics. These findings show the importance of disaggregating analysis of different temporary employment types where possible.

Table 2 - Descriptive Statistics by Employment Type

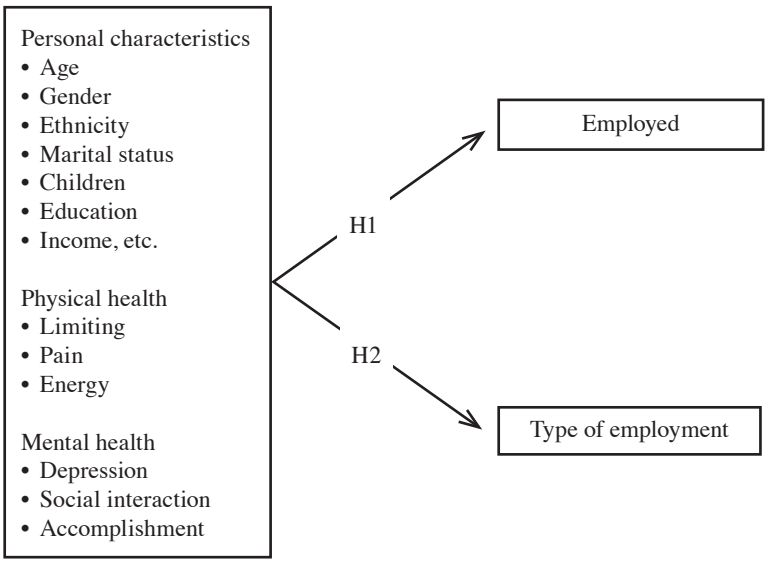
Variable	*Employed*	*Not Employed*	*Full Time*	*Part Time*	*Permanent*	*Fixed Term*	*Contractor*	*Seasonal*	*Casual*	*Other Temp*
Physical health										
Health limiting	1.409	1.827***	1.372	1.543***	1.395	1.432	1.384	1.426	1.560***	1.474*
Pain	1.644	1.924***	1.622	1.726***	1.627	1.642	1.717**	1.795*	1.732**	1.667
Energy	2.331	2.611***	2.296	2.458***	2.317	2.374	2.353	2.221	2.410**	2.438***
Mental health										
Health social	1.396	1.824***	1.365	1.507***	1.374	1.565	1.402	1.328	1.554***	1.445*
Depressed	1.580	1.923***	1.549	1.692***	1.553	1.632*	1.674***	1.475	1.767***	1.655**
Health accomplishing	1.433	1.824***	1.397	1.563***	1.402	1.535	1.487***	1.426	1.641***	1.526***
Demographic characteristics										
Asian	0.081	0.101***	0.082	0.078	0.079	0.074	0.071	0.115	0.101*	0.098
Maori	0.116	0.218***	0.114	0.122	0.115	0.126	0.091*	0.205***	0.154***	0.088*
Pacific peoples	0.041	0.077***	0.042	0.033*	0.041	0.058	0.023**	0.066	0.047	0.033
Male	0.490	0.337***	0.562	0.226***	0.484	0.387***	0.692***	0.549	0.378***	0.500
Partnered	0.637	0.388***	0.655	0.572***	0.648	0.613	0.674	0.557**	0.446***	0.686
Children	0.491	0.606***	0.457	0.615***	0.483	0.535*	0.467	0.410	0.603***	0.507
Educational qualifications										
Qual school	0.455	0.476**	0.449	0.481**	0.456	0.319***	0.469	0.508	0.518***	0.436
Qual tertiary	0.293	0.178***	0.295	0.285	0.295	0.403***	0.281	0.107***	0.218***	0.336*
Qual post grad	0.114	0.048***	0.122	0.086***	0.115	0.197***	0.126	0.025***	0.063***	0.119
Age categories										
15-19	0.039	0.171***	0.017	0.116***	0.027	0.048**	0.017	0.115***	0.195***	0.045**
20-24	0.063	0.096***	0.061	0.070	0.060	0.077	0.012***	0.090	0.142***	0.060
25-29	0.082	0.091*	0.088	0.058***	0.086	0.119**	0.051***	0.066	0.074	0.040***
30-34	0.101	0.088**	0.104	0.093	0.103	0.129	0.094	0.090	0.076**	0.098
35-39	0.122	0.102***	0.122	0.125	0.123	0.132	0.147*	0.148	0.097*	0.086**
40-44	0.135	0.085***	0.139	0.121**	0.137	0.132	0.152	0.098	0.099**	0.133
45-49	0.130	0.081***	0.136	0.111***	0.134	0.116	0.149	0.074**	0.076***	0.138
50-54	0.125	0.074***	0.131	0.102***	0.127	0.110	0.146	0.115	0.080***	0.136
55-59	0.110	0.087***	0.116	0.091***	0.113	0.058***	0.124	0.123	0.063***	0.148**
60-64	0.092	0.125***	0.087	0.113***	0.090	0.077	0.108	0.082	0.099	0.117*
Sample size	9,057	3,196	7,108	1,949	7,074	310	604	122	527	420

Note: ***, **, and * indicate significance levels for t-tests comparing employed with not employed, full-time with part-time, and each type of temporary employment type with permanent.

4. Method

The core focus of this paper is to address sample selection issues. Therefore, contrary to the majority of approaches adopted elsewhere, this paper examines (simultaneously) whether there are associations between a range of personal and health-related factors on employment *and* employment type. We assume that data take the format shown in figure 1, and a distinctive feature of this study is that it models the hypotheses of H1 and H2 simultaneously.

Figure 1 - Summary of Associations Investigated in this Paper



Past studies have modelled the determinants of employment status (yes/no) and employment type (permanent/temporary) separately. However, if there is an overlap in the unobserved characteristics that determine both the propensity to be employed and the type of employment (e.g. personal traits), then the errors from the regression models will be related. This will bias the coefficients on our health indicators. To deal with this modelling obstacle, we employ a bivariate probit, which also allows construction of marginal effects for covariates, conditional on whether an individual is employed or not.

5. Results

Table 3 presents the results of the bivariate probit regressions where the first regression of each pair examines the probability that the individual is employed and the second regression examines the propensity that the individual is in a particular type of employment[1]. There is consistency in the results across the table and many of the covariates yield expected findings.

[1] All regressions have been weighted using the sample weight provided by Statistics NZ.

For instance, Maori and Pacific Islanders are less likely to be employed than Europeans, males are more likely to be employed than females, respondents who have partners are more likely to be employed than people without partners, and those with children may face constraints on their ability to work as indicated by the negative coefficients. Relative to people in the 30-34 year old age bracket, those in the 40-44, 45-49 and 50-54 age groups are more likely to be working, perhaps because these age groups may be past the average child bearing age for women and because of the need for extra income to maintain the same level of welfare in family units as opposed to a household singleton. The 60-64 year old age group are less likely to be employed, perhaps indicating the preference of employers to select and train younger workers in order to reap longer term returns from their investment in these workers or the choice of older workers to retire early. The results also corroborate existing knowledge that higher qualified individuals are more likely to be in employment.

Turning our attention to the health-related variables, four of the six variables have a negative association with being employed. With regard to the physical health domain, only health limiting has a statistically significant negative association with the likelihood of being employed, while the coefficients on pain and energy are statistically insignificant. In contrast, all three mental health variables appear to be consistently exhibiting a significant negative relationship with being employed.

The second of each pair of regressions correspond to H2 in figure 1, and in general indicate that physical and mental health issues tend to be associated with non-participation in particular employment types – such as full-time and permanent work. However, before delving much further into the direction and sign of coefficients in table 3, it is important to note that at this stage we haven't controlled for sample selection bias. For an individual to be formally included in the employment type specification, the individual must first be employed. Therefore, the results of the employment type regressions should not be biased by inclusion of individuals who are not employed, which is potentially the case in the second columns of these pair-wise regression results. Accordingly, table 4 presents the marginal effects corresponding to the second of the pair-wise regressions, and are estimated conditional on the individual being employed, e.g. P (Full time=1 | Employed=1) and similarly for other employment types (such as P(Seasonal=1| Employed=1); P(Casual=1| Employed=1), etc).

There are three key findings from these results. First, in general, results point to a significant relationship between health problems and a lower propensity to be in full time or permanent work. Interestingly, health issues also have a negative relationship with contract work (albeit marginally, and with respect to the health limiting variable) and seasonal employment (with respect to health social and depression). Second to this, it is worth noting that the magnitude of the marginal effects on full time and permanent employment are much larger than the corresponding marginal effects of health problems on being in temporary work. Third, there are only two situations where worse health is associated with increases in the probability of being in a particular employment type – health accomplishing for fixed term work, and lack of energy for other temp work. These results indicate that while poor health is potentially a significant inhibitor for an individual entering full time or permanent work, these findings do not translate into an equivalent upsurge in temporary employment.

Table 3 - Bivariate Probit Regression Results

Variable	*Employed*	*Full Time*	*Employed*	*Permanent*	*Employed*	*Fixed Term*	*Employed*	*Contract*	*Employed*	*Seasonal*	*Employed*	*Casual*	*Employed*	*Other Temp*
Physical health														
Health limiting	-0.115***	-0.115***	-0.101***	-0.067***	-0.112***	-0.060	-0.112***	-0.101***	-0.113***	0.031	-0.108***	0.012	-0.112***	0.007
	(0.022)	(0.023)	(0.021)	(0.022	(0.022)	(0.044)	(0.022)	(0.032)	(0.022)	(0.057)	(0.021	(0.029)	(0.022)	(0.040)
Pain	-0.012	-0.015	-0.015	-0.028*	-0.013	0.008	-0.012	0.034	-0.012	0.049	-0.012	0.013	-0.014	0.006
	(0.017)	(0.016)	(0.017)	(0.015)	(0.017)	(0.034)	(0.017)	(0.023)	(0.017)	(0.038)	(0.017)	(0.026)	(0.017)	(0.034)
Energy	-0.022	-0.030	-0.019	-0.028	-0.024	0.011	-0.023	-0.004	-0.023	0.009	-0.028	-0.038	-0.025	0.085**
	(0.022)	(0.021)	(0.021)	(0.020)	(0.022)	(0.039)	(0.022)	(0.033)	(0.022)	(0.054)	(0.021)	(0.030)	(0.022)	(0.040)
Mental health														
Health social	-0.061***	-0.041*	-0.070***	-0.042*	-0.067***	0.029	-0.069***	-0.028	-0.068***	-0.173***	-0.055**	-0.001	-0.069***	-0.036
	(0.023)	(0.023)	(0.023)	(0.023)	(0.024)	(0.044)	(0.023)	(0.035)	(0.023)	(0.053)	(0.023)	(0.040)	(0.023)	(0.047)
Depressed	-0.091***	-0.086***	-0.086***	-0.073***	-0.089***	-0.072	-0.088***	0.034	-0.090***	-0.120*	-0.089***	0.018	-0.087***	0.019
	(0.024)	(0.023)	(0.023)	(0.022)	(0.024)	(0.045)	(0.024)	(0.033)	(0.024)	(0.064)	(0.024)	(0.032)	(0.024)	(0.045)
Health accomplishing	-0.068***	-0.074***	-0.079***	-0.090***	-0.069***	0.081*	-0.069***	0.035	-0.071***	0.038	-0.073***	0.013	-0.065***	-0.016
	(0.025)	(0.024)	(0.024)	(0.023)	(0.025)	(0.044)	(0.025)	(0.035)	(0.025)	(0.067)	(0.025)	(0.034)	(0.025)	(0.049)
Demographic characteristics														
Asian	-0.395***	-0.335***	-0.402***	-0.309***	-0.422***	-0.216**	-0.421***	-0.062	-0.421***	0.237*	-0.407***	0.029	-0.422***	-0.021
	(0.058)	(0.054)	(0.057)	(0.054)	(0.059)	(0.112)	(0.059)	(0.097)	(0.059)	(0.136)	(0.058)	(0.084)	(0.059)	(0.085)
Maori	-0.237***	-0.124***	-0.259***	-0.186***	-0.246***	0.001	-0.249***	-0.144	-0.254***	0.256**	-0.246***	-0.077	-0.251***	-0.047
	(0.046)	(0.045)	(0.046)	(0.045)	(0.047)	(0.092)	(0.047)	(0.093)	(0.047)	(0.106)	(0.047)	(0.073)	(0.047)	(0.098)
Pacific peoples	-0.228***	-0.047	-0.278***	-0.108	-0.254***	0.089	-0.257***	-0.347***	-0.253***	-0.114	-0.264***	-0.015	-0.254***	-0.201
	(0.071)	(0.072)	(0.070)	(0.067)	(0.071)	(0.122)	(0.072)	(0.129)	(0.072)	(0.163)	(0.070)	(0.116)	(0.072)	(0.134)
Male	0.428***	0.758***	0.387***	0.173***	0.404***	-0.126*	0.408***	0.511***	0.408***	0.177**	0.378***	-0.064	0.408***	0.106*
	(0.036)	(0.033)	(0.034)	(0.032)	(0.035)	(0.066)	(0.035)	(0.052)	(0.035)	(0.086)	(0.035)	(0.055)	(0.035)	(0.058)
Partnered	0.315***	0.294***	0.330***	0.249***	0.359***	0.045	0.361***	0.028	0.358***	0.040	0.360***	-0.085	0.358***	0.177***
	(0.037)	(0.035)	(0.037)	(0.034)	(0.037)	(0.075)	(0.037)	(0.057)	(0.038)	(0.097)	(0.037)	(0.066)	(0.037)	(0.069)
Children	-0.288***	-0.350***	-0.227***	-0.179***	-0.257***	-0.073	-0.256***	-0.134**	-0.256***	-0.297***	-0.255***	0.077	-0.255***	0.059
	(0.040)	(0.036)	(0.038)	(0.035)	(0.039)	(0.065)	(0.039)	(0.059)	(0.039)	(0.096)	(0.039)	(0.061)	(0.039)	(0.065)

Table 3 - Bivariate Probit Regression Results (continued)

Variable	*Employed*	*Full Time*	*Employed*	*Permanent*	*Employed*	*Fixed Term*	*Employed*	*Contract*	*Employed*	*Seasonal*	*Employed*	*Casual*	*Employed*	*Other Temp*
Educational qualifications														
Qual school	0.368***	0.293***	0.359***	0.269***	0.379***	0.115	0.382***	0.204**	0.380***	-0.297***	0.375***	-0.033	0.383***	0.166*
	(0.044)	(0.044)	(0.043)	(0.043)	(0.044)	(0.107)	(0.044)	(0.081)	(0.044)	(0.094)	(0.044)	(0.070)	(0.044)	(0.097)
Qual tertiary	0.562***	0.429***	0.523***	0.319***	0.562***	0.446***	0.563***	0.232***	0.564***	-0.495***	0.558***	-0.065	0.565***	0.292***
	(0.052)	(0.050)	(0.051)	(0.049)	(0.053)	(0.119)	(0.053)	(0.090)	(0.053)	(0.131)	(0.052)	(0.087)	(0.053)	(0.103)
Qual postgrad	0.657***	0.563***	0.599***	0.372***	0.653***	0.558***	0.644***	0.243**	0.650***	-0.789***	0.651***	-0.246**	0.654***	0.280**
	(0.073)	(0.067)	(0.072)	(0.064)	(0.075)	(0.130)	(0.075)	(0.101)	(0.075)	(0.219)	(0.075)	(0.108)	(0.075)	(0.124)
Age categories														
15-19	-0.775***	-1.249***	-0.790***	-0.923***	-0.738***	-0.009	-0.745***	-0.544***	-0.748***	0.209	-0.709***	0.523***	-0.750***	-0.079
	(0.080)	(0.085)	(0.079)	(0.080)	(0.080)	(0.179)	(0.080)	(0.170)	(0.080)	(0.200)	(0.080)	(0.121)	(0.080)	(0.148)
20-24	-0.230***	-0.393***	-0.237***	-0.323***	-0.219***	-0.007	-0.228***	-0.737***	-0.228***	0.146	-0.210***	0.615***	-0.234***	0.095
	(0.080)	(0.076)	(0.078)	(0.073)	(0.079)	(0.155)	(0.080)	(0.183)	(0.080)	(0.186)	(0.079)	(0.115)	(0.079)	(0.146)
25-29	-0.069	-0.038	-0.062	0.034	-0.076	0.137	-0.078	-0.311**	-0.079	-0.015	-0.074	0.011	-0.083	-0.408***
	(0.074)	(0.070)	(0.074)	(0.068)	(0.075)	(0.145)	(0.075)	(0.125)	(0.075)	(0.199)	(0.075)	(0.112)	(0.075)	(0.139)
35-39	0.037	0.008	0.061	0.039	0.075	-0.132	0.077	0.186*	0.069	0.152	0.075	-0.001	0.067	-0.171
	(0.067)	(0.062)	(0.067)	(0.063)	(0.068)	(0.124)	(0.068)	(0.103)	(0.068)	(0.170)	(0.068)	(0.112)	(0.068)	(0.117)
40-44	0.180**	0.152**	0.176**	0.092	0.212***	-0.090	0.205***	0.141	0.210***	0.058	0.213***	-0.045	0.209***	0.120
	(0.071)	(0.065)	(0.072)	(0.063)	(0.073)	(0.130)	(0.073)	(0.102)	(0.073)	(0.192)	(0.073)	(0.108)	(0.073)	(0.116)
45-49	0.187***	0.145**	0.200***	0.192***	0.225***	-0.154	0.221***	0.078	0.220***	-0.232	0.219***	-0.061	0.220***	-0.047
	(0.065)	(0.073)	(0.073)	(0.064)	(0.074)	(0.128)	(0.075)	(0.102)	(0.075)	(0.185)	(0.074)	(0.116)	(0.075)	(0.108)
50-54	0.246***	0.144**	0.215***	0.145**	0.271***	-0.207	0.271***	0.091	0.266***	-0.083	0.272***	-0.059	0.270***	0.159
	(0.076)	(0.068)	(0.075)	(0.066)	(0.077)	(0.128)	(0.077)	(0.101)	(0.077)	(0.170)	(0.077)	(0.119)	(0.077)	(0.114)
55-59	0.070	0.020	0.055	0.038	0.097	-0.323**	0.093	0.042	0.096	0.050	0.099	-0.160	0.098	0.276**
	(0.073)	(0.069)	(0.072)	(0.069)	(0.074)	(0.154)	(0.075)	(0.109)	(0.075)	(0.173)	(0.074)	(0.116)	(0.075)	(0.117)
60-64	-0.424***	-0.446***	-0.413***	-0.324***	-0.393***	-0.235*	-0.392***	0.012	-0.398***	-0.275*	-0.391***	0.064	-0.392***	0.141
	(0.076	(0.070)	(0.075)	(0.070)	(0.077)	(0.145)	(0.078)	(0.117)	(0.077)	(0.203)	(0.077)	(0.117)	(0.078)	(0.122)
Constant	0.880***	0.379***	0.878***	0.501***	0.835***	-2.043***	0.831***	-1.967***	0.840***	-1.910***	0.830***	-1.746***	0.835***	-2.418***
	(0.096)	(0.090)	(0.092)	(0.087)	(0.095)	(0.206)	(0.096)	(0.155)	(0.096)	(0.241)	(0.094)	(0.135)	(0.096)	(0.166)
ρ (Rho)	0.998		0.996		0.999		0.876		0.996		0.999		0.999	
χ^2 for LR test of ρ=0	66.215***		44.858***		22.783***		75.435***		15.831***		0.419		5.918**	

Notes: Standard errors are in parentheses; *, ** and *** indicate statistical significance at the 10, 5, and 1 percent levels, respectively. Omitted categories are females, non-partnered, European and other ethnicity, no school qualifications, and age 30-34 years.

Table 4 - Marginal Effects after Biprobit

	Full time	*Permanent*	*Fixed Term*	*Contractor*	*Seasonal*	*Casual*	*Other Temp*
Physical health							
Health limiting	-0.023***	-0.005	-0.003	-0.008**	0.001	0.003	0.002
Pain	-0.004	-0.010	0.001	0.004	0.001	0.002	0.001
Energy	-0.008	-0.009	0.001	-0.00001	0.0003	-0.004	0.008**
Mental health							
Health social	-0.002	-0.001	0.003	-0.002	-0.004***	0.001	-0.002
Depressed	-0.016**	-0.012	-0.004	0.005	-0.002*	0.004	0.003
Health accomplishing	-0.017**	-0.022***	0.006**	0.005	0.001	0.003	-0.0004

Note: *, ** and *** indicate statistical significance at the 10, 5, and 1 percent levels, respectively.

Limitations

The results presented within tables 3 and 4 implicitly assume that the direction of causality is from health status to employment type. However, causation may run in the reverse direction if employment reduces the probability or severity of mental and physical health issues or if being unemployed accentuates an individual's health status.

This issue results in the estimated coefficients being potentially unreliable, as variation in the explanatory variables is not only associated with variation in the employment (outcome variable), but also changes in the error term. Instrumental variables is the most common approach with regard to handling these endogeneity concerns. However, our search of the NZGSS netted no appropriate instrument. A valid instrument would need to be associated with changes in health status, but not lead to changes in employment type (except by the indirect route of health).

Given the possibility of endogeneity impacting our results in tables 3 and 4, we acknowledge this limitation and point out the importance of further NZ surveys that measure health and employment on a longitudinal basis, such that future studies can delve into disentangling the causal pattern at play here.

6. Conclusions

This paper presented an investigation of the relationship between mental and physical health issues and the propensity to be in employment per se and in particular employment types (e.g. full-time, casual, seasonal, etc.)[2]. Separating these two issues is key if appropriate policy is to be formulated to enhance employment rates and understand why there are differences in the likelihood of people with various health conditions being in particular employment contracts. However the vast majority of existing studies jumbled mental health and physical health conditions into one variable. By drawing data from the New Zealand General Social Survey we are able to distinguish between these two different health issues.

[2] There are no specific reasons as to why the results should not be generalizable beyond NZ. However, it should be noted that NZ has not gone down the same route as many European countries – such as Spain, which previously had high rates of employment protection for permanent workers, and have implemented policies in the last two decades to increase the prevalence of temporary contracts, in response to the detrimental effects of recessionary periods.

Our empirical analysis reveals that the majority of health conditions are negatively associated with the likelihood of an individual being in employment and in full time and permanent contracts. Mental health issues in particular stand out as having a significant negative relationship with an individual's propensity to be employed. An important result from the bivariate probit analysis is that while the role of poor health in terms of working full time or being in permanent employment was negative and significant; the role that poor health plays with respect to temporary work is mixed, and appears to usually be small in magnitude.

It is important to recognise that while our empirical analysis has been able to control for both mental and physical health factors, it is beyond the scope of this study to investigate the complicated inter-relationships between physical health and mental health; for instance, it could be the case that mental health influences physical health and then employment. Future analysis is recommended down this track.

Overall, this study signals that public policy employment initiatives need to be aware of the important part played by mental and physical health issues. Promoting the employment opportunities of people with mental health should be a political priority, however the risk is that this is translated into 'any old' work, with little or no thought placed on aspirations, skills and abilities, and potentially forcing people into inappropriate and dissatisfying employment. Dividing people in this way is underpinned yet again by a medicalised view of mental health, with no consideration of the circumstances of employment. As Waddell and Aylward (2005) point out, while work is generally good for physical and mental health, there are major provisos, namely that physical and psychosocial conditions are satisfactory and provide a decent 'human' quality of work, and that work provides adequate financial reward and security.

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The Effect of Job Insecurity on Labour Supply

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Abstract

The aim of this paper is to analyse the effect of job insecurity on labour supply. We propose a discrete choice model of labour supply, in which the choice alternatives are characterised by bundles of income, hours of work and job insecurity. The results show that job insecurity has a negative and significant effect on individuals' utility. Moreover, once job insecurity is included in the discrete choice alternatives, the predictive power of the model improves significantly. Labour supply elasticities are significantly higher than those obtained with a traditional model and increase with the level of job insecurity. Finally, a decrease of job insecurity at work has a positive and significant effect on participation. Policies aimed at improving working conditions could, in this sense, be useful to create incentives in labour market.

Keywords: Discrete choice, Labour supply, Job insecurity

JEL classification: C25, J22, J81

1. Introduction

A considerable body of research has documented the importance of job insecurity as a work domain. At the individual level, job insecurity has been found to negatively affect job satisfaction (Clark, 2010; De Witte, 2005; Hellgreen, *et al*. 1999), as well as physical and mental health (Burgard *et al*. 2009; De Witte, 1999; Dekker and Schaufeli, 1995; Ferrie, 1998). At the organisational level, job insecurity has been shown to be related with higher absenteeism (Chirumbolo and Areni, 2005; Probst, 2002), higher turnover and quit intentions (Clark, 2001; Dekker and Schaufeli, 1995) and less organisational commitment (Hellgreen, *et al*. 1999; Lord and Hartley, 1998; Rosenblatt, *et al*. 1999). However, the effect of job insecurity at a more aggregate level has been less considered in the literature. In this article, we study the effect of job insecurity on labour supply. In particular, we extend traditional discrete choice models of labour supply to incorporate job insecurity in the choice alternatives and compare the estimated labour supply responses to those of a model where only a discrete hours' set characterises job alternatives.

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Discrete choice models of labour supply have become increasingly popular as they facilitate dealing with non-linear and non-convex budget sets as well as accounting for multiple goods in the utility function, compared to the traditional approach based on a continuous set of hours. The idea behind the discrete choice approach is to define a finite number of working hours' alternatives and to explicitly specify a utility function characterising the individual's utility at each of the alternatives of the discrete hours set. The estimation of the discrete choice model provides directly the parameters defining the shape of the utility function.

Most studies, using the discrete labour supply approach, take income and hours of work as the only choice variables affecting individuals' decisions. However, we agree with Dagsvik and Strøm (2006) that 'hours of work and income are only two out of several job related attributes, which are important for individual behaviour in the labour market'. Dagsvik (1994) and Dagsvik and Strøm (1992) propose a model of labour supply which accounts for the importance of qualitative factors of jobs. This model of discrete choice labour supply assumes that the alternatives are characterised by 'job packages' which are defined by a bundle of hours of work, wage rates and other non-pecuniary job attributes. Other studies on labour supply such as Aaberge, Dagsvik and Strøm (1995), Aaberge and Colombino (2013) and Dagsvik and Strøm (2006) use a similar methodology. Dagsvik and Strøm (2006) introduce, for instance, job sector (public or private sector) in their analysis, assuming that jobs in different sectors may differ in terms of non-pecuniary attributes. In a recent paper, Kunze and Suppa (2013) investigate the effect of introducing job characteristics in discrete choice models of labour supply. However, alternatives are defined only over discrete hours' choices, while job characteristics enter the utility function through interactions between income and leisure. Contrary to Kunze and Suppa (2013), in this paper, we propose an extended discrete choice model, where the choice alternatives are characterised by bundles of income, hours of work and job insecurity in order to allow for more flexibility in the choices available to individuals and to analyse the effect of changes in job insecurity on labour supply decisions.

Our contribution to the literature is twofold. First, we provide an extension of discrete choice labour supply models in order to allow for the introduction of non-pecuniary job attributes in the analysis, in our case job insecurity. We analyse how such extension affects labour supply elasticities. Second, we complement the literature on the consequences of job insecurity. In particular, we show that job insecurity has a significant effect on labour supply decisions, which could be of interest in terms of labour market policies based on non-monetary incentives. The paper is structured as follows. Section 2 briefly discussed the nature of job insecurity as a job attribute. Section 3 presents the discrete choice models to be used in our labour supply analysis. First, we present the traditional labour supply model where only hours of work define the choice set. Then, the extended conditional logit is introduced in order to allow the choice set to be characterised by bundles of income, hours of work and job insecurity. Section 4 describes the data and presents some summary statistics. Section 5 presents the estimates of the structural labour supply models. Section 6 discusses labour responses in terms of wage elasticities and changes in the predicted probabilities from a decrease of job insecurity. Finally, section 7 concludes.

2. Job Insecurity as a Job Attribute

Jobs are characterised by multiple attributes, which might affect individuals' labour supply decisions. In this paper, we focus on job insecurity, which has been considered one of the most important domains at work (Clark, 2001 and 2010). Moreover, job insecurity has proved to significantly affect important individuals' outcomes such as well-being (Clark, 2001 and 2010; Green, *et al*. 2013), health (Burgard, *et al*. 2009; Ferrie, 1998) and organizational commitment (Hellgreen, *et al*. 1999; Lord and Hartley, 1998; Rosenblatt, *et al*. 1999).

According to Greenhalgh and Rosenblatt (1984) job insecurity is defined as the perceived powerlessness to maintain the desired job continuity. The idea that job insecurity refers to individuals' perception of their job situation highlights the fact that both a subjective and an objective component characterise this concept. Individuals evaluate their level of job insecurity based on objective information from their jobs. Studies have shown that perceived job insecurity provides reliable information about objective indicators of insecure jobs. In particular, perceived job insecurity is significantly associated with temporary employment and job sector; public sector being considered more secure than the private sector (Campbell, *et al*. 2007; Clark and Postel-Vinay, 2009; Deloffre and Rioux, 2003; Näswall and De Witte, 2003). Moreover, perceived job insecurity has proved to be a good predictor of future unemployment experiences even after controlling for observed objective variables, implying that self-perceived job insecurity contains useful private information about jobs, which is otherwise not directly available in surveys (Campbell, *et al*. 2007; Deloffre and Rioux, 2003). In fact, restructuration such as privatization of formerly public companies, as well as layoffs have been shown to increase self-perceived job insecurity (Ferrie, *et al*. 1995; Nelson, *et al*. 1995).

The particular interpretation of job insecurity information is moreover linked to the formulation of the questions included in surveys. At least three different formulations are used in surveys, which are related to feelings of insecurity ('Do you feel your job is secure?'), satisfaction with job insecurity ('How satisfied are you with your job security?') and the probability of losing a job ('What is the probability that you lose your job in the next (e.g. 12 months?'). Note that the first two formulations, in particular, confound two components of job insecurity discussed in the literature: the probability of job loss and the cost of job loss (Campbell, *et al*. 2007). The variables related to these three types of questions are however highly correlated and all three are significantly associated with objective indicators of insecure jobs. Nevertheless, it is important to keep in mind which type of information is available when interpreting the results.

While acknowledging the particularities related to the concept of job insecurity, in this paper we consider it as a proxy for an indicator of the objective insecurity characterising a job. Throughout our analysis, we discuss the implications of such assumption given the type of information available in the British Household Panel Survey (BHPS) used in our study.

3. Discrete Choice Models of Labour Supply

Discrete choice models of labour supply are particularly popular in the framework of behavioural microsimulation of tax and benefit reforms. In fact, many policies are specifically aimed at encouraging labour market participation of certain population groups. For instance, Brewer, *et al*. (2007) use a structural model of labour supply in order to evaluate the effect of the Working Families Tax Credit on labour market participation in the UK. Moreover, other tax and benefit reforms might also affect individuals' labour supply behaviour, which needs to be taken into account when evaluating the effect of such policies on different outcome variables, such as poverty or inequality.

In this section we describe the model most widely used to estimate discrete choice labour supply, namely the conditional logit model. The model is derived under the assumption of utility maximisation. Consider individual i chooses among a finite number of job alternatives, J. The utility obtained from alternative j is U_{ij}, $j = 1,\ldots,J$. Individual i chooses alternative j if and only if $U_{ij} > U_{ik}, \forall k \neq j$. The utility function can be decomposed in a deterministic and a stochastic component: $U_{ij} = V_{ij} + \varepsilon_{ij}$, where the distribution of the random vector $\varepsilon_i = \{\varepsilon_{i1},\ldots,\varepsilon_{iJ}\}$ is given by $F(\varepsilon_i)$. The probability that a particular alternative j is chosen is:

$$\begin{aligned} P_{ij} &= Prob(U_{ij} > U_{ik}, \forall k \neq j) \\ &= Prob(V_{ij} + \varepsilon_{ij} > V_{ik} + \varepsilon_{ik}, \forall k \neq j) \\ &= Prob(\varepsilon_{ik} < \varepsilon_{ij} + V_{ij} - V_{ik}, \forall k \neq j) \end{aligned}$$

Depending on the specification of the distribution of the random component, different discrete choice models can be obtained. The conditional logit model is obtained assuming that the stochastic component, ε_{ij}, is independent and identically distributed over alternatives and follows a type-one extreme value distribution, given by:

$$F(\varepsilon_i) = e^{-e^{-\varepsilon_{ij}}}$$

Under the conditional logit setup, the probability that alternative j is chosen is given by (McFadden, 1974):

$$\begin{aligned} P_{ij} &= Prob(\varepsilon_{ik} < \varepsilon_{ij} + V_{ij} - V_{ik}, \forall k \neq j) \\ &= \frac{e^{V_{ij}}}{\sum_{k=1}^{J} e^{V_{ik}}} \end{aligned}$$

In our basic model, individuals choose among a finite number of working hours alternatives in order to maximise their utility, defined over net income and hours of work. We assume that the gross wage rates are fixed and independent of the hours of work. The decision is taken given the gross wage rates and the tax and benefit system.

More formally, let h_i be the number of hours worked by individual i. We define J discrete hours alternatives so that h_{ij} represents the number of hours worked by individual i under alternative j, with $j = 1,\ldots,J$. In our basic model, four alternatives are defined, $J = 4$: inactivity, part-time, full-time, overtime. Let y_{ij} be individual i's net income given the hours choice h_{ij} and x_i a vector of individual characteristics. The net income y_{ij}, when $h_i = h_{ij}$ is chosen, is defined as:

$$y_{ij} = w_i h_{ij} + \mu_i + G(w_i, h_{ij}, \mu_i, x_i) \ ,$$

where w_i are gross hourly wage rates, μ_i is non-labour income and the function $G(w_i, h_{ij}, \mu_i, x_i)$ represents the tax-benefit rules which depend on gross wages, hours of work, non-labour income and individual characteristics. Several functional forms can be used to specify the deterministic part of the utility function. Following Keane and Moffitt (1998) and Brewer *et al*. (2007), we define it as a second order polynomial. In our basic conditional logit model, the deterministic part of the utility function is given by:

$$V(y_{ij}, h_{ij}, x_i) = \alpha_{yy} y_{ij}^2 + \alpha_{hh} h_{ij}^2 + \alpha_{yh} y_{ij} h_{ij} + \alpha_y y_{ij} + \alpha_h(x_i) h_{ij} \ ,$$

where we account for observed heterogeneity in preferences for hours of work through interactions with personal characteristics:

$$\alpha_h(x_i) = \alpha_{h0} + \alpha'_{hx} x_i$$

In our extended model, job insecurity is introduced as a non-pecuniary job attribute affecting labour supply. Three job insecurity levels are defined characterising low, middle and high job insecurity. A total of ten alternatives are available representing inactivity and combinations of hours of work and job insecurity levels. More formally, let s_{ij}, represent the level of job insecurity of individual *i* under alternative *j*. The deterministic part of the utility function, in our extended model is given by:

$$\begin{aligned} V(y_{ij}, h_{ij}, x_i) = {} & \alpha_{yy} y_{ij}^2 + \alpha_{hh} h_{ij}^2 + \alpha_{ss} s_{ij}^2 + \alpha_{yh} y_{ij} h_{ij} + \alpha_{ys} y_{ij} s_{ij} + \alpha_{hs} h_{ij} s_{ij} + \alpha_y y_{ij} \\ & + \alpha_h(x_i) h_{ij} + \alpha_s(x_i) s_{ij} \ , \end{aligned}$$

where we allow for observed preferences heterogeneity for hours of work and job insecurity:

$$\alpha_h(x_i) = \alpha_{h0} + \alpha'_{hx} x_i$$
$$\alpha_s(x_i) = \alpha_{s0} + \alpha'_{sx} x_i$$

Unobserved heterogeneity in preferences could also be accounted for by introducing random terms in $\alpha_h(x_i)$ and $\alpha_s(x_i)$ (see, Train, 1998 and Train, 2003). However, in our empirical analysis, unobserved heterogeneity in preferences is not accounted for given the small size of our sample. The sample likelihood function for the conditional logit model is given by:

$$L = \prod_{i=1}^{N} \prod_{j=1}^{J} [P_{ij}(y_{ij}, h_{ij}, x_i)]^{d_{ij}}$$

where d_{ij} is a dummy equal to one if individual *i* chooses alternative *j* and zero otherwise.

Note that in order to construct the discrete choice alternatives in labour supply

models it is usually assumed that gross hourly wages are fixed and independent of hours of work.[1] While independence between wages and hours of work is generally accepted in the structural labour supply literature, in our extended models the relationship between wages and job insecurity deserves more attention. In fact, if job insecurity is considered a disamenity some sort of compensating wage differentials might exist for jobs with higher insecurity, which would need to be taken into account in our labour supply model.[2] For instance, consider an individual currently in a job with low job insecurity, in order to construct all her possible choice alternatives, we need to define what would be her wage under the alternative of middle and high insecurity. In this study, we take into account the relationship between wages and job insecurity by randomly assigning wages by education groups from the wage distribution, as will be explained in section 4.

4. Data

Our analysis uses data from wave ten of the British Household Panel Survey containing information for years 2000 and 2001. The BHPS is a nationally representative survey for the United Kingdom, which provides information about individual and household characteristics, wages, other income sources and working conditions. We limit our analysis to wave ten of the BHPS because of the need of developing a detailed tax and benefit microsimulation model to calculate disposable income for each discrete hour alternative. Our microsimulation model is based on EUROMOD version 21A, which simulates tax-benefit rules for the UK in 2001 (see, Sutherland and Gutierrez, 2004). Wave ten of the BHPS contains 15,603 individuals, however, we restrict our analysis to single females, who gave full interview. This restriction is made for two reasons. First, focusing on single individuals enables us to neglect interactions within the household in the context of labour supply. Second, the sample of single males is too small for the estimation of the models and a joint estimation of males and females might bias the results for women. As it is usually done in the literature, we further exclude individuals in self-employment because their labour supply decisions may differ considerably from those of salaried workers and their income information from surveys is considered less reliable than for employees. Disabled individuals, full-time students and pensioners are also excluded in order to keep only those individuals available for the labour market. This leaves us with a sample of 750 females.

Before restricting our analysis to our sample of interest we need to treat the problem of non-observed wages for non-workers. We do this by estimating a two-step Heckman selection model for women, using the whole sample of females (N=8,035). The wage equation depends on variables related to human capital, such as age and education as well as region dummies to control for differences in labour markets. The selection equation is based on the usual exclusion restrictions for identification where, in additional to the previous, non-labour income, being married and having children of different ages are included as variables (see, Van Soest, 1995; Haan, 2010; Bargain, *et al*. 2014). The results of the estimation are shown in table 1.

[1] Some exceptions are studies by Aaberge and co-authors. See, for instance, Aaberge and Colombino (2013).
[2] For a discussion about compensating wage differentials see, Rosen (1987).

Table 1 - Heckman Selection Model for Females

	coef.	*st. error*
log hourly wage equation		
age	0.0590 ***	(0.0037)
age^2	-0.0007 ***	(4.82e-5)
cse	0.146 ***	(0.0321)
o-levels	0.224 ***	(0.0253)
a-levels	0.340 ***	(0.0285)
higher degree	0.455 ***	(0.0251)
university degree	0.818 ***	(0.0284)
constant	0.368 ***	(0.0787)
selection equation		
age	0.148 ***	(0.0073)
age^2	-0.002 ***	(8.61e-5)
cse	0.203 ***	(0.0682)
o-level	0.442 ***	(0.0537)
a-level	0.437 ***	(0.0637)
higher degree	0.601 ***	(0.053)
university degree	0.573 ***	(0.0655)
non-labour income	-0.0014 ***	(6.28e-5)
married	-0.188 ***	(0.0414)
child (0-2)	-0.464 ***	(0.0613)
child (3-4)	-0.381 ***	(0.0614)
child (5-11)	-0.183 ***	(0.0436)
child (12-15)	-0.0334	(0.0456)
constant	-1.911 ***	(0.152)
lambda	0.0729 ***	(0.0254)
Observations	8,035	

Note: Region dummies included in the wage and selection Equations.

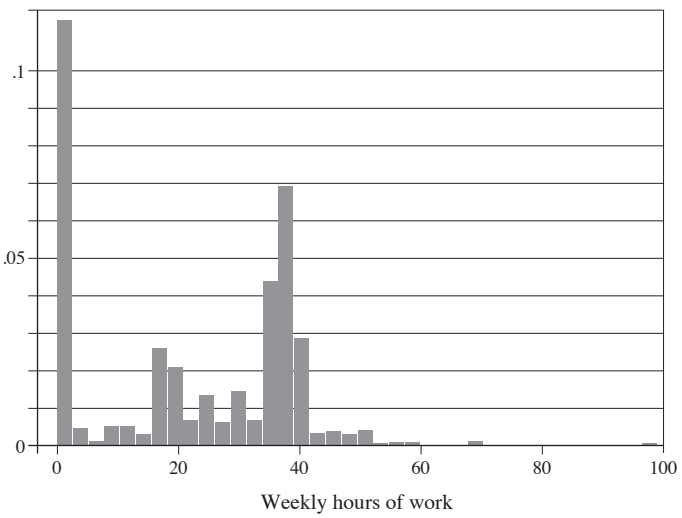
Most variables present the expected signs, both in the selection and in the wage equations. In particular, wages and the probability of participation increase with age at a decreasing rate. The higher the level of education, the higher the probability of participation and the higher the wage. Being married decreases the probability of participation for women, as expected. Participation is lower with the presence of young children in the household and these effects are significant. Non-labour income has the expected negative and significant effect on participation. Finally, the coefficient for the inverse Mill's ratio (lambda) is positive and significant, implying a selectivity and therefore that the observed wages are higher than the wage offers of a random sample.

Using the results obtained from the Heckman selection model, gross hourly wages are imputed for non-workers. Once the information on gross hourly wages is available for all individuals, we need to calculate the disposable income for each discrete hour alternative. As previously mentioned, disposable income is calculated using our own tax and benefit microsimulation model for the BHPS, based on EUROMOD version 21A. Eleven tax and benefit rules are simulated: minimum wage, national insurance employee contributions, contributory job seekers allowance, winter fuel allowance, income tax, children's tax credit, child benefit, working families tax

credit, income support, housing benefit and council tax benefit. Other benefits are not simulated but are included in the calculation of disposable income.[3]

Consider now the distribution of weekly hours of women in our sample, presented in figure 1. Important peaks are observed for inactivity and full-time work (around 40 hours per week), as well as a small peak for part-time work (around 20 hours per week). Taking this into consideration, we define four discrete hours points, characterising inactivity, part-time work, full-time work and overtime work: h={0,20,40,55} which correspond to the intervals {0–5,6–34,35–45,>45}. These discrete hours points represent the set of alternatives in our basic model.

Figure 1 - Distribution of Female Weekly Hours of Work



In the extended model, job insecurity is used as a non-pecuniary job attribute to be included in the job choice bundle. The BHPS provides information concerning satisfaction with job security at work. Job security takes values between 1 and 7 with 1 representing that the individual is 'not satisfied at all' with job security at work and 7, that the individual is 'completely satisfied'. As discussed in section 2, despite the subjective nature of this variable self-perceived job insecurity is associated with objective indicators of insecure jobs, such as temporary contracts (Campbell *et al*. 2007; Clark and Postel-Vinay, 2009; Deloffre and Rioux, 2003; Näswall and De Witte, 2003). Moreover, satisfaction with job insecurity is correlated with other type of information about self-perceived job insecurity, such as the likelihood of becoming unemployed. For our extended labour supply model, we generate a job insecurity variable taking values 2, 4 and 6, where 2 represents 'low job insecurity' (values 5 to 7 from the original variable; satisfied with job security), 4 represents 'middle job

[3] A detailed description of the tax and benefit microsimulation model for the BHPS can be made available on request from the author.

insecurity' (value 4 from the original variable; neither satisfied nor dissatisfied) and 6 'high job insecurity' (values 1 to 3 from the original variable; dissatisfied with job security). By regrouping the original values in such way, we expect to capture better those individuals in insecure jobs (those dissatisfied with their job security) and at the same time this allows us to save computational time by reducing the number of choice alternatives. Ten discrete choice alternatives are therefore defined for the extended model, representing bundles of hours of work and job insecurity: (*hours, insecurity*), where *hours* = {0,20,40,55} and *insecurity* = {2,4,6}.[4] Descriptive statistics of the variables used in our labour supply model are presented in table 2.

Table 2 - Descriptive Statistics of the Labour Supply Sample

	mean	*std. dev.*
Net income (£ per week)	250.41	113.75
Hours of work (per week)	21.86	16.93
Age	37.71	10.57
No qualification	0.179	0.383
Certificate of Secondary Education (CSE)	0.095	0.293
O-levels	0.207	0.405
A-levels	0.097	0.297
Higher degree	0.279	0.449
University degree	0.144	0.351
Children aged 0-2	0.065	0.247
Children aged 3-4	0.103	0.304
Children aged 5-11	0.333	0.472
Children aged 12-18	0.256	0.437
Job insecurity	2.651	1.392
low job insecurity (2)	0.579	0.494
mid. job insecurity (4)	0.044	0.205
high job insecurity (6)	0.095	0.293
Number of observations	750	

As mentioned in the previous section, in order to construct the discrete choice alternatives in our extended labour supply models, we need to consider the relationship between wages and job insecurity. In the data, for each individual we observe a gross hourly wage and a particular level of job insecurity. In order to define the wage rate related to other levels of job insecurity, we first impute wages by randomly assigning from the wage distribution of individuals with the same level of education but which are observed in a different job insecurity group. In this way, for each individual in our sample we obtain three gross hourly wage rates related to low, middle and high job insecurity. The average hourly wages for each level of insecurity are presented in the table 3. We observe that on average wages increase with the level of job insecurity, which is in line with the idea of compensating wage differentials (see, Rosen, 1987).

[4] The results are robust for different values of discrete hours of work and job insecurity.

Table 3 - Average Gross Hourly Wages by Job Insecurity Level (£ /hour)

	mean	*std. dev.*
Low job insecurity	8.1525	5.5656
Middle job insecurity	8.1737	5.1319
High job insecurity	8.2691	4.8355

The gross hourly wages related to different levels of job insecurity are then constructed with respect to the average gross hourly wages of the whole population. Consider for instance that the job of individual i is characterised by a gross hourly wage w_i and a low level of job insecurity. The gross hourly wage of individual i under middle job insecurity will then be given by $w_i + w_i(8.1737–8.15250)/8.1525$ and under high insecurity by $w_i + w_i(8.2691–8.15250)/8.1525$.

Table 4 provides summary statistics for each discrete hours alternative of our sample of interest. As previously mentioned, the two main groups are full-time employment and inactivity. Average age is slightly higher in the part-time and overtime work groups. The inactivity group presents the lowest percentage of individuals with higher education. In particular, only 24.26 per cent of the inactives have higher education, compared to 68.75 per cent, in overtime work. Finally, in terms of job insecurity, the percentage of women dissatisfied with their job security situation is the highest for overtime jobs.

Table 4 - Discrete Employment Statistics

Hours per week	*Share (%)*	*Age*	*Higher Education (%)*	*Net income per week*	*Job Insecurity (% dissatisfied)*
0	31.33	36.49	24.26	203.4	-
20	27.87	38.92	39.71	221.66	11.96
40	36.53	37.67	56.57	304.3	13.87
55	4.27	39.13	68.75	322.08	18.75

5. Estimation of the Labour Supply Models

This section presents the results of the structural labour supply estimation. Two models are estimated and compared. The first model is the conditional logit model traditionally used in the discrete choice literature to estimate labour supply, in which only discrete hours alternatives define the choice set. The second model consists of an extension to the basic conditional logit model, where the choice set is now defined by combinations of hours of work and job insecurity and where job insecurity is set to zero for the inactives.[5] In both models, age, higher education dummies and dummies for children of different ages are used as regressors to account for observed heterogeneity in preferences. Table 5 presents the estimated parameters for these models.

[5] A nested logit model was also estimated, in which alternatives are grouped into two nests representing inactivity and participation. The inactivity nest contains a single alternative while the participation nest is formed by alternatives characterised by bundles of hours of work and job insecurity. The results obtained with the nested logit model are similar to those presented in the paper.

Table 5 - Estimated Parameters of the Structural Model

	Conditional Logit: Hours		*Conditional Logit: Insecurity*	
Variable	*Coef.*	*St. Error*	*Coef.*	*St. Error*
Income^2	-5.46	(4.048)	-6.094	(4.243)
Income	12.244***	(2.121)	9.992***	(2.17)
Hours^2	-0.146***	(0.186)	-0.548***	(0.407)
Insecurity^2	-	-	0.317***	(0.031)
Income × hours	-0.941**	(0.465)	-0.428	(0.509)
Income × insecurity	-	-	0.062	(0.283)
Hours × insecurity	-	-	0.003	(0.032)
Hours	1.013***	(0.149)	3.941***	(0.273)
× age	-0.087***	(0.025)	-0.133***	(0.031)
× high edu.	0.262***	(0.054)	0.249***	(0.064)
× child 0-2	-0.783***	(0.146)	-0.681***	(0.208)
× child 3-4	-0.544***	(0.103)	-0.567***	(0.134)
× child 5-11	-0.326***	(0.059)	-0.426***	(0.073)
× child 12-18	-0.100*	(0.058)	-0.091	(0.071)
Insecurity	-	-	-3.309***	(0.258)
× age	-	-	0.067**	(0.03)
× high edu.	-	-	-0.008	(0.054)
× child 0-2	-	-	-0.062	(0.203)
× child 3-4	-	-	0.078	(0.122)
× child 5-11	-	-	0.126*	(0.068)
× child 12-18	-	-	-0.05	(0.069
Pseudo R-squared	0.1308		0.1772	

Notes: The main variables have been rescaled as follows: income/1000; hours/10; age/10. Standard errors in parentheses. *p<0.05, **p<0.01, ***p<0.001

In general our results are in line with our expectations and coefficients across the models estimated go in the same direction. For both models, marginal utility of income is positive for over 99 per cent of observations and as the coefficient of income square is negative, concavity in income for the utility function is respected. Marginal utility of hours of work is negative for around 78 per cent of observations in the basic labour supply model, while under the extended model this holds for a slightly lower percentage of cases, of around 70 per cent. Turning to job insecurity, marginal utility is negative for around 90 per cent of observations in our extended model. Moreover, the estimated effects of job insecurity are significant, confirming the importance of accounting for non-pecuniary job attributes on labour supply.

In line with our expectations, single women with young children have lower preferences for work and these effects are significant in both models estimated. In particular, the strongest negative effect is for women with very young children aged under three years old. Similarly, for both the basic and extended model, individuals with higher education have higher preferences for work and the interaction between hours of work and age presents a negative and significant coefficient. Turning to job insecurity, we remark that only the interaction with age presents a significant

coefficient, with preferences for job insecurity decreasing with age. Women with children aged less than three years old present lower preferences for job insecurity, as expected, however, the effect is not significant.

The ability of our models to fit the data can be tested by comparing predicted and observed frequencies. Predicted frequencies are obtained by averaging up individual probabilities for each discrete hours alternative over the whole sample, while observed frequencies are simply the frequencies of each observed choice over the whole sample. Table 6 shows that the basic conditional logit, where only hours of work define the choice set, performs poorly in terms of fitting the data. Full-time is considerably underestimated and part-time is strongly overestimated. These results are in line with the literature, where such problems have been treated mainly by adding alternative specific dummies (Van Soest, 1995) or fixed costs of work (Blundell *et al*. 2000). Here we consider whether the additional information in terms of job characteristics serves to improve the predictive power of the model. This seems to be the case, as the introduction of job insecurity into the model improves considerably the fit of the data. Additionally, as shown in table 5, the pseudo-R-squared or Likelihood Ratio Index of McFadden (1974) is higher for our extended labour supply model, confirming that it provides a better fit than the basic model.

Table 6 - Observed vs. Predicted Frequencies

		Predicted	
Alternatives	*Observed*	*Conditional logit: Hours*	*Conditional logit: Insecurity*
Inactivity	31.33	28.19	32.00
Part-time	27.87	37.19	25.77
Full-time	36.53	25.97	38.93
Overtime	4.27	8.66	3.30
Inactivity	31.33	-	32.00
Part-time			
low insecurity	22.93	-	20.11
mid. insecurity	1.60	-	2.28
high insecurity	3.33	-	3.38
Full-time			
low insecurity	29.2	-	30.76
mid. insecurity	2.27	-	3.36
high insecurity	5.07	-	4.81
Overtime			
low insecurity	3.33	-	2.64
mid. insecurity	0.13	-	0.28
high insecurity	0.80	-	0.38

The introduction of job insecurity as an additional job attribute in the labour supply model raises the issue of omitted variables bias. As shown in the results, job insecurity has a significant effect and improves the fit of the model. Other relevant job attributes could potentially influence labour supply decisions and leaving them out could bias the parameter estimates. It is clear that the extension of the model is

limited to the availability of information in the data. In our case, the choice of job insecurity was not only related to this limitation but also to the literature reporting the importance of job security as a work domain (Clark, 2001 and 2010). Therefore, despite incorporating only an additional dimension of work into the model, we consider job insecurity is one of the important dimensions to account for. In the same line, in terms of model specification, the introduction of additional job attributes in the labour supply model raises the question of the relevance of the assumption of independence of irrelevant alternatives (IIA), underlying the conditional logit model. In order to test the restriction imposed by the IIA assumption, we estimated a nested logit model for both our basic and extended labour supply models. Alternatives were grouped into two nests representing inactivity and participation. The nested logit model partially relaxes the IIA assumption by allowing correlation between the choices inside each nest (see, Train, 2003). The results of the nested logit models are similar to those of the conditional logit models presented in the paper.[6]

6. Labour Supply Elasticities and Responses to Changes in Job Insecurity

The parameter estimates obtained in the previous section can be used to calculate labour supply elasticities and to analyse the effects of policy reforms on participation and labour supply. The aim of this section is twofold. First, wage elasticities obtained with our models are compared. Then, using our extended model, we analyse the effect of a change in job insecurity on labour supply.

Labour supply elasticities in discrete choice models are calculated numerically using the estimated parameters of the utility function (see, Creedy and Kalb, 2005). First, we increase gross hourly wages by one per cent and compute the new disposable income for each alternative using our tax and benefit microsimulation model. Then, with the parameters from the utility function, obtained in the previous estimation, we calculate the average simulated probability of being at each alternative for both the old and the new value of disposable income. These probabilities are then used to compute the expected value of labour supply before and after the wage increase, following:

$$E[h|y,x]=\sum_{j=1}^{J} P_{ij}h_j$$

Finally, labour supply elasticities are computed numerically by dividing the percentage change in expected labour supply by the percentage change in wages, one per cent in this case. Table 7 shows the elasticities derived from our labour supply models.

[6] Results are not reported here but can be made available upon request from the author.

Table 7 - Labour Supply Elasticities

	Conditional logit: Hours	*Conditional Logit: Insecurity*
Total	0.126	0.153*
Low job insecurity	-	0.141*
Middle job insecurity	-	0.158*
High job insecurity	-	0.158*

*significantly different than the elasticity of the basic conditional logit

The calculated labour supply elasticities are quite in line with previous studies. In fact, elasticities for single females are in general between 0 and 0.7 (Bargain *et al*. 2012). Our basic conditional logit model provides a labour supply elasticity of 0.126, while our extended labour supply model provides a higher elasticity of 0.153. The statistical significance of the difference in elasticities is confirmed using bootstrapping techniques with 1,000 repetitions. In our extended conditional logit model, a further distinction can be made by calculating elasticities for different levels of job insecurity. Labour supply elasticities are lower under low job insecurity compared to middle and high insecurity. This result suggests that wage increases would have weaker effects for women facing good conditions at work, in terms of job security. However, bootstrapping techniques show no significant differences between elasticities for low job insecurity and high job insecurity. This might be related to the small sample of individuals in high insecurity jobs.

In addition to the calculation of labour supply elasticities, our extended model allows us to analyse the effect of job insecurity on labour supply. However, because of the qualitative nature of our job insecurity variable, the same methodology used to calculate wage elasticities cannot be applied. Here we simulate the effect of a decrease of job insecurity by observing the change in predicted probabilities calculated by our model. We decrease levels of job insecurity by the equivalent of one standard deviation of job insecurity (std. dev. 1.392) for individuals with middle and high insecurity. Table 8 presents the predicted probabilities calculated with our model before and after the decrease in job insecurity.

Table 8 - The Effect of a Decrease in Job Insecurity

	Predicted Probabilities Conditional Logit: Insecurity	
	Before	*After*
Inactivity	32.00	29.52
Part-time	25.77	27.02
Full-time	38.93	40.09
Overtime	3.30	3.37

Our results show that a decrease in job insecurity has a positive effect on participation. In fact, the probability of inactivity decreases by around 2.5 percentage points. All working alternatives present an increase, the most important being for part-time and full-time employment. This result is particularly interesting in terms of policy because objectives aimed at providing incentives for participation could also be achieved through the channel of improving non-pecuniary job attributes, and not only through monetary incentives. In order to have an idea of the magnitude that the decrease in inactivity represents, we calculated the increase in overall gross wages necessary to obtain an equivalent decrease in inactivity. An increase in overall gross wages of around 20 per cent would be needed in order to obtain a similar decrease in the probability of inactivity.

These results provide an interesting insight into the effect of non-pecuniary job attributes on labour supply, however, it is important to remark that this labour supply model does not take into account the reaction of firms to policies aimed at improving working conditions. In fact, from the demand side, providing better working conditions might represent additional costs which could be linked to a decrease in wages. This would result in a negative effect of labour supply and therefore the total effect would be ambiguous. The incorporation of labour demand within our setting represents, in this sense, an important step for future research.

7. Conclusion

The aim of this paper was to provide an insight into the effect of non-pecuniary job attributes on labour supply. Two models were estimated and compared. First, we estimated a conditional logit model where the choice set is defined only in terms of discrete hours alternatives. This is the approach most widely used to estimate discrete choice labour supply. Then, we proposed an extension to the model in which the choice set is characterised by bundles of income, hours of work and job characteristics; job insecurity in our case. The estimation of these structural labour supply models was done using maximum likelihood.

Different observations can be drawn from our results. First of all, as expected, job insecurity has a negative effect on individuals' utility, with a calculated marginal utility which is negative for around 90 per cent of the observations. Second, the predictive power of the model improves considerably when job insecurity is included as an attribute of choice, compared to the basic conditional logit model without alternative specific dummies or fixed costs of work. Third, labour supply elasticities calculated with the extended labour supply model are higher than those of the traditional conditional logit model and these differences are significant. Moreover, wage elasticities for women working under low job insecurity are lower than those of females in middle and high insecurity jobs implying that individuals working under good job security conditions would respond less to wage changes. Finally, our results contribute to the literature on the effects of job insecurity, showing that a decrease of job insecurity decreases the probability of inactivity by around 2.5 percentage points. This result is particularly interesting as it suggests that policies aimed at improving working conditions could be used to create incentives for labour market participation.

An important aspect behind our results is the use of self-reported working conditions, in our case self-perceived job insecurity. This is the type of information available in most household surveys. While perceived job insecurity has been shown to be associated with objective indicators of insecure jobs, it is important to keep in mind that a subjective component characterises such measures. In particular, it could be the case, for some individuals, that an improvement in objective job security factors would not be reflected in a better subjective perception of job security. For this reason, the findings obtained in this study should be contrasted with future analysis using objective measures of working conditions. In the case of job insecurity, for instance, an indicator of objective insecurity could be constructed based on information concerning temporary employment, sector of work, presence of job security guarantees at the firm level (available from linked employer-employee data), among others.

To conclude, we believe that the incorporation of working conditions in the analysis of labour supply offers potential opportunities for future research. In particular, multiple factors characterise jobs therefore a better understanding of the main attributes influencing labour market participation could be useful from a policy perspective. Moreover, it should be possible to consider to which extent (if any) incorporating job attributes in behavioural microsimulation models affects ex-ante evaluations of policy reforms. Finally, from a methodological point of view, the incorporation of additional job attributes highlights the importance of accounting for possible correlations between wages and job characteristics as part of the analysis of labour supply.

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Isolating the Determinants of Temporary Agency Worker Use by Firms: An Analysis of Temporary Agency Workers in Australian Aged Care

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Abstract

Despite a reasonable amount of literature on firms' reasons for using agency workers we contend that the firms which are users of agency workers are not well understood. Temporary agency work is interesting in the context of understanding the functioning of labour markets. Temporary agency work is of particular interest in Australia which already has a high level of casual employment offering employers considerable flexibility in managing their workforce by other means. We use a unique Australian employer survey in an industry with a higher than usual share of agency workers in the constrained worker supply context, to highlight and explore the differentiating features between those firms that do and do not use agency workers. The analysis enables better identification of the economic conditions under which firms use agency workers. We gain insight into aspects of the aged care sector that encourage temporary agency worker usage by firms.

Keywords: Temporary agency workers; Labour demand; Forms of employment

JEL classification: J01, J23, J40

1. Introduction

This paper considers the use of temporary agency workers by firms in the Australian residential aged care sector. The purpose is to characterise firms and their usage of temporary agency workers within the Australian residential aged care sector. The value of this is two-fold. Firstly, research interest in non-traditional employment relationships continues as traditional forms of employment are being replaced by more temporary forms of employment, often with less direct relationships between organisations and the people who undertake work on their behalf. Secondly, the aim

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of this research is to better identify the economic and institutional reasons for why firms might want this more temporary relationship. The empirical focus on residential aged care is valuable to this aim because as the Australian population ages there is increasing demand for aged care services with pressure placed on the provision of care services. Of central interest to this research is the attendant problem for the firms of sourcing a sustainable workforce, as this gives a specific lens to understanding how temporary agency workers fit within the range of firms' solutions for their workforce problems. The further value of the Australian aged care sector for our research is that not only does Australia have a high use of temporary workers, including temporary agency workers, but within the aged care sector the scale of agency worker use is quite high, compared to internationally. The research question we address is what sorts of firms adopt this workforce solution, as this can be of benefit to better comprehend this component of the modern labour market. As well, this research provides some insight into what conditions of the aged care sector encourage temporary worker usage by firms. Consequently, in joining together these two areas, this paper provides a useful empirical contribution to a better understanding of both the nature of temporary agency worker use in the Australian aged care workforce and also of the drivers of this component of non-traditional employment.

We organise the paper as follows. We initially present a background to the research. In doing so, we clarify some of the special aspects of temporary agency work. This is followed by a brief overview of existing literature on temporary agency work. This review has a separate subsection specifically representing the firms' motivations for temporary agency worker use which we focus upon in our later empirical sections. This subsection explores in detail what is known about firm motivations for the use of temporary agency workers. We reflect that the evidence is thin and overly generalised about the reasons for employers' use of temporary agency workers.

We then present arguments as to why empirical analysis of Australian agency worker use in aged care reveals a compelling story. Subsequent sections present the empirical analysis of the features of Australian aged care firms using agency workers. Finally, we discuss the findings in the context of the literature to date and draw some conclusions.

2. Background

What is Interesting about Temporary Agency Work?

Temporary agency work is interesting. It is part of the framework of the functioning of labour markets where it is often seen as a segment of the construct of 'employment flexibility' and non-traditional forms of employment.

There is a distinctive aspect of temporary agency work which is often misunderstood. Temporary agency work can be particularly curious amongst the variety of temporary work forms because of the triangular contractual relationship that exists. Agencies supply temporary workers on a contract basis to other 'host firms'. The agency workers remain on the payroll of the supply firm (the 'agency') but work for and are under the supervision of the client 'host' firm. The agency receives a fee for its services above the wage paid to the agency worker. These bilateral contractual arrangements between the agency and the host firms and between the agency and the agency workers allow for easy adjustment at short notice. Agency workers are

external employees because they are hired by one organisation (the temporary work agency) in order to work in another organisation (client organisation) at a profit. While administrative control is with the agency, the client organisation supervises and directs the immediate work carried out by the agency worker.

Literature

There are several key strands which we identify in the literature on temporary agency workers to date. We define four strands to the literature on temporary agency workers which focus: (1) on defining this form as non-traditional employment, (2) the agency worker perspective, (3) the cross-over between the workers and firm outcomes, and finally (4) the firms' reasons for agency worker use.

Non-traditional Employment

One key initial strand of the temporary agency worker research to date stems from the contrast between this form of employment and the traditional regular employment relationship. The traditional employment contract, including that for part-time work, is an agreement between the employee and the employer which involves an expectation of an ongoing relationship, even though either party might terminate the relationship at any time. In contrast, temporary agency workers expect and are expected to be temporary. Much literature has been devoted to identification and acknowledgement of the existence of this non-traditional form of employment, pointing out the existence, size or growth of temporary agency worker numbers, see for an example Purcell (1998). The terminology in the earlier literature about temporary agency work encompasses terms such as externalisation, outsourcing and contracting out, as outside contractors in market-mediated work arrangements were included together with temporary workers in the contracting out of business support services and subcontracting, Abraham *et al*. (1993); Abraham *et al*. (1996). The terms were linked because they involved the use of external workers (outsiders) to perform tasks that in principle could have been done by the firm's regular employees. Temporary agency work has also been referred to as 'temporary help employment' and grouped early on with part-time work under the term 'contingent work'.[1] Labour hire and on-hire have also been used to refer to temporary agency work, and Hall (2000, p.24) points out that it falls into the context of non-standard employment forms (atypical employment). Some literature further links temporary agency work to the 'casualisation' of work, Lumley *et al*. (2004).

Agency Worker Perspective and the Worker Outcomes

A second strand of temporary agency work literature focuses on the agency worker perspective and the worker outcomes for this variation from the traditional employment nature. In their extensive review, Connelly and Gallagher (2004, p.963) reflect that temporary agency worker areas of research cover exploration across the range of agency worker commitment, job satisfaction, role conflict/ambiguity, volition, perceived organisational support, justice/unfair treatment, organisational/citizenship behaviours, wellbeing, work-family conflict, performance, psychological contracts,

[1] Belous (1989) cited in Abraham *et al*. (1993, p.1).

integration/trust and knowledge-sharing. In this agency worker perspective strand, human capital theory and labour market segmentation are variously used to address why workers undertake temporary agency work under certain conditions. Some argue that agency workers have either selected this from a range of job options or have been matched to it by the sorting of skills in the labour market. Workers with marginal commitments to the labour market, generally identified in this literature as being mainly married women with children, young people and older people, select temporary agency work over other employment options, motivated by a need or desire for the flexibility accorded by this form of work, Coe *et al*. (2010, p.1,060). However, this view is contested and in contrast the labour market segmentation literature focuses on constrained choices and that these same groups of women, young people and older workers cannot access regular work, Purcell *et al*. (2004); Forde *et al*. (2005); Stanworth *et al*. (2006); Drago *et al*. (2009). This aspect further links to the flexibility-hours mismatch literature which suggests that identifying mismatch empirically for those workers that are the most likely to be in a mismatched job reflects the constraint rather than the choice, Altonji *et al*. (1985); Golden (2001); Boheim *et al*. (2003); Reynolds *et al*. (2006).

The issues of constraint and choice from the worker perspective also demonstrate that worker preferences must be examined in order to understand individual workers and agency work. Bernasek *et al*. (1999) provided some early survey information from a US contingent worker supplement to the general Current Population survey (the contingent worker category is broader than just agency workers), which were split into those preferring this type of work and those not. They found strong variation by this split, with those preferring this type of work differing clearly in personal and job characteristics from those not preferring contingent work. This split between constraint and choice or preference, and what this means, is found again in Brennan *et al*. (2003, p.91) where it was found that 64 per cent of Australian temporary agency workers surveyed felt they had a choice about temporary agency work but also that 60 per cent would prefer to be employed directly.

In the more recent literature for this strand, it is concluded that preference, volition or intent plays a key role in influencing the outcomes for workers Krausz (2000); Isaakson *et al*. (2002); Parker *et al*. (2002); Rodriguez (2002); Cuyper *et al*. (2007)[2]. Individuals preferring temporary employment (voluntary temporaries) are likely to respond in a more favourable way, and so the self-reported attitudes, wellbeing and behavioural outcomes are a function less of the status (temporary agency worker or regular employee) and more of the preference for the status or not. However, when constrained choice of contract occurs as in many labour markets, volition is unlikely to fully explain outcomes. The motives for accepting temporary agency employment then need to be investigated more than just contract preference and this has limited the evidence about volition, Cuyper *et al*. (2007).

Taken together, these aspects of constrained choice and preferences of the workers suggest that firms and their motivations for using agency worker forms of employment may dominate the market supply and demand for each type of employment

[2] Buddelmeyer *et al*. (2013) examine job satisfaction for contingent agency workers but the data and analysis do not reflect preference, volition or motives.

form in certain situations. This domination then leads to the workers having less discretion over their employment terms such as the form of employment contract. For this reason, we pursue the firm and the features of the firms using agency workers in our subsequent empirical analysis.

A further subdivision of agency worker perspective in the literature develops upon the concept of the interaction between the agency workers and the standard workers. The consequential outcomes derived from temporary agency worker use in this literature stem from the interaction between agency workers and standard workers, resulting in the standard workers outcomes being affected, Allan (2000); Ward *et al*. (2001); Davis-Blake *et al*. (2003); George (2003); Purcell *et al*. (2004); Hoque *et al*. (2008); Banerjee *et al*. (2012); Bryson (2013)[3]. The presence of agency workers can stir up negative emotions among internal standard employees, Allan (2000), and cause a deterioration in relations between co-workers and between management and co-workers, Chen *et al*. (2009); Davis-Blake *et al*. (2003). Given their temporary membership of client organisations, agency workers often lack the organisation-specific knowledge necessary to carry out the work as efficiently as standard employees, Allan (2000); Ward *et al*. (2001); Purcell *et al*. (2004); Hoque *et al*. (2008). There is some evidence standard employees adapt by taking on higher workloads thereby increasing their stress, Ward *et al*. (2001); Hoque and Kirkpatrick (2008), and are put in a position of being informal supervisors, Broschak *et al*. (2006); Hoque *et al*. (2008), which raises stress and workload for the standard employees Allan (2000); Ward, *et al*. (2001); Purcell *et al*. (2004); Hoque *et al*. (2008). In a recent meta-analysis of 72 studies, Wilkin (2013) concluded that workers in temporary positions such as casual and labour hire workers were slightly less satisfied with their jobs than permanent employees.

The Overlap between the Worker Perspective and the Firm Outcomes

In a third strand in the literature, this interaction between standard and non-standard workers is also seen as acting as the mechanism propagating the firm outcome – see, for example Pedulla (2013). Hence, there is a link between the agency worker, worker outcomes and firm outcomes. However, there are comparatively few empirical papers which directly examine temporary agency workers and firm outcomes as there are few data available which allow such analysis. Amongst those which do exist, the findings are varied with regard to the relationship between firm performance and use of temporary agency workers. This is likely to be partly due to the causal impact of agency workers on firm performance being potentially difficult to identify across all firms (as a result of reverse causation arising from the non-random use of agency workers by firms in differing contexts). Bryson (2013) uses British workplace panel data and finds that agency workers are associated positively with improved financial performance for firms, but only weakly associated with the firm outcome of higher sales per employee and not statistically associated with the firm outcome of value added per employee. They also find from the linked employee data that the presence of

[3] Results in outcomes for workers cover increasing job stress, Allan (2000); Ward *et al*. (2001); Purcell *et al*. (2004); Hoque *et al*. (2008), decreasing job satisfaction, Banerjee, *et al*. (2012); Bryson (2013) and increased intention to leave, Ward *et al*. (2001); Davis-Blake *et al*. (2003); Purcell *et al*. (2004); Hoque *et al*. (2008).

any temporary agency worker in the workplace (not just in the employee occupation) is negatively associated with (standard) employee wellbeing, Bryson (2013, p.137) which supports the earlier findings of the literature on the interaction between standard workers, agency workers, and the worker outcomes. Earlier work on the relationship between firm performance and use of temporary agency workers vary between countries, variation in the construction of the firm performance measures used, and sometimes different analytical techniques, so it is hard to identify if the difference in results for the relationship found are due to the differing national institutional context or these other variables. Nielsen *et al*. (2011) used panel data on German manufacturing firms and found a U-shaped relationship between the intensity of agency worker use (percentage of agency workers in the firm's total employment) and a measure of unit labour costs, which they interpreted as linking agency worker use to firm competitiveness. Beckman *et al*. (2009) used panel data for German firms and found an inverse U shaped relationship between the share of temporary workers in the firm's workforce and changes in sales.[4]

A somewhat earlier literature also linked worker employment terms to the firms' outcomes. This was specifically in the health care services sector. There is a subdivision within the health care literature which examines how staffing characteristics of the workforce in health care settings such as hospitals and aged care, in particular agency workers, can adversely affect the quality of care (an outcome of the firm). Allen (2000, p.199) examined agency worker use in a hospital setting and found case study evidence indicating that they were '…less committed to the work and the organisation and less capable of performing the full range of tasks for which they are paid. Permanent staff often had to work harder to cover for their shortcomings'. They also found agency staff made it difficult to achieve the organisational aspirations of quality care service. Castle *et al*. (2008) used a survey to study the relationship between agency working in nursing care staff for US residential aged care. They found that high agency nurse use was associated with lower care quality. This builds on earlier US findings for nursing agency staff in hospitals which showed they were associated with low care quality, Strzalka *et al*. (1996). This literature reflects that aspects of the workforce solutions adopted by firms (including the employment form being permanent or temporary agency worker) can affect key outcomes of the firm (in this case negatively). We note briefly here that this health care literature makes a further case for the potential valuable contribution in the aged care context of empirical studies such as that here of aged care firms' use of temporary agency workers.

In the next section we address the fourth strand of the literature which we have identified, namely, the firms' perspective on why they use agency workers. This strand is of particular relevance to our subsequent empirical study of aged care firms' reasons for using temporary agency workers.

[4] Other findings on agency worker use and firm performance by Kleinknecht *et al*. (2006) for Switzerland and Arvantis (2005) for Holland suffer from technical problems identified from subsequent developments in econometric techniques, which make these earlier findings unreliable econometrically.

3. An Overview of the Specific Literature on the Firms' Reasons for Temporary Agency Worker Use

In this section we cover the perspective of earlier literature specifically addressing the host firms' reasons for using agency workers. We would point out that while the international literature is included, it is important to maintain awareness of the many differing institutional frameworks and employment law for the agency worker context and that this can change over time.

The existing international and national literature on why host firms use agency workers is largely empirical and descriptive. In essence, a small number of modest scale surveys, in the US and Australia, have directly asked employers why they use agency workers. The results are mostly reported in terms of the prevalence of the particular reasons and reflections on how the reasons relate to profit-maximising behaviour, Houseman (2000, 2001); Brennan *et al*. (2003). Regression estimates are occasionally used to support the descriptive significance of individual factors. There is also sometimes the use of larger general data sets to address the issue across all types of firms within the US, the UK and Australia, Abraham *et al*. (1993, 1996); Laplagne *et al*. (2005); Forde *et al*. (2005). These surveys are supplemented by case studies that look for more detail and reasoning, Connell *et al*. (2002); Houseman *et al*. (2003); Stanworth *et al*. (2006). These studies have been the basis of several overviews of the research, Hall, R. (2006); Coe *et al*. (2010), which underpin the growing consensus about the main motivations that host firms have for employing agency workers. These motivations include rapid accommodation of fluctuations in the firm's product demand and labour supply from their permanent workforce; as a form of probation and screening; reduction in on-costs and costs of hiring and firing; quick provision of hard-to-recruit skills and reduced exposure to industrial action. These factors have been further reduced by some reviewers to numerical flexibility and the engagement of labour without obligation, Hall (2000, p.30). From their analysis of the Australian Workplace Industrial Relations Survey, and perhaps reflecting the question focus of this survey context, Laplagne *et al*. (2005, p.39-40) concluded that structural change, the competitive environment, and industrial relations had a role in the adoption or greater use of agency workers. These would seem to concur with the findings already mentioned but use language that refers more to the broader overlying features of the economic/institutional environment.

Considering that the use of agency workers has been shown by this review to give firms the benefits of increased flexibility, cutting costs and providing access to qualified staff to cover for skill shortages then it might be argued that the use of agency workers is beneficial to firms. Previous research cited earlier about the effects on the standard workers, and the firm performance, has however pointed out a number of drawbacks. This also overlaps with the literature on use of temporary agency workers within the occupation of nursing, or within hospitals/care-giving roles which finds adverse effects on the quality of care, Strzalka *et al*. (1996); Allen (2000); Castle *et al*. (2008); Castle (2009). The benefits of agency worker use for firm performance, as set out earlier, are slightly unclear from the empirical evidence to date with some finding a positive relationship but with some finding an inverse U shaped relationship, Beckman *et al*. (2009); Nielsen *et al*. (2011); Bryson (2013).

A valuable distinction has been highlighted between the reasons for using high and low skill agency workers. Houseman *et al*. (2003) concluded that for high skill occupations, employers paid more to agency workers than to regular employees, mainly to gain extra recruiting time for permanent positions, thereby avoiding wage rises for new hires and existing employees. For low skill occupations agency workers appeared to have facilitated the firms scope to try out more 'risky' workers, by lowering their wage and benefits and the costs of turnover. Interestingly, the Houseman *et al*. (2003) findings are set in the context of hospitals, and can be informative for the aged care setting of the data we use.

We would contend on the basis of this review that the employers and their use of agency workers are not well understood and bear deeper analysis. With the exception of Laplagne *et al*. (2005) which used the AWIRS, the literature on firms' use of agency workers is mainly derived from short cross-sectional quantitative surveys or case studies. Such surveys are essential to establish a representative picture of the main reasons for agency work across a wide range of industries and occupations. As the review shows, mainly drawn from the case study research, there are varying circumstances under which agency workers are used by host firms for different reasons (Hall, 2000; Houseman *et al*. 2003; Stanworth *et al*. 2006). Agency workers are a solution tool, rather like a penknife, applicable in a range of circumstances. Hence there are serious limits to how much such general coverage surveys can reveal about the particular circumstances of the use of agency workers, and the complexity of the host firm motivations.

One of the key reasons for the use of agency workers is as a strategy for organisations to achieve numerical flexibility and adjust for changes in the business cycle, Houseman (2001); Kalleberg *et al*. (2003); Ono *et al*. (2013) and can vary with the output of industrial production, Jahn *et al*. (2012). In line with the argument regarding numerical flexibility, some research has found that using agency workers allows organisations to circumvent laws on employment security and as such make it possible to lay off staff at short notice, Burgess *et al*. (2006); Hall (2006). Another reason put forward for using agency workers is to screen them as potential employees in the internal workforce, which infers that labour laws make it hard to dismiss employees (cheaply) once hired on a permanent basis, Houseman, (2001); Houseman *et al*. (2003). The logic of hiring agency workers to achieve numerical flexibility in staffing does imply a fluctuation in demand for output or services. Ono *et al*. (2013) explore US manufacturing firms' use of temporary agency workers and the firm characteristics in the context of fluctuating output. They found that plants tended to use agency workers when their output was expected to fall, suggesting agency workers were used to reduce the costs of dismissing permanent employees. Dräger *et al*. (2012) also focus on numerical flexibility and workload/demand/business cycle fluctuations using European cross-country firm data to explore the role of employment protections in the use of agency workers. They found that in countries with high employment protection (high dismissal costs for workers with permanent contracts) firms with an unstable workload were significantly more likely to hire temporary agency workers[5]. Hence our research can add to the knowledge about the use of agency workers in the setting of the other reasons put forward by firms which have not yet had much attention.

To redress gaps in the literature we concentrate on understanding the types of host firms and their use of agency workers. This is of particular interest in Australia, which already has a high level of casual employment, which gives employers considerable flexibility in managing their workforce. This suggests that there is an additional aspect provided by agency staff to their firm clients, that we would like to understand more fully.

4. Temporary Agency Work in Australia

The use of temporary workers in a variety of forms, not just temporary agency workers, is reasonably high in Australia. In 2010, only just over two thirds of employees were permanent, Buddelmeyer (2012, p.54). The almost one third of employees in temporary work were 2.5 per cent temporary agency workers, 19.9 per cent casuals, 9.3 per cent fixed term, Buddelmeyer (2012, p.54 HILDA). The study of temporary agency work within Australia is then also of special interest because there is a strong market alternative available in the formal casual worker context. This is particularly well developed in Australia, relative to other international settings. There are formally agreed Award wage rates which set a 25 per cent loading[6] and contract terms which apply to casual workers.

In the narrower group of temporary agency workers, since 2000 in Australia the scale of agency work amongst the employed appears to have fallen slightly or been level. Shomos *et al*. (2013, p.39) indicate that the growth in the prevalence of agency workers amongst the forms of work in earlier decades variously reported in the literature is not evident in Australia over the decade from 2000. The share was 3.1 per cent in 2001, and remained at this level until 2003 after which it fell to below three per cent reaching 2.3 per cent in 2010 according to Household Income and Labour Dynamics in Australia data; while using the ABS Forms of Employment Survey 2001, 2008 and 2011 the share of agency workers amongst the employed was 1.8 per cent, 1.2 per cent, 1.2 per cent, respectively, Shomos *et al*. (2013, p.83 table B5).[7]

In 2011[8], the 1.5 per cent of Australian employees who were agency workers made up a total of 141,700 persons who were paid by a labour hire firm/employment agency. It is important to note that this information reflects a set of questions about how they found their work and whether they are paid via the agency. Of these persons, the Administrative and support services (20 per cent) and Manufacturing (13 per cent) were the industry divisions with the greatest proportion. Clerical and administrative

[5] Dräger *et al*. (2012, p.19).
[6] Australian Industrial Relations Commission 2008, modern Awards casual wage loading applied from 1 January 2010, Shomos *et al*. (2013, p.11-13).
[7] Estimates based on sample surveys are subject to sampling error and the standard error measures the reliability of the estimates given the features of the survey. The HILDA is a complex longitudinal household survey and no standard error is published for these statistics cited while the ABS FOES is a supplement to the monthly Labour Force Survey which also has complicated survey design affecting the standard error, and while a spreadsheet is available for determining the standard error of particular estimates within a year there is no guidance for inter-year comparisons. Given the scale of the differences between estimates is fairly small at less than two per cent then in the context of the standard error of these surveys, these variations between estimates are unlikely to be strongly statistically different from each other if formally tested.
[8] ABS 6359.0 Forms of Employment Survey November 2011. We use the term agency worker rather than labour hire.

workers (21 per cent) and Machinery operators and drivers (19 per cent) were the most common occupation groups. Amongst labour hire workers, there were 115,500 persons (82 per cent) who usually had continuous/ongoing work from a labour hire firm/ employment agency. For the groups of workers that would represent aged care which is the focus of our subsequent empirical research, this survey finds that amongst labour hire workers there are six per cent in the Health care and social assistance industry and seven per cent in Community and personal service occupation. In this context, it becomes clear that temporary agency work in Australia is a persistent, although small phenomenon amongst the temporary worker solutions available to firms. It is of interest to understand this alternative and more about the firms that choose it.

5. Aged Care and the Australian National Aged Care Workforce Census and Survey, 2012

Previous research covered in the literature reviewed has identified an overview of the reasons and advantages to host firms from the use of agency workers, but it has also posited that there can be drawbacks for firm performance from using this variation from the standard form of employment. We aim to further explore the differences between those firms that do and do not use agency workers, using relatively expansive information available about Australian aged care organisations. We will establish the roles that agency workers play in enabling facilities to deal with shortages of specific skills. This is possible to do in our data, which is confined to an industry where there is stable overall demand (aged care). In doing so, we will use information in the data about the firm to take account of how the facilities differ in, among other things, the reasons for the skill or labour shortage, efforts to recruit new staff and working conditions.

Recognising the earlier findings, we would like to further examine firms' use of agency workers in the context of a tight labour market (skills shortages), and the variation for the low-skill / high-skill dichotomy. The data we apply to this question allow us to focus on host firms in a single industry sector[9] which has a higher than usual share of agency workers (residential aged care), and the low skill / high skill occupational dichotomy can be pursued for personal care workers (low skill) and nurses (high skill). This can isolate the information about firm's use of agency workers from the data more clearly. We understand that one reason for hiring agency workers is to achieve numerical flexibility in staffing when demand for output or services fluctuate. But we expect aged care facilities to have quite a steady demand for their care services. The use of agency workers is also related to a need to fill vacancies. Recruitment, particularly of nurses, can be difficult in the Australian aged care sector, King *et al*. (2012, p.59). Case studies in the Australian context indicate that the decision to hire registered nurses through agencies is driven by the immediate need for employees of appropriate qualification, Allen (2000); Lumley *et*

[9] There is some relevant earlier literature within the context of a single occupation or single industry. Bryson and Blackwell (2006) explore the single industry of UK higher education where temporary worker usage is over 50 per cent, however there is not a temporary agency worker focus, and hence it is not in the earlier review. Ono *et al*. (2013) explore US manufacturing firms' use of temporary agency workers and the firm characteristics in the context of fluctuating output.

al. (2004). In addition, there is often a fixed staffing ratio to ensure there are enough staff with the correct qualifications rostered in order to meet the minimum standards of care guidelines for assuring aged care service quality, Kaine *et al*. (2013). Hence aged care use of agency workers is likely to be driven more by skills shortages or other reasons cited by firms in the earlier literature review and we look for evidence that this is the case.

We use the National Aged Care Workforce Census and Survey, 2012. This data provide information about Australian aged care providers and their workforce in aged care. Aged care is a useful context for analysing agency workers for several reasons. Firstly, employment in the aged care sector is currently expanding but labour and skills shortages in the aged care workforce are predicted to multiply further due to the aging population (Productivity Commission, 2011). Hence, aged care is a sector facing high overall demand, and high workforce demand. This context is useful because it allows our analysis to focus on the firms' reasons for use of agency workers when faced with a context of overall growth in demand for aged care places and a short supply of workers. This allows us to preclude some of the gamut of reasons firms put forward for the use of agency labour (see, earlier literature review). For example, 'numerical flexibility' for reasons of uncertain demand can be put aside because the demand for workers in aged care holds steady overall. Hence our research can add to the knowledge about the use of agency workers in the setting of the other reasons put forward by firms which have not yet had much attention.

A second reason for which aged care is a useful context for agency workers is that the workforce characteristics of the aged care sector lend themselves to the empirical study of agency workers. This is because of a greater sample size of firms using agency workers due to the relatively high use of agency workers with 46 per cent of facilities using agency workers, King *et al*. (2012, p.65). This is noteworthy when considered in the context of the 2011[10] figures of agency work presented earlier as it shows that although agency workers are used by a large number of firms within aged care, it is a relatively small share of all agency workers who are in the occupations and industries in which aged care would be found (six to seven per cent). The aged care workforce in 2011 was made up of nearly ten per cent of agency workers whereas in the general Australian workforce this was only one and a half per cent, King *et al*. (2013) and ABS 6359.0 Forms of Employment Survey 2011. Some earlier research has also used these data for this reason, but focussed on the effects on workers satisfaction or intention to leave/retention rather than the firms' perspective, King *et al*. (2013); Howe *et al*. (2012).

The Australian aged care labour market environment is acknowledged to face some labour market issues related to the 'managed market' regulatory and institutional context it enjoys. Aged care is a labour intensive activity and aged care employees in caring roles make up about 23 per cent of the Healthcare and Social Assistance Industry workforce, Productivity Commission (2011, p.349). Aged care services are publicly funded via Federal government funds to a mixture of private and public providers of aged care. There is regulation of the amount individuals pay for aged care and the subsidy for this, there is licensing of residential aged care providers and there

[10] ABS 6359.0 Forms of Employment Survey 2011.

are minimum standards of care, Kaine *et al*. (2013, p. 26-28). The public funding is distributed to facilities via a subsidy for each resident, based on assessment of their care needs level which is performed by Aged Care Assessment Teams. The public funding of the aged care sector has been linked to the acknowledged low wage rates faced by aged care workers, Kaine (2012); Kaine *et al*. (2013); King *et al*. (2013), for example: '…the public funding of aged care…has imposed budgetary constraints, with aged care providers frequently citing inadequate funding as a barrier to improving the wages and conditions of caregivers', Kaine *et al*. (2013, p.39).

For the aged care workforce low wages in particular apply to personal care assistants (PCAs) rather than nurses or allied health services. PCAs in residential care provide mainly personal care and basic health care tasks but undertake tasks such as administering medications when they have undertaken relevant training, King, *et al*. (2013, p.306). Martin (2007) and King *et al*. (2013) indicate that the competing industries against which PCA workers tend to benchmark for jobs are similar skill level occupations in retail and hospitality which can have somewhat higher wages. This competition across sectors for the PCA workforce is relevant to the issue of the low wages in aged care: '…In responding to these demand pressures, the supply of personal care workers … will be driven by the relative attractiveness of aged care compared to alternative employment options. Basic personal care skills such as those of PCA's can be developed reasonably quickly, but so can the skills associated with similar paying work. While most aged care providers will support skill development, current remuneration and working conditions are considered strong disincentives to entering and staying in the sector', Productivity Commission, (2011, p.354). Another aspect of the (low) pay in aged care is that it is mainly set through the centralised system of Awards. Further, there is a special industrial relations aspect within aged care as in 2012 the Living longer, living better: aged care reform package, Department of Health and Aging (2012) put aside a substantial share of the allocated funding for the aged care sector to be subject to the development of a workforce 'Compact' between unions, aged care providers and Government for the improvement of wages and conditions but progress since then is unclear, Kaine *et al*. (2013, p.40). In our later analysis of agency work, we exploit the ability of our aged care data to examine both nurses and PCA's to better explore the skills context of firms' application of agency work.

The National Aged Care Workforce Census and Survey, 2012

The Australian National Aged Care Workforce Census and Survey, 2012 (hereafter the Aged Care Census) provides a valuable opportunity to explore the use of agency workers by host-organisations, in this case in aged care organisations. This large scale survey was conducted for the Commonwealth Department of Health and Aging. In 2012, the census covered both the residential and community aged care organisations and their related workforces, and provided detailed information about aspects of care work. Accordingly, it gives a comprehensive snapshot of the national Australian aged care workforce. The methods and instruments are reasonably well established and documented King *et al*. (2012, p.3-7), with a high response rate and quality allowing generalisation from the data.

The Aged Care Census 2012 went out to all residential facilities, sometimes called nursing homes or long-term care facilities; and community care facilities. We use only the data from the residential aged care sector. The differences between that sector and the community care sector would, at this stage, cause unnecessary complications. The Department of Health and Ageing supplied a list of organisations that received funding in specific aged care programs and this list was the basis of the sample. The response rate was high: 96 per cent or 2,481 responses from residential facilities. This was attributed to both the fact that the address list information was accurate and up to date but also to a sizable unique incentive "…the Commonwealth offered a participation incentive to facilities through the Conditional Adjustment Payment", King *et al*. (2012, p.6). The survey was sent out in late January 2012 and was in the field until March 30, 2012. Data from facilities were reported based on workforce records for a designated fortnight, taken as the last pay period in November 2011.

The data were weighted and analysed to provide a comprehensive snapshot of the national aged care workforce as reported in King *et al*. (2012). A modified version of the dataset has been made publically available to researchers via the Department of Health and Ageing. The data to be used in our analysis, however, is from the original dataset held at the National Institute of Labour Studies.

The Aged Care Census 2012 primarily provides information about the directly employed workforce in direct care roles in aged care. While data on agency workers were collected, this was only done at the facility level. As such, detailed comparisons of the agency workers and internal workforce beyond occupation cannot be made. However, there is good information about the facility and aspects of their workforce including the agency workers, which is what we utilise.

We introduce the available information on employment of agency workers in the survey, and then discuss our analysis methods.

The data in the Aged Care Census on the facilities and the workforce of the aged care sector contain a great deal of information that can be used to obtain insights about the firm and motivations for using agency workers. Firstly, agency workers are a significant proportion of the direct care workforce: in the designated fortnight they were nearly 10 per cent of all direct care workers in nursing homes. This is substantially higher than the general Australian workforce (1.5 per cent in the ABS 6359.0 Forms of employment survey 2011 when calculated as a percentage of all employees: 141,700 of 9,286,200).

Of these agency workers, personal care attendants formed the largest group, as they do in the aged care employee workforce, while registered nurses provide specialised services and work a higher number of shifts per worker than other occupations. 46 per cent of all residential aged care facilities had engaged agency workers in the survey period (a designated fortnight). Overall, 55 per cent of firms engaged external workers of all types (table 1).

Table 1 - Proportion of Residential Facilities Using External Workers in the Designated Fortnight, by Occupation and Type of Worker, 2012 (per cent)

Occupation	*Temporary agency worker*	*Brokered*	*Self employed*	*All external workers*
Registered Nurse	31.2	0.9	1.2	32.6
Enrolled Nurse	16.9	0.2	0.2	17.1
Personal Care Attendant	33.9	0.3	0.3	34.3
Allied Health	3.2	4.0	11.2	16.9
All occupations	45.8	4.9	11.8	55.0

Source: King *et al*. 2012, p.65.

6. Description of the Empirical Analysis Methods

We aimed for this analysis to provide a simple, well-targeted description of the key (statistically significant) differences between organisations by the subgroups 'use agency workers', (or 'don't use agency workers'). We also explored the role of agency workers in helping to manage changes in the availability for work of the host organisations' core workforce.

We used the residential facilities information only. The variables were selected representing information from facilities about their organisational characteristics, workforce size and characteristics, skill shortages, vacancies, work-related injury/ illnesses, and their use of agency workers in direct care roles. We excluded information about allied health workers and nurse practitioners and used only those in nursing or personal care attendant occupations. For the purposes of the high skill grouping, we combined registered nurses with enrolled nurses, while for the low skill grouping we used personal care attendants. We conducted statistical tests and report only differences that are both significantly different in a statistical sense, and big enough to matter.

Initially in our descriptive analysis, using cross tabulation we explored the association between the characteristics of aged care organisations that use agency workers, against those which don't. We then analysed this association in the multivariate context using a probit to allow us to account for these factors together and find what is still influential in describing aged care organisations that use agency workers, against those which don't. We included in the model all of the firm description variables examined. In reporting the probit results, we give the marginal effects which help with interpretation, rather than the coefficients. Due to the survey design, and also to highlight the high-skill/low-skill dichotomy, we analyse nurses and personal care attendants (PCAs) separately.

There is a sound sample size for each of the key subgroups we examine – facilities' employment of nurses and PCAs, and their agency worker use for these occupations (table 2).

Table 2 - Samples of Residential Facilities for Nurses and PCAs, by Use of Agency Staff

	Residential Facilities			
	Nurses		*Personal care attendants*	
	Without agency staff	*With agency staff*	*Without agency staff*	*With agency staff*
Cases	1,423	879	1,447	840

Notes: Number of survey cases in each group.

7. Results of the Empirical Analysis

The data show that while aged care facilities of all types use agency workers, some types have a higher propensity to use agency workers than do others. We note that each characteristic is initially examined in isolation whereas in practice some are likely to be linked such as having a small number of employees and being in a regional or remote area. This is tested in the probit results reported subsequently.

There are a cluster of questions about the size, corporate configuration and location of the aged care facility (see, tables 3 and 4). They show that larger, for profit, metropolitan facilities and those that are part of a larger organisation are more likely to employ agency staff. While there are some differences in degree, the pattern applies to both nurses and PCAs. This suggests that the use of agency staff is more likely to be part of the strategy of larger and more formal human resource management practices.

Table 3 - Average Number of Employees at Facility by Whether Agency Staff is Used

Residential facilities	*Without agency nurses*	*With agency nurses*	*Without agency PCAs*	*With agency PCAs*
Average number of registered and enrolled nurses	14.1 t = 6.82 Pr = 0.000	18.1	14.9 t = 3.17 Pr = 0.002	16.8
Average number of personal care attendants	36.0 t = 10.54 Pr = 0.000	48.6	36.1 t = 9.85 Pr = 0.000	48.0
Total number of employees	71.4 t = 10.51 Pr = 0.000	93.7	72.3 t = 9.38 Pr = 0.000	92.5

Notes: The mean in each group is shown.

Table 4 - Proportion of Facilities with Agency Staff by Ownership Type, Corporate Structure, Location

	Nurses				*Personal care attendants*			
Residential facilities	*Without agency staff*		*With agency staff*		*Without agency staff*		*With agency staff*	
Ownership type	*Cases*	*Per cent*	*Cases*	*Per cent*	*Cases*	*Per cent*	*Cases*	*Per cent*
Not-for-profit	849	64.6	465	35.4	802	60.9	515	39.1
For profit	401	54.4	336	45.6	428	59.2	295	40.8
Public	173	68.9	78	31.1	217	87.9	30	12.1
Total	1,423	61.8	879	38.2	1,447	63.3	840	36.7
	chi2 = 26.85 Pr = 0.000				chi2 = 72.59 Pr = 0.000			
Corporate structure								
Part of larger organisation	1,041	58.3	744	41.7	1,054	59.3	722	40.7
Not part of larger organisation	387	73.0	143	27.0	398	76.0	126	24.0
Total	1,428	61.7	887	38.3	1,452	63.1	848	36.9
	chi2 = 37.36 Pr = 0.000				chi2 = 47.94 Pr = 0.000			
Location								
Major Cities	730	51.7	682	48.3	679	48.3	728	51.7
Inner Regional	445	77.9	126	22.1	493	86.3	78	13.7
Outer Regional	213	80.4	52	19.6	233	90.3	25	9.7
Remote	21	58.3	15	41.7	28	82.4	6	17.6
Very Remote	14	77.8	4	22.2	14	82.4	3	17.6
Total	1,423	61.8	879	38.2	1,447	63.3	840	36.7
	chi2 = 164.87 Pr = 0.000				chi2 = 356.37 Pr = 0.000			

Note: Percentages are of the total in each row.

Most managers of aged care facilities have nursing qualifications, with almost half of these also having management qualifications (table 5). There is some tendency for nurse managers to be more likely to be present in firms which employ agency staff, particularly agency nurses.

Table 5 - Proportion of Facilities With Agency Staff by Manager's Qualification

	Nurses				*Personal care attendants*			
Residential facilities	*Without agency staff*		*With agency staff*		*Without agency staff*		*With agency staff*	
Manager's qualifications	*Cases*	*Per cent*	*Cases*	*Per cent*	*Cases*	*Per cent*	*Cases*	*Per cent*
Nursing	688	59.6	466	40.4	725	63.2	423	36.8
Managerial	76	69.7	33	30.3	77	68.8	35	31.3
Both of them	590	62.0	362	38.0	584	62.0	358	38.0
Neither of them	25	89.3	3	10.7	21	72.4	8	27.6
Total	1,379	61.5	864	38.5	1,407	63.1	824	36.9
	chi2 = 14.06 Pr = 0.003				chi2 = 3.11 Pr = 0.375			

Note: Percentages are of the total in each row. Question A3.1: What qualifications does the Care Manager/Care Coordinator in your facility have?

A second cluster of questions relate to the role that agency staff play in helping facilities to meet their need for a specific staffing profile and set of skills. Facilities that use agency staff are substantially more likely to report having a shortage of staff than those that do not. This is particularly true for a shortage of nurses: 83 per cent of facilities that employ agency nurses report having a shortage of nurses, whereas only 57 per cent of those who do not employ agency nurses report a shortage (table 6). Shortages are less common for personal carers, but the same pattern applies.

Table 6 - Proportion of Facilities With Skill Shortages by Whether Agency Staff is Used

Residential facilities	*Without agency nurses*	*With agency nurses*	*Without agency PCAs*	*With agency PCAs*
Registered and enrolled nurses	57.3	82.5	61.1	75.5
	chi2 = 157.45 Pr = 0.000		chi2 = 49.60 Pr = 0.000	
Personal care attendants	42.9	53.6	40.6	59.4
	chi2 = 24.91 Pr = 0.000	chi2 = 76.61 Pr = 0.000		

Notes: Shows only the proportion with skill shortages within 'without agency nurses' – so for example 57.3 per cent of facilities without agency nurses record a skill shortage [not shown is 42.7 per cent of facilities without agency nurses do NOT record a skill shortage]. Question B7.1: For each employee classification, please indicate whether you had skill shortages during the last 12 months.

This picture of agency staff being used to help manage a shortfall in employee numbers and skills is reinforced by the fact that facilities that use agency staff have a higher number of fulltime equivalent vacancies than those that do not. For example, those with agency personal carers report an average of 2.34 vacancies for employee PCAs, compared with 0.84 vacancies for facilities that do not use agency PCAs (table 7). They also reported taking a little longer to fill their vacancies for PCAs, but this is not statistically significant for nurses.[11] Those with agency personal carers report an average of 3.87 weeks to fill the most recent vacancy for employee personal carers, compared with 2.76 vacancies for facilities that do not use agency personal carers (table 8).

Table 7 - Average Number of Full-time Equivalent Vacancies by Whether Agency Staff is Used

Residential facilities	*Without agency nurses*	*With agency nurses*	*Without agency PCAs*	*With agency PCAs*
Registered and enrolled nurses	0.59	1.56	0.77	1.20
	t = 7.64 Pr = 0.000		t = 3.52 Pr = 0.000	
Personal care attendants	0.84	2.51	0.84	2.34
	t = 5.78 Pr = 0.000		t = 5.94 Pr = 0.000	

Notes: The mean in each group is shown. Question B8.1 As at the time of this survey, how many vacancies do you have in each classification?

[11] Because of the format of the questionnaires, we could not combine the information for registered and enrolled nurses for this question.

Table 8 - Time (weeks) Spent to Fill the Most Recent Vacancy for Registered Nurses, Rnrolled Nurses and PCAs by Whether Agency Workers are Used

	Residential Facilities		
	Without agency workers		*With agency workers*
Registered nurses			
Mean	7.17		7.58
Standard deviation	58.6		21.0
		t = 0.19 Pr = 0.849	
Median	1		3
75% percentile	5		6
90% percentile	10		12
95% percentile	21		28
99% percentile	80		90
Enrolled nurses			
Mean	4.95		3.46
		t = 0.87 Pr = 0.382	
Standard deviation	45.5		8.2
Median	0		0
75% percentile	3		3
90% percentile	7		8
95% percentile	11		12
99% percentile	52		42
PCAs			
Mean	2.76		3.87
		t = 2.63 Pr = 0.009	
Standard deviation	9.4		9.5
Median	1		1
75% percentile	2		3
90% percentile	5		6
95% percentile	8		13
99% percentile	28		52

Notes: Question B8.2 Approximately how long did it take you to fill the MOST RECENT vacancy for employees in each classification? (weeks).

The main reason given for facilities using agency nurses (table 9) and agency PCAs (table 10) is that recruitment of employees is too slow, and they need specialist skills that have been hard to recruit. Facilities without agency staff more commonly thought the reason for their skills shortages arose from their geographical location. Regardless of whether they used agency staff, about a sixth of facilities felt the reasons for their skills shortages were lack of availability of adequate training and wage or salary costs were too high for the business. Only a very small proportion felt it was due to uncertain long term demand for their services. This last finding confirms that we are able to describe the context of aged care as reflecting a stable operating environment and this allows the conclusion that the results of our research do not reflect aspects of flexibility in staffing for addressing output or service fluctuations.

Table 9 - Sources of Skill Shortages at Facilities by Whether Agency Nurses are Used

	Residential Facilities			
	Without agency nurses		*With agency nurses*	
Sources of skill shortages	*Cases*	*Per cent*	*Cases*	*Per cent*
Specialist knowledge required	362	25.3	314	35.4
		chi2 = 27.06 Pr = 0.000		
Geographical location of facility	451	31.5	207	23.3
		chi2 = 18.02 Pr = 0.000		
Wages or salary cost too high for business	195	13.6	114	12.9
		chi2 = 0.28 Pr = 0.594		
Lack of availability of adequate training	231	16.1	153	17.2
		chi2 = 0.49 Pr = 0.486		
Unsure of long term demands for service	77	5.4	29	3.3
		chi2 = 5.59 Pr = 0.018		
Recruitment too slow	335	23.4	295	33.3
		chi2 = 26.83 Pr = 0.000		
Other	521	36.4	284	32.0
		chi2 = 4.66 Pr = 0.031		

Notes: Each per cent recorded for a group is a separate instance due to multiple coding. Question B7.2 Were these skill shortages due to any of the following? (cross all relevant boxes).

Table 10 - Sources of Skill Shortages by Whether Agency PCAs are Used

	Residential Facilities			
	Without agency PCAs		*With agency PCAs*	
Sources of skill shortages	*Cases*	*Per cent*	*Cases*	*Per cent*
Specialist knowledge required	362	24.9	305	36.0
		chi2 = 32.01 Pr = 0.000		
Geographical location of facility	482	33.1	166	19.6
		chi2 = 48.66 Pr = 0.000		
Wages or salary cost too high for business	187	12.9	117	13.8
		chi2 = 0.42 Pr = 0.518		
Lack of availability of adequate training	230	15.8	150	17.7
		chi2 = 1.38 Pr = 0.241		
Unsure of long term demands for service	67	4.6	38	4.5
		chi2 = 0.02 Pr = 0.891		
Recruitment too slow	338	23.2	287	33.8
		chi2 = 30.52 Pr = 0.000		
Other	526	36.2	282	33.3
		chi2 = 1.97 Pr = 0.160		

Notes: Each per cent recorded for a group is a separate instance due to multiple coding. Question B7.2 Were these skill shortages due to any of the following? (cross all relevant boxes).

When asked what the main strategies had been for solving skill shortages in the last 12 months (see table 11), regardless of whether they used agency workers, roughly a half of all facilities said that they relied heavily on asking their employee workforce to

work longer hours. However, for those that used agency workers, their main strategy for skill shortages was to make greater use of agency staff (about three quarters said they used this solution in the last 12 months), but only roughly a quarter of those facilities currently without agency workers used this strategy. Regardless of whether they had used agency staff in the recent past, facilities did not generally apply a solution of an increase in the immediate wage and employment conditions offered to regular staff (only about an eighth of facilities reported they had used this solution), nor a solution of employing additional staff on short term contract (roughly 13 per cent had applied this).

Table 11 - Solutions for Skill Shortages by Whether Agency Nurses or Agency PCAs are Used

	Residential Facilities			
Sources of skill shortages	*Cases*	*Per cent*	*Cases*	*Per cent*
For nurses	*Without agency PCAs*		*With agency PCAs*	
More use of external training of staff	280	19.6	185	20.9
		chi2 = 0.57 Pr = 0.451		
More use of on-the-job training of staff	517	36.1	311	35.1
		chi2 = 0.27 Pr = 0.602		
Existing workforce worked longer hours	738	51.6	435	49.0
		chi2 = 1.40 Pr = 0.236		
Made greater use of agency staff	343	24.0	664	74.9
		chi2 = 577.17 Pr = 0.000		
Sub-contracted or out sourced service	47	3.3	70	7.9
		chi2 = 24.25 Pr = 0.000		
Employed staff on short term contract basis	188	13.1	117	13.2
		chi2 = 0.00 Pr = 0.971		
Wages, salary and/or conditions increased	181	12.6	107	12.1
		chi2 = 0.17 Pr = 0.678		
Reduced outputs or production	41	2.9	27	3.0
		chi2 = 0.06 Pr = 0.804		
Other	355	24.8	112	12.6
		chi2 = 50.50 Pr = 0.000		
For PCAs	*Without agency PCAs*		*With agency PCAs*	
More use of external training of staff	288	19.8	173	20.4
		chi2 = 0.12 Pr = 0.725		
More use of on-the-job training of staff	511	35.1	311	36.7
		chi2 = 0.56 Pr = 0.453		
Existing workforce worked longer hours	741	50.9	435	51.3
		chi2 = 0.03 Pr = 0.864		
Made greater use of agency staff	381	26.2	614	72.4
		chi2 = 466.43 Pr = 0.000		
Sub-contracted or out sourced service	47	3.2	69	8.1
		chi2 = 26.96 Pr = 0.000		
Employed staff on short term contract basis	187	12.9	114	13.4
		chi2 = 0.16 Pr = 0.685		
Wages, salary and/or conditions increased	170	11.7	113	13.3
		chi2 = 1.34 Pr = 0.247		
Reduced outputs or production	39	2.7	26	3.1
		chi2 = 0.29 Pr = 0.590		
Other	335	23.0	129	15.2
		chi2(1) = 20.32 Pr = 0.000		

Notes: Each per cent recorded for a group is a separate instance due to multiple coding. Question B7.3 How were these skill shortages addressed in the last 12 months? (cross all relevant boxes).

Characterising the Use of Agency Workers by Firms

We report the result of the probit regression of agency worker use in table 12. Nurses and PCAs are reported in separate columns. The marginal effects are reported together with the standard error. Stars are used to indicate the t statistic test results, with levels of significance of one per cent (three stars), five per cent (two stars) and ten per cent (one star) reported. The reference groups are set as those with the largest sample share. The dependent variable is a dummy with one for using temporary agency workers, zero otherwise. Explanatory variables included are: Number of full-time equivalent vacancies, Weeks to fill the vacancy for RN and Weeks to fill the vacancy for EN in the nurses equation, Weeks to fill the vacancy for PCA in the PCA equation, dummy 'with skill shortages', Sources of skill shortages zero-one dummies (Specialist knowledge required, Geographical location of facility, Wages or salary cost too high for business, Lack of availability of adequate training, Unsure of long term demands for service, Recruitment too slow), Solutions for skill shortages zero-one dummies (More use of external training of staff, More use of on-the-job training of staff, Existing workforce worked longer hours, Made greater use of agency staff, Sub-contracted or out sourced service, Employed staff on short term contract basis, Wages, salary and/or conditions increased, Reduced outputs or production), Special duties dummies[12] (staff are ever required to: Work longer than scheduled due to unanticipated needs of residents, Work variations in hours or location at short notice, Work in very unsanitary conditions, Work with aggressive service users, Working alone late at night), Manager's qualification (Reference group is with nursing qualifications: With managerial qualifications, With nursing and managerial qualifications, With other qualifications), Ownership type (Reference group is not-for-profit: For profit organisation, Public organisation)[13], Location (Reference group is Metropolitan: Inner regional area, Outer regional area, Remote area, Very remote area), Number of employees, dummy 'the facility is part of a larger organisation', dummy 'Also provides community based services', facility work related injury rate.

[12] Question B9 Are workers required to do any of the following as part of their job? Under normal circumstances, exceptional circumstances, never (cross one box per row – multiple response). We grouped normal and exceptional to represent 'ever' with a value of 1 in the dummy.

[13] This is an objective categorization drawn from the list sample administrative funding records describing the facility organization type held by the Department of Health and Aging. As a result it is a reliable definition. We group the original categories for analysis as: nonprofit= Charitable, Community Based, Religious; forprofit= Private Incorporated Body, Private Non-Incorporated Entity, Publicly Listed Company; public= Local Government, State Government. These are the same groups used for King *et al*. (2012) which found notable differences by these ownership types, with 56 per cent of direct care workers in not-for-profit (p.51), places in for profit and publicly owned are much more likely to be exclusively high care (p.53), and staffing ratios in not-for-profit facilities are lower than in for-profit facilities, which in turn are lower than in public facilities (p.55).

Table 12 - Residential Facilities: Determinants of Whether Using Temporary Agency Workers

	Nurses (N=1536)		*PCAs (N=1968)*	
	dy/dx	*S.E.*	*dy/dx*	*S.E.*
Number of full-time equivalent vacancies	0.062***	(0.01)	0.014***	(0.00)
Weeks to fill the vacancy for Registered Nurse	0.001	(0.00)	-	-
Weeks to fill the vacancy for Enrolled Nurse	-0.002*	(0.00)	-	-
Weeks to fill the vacancy for PCA	-	-	0.002*	(0.00)
With skill shortages	0.073*	(0.04)	0.084***	(0.03)
Sources of skill shortages				
Specialist knowledge required	0.000	(0.04)	0.020	(0.03)
Geographical location of facility	-0.085**	(0.04)	-0.052	(0.03)
Wages or salary cost too high for business	-0.091**	(0.04)	-0.018	(0.04)
Lack of availability of adequate training	-0.101***	(0.04)	-0.087***	(0.03)
Unsure of long term demands for service	-0.099	(0.07)	-0.021	(0.06)
Recruitment too slow	0.012	(0.04)	-0.009	(0.03)
Solutions for skill shortages				
More use of external training of staff	0.047	(0.04)	0.026	(0.03)
More use of on-the-job training of staff	-0.010	(0.04)	0.005	(0.03)
Existing workforce worked longer hours	-0.192***	(0.03)	-0.133***	(0.03)
Made greater use of agency staff	0.491***	(0.03)	0.399***	(0.02)
Sub-contracted or out sourced service	0.171***	(0.07)	0.180***	(0.06)
Employed staff on short term contract basis	-0.070*	(0.04)	-0.007	(0.04)
Wages, salary and/or conditions increased	-0.067	(0.05)	-0.048	(0.04)
Reduced outputs or production	0.011	(0.09)	0.094	(0.08)
Ever part of the job				
Work longer than scheduled	0.004	(0.06)	-0.029	(0.05)
Variations in hours or location at short notice	0.053	(0.04)	0.098***	(0.03)
Working in very unsanitary conditions	0.002	(0.07)	0.105	(0.06)
Working with aggressive service users	0.051	(0.04)	-0.009	(0.03)
Working alone late at night	-0.107**	(0.04)	-0.074**	(0.03)
Manager's qualification (Reference group is with nursing qualifications)				
With managerial qualifications	0.044	(0.08)	-0.020	(0.06)
With nursing and managerial qualifications	-0.045	(0.03)	0.014	(0.03)
With other qualifications	0.153	(0.23)	0.031	(0.11)
Ownership type (Reference group is not-for-profit)				
For profit organisation	0.010	(0.03)	-0.094***	(0.03)
Public organisation	0.001	(0.05)	-0.105**	(0.05)
Location (Reference group is Metropolitan)				
Inner regional area	-0.219***	(0.03)	-0.311***	(0.02)
Outer regional area	-0.255***	(0.04)	-0.314***	(0.02)
Remote area	0.108	(0.16)	-0.259***	(0.05)
Very remote area	-0.342***	(0.10)	-0.290***	(0.04)
Other organisational characteristics				
Number of employees	0.002**	(0.00)	0.001**	(0.00)
The facility is part of a larger organisation	0.082**	(0.04)	0.057*	(0.03)
Also provides community based services	0.063	(0.05)	0.059	(0.04)
Work related injury rate	0.025	(0.38)	-0.048	(0.23)

Note: The dependent variable is the probability of using temporary agency nurses/PCAs. *** p<0.01, ** p<0.05, * p<0.1

For nurses, using temporary agency workers was associated with those facilities reporting a higher level of full-time vacancies (raising the likelihood by 6.2 per cent), and for facilities with skills shortages they were 7.3 per cent more likely to use temporary agency workers (but this is only statistically significant at the 10 per cent level). Facilities with more employees were slightly more likely to use temporary agency workers (0.2 percentage points more likely for each additional employee) and those part of larger organisations were eight per cent more likely to use temporary agency workers than those not part of larger organisation. The facilities that were metropolitan based were more likely to be using temporary agency workers. Facilities that said they had made greater use of agency workers to solve skills shortages in the last year were 49.1 per cent more likely, and those who had subcontracted out or outsourced a service to solve skills shortages in the last year 17 per cent more likely to use temporary agency workers. However facilities that made the existing workforce work longer hours when they had a skills shortage in the last year were 19.2 per cent *less* likely to use temporary agency workers. Where facilities had staff work alone late at night the use of temporary agency workers was 10.7 per cent less likely. Facilities that reported that their skills shortages were due to the geographic location of the facility were 8.5 per cent less likely, where it was reported the skills shortage was due to the wages or salary costs being too high for the facility were 9.1 per cent less likely and where the skills shortage was due to the lack of availability of adequate training they were 10.1 per cent less likely to use temporary agency workers.

Where there were statistically significant factors associated with agency worker use that were in common for nurses and PCAs, they were always in the same direction (reporting the same sign for the marginal effect). This supports a commonality in these factors for agency worker use for Nurses and PCAs.

In regard to PCAs, there were three factors that were influential for agency worker use which were not present for nurses: where the facility was a not-for-profit temporary agency workers were more likely to be used than any other solution type; and where it was reported that staff faced variations in hours or location at short notice they were 9.8 per cent more likely to use temporary agency workers. Whereas for nurses, when the facility found that their skills shortages were due to the geographic location of the facility, or due to the wages or salary costs being too high for the facility then outlets were less likely to use temporary agency workers, this was not the case for PCAs (but similar to nurses where they said the skill shortage was due to the lack of availability of adequate training they were 8.7 per cent less likely to use temporary agency workers).

For PCAs, using temporary agency workers was associated with facilities reporting a higher level of full-time vacancies (each additional vacancy raising the likelihood of temporary agency worker use by 1.4 per cent), and for facilities facing skills shortages they were 8.4 per cent more likely to use temporary agency workers. Facilities with more employees were slightly more likely to use temporary agency workers (0.1 percentage points more likely for each additional employee) and those parts of larger organisations were 5.7 per cent more likely to use temporary agency workers than those not part of larger organisation. Again, the facilities that were metropolitan based were more likely to be using temporary agency workers. Facilities

that said they had made greater use of agency workers to solve skills shortages in the last year were 39.9 per cent more likely, and those who had subcontracted out or outsourced a service to solve skills shortages in the last year 18 per cent more likely to use temporary agency workers. However facilities that made the existing workforce work longer hours when they had a skills shortage in the last year were 13.3 per cent less likely to use temporary agency workers. Where facilities had staff work alone late at night the use of temporary agency workers was 7.4 per cent less likely. Facilities that reported that their skills shortage was due to the lack of availability of adequate training were 8.7 per cent less likely to use temporary agency workers.

8. Discussion

We have characterised employers' use of temporary agency workers in a context without fluctuating output or service demand, and with tight labour markets, for both high skill and low skill occupations. We initially discuss the findings which seem common to both skill groups, and then discuss the differences that we found exist for high skill and low skill occupations. Where relevant, we also place our findings in the context of the empirical literature on the reasons for employers' use of temporary agency workers.[14]

In an extension not possible in the earlier work by Ono *et al*. 2013, we have been able to explore firms' reasons for agency worker use and the context of skills shortages together with the firm characteristics, within an isolated context of a single industry and hence a reduced set of motives for using agency workers. We find that temporary agency workers are used by firms to solve skills shortage issues, but not all types. Facilities with skills shortages were between seven and eight per cent more likely to use temporary agency workers, and for each additional vacancy the facility was more likely to use temporary agency workers by six per cent when it was a nursing (high skilled) vacancy but one per cent for a PCA (low skilled) vacancy.[15] With regard to solutions applied for their skills shortages in the last year, we found that when they had made greater use of agency staff or had subcontracted out services, facilities were more likely to use temporary agency workers now. We find that the use of temporary agency workers is between eight and ten per cent less likely when the source of the skills shortage is due to the geographic location of the facility, (which perhaps fits with the subsequently discussed picture of metropolitan facilities being more likely to use temporary agency workers as a result of local labour markets in their location and the potential urban concentration of agencies).

Our results are consistent with some of the findings of Houseman (2000, 2001). We would expect some deviation from their findings since their research was for all occupations/industries whereas ours is intentionally limited in order to allow more specificity. Also, their findings are for the US and ours for Australia, and some of

[14] We are unable to compare to the AWIRS analysis of Laplagne *et al*. (2005) as there are no similar variables.

[15] While this is discussed here as a commonality for high and low skills in that the number of vacancies raises the likelihood of using temporary agency workers, the very different sizes are also discussed as part of the differential characterisation for high and low skill occupations.

[16] Unionisation is not present in our data nor a variable corresponding to 'good benefits for their regular staff'.

their modelling variables are not present in our study or are irrelevant for our context.[16] Our results confirm the general findings of Houseman (2000, 2001) that temporary agency workers usage was more likely for firms with larger employee numbers, while less likely for firms in a rural area location.[17] Mangum *et al*. (1985) also found large firms more likely than small firms to use temporary agency workers. Davis-Blake *et al*. (1993, p.217) found the broader general group of temporary workers more likely to be used by large rather than small firms and suggested that perhaps large firms may be more able to afford the more expensive externalisation while smaller firms might try to manage temporary staff themselves. We find that larger, metropolitan facilities and those that are part of a larger organisation are more likely to employ agency staff. While there are some differences in degree, the pattern applies to both nurses and PCAs. Ono *et al*. (2013, p.433) also found in the US manufacturing context that large and urban firms and those facilities part of a larger firm were more likely to use temporary agency workers. They suggest the association with large firms might be related to fixed costs associated with temporary workers, such as negotiating with the agency. They also link being part of a larger organisation to the fixed costs, with the fixed costs spread and so making the cost of using temporary agency workers smaller. They plausibly propose that the urban association with agency worker use might reflect the aspects of the immediate local labour markets for temporary workers around the firm location, such as the local unemployment rate,[18] and the local concentration of agencies affecting the demand for and supply of agency workers to that location, Ono *et al*. (2013, p.438). This latter result seems to reflect the 'market making' role of agencies, Coe *et al*. (2010, p.1064). Coe (2010) points out that the very existence of agencies reshapes the norms and expectations of firms and of workers. While temporary staffing agencies are profit businesses, they are often seen as neutral intermediaries matching supply of labour with demand from employers, contributing to efficient functioning of the labour market, Mangum *et al*. (1985); Coe *et al*. (2010). However, Peck and Theodore (2002), and more directly Coe *et al*. (2010, p.1063) point out that agencies supply a particular form of labour market flexibility in mediating between supply and demand, and hence play a role in the construction and making of labour markets.

In our aged care example of a sector where there is stable demand, employment growth and skills shortage, our findings thus probably reflect several aspects of the Australian labour markets: (1) The forms of work available in a local labour market reflect the demand and supply of each type of working arrangement, mediated by the institutional factors, with the firms seeking the most cost-effective outcome and workers maximising their well-being, Shomos *et al*. (2013). Recruitment and matching of workers and training are key costs in the process of engaging workers. Shomos (2013, p.20) points out that agency workers could be preferred because their agency benefits from economies of scale in recruitment and selection. Recall also that Brennan *et al*. (2003) found that 60 per cent of Australian agency workers would prefer to be

[17] Their industry seasonality findings are not relevant for our context where our findings confirm that facilities did not think that skill shortages they faced were due to uncertain demand for their services – see tables eight and nine earlier.

[18] As Australia had a very low unemployment rate below six per cent during the period the data reflects, then rather than unemployment, it likely reflects the supply to agencies of those wishing to change employment due to urban population density.

employed directly. Additionally, 54 per cent of agency workers stated that their reason for using an agency was the ease of obtaining work via an agency (ABS 6359.0, p.49 table 17). Taken together, this points towards inefficient matching in the Australian labour market for both the firm and the worker where agencies can provide a solution, despite the premium to the firm and the wage penalty to the worker and the availability of casuals. This does not preclude the agencies' 'market making' role. (2) Such hiring costs are higher when it is difficult to observe a person's skills. It is acknowledged that caring role skills to a large extent are personality dependent, involve successful teamwork, Martin (2007), and are accordingly hard to observe before work is started which means that signals such as training qualifications (which are quick and cheap to check) can be less relevant. This also fits with our finding that agency workers (nurses or PCAs) are less likely to be used when the source of the skills shortage is lack of availability of training. (3) A large component of the aged care sector is multi-site where about three quarters of facilities are part of a larger organisation, King *et al*. (2012, p.56 table 4.5) and anecdotal evidence suggests that many have a single head office HR. As a result, the local facility effectively has no local HR. The services of agencies are more likely to be cost-effective when there is no in-house HR capacity for managing local temporary 'relief' roles, Shomos *et al*. (2013, p.20) – see further below where we reflect subsequently that it appears from our findings that agency workers are used to offer 'relief' for the internal staff, at least partly.

In considering the nature of the job and workplace practices, we found that the use of temporary agency workers is between seven and eleven per cent less likely where the workplace had staff working alone late at night. One aspect it might represent is the observed aspect of agency workers needing to be informally supervised by the internal staff, Allen (2000, p.199), and this is less possible if staff work alone at night. We speculate that this may also be a reflection of the need/desire to address occupational health and safety considerations in residential aged care in order to achieve quality accreditation (see earlier in section 5). There is some Australian literature about the use of temporary agency workers and poor occupational health and safety, Johnstone and Quinlan (2006); Quinlan *et al*. (2014). Although we note that contrary to Quinlan *et al*. (2014) the workers in this analysis are in residential care rather than community/home-care. If our finding indeed reflects such a staffing strategy of avoiding agency use where staff work alone, then our additional finding that the work related injury rate of the facility is not related to the use of agency workers, for nurses or PCAs, suggests it may be working and that it may be a useful remedy not to allow agency workers to work alone in care roles.

In examining the factors influential for low skill and high skill occupations, there were some key differences observable.

For the high skill occupation of nursing, where the skills shortage was due to the geographic location or due to salary costs being too high for the business, then temporary agency workers were less likely to be used. This concurs with the findings for Ono *et al*. (2013, p.438) that manufacturing plants requiring high-skill workers were less likely to use temporary agency workers. Our finding about the salary costs being too high for the business gives some empirical support to the Ono *et al*. observation that lower use of agency workers for high skill occupations was perhaps due to the higher margin paid by firms to agencies for high skill than for low skill agency

workers. Supporting this further, Houseman (2003) found in the hospital setting that for high skills occupations, employers would pay more for agency workers than for regular employees mainly to gain extra recruiting time for permanent positions, hence avoiding wage rises for new hires and existing employees. It also supports suggestions that the use of agency workers is related to pressures on labour costs, Forde and Slater (2006, p.150). As set out earlier in the background section, aged care in Australia is labour intensive with public funding acknowledged to be limiting (staffing) budgets, Productivity Commission (2011); Kaine *et al*. (2013).

For the low skill occupation of PCA, there was a difference in the degree to which agency workers were more likely to be used compared to the high skill occupation of nursing, as represented by the scale of the marginal effect: when there was a vacancy, facilities were only 1.4 per cent more likely to use agency workers for each PCA vacancy (but 6.2 per cent for nurses); if they had used agency staff during the last year to solve skills shortages then they were only 39.9 per cent more likely to use agency PCA workers, (but 49.1 per cent for nurses); and where they reported the existing workforce had worked longer hours during the last year they were only 13.3 per cent more likely to use agency PCA workers (but 19.2 per cent for nurses). Hence, for these aspects, the use of agency workers was raised to a lesser degree for the low skill occupation than for the high skill occupation.

There were also two factors which influenced the use of agency workers only for the low skill occupation of PCA: where the staff worked variations in hours or location at short notice, this led the use of temporary agency workers to be 9.8 per cent higher; and where it was a not for profit organisation, then the use of temporary agency workers was higher.

There also seems to be some aspect of offsetting capacity in the regular staff hours of work (underutilisation or overtime use) that ameliorates the use of temporary agency staff and when this is present the use of temporary agency workers is lower. Facilities that made the existing workforce work longer hours when they had a skills shortage in the last year were between 13 and 19 per cent less likely to use temporary agency workers. This suggests that temporary agency workers may substitute for the existing workforce working longer hours. This concurs to an extent with the finding by Lautsch (2002) that agency workers were sometimes used to protect internal employees from fluctuating needs. Not-for-profits might be willing to go to greater lengths to protect their internal employees, to maintain their commitment or social responsibility for them.

In common with the Houseman *et al*. (2003) case studies, we found that the factors influencing a facility's use of temporary agency workers differ between high and low skill workers (although there is a set which are in common). We found that firms were much more likely to have used agency workers for high skill (nursing) vacancies than for low skill PCA vacancies. While the use of agency workers was more likely for high skills (nurses), it still occurred for low skills (PCAs). We also found that there were some factors which had a much smaller scale in affecting the degree of how likely employers were to use agency workers for the workers of low skill rather than high skill. However we were unable to directly address the wages/ benefits aspect in these data. Indirect evidence, which gives only a cursory insight into this aspect, is found where the skill shortage is deemed to be due to 'wages or

salary costs too high for the business': for the high skill occupation of nurses, where this was the case, the use of agency workers was nine per cent lower but there was no significant influence detected for the low skilled occupation of PCAs. This might also have some bearing on the Laplagne *et al*. (2005) findings, where it reflects the flipside of their finding that when it was a low wage workplace relative to others in the same industry then agency worker use was less likely. Facilitating numerical flexibility via low skill peripheral roles was seen in early literature as the chief motive for using agency workers, Purcell (1998), Davis-Blake *et al*. (2003). However our findings were undertaken in an environment which precludes the issue of numerical flexibility and would accord more with the more recent HR literature suggesting agency worker use is a long term skills supply strategy that enables organisations to remain viable, Holst *et al*. (2010); Håkansson (2012); Håkansson (2013). In the context of aged care, as set out in the background section, providers frequently cite inadequate funding, Kaine *et al*. (2013, p.39) and operate a labour intensive activity but need to meet minimum standards of care which can set rostering ratios of qualified staff.

In the context of the Stanworth *et al*. (2006) findings, we find that the employer decision to use temporary agency workers appears to be deliberate planned. We find agency worker use is limited in the influence of only some aspects of staffing skills shortages, and while aged care facilities of all types use agency workers, the analysis shows that some types have a higher propensity to use agency workers than do others. We also find that the use of temporary agency workers in this aged care context appears to be for supplementing a regular workforce (rather than substitution of them) – only about half of facilities had agency workers in use during the survey reference fortnight (only two fifths had agency workers for the nurses and PCA) and only some types of firms have a higher propensity to use agency workers than do others. We found that firms were more likely to use agency workers now if they also subcontract or outsource services. This indicates a conscious decision to adopt this HR strategy of externalisation.

9. Conclusions

Our finding is that temporary agency workers are used to solve skills shortage issues, but not of all types. This result echoes the general qualitative finding of the earlier Brennan *et al*. (2003, p.18) Australian general survey that their use '…seems targeted and specific rather than being a broad widespread strategy'. However, we provide substantive analysis to support this result. We have been able to add focus to that qualitative story with use of a survey of a single sector, which allows emphasis on a particular constrained worker supply context and by modelling to account for the linkages between firm characteristics and agency worker use.

By and large, the results from this study are partly expected given that some previous studies found similar results. This research does however make a number of unique contributions to the study of firms' use of agency working. By isolating from demand fluctuations/firing-costs/numerical flexibility, we have been able to concentrate on the remaining firm motivations for temporary agency workers and have identified labour costs and reduction of labour recruitment costs. This suggests that some of the aspects of transferring responsibility to the agency confer valuable benefits to the firms as it mitigates costly issues of recruitment, payroll administration and managing employee benefits.

We find evidence that agency workers appear to be used in some cases as temporary workers brought in to alleviate workload/roster issues for the internal workers. Agency workers appear to be used to avoid some issues involved in transferring the legal responsibility of employment indirectly, such as occupational health and safety. We find evidence to support the view that the use of agency workers is part of a deliberate strategy of externalisation, often combined with outsourcing of services. The finding that those facilities which are larger, urban and those part of a larger organisation are more likely to use agency workers may be a manifestation of the market-making role of agencies concurrent with the agency costs aspects already discussed. We conclude that there are some attributes of the Australian aged care 'managed market' funding constraints which might encourage agency worker use for these types of firms.

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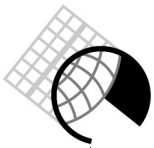

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