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Stepping Stones to Permanent Employment with Particular Reference to the Queensland Public Service

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Abstract

It is widely believed that initial experience in temporary and/or casual employment may act as an important steeping-stone to permanent or more desired employment. This is because, on the demand side, employers are increasingly using non-standard employment as a means of labour force screening, and, on the supply side, such jobs offer workers a chance to broaden workforce skills and improve employability. What is not known is how important the non-standard route has become in labour market transition or whether it offers a preferred route to traditional job search methods? In this paper labour force transition is investigated using data gathered from a longitudinal database (MOHRI) covering staff movements in the Queensland public service. The database covers those who have entered the public service through traditional recruitment methods as well as those that have entered through temporary and casual appointments. Empirical analysis used in the paper is based upon cumulative incidence function testing and competing risk hazard function analysis. The results also allow consideration of some of the determinants of exit from the public service.

1. Introduction

In its July 2002 *Employment Outlook* the OECD examined the increasing incidence of temporary employment across its member nations. While noting that temporary workers were 'a diverse group who work in wide range of occupations and sectors', the OECD pointed out that younger workers and the low skilled had a disproportionate share of temporary jobs. Opinion is divided about the implications of temporary employment for the longer-term job prospects of the participants. Some see temporary or casual employment as a useful means of initial entry into the labour market and one that will speed up transition to permanent employment. Others point to the dangers of non-standard workers being trapped in a cycle of unstable and/or low paid work. This issue has recently been considered in a recent symposium on temporary work in the *Economic Journal* (Booth et al. 2002).

This paper provides further evidence on this issue by using a large database of public sector employees in the Australian state of Queensland. The paper is distinguished by a number of features. First, the paper represents the first intensive usage of a newly available data source that is both large (190,000 observations) and has longitudinal properties. Second the use of public servants as a test group is potentially important in contributing to debate on work force transition because it is widely believed that public servants, given their supply characteristics and the nature of the labour market they operate in, might be expected to have a higher success rate in the transition to permanent work than those in the private sector. In other words, if non-standard employment is providing a significant platform for transition to permanent employment this should show up clearly in this database particularly given the propensity for permanent public service positions to be filled internally. Finally, in terms of technique, the analysis represents one of the few applications to economics of the competing risk analysis developed by Gray (1998) and Fine and Gray (1999) for medical research.

A major difficulty in isolating the true determinants of workforce transitions occurs because the observed data (transit end points) relates only to outcomes and do not cast light upon the motivations of those being observed. While, it might be expected that individual attributes such as education, work experience, age and gender would help determine the speed at which an individual would progress equally important are the motivations and aspirations of those being observed.

For example, while a transit from temporary to permanent probably indicates a successful or desired outcome, so to might a situation of non-transition, where a person remains in a temporary or casual position by choice. Within private sector jobs this is an important issue because there are significant groups in the workforce, such as students, retirees and carers that seek only temporary or casual work. Within the public sector this problem is likely to be minimised because non-standard employment is still relatively minor in the Queensland public service and because it can be assumed that most persons who enter the public service are seeking permanent employment.

International studies of transitions from temporary to permanent employment are considered in section 2 and Australian evidence is outlined in section 3. Section 4 introduces the database and contextual information concerning the Queensland public service. An analysis of transition probabilities in the public service database is presented in section 5. This analysis is extended in section 6 through competing risks analysis. Finally, section 7 concludes the paper and draws conclusions.

2. International Studies

For a number of reasons the speed at which persons transit from non-standard to permanent work appears to vary within groups and across economies. Houseman (1997), using US data found a low transition rate from temporary to permanent employment. She conducted a survey of 550 private sector employers who employed five or more employees in the United States.

Houseman distinguished between three types of flexible workers: agency temporaries, regular part-time workers, short-term hires, and on-call workers. The survey responses revealed how employers treated each category of worker differently. More than one-half of all firms seldom or never moved on call-workers and short-term hires into regular work. In contrast, 54 per cent of employers often or occasionally moved part-time workers into regular work.

Hotchkiss (1999) in a study of job search in the US found that accepting spells of casual actually reduced the speed of transition into permanent employment. The study found, those who take a transitional/casual job would be searching for permanent positions approximately 8 months longer than those who engaged exclusively in full-time job search

In contrast, Booth, Francesconi and Frank (2002) investigated the transitions to permanent employment of temporary workers using data from the British Household Panel Survey (BHPS). They found that after 7 quarters, 24 percent of those hired as temporaries and 9.2 per cent of those employed as casuals transited to permanent employment. The median transition time to permanent employment was eighteen months for persons on fixed-term contracts and three and half years for persons on seasonal contracts. The authors found that the steeping-stone approach of using non-standard employment was more important for young men while, for women, education levels had the more significant effect on the probability of obtaining permanent employment.

Much higher rates of transition were found in Sweden. Holmlund and Storrie (2002) using Swedish labour force data found that every quarter about ten per cent of persons on temporary contracts moved to permanent contracts, which represents a significant transition rate, or hazard rate.

3. Australian Studies

The past decade has seen significant changes in the structure of the Australian labour market. Among these has been the marked growth in casual employment, common across OECD countries, but pronounced in the case of Australia and New Zealand (Mangan and Williams, 1999; Mangan, 2000). This changing nature of the labour force has resulted in a debate concerning the longer-term labour market outcomes for participants. Dawkins and Norris (1990) have extolled the demand-side benefits of casual employment in terms of increasing the numerical and functional flexibility of the labour market. As well, Wooden (2001) and others have consistently pointed out that a significant number of groups in the labour market actively seek out non-standard work and have no inclination to transit to permanent work. Others have warned against increased labour market segmentation and the potential for growth in low wage, unstable employment. (Gaston and Timcke (1999).

Differences in individual motivations make ex-post assessment of transition rates problematic. Nevertheless, there have been a number of attempts at testing for a lagged relationship between casual employment and eventual transition to permanent employment. Implicit in the literature is the assumption that individuals would prefer to be employed on a permanent basis. Therefore,

obtaining a casual job does not halt the job search for permanent employment but rather may be part of the overall strategy of obtaining one. Within this context a number of studies have queried whether obtaining casual employment does promote transition to permanent employment or does it act as a trap for low-wage employment.

The results are varied and must be viewed with caution due to both the heterogeneity across casual employment and the fragmentary nature of relevant longitudinal data (Burgess & Campbell, 1998). Burgess and Campbell (1998) claim that working casually is not an effective means of transiting to permanent employment. A survey conducted from May 1995 to September 1996, using data obtained from the *SEUP* reports (ABS, 1997), revealed that of the of individuals employed on a casual basis, only 13% had progressed to full-time work over the time frame (Burgess & Campbell, 1998). Of the remaining individuals, over half were either unemployed or had ceased searching for employment (Burgess & Campbell, 1998).

Gaston and Timcke (1999) found that transition rates from casual to permanent full-time positions among various youth cohorts differed across time. In the short run (less than 12 months) factors such as gender, employer-provided training and the receipt of government benefits were the major factors effecting transition rates. In the longer run, work experience gained from casual employment assumed more importance.

Chalmers and Kalb (2001) specifically examined the hypothesis that accepting casual work would speed up eventual transition into permanent employment because it provides work experience; identifies jobseekers most able to work; and enlarges a jobseeker's social network within the working community. The data analysed were derived from the *ABS Survey of Employment and Unemployment 1994-97 (SEUP)*. The sample includes members of the population aged 15-59 residing in private dwellings. It excluded full-time students, contributing family workers, those holding more than one job in the survey period and those who dropped out of the survey prior to 1996. The results indicated that casual work experience has little effect on the transition into permanent employment.

In summary, to this point, the empirical results for the Australian labour market are less supportive of the stepping-stones hypothesis than some of the overseas studies cited above. These results may be summed up in then quote by Burgess and Campbell that "syphoning jobseekers into temporary jobs is not sufficient in itself to break the unemployment cycle" (Burgess & Campbell, 1998). Thus, the observed growth in casual employment may mark the beginning of a new era in which "it will be very difficult for jobseekers and more employed workers to escape the trap of rising employment insecurity" (Burgess & Campbell, 1998). However, it should be remembered that, in contrast to the overseas studies, the Australian studies have concentrated on the youth cohort, which may reduce the observed transition rate because of the tendency for youth to interchange between spells of employment, full-time education and unemployment to a greater extent than other sections of the population.

The other point of interest is that most of the results cited relate to private sector labour markets. There may be reason, for the arguments expressed above that the pattern of transition between non-standard and permanent work will differ within the public sector because it more clearly has the characteristics of an internal labour market.

4. The Use Of Temporary Employees In The Public Service

The Queensland State government as part of its *Breaking the Unemployment Cycle* initiative*,* has through its public sector traineeship program facilitated the hiring of trainees on a temporary (1 year) basis. Under this program about fifteen hundred trainees commence each year. There appears to be a high retention rate of these trainees. The results of a July 2002 telephone survey found that fifty percent of trainees who completed their training were employed by the same agency after completing their traineeship (NCVER 2002). Unfortunately the survey did not ask whether they were permanently or temporarily employed. Nonetheless it is possible from a new data source to establish some stylised facts about non-standard employment in the public service to inform the policy debate. In particular, the data are able to show how many temporary employees still remain in temporary employment after twelve months and how many have changed status, either progressing to permanent employment or exiting the Public service.

The Minimum Human Resource Information database (MOHRI) was initiated the Queensland government in 1995 to improve monitoring of staff movements within the Queensland Public Service and to be a part of the Government's human resource policy. Data are gathered quarterly across staff in every government agency and department, with the exception of government owned corporations such as Queensland Rail, and statutory authorities. The MOHRI database contains information on all of the 190,000 Queensland government employees. A full list of the data items in MOHRI is available from the Queensland Government website[1], but a short list should give a flavour of the information contained: agency, date of birth, sex, Aboriginal and Torres Strait Islander and Non-English Speaking Background status, Australian Standard Classification of Occupations code, Queensland public service starting date, Classification code, employment category (permanent, temporary, casual, contract), full-time equivalent ratio and sick leave days drawn.

 Public servants comprise about 10% of the States labour force and about 13% of employed persons. Public employees are distinguished from the private sector workforce by above average educational qualifications and, in the lower and middle ranges, higher wages and longer job tenure. A number of studies have found that, in general, public servants are more risk averse than private sector employees and, as a result might be expected that to place a higher premium on securing permanent employment. In this sense the

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[1] www.qld.giv.com

Queensland public service acts like a large internal labour market. Consequently, it might also be expected that those entering the public service through temporary or casual employment be more likely to achieve permanent employment than comparable entrants to the private sector market and that, all other things being equal, transition rates from casual to permanent in the public sector would exceed transition rates in the private sector.

The default form of employment in the public service is permanent employment although the database identifies part-time, casual, temporary and contract employment.[2] In this paper there is a presumption that most employees would prefer to be permanent and indeed, one of the attractions of public service employment is its associated tenure. Also, the current government actually promotes permanent employment across the workforce, and therefore is unlikely to be seen to be discouraging it in its own workforce. However, that is not to say that all entrants are equally likely, from the demand side, to transit to permanent employment, nor that all non-standard workers are treated equally. Anecdotal evidence suggests that temporary employment is being used in the public service as a screening device, and casual employment is being used primarily as a labour force flexibility device. If this were the case we would expect to observe, in the first instance, differences in the transition rates between temporary and casual workers.

To examine this, and other hypotheses and to make use of the *longitudinal* dimensions of the database over six quarters (December 2000 to March 2002) three fields in the database, sex, birth date and QPS were concatenated to create a unique identifier.[3] Unfortunately this resulted in a small fraction of records with the same identifiers, which had to be dropped from the data set. The subset of data set used in this study consists of 12,525 observations on new, temporary and casual employees who commenced between December quarter 2000 and September quarter 2001. These new employees were traceable until September quarter 2002, giving seven consecutive quarters in which to observe transitions.

Table 1 presents a cross-tab summary of the data set. The category column is type of non-standard employment at entry into the public service. Transition status describes the observed transition. There are two competing risks, transiting to permanent employment or exit. Observations of those who

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[2] Casual employees normally work less than full-time hours as prescribed by the applicable industrial instrument and attract less employer-funded benefits. The difference between casual employment and temporary employment is that casual employment attracts the loading in lieu of sick and recreation leave whereas temporaries are generally entitled to same entitlements as full-time employees (Department of Industrial Relations 2000). Temporary employees are employed for fixed term engagements of specific periods of time. The circumstances for engaging temporary employees are many and include specific budget allocation for a particular projects, replacing permanent employees who are absent from their substantive position or assistance required to meet peak workloads.

[3] Longitudinal data, also known as *panel* data, are a time series of cross-section data, created for example by observing individuals over several periods. These datasets typically have many more cross-section observations than time-series observations, as in certainly the case with MOHRI with about 180,000 individuals recorded over six quarters.

remain in the same employment status are regarded as censored.[4] It may be seen that over the period that approximately 16% of new non-standard workers (temporary or casual) transited to permanent employment over the 7 observation periods. However, those that entered as temporaries were three times as likely to move to permanent employment (23%) as those who entered as casuals. (7.0%)

Table 1: Summary of transitions of recently entered non-standard employees into the Queensland Public Service

Category		No change/ Censored	Permanent	Exit	Total
		Transition status			
Temporary	Count	2,312	1,518	2,810	6,640
	%	34.8%	22.9%	42.3%	100.0%
Casual	Count	1,805	503	3,577	5,885
	%	30.6%	8.6%	60.8%	100.0%
Total	Count	4,117	2,021	6,387	12,525
	%	32.9%	16.1%	51.0%	100.0%

Source: derived from the MOHRI Database (2003)

A decision had to be made as to how to handle employees who temporarily dropped out of the public service, re-entered, but who were not present in the final quarter of observation so that they were not counted as censored. To simplify the analysis a decision was made to treat the failure time as the time to the first break from the public service.

The transitions shown in table 1 relate to outcomes over the whole period of observation. The data in table 2 examines the process by quarter and by type of non-standard employment to identify the time path of transitions. This allows consideration of questions such as what proportion of temporaries and casuals who have been in the public service, for example for one year, have made the transition to permanent status or exited from the public service and are their any significant differences in the experiences between temporaries and casuals. In the next section of this paper, these transition probabilities by quarter are worked out for different breakdowns of new temporary and casual public servants, and tests are conducted to determine if there are statistically significant differences in the probabilities. These transition probabilities are presented in table A1 in the appendix.

From table 2 it can be seen that one in five new temporary employees becomes a permanent employee one and a half years after commencement. Although the bulk of   transition to permanent employment has occurred by

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[4] For the purposes of the analysis, transitions between temporary and casual and to contract employment were not considered to allow full concentration on the main areas of interest, transitions from non-standard to permanent employment or exits from the public service. Inspection of the databases showed that these transitions were, in any case, very infrequent.

the 5th quarter (22 % for temporaries and 15% for casuals). The highest rate of increase is between the first and second quarters (temporaries) after commencement. After one year, the transition curve begins to flatten out, and the rate of transition drops. As well, after one year of initial employment, of the new cohort of non-standard employees, as many have left the public service (although it is possible they could come back in later, either as a temporary or in some other category) as stayed in at the non-standard classification.

The other point from the data in table 2 is that casual employees in the survey tend to exit the public service quicker than temporary employees and are less likely to transit to permanent employment. This might be expected from the earlier discussion of the data which showed that casual employees in the Queensland public service are typically lower skilled than temporary employees. Under these circumstances it is less likely that casual jobs in the public service will be a stepping-stone to permanent employment.

Table 2: Transitions of new temporary and casual employees within the Queensland Public Service

Quarters elapsed	Temporary - %		Casual - %		Total - %	
	Permanent	Outside	Permanent	Outside	Permanent	Outside
1	3.4	12.7	2.0	33.6	2.7	22.5
2	9.5	22.2	3.6	46.6	6.7	33.6
3	13.3	27.9	5.1	53.1	9.5	39.7
4	19.1	37.0	6.9	57.5	13.4	46.6
5	21.7	41.9	8.1	60.7	15.3	50.8
6	24.5	44.6	9.5	62.6	17.5	53.1
7	27.4	46.5	11.6	65.4	20.1	55.4

Source: derived from the MOHRI database (2003)

It is expected that age will be a significant explanation of public service transitions. For example, if the screening hypothesis holds, it may be that the public service is primarily trailing younger workers with limited labour market experience. Public Service records show that new temporary and casual employees have an average age of 33, which is lower than the average age of the public service of 41 years (Department of Industrial Relations 2000) but still relatively high when compared to the average age of entry in the private sector.

As well, there are apparent age differences among non-standard workers. The data in table 3 show that temporary employees are, on average, younger than casual employees, with 34.7 per cent of new temporary employees aged 15 to 24 years compared with 19.8 per cent of new casuals.

Table 3: Age distribution of casual and temporary employees

	Category			% of age group in category		
	Temp.	Casual	Total	Temp.	Casual	Total
15 to 19	876	414	1290	13.2	7	10.3
20 to 24	1427	756	2183	21.5	12.8	17.4
25 to 34	1962	1568	3530	29.5	26.6	28.2
35 to 44	1386	1814	3200	20.9	30.8	25.5
45 to 54	821	953	1774	12.4	16.2	14.2
55 plus	168	380	548	2.5	6.5	4.4
Total	6640	5885	12525	100.0	100.0	100.0

Source: derived from the MOHRI database (2003)

Another point of differentiation between those employed as temporary and those employed as casual is in formal skill levels. The data in table 4 show that new temporary employees have higher skill levels than new casual employees with 49.6 per cent having occupations in the two highest skill levels according to the Australian Standard Classification of Occupations (ASCO), compared with 40.6 per cent of new casuals.

Table 4: Employment category by skill level for non-standard entrants

Skill level	Occupations	Category			% by skill level		
		Temp.	Casual	Total	Temp.	Casual	Total
1	Managers & administrators/ Professionals	2,699	1,961	4,660	40.6	33.3	37.2
2	Associate professionals	595	427	1,022	9.0	7.3	8.2
3	Tradespersons & related workers/ Advanced clerical & service workers	361	193	554	5.4	3.3	4.4
4	Intermediate clerical and service workers/ production & transport workers	1,731	2,174	3,905	26.1	36.9	31.2
5	Elementary clerical, sales and service workers/ Labourers & related workers	1,254	1,130	2,384	18.9	19.2	19.0
Total		6,640	5,885	12,525	100.0	100.0	100.0

Source: constructed from data in MOHRI data base (2003)

Another factor to consider is gender. Currently more females than males enter the Queensland public service both as temporary and casual employees reflecting, both the gender makeup of the public service as a whole, in which females significantly outnumber males (refer to table 5), and the higher propensity for females to accept non-standard employment. Other factors include the occupational makeup of the public service, with teachers and nurse the two major occupational groups and also the fact that the public service is an attractive employer for females owing to the employment flexibility it offers.

Table 5: Temporary and casual employees by sex

Category	*Sex*			*% of category by sex*		
Category	*Male*	*Female*	*Total*	*Male*	*Female*	*Total*
Temporary	2,404	4,236	6,640	36.2	63.8	100.0
Casual	1,861	4,024	5,885	32.0	68.0	100.0
Total	4,265	8,260	12,525	34.0	66.0	100.0

Source: derived from the MOHRI database (2003)

5 Cumulative Incidence Functions With Competing Risks

To this point the descriptive data has been used to establish a number of stylised facts about transition and exit patterns among those who entered the Queensland Public Service through non-standard means. Those employed on a temporary basis appear to do better (more likely to transit and less likely to exit) than those employed as casuals, those aged 20-24 years do better than any other age group but there appears to be little in the way of difference between the transit and exit behaviour between ATSI, NESB and ESB or by gender.

A formal way to test for differences in the propensity of non-standard entrants to transit to permanent employment is through survival analysis with competing risks. In the competing risks problem, an important role is played by cumulative incidence functions (CIF) whose value at time t is the probability of failure, at time t, for a particular type of failure in the presence of other risks. (Gilbert and Mcteague, 2001).[5]

Technically, CIFs are the integral over failure time t of the sub density function for j different failure types, where the sub density function is equal to the product of the cause specific hazard function for failure type j and the survivor

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[5] A traditional approach to the analysis of competing risks data is to treat failures due to other risks as simply a censoring of the data, and to use the Kaplan-Meier method to estimate the survival function for each risk. However, the Kaplan-Meier estimator assumes independence of the competing risks, which is unlikely to be very realistic in the present case where those who have the highest chance of becoming permanent would have the lowest risk of leaving the public service. (Pepe, 1991)

function. (Kalbfleish & Prentice 1980). In other words the cumulative incidence function is the marginal probability of an event having occurred by time t.

$$I_j(t) = P(T < t, J = j) = \int_0^t f_j(u)du \qquad (1)$$

where j = 1, m.

The cause-specific hazard function is:

$$\lambda_j(t;Z) = \lim_{\Delta t \to 0} \frac{P(t \leq T < t + \Delta t, J = j | T \geq t, Z)}{\Delta t} \qquad (2)$$

Assuming failure types are unique, the overall hazard at time t is the sum of the hazards from failing due to all the other m causes:

$$\lambda(t;Z) = \sum_1^m \lambda_j(t;Z) \qquad (3)$$

The survivor function is:

$$F(t;Z) = \exp\left[-\int_0^t \lambda(u;Z)du\right] \qquad (4)$$

Given covariates Z, the sub density function for failure type j, the probability of a failure type j occurring at time t is equal to the cause-specific hazard function for failure type j multiplied by the survivor function, since only the survivors are at risk of failure.

$$f_j(t;Z) = \lambda_j(t;Z)F(t;Z) \qquad (5)$$

The integral of this over time is the cumulative incidence function, which gives the probability that a failure of type j will occur before any particular time t. Basically, this is the expected percentage of new non-standard employees starting in a particular quarter who will be permanent, or have left, depending on which risk is referred to, t quarters after commencement. In essence, table 2 reports the cumulative incidence functions for new temporary and casual employees.
The cumulative incidence methodology used below was developed by Gray (1988) and Fine and Gray (1999) and is adopted and implemented in the *survival* and *cmprsk* packages in the freeware statistical language *R* (Ihaka & Gentleman 1996).

Graphs of all the cumulative incidence functions for each risk are contained in A2. Separate functions are estimated by sex (Figure 1) type of non-standard employment (figure 2), age (figure 4), skill level (figure 5) and whether the individual was or was not ATSI (figure 6) or NESB (figure 7).

To accompany the cumulative incidence functions and to statistically clarify the results, tests of the equality of the cumulative incidence functions of the propensities for selected groups of new (non-standard) public sector employees to either transit to permanent employment or exit the public service were conducted using the methodology developed by Gray (1988). The results appear in table 6

Table 6: Gray test of equality of cumulative incidence functions†

	Permanent			Outside		
Comparison groups	Test statistic		P-value	Test statistic		P-value
Males and females	3.7238		0.0536	22.2431	**	0.0000
Casuals and temporaries	456.1926	**	0.0000	636.0802	**	0.0000
Full-time and part-time	473.3179	**	0.0000	400.0863	**	0.0000
Teens (15 to 19) and others	78.5780	**	0.0000	8.5403	**	0.0035
20 to 24 year olds and others	131.8067	**	0.0000	16.4251	**	0.0000
15 to 19 and 20 to 24 year olds	152.8284	**	0.0000	19.7653	**	0.0000
ATSI and others	1.3166		0.2512	0.7633		0.3823
NESB and others	0.1343		0.7140	1.2581		0.2620

† All test statistics distributed as chi-square with 1 degree of freedom
* significant at five per cent level
** significant at one per cent level
ATSI refers to Aboriginal and Torres Strait Islanders and NESB refers to Non-English Speaking Background.

The behaviour of the cumulative incidence functions and the results of tests reveal significant differences between the movement between casuals and temporaries (both in transit to permanency, and it exit rates), teens (15-19 years) and the rest of the intake (in terms of transit to permanency), teens (15-19 years and those aged 20-24 years (for both transit to permanency and exit rate) and between those aged 20-24 years and the rest of the intake (for both transit to permanency and exit). However, they do not find any statistical difference in the transit or exit behaviour of the new entrants by sex, ATSI or NESB.

When considered in the context of the human resource policies of the Queensland public service there appears to be a number of reasons for these results.

The differences in movement rates between temporaries and casuals may indicate that demand-side selection is taking place at the time of entry with the those being recruited as temporaries being earmarked for screening and eventual transit to permanency and those recruited as casuals being recruited on a short-term needs basis or to provide labour force flexibility in the public service. The significantly higher exit rates for casuals would support this conclusion.

However, this neat differentiation role between temporaries and casuals is not absolute; some casuals do move into permanency. As well, less than 30 % of those entering as temporaries have progressed to permanency by the 7th quarter.

Clearly other factors, beside job classification at entry are influencing outcomes for new entrants.

Age of entry appears an important variable (or at least is proxying the effect of other variables such as skill and work experience and job readiness). Age impacts in several instances. The youngest entrants, those aged 15-19, are less likely to transit to permanency and more likely to exit than all other age groups combined (figure 3) and do particularly badly When compared to those aged 20-24 years (figure 4). In figure 4, teenagers and 20 to 24 year olds were treated as separate groups because of observed differences in outcomes and because they represent distinct labour market groups on the basis of education, work experience and employability. The transition probabilities presented in table A1 show that 20 to 24 year olds are three times more likely than teenagers to gain permanent employment, and one-and-a-half times more likely to gain permanent employment than the average new non-standard employee. As well, this group do better than all age groups considered jointly.

Table 7 provides a breakdown of the three possible 'failure' status by age group for both temporaries and casuals. The two cross-tabulations splitting casuals and temporaries told the same story, so only the cross-tabulation for the total group was presented.

Table 7: Failure Status by Age group, temporaries and casuals

			Failure Status			
			Censored	*Permanent*	*Out*	*Total*
Age group	15 to 19	Count	430	104	756	1,290
		%	10.4	5.2	11.8	10.3
	20 to 24	Count	614	530	1,039	2,183
		%	14.9	26.2	16.3	17.4
	25 to 34	Count	1,081	645	1,804	3,530
		%	26.3	31.9	28.2	28.2
	35 to 44	Count	1,172	470	1,558	3,200
		%	28.5	23.3	24.4	25.6
	45 to 54	Count	627	234	913	1,774
		%	15.2	11.6	14.3	14.2
	55 plus	Count	193	38	317	548
		%	4.7	1.9	5.0	4.4
	Total	Count	4,117	2,021	6,387	12,525
		%	100.0	100.0	100.0	100.0

Source: derived from the MOHRI database (2003)

Table 7 reveals that the only age group to have a transition rate to permanent employment greater than their share of the total population are those aged 20 to 24. This is the age group in which people after having obtained tertiary qualifications are initially trying to enter the public service on a permanent basis. Therefore it is likely that for this age group, temporary employment is being used as a screening device. The high rate of transitions for this age group to permanent employment suggests that there are already permanent jobs earmarked for this type of entrant and that their period of temporary employment is probationary.

The results concerning age indicate that, with the introduction of the Public Sector Employment Initiative, the Queensland public service is once again becoming a training ground for young school-leavers aged 15-19. However, in contrast to earlier periods, this internal training is not necessarily being turned into permanent job opportunities. A number of factors could be accounting for this. Firstly it may be that the traineeship scheme is simply designed as a general training scheme for teens and was not intended, either implicitly or explicitly to act as a pre-requisite to employment in the public service. As a result, it may be best to judge the scheme on the post traineeship experiences of these workers to see if the 12 month public service experience is equipping them for employment elsewhere or whether they are exiting to other forms of training.

However, another potential reason, particularly given the results of the telephone survey reported in section 1 is that t those aged 15-19 years are being given extended screening to compensate for lack of job experience and formal education. If this was the case it would be in keeping with the traditional internal labour market features of the Public service, in which entry, under any circumstances helps promote permanency. For this to be true it would be necessary to show that 15-19 year olds are over-represented amongst the censored data. However, inspection of the results shown in table 7 indicates that teenagers are not over-represented compared to their total share of temporaries and casuals who have remained in non-standard employment. Teenagers are no more likely to remain as a temporary or casual than other age groups.

 In terms of the other variables considered, the Gray tests of equality between CIF functions failed to find any significant differences in the cumulative incidence of leaving the public service for ATSI and NESBs despite the apparent   differences shown in the cumulative incidence function graphs (figure 6 and 7). Considered along with the findings for sex the results, to this point, would represent an endorsement for the Queensland public service equal opportunity policies. Further on in the paper these findings are investigated in a competing risks regression format, which allows both for the effect of covariates and for consideration of the specific effects of skill differences.

6. Competing Risks Proportional Hazard Model

To control for the effects of other covariates when considering the effect on the cumulative incidence of failure of a particular covariate, a competing risks regression was estimated following the method of Fine and Gray (1999). The Fine-Gray method is to estimate a semi-parametric proportional hazards model, where the sub-distribution function for each risk is subject to a *log (-log)* transformation. A baseline hazard function is estimated non-parametrically, letting the data speak for themselves, with covariates having the effect of shifting the baseline hazard function.

The sub-distribution hazard for event 1 (here the transition to permanent employment is:

$$\lambda_1(t;Z) = -d \log\{1 - F_1(t;Z)\} / dt \tag{6}$$

where t is time, Z is a vector of covariates, and F_1 is the hypothetical survivor function in which the other risk is treated as a censoring event. If λ is the baseline hazard for the first risk, the model to be estimated is:

$$\lambda_1(t;Z) = \lambda_{10}(t) \exp\{Z^T(t)\beta_0\} \tag{7}$$

The advantage of the Fine-Gray competing risks model over the standard Cox proportional hazard model is that it does not assume independence of the competing risks. For example, it does not assume that the 'risk' of leaving the public service does not depend upon whether a person becomes permanent or not. This assumption is certainly questionable, because a person who does not obtain a permanent public service job may consider alternative employment in the private sector.

Fine and Gray account for these non-independent competing risks through a novel weighting technique used in the estimation process, which re-weights the contributions to the risk sets for the competing causes. The re-weighting is based on an estimate of the survivor function of the censoring distribution.

In the regression models estimated here, control variables consist of dummy variables for sex, casual or temporary status, full-time or part-time status, ATSI and NESB status, and for age and the skill level of the job. The skill group dummy variables are based on the Australian Standard Classification of Occupations (ASCO) code (Australian Bureau of Statistics, 1997). The skill groups are aggregations of the major occupation groups, as outlined in table 5. It is expected that higher skilled workers are more likely to become permanent employees owing to the attractiveness of their skills. It is also expected that they will be less likely to leave the public service because for some high-skilled occupations, particularly in the education and nursing professions, the government is the major employer in the state, and private

sector opportunities may not be as readily available as for persons in other occupations.

With the dummy variables used the base case is that of a non-ATSI, non-NESB, 25 to 44 year old male, in a temporary, part-time job in the lowest skill category. The regressions were estimated by maximising the partial likelihood function in the R package *cmprsk*. Results are presented in table 9, with regression estimates for the hazard functions of the two competing risks presented alongside each other.

Table8: Competing risk regression results†

Covariates	Permanent Coefficient		s.e.	Outside Coefficient		s.e.
Age group dummy variables						
15-19	-0.8634	**	0.1107	0.1984	**	0.0369
20-24	0.2537	**	0.0523	0.0082		0.0328
45-54	-0.2029	**	0.0711	0.0114		0.0351
55 plus	-0.6940	**	0.1661	0.0800		0.0567
Other covariates						
Casual status	-0.5259	**	0.0770	0.4988	**	0.0361
Full-time	0.6573	**	0.0728	-0.1326	**	0.0371
Sex (Female)	0.1486	**	0.0482	-0.1411	**	0.0247
ATSI	-0.4938		0.2567	0.2802	**	0.0976
NESB	-0.0917		0.0978	0.0532		0.0490
Skill group dummy variables						
1	0.3134	**	0.0717	-0.0825	*	0.0330
2	0.0898		0.0985	-0.1002	*	0.0495
3	-0.3530	*	0.1419	-0.0625		0.0584
4	0.0422		0.0771	-0.1031	**	0.0328

† Double log proportional hazard model estimated using *cmprsk* package in R
* significant at five per cent level
** significant at one per cent level

Parameters of hazard functions, like parameters in other non-linear models are very difficult to interpret. Because the model is non-linear, they do not have the partial derivative/slope coefficient interpretation that they do in OLS regression. The actual partial derivative will depend upon the time elapsed and the value of other variables in the model. In the interests of simplicity, attention is thus confined to the sign and significance of the parameter estimates only.

The most significant factor influencing transitions to permanent employment appears to be age, with all four age dummy variables significant in the first regression. As the tests on the cumulative incidence functions also showed, teenagers are less likely to make the transition to permanent employment, and 20 to 24 year olds are more likely to make it. Mature aged workers (45 plus) are less likely than other workers to become permanent.

The first competing risk regression also demonstrates the importance of employment status. Casual employees are significantly less likely to become permanent, as are those who only work part-time. Other significant variables include sex, with females more likely to become permanent, and skill level. The highest skilled workers in category 1, which include teachers and registered nurses, are more likely to make the transition to permanent employment. Workers in skill category 3 are less likely than the lowest skilled workers to become permanent, although since this group includes advanced clerical workers the result may be explained by the fact that this group consists of the classical or archetypal short-term worker.

In explaining the movement out of the public service the only age dummy variable of significance is that for teenagers, who are much more likely to leave the public service than others. Employment status is significant again, and in line with the tests on the cumulative incidence functions, casual and part-time employees are more likely to leave the public service than temporaries. Skill level is also again significant, with employees in skill levels 1, 2 and 4 less likely to leave the public service than those in the lowest skill category. It can be inferred from the regression results that employees in skill category 3, which includes the archetypal temporaries, are more likely to leave the public service than those in skill categories 1, 2 and 4, as would be expected. After controlling for other variables, sex and ATSI status become significant explanatory variables with respect to leaving the public service. Once in the public service as temporaries or casuals women are less likely to leave than men, perhaps reflecting family-friendly working conditions in the public service. ATSI workers are much more likely to leave the public service than non-ATSI workers, so the previous discussion on the effectiveness of Equal Employment Opportunity policies may need to be qualified somewhat.

For comparative purposes, the hazard functions of the competing risks were also estimated via the Cox proportional hazard model in *STATA*, treating the other failure in each regression as a censoring event – that is, assuming independence of competing risks. The Cox proportional hazard function assumes that covariates act to shift an unspecified baseline hazard function, as in the Fine-Gray model. The estimated hazard functions, presented in table 10, tell almost the same story as the Fine-Gray results presented above. The only difference is that the employees in the two highest skill categories are not predicted to have a lower probability of leaving the public service under the Cox proportional model.

Table 9: Cox proportional hazard model results†

Covariates	Permanent Coefficient		s.e.	Outside Coefficient		s.e.
Age group dummy variables						
15-19	-0.8991	**	0.1099	0.1483	**	0.0432
20-24	0.2505	**	0.0535	0.0342		0.0358
45-54	-0.1877	**	0.0721	0.0007		0.0375
55 plus	-0.6160	**	0.1656	0.0540		0.0593
Other covariates						
Casual status	-0.2607	**	0.0752	0.4947	**	0.0397
Full-time	0.6099	**	0.0708	-0.0895	*	0.0411
Sex (Female)	0.0993	*	0.0491	-0.1370	**	0.0272
ATSI	-0.4447		0.2601	0.2530	*	0.1204
NESB	-0.1174		0.1002	0.0445		0.0568
Skill group dummy variables						
1	0.3342	**	0.0706	-0.0611		0.0363
2	0.1174		0.0981	-0.0981		0.0533
3	-0.3117	*	0.1431	-0.0822		0.0674
4	0.0956		0.0752	-0.0963	**	0.0363

† Cox proportional hazard models estimated using *STATA*
* significant at five per cent level
** significant at one per cent level
Observations: 12,525
Permanent failure hazard model: LR Chi^2 (13) = 570.37**
Outside failure hazard model: LR Chi^2 (13) = 507.27**

7 Summary and Conclusions

The paper has examined transit and exit behaviour among public servants who have recently entered the Queensland public service as non-standard employees. It did this to explore the widely held belief that non-standard employment is a stepping-stone to permanent employment and to see if the internal labour market environment of the public service enhances the stepping-stone effect. The paper also considered how attribute differences among entrants such as age, gender and skill impact upon their observed transition and exit patterns. Transition to permanent employment and exit from the Public Service were regarded as competing risks and the empirical analysis in the paper employed the cumulative incidence methodology of Gray (1988) and the competing risks regression model of Fine and Gray (1999).

In considering the stepping-stones hypothesis, it was found that some workers who enter through non-standard employment do rapidly transit to permanent employment but this is not the case for the majority of entrants and the transition rate is significantly effected by individual attribute variables such as age and gender and skill level and, in particular, by the type of non-standard employment through which they initially entered. For example, those

employed, as temporaries are approximately 3 times more likely to transit to permanent employment as those who initially entered as casuals.

At one level it is tempting to suggest that a deliberate demand-side selection process is occurring at the time of entry with those employed as temporaries being selected for screening as potential future full-time employees while the casual classification is being used purely on a task specific basis and as a means of providing labour force flexibility. This argument is strengthened by the fact that those jobs where the chances of transit to permanency are greater, such as for teaching and nursing, are primarily offered as temporary rather than casual positions and the exit rate of casuals (65%) is much higher than the exit rate of temporaries (47%).

However, the two non-standard groups display little difference in their propensity to be retained in their current (non-standard) position. The overall rate of remaining in the same (or similar) position is 24.5% of entrants. This can be decomposed into 26% of temporaries and 23% of casuals. That is, casuals are only marginally less likely to be retained in their current non-standard positions as temporaries. The decision to maintain a person in their current position is purely a demand-side one and the data indicate that once the decisions on who to keep and who to let go are determined, Agency employers are keeping approximately the same percentage of both forms of non-standard entrants on as a continued source of flexible labour and/or for extended screening.

In other words the actual transit/exit process is not as clear-cut as the scenario above suggests. In the hierarchy of non-standard entry, the job/attribute mix determines those that are originally employed as temporaries will transit to permanency at a greater rate than casuals, but there is some overlap. Permanent jobs are not exclusively reserved for temporaries. A small percentage of those that entered as casuals also obtain permanent employment, possibly through their work performance once inside the organisation. As well, the similar treatment of temporaries and casuals in the context of retention in non-standard jobs indicates that at least part of the intake is designed as flexible labour irrespective of their classification. A missing ingredient in the whole process is information on voluntary quits among these groups. Much of the literature indicates that there is a high supply side element at work in non-standard employment. It may be that those entering as casuals have a higher propensity to voluntary exit than those employed as temporaries by virtue of the nature of the job and their own attributes and circumstances.

In terms of specific support for the stepping stones hypothesis, the most successful cohort are temporaries aged 20-24 years, but even here less than 30 % of the intake in that group transit to permanent employment and over 50% exit by the end of 7 quarters. For temporaries as a whole their transit rate of 27 % is similar to that observed by Booth (after 7 quarters) within the British Panel Household survey, lower than that found in Sweden but well above those found in Australian studies. On these results a case could be

argued pointing to a small public service enhancement of the stepping-stones role of non-standard employment but it is not large and does not offer up any support for the existence of a cosy internal labour market set up where entry almost guarantees permanency.

However, the stepping stones impact may be higher than it appears if there is a high voluntary exit rates and, correspondingly, a higher than observed transition rate among those that wish to stay.

Features that effect Public service exits other than job status include age, and belonging to a disadvantaged group. The most likely to exit are those aged 15-19, this is partly due to the terms and conditions of the training program under which most enter the public service where employment is not guaranteed after one year. The impact of other variables on exit rates is less clear-cut.   The initial cumulative incidence function analysis indicated that human resource policies within the public service appeared to have eradicated any statistical disadvantage by gender and ATSI. However, after controlling for other variables, sex and ATSI status become significant explanatory variables with respect to leaving the public service. Once in the public service as temporaries or casuals women are less likely to leave than men, and ATSI workers are much more likely to leave the public service than non-ATSI workers. These results indicate a reconsideration of these human resource policies may be required.

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Appendix 1

Table A1: Transition probabilities (percentages) in the MOHRI database

Quarters elapsed	Males			Females		
	Permanent	Outside	Censored	Permanent	Outside	Censored
1	2.4	23.8	73.8	2.9	21.9	75.2
2	6.0	36.0	58.0	7.1	32.4	60.5
3	8.7	42.1	49.2	9.9	38.5	51.6
4	12.5	49.7	37.8	13.8	45.0	41.2
5	14.4	53.7	31.9	15.8	49.3	34.9
6	16.9	55.9	27.2	17.8	51.6	30.6
7	18.9	57.6	23.5	20.7	54.2	25.1
Quarters elapsed	Temporaries			Casuals		
	Permanent	Outside	Censored	Permanent	Outside	Censored
1	3.4	12.7	83.9	2.0	33.6	64.4
2	9.5	22.2	68.3	3.6	46.6	49.8
3	13.3	27.9	58.8	5.1	53.1	41.8
4	19.1	37.0	43.9	6.9	57.5	35.6
5	21.7	41.9	36.4	8.1	60.7	31.2
6	24.5	44.6	30.9	9.5	62.6	27.9
7	27.4	46.5	26.1	11.6	65.4	23.0
Quarters elapsed	Full-time			Part-time		
	Permanent	Outside	Censored	Permanent	Outside	Censored
1	3.7	13.1	83.2	1.9	30.5	67.6
2	10.1	22.2	67.7	3.8	43.3	52.9
3	14.1	27.9	58.0	5.5	49.7	44.8
4	20.3	37.6	42.1	7.5	54.2	38.3
5	22.8	42.8	34.4	9.0	57.4	33.6
6	25.6	45.5	28.9	10.5	59.4	30.1
7	28.3	47.3	24.4	12.9	62.3	24.8
Quarters elapsed	15 to 19			20 to 24		
	Permanent	Outside	Censored	Permanent	Outside	Censored
1	0.7	17.4	81.9	3.9	20.2	75.9
2	1.9	27.0	71.1	10.9	29.5	59.6
3	3.3	33.6	63.1	14.9	35.3	49.8
4	6.3	49.5	44.2	21.4	42.6	36.0
5	7.7	56.6	35.7	23.1	47.3	29.6
6	8.7	61.3	30.0	25.3	49.7	25.0
7	8.7	64.0	27.3	28.8	51.9	19.3
Quarters elapsed	ATSI			NESB		
	Permanent	Outside	Censored	Permanent	Outside	Censored
1	2.5	14.9	82.6	3.2	14.5	82.3
2	4.1	23.1	72.8	5.5	28.6	65.9
3	7.4	31.4	61.2	8.8	38.0	53.2
4	10.7	55.4	33.9	12.3	48.8	38.9
5	12.9	58.5	28.6	14.6	55.3	30.1
6	12.9	60.5	26.6	17.1	57.8	25.1
7	12.9	60.5	26.6	20.7	60.6	18.7

Source: derived from the MOHRI database (2003)

Appendix 2:

Cumulative Incidence Functions; Figures 1-7

Figure 1b: Cumulative incidence functions: Males and females
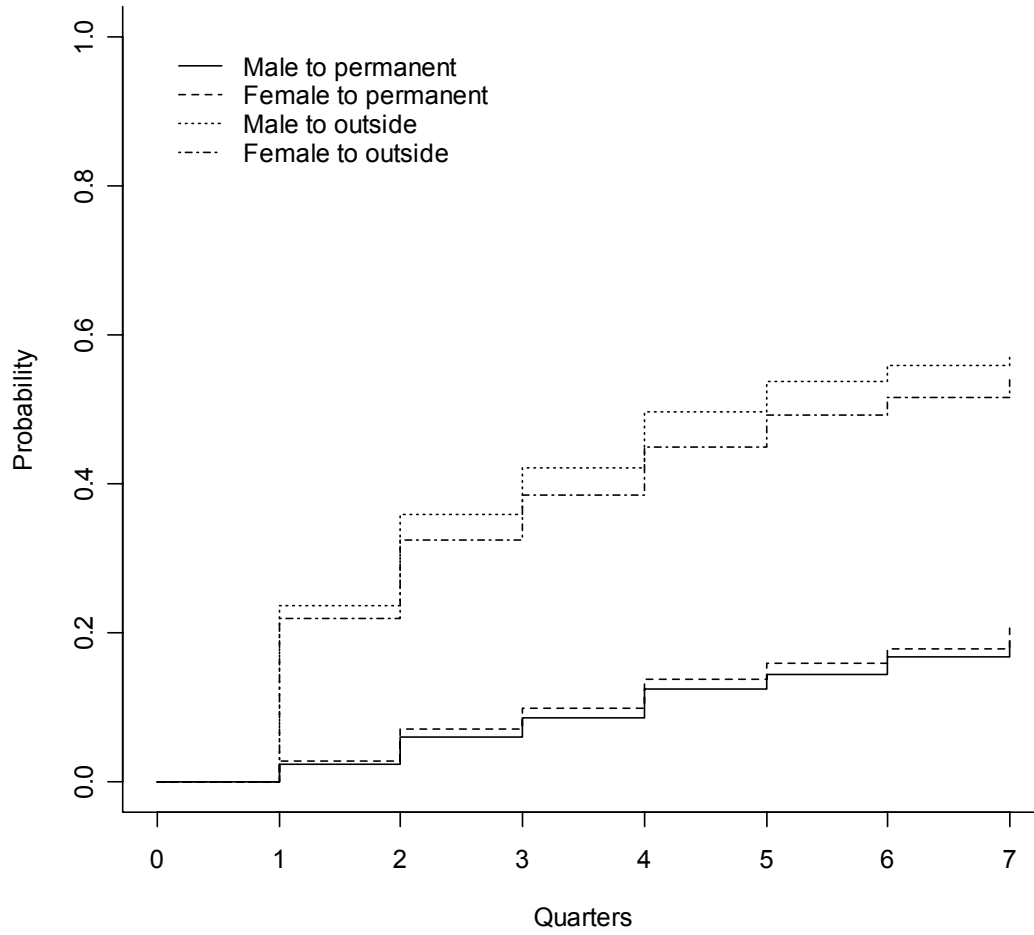
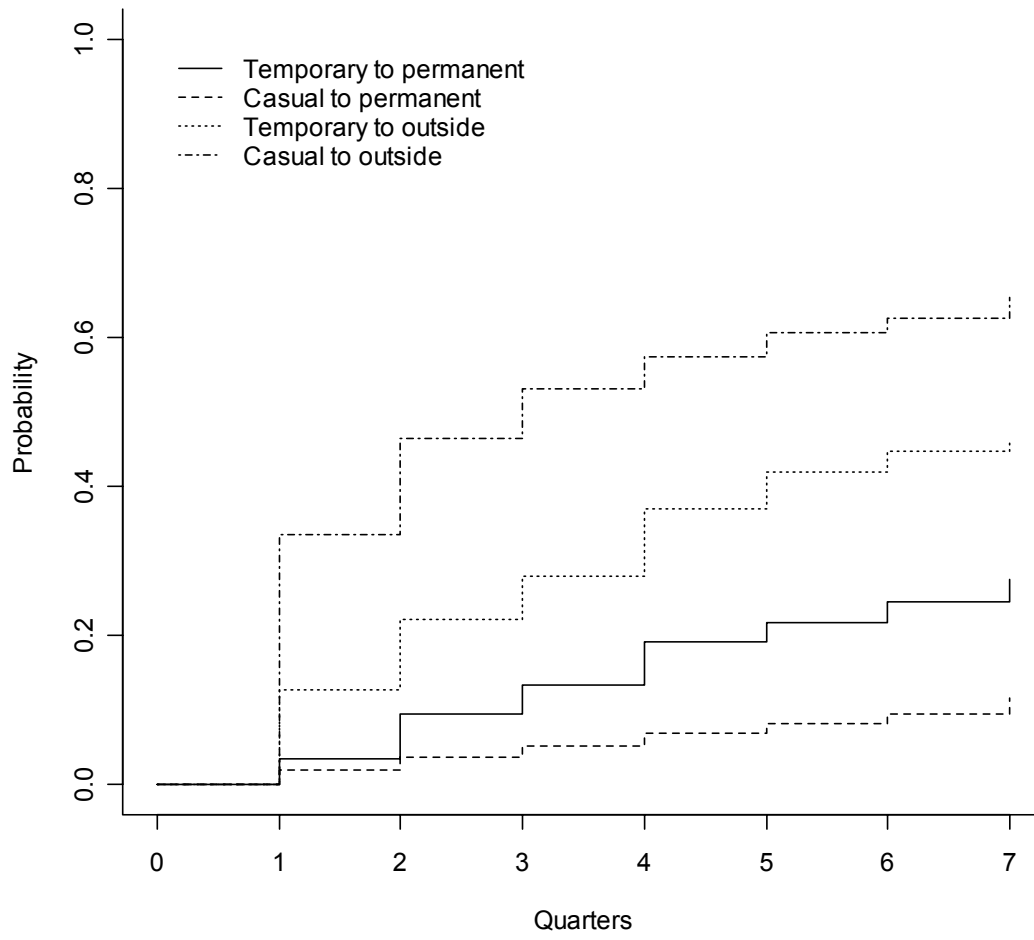**Figure 2b: Cumulative incidence functions: Casuals and temporaries**

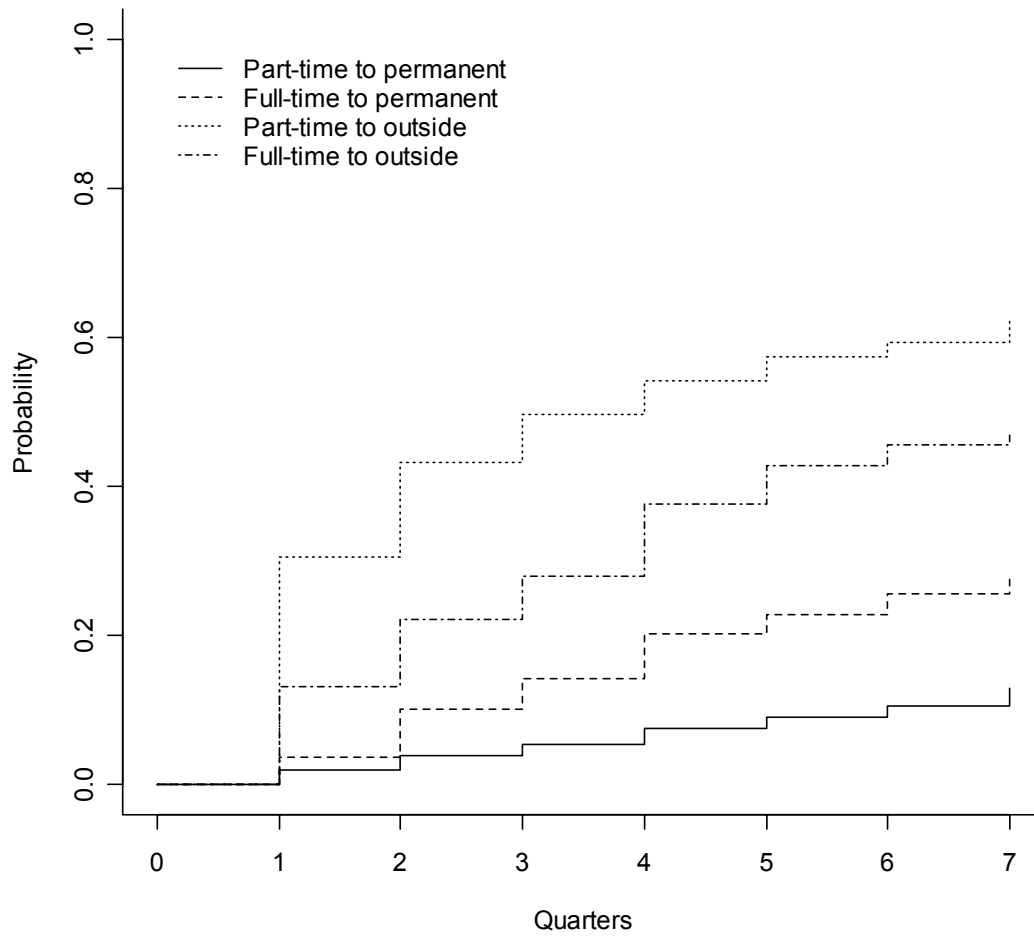**Figure 3b: Cumulative incidence functions: Full-time and part-time**

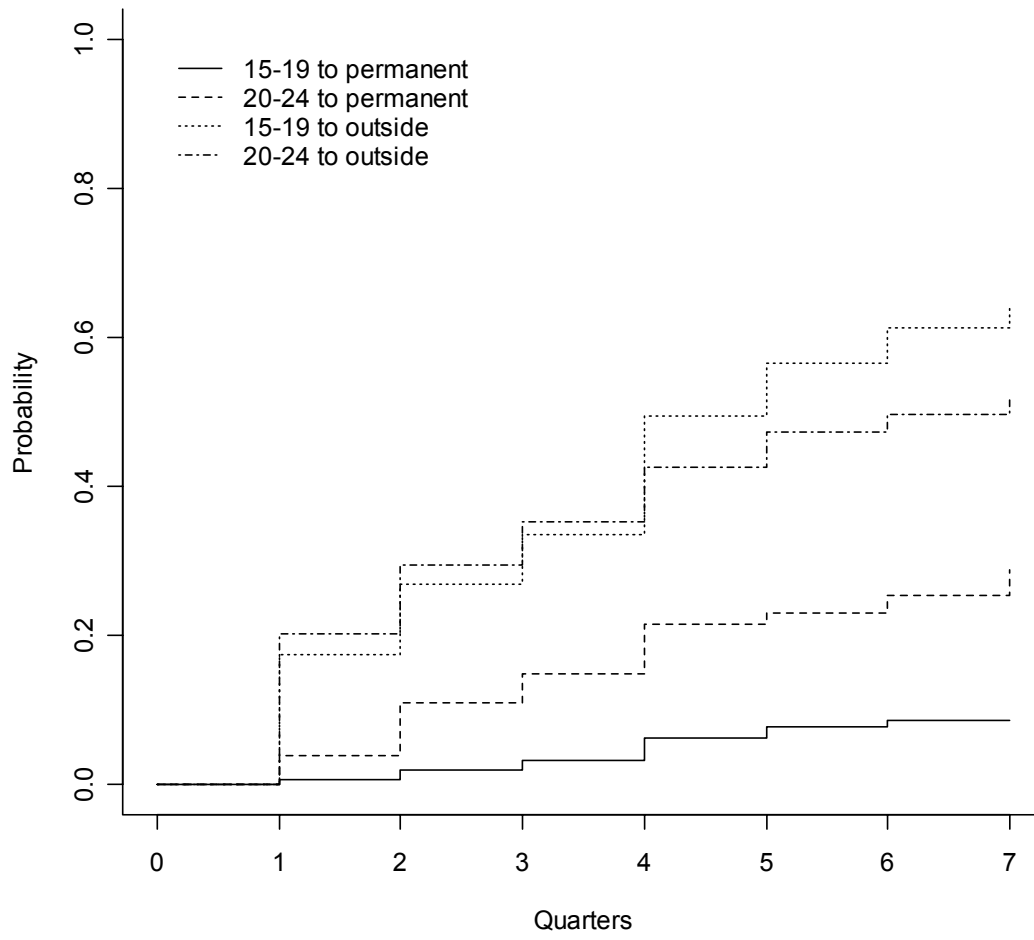**Figure 4b: Cumulative incidence functions: 15-19 and 20-24 year olds**

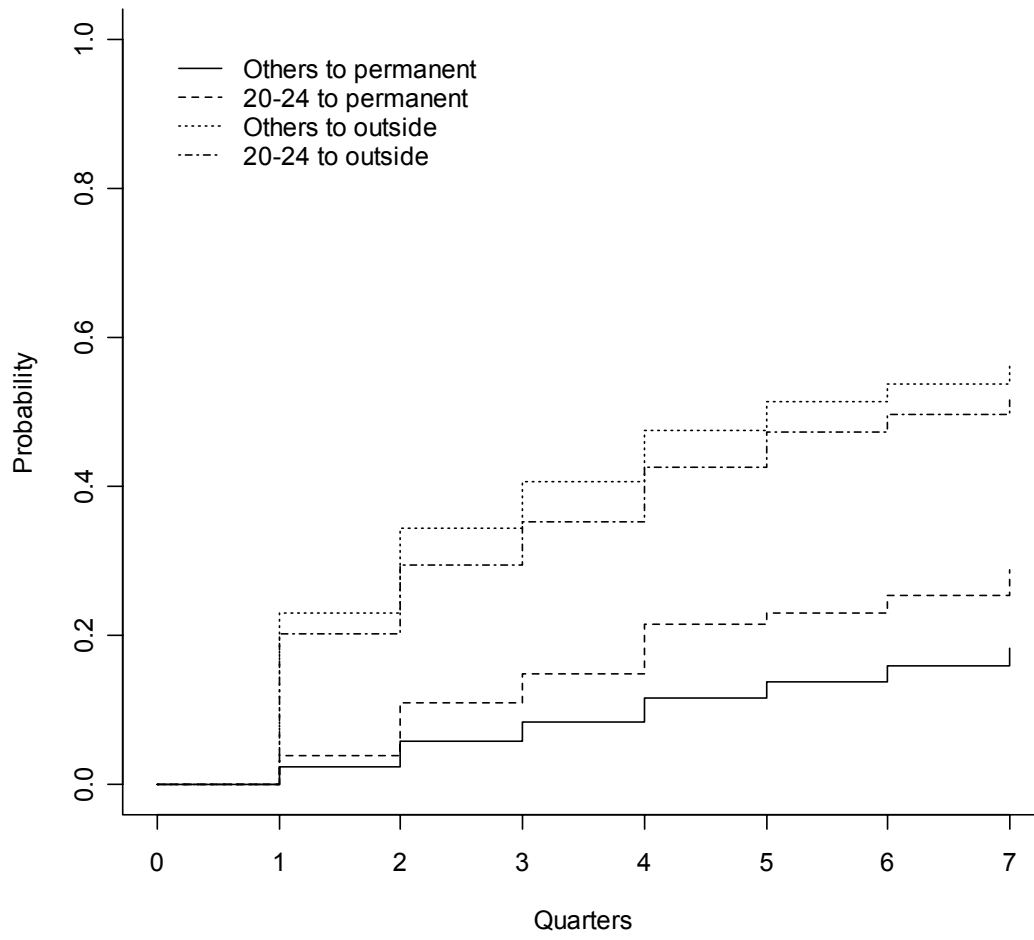**Figure 5b: Cumulative incidence functions: 20-24 year olds & others**
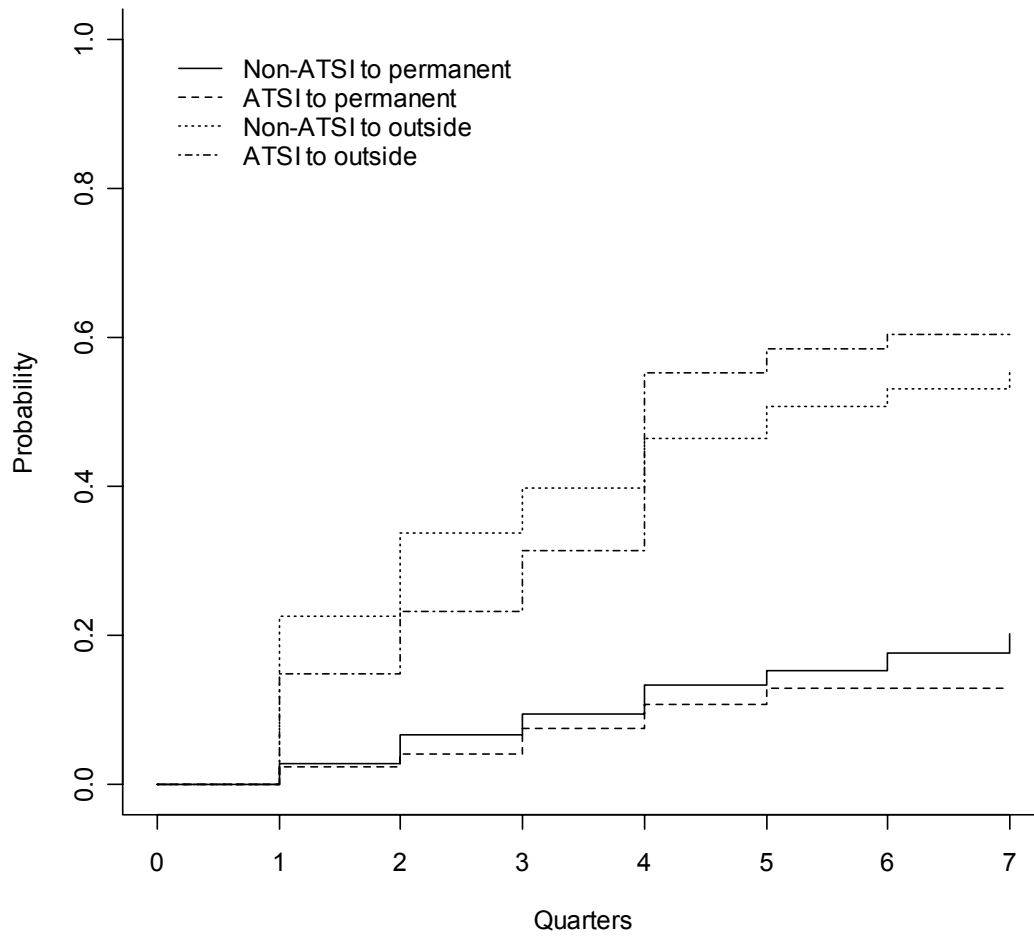
Figure 6b: Cumulative incidence functions: ATSI & non-ATSI

Figure 7b: Cumulative incidence functions: NESB & non-NESB

Legend:
- Non-NESB to permanent
- NESB to permanent
- Non-NESB to outside
- NESB to outside

X-axis: Quarters

Y-axis: Probability