Work, Household Dynamics and Housing Insecurity

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Abstract

Expansion of the standard employment contract along with the growth in female labour participation has given rise to a range of employment arrangements amongst households in terms of hours worked and mix of employment contracts. Greater distinctions can now be made between working and jobless households and also according to the presence of permanent and non permanent employment within a household. Changes in labour markets have occurred alongside many significant shifts within the housing market, including declining affordability in both purchased and rental accommodation. Together these trends raise concerns about the capacity to maintain housing costs, not only amongst households who become unemployed, but also amongst those relying solely on a non permanent or variable income.

The paper uses the first three waves of HILDA data to model the connections between more insecure forms of employment, household conditions and housing insecurity, placing particular emphasis on the employment composition of the household. A static logistic regression model with random effects is initially applied to a measure of housing insecurity for both renters and purchasers. This is followed by dynamic models of the factors associated with transitions into and out of purchased housing. The results point to a strong relationship between non standard employment and housing insecurity after controlling for income and other household characteristics.

Introduction

Concern for housing insecurity typically rises during periods of growing unemployment and economic decline. Rising unemployment is an undeniable threat to housing security as evidenced by the high rates of mortgage foreclosures during the recessions of the 1980s and the early 1990s. However, the persistence of housing insecurity in the rental market, and rising mortgage arrears and foreclosures prior to the onset of the most recent financial crisis, suggest that other factors apart from the rate of unemployment have been increasing their influence over the security of housing (Berry et al, 2009; House of Representatives, 2008).

On the housing side, declining affordability in rental and purchased housing, more liberal use of credit and debt, rising interest rates, increasing competition in the rental market and constraints on social housing are likely to be important causes (Hayward, 1996; Wulff & Maher, 1998; Wulff et al, 2001; Abelson et al, 2004). These trends have occurred along side significant restructuring of the labour market over the past two decades that has reshaped the distribution and security of household incomes (Watson et al, 2003; Harbridge & Bagley 2002; O'Connor & Healy, 2002; Borland, 2000; Gregory & Sheehan, 1998; Hancock, 1999; Fagan & Webber, 1999; O'Connor & Stimson, 1995, Webber, 1994).

One important change in the labour market that has implications for housing has been the transformation of the standard full-time permanent male earner model or growth of the 'non standard' employment contract, and increasing participation of females in the workforce. In 2004, the Australian Productivity Commission estimated that 3.3 million persons were engaged in 'non-traditional work' (Productivity Commission, 2006:23)[1].

The main security concerns associated with non-standard work arise from the compositional increase in the share of employment associated with inferior rights and protection, particularly within casual and labour hire contracts resulting in unpredictable and fluctuating incomes (Watson et al, 2003; Borland et al, 2001; Fincher & Saunders, 2001; Ruyter & Burgess, 2000; Campbell, 1997). Nationally, the growth of more insecure forms of employment has been especially 'extreme' by international comparisons, with Australia ranked amongst the highest employers of temporary labour across OECD countries (Pocock & Buchanan, 2003: 277).

[1] The Productivity Commission research applied slightly different criteria of 'non-traditional work' instead of the more widely used term of 'non-standard employment'.

The way paid work is distributed amongst households is becoming increasingly diversified in terms of hours and mix of working arrangements from permanent, fixed term, casual, self employment to non participation in the labour market. Greater distinctions can now be made between working and jobless households and also according to the presence of permanent and non permanent employment within a household.

Existing research has identified two potential processes for how the growth in non standard employment may contribute to housing insecurity. The first is through the direct threat or loss of housing associated with an increase in the unpredictability of earnings interacting with inflexible housing costs. There is now a sizeable number of studies in the UK and Europe documenting the implications of the move towards flexible labour and non standard employment, including the rapid growth in self employment, low paid and precarious employment impacting on the security of home ownership (Forrest & Kennett, 1997; Ford & Wilcox,1998; Burrows,1998; Burrows & Ford, 1998; Böheim & Taylor, 2000; Croft, 2001; Horsewood & Doling, 2004).

In a cross country comparative analysis of mortgage payment difficulties using the European Community Household Panel (ECHP) Horsewood & Dooling (2004) found that the most important determinant for mortgage risk was not the unemployment rate per se, but the sudden and unexpected event of unemployment, which in most part, was mediated by the effect of institutional arrangements within each country. Based on their findings they concluded that:

> *…whatever the myriad of events and circumstances that have resulted in the many individual cases of mortgage repayment difficulties, institutional arrangements seem to provide a context which influences whether or not those events and circumstances become critical. Specifically the findings suggest that individual borrowers are more likely to experience repayment difficulties where they live in countries that are characterised by large home ownership sectors, flexible labour markets, volatile mortgage markets and less generous social security arrangements (Horsewood & Doling, 2004: 445).*

The second way that non standard employment can potentially contribute to housing insecurity identified in the literature is via a precautionary motive where households delay or are prevented from becoming home owners and are therefore forced to remain in the rental sector. The precautionary savings model is a development from the economic life-cycle hypothesis emphasising the increased tendency for households to save when income is expected to decrease or is uncertain, such as the pending threat of unemployment or when income fluctuates.

Benito (2006) has recently expanded this concept to examine the relationship between income uncertainty and household consumption, finding that labour insecurity invokes a precautionary motive in the consumption decisions of households. While his particular focus was on durable goods, other overseas studies have shown that a history of non-standard work and income uncertainty significantly reduce the probability of entering into home ownership. The inability to generate a predictable income from many non standard jobs is thought to reduce confidence in meeting the long term credit costs and expected increases in earning potential associated with the decision to purchase a home (Dieleman & Everaers, 1994; Robst et al, 1999; Wiens-Tuers, 2004).

The implications of the growth in non standard employment for the housing market are yet to be fully realised in the Australian context. Apart from a small number of studies there has been limited research documented in the Australian literature on the statistical relationship between non standard work, exclusion and housing insecurity. Berry et al (1999) modelled mortgage arrears using bank loan records data; however their research was limited to a small number of variables on the characteristics of households collected when the initial mortgage was taken out. There is also some evidence of a precautionary motive based on Kupke & Marano's (2004) research in which recent home owners in less secure work were found to be more cautious and 'under consume' according to their income level, although their study was based on those who had already transitioned into home ownership.

Minimising the impact of unemployment continues to be a critical social policy goal however it is equally important to understand the housing consumption implications for working households reliant on less secure sources of income. Building on the emerging literature in this area, the aim of this paper is to establish whether non standard employment

as well as labour market exclusion is associated with an increased risk of payment difficulties and also to examine the presence of a precautionary motive in the Australian home ownership market linked to different types employment conditions.

To explore these two themes, the paper is organised into four parts. In the first section, an overview of the method and labour market variables used in the models is outlined, placing particular emphasis on the construction and summary statistics from household measures of employment. This is followed by a presentation of findings based on static and dynamic logistic regression models with random effects testing the association between non standard employment and the risk of housing arrears and transitioning out of home ownership. In establishing support for the second proposition of a precautionary motive, the section to follow presents results on the role of different employment states on the likelihood of transitioning into home ownership from the rental market. The paper concludes with a discussion of the implications for both labour and housing markets.

Method & Data Summary

The analysis draws on the first three waves of HILDA data covering the period 2001-2003 (released in 2005). This period corresponds with strong growth in the Australian economy in which non standard employment continued to rise whilst unemployment remained at around six percent (ABS, 2003). A balanced dataset of 10,777 respondents was initially created for the three waves in order to follow the same responding individuals across time. Outright owners, independent and dependant children and non-fully responding households were excluded from the dataset reducing the final cross-sectional sample size to 4,336 responding persons across three waves[2]. Using the balanced wide panel file of 4,336 individuals, the total sample number in the balanced pooled cross-section was transformed to 13,008 observations or cases (4,336 x 3) in a long file.

2 Individuals living in a home that is owned outright in one or more waves were selected out of the final balanced dataset because the focus of the research is on those with recurrent housing costs. There were 5,441 individuals living in a home that was owned outright during one or more waves. Children were excluded so that the labour market composition of the main earners could be determined based on the assumption that a significant proportion of housing costs are maintained by parents/guardians. Fully responding households were selected so that labour market composition of the main earners could be determined.

Data definitions for labour and housing insecurity

The concept of housing insecurity has been operationliased in various ways in the literature. In this paper, an existing HILDA financial stress measure of not being able to 'pay the mortgage or rent on time' has been applied as a dependant variable and is referred to as 'arrears' in both renter and purchaser models. Households experiencing arrears typically represent the extreme end of a financial stress continuum, especially given that many will compromise or go without food to meet payments for their housing (Parkinson forthcoming). A second measure used as a dependant or response variable is based on the transition into and out of purchased housing. This latter group however have not been defined according to experiences of financial stress.

Given that a central focus of the paper is to understand the influence of non standard employment and also labour market exclusion on housing security outcomes, a number of different employment variables measured at both the individual and household level have been incorporated into the final models. One previous method for identifying the labour market characteristics of households has been to select the household head or reference person. This approach however has limitations when the data analysed is longitudinal and also when the research focus is to understand the way in which work is distributed within the household.

To overcome these limitations the attribute approach advocated by Duncan & Hill (1985:362) has been used in the construction of the final dataset[3]. In the attribute approach the individual remains the unit of analysis while relevant indicators are measured at the household level.

Recent approaches used to examine the distribution of employment within the household have classified households into workless or work-rich groupings (Muffles & Fourage, 2000; Gregg & Wadsworth, 2004). These measures do not indicate the way work is organised in the household according to contract type or full and part-time distinctions. Two new data

3 In HILDA households are not considered longitudinal units and members within households are provided with a new household identification code in each wave making any household analysis more conducive to an attribute approach (Wooden, 2001).

measures were derived to take the broader employment composition of the household as the unit of measurement into account.

The first measure is based on the total household employment composition according to hours worked and ranges from all members out of the labour force (unattached) or looking for work (job seeking) to those with two or more members employed on a full-time basis. The second measure of employment examines the household composition according to contract status amongst the various combinations of employment including being out of the labour force, looking for work, non permanent including casual and fixed term, permanent and self employment.

This second measure of household employment composition is coded into five broad groups. Amongst those with employed members in the household three groups are distinguished, including those without any permanent employment in the household or the *non permanent*, those with at least one permanent member, and all self employed households. Households with a mix of self and waged employment are assigned to the non permanent household if the wage earner is non permanent. If the wage earner is permanent then they are assigned to a household measure with at least one member in permanent employment.

Unlike the first household measure, the classification does not distinguish between one or more earners, rather it represents a proxy measure between more secure and less secure households, with non permanent and all self employed households considered most insecure whilst permanent households are considered more secure. While it is recognised that permanent employment can become insecure, especially during periods of economic decline, the predictability of earnings and access to entitlements is much greater for those with at least one member who is employed on a permanent basis.

In addition to the type of employment contract, labour security is also measured according to actual time spent in employment using the employment calendar variables in HILDA and builds on and modifies the approach applied by Muffles & Fourage (2000). Time spent in employment can vary from 100 percent of the time to 0 percent for any given year. Combining three years or waves together the categories included in the model:

- *continuously* employed 100 percent of the time;
- *episodically* employed or participating less than 100 percent during two occasions;
- a *discrete* or one off period of less that 100 percent participation; and
- *fully excluded* or 0 percent participation over the three year period.

Time spent in employment is measured at the individual level and is non-time varying, that is, a person is either coded as zero or 1 in each period. A summary of the three measures appears in figure 1 below.

Figure 1. Measures of Household and Individual Labour Participation

Household measurement of employment participation	Household contract composition	Individual measurement continuum of participation
Job Seeking	Job Seeking	Fully excluded
All unattached	All unattached	Discrete exclusion
One member employed part time	Non permanent	Episodic exclusion
one member employed full time	At least one permanent	Continuously employed
2 or more employed full time	All self employed	
2 or more employed part time		
1 full time and 1 or more part time		

Summary of Employment Characteristics of the Sample

The proportion of individuals experiencing arrears on one or more occasions in their housing over the three year period is higher among renters (19%) than purchasers (8%). This suggests that during 2001-2003 renters were more likely to struggle with repayment difficulties compared with purchasers. Movement between both renter and purchaser status over the three year time interval was relatively infrequent, with eight percent of renters making the transition into purchased housing and a further five percent moving out of home owner status back to the rental market.

Table 1 presents an overview of the characteristics of the arrears and transitions samples according to the employment measures previously defined in figure 1 (see appendix B for an overview of the descriptive statistics for other household and individual variables included in the models). As shown, individuals with at least one member of their household

in permanent employment are more highly concentrated amongst purchasers without arrears (76%) and amongst those remaining (75%) in or making the transition to purchased housing (74%). The consistency across different purchaser groups reinforces the descriptive importance of permanent employment in the sustainability of purchased housing.

Secure purchasers are also more likely to have at least one member in full-time employment and to be continuously employed over the three years. On the other hand purchasers with arrears are less likely to have permanent employment (50%) and have a greater proportion of no employed members (15%), non permanent (19 %) and all self employed members (15%).

While renters generally have lower proportions of permanently employed members compared with purchasers, renters in arrears are the least likely to have any permanently employed members in their household (39%). The distribution of hours worked according to part-time and full-time combinations within the household is generally similar for both renters with and without arrears. However, those with rental arrears have higher proportions experiencing episodic (31.5%) or discrete (19%) periods of non participation in the labour market.

Table 1. Employment Characteristics of Housing Sample Groups

	Arrears Samples				Transition Samples			
	Renters %		Purchasers %		Purchaser to renter %		Renter to purchaser %	
	No Arrears	Arrears	No Arrears	Arrears	No Transition	Transition	No Transition	Transition
Household Employment								
Contract Status								
Job seeking household	5	7	1	6	1	4	5	1
All unattached	26	17	3	10	4	13	24	4
No permanent members	17	27	12	19	12	12	19	14
All self employed household	5	10	8	15	8	8	6	7
One or more permanent	47	39	76	50	75	63	45	74
	100	*100*	*100*	*100*	*100*	*100*	*100*	*100*
Hours Worked								
No employed members	31	24	4	15	5	17	29	5
One member employed part time	11	16	4	10	5	7	11	3
2 or more employed part time	3	4	2	2	2	2	3	1
one member employed full time	25	29	28	29	27	29	26	32
2 or more employed full time	18	15	31	19	30	27	18	34
1 full time and 1 or more part time	12	12	31	25	31	18	12	25
	100	*100*	*100*	*100*	*100*	*100*	*100*	
Individual Employment Participation								
Continuous participation	36	31.5	66	48	65	46	35	57
Episodic participation	21	31.5	12	24	13	22	23	17
Discrete non participation	15	19	14	17	14	18	16	18
Full exclusion	28	18	8	11	8	14	26	8
	100	*100*	*100*	*100*	*100*	*100*	*100*	*100*
	N=4,076	N=972	N=5,821	N=482	N=6,012	N=301	N=5,707	N=525

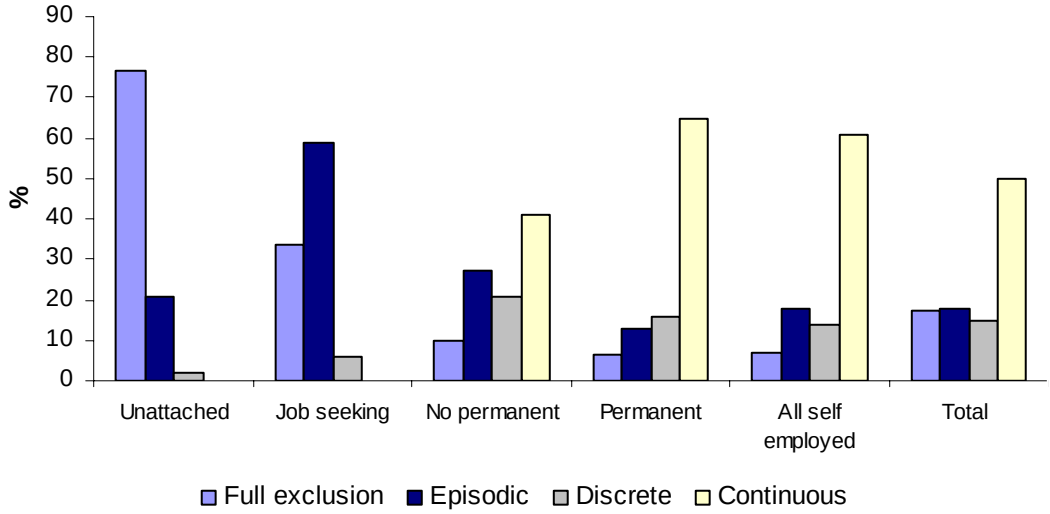
Continuity of Employment and Satisfaction with Security

The descriptive statistics in table 1 show increased proportions of non standard employment amongst households experiencing arrears. Potential explanations of the role of non standard employment could relate to a higher propensity to move in and out of employment, lower overall incomes, sudden fluctuations in earnings, or to differences in the characteristics of households engaged in these types of employment contracts.

Moving in and out of employment is likely to be an important influence for households with only non permanent employment. Figure 2 compares the continuity of employment participation amongst different household employment groups based on the categories introduced earlier (see figure 1). As shown, while job seeking households are most likely to have members episodically engaged in the labour market (59%), there is also an increased likelihood amongst those with no permanent members (27%) and self employed (18%)

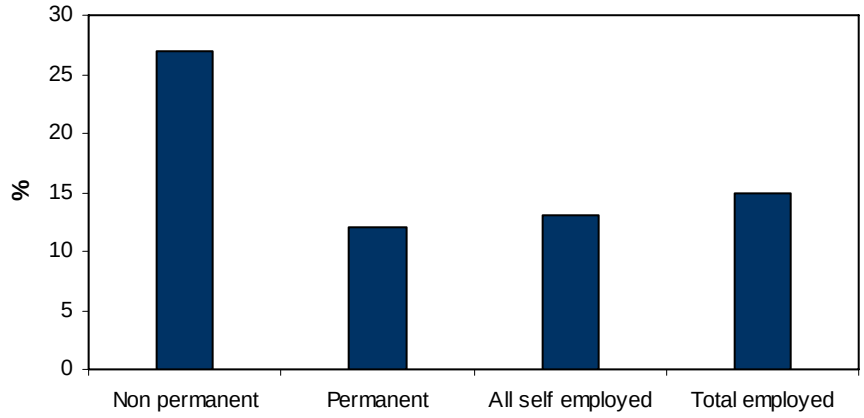
members compared with individuals with at least one permanent member (13%) in their household. There is less instability amongst individuals living in an all unattached household, with the majority (80%) fully excluded from the labour market over the three year period. Conversely, individuals with permanent members (65%) are more likely to be continuously employed compared to non permanent households (41%).

Figure 2. Individual Employment Participation between 2001-2003



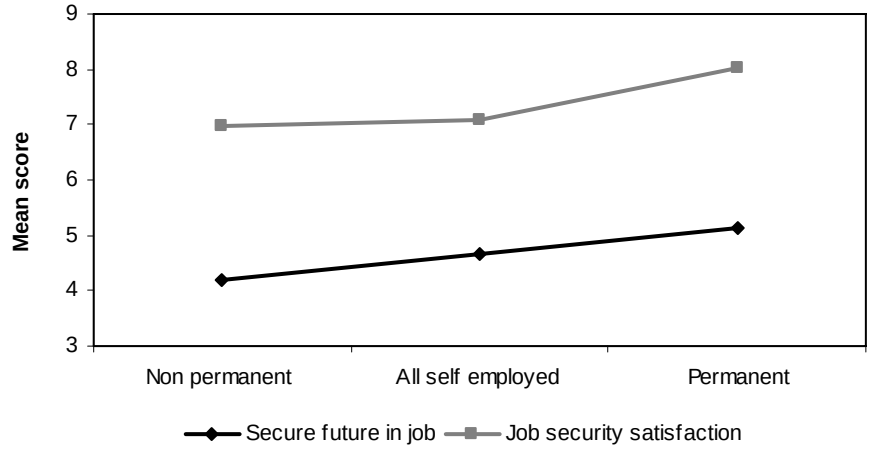
Weekly or fortnightly fluctuations in earnings, especially amongst self and casual employment could also be more detrimental for some households than actual employment loss however this impact is much harder to measure. A further dimension that provides insight into the security differences amongst the different household groups shown in figure 3 is the proportion reporting a preference to work more hours, otherwise defined as underemployment. As illustrated, the preference to work more hours amongst non permanent households (27%) is more than double those with at least one member in permanent employment (12%). This suggests that is not just differences in hourly wage rates but access to sufficient hours of paid work in order to meet consumption needs, including housing.

Figure 3. Prefer to work more hours



The above findings are reinforced by perceptions of security expressed as mean scores of satisfaction with job security and the feeling that ones job is secure which are shown in figure 4. Satisfaction with security is measured on a scale from 0 to 10 where a score of 0 corresponds with complete dissatisfaction and a score of 10 with compete satisfaction. The second measure "I have a secure future in my job" is measured on scale of 1 to 7, where a score of 1 corresponds with strongly disagree and seven with strongly agree.

Figure 4. Perceptions of security



As shown, perceptions of security increase with permanence of employment in the household, with mean satisfaction with security scores of 6.96 for non permanent, 7.10 for all self employed, rising to 8.03 for individuals living in a permanent household. There are also differences in self rated assessments of security satisfaction within self employment,

with own account workers being the least satisfied of all employment groups (6.47). Compared with their permanent (5.12) counterparts, individuals living in a non permanent (4.21) household are less likely to agree that they had a secure future in their job.

Delayed access to income support and housing assistance compared with jobless households could also increase the risk of payment difficulties amongst those reliant on non permanent or self employment. For instance, 15 percent of non permanent households live in social housing compared with 46 percent of all unattached and 31 percent of all job seeking households. Non permanent households (35%) are also less likely to be receiving income support compared with an all unattached (85%) and job seeking (61%) household. This suggests that discrete or episodic periods of non participation could be more destabilising for housing outcomes than longer term exclusion from the labour market, at least until adjustments in housing costs are made to accommodate changes to income by either moving or selling for example.

This descriptive overview and in particular observed differences in employment stability, underemployment and perceptions of security amongst households in non standard employment is likely to make planning for housing particularly difficult when repayments or rents remain constant. The next section outlines the static and dynamic models used to test the influence of different labour market variables on housing security outcomes.

A Static Model of Housing Arrears for Renters & Purchasers

Repeated observations for the same individual can bias estimates due to correlation of the explanatory variables with the error term thus violating assumptions of independence applied in naïve or ordinary regression. Fixed and random effects are two panel models controlling for potential correlation with the error term, with the former assuming correlation and the latter assuming no correlation. For the purposes of this analysis a random effects model was preferred because of the small number of events and also the desire to make broader population inferences.

A random effects model can control for unobserved heterogeneity by the inclusion of an additional random intercept in the equation error term. What this means in practice is the added advantage of being able to calculate the variance from the weighted mean score *within* repeated responses of the same individual with the mean score *between* different individuals – or in other words to hold time constant. Taking into account unobserved heterogeneity the random effects model formulation is written as follows:

$$y_{it}^{*} = \boldsymbol{x}_{it}^{'}\boldsymbol{\beta} + \alpha_i + u_{it} \qquad 1.1$$

where α_i is the unobserved, individual specific heterogeneity and u_{it} is error term and assumes that the unobserved effect α_i is uncorrelated with the explanatory variables.

Expressed as a binary latent response model where $y_{it}=1$ if $y_{it}^{*}>0$, and 0 otherwise, a static logistic regression model with random effects can be written as

$$\text{Prob}\left(y_{it}^{*}=1\middle|\alpha_i\right)=\pi\left(\alpha_i+\boldsymbol{x}_{it}^{'}\boldsymbol{\beta}\right)=\frac{1}{1+\exp\left(-\left(\alpha_i+\boldsymbol{x}_{it}^{'}\boldsymbol{\beta}\right)\right)} \qquad 1.2$$

Where y_{it} indicates rental or purchaser arrears and x is a vector of employment and other control variables measured at the household and individual level for subject i at time t.

Transition models into and out of home ownership

To follow transitions across tenures over the three year period, a multinomial transition model with random effects was specified through binary dependant variables derived from the categorical housing tenure variable: owner/purchaser, rent/rent buy and living rent free. Expressed as a Markov model of order 1 where H_{it} is the history of the *i*th subject to time *t* let $H_{it} = \{y_{i1}, ..., y_{i,t-1}\}$. The response variables for a change in housing state from purchaser to renter and the reverse transition assume a binary value based on a multinomial transition matrix where the end housing state is conditional on the origin housing state in which

$$y_{it,jk} = \begin{cases} 1 & \text{if } y_{it} = k \text{ and } y_{i,t-1} = j, \\ 0 & \text{otherwise} \end{cases} \qquad 1.3$$

Where *j* is the state or tenure of origin and *k* the destination tenure, the probability of making a transition from renter to purchaser or purchaser to renter can be expressed as

$$\begin{aligned} \pi_{it,jk} &= \text{Prob}(y_{it} = k | y_{i,t-1} = j) \\ &= \text{Prob}(y_{it} = k | \{y_{i,t-1} = j, y_{i,t-2}, ..., y_{i,1}\}) \end{aligned} \qquad 1.4$$

The parameterization of a multinomial model logit (Frees, 2004) with the inclusion of a random intercept α_i for each state of origin in which the systematic component $V_{it,jk}$ represents the conditional probability that the *i*th subject at time *t* makes a transition *jk* can be formulated as follows:

$$\pi_{it'jk}(\alpha_i) = \frac{\exp(V_{it,jk})}{\sum_{h=1}^{c} \exp(V_{it,jh})} = \frac{\exp(\alpha_{ijk} + \boldsymbol{x}'_{it,jk}\boldsymbol{\beta}_j)}{\sum_{h=1}^{c} \exp(\alpha_{ijh} + \boldsymbol{x}'_{it,jh}\boldsymbol{\beta}_j)}, j,k = 1,2,....,c, \qquad 1.5$$

For a transition into rental status, the starting origin state or tenure included all individuals who were purchasers in wave one. A new binary variable *purchre* measured the transition from purchaser status in wave 1 to renter in waves 2 & 3. Purchasers remaining in that state in all three waves were coded to zero and those making a transition in either wave 2 or 3 were coded to 1 when the transition occurs. The same method was used to construct the dependant variable *repurch* for a transition from renter to purchaser status, with a transition from wave one to waves 2 & 3 coded as 1 and no transition coded as zero. The above models were applied to a pooled dataset within Stata using the xtlogit command with random effects based on Gauss-Hermitte quadrature approximation.

Explanatory variables included in the last two transition models are similar to those for the static models, however additional non time varying measures of employment, income and housing costs have been included to help control for initial conditions prior to a transition. Time invariant and time varying variables have also been included in the transition models for family type and various labour market measures to control for changes associated with household formation and dissolution and to help distinguish between duration effects and changes occurring within the three year period.

The influence of non standard employment and exclusion on housing insecurity

Results based on the first two static models for arrears amongst purchasers and renters are presented in table 2. The findings are generally consistent with international research on the links between non standard employment, unemployment and an increased likelihood of housing insecurity. As shown, the most influential labour market factors associated with increased odds (coefficient estimates have been converted to odds ratios) of arrears are typically those relating to greater income uncertainty including self employment, non permanent employment and unemployment.

The relationship is especially strong when more insecure forms of work are the only types of employment in the household and still hold after controlling for a range of household characteristics including income, savings, housing costs, family type and stability. Moreover, non standard employment and unemployment appear to be more significant than being ‘unattached’ from the labour market altogether. This suggests that movement in and

out work and/or unpredictability of earnings is potentially more detrimental for housing security outcomes than longer term labour market exclusion.

Specifically for renters, households relying primarily on self employment are nearly three times (2.78) more likely to experience arrears in their rental property compared to the base group of an all employee household with one or more permanently employed ($p<0.001$). Increased odds of arrears (2.74) are equally significant amongst all self employed purchasers.

Table 2. Static model predictors for rental & purchaser arrears, HILDA 2001-2003

	Rental Arrears			Purchaser Arrears		
Household Employment	**OR**	**95% CI**		**OR**	**95% CI**	
Job seeking household	1.229 [0.365]	0.68- 2.20		5.304 [2.322]	2.25- 12.51	***
All unattached	1.208 [0.329]	0.71-2.06		2.634 [0.982]	1.27- 5.47	***
No permanent members	1.569 [0.259]	1.35-2.17	***	1.460 [0.287]	0.99- 2.15	**
All self employed household	2.778 [0.623]	1.79- 4.31	***	2.743 [0.594]	1.79- 4.19	***
One or more permanent (Omitted)	1.0					
One member part–time	0.968 [0.210]	0.63-1.48		1.229 [0.366]	0.68- 2.20	
One full-time	1.143 [0.192]	0.82-1.59		1.332 [0.237]	0.94- 1.89	*
Individual Employment						
Continuous participation (omitted)	1.0			1.0		
Episodic participation	1.359 [0.249]	0.948-1.947	*	1.488 [0.316]	0.98- 2.26	**
Discrete non participation	1.359 [0.253]	0.943-1.957	*	1.389 [0.281]	0.93- 2.07	*
Full exclusion	0.690 [0.169]			0.545 [0.164]	0.30-0.98	**
Individual casual contract	1.507 [0.263]	1.07-2.12	**	1.537 [0.318]	1.03- 2.30	**
Other Household Conditions						
Income support recipient	1.359 [0.209]	1.06-1.84	**	1.725 [0.374]	1.13- 2.64	***
Don't' think could raise $2000	2.680 [0.344]	2.08-3.45	***	3.553 [0.652]	2.48- 5.09	***
Member leaving household w2 or w3[4]	0.951 [0.184]	0.65-1.39		1.421 [0.438]	0.78- 2.60	
Member joining household w2 or w3	0.946 [0.171]	0.66-1.35		1.092 [0.278]	0.66- 1.80	
Couple family with depend children	1.447 [0.242]	1.04-2.01	**	0.736 [0.135]	0.51- 1.05	*
Lone parent depend children	1.237 [0.270]	0.81- 1.90		1.135 [0.371]	0.60- 2.16	
Lone person	0.940 [0.176]	0.65- 1.36		0.965 [0.272]	0.55- 1.68	
All other family groups (Omitted)						
Monthly household equiv income/100[3]	0.988 [0.005]	0.98- 0.99	***	0.962 [0.006]	0.95- 0.97	***
Monthly housing costs/100	1.036 [0.020]	1.00- 1.08	*	0.996 [0.017]	0.96- 1.03	
Social housing	0.556 [0.104]	0.39-0.80	***			
Amount owing on loan				1.0035 [0.0001]	1.00- 1.00	***
Age of oldest member in household	1.036 [0.028]	0.98- 1.09		0.984 [0.039]	0.91- 1.06	
Age Squared	0.999 [0.000]	0.99- 0.99	**	1.0001 [0.000]	0.99- 1.00	
Long term health condition	1.167 [0.161]	0.89-1.53		1.076 [0.191]	0.76- 1.52	
Australian born	1.502 [0.237]	1.106-2.04	***	1.516 [0.274]	1.06- 2.16	**
Degree	0.433 [0.079]	0.30-0.62	***	1.072 [0.192]	0.76- 1.52	
Wald chi2	269.22		***	254.13		***
Likelihood-ratio test of rho	298.57		***	172.38		***
Number of observations: N=	4,953			6,130		
Number of groups: N =	2,166			2,502		

1. Coefficient estimates for random effects models have been converted to odds ratios. Standard errors appear in parentheses.
2. *** Significant at the 1% level ** Significant at the 5% level * Significant at the 10% level
3. The unit of income included in the model is monthly household income divided by 100. Income is equivalised by applying the OECD equivalence scale. Equivalised income measures capture economies of scale associated with the addition of each household member.
4. A SPSS program was obtained from HILDA staff to identify households that have either had a new person enter or a member leave household based on changes on household ids.

Individuals living in a household with no permanently employed members or a 'non permanent' household also have a significantly increased likelihood of arrears in both rental and purchased housing. Amongst renters, the odds of rental arrears for those with no permanent employment in the household is 1.57 or 57 percent higher compared with a household with at least one member permanently employed ($p<0.001$). The impact of non permanent employment is also evident amongst purchasers, who are 1.46 times more likely to have arrears ($p<0.05$).

Potential explanations for the influence of non permanent employment in the household could relate to the unpredictability and/or lower earnings associated with non permanent work and also the tendency for non permanent employment to be concentrated amongst single earner households. To control for this effect a casual employment variable measured at the individual level was also included in the model. Fluctuations in income from casual employment may be concealed or absorbed into the overall income of the household when combined with other working arrangements.

Amongst renters, the influence of casual employment measured at the individual level, whilst lower in significance ($p<0.05$) than an all non permanent household, is however associated with increased odds of rental arrears (1.51) and purchaser arrears (1.54). The impact of casual employment measured at the individual level is surprisingly strong given that it is often combined with other types of employment within the household. The results suggest that income uncertainty as well as lower potential earnings could be interacting together to increase the likelihood of housing insecurity even in the presence of other types of employment in the household. This finding could also be related to the growing importance of a second income in managing housing costs.

A further test of the effect of non permanent work was to control for part-time employment. One factor that may account for increased insecurity amongst those in non permanent employment is the high proportion employed on a part-time basis. However, households with only one member in part-time employment have decreased odds, although these results were insignificant. The effect of non permanent employment is still apparent after controlling for households relying solely on part-time employment and points to the potential importance of fluctuating incomes rather than the differences between part and full-time earnings per se.

Labour market exclusion measured at the level of the household is especially influential for purchasers but not renters. Amongst purchasers, jobseeking households have the greatest odds of arrears (5.30) followed by those in an all 'unattached' household (2.6). The high standard errors on these results reflect small numbers amongst all 'jobseeking' purchaser households and suggest some caution in the interpretation of odds ratios (see also earlier table 1 on summary statistics).

Nonetheless, the results do point to a stronger association between movement in and out of work and purchaser insecurity over longer term exclusion from work. This is supported by the individual employment measures where individuals experiencing episodic (1.48), discrete (1.39) periods of participation have significantly higher odds of arrears compared with those who had been fully excluded (0.55) over a three year period.

These findings suggest that it is households who are reliant on income from employment and/or who are looking for work who face the greatest threat of arrears in their purchased housing. Fully excluded individuals are most typically those who are retired from the workforce and observed differences could reflect both higher housing costs and a younger age profile amongst working purchasers.

Renters experiencing episodic (1.36) or a discrete (1.36) period of non participation also have higher odds of arrears compared with those who had been fully excluded (0.69). While the odds of rental arrears are slightly elevated amongst individuals living in an all unattached (1.21) and or jobseeking (1.23) household, the results are insignificant. It could be that renters living in all unattached or jobseeking household are more likely to be concentrated in social housing with reduced or flexible housing costs that can mediate against higher risks of housing insecurity. Indeed living in social housing significantly reduces the odds of arrears by 46 percent ($p<0.001$). There could also be greater scope for sharing rental costs or moving to more affordable housing compared with home owners who can become 'trapped' in their purchased housing in the event of unemployment or reduction in paid hours (Böheim & Taylor, 2000; 2002).

Employment and the move out of home ownership

A further measure of the impact of work on housing security outcomes is to model the various measures of employment on the likelihood of moving out of home ownership back into the rental market. A move out of purchased housing can occur for a number of reasons, including household dissolution or a temporary transition whilst building a new property, that may be independent or interact with financial constraints from the labour market. After controlling for income and housing costs, the strongest predictors for a transition out of purchaser status related to household composition and instability and also the absence of employment within the household.

Model results in table 3 are based on a lagged independent variable for housing costs in which amounts in wave one are brought forward to next wave observation. Including lagged independent variables omits first year observations. In the descriptive statistics, a quarter of individuals making the transition back into rental status also had a member leave the household. This compares to five percent for those who remain in home ownership (see appendix B). Given the prominence of household dissolution in the transition out of purchaser status, a different approach to the role of labour market variables and family type has been taken where time varying and time invariant predictors are both included in the model. This enables employment and family composition at any period over the three years to be controlled for.

The model results indicate that the transition back into the rental market is more likely to occur amongst those whose current status was a lone person than couple households and is strongly associated with household dissolution. A member leaving the household increases the odds of a transition out of purchased housing to 3.8 ($p<0.001$). Individuals living in a couple household with dependant children at any stage during the three years have significantly higher odds (2.6) of moving back into the rental market. When included as a time varying measure the relationship becomes negative (0.26) and insignificant.

Table 3. Factors associated with the transition out of home owner status, HILDA 2001-2003

Transition from home owner to renter						
	OR	**95% CI**			**OR**	**95% CI**	
Household Employment				***Household & Individual Conditions***			
No employed members time varying	4.710 [2.695]	1.535-14.458	***	Couple family with depend children time varying	0.266 [0.086]	0.141- 0.502	***
No employed members time invariant	0.566 [0.282]	0.213- 1.501		Couple family with depend children time invariant	2.662 [0.802]	1.475- 4.805	***
All self employed time varying	1.752 [0.828]	0.694- 4.426		Lone parent depend children time varying	1.175 [0.752]	0.335- 4.120	
All self employed time invariant	0.716 [0.286]	0.327- 1.569		Lone parent depend children time invariant	0.979 [0.557]	0.320- 2.989	
No permanent members time varying	0.946 [0.295]	0.514- 1.743		Lone person time varying	0.632 [0.291]	0.256- 1.560	
No permanent members time invariant	1.065 [0.258]	0.663-1.711		Lone person time invariant	3.380 [1.478]	1.435- 7.966	***
At least one permanent (omitted)	1.0			All other family types (omitted)	1.0		
At least one full-time	0.779 [0.268]	0.397- 1.529		Monthly household equiv income/100	1.013 [0.005]	1.004- 1.023	***
No full time members (omitted)	1.0			Monthly housing costs lagged/100	0.970 [0.017]	0.936- 1.005	*
				Age of oldest member in household	0.912 [0.042]	0.834- 0.998	**
Individual Employment/ Education				Age Squared	1.000 [0.000]	0.999- 1.002	
Continuous participation	0.406 [0.142]	0.204-0.806	***	Long term health condition	0.763 [0.183]	0.477- 1.221	
Episodic participation	1.171 [0.409]	0.591-2.321		Mortgage Arrears time invariant	1.877 [0.421]	1.210 - 2.912	***
Discrete non participation	0.746 [0.282]	0.356-1.563		Member leaving household w2 or w3	3.794 [0.912]	2.368-6.077	***
Full exclusion (Omitted)	1.0			Member joining household w2 or w3	0.911 [0.259]	0.522- 1.590	
Degree	0.585 [0.136]	0.371- 0.923	**	Australian born	1.440 [0.337]	0.910 - 2.277	
Wald chi2 = 219.06 ***				Income support recipient	0.666 [0.207]	0.361-1.225	
Likelihood-ratio test of rho 109.24=***				Don't' think could raise $2000 time invariant	1.400 [0.340]	0.869-2.255	
Number of obsns N= 4,102							
Number of groups N = 2,088							

1. Coefficient estimates for random effects models have been converted to odds ratios. Standard errors appear in parentheses.
2. *** Significant at the 1% level ** Significant at the 5% level * Significant the 10% level
3. The unit of income included in the model is monthly household income divided by 100. Income is equivalised by applying the OECD equivalence scale. Equivalised income measures capture economies of scale associated with the addition of each household member.
4. A SPSS program was obtained from HILDA staff to identify households that have either had a new person enter or a member leave household based on changes on household ids.

The time invariant measure for lone person is also significantly linked to increased odds of 3.38, however on a time varying basis the odds decrease to 0.632 and is no longer significant. Being a lone parent with dependant children is not significant for time or non time varying measures, suggesting that when separation occurs it is the female partner, at least in the interim period that is most likely to remain in the purchased home.

The descriptive statistics showed that purchasers are more likely to be permanently employed and any movement out home ownership, especially if relating to household dissolution will increase the influence of permanent work. To control for this effect household time varying and non time varying measures have also been included in the models to isolate the impact of employment. Using households with more than one member in permanent employment as the omitted reference group, the absence of any employment within the household is strongly associated with a transition when measured on a time varying basis (4.7) ($p<0.01$) but not when measured on a time constant basis (0.56). The decreased odds (0.41) of moving out of purchaser status amongst the continuously employed confirm the potential influence of unemployment and/or moving out of the labour market.

These results could be reflective of the sudden loss of employment of the main permanent earner at the time of the transition and also a separation where one of the members living in a household with permanent employment was not employed. Labour market position could be interacting with household dissolution, where those who are unable to increase their labour market participation or hours worked in the context of separation are more likely to run into repayment difficulties. Income and labour market factors could be interacting with delays in property settlement where members from a dissolving household move back into the rental market at different periods of time. Alternatively, loss of employment within the household could also be implicated in a dynamic process with relationship breakdown and the eventual movement back into the rental market (Berry et al, 1999).

In the earlier static model, self employment was influential in purchaser arrears, however while those in self employment at the time of the transition have higher odds of moving out of purchased housing, the results were not insignificant. Those in self employment, especially in the context of business failure could move into an unemployed household at the time of the transition.

A further interpretation of the results is that once household dissolution and the movement of permanently employed within a household relationship has been isolated, it is financially constrained households, as evidenced by arrears who move back into the rental market. Experiencing difficulties with repayments or 'arrears' at any stage during the three year period increases the odds of moving out of home ownership by 88 percent ($p<0.01$). Similarly, difficulty raising $2,000 during a time of need increases odds by 40 percent, although was not significant. Increasing age and possessing a degree is negatively associated with a transition, however there is a positive relationship with income with the odds increasing by 1.3 with every additional $100 of monthly income.

After including lagged housing payments, for every $100 increase in housing costs there is a decreased likelihood of a transition into rental status by 3 percent ($p<0.10$). This could indicate that individuals at the higher end of the mortgage market are less likely to move back into renter status while those with lower mortgage costs more likely to make a transition.

Non standard employment and a precautionary motive for home ownership

In this section the precautionary motive linked to labour insecurity is modelled by examining the role of employment in the transition into home ownership. The findings of the transition model from renter to home owner status are presented in table 4. Similar to the previous transition model, housing costs have been lagged therefore omitting wave one observations. Time invariant measures of household employment have been included in order to identify the effect of household employment prior to and during a transition.

The results shown are consistent with previous studies that have identified a relationship between full-time employment, household stability and the progression towards homeownership. Generally, 'high commitment' dual income households are in a more advantageous housing position compared to households with a single earner or no earner, with the presence of two or more earners found to assist with the transition into home ownership (Yates, 2002; Clark et al, 1994).

Table 4. Factors associated with a transition into home owner status, HILDA 2001-2003

Transition from renter to home owner							
	OR	95% CI			OR	95% CI	
Household Employment				Other Household Conditions			
No employed members time invariant	1.0			Easily raise $2000	1.775 [0.315]	[1.25-2.51]	***
All self employed time invariant	1.524 [0.442]	[0.86-2.69]		Member leaving household w2 or w3	0.450 [0.156]	[0.23-0.89]	**
No permanent members time invariant	1.000 [0.199]	[0.68-1.48]		Member joining household w2 or w3	0.650 [0.153]	[0.41-1.03]	*
At least one permanent time invariant	2.257 [0.618]	[1.32-3.86]	***	Couple family with depend children time varying	3.980 [1.114]	[2.30-6.88]	***
Two full time members time invariant	1.388 [0.312]	[0.89-2.16]		Couple time varying	2.155 [0.642]	[1.20-3.86]	***
One full time and one part time members time invariant	1.041 [0.222]	[0.69-1.58]		Lone person time varying	0.485 [0.161]	[0.25-0.93]	**
No full time members (omitted)	1.0			Other family groups (omitted)	1.0		
Individual Employment /Education				Monthly household equiv income/100	1.013 [0.003]	[1.01-1.02]	***
Continuous participation	2.400 [0.878]	[1.17-4.92]	***	Lagged house price index	1.035 [0.005]	[1.03-1.05]	***
Episodic participation	1.061 [0.396]	[0.51-2.20]		Age of oldest member in household	1.060 [0.056]	[0.96-1.18]	
Discrete non participation	1.508 [0.602]	[0.69-3.30]		Age Squared	0.999 [0.001]	[0.99-1.00]	*
Full exclusion (Omitted)	1.0			Long term health condition	1.260 [0.282]	[0.81-1.95]	
Degree	1.255 [0.271]	[0.82-1.92]		Australian born	0.886 [0.1888]	[0.58-1.35]	
Number of observations: N= 3706				Wald chi2 = 276.29 ***			
Number of groups N= 2022				Likelihood-ratio test of rho = 305.17 ***			

1. Coefficient estimates for random effects models have been converted to odds ratios. Standard errors appear in parentheses.
2. *** Significant at the 1% level ** Significant at the 5% level * Significant the 10% level
3. The unit of income included in the model is monthly household income divided by 100. Income is equivalised by applying the OECD equivalence scale. Equivalised income measures capture economies of scale associated with the addition of each household member.
4. A SPSS program was obtained from HILDA staff to identify households that have either had a new person enter or a member leave household based on changes on household ids.

A significant departure of the current findings from previous research however is that the relationship between full-time income and moving into purchaser status is no longer significant after correcting for the permanence of employment within the household. The odds of moving into purchaser status is 2.26 ($p<0.001$) for those with at least one permanent member in the household, twice the odds of all other household employment groups including full-time dual earning households. Being continuously employed over the three year period also doubles the odds (2.40) of moving into purchaser status.

Linked to permanent and continuous employment, income, savings, and living in a couple household are also significantly associated with a transition. A $100 increase in household income increases the odds of moving into purchased housing by 1.3 percent. Being able to easily raise $2000 at any time during the three years increases the odds by 78 percent ($p<0.001$).

The model results lend support to a precautionary motive linked to the security of employment within the household, even when working hours may be full-time. The observed relationship between permanent employment and the transition into home ownership may also reflect a lower propensity for conforming lending institutions in Australia to provide mortgage credit to the self employed and non permanent employees.

The respective odds for couples with children (4.0) and without (2.16) and the negative relationship with members leaving and joining suggest that household formation and stability play a strong role in the movement into homeownership, findings that are consistent with previous research. Higher odds amongst those with children is an interesting finding that runs counter to earlier life cycle theories where children typically arrive after the purchase of the family home. This finding may also be indicative of a further labour market precautionary motive where households delay purchasing until both partners can work continuously.

The role of housing costs is more difficult to measure. Other studies including Diaz-Serrano (2005) examining the probability of homeownership based on a larger panel have compared user costs for renting versus owning by including values of annual regional house prices, interest rates, and various property and marginal tax rates in their model dataset. Aarland &

Nordvick (2009) include a measure of regional house prices on a two wave panel although the results were insignificant.

The measure of housing costs used in the current model is annual average of housing costs for established dwellings from the ABS house price index. The first year observations for the 2001 house price index is lagged or brought forward to correspond with initial prices prior to a transition. The association between the transition into home owner status and housing price is positive and highly significant, indicating that an annual rise in the price index increases the probability of a transition by 3.5 percent.

Discussion & Conclusion

Applying both static and dynamic models to rental and purchaser insecurity confirm the association between non standard employment, unemployment and housing insecurity previously identified in international research. There were however some important differences observed amongst renters and purchasers. For renters it is the working insecure – those in non permanent and self employed households and those moving in and out of the labour market that were found to experience the highest risk of arrears. These are likely to be the groups who are outside the social housing system reliant on private rental and therefore less able to plan for any sudden changes in income. The all unattached and longer term excluded did not experience higher odds of rental arrears.

For purchasers, who on average have higher repayment costs than renters, risk to housing payments appears to be influenced by any event that threatens both the amount and predictability of earnings. Like renters, non permanent and self employment was also influential. Purchasers also appeared to be more vulnerable to the experiences of unemployment and labour market exclusion, notwithstanding the smaller proportions of these employment groups amongst purchasers.

The relationship between non standard work and housing was generally strongest when there were no household members in permanent employment. Participation in non standard work, including casual and fixed term employment is associated with an increased likelihood of interim periods of unemployment and for many is often the first type of employment obtained when re entering the labour market (Golsch, 2004; Productivity Commission, 2006; Chalmers & Waddoups, 2007; Buddelmeyer & Wooden, 2007).

Individuals in non standard employment are also likely to be the first employees or sub contractors to be laid off during organisational restructures and downsizing (Auer & Cazes, 2000; Stewart and Swaffield, 1999:40). Sudden losses of income due to fluctuating hours or continued employment in the position can add to difficulty of meeting housing costs and capacity to generate savings. Limited income mobility associated with many non standard jobs especially for casual employment following a period of unemployment or labour market exclusion could also be a factor increasing housing insecurity.

The findings on labour market and income measures suggest the importance of both certainty of income but also the ability to draw on additional resources should there be any fluctuation in earnings. Lower incomes, reduced savings, higher housing costs, household instability and poorer health status were all linked to a higher likelihood of housing insecurity.

Households unable to adjust their housing costs should earnings fluctuate are especially vulnerable in their housing. This is particularly evident amongst households in self employment who on average have higher median housing costs when compared with other households, especially with those who were fully excluded from the labour market (Parkinson, forthcoming). Households with both members out of the labour market for extended periods were found to have lower median housing costs and were more likely to live in social housing.

Household dissolution was found to be especially influential in the transition back into the rental market from purchased housing. It is likely that household instability combines with existing labour market vulnerability in the housing insecurity dynamic. The high significance amongst those with a member leaving the household, no employed members in the household, part-time employment, being a lone person suggest that household change and labour position interact in the sustainability of home ownership. In the event of household dissolution many women in non permanent employment or who are out of the labour market will be particularly vulnerable to housing insecurity if they are the ones remaining in the home, especially if the home has recently been purchased.

Being out of the labour market was not significantly related to rental arrears however was a strong predictor in purchased housing. This could be pointing to both duration effects of long term labour market exclusion and/or to the interrelation between household dissolution and sale of the property amongst families with children where one member is out of the labour market.

There are likely to be a number of factors accounting for the capacity to maintain housing costs in the context of long term labour market exclusion. The presence of direct debit for home owners could mean that other expenditure in the household such as food is reduced to prevent loss of the family asset and also the greater incentive to increase labour supply or accept any type of employment in order to avoid mortgage default and foreclosure. Alternatively selling the property in instances of an unexpected employment event or household change could see the household move out of purchaser status altogether.

The overall findings support the importance of permanent employment in the long term security decision to purchase and confirm the influence of a precautionary motive attached to labour and housing security. The insignificance of full time employment over permanent employment suggests that is not only the hours worked but overall employment security that influences the way households consume housing.

Household employment composition combined with family type, income and age indicate that the typical profile of households moving out of the rental and into the mortgage market during 2001 to 2003 were younger stable and financially secure families with at least one member in permanent employment. Modelling these dynamics over a longer duration would help to further confirm the precautionary influence of labour insecurity. Also including other measures such as interest rates and housing user costs could improve understanding the role of housing market indicators on the transition into home ownership.

Reviews of the labour market literature suggest that the movement out of non permanent employment is unequally distributed according to occupational class, education and gender (Chalmers & Waddoups, 2007; Buddelmeyer & Wooden, 2007). In the absence of additional resources to draw on, households reliant solely on non permanent employment for their income in the longer term will be more likely to remain in the rental sector. Further research into how many years household members remain in non permanent employment will be informative in determining the longer term consequences of the growth of non standard employment on aggregate housing demand and also the sustainability of purchased housing for those in less secure employment entering into home ownership.

As unemployment continues to grow we can expect to also see the numbers of households experiencing arrears to increase, however in a significantly more complex labour market structure housing insecurity for those still attached, albeit precariously, should not be overlooked. The more recent events of the US sub prime crisis can attest to the potentially disastrous consequences when the links between basic wage security and consumption go unchecked. On the labour market side, there needs to be greater recognition of the implications of the growth of non standard employment for housing consumption. On the housing side, the growth in non standard work is likely to increase the need for a rental market that can accommodate and provide a longer term secure and affordable alternative to an increasingly diverse mix of households.

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Appendix A

Table 1a List of variable measures and definitions

Model Variables	Definitions	Measurement
	Dependant Variables	
Arrears	Couldn't pay rent or mortgage on time coded to one and all else zero	Binary
Transition from renter to purchaser (dynamic)	Renter in wave 1 to purchaser in wave 2 or 3 coded one and all else zero	Binary Transition from origin state
Transition from purchaser to renter (dynamic)	Purchaser in wave 1 to renter in wave 2 or 3 coded to one and all else zero	Binary Transition from origin state
	Independent Variables	
Individual Labour market measures		
Full exclusion	Not employed during any year over three yrs coded to one and all else zero	Binary Time invariant
Episodic Employment	Not employed on more than one occasions coded to one and all else zero	Binary Time invariant
Discrete Employment	Not employed on one occasion coded to one and all else zero	Binary Time invariant
Continuous employment	Continuous Employment during 3yrs coded to one and all else zero	Binary Time invariant
Casual employment	Casual worker (ABS definition) individual Casual coded to one all else included not employed coded to zero	Binary Time varying
Household Labour market measures		
Job seeking	All members looking for work or one member looking for work and other member out of the labour market coded to one and all else zero	Binary Time varying
All unattached	All members out of the labour market coded to one and all else zero	Binary Time varying
No employed members or 'Jobless' household	No employed members in the household – includes job seeking and all unattached coded to one and all else zero	Binary Time varying
No employed members or 'Jobless' household	No employed members in the household – includes job seeking and all unattached coded to one and all else zero	Binary Time invariant
No permanent employment	One or more members in the household are employed in non permanent employment only based on employment contract that casual and fixed term coded to one and all else zero. Households with a mix of self and waged employment have been assigned to the non permanent household if the wage earner is non permanent.	Binary Time varying
No permanent employment	One or more members in the household are employed in non permanent employment only based on employment contract that casual and fixed term coded to one and all else zero. Households with a mix of self and waged employment have been assigned to the non permanent household if the wage earner is non permanent.	Binary Time invariant
All self employed household	All employment from either from independent contract work or own business coded to one and all else zero	Binary Time varying
All self employed household	All employment from either from independent contract work or own business coded to one and all else zero	Binary Time invariant
At least one permanent	One or more members employed on permanent contract coded to one and all else zero. Households with a mix of self and waged employment have been either assigned to the permanent household if the wage earner is permanent.	Binary Time varying
At least one permanent	One or more members employed on permanent contract coded to one and all else zero. Households with a mix of self and waged employment have been	Binary Time invariant

Model Variables	Definitions	Measurement
	either assigned to the permanent household if the wage earner is permanent.	
One part-time	Only one member employed part time coded to one and all else zero	Binary Time varying
Two or more part-time	All members in the household in part-time employment coded to one and all else zero	Binary Time varying
One employed full-time	Only one employed in household and employment is full-time coded to one and all else zero	Binary Time varying
Two or more employed full-time	At least two members employed full-time coded to one and all else zero	Binary Time varying
One fulltime & one or more part-time	One member full-time and one or more in part time employment coded to one and all else zero	Binary Time varying
No full-time	All members in the household in part-time employment – combines one & two members in part time employment coded to one and all else zero	Binary Time varying
One or more full time	One or more members in full-time employment – combines all of the above with at least one member in full-time employment coded to one and all else zero	Binary Time varying
Other Household Indicators		
Couples without children	Living in couple without children coded to one and all else zero	Binary Time varying
Couples without children	Living in couple without children coded to one and all else zero	Binary Time invariant
Couple family with depend children	Couples with non independent children including children under 15 and/or still at school coded to one and all else zero	Binary Time varying
Couple family with depend children	Couples with non independent children including children under 15 and/or still at school coded to one and all else zero	Binary Time invariant
Lone parent depend children	Lone parent with non independent children including children under 15 and/or still at school coded to one and all else zero	Binary Time varying
Lone parent depend children	Lone parent with non independent children including children under 15 and/or still at school coded to one and all else zero	Binary Time invariant
Lone person	Person living alone coded to one and all else zero	Binary Time varying
Lone person	Person living alone coded to one and all else zero	Binary Time invariant
Other	Couples and lone persons with independent children, group & multi-family household coded to one and all else zero	Binary
Member leaving household w2 or w3	Has there been a reduction in household measured by house id for fully responding households*. Coded to one and all else zero	Binary Time varying
Member joining household w2 or w3	Has there been an increase in household measured by house id for fully responding households*. Coded to one and all else zero	Binary Time varying
Social rental	Renting from public/community housing authority coded to one and all else zero	Binary Time varying
Arrears (as depend variable in transition model)	Couldn't pay mortgage on time coded to one and all else zero	Binary Time invariant
Age of oldest member in household	Original HILDA measurement	Continuous Time varying
Monthly household equiv income00	Monthly household OECD equivalent income divided by 100	Continuous Time varying
Monthly rental payments	Rent payments $ per month divided by 100	Continuous Time varying
Monthly mortgage repayments	Mortgage repayments $ per month divided by 100	Continuous Time varying
Monthly Housing costs	Rent and purchaser usual repayments $ per month divided by 100	Continuous Time varying
Amount owed on loan	Approximate amount owed on loan divided by 1,000 from first mortgage	Continuous

Model Variables	Definitions	Measurement
		Time varying
Monthly housing payment lagged	Lagged variable for rental and purchaser housing costs divided by 100	Continuous Time varying
Other Individual Indicators		
Income support recipient	Includes government old age pension and all benefits coded to one and all else zero	Binary Time varying
Don't' think could raise $2,000	Ability to raise $2000 in time of need - Don't think could raise $2000 in time of need recoded to 1 and all other values recoded to zero	Binary Time varying
Don't' think could raise $2,000	Ability to raise $2000 in time of need - Don't think could raise $2000 in time of need recoded to 1 and all other values recoded to zero	Binary Time invariant
Could easily raise $2,000	Ability to raise $2000 in time of need – Easily raise $2,000 recoded to one all else recoded to zero	Binary Time varying
Long term health condition	Long term health condition, disability or impairment coded to one and all else zero	Binary Time varying
Australian born	Country of birth brief recoded to Australian born recoded to one and all else zero	Binary Time varying
Degree	Highest education level achieved recoded to one if degree or above all else zero	Binary Time varying

Appendix B

Table 1b. Comparison of Mean Scores for Renters & Purchasers with and without Arrears

	Renters		Purchasers	
	No Arrears	Arrears	No Arrears	Arrears
Household Employment				
Job seeking household	5	7	1	6
All unattached	26	17	3	10
No permanent members	17	26	12	19
All self employed household	5	10	8	15
One or more permanent (Omitted)	47	39	76	50
One member part–time	11	16	4	10
One full-time	25	29	28	29
Individual Employment				
Continuous participation	36	31	66	48
Episodic participation	21	31	12	24
Discrete non participation	15	19	14	17
Full exclusion (Omitted)	28	18	8	11
Casual contract	13	22	11	16
Other Household Conditions				
Income support recipient	32	41	10	27
Don't' think could raise $2000	26	42	7	25
Member leaving household w2 or w3	7	8	3	5
Member joining household w2 or w3	8	9	6	6
Couple family with depend children	23	33	59	54
Lone parent depend children	11	16	4	10
Lone person	30	25	9	12
Social Housing	21	12		
Monthly household equiv income	2,205	1,860	3,049	2,168
Monthly housing costs	669	685	1,002	898
Amount owing on the loan			109,080	106,180
Age of oldest member in household	43	37	41	42
Age Squared	2091	1539	1789	1843
Long term health condition	27	25	15	23
Australian born	73	81	77	80
Degree	21	18	26	21
	N=4,076	N=972	N=5,821	N=482

Table 2b. Comparison of mean scores for non transitioning and transitioning renters & purchasers

	Transition from renter to purchaser		Transition from purchaser to renter	
	No transition	**Transition**	**No transition**	**Transition**
Household Employment				
No employed members time varying			5	18
No employed members time invariant			8	22
All self employed time varying			8	8
All self employed time invariant	9	13	13	13
No permanent members time varying				
No permanent members time invariant	35	31		
At least one permanent time varying			75	62
At least one permanent time invariant	59	85	85	85
Two full time members non time invariant	27	48		
One full time and one part time member time invariant	23	38		
No full time members (omitted)				
At least one full-time			88	74
Individual Employment				
Continuous participation	35	57	65	46
Episodic participation	23	17	13	22
Discrete non participation	16	18	14	18
Full exclusion (Omitted)	26	8	8	14
Other Household Conditions				
Income support recipient			11	19
Easily raise $2000	30	52		
Don't' think could raise $2000 time invariant			15	28
Member leaving household w2 or w3	7	4	4	25
Member joining household w2 or w3	8	12	6	11
Couple family with depend children time varying	25	45	60	36
Couple family with depend children time invariant			65	54
Lone parent depend children time varying			5	11
Lone parent depend children time invariant			7	14
Lone person time varying	30	12	9	23
Lone person time invariant			12	29
Couple time varying	24	34	20	24
Couple time invariant			24	33
Monthly household equiv income/100	2,114	3,517	2,936	2,979
Monthly housing costs	673	1188	988	856
Monthly housing costs lagged*				
Age of oldest member in household	42	37	42	40
Age Squared	1994	1434	1813	1,701
Long term health condition	27	18	15	18
Mortgage Arrears time invariant			15	28
Australian born	74	73	78	84
Degree	19	29	25	15
	N=5707	N=525	N=6,012	N=301

Table 3b Within Employment Group Summary Characteristics

Summary Characteristics	Unattached	Job Seeking	No Permanent	Permanent	All Self employed	Total
Gender %						
Female	61.1	50.7	53.6	48.9	41.9	50.8
Male	38.9	49.3	46.4	51.1	58.1	49.2
Wealth & savings						
Could easily raise $2,000 %	25.2	11.5	34.9	49.0	50.0	42.7
don't think could raise $2,000 %	45.3	55.5	21.4	9.8	10.2	17.6
Income support %	60.9	81.8	29.2	7.6	16.2	21.0
Mean household wealth $	50,731	61,846	139,874	245,465	441,571	211,945
Income & Housing costs						
Monthly household equivalised income $	1,137	1,252	2,276	3,082	2,796	2624
Rent usual repayments $ per month	466.47	528.88	709.17	844.73	814.82	715.63
Mortgage usual repayments $ per month	506.22	874.84	874.57	1066.08	1169.95	1027.23
Approximate outstanding on home loan $	56,502	98,991	91,770	117,728	133,629	113,293
Ratio of Income to Rental Costs %	46.27	55.32	46.66	34.50	50.45	41.34
Ratio of Income to Mortgage Costs	47.22	55.57	40.88	37.27	44.98	38.86
Social Housing – Renters %	46.0	30.6	15.3	8.1	8.5	19.5
Time of labour market exclusion						
Mean duration out of labour market	17.3997	5.4880	3.8552	2.9057	2.8908	5.1114
Mean duration unemployed	1.1646	3.2313	.9977	.4550	.4902	.7197
Full excluded %	77.4	34.5	10.3	6.3	6.8	17.6
Episodic %	20.5	59.1	27.4	12.7	18.3	17.8
Discrete %	2.1	6.4	21.0	16.1	13.8	14.5
Continuous %	0	0	41.3	64.8	61.0	50.1
Time of employment						
Mean tenure in current occupation (years)			6.29	8.24	10.49	8.08
Mean tenure with current employer (years)			3.24	5.94	7.07	5.57
Contract status						
Individual casual contract%			67.0	10.8	100.0	20.6
Other contract, including fixed term%			33.0	89.2	0	79.4
Cultural identity & Country of birth						
Indigenous background%	6.1	9.8	3.5	1.7	1.0	2.7
Overseas non English speaking%	19.9	23.7	16.7	13.	17.1	15.7
Overseas English speaking%	15.6	8.3	8.9	11.7	15.0	12.0
Health						
Long term health condition, disability or impairment%	54.9	37.0	18.9	13.4	16.9	20.9
Education						
Year 11 or below%	53.9	38.6	23.4	20.8	21.5	26.3
Age						
Mean age of oldest member in household	56.35	39.06	38.10	39.11	42.30	41.55
Household type						
Couple family without children%	27.4	11.8	18.1	27.3	20.1	24.9
Couple family with depend children%	9.1	28.6	37.0	46.7	51.9	39.9

Summary Characteristics	Unattached	Job Seeking	No Permanent	Permanent	All Self employed	Total
Lone parent depend children%	18.8	21.2	11.4	4.0	2.8	7.6
Lone person%	40.7	27.0	20.2	11.4	20.4	17.9
Group household%	1.2	1.7	4.6	3.2	1.0	2.9
Multi-family household%	0.6	2.7	1.6	1.1	.6	1.1
Household stability						
Member leaving household w2 or w3%	7.0	11.1	7.5	5.5	6.9	6.3
Member joining household w2 or w3%	4.0	11.0	8.2	7.5	9.7	7.4

Source: HILDA Release 3.0 (waves 1 – 3) Confidentialised January 2005