Employment Protection, Threat and Incentive Effects on Worker Effort.

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Abstract

This paper provides new evidence on the effect of changes in employment protection on worker effort. We use novel multi-organization data to examine changes in worker absence as workers move from temporary to permanent employment contracts. Earlier research has demonstrated very large negative effects of employment protection on effort. We find that the magnitudes of these effects are substantially smaller than those identified in previous studies. It has been suggested that the negative effect on effort is due to a fear of dismissal. We demonstrate that the absence behaviour of temporary workers is also influenced by incentives to attain jobs with protection that are unrelated to threat of dismissal, this has not been considered in earlier research. This channel of employment protection effects has important policy implications.

KEYWORDS: Employment Protection, Absenteeism, Effort

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I. Introduction

A long standing concern of the literature on employment protection legislation is its impact on labour market transitions and unemployment (Lazear 1990, Blanchard and Portugal 2001, Acemoglu and Angrist, 2001, Kugler and Pica 2008). Recently, a literature has also developed that specifically focuses on the effect of employment protection on worker effort measured through variations in absenteeism (Riphahn and Thalmaier 2001, Ichino and Riphahn 2004, Ichino and Riphahn 2005, Engellandt and Riphahn 2005). The key insight from this literature is that increased employment protection reduces worker effort. It is suggested that this reflects workers greater fear of job loss when employment protection is limited. This paper provides new and more extensive evidence on employment protection effects on worker effort.

Early research on employment protection effects analysed survey data on German public sector workers and found a large increase in absence after 6 months of tenure, which corresponded to an automatic increase in employment protection (Riphahn and Thalmaier, 2001). However, they were unable to find a statistically significant effect for female workers. They also noted that absence probabilities exhibited non-linearities in the first six months of tenure and were particularly low in the first two months. Our paper is most closely related to a series of studies of Italian bank workers (Ichino and Riphahn, 2004, 2005) that found quite marked effects of increased employment protection on worker absence. These papers examined workers in a setting where a significant level of employment protection automatically came into operation after workers completed 12 weeks of employment. Specifically, they demonstrate an increase in the rate of absenteeism after workers gain employment protection of between 100% and 200%. As they note, increased worker effort in the early stages of an employment contract could be motivated by the desire to signal

underlying productivity.[1] They relied upon identifying separate employment protection effects from changes in absence-tenure patterns. Consequently, they could not separate changes in tenure from changes in employment protection.

While existing research has stressed that the lack of employment protection increases effort (reduces absence) due to an increased fear of job loss, the effort decisions of workers with limited employment protection may also be affected by incentives (Wilson and Peel 1991, Audas, Barmby and Treble 2004). Specifically, temporary or probationary work contracts may be used by employers to screen workers for suitability for permanent contracts (Booth, Francesconi and Frank 2002, Green and Leeves 2004). This provides an additional incentive for these workers to signal effort early in their contract, over and above a general desire to signal underlying productivity.

It is critical to consider the effect of opportunities to obtain employment protection (hereafter referred to as a `contract effect') as the overall impact of changes in employment protection regulations may hinge on this. For example, easing unfair dismissal laws could lead to higher effort due to an increase in the risk of job loss, but may have a contrary effect if `protected' jobs become scarcer. These types of issues will become more important as the balance between temporary and permanent workers changes, as is currently happening in many OECD countries under policies such as `flexicurity'.

This paper uses a large novel personnel data set to examine these issues. Our data set covers an entire public sector workforce in Australia and we use this to investigate changes in absence, our indicator of effort, as workers move from temporary to permanent contracts. The institutional setting is advantageous to the study of employment protection effects on

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[1]A theoretical rationale is that in the presence of uncertainty about the underlying ability of workers there will be an incentive for new workers to signal ability through increased effort early in an employment spell (Holmstrom 1999,Koszegi and Li 2008).

absenteeism. This is because the workforce is characterised by a dichotomy between jobs with limited employment protection, temporary contracts, and permanent contract workers who are very difficult to dismiss. Furthermore, these contract types do not vary in other key dimensions such as leave entitlements and rates of pay. Hence, we argue that conditional differences in absenteeism between temporary and permanent workers in our data reflect variations in employment protection. In addition, our data, unlike that used in previous research, is not survey based or from a single firm, but instead, covers a multi-organization and multi-plant workforce.

In our data workers make the transition from temporary to permanent employment at different stages of tenure. This provides an opportunity to separately identify the effects of tenure and employment protection on absenteeism. We further extend earlier research by attempting to identify if perceived opportunities for contractual advancement condition the effort decisions of workers without employment protection. We exploit workplace variation in our data to provide indicators of opportunities of gaining a permanent contract.

In summary, we find that workers on a temporary contract do, on average, take less absence than if they were employed on a permanent contract. However, our estimates of this difference are much lower than those reported in previous studies. This could reflect differences in institutional settings and sectoral variation. Yet, our results clearly show how estimates of employment protection effects are quite sensitive to the specification of tenure by exploiting the time-varying contract progression in our data. We also address the possible endogeneity of contract progression when progression varies by time and show that this does not fundamentally change the point estimates of contract effects. In addition, evidence is presented to suggest that the absence of temporary workers who have limited employment protection is reduced by increased incentives, in this case an increase in the opportunity of gaining a permanent contract.

The remainder of the paper is structured as follows. The next section provides some background on the public sector workforce, an outline of the data and examines the contribution of personal and workplace characteristics to the difference in absenteeism between temporary and permanent workers. Section 3 outlines the empirical methodology used to estimate employment protection effects, and the impact of workplace threats and incentives. Section 4 provides the empirical results whilst section 5 concludes.

II. Background and Preliminary Evidence

Background

The data used in this study was collected by the state government of Queensland in Australia as part of the Minimum Obligatory Human Resources Information (MOHRI) database. The database holds quarterly information on approximately 180,000 public sector workers and in this study refers to the period from quarter 1 2001 to quarter 3 2004, inclusive. In Australia, state governments account for 65.8 % of all public sector employees and have responsibility for core services, such as education, health, corrective services, emergency services and law enforcement. The remaining public sector employees work in the federal government (23%) and local government (11.2%). State government workers make up approximately 12.5% of the total employed labour force in Queensland.

Workers in the Queensland public service can be employed on one of four types of contract, temporary, permanent, contract or casual. It is important to note the key differences between these contract types. Casual employment is a common form of `flexible' employment contract in Australia and made up 25% of total employment in 2007 (ABS 2009). Casual employees are hired on a common law basis so in essence each employment contract starts and ends on each day of work. They have no entitlements to sick or holiday

pay (ABS 1996) but receive a wage premium as compensation. Supply teachers provide a good example of casual employees in our data set. Contract workers are similar except that they are hired for specific projects that are not long-term. Again they are not entitled to holiday or sick leave. In both of these cases, any sick leave would be unpaid and unrecorded. As a result of this we exclude casual and contract workers from our analysis.

Temporary employment contracts are fixed term contracts that are renewable and there is no maximum number of times that a contract can be renewed. Temporary workers can be fired or their contract may not be renewed. Workers on permanent contracts are tenured, and are very difficult to dismiss.[2] Critically for our purposes, temporary and permanent contracted workers do not vary in terms of leave or pay entitlements. The key distinction is in terms of ease of dismissal. There is no obvious disadvantage to a temporary worker from taking a permanent contract, and hence there is no reason to suspect a `non-compliance' problem whereby temporary workers would be offered, but not accept, a permanent contract.

Typically, research in this area only observes an overall measure, or restricted set of, absence categories that may contain a variety of components, some more discretionary than others. Our data is advantageous insofar as we observe a number of different components of leave; these are sickness absence leave, maternity/paternity leave, workplace injury leave and industrial dispute leave. We focus on the first category which is the key discretionary component of leave. This is recorded in MOHRI as hours of leave per quarter at a frequency of up to 0.25 of an hour. Both temporary and permanent contracted workers gain sick leave entitlements of 2 weeks a year.

A number of decisions were made regarding excluding workers and observations

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[2] For instance, quarterly dismissal rates for permanent employees in our data range from 0.00006 to 0.0019.

from our analysis. First, the key interest is in changes in absence behaviour that are largely volitional and not due to underlying health problems. Thus, we exclude workers who are on long-term unpaid absence leave due to ill-health. In addition, we also exclude workers who take particularly long periods of paid absence in a quarter as they are unlikely to be making effort decisions at the margin.[3]

By its very nature our data exhibits attrition as workers leave the public sector. Moreover, this attrition is likely to be correlated with observable characteristics, and potentially, unobservable characteristics. This may bias estimates of contract effects. One option is to focus on a balanced panel of observations (i.e. excluding leavers). Whilst econometrically attractive this seems to us likely to have other unappealing side effects such as introducing sample selection. We therefore retain workers who leave the service but also check the robustness of our results once they are excluded.

Descriptive Statistics

INSERT TABLE 1

Table 1 provides an overview of MOHRI, split by contract status and gender. Temporary workers are, on average, younger and have considerably lower tenure than permanent workers. They work less hours, on average, than permanent contracted workers. They are, however, predominantly full time. For instance further investigation of the data reveals that 70% of temporary workers are on Full-Time Equivalency (FTE) rates of over 80%, the corresponding rate is 80% of permanent workers. There are some differences in occupational structure between the two groups, with temporary contracted workers more

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[3] We use 60 hours a quarter as this cut-off, however our key estimates are not particularly sensitive to this.

likely to be in Other Professional, Intermediate or Elementary Clerical, Sales and Service work. They are also less likely to be employed as nurses or teachers. Temporary workers are also more likely to be indigenous Australians (Aboriginal or Torres Strait Islander (ATSI)) or from an Asian background. Average absence rates per quarter are approximately 2% of contracted hours for temporary workers and 3% of contracted hours for permanent workers. The rate of absence amongst our temporary workers is slightly higher than the probationary cohort in Ichino and Riphahn's (2005) data, who report absence rates of 1.3%, however, overall absence rates are broadly comparable to national absence rates reported for Canada and the UK in Barmby (2002).

The Queensland public sector workforce is organised into a range of departments according to function (portfolio). These include departments covering health, education, police services, correctional services, emergency services, roads, transport and a range of policy orientated departments. In total there are 51 departments in our data period, but as a result of departmental re-shuffles and amalgamations there are never 51 departments at one point in time. Generally there are 32-40 departments in operation within any given quarter. There are large variations in the use of temporary contracts across these departments, including variation in the rates of temporary workers' job loss (θ) and the rate of temporary workers' transition to a permanent contract (γ). Table 2 provides summary statistics on temporary contract use by department.[4] On average, in any given quarter roughly 16% of departmental workforces are temporary, 11% of these temporary workers separate from the public sector in a quarter and 9% gain a permanent contract. These data demonstrate that, despite their common institutional framework, departments set their own practices regarding the use of temporary workers. Some departments, for instance 1 and 24, use a relatively large

[4]To maintain anonymity of departments we do not report names. In this table to provide a more consistent pattern of these variables, only departments who were present in our data for at least 12 quarters are reported.

proportion of temporary workers, with high turnover and low transition rates to permanent contracts. Others, such as department 2, clearly view temporary workers as potential permanent employees. Furthermore, the reported standard deviations, provided in parentheses in Table 2, demonstrate that transition rates (γ) and the risk of temporary contract non-renewal (θ) vary substantially within departments over the sample period.

INSERT TABLE 2

More generally, correlations between (θ), (γ) and the use of temporary workers suggest that departments with a higher proportion of temporary workers have lower temporary worker separation rates and lower rates of transition to permanent contracts. Rates of job loss and rates of transition from temporary to permanent contracts are positively correlated.

Preliminary Findings

To provide initial evidence of the partial correlation between absenteeism and contract type we used the complete MOHRI dataset of all permanent and temporary workers. From the raw data we observe that permanent contracted workers take on average 5 and a half hours more absence a quarter than temporary workers (see Table 1). This differential may arise because of variations between workers with respect to observable characteristics that are associated with absence. In addition, permanent and temporary workers may also vary in terms of unobservable characteristics that are associated with absence. Thus, we estimated a regression model of quarterly absence with a vector of controls for time-varying characteristics of workers, workplace characteristics and worker fixed effects to capture time-invariant individual unobservable characteristics. In unreported estimates these show that male permanent workers took 1.932 [s.e. 0.243] more hours absence per quarter, and female permanent workers took 2.181 [s.e. 0.143] hours more absence per quarter when compared to

9

temporary workers. Thus, a smaller, but statistically significant, differential in absence levels remains after controlling for observable and unobservable factors. Our aim is to determine the extent to which this is a result of a change in employment protection, or a reflection of other factors.

To address this issue, rather than continue to examine the full MOHRI data set, we choose to focus on a cohort of workers who enter the public sector on a temporary contract during the 2001 calendar year. This allows us to examine changes in absence behavior as early tenure workers move from temporary to permanent contracts. In this way our set-up is comparable to other studies of early career absenteeism (Ichino and Riphahn, 2005). Focussing on a single cohort has several advantages. First, as discussed below, it allows the use of workplace level information drawn from the full sample (excluding the cohort) to generate variables which proxy for the opportunity to move to a permanent contract. Second, we avoid biases in the full sample related to the non-random pre-sorting of workers into tenure groups and contract types at the start of our sample period.

Our cohort was selected to maximise the sample size of temporary contracted entrants whilst allowing sufficient time to observe their subsequent absence behaviour. These workers are then followed for up to 14 additional quarters, providing they remain in the public sector workforce. Sample means for the cohort are reported in the Appendix as Table A1. Compared to our full sample of temporary workers in MOHRI our entrant cohort are younger, work longer hours and while the distribution of occupational type is similar, there is some slight indication that the entrants are more likely to be in lower skilled occupations. Table A2 provides a summary of the transition patterns of the cohort. This demonstrates that while a lot of transitions occur within the first five quarters of employment, many temporary workers gain permanent contracts after this period.

III.   Empirical Methodology

Employment Protection and Absenteeism

Our main estimating model of absenteeism is:

$$A_{it} = \alpha_i + \phi Perm_{it} + \beta X_{it} + \delta W_{it} + \omega Z_{ijt} + \varepsilon_{it} \qquad (1)$$

Where A_{it} is the hours of absence taken in quarter t by worker i and α_i is an individual specific fixed effect that controls for unobserved time invariant differences between workers. $Perm_i$ is the workers' time varying contract status, here denoted by a dummy variable identifying permanent contract status. Hence, estimates of ϕ are identified in this model by workers moving between contract states. X_i is a vector of time varying personal characteristics (including tenure) and W_i is a vector of time varying workplace and work-related characteristics. There may be differences in departmental management practices in relation to absence management and/or the treatment of temporary workers. Thus, we introduce controls for unobservable workplace characteristics. Ideally, we would include a fixed effect for every workplace in the public sector. However, this would require the inclusion of over 1500 fixed effects. Instead, we include fixed effects for each of the 51 departments in the public sector where Z_{ijt} is a dummy that is equal to one if worker i is in department j at time t. We observe the hourly wage in the data, but note that the wage is likely to be endogenous and exclude this from our empirical models. However, all of our key results are robust to the inclusion of wages as a control in our regression models. Finally, absenteeism is likely to have a seasonal component. We therefore introduce controls for the quarter of the year, and omit the first quarter (January to March).

A key feature of our institutional setting is that there are no set rules (i.e. tenure limits) for progression from temporary to permanent employment contracts. Temporary workers can be offered a permanent contract at any time. This gives rise to variation between

11

tenure and changes in the level of employment protection. At the same time, the assignment of temporary workers to permanent contracts in our data is unlikely to be an exogenous event. This non-random assignment has the potential to bias the estimates of contract effects on absence. Temporary workers may be assigned (or assigned earlier) to permanent contracts on the basis of absence behaviour or unobserved characteristics that affect absence behaviour. In this case, temporary workers with better (i.e. lower) absence behaviour move to permanent contracts earlier. If these differences are related solely to time-invariant unobserved individual characteristics, the implementation of a fixed effects approach should lead to unbiased estimates of contract effects. This would be the case if temporary employment was being used as a screening mechanism allowing firms to observe elements of worker productivity that were unobservable, or observed with less precision at the point of recruitment. It is also possible, but perhaps less likely, that there are time-varying omitted variables, such as unobserved changes in personnel practices, workplace culture and the like. In this case estimated contract effects controlling for worker fixed effects may still be subject to bias. We explore the robustness of our results to these potential biases by using an instrumental variables approach. However, since our dataset is derived from administrative data it has a limited range of variables to draw on for plausibly exogenous instruments.

In view of the above, we use two instruments derived from data excluding the cohort, the proportion of the departments' workforce that is on a temporary contract, and quit rates of permanent employees measured at the department level. These appear to fit the criteria required for validity, discussed in the results, but we explore the possibility that the exclusion restriction is not perfectly met. We relax the exclusion restriction assumption and assess the sensitivity of our estimates of contract effects using a method proposed by Conley et al (2008) that explicitly builds in the possibility of `exogeneity error'. Uncertainty about the exclusion restriction is treated as being of the same order of magnitude as sampling

uncertainty. This method also takes into account the strength of the instrument in combination with exogeneity error, insofar as weaker instruments will amplify any specified exogeneity errors.

Is Temporary Workers' Absenteeism Influenced by Workplace Incentives?

The second contribution of our paper is to provide evidence of whether temporary workers' effort is conditioned by particular workplace incentives that do not exist for permanent workers. We proxy for incentives using the transition rates from temporary contracts to permanent contracts within the worker's department (γ), as previously reported in Table 2. Note that, the incentive variable is created from the complete MOHRI data set, excluding our cohort of temporary contracted entrants. In addition, we introduce a control for time-varying changes in local conditions, such as a change in work culture that could affect absenteeism in the workplace and through that change individual worker behaviour. These are captured with a variable measuring average workplace absenteeism. The well known reflection problem (Manski 1993) means that we cannot necessarily interpret the coefficient on the average workplace absenteeism as a causal estimate of so called `peer effects', rather it provides an indicator of association between workplace and individual absenteeism. Nevertheless, earlier work with this dataset focusing explicitly on peer effects provided evidence suggesting a positive casual effect of peer absence behaviour on individual absence behaviour in the case of teachers (Bradley at al 2007). This leads to the following empirical specifications:

$$A_{it} = \alpha_i + \omega Z_{ijt} + \varphi \gamma_{ijt-n} + \beta X_{it} + \delta W_{it} + \phi Perm_{it} + \lambda \overline{g}_{ijt} + \varepsilon_{it} \tag{2}$$

13

where γ is the measure of transition from temporary to permanent contracts in workplace j for worker i at time $t\text{-}n$, and $\bar{g}$ measures average workplace absence in workplace j for worker i at time t. The expectation is that $\varphi < 0$ and $\lambda > 0$. The former would indicate that temporary workers respond positively to an environment affording potentially greater possibilities of gaining permanent employment. There is no natural lag period to choose for the incentives measure, so we experiment with models with a one lag period (γ_{ijt-1}) and a distributed lag of two periods and (γ_{ijt-1} $_+$ γ_{ijt-2})/2. The latter allows for more time for information to become available to workers in departments.[5]

IV. Results

Employment Protection and Absenteeism

Figure 1 presents the cohort of temporary workers' absence normalized to the time at which they transit to permanent employment. Specifically, time 0 on the x-axis refers to the quarter in which the worker made the transition from a temporary to a permanent contract. As a result, period 0 covers a quarter within which we do not perfectly observe the timing of the transition between contract types. Hence, we do not know exactly how much of the absence in this period occurred whilst the worker was on a temporary contract. A better comparison is between the periods denoted -1 and 1. The raw difference in absenteeism calculated in this way reveals marked gender differences in the contract effect on absence. For males, there is an increase in absence of 1.32 hours per quarter, while for females the increase is higher at

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[5]Longer lags of γ were also tested. These resulted in estimates of a similar magnitudes to those reported, however the estimates were less precise.

2.35 hours per quarter. An alternative approach is to look at mean differences in absenteeism over the whole period before and after transition, which reveals a mean difference of 3.162 hours and 3.304 hours for males and females, respectively.

INSERT FIGURE 1

Figure 2 plots mean absence over time for the cohort of temporary entrants (i.e. the x-axis runs from the quarter of entry through to the last quarter that they are observed). It is immediately noticeable that temporary workers take very little absence in the first two quarters. There is a marked increase in absence after this time, which is not associated with any systematic contract change for the cohort.[6] This tenure pattern could reflect so called `early career concerns' (Holmstrom 1999). Consequently, the apparent contract effects on absence reported in Figure 1 may be overstated if there is a positive absence-tenure relationship, especially for those workers making the transition to a permanent contract early in their tenure with the public service. This re-emphasizes the need to identify contract and tenure effects separately.

INSERT FIGURE 2

We now examine more formally if workers' absence increases significantly following a change in contract status from temporary to permanent. As noted above, a difficulty with our data is that we only observe quarterly intervals (not the actual date of transition). Hence, tenure at the time of transition is imperfectly observed. This quarter of transition is excluded from the analysis as during this quarter we cannot precisely assign contract status.[7] We also

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[6]Similar absence to tenure patterns are reported for representative data for the UK labour force by Ercolani (2006).

[7]In all estimations excluding period 0 has a small positive effect on the estimate of the permanent contract effect.

exclude the first quarter of observation as by definition in this period all workers are on temporary contracts and this quarter may not represent an entire quarter of observation. Again this decision has only a minor effect on our main estimates.

Variants of equation (1) were estimated for the cohort and the results are reported in Table 3. Initially we estimate a simple OLS variant of (1) with and without a control for tenure. This provides some initial indication of the sensitivity of the estimated contract effect to worker tenure. Following this fixed effects are introduced to control for time invariant differences in worker and departmental characteristics. For the purposes of comparison the raw contract differential in absenteeism is also reported in Table 3.

The OLS estimates with tenure omitted indicate a contract difference in absence of 2.769 hours per quarter for males and 2.279 hours per quarter for females. Both estimates are statistically significant at standard levels. These initial results suggest that differences in absence behaviour between workers on temporary and permanent contracts that we see in the data are in part a result of observable characteristics. This is more noticeable for females. The next set of estimates are those including a control for tenure and its quadratic. This leads to a halving of the estimated permanent contract effect on absenteeism. This provides some indication that a sizeable proportion of what might be identified as possible contract differences in absence behaviour is associated with the absence-tenure patterns observed in Figure 2. This is examined in more detail below.

INSERT TABLE 3

Estimates of (1) with worker and departmental fixed effects are reported in the next two columns of Table 3. The inclusion of these controls leads to a small reduction in the estimate of the contract effect for males and a slight increase for females. When compared to the previous estimates, this suggest only a minor additional explanatory role for time

invariant unobserved differences in underlying absence propensities between temporary workers who gain permanent contracts. The same is true for unobserved workplace characteristics. These effects are not sufficient to change the general findings regarding contract effects.

Robustness Checks

This section outlines a range of robustness checks of the contract effect estimates. Temporary and permanent workers may, on average, work in different geographic areas which vary in terms of underlying absence probability due to differences in factors such as travel-to-work times and regional variations in sickness. We introduced postcode level fixed effects to capture time invariant location differences and found our main results were unaffected, although the estimates were less precise. Finally, the models in Table 3 were re-estimated excluding, in turn, specific groups of workers for whom absence behavior may vary substantially. We excluded workers who reported having a disability and workers on part-time hours (full-time equivalency less than, or equal to, 80 percent). In neither case did this substantively affect the estimates of contract effects on absenteeism.

Following Ichino and Riphahn (2005), we estimate a variant of (1) where the linear tenure and quadratic term in earlier estimates are replaced with a dummy variable included for each quarter of tenure omitting the first quarter of tenure that we observe. Unlike Ichino and Riphahn (2005) we are still able to include separate contract effect estimates because of the time variation of transition in our sample. The estimates from this model are reported in Table 4, and in addition we also report full tenure-quarter point estimates. The inclusion of these tenure controls leads to a marked reduction in the size of the permanent contract effect, falling to 0.642 for males and 0.854 for females. Whilst these estimates are relatively precise, they are even lower than those obtained in Table 3, and indicate a fairly small impact of

contract change on worker absenteeism.

<center>INSERT TABLE 4</center>

Another potential source of bias in the contract estimates is that the dismissal and non-renewal of temporary workers is non-random. For instance, temporary workers who quit or are fired, may, on average, have higher absence levels. Examination of our data confirms this; temporary workers who leave during our period of observation have higher average absenteeism levels in every tenure quarter. This may bias the estimated absence differential between permanent workers and temporary workers. Therefore, all the models in Tables 3 and 4 were re-estimated excluding all workers who left the public sector workforce during our sample period. Estimates of the contract effect on absence were essentially unchanged.

Our results do not appear to be driven by our cohort selection. All of our models were re-estimated on two alternative cohorts, one that contains all temporary contracted workers who entered between 2001 quarter 2 to 2002 quarter 1 (i.e. one quarter on from our main cohort) and also for another cohort who entered between 2001 quarter 3 to 2002 quarter 2. In no case did this materially affect the size and significance of the estimated contract effect on absenteeism.

One might also worry that workers have prior knowledge of changes in contract status and adjust absence behaviour before actually gaining a permanent contract. To examine this a variable was created t\hat incorrectly flagged a temporary worker as moving to a permanent contract one quarter before the actual transition occurred. Our main fixed effects model was re-estimated with this variable replacing our permanent contract dummy. Hence, this model identifies the effect of a permanent contract in the period before transition. The (incorrect) contract effect from models with quadratic tenure terms was positive but not statistically

significant[8], whilst models including tenure dummies revealed a contract effect that was substantively zero.

Our fixed effects estimates of contract effects could still be biased if there are time varying unobservable characteristics that influence the probability of gaining a permanent contract and absenteeism. To address this possibility we estimate a two-stage least squares model where, in the first stage the dependent variable is the probability of gaining a permanent contract at the time when the individual makes the transition to a permanent contract, and in the second stage the dependent variable is absence per quarter. As suggested earlier, we proceed on the basis that instrument exogeneity may not be strictly maintained, and we therefore examine the consequences for our contract effect estimates. Drawing from the complete MOHRI data set, we identify our model with two variables, variations in which are likely to influence the probability of a temporary worker gaining a permanent contract but have no, or limited effects, on individual absenteeism.[9] The first is the time varying departmental separation rate of permanent workers in the previous quarter. This is inversely related to the probability of a temporary worker gaining a permanent contract but, conditional on other observable covariates, appears to have no direct effect on individual absenteeism. However, it could still be argued that a higher separation rate reflects a decline in the work climate, which leads workers, including those on temporary contracts, to take more absence. We explore the potential for a direct effect on our estimated contract effect. The second instrument we use is time variation in the proportion of the departmental workforce that is temporary. This is also inversely related to the probability of a temporary worker gaining a permanent contract. Again it is possible that a larger temporary workforce increases the

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[8]Estimates of 0.505 [s.e. 0.461] and 0.245 [s.e. 0.326] for males and females, respectively.

[9]Note that we exclude those individuals who are in our temporary entry cohort when calculating these variables.

competition for permanent positions. This could influence absenteeism, positively or negatively, if excessive competition discourages workers such that they are less inclined to compete and signal their desire to be selected.

The estimates of contract effects with instruments, reported in Table 5, were 1.642 hours for males and 0.959 hours for females. The female estimate was not statistically significant, which accords with previous evidence (Ichino and Riphahn, 2005). The tests suggest that the instruments are strong and valid but the Sargan test does not exclude the possibility that the instruments are endogenous. To investigate the impact of a specification error in our instruments, we examine the consequences of relaxing the assumption that our instrumental variable of the lagged departmental permanent separation rate has no direct effect on absenteeism (Conley et al 2008) on our estimated contract effect for males. We assume that the error is from a uniform distribution with a mean of zero and variance δ^2, and then select different values for δ to create confidence intervals for our estimates of the male contract effects. There is little guidance as to what values of δ to select. We introduced a range of values, but report the estimates for two indicative values for $\delta = 0.5$ and $\delta = 0.15$. The former assumes a relatively large effect, 0.5 represents a standard error greater than that reported for the contract effect itself in Tables 3 & 4 (which range from 0.2 to 0.4), whereas 0.15 is a more conservative estimate of the size of the specification error. The bounds estimates suggest that the range is not particularly sensitive to the degree of specification error but does indicate that we cannot rule outs the possibility of no contract effect, or even a negative effect at the 90% confidence level.[10] Nevertheless, the likelihood of a positive

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[10] Similarly, we also investigated the sensitivity of our contract estimates to a misspecification of the second instrument. However there is no evidence in our data of any direct effect of the proportion of the departmental workforce that is temporary on our temporary workers' absenteeism. As a result our point estimates of contract effects are unaffected by allowing for this form of specification error with this instrument.

impact on absenteeism remains the most probable outcome from a change in contract status.

In summary, our estimates of the contract effects suggest an approximate increase in absenteeism of 1 to 1.6 hours per quarter. This translates to an increase in absence rate of roughly 15% to 23%.[11] This is markedly lower than the increase in rates reported by Ichino and Riphahn (2004, 2005) which range between 100% and 200%. The magnitude of this effect is, however, sensitive to tenure specification, and to controlling for potentially time varying endogeneity bias.

Our second contention is that lower absenteeism whilst in a temporary contract need not necessarily just reflect concerns over dismissal but also a desire to signal ability and motivation to obtain a permanent contract. The next section exploits the department level data in Table 2 to provide evidence on whether there is a link between potential opportunities to gain more secure employment and worker effort.

Incentives: Empirical Evidence

We initially proceed under the assumption that the incentive is a separate and additive effect on worker absence. This leads us to estimate equation (2). Our estimates of incentive effects, unlike contract status effects, are not particularly sensitive to the functional form of tenure chosen.

Estimates are reported in Table 6. It is worth re-emphasizing that these models include non-parametric controls for tenure and departmental level fixed effects, hence the estimated effects of gaining a permanent contract are identified by variation in γ over time within the department. We first estimate the equation without the inclusion of average

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[11] We compute this by taking this estimated increase in hours over the average absence of temporary workers whilst temporary, excluding those who never gain a permanent contract in our sample period. If we include all temporary workers in the cohort, the percentage increase ranges from 19% to 29%.

workplace absenteeism ($\bar{g}$). The estimates support the view that more opportunities to gain permanent employment decreases absenteeism (increases effort). In the last two columns of Table 6 we include workplace absenteeism. This attempts to control for unobservable time-varying changes influencing all workers' absenteeism that may be correlated with variations in γ. This would upwardly bias our estimates of γ's impact on worker absence. As expected, the estimated incentive effects fall but are statistically robust to the inclusion of workplace absenteeism. Higher average workplace absenteeism is associated with increased individual absenteeism, this is indicative of possible peer effects but the potential for reverse causality necessitates caution in any interpretation of this effect.

The contract effects are of a similar order of magnitude to those reported in Table 5. Note, however, that the two lag period model, which drops an additional period of observation, increases the estimates of contract effects somewhat. Also, recall from Table 2 that departmental variations in temporary job loss rates (θ) are correlated with our measure of incentives (γ). Thus, in unreported estimates we included the term (θ) in addition to γ and $\bar{g}$, and we used two lag structures as above. For males increases in the temporary job loss rate were associated with lower absenteeism, but no effect could be discerned for females. In no cases did this additional variable alter the estimates of γ, $\bar{g}$ or the overall permanent contract effect.

How big are these incentive effects? They range between -0.04 and -0.07 for a 1 percentage variation in the likelihood of gaining a permanent contract. To put this in context, the standard deviation in this variable across time within departments is 9 percentage points, hence a 1 standard deviation increase in the departmental transition rate from the mean would reduce the average temporary workers' absenteeism by 0.36 to 0.62 hours per quarter. This is in the order of half the effect of our estimated contract effect.

INSERT TABLE 6

The incentive effects should not influence the behaviour of our temporary workers once they gain a permanent contract. In further tests, we interacted γ with a dummy indicating a permanent contract had been obtained. As expected, these interaction terms were statistically insignificant and approximately zero, whilst the signs and size of the coefficients on γ and the contract effect were unaffected. Hence, there is no further incentive effect once temporary workers make the transition to a permanent contract.

Finally, it is also worth mentioning a little more about cohort selection as this may be critical in our incentive model as the cohort timing effectively defines which values of γ are used to identify incentive effects. Equation (2) was re-estimated on a cohort covering temporary workers who entered the public sector workforce in 2001 quarter 3 to 2002 quarter 2, inclusive (i.e. moving the cohort selection frame ahead two quarters). Estimates for this cohort are reported as Table A3 in the appendix. As can be seen, estimates of γ largely follow those reported in Table 6. It also noticeable that estimated contract effects are larger but still comparable to those reported in earlier tables.

V. Conclusion

This paper sought to make two contributions to the understanding of employment protections' effects on worker behaviour.

First, we sought to disentangle the effects of changes in employment protection from any tenure effects on worker effort, in recognition of the fact that effort will be conditioned by tenure through influences unrelated to contract status. Our data enabled us to overcome difficulties faced by other researchers where probation and tenure were explicitly linked. We

estimated models of discretionary worker absence identifying the impact of a change in contract status from less to more protected employment that also included tenure specified parametrically and in more flexible non-parametric forms; as well as controls for time invariant individual and workplace characteristics. In an extension of the model we investigated the potential for endogeneity in the relationship between absence behaviour, tenure and contract status change to bias our estimates.

Our results indicate that tenure, however specified, is a significant influence on absence behaviour and the estimates of contract status change, whilst significant, are small compared to earlier estimates. We identified an increase in absence rates of approximately 20%, earlier studies suggested increases in the order of 100% to 200% (Ichino and Riphahn 2004, 2005). As with earlier studies we found some differences between contract change for males and females

Second, we extend previous research by including the possibility for incentives that exist in the work environment to influence absence behaviour of workers with lower employment protection. It was found that increases in the potential opportunities for movement to permanent contracts over time resulted in temporary workers exerting more effort (take less absence), where we included a control to capture other time varying changes in workplace environment and culture that may affect worker absence behaviour. This incentive effect did not change the contract status estimates and was about half the size of the contract status change effect. The influence of incentives on absence behaviour can be seen to reflect the dual use of temporary workers as both a flexible labor force and also a source of recruitment to permanent employment.

These findings have implications at a more aggregate level. They suggest an ambiguous effect of changes in employment protection on worker effort. For instance, easing of unfair dismissal laws could lead to increases in some workers' effort due to an increase in

the risk of job loss, but may have a contrary effect on others if protected jobs become scarcer.

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Table 1: Sample Means, Queensland Public Service 2001(1)-2004(3), Age 20-65

	Temporary		Permanent	
	Male	Female	Male	Female
Absence (hours in quarter)	7.913	7.674	13.555	13.042
Absence Rates (per quarter)	1.82%	2.02%	2.93%	3.21%
Hourly Wage ($AUD)	21.519	20.243	25.271	23.085
Age (years)	35.902	36.561	42.275	40.775
Tenure (years)	3.031	2.745	13.911	10.111
Non-English Speaking Background (NESB):				
European	0.020	0.024	0.023	0.024
Asian	0.050	0.035	0.023	0.026
Other	0.025	0.022	0.041	0.039
Aboriginal or Torres Strait Islander (ATSI)	0.035	0.031	0.019	0.019
Disability	0.044	0.037	0.081	0.06
Full-time Equivalency (FTE)	0.923	0.807	0.981	0.863
Workforce Temporary (%)	0.201	0.174	0.115	0.124
Establishment Size	1057.091	947.133	894.512	989.149
Occupation:				
1. Manager	0.022	0.011	0.055	0.013
2. Other Professional	0.305	0.190	0.193	0.108
3. Teacher	0.131	0.201	0.182	0.292
4. Nurse	0.020	0.073	0.031	0.128
5. Associate Professionals	0.131	0.089	0.244	0.105
6. Tradespersons	0.100	0.003	0.064	0.003
7. Advanced Clerical and Service Workers	0.014	0.017	0.013	0.016
8 Intermediate Clerical, Sales and Service Workers	0.150	0.336	0.116	0.269
9. Intermediate Production and Transport Workers	0.011	0.001	0.022	0.001
10. Elementary Clerical, Sales and Service Workers	0.046	0.051	0.013	0.012
11. Labourers and Related Workers	0.07	0.028	0.067	0.053
Observations	108,976	235,682	789,234	1,325,468

Source: MOHRI data.

Table 2: Departmental Variation in the Use of Temporary Contracts
Summary Statistics (Selected Departments)

Dept	Workforce on Temporary Contracts (%)	Temporary Workers' Job Loss Rate (θ)	Transition Rate to Permanent Contracts (γ)	Average Number of Workers
1	0.220 (0.085)	0.199 (0.122)	0.055 (0.085)	191 (17.342)
2	0.060 (0.038)	0.068 (0.068)	0.218 (0.084)	2848 (184.441)
3	0.086 (0.056)	0.114 (0.182)	0.123 (0.036)	6218 (889.1352)
4	0.188 (0.049)	0.064 (0.048)	0.097 (0.060)	2185 (166.709)
5	0.312 (0.038)	0.091 (0.092)	0.048 (0.032)	233 (65.873)
6	0.063 (0.017)	0.133 (0.051)	0.106 (0.027)	4312 (248.931)
7	0.121 (0.066)	0.159 (0.052)	0.047 (0.026)	3338 (883.113)
8	0.159 (0.042)	0.177 (0.130)	0.101 (0.022)	2563 (478.902)
9	0.314 (0.121)	0.101 (0.111)	0.048 (0.025)	1315 (50.907)
10	0.129 (0.023)	0.079 (0.085)	0.078 (0.027)	4597 (149.510)
11	0.278 (0.114)	0.138 (0.095)	0.045 (0.016)	808 (83.990)
12	0.136 (0.135)	0.043 (0.083)	0.020 (0.012)	3674 (874.159)
13	0.233 (0.124)	0.064 (0.113)	0.051 (0.016)	4181 (123.629)
14	0.219 (0.059)	0.136 (0.056)	0.076 (0.042)	401 (150.358)
15	0.092 (0.035)	0.053 (0.072)	0.070 (0.057)	67179 (4470.110)
16	0.166 (0.079)	0.108 (0.081)	0.063 (0.030)	2474 (177.293)
17	0.133 (0.054)	0.054 (0.075)	0.159 (0.043)	47347 (6064.655)
18	0.242 (0.016)	0.096 (0.086)	0.045 (0.033)	1213 (65.128)
19	0.111 (0.079)	0.098 (0.049)	0.072 (0.029)	2454 (141.062)
20	0.074 (0.051)	0.180 (0.037)	0.116 (0.110)	347 (39.791)
21	0.169 (0.043)	0.073 (0.132)	0.040 (0.033)	248 (23.546)
22	0.049 (0.017)	0.132 (0.270)	0.109 (0.096)	504 (9.318)
23	0.040 (0.046)	0.216 (0.045)	0.116 (0.015)	186 (64.079)
24	0.327 (0.078)	0.039 (0.100)	0.043 (0.071)	155 (14.535)
25	0.023 (0.030)	0.196 (0.289)	0.271 (0.286)	11746 (413.860)
26	0.177 (0.056)	0.081 (0.050)	0.059 (0.030)	817 (45.641)
27	0.178 (0.032)	0.072 (0.034)	0.044 (0.030)	307 (34.505)
28	0.088 (0.025)	0.113 (0.054)	0.111 (0.047)	1506 (86.981)
Mean	0.156 (0.106)	0.106 (0.121)	0.086 (0.091)	
Median	0.153	0.099	0.071	

Correlations

	Temporary (%)	θ
θ	-0.319	
γ	-0.644	0.307

Source: MOHRI. For confidentiality reasons we do not report department names. To illustrate the variability of these variables () are across sample period standard deviations at the departmental level.

Table 3: Absenteeism and the Transition to Permanent Employment, Temporary Entrant Workers

	Raw Differential		OLS (without tenure)		OLS (with tenure)		FE (with tenure)	
	Male	Female	Male	Female	Male	Female	Male	Female
Permanent Contract	3.162	3.304	2.769*	2.279*	1.353*	1.123*	1.276*	1.309*
			[0.300]	[0.209]	[0.339]	[0.248]	[0.382]	[0.279]
Tenure (years)					1.106*	0.880*	0.920*	1.112*
					[0.136]	[0.108]	[0.149]	[0.128]
Tenure² (years)					-0.037*	-0.039*	-0.026*	-0.042*
					[0.004]	[0.007]	[0.005]	[0.006]
Departmental Dummies			No	No	No	No	Yes	Yes
r²			0.074	0.066	0.091	0.075	0.048	0.039
Observations	12,323	23,340	12,323	23,340	12,323	23,340	12,323	23,340

Source: MOHRI data. *, ** indicate statistical significance at 1% and 5%, respectively.

Robust standard errors clustered at the individual level in parentheses. Controls for ethnicity, disability, occupation, age, FTE, Establishment Size and seasonal dummies included but not reported

Table 4: Contract Effects and Non-Parametric Tenure Controls, Temporary Entrant Workers

	Male	Female
Permanent Contract	0.642***	0.854*
	[0.388]	[0.286]
Tenure Quarter:		
3	3.439*	3.952*
	[0.263]	[0.252]
4	4.789*	4.759*
	[0.338]	[0.278]
5	4.861*	5.211*
	[0.414]	[0.323]
6	5.753*	5.554*
	[0.489]	[0.367]
7	6.356*	5.877*
	[0.566]	[0.412]
8	7.370*	6.040*
	[0.617]	[0.450]
9	6.943*	6.864*
	[0.688]	[0.489]
10	7.583*	6.342*
	[0.742]	[0.623]
11	8.141*	6.467*
	[0.827]	[0.588]
12	9.398*	6.342*
	[0.900]	[0.623]
13	9.171*	6.915*
	[1.008]	[0.687]
14	8.531*	6.742*
	[1.093]	[0.762]
15	11.639*	7.401*
	[1.614]	[0.991]
r^2	0.089	0.057
Observations	12,323	23,340

Source: MOHRI data. *,**, *** indicate statistical significance
at the 1%, 5% and 10% level, respectively. Robust standard errors
clustered at the individual level in parentheses. All models include
controls for time varying worker characteristics, worker fixed effects,
workplace characteristics and departmental level fixed effects.

Table 5: Absenteeism and the Transition to Permanent Employment –
Instrumental Variables Estimates, Temporary Entrant Workers

	Males	Females
Permanent	1.642*** [0.984]	0.959 [0.655]
Instruments		
Proportion of Department Temporary	-0.057 [0.003]	-0.047 [0.002]
Permanent Separation Rate	-0.016 [0.017]	0.045 [0.007]
Observations	7,159	13,659
Partial R^2	0.06	0.03
Cragg-Donald Wald F-statistics	223.77	208.08
Sargan Statistic	1.652 [*pval* 0.199]	0.367 [*pval* 0.544]
Bounds Estimates (90%)		
$\gamma = 0.15$	[-0.544,3.541]	
$\gamma = 0.50$	[-0.590, 3.587]	

Source: MOHRI data. *, ** indicate statistical significance at 1% and 5%, respectively.

Robust standard errors clustered at the individual level in parentheses. Controls for tenure, ethnicity,

disability, occupation, age, FTE, Establishment Size and seasonal dummies included but not reported

Table 6: Absenteeism, Incentives and Employment Protection, Temporary
Entrant Workers

	(I)		(II)	
	Males	Females	Males	Females
Lagged 1 Period				
Permanent Contract	0.598 [0.376]	0.617** [0.268]	0.704*** [0.374]	0.707*[0.267]
Temporary to Permanent Transition Rate	-0.088*[0.017]	-0.058* [0.011]	-0.074* [0.017]	-0.041*[0.011]
Workplace Average Absenteeism			0.225* [0.024]	0.247* [0.018]
r^2	0.055	0.043	0.064	0.052
Observations	12259	23279	12255	23248
Average 2 Lagged Periods				
Permanent Contract	1.038** [0.433]	1.220* [0.308]	1.087** [0.043]	1.249*[0.306]
Temporary to Permanent Transition Rate	-0.052* [0.011]	-0.048* [0.007]	-0.041* [0.012]	-0.035* [0.007]
Workplace Average Absenteeism			0.260* [0.027]	0.243* [0.020]
r^2	0.05	0.019	0.062	0.023
Observations	10267	19667	10264	19643

Source: MOHRI data. *,**, *** indicate statistical significance at the 1%, 5%
and 10% level, respectively. Robust standard errors clustered at the individual level in parentheses.

All models include controls for time varying worker characteristics, individual fixed effects,
workplace characteristics, non-parametric tenure dummies and departmental level fixed effects.

Table A1: Sample Means by Gender, Temporary Entrant Workers

	Male	Female
Age (years)	33.609	32.156
Non English Speaking Background (NESB)		
European	0.017	0.023
Asian	0.032	0.017
Other	0.012	0.020
Disabled	0.014	0.015
ATSI	0.032	0.024
Full Time Equivalency (FTE)	0.941	0.877
Hourly Wage ($AUD)	18.344	17.79
Establishment Size (Number of Workers)	298.975	316.002
Workforce Temporary (%)	0.137	0.135
Occupation		
1. Manager	0.017	0.018
2. Other Professional	0.266	0.197
3. Teacher	0.137	0.206
4 Nurse	0.002	0.013
5. Associate Professionals	0.113	0.072
4 Tradespersons	0.088	0.002
5 Advanced Clerical and Service Workers	0.013	0.025
6 Intermediate Clerical, Sales and Service Workers	0.170	0.314
7 Intermediate Production and Transport Workers	0.011	0.002
8 Elementary Clerical, Sales and Service Workers	0.089	0.117
9 Labourers and Related Workers	0.094	0.034
Observations	1,922	3,458

Source: MOHRI

Table A2: Tenure and Transition to Permanent Contract,
Temporary Entrant Workers

	Males Transitions	Females Transitions
2nd Quarter	102 [0.053]	203 [0.059]
3rd Quarter	115 [0.070]	271 [0.088]
4th Quarter	98 [0.066]	145 [0.052]
5th Quarter	122 [0.095]	235 [0.095]
6th Quarter	52 [0.049]	92 [0.045]
7th Quarter	47 [0.050]	86 [0.048]
8th Quarter	30 [0.036]	67 [0.041]
9th Quarter	35 [0.044]	66 [0.042]
10th Quarter	19 [0.025]	38 [0.026]
11th Quarter	20 [0.028]	41 [0.030]
12th Quarter	11 [0.017]	28 [0.022]
13th Quarter	6 [0.013]	21 [0.024]
14th Quarter	5 [0.016]	10 [0.016]
15th Quarter	1 [0.011]	1 [0.005]
Total Transitions	663	1,304
% Make Transition in Sample	0.345	0.377

Source: MOHRI. Quarterly rates of transition in parentheses.

Table A3: Absenteeism, Incentives and Employment Protection, Alternative Cohort of Temporary Entrant Workers

	(I)		(II)	
	Males	Females	Males	Females
Lagged 1 Period				
Permanent Contract	1.604* [0.392]	1.171* [0.289]	1.639* [0.392]	1.147* [0.289]
Temporary to Permanent Transition Rate	-0.079*[0.020]	-0.079* [0.014]	-0.058* [0.020]	-0.058* [0.014]
Workplace Average Absenteeism			0.242* [0.026]	0.184* [0.020]
r^2	0.041	0.031	0.042	0.033
Observations	11,596	21507	11596	21507
Average 2 Lagged Periods				
Permanent Contract	1.729* [0.521]	1.265* [0.361]	1.808* [0.052]	1.278*[0.360]
Temporary to Permanent Transition Rate	-0.071* [0.020]	-0.066* [0.012]	-0.050** [0.020]	-0.051* [0.013]
Workplace Average Absenteeism			0.231* [0.033]	0.161* [0.026]
r^2	0.017	0.026	0.024	0.021
Observations	8299	15594	8299	15594

Source: MOHRI data. *,**, *** indicate statistical significance at the 1%, 5%
and 10% level, respectively. Robust standard errors clustered at the individual level in parentheses.
All models include controls for time varying worker characteristics, individual fixed effects,
workplace characteristics, non-parametric tenure dummies and departmental level fixed effects.

FIGURE 1: Hours Absence by Transition Time to Permanent Employment,
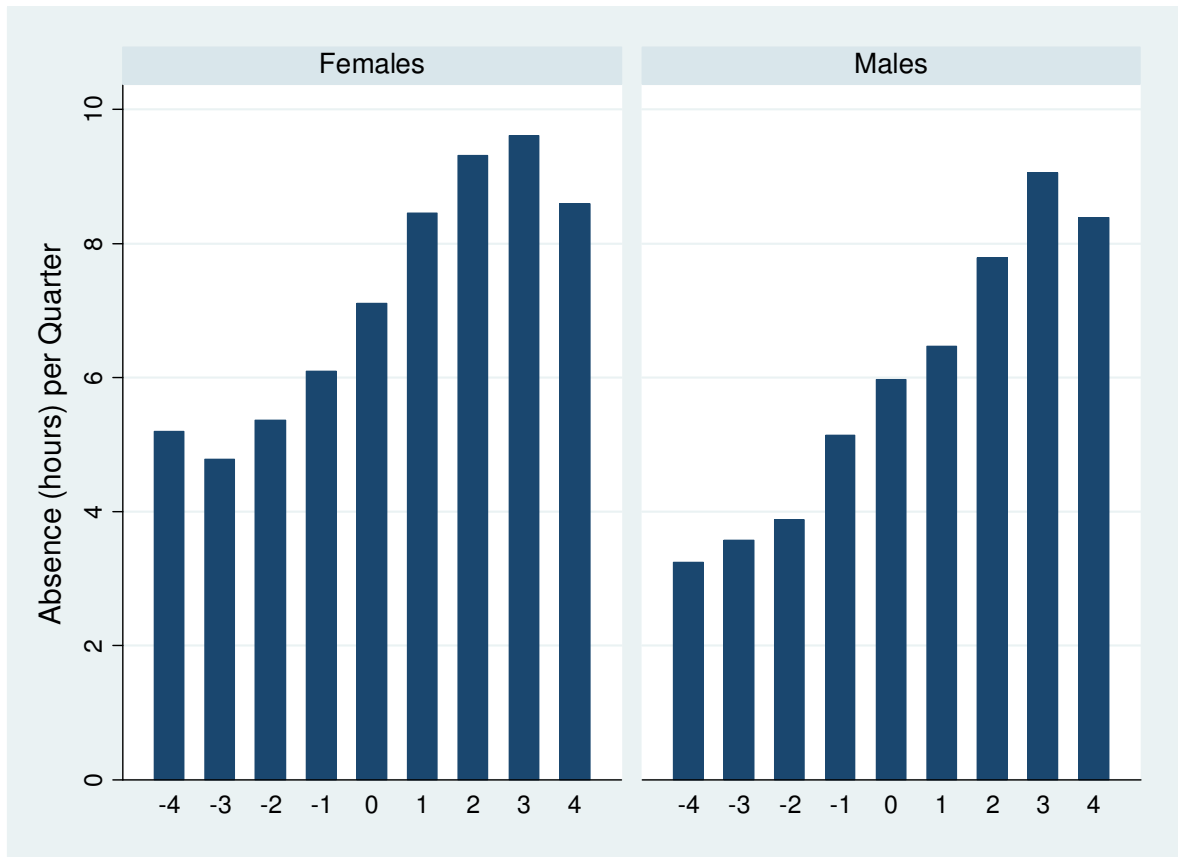Temporary Contract at Entry Cohort

FIGURE 2: Hours Absence by Tenure, Temporary Contract at Entry Cohort.