Final Report

Project 3/2005: An Examination of Welfare Transitions Using the First Three Waves of the HILDA Survey

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Executive Summary

- This project examines the movements of the working age population into and out of welfare using the first three waves of the Household, Income and Labour Dynamics in Australia (HILDA) survey (2001-2003). It concentrates on welfare payment reliance in the Australian labour market.
- Reliance on welfare payments is measured using an index of the proportion of total income from all different welfare payments, the *TPI*. Three individual but inter-connected facets of welfare reliance are examined:
    - The absolute level of welfare reliance (measured by the level of *TPI*).
    - The over time persistence in any given type of welfare payment (measured by how past receipt affect current receipt).
    - The over time persistence of the level of *TPI* (measured by how past levels of *TPI* affect current levels of *TPI*).
- The microeconomic foundations of individual labour supply and welfare receipt are combined using a realistic budget constraint derived from the Melbourne Institute Tax and Transfer Simulator (MITTS). The resulting model showed that the Australian welfare system tends to bunch up welfare recipients towards either very high or very low levels of welfare reliance.
- The project performed a series of multivariate regressions to estimate the level of welfare reliance and the persistence of welfare reliance. Estimations were carried for four major categories of programmes. The main results on welfare reliance and over time persistence can be summarised as follows:
    - *Over time persistence patterns do not follow welfare reliance patterns.* The proportion of income that comes from welfare does not seem to correlate with the over time persistence of welfare, despite the high level of observed mobility between payment types. This project finds no empirical support for the proposition that the Australian welfare system as a whole causes further unemployment.
    - *Over time persistence in any given type of welfare payment differs by welfare payment type*, even after observed differences between recipients of different welfare payments have been taken into account.
    - *Over time persistence of the level of TPI differs by welfare payment type,* even after observed differences between recipients of different welfare payments have been taken into account.
- An overall summary of reliance and persistence by the four major categories of welfare payment is as follows:

- **DSP:** High level of welfare reliance. Slow adjustment/High persistence. Those observed on DSP in the last period, are highly likely to be on DSP in the current period. Last period's level of welfare affects current period's level by a lot. Shocks that cause deviations away from the equilibrium last long and individuals adjust slowly back to their high level of reliance. This could be a reflection of the fact that recipients who get into or out of DSP do so slowly and for a long time. Most of this result is driven by recipients moving into DSP.
- **LMA** (NSA and/or YA)**:** Low/average level of welfare reliance. Average-Slow adjustment/High-Average persistence. Those observed on LMA in the last period, have an average likelihood of being on LMS in the current period. Last period's level of welfare affects current period's level quite a bit. This could imply that shocks that cause deviations away from the equilibrium last longer as adjustment is slower. Slower adjustment could be the manifestation of more thorough job search being associated with longer search whilst on welfare.
- **PPS:** Average level of welfare reliance. Average-Slow adjustment/High-Average persistence. Those observed on PPS in the last period, have a high likelihood of being on PPS in the current period. Last period's level of welfare value affects current period's level quite a bit. Shocks that cause deviations away from the equilibrium last longer as adjustment is slower. Single parenthood explains these reliance characteristics. This is a group of individuals with fairly tight time and budget constraints and typically idiosyncratic family and non-family support.
- **PPP:** Average level of welfare reliance. Fast adjustment/low persistence. Those observed on PPP in the last period, have the lowest likelihood amongst all types of welfare payment of being on the same payment in the current period. Last period's level of welfare has an average effect on current period's level. Shocks that cause deviations away from the equilibrium do not last long as they adjust quickly. These are principally females who move in and out of welfare receipt more often than others. A longer panel would be needed to investigate this behaviour in more detail.

- The project also estimated the impact of life events on welfare, but found little empirical support for this analysis. Health status changes and marital status changes were the main events that changed in welfare receipt. We believe that this is not because there are no life events that are important regarding labour market behaviour. It is rather that such other life events are too infrequent to be able to produce sufficiently precise estimates in the first three waves of HILDA used for this analysis. We recommend that this issue be revisited in two-three years when there will be 5-6 years of panel information and there will be more observations of people who experienced such events.

1. Introduction

The objective of this project is to use the first three waves of the Household, Income and Labour Dynamics in Australia Survey (HILDA) in order to describe the nature of movements into and out of welfare receipt of working age persons, and the characteristics and events associated with alternative paths for welfare receipt patterns. Particular emphasis will be placed on the study of welfare reliance and the over time persistence of welfare reliance within a dynamic framework. The HILDA data provide a new opportunity to derive statistics on individuals' welfare reliance over time. Previous Australian research that concentrated on the study of individual reliance measures often encountered data limitations, principally because of the lack of complete individual in and out of work histories. HILDA overcomes this problem and allows this project to study the development of *individual* welfare reliance over time. This distinction is crucial for the identification of the reasons why exit from welfare, entry to welfare, and exit from welfare followed by re-entry may occur. The project provides several categorisations of welfare reliance and the persistence of welfare reliance over time.

The project presents a static picture of welfare reliance (i.e. where reliance statistics for a single time point are examined, thus concentrating in differences across persons) and a dynamic picture of welfare reliance (i.e. where reliance statistics over a period of time are examined, thus providing information on differences within individuals over time). Both types of analyses are complementary and can be used to answer different questions. The project focuses on the study of welfare reliance for recipients on different welfare payments.

Section 2 provides an overview of the issue of welfare reliance in the Australian context. Section 3 outlines a useful economic framework that can guide the analysis for this report. Section 4 describes the HILDA data used for the empirical analysis. Sections 5 and 6 provide descriptive analysis of the HILDA data. Section 7 contains the main multivariate estimation results. Section 8 concludes the report.

2. International and Australian Literature on Welfare Reliance

Welfare reliance or dependency is an important policy issue that has been addressed in the past by both Australian and international researchers. Despite the progress that has been made in understanding the characteristics of individuals who are more likely to be long term

recipients (for example, lone parents, the older unemployed, indigenous Australians etc.), more work is needed in order to understand better why some recipients are heavily reliant on welfare for longer periods of time and why they do not move back into paid employment.

The Australian system of social support refers to a collective set of payments that represent the primary source of income for recipients. It comprises of two main components. The elements of the first component are collectively known as 'income support' payments (IS) and comprise of more than 20 separate programmes. IS payments are welfare payments made by the Commonwealth Government to persons who are assessed as unable to obtain the income necessary to satisfy their basic consumption needs from other (private) sources. The elements of the second component of the Australian welfare system are known as 'non-income support' payments (NIS). These payments are intended to supplement the income of persons who obtain most of their income from private sources and largely comprise payments to families with dependent children. In general, most previous Australian studies on welfare reliance and transitions have focused on IS payments (Reference Group on Welfare Reform 2000, Gregory and Klug 2003, Wilkins and Tseng 2003, Harris and Kalb 2005), although one recent study attempts to examine the transitions between IS and NIS (Gong 2004).

A key decision that has to be made in analysing welfare reliance in the Australian context is whether it is more appropriate to examine particular components of the social support system or the system as a whole. Some Australian studies focus on particular components of the income support system. For example, Barrett (2000) uses the Longitudinal Data Set (LDS), which is a 1% sample of all income support recipients in Australia, to study the duration of individuals receiving sole parenting payments. By estimating a duration model, he concludes that the average time spent on one episode of that payment was about two years and that heterogeneity amongst welfare recipients plays an important role in developing some understanding regarding how long individuals stay on sole parenting payment. However, the emphasis on the length of a single type of payment is very limited as a measurement of welfare dependency and there appears to be an increasing tendency in the literature to look at the social support system as a whole.

A recent descriptive study by Gregory and Klug (2003) investigates the time a 1995 entry cohort of lone parents spent on all kinds of income support programmes, based on the LDS. They find that most of the people were 'long term income support customers', although the time spent on the sole parenting payments was relatively short. They also find that there was considerable mobility between different types of payments. They, therefore, suggest that the

focus should be on IS programmes as a group rather than on each programme individually. When individuals are moving in large numbers from one programme to another, often without an intervening period off-payment, it is important that policy be consistent in the sense that it does not create conflicting incentives, especially regarding return to work incentives. For many individuals different programmes can be close substitutes. It may therefore be more informative to establish the time an individual spends on all forms of income support.

Similarly, Harris and Kalb (2005) use the LDS to study in detail the transitions between seven groups of income support payment types. The payment type categories are unemployment payments, sole parent payments, partner and parenting payments, disability and sickness payments, age pension, other payments and not receiving any payments. They define two categories of individuals not receiving payments: the non-payment partner category and the no payments category. The first group of individuals not receiving payments are partners of people who do receive income support payments and the second group are either singles not receiving income support payments or individuals whose partner is not on payments either. They find large differences in the retention rates (probability of remaining on the same payment type) of different payment types. The highest retention rate is observed for people on disability payments and the lowest for those on unemployment payments. Summarising the effects by individual characteristics they find that older individuals have lower exit rates, longer spell durations, fewer spells and longer total duration on income support during the five-and-a-half-year observation period. Women spend more time on income support, mostly through sole parent payment spells and partner and parenting spells. When comparing duration of spells on unemployment payments, there is not much difference between men and women. Ethnicity seems to be of some importance as reflected by the indicator for people born outside Australia and the indicator for people of Aboriginal or Torres Strait Islander descent. Those who are born outside Australia have, on average, longer spells, whereas the second group has shorter spells, which occur more often, resulting in a longer total duration on payments.

Tseng and Wilkins (2003) look at the social support system as a whole, using measures of welfare reliance suggested by Gottschalk and Moffitt (1994). They use both the ABS Income Distribution Survey (IDS) and the LDS to describe the nature of welfare reliance in Australia during the 1980s and 1990s. As in Whiteford and Angenent (2001), they find that significant growth in the extent of reliance on income support (which they define as the proportion of the workforce population on income support) has occurred since 1981-1982, when less than one-

quarter of the population aged 15-64 years received income support payments. Most of the increase appears to have occurred after 1989-1990, and has been most pronounced among single males, particularly those born outside Australia and those with no post-school educational qualifications.

Much of the international literature on welfare reliance stems from the US and consequently has focused on specific US welfare payments. In the US, welfare reliance typically refers to a specific programme – Aid to Families with Dependent Children (AFDC) or Temporary Assistance to Needy Families (TANF), the programme that replaced AFDC following welfare reform in 1996. Therefore, the literature in the US that examines welfare transitions and dynamics has tended to focus primarily on AFDC or TANF receipt and benefits. There are several parallel literatures that have been developed for unemployment benefits (for example, Meyer 1990 and Blank and Card 1991) and for disability benefits (for example, Bound and Waidmann 1992). There is therefore no simple template that one can utilise from the international literature and apply to the Australian labour market in order to study welfare dynamics and transitions.

When it comes to deriving clear and generalisable policy messages, the focus on single welfare payments can be seen as a disadvantage, especially given mobility across programmes. Recently, a more general approach to studying welfare reliance appears to be gaining a foothold in the US, in the sense that the emphasis is shifted away from the *type* of programme which generates the welfare payment, and towards the *level* of support provided to an individual through welfare. A recent Annual Report to Congress on 'Indicators of Welfare Dependence' (2005) uses the combination of welfare payments from three separate programmes (TANF, Food Stamps, and Supplemental Security Income) and applies the Gottschalk and Moffitt (1994) measure that defines welfare reliance as the proportion of total annual income that is derived from annual welfare payments in order to create an overall measure of welfare dependency.

At present, the study of the dynamics of welfare reliance in Australia has not been sufficiently investigated, mainly due to the lack of individual level panel data that are representative of the Australian population.[1] The need for individual level panel data for the

[1] Panel data, often referred to as *longitudinal data* or *cross-section, time-series data,* is the kind of data where a specific group of individuals (usually a sample representative of the population at the time the panel starts) are followed over time, and information is gathered on the same issues over time and across individuals. The advantage of this data is that it observes variations between individuals (the conventional cross section data,

study of Australian welfare has been well understood and explained in the Australian literature. Some quotes from several recent attempts to analyse this issue drive this point home:

"It is not easy to determine how many Australians are heavily reliant on income support for long periods of time. Most data on the proportion of income from income support relate only to one point in time. These can be supplemented by social security data on the length of time over which people have been receiving an income support payment. The Department of Family and Community Services is currently developing data sources that will provide this information over time." (Reference Group on Welfare Reform 2000, p.65, footnote 2.)

"A valuable extension of the descriptive analysis presented in the present paper would be formal analysis of the determinants of the extent of reliance on income support. Specifically, estimation of a model of the dependence of welfare reliance on characteristics would permit us to quantify the role of specific factors in determining the extent of individual reliance. Such a formal approach to the study of the determinants of reliance would also be useful for analysis of the determinants of changes in reliance (in both extent and nature) over time, and in particular decomposing changes to patterns of reliance over time into those due to characteristics changes (including private income changes) compared with those due to changes in other factors such as government policy." (Tseng and Wilkins 2003, p. 216)

"Although the IDS and LDS are able to provide us with important insights into the extent and nature of reliance on income support in Australia, they do suffer from significant limitations. Possibly the greatest weakness of the available data is that we do not have detailed income information on a longitudinal basis. The IDS contain the income information, but not on a longitudinal basis, while the LDS contains longitudinal information over a reasonably long period, but not the income information. A data set combining both features would be a welcome development for the study of welfare reliance in Australia." (Tseng and Wilkins 2003, p. 217)

"The LDS does not provide enough information on the individual's characteristics to disentangle the underlying reasons for longer duration on payments or to suggest policy changes that may deal with the longer spells." (Harris and Kalb 2005, p. 56)

The HILDA data set was designed to handle such dynamic issues. Although there are only few waves available at this point in time, there are many new research questions that can

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called *between* information) alongside with information on individual changes over time (called *within* information).

be addressed using the improved level of information provided by the panel structure of the first three waves.

This report provides two major improvements over past research. The first improvement is that it uses HILDA, the first Australian household panel data set. As data collection in HILDA is not employment state dependent, it provides the opportunity to study individuals over time no matter what their labour market status may be and how it may have changed during the investigation period. The second improvement is that it applies one of the suggested measures of overall welfare reliance from Gottschalk and Moffitt (1994), created from HILDA data, in order to analyse the dynamic structure of the Australian social support system as a whole.

Having praised the potential benefits from using panel data, we should also mention some of the shortcomings resulting from using panel data. First, panel data requires a much higher degree of econometric sophistication, often an off-putting attribute for applied work. Some of the issues that are well understood in cross section econometrics and which may be pertinent in the present analysis are still under development in panel data econometrics (e.g. non-random selection estimation). Second, for processes which take a long time to adjust, one needs a long panel in order to observe variation. This may take years to build up. Third, unlike cross section data where one has to worry about just one round of sampling being representative of the population, with panel data the complex issue of remaining representative arises because of attrition. To achieve this, panel weights have to be used alongside with cross section weights in a complex fashion. The issue of panel weights arises due to the unavoidable occurrence of attrition from wave to wave. This is a complex statistical problem which, due to the increased prevalence and use of panel data sets, is subject to intense investigation in the international literature. In short, for all its great potential, panel data should not be treated as panacea for solving all empirical problems, and applied research should make this clear.

3. The Economic Framework

3.1 Background Economic Principles

This section outlines the main economic principles that form the foundation for the study of welfare receipt and individual reliance on welfare. The provision of welfare to those who cannot fully support themselves and their families is recognised to be one of the mainstays of

social welfare in economically developed countries; it is generally agreed that state support is often necessary in order to alleviate their economic disadvantage. However, there does not appear to be such clear agreement about the degree to which welfare could and possibly should be used to encourage individuals into and back into the labour force. How welfare influences individual labour market behaviour over time is still a disputed area with some empirical disagreement, and the provision of welfare has often been flagged as one of the reasons for labour market stickiness. This is because the receipt of welfare may reduce the incentives of those out of work to return to work. Apart from the immediate effects of welfare on current behaviour, its provision has been flagged as having its own dynamic properties which may damage future re-employment chances through the generation of future welfare reliance. The project adopts an economic model which recognises that there are two main conflicting objectives of public policy regarding welfare provision. The first objective is to protect those in need and argues for a generous provision of welfare. The second objective is to reduce any adverse effects generated by welfare, and argues for reduced public spending and a less generous provision of welfare.

It is clear that evidence-based policy requires some quantification of the size of the two (conflicting) effects of welfare. What may sound as a straightforward application of economic theory turns out to be a highly complicated empirical exercise, mainly due to the highly regulated nature of the labour market. The large number of welfare receipt policies in place and the lack of any clear cut 'natural experiments' imply that the analytical framework necessary for the study of welfare will be complex. In practice, economic incentives and the responses of individuals to these incentives can be masked and/or distorted by a plethora of co-existing interventions, often making their empirical detection a complex undertaking.[2]

The project considers individuals who try to maximise their utility over time, exhibiting 'optimising' behaviour that will be consistent with individual preferences in most instances. Utility depends on two main things: money and time. A simplified version of the labour supply model is used in order to explain the decision to work or not to work in the context of the trade-off between the *money earned* from work against the *time lost* from work. Optimising behaviour is translated into the so-called *reservation wage*, which is the minimum

[2] This is not all that uncommon when complex social issues are concerned. Simple and clear policies and laws are easier to implement and study, but do not target well. They are more likely to generate individual problems. More complex and refined policies and laws are harder to implement and study, but target a lot better. There is always a trade off to be managed.

wage an individual is prepared to work for.[3] Where this reservation wage is higher than the highest actual wage offer, we observe a person out of work. Note that, in this simplified world, being out of work can be 'caused' by either too high pay expectations (a high reservation wage) and/or a lack of serious market opportunities (a low wage offer). In essence, the economics of welfare receipt studies the economic incentives involved in the trade-off between money and time which determines the optimal choice to work or not, taking into consideration the way in which labour market regulations, individual characteristics and economic conditions influence these relevant incentives and the optimal choice outcomes. The operational word here is *optimal*, and it needs some explaining.

The economic model does not argue that for the vast majority of those concerned, being out of work and/or being a welfare recipient is an optimal state to be in. The economic model simply postulates that, given their personal circumstances (such as abilities, training, family constraints and other) and the prevailing market conditions (mainly demand for labour), individuals choose to be in the state that is best for them. In some occasions this may be the state of unemployment, or partial employment in receipt of welfare support from the state. This may not be a desirable situation (as, indeed, it may be one which involves considerable hardship with few or no alternatives) but it may be the best possibility open to them given their circumstances. This is the definition of 'optimal choice' used in this project.

3.2 Possible Side Effects of Welfare Provision

If a market driven choice rule can allocate workers to welfare in accordance with their preferences, why would a policy maker wish to intervene? The literature offers two prominent reasons why welfare provision may be damaging and why intervention may improve on the market outcome. These reasons can be broadly categorized as *Moral Hazard* and *Human Capital Deterioration*.

Moral hazard. Welfare provision strengthens the incentive to stay out of work by leaving the productivity of a worker unchanged and by increasing their reservation wage (see, for example, Shavell and Weiss 1979 and Karni 1999). The result is that the number of persons prepared to work for the market wage rate drops. This reduction in the propensity to supply labour (referred to in the literature as the problem of Moral Hazard,) reduces the number of

[3] Of course, this is a theoretical model which captures average behaviour and is of little use in predicting and explaining the behaviour of a specific individual. For most public policy intervention, which are aimed at groups of people and not individuals, this is a sufficient design with considerable predictive power.

persons in employment, and will subsequently drive wages up and increase unemployment. Theoretical and empirical literature results on welfare payments reach the conclusion that higher welfare payments result in longer unemployment. There is little disagreement about the direction of this effect, but wide disagreement about the size of this effect.[4] It is widely accepted today that the effect of welfare on labour supply may vary considerably in size depending on eligibility rules, level of benefits, duration of benefits, tax rates, associated search activities and other institutional characteristics. Ultimately, the effect of welfare on unemployment is an empirical matter.

Human capital deterioration. Persons who stay out of employment and on welfare receipt for longer periods risk losing some of their human capital (see, for example, Bartel and Borjas 1981, Fallick 1996, and Jacobson, LaLonde and Sullivan 1993). Lengthy unemployment in these cases is not only caused by past low re-employment probabilities, but is also causing future lower re-employment probabilities. This is often referred to in the literature as state or duration dependence. There are several mechanisms through which this may happen. It could be that the human capital of the individual declines with longer term out of work spells. In fast changing occupations this can be a factor of human capital obsolescence through long out of work spells. It could be that employers have little in depth information on job applicants. They may then use observed longer out of work durations as a signal of a lower quality candidate (e.g. an applicant with low motivation and lower productivity). Employers may then assume (on statistical grounds) that the longer a candidate for a job has have been out of work, the more likely that this candidate will prove to be a worker of lower productivity. The longer term unemployed therefore may suffer from this type of stigma. Where human capital deterioration may be possible, the effect of moral hazard will be accentuated.[5]

[4] There has been some empirical evidence that suggests that it is difficult to stereotype the unemployed, be they short-term unemployed or longer-term unemployed. For example, it is possible that longer unemployment spells are associated with longer subsequent employment spells. The behavioural route for this type of observation could be that longer job search may result in better and more stable employment choices. However, evidence is currently rather scant in support of this proposition.

[5] Important empirical issues arise within this context, in terms of the distinction between spurious and true state dependence. Briefly, spurious state dependence amounts to the situation where the length of unemployment does not harm the employability of the unemployed, but when watching any given cohort of unemployed make progress through their unemployment spells, one observes the lower human capital individuals remain longer and become an increasingly higher proportion of those who remain in unemployment (from that given cohort). Hence, whilst it may appear that unemployment duration harms human capital, this observation is a statistical artefact. By contrast, true duration dependence is the situation where the human capital of individuals deteriorates because of unemployment duration. That is, individuals become less and less employable because they are staying out of work longer. The distinction is hard to identify at the empirical level and can lead to serious misinterpretations of data and policies.

At the more general level, like every transfer, welfare has budgetary implications which are not negligible, especially as their size is counter-cyclical. One other possible side-effect of welfare provision is that because of the typically lower wages welfare recipients command in the labour market, removing entitlement from someone who has gained employment may act as an employment disincentive if it is done too abruptly. Hence, welfare is often designed to taper off as hours of and income from work increase.

3.3 Theory: the Static Model

This section presents a simple economic model and adapts it to the specific problem at hand, namely the level of welfare reliance and its sensitivity to external shocks. The model starts by assuming a 'typical' individual and their optimal choices. Then the model introduces two simple forms of heterogeneity which are pertinent to the Australian labour market realities: First, heterogeneity of preferences over labour and leisure (which will influence their indifference map), and, second, heterogeneity of entitlement to welfare payments, which result from their personal circumstances (e.g. where sole parents and married parents have different welfare entitlements which in their turn result in them having different budget constraints).[6] Using this framework, and allowing individuals to make decisions in accordance with their own preferences and budget constraints, we show the possibility that observed patterns can be at least in part explained by existing welfare rules and we identify areas where these rules have their major impact.

Starting with the typical individual (or simply assuming preference homogeneity) preferences are mainly influenced by two factors, their income and the amount of leisure (where leisure is defined as the total of available hours per day minus the number of hours spent in employment). In a simple economic model, individuals are said to derive utility from two factors, the goods purchased using income and the time to enjoy them using leisure. On the assumption of a well-defined preference structure, individuals can be shown to be making decisions which all revolve around the major trade-off between income and leisure.[7] In the

[6] An indifference map is a set of indifference curves which all belong to an individual and characterize fully that individual's preferences. In the diagrams here, only few of those indifference curves are plotted for expository clarity. However, it is useful that the reader imagines a space full of non-intersecting indifference curves

[7] There are many texts that explain the economic model. This model is good for some uses and not as good for others. For example, this model works very well for describing the behaviour of large groups of people and the average responses to changes in their environment. They are good for making targeted predictions about sub-groups of people. This model is far less capable of generating individual predictions about behaviour due to the large number of statistical noise present in all data sets that can be used to quantify it and test specific empirical hypotheses.

context of the present report, the pertinent choice is the level at which reservation wages are set, which reflects the degree to which individuals are prepared to supply their labour in the market. More formally, denoting total income by *y*, leisure by *L* (with hours worked being *H = 24 – L*), hourly wage by *w* and individual characteristics by *x*, we can write the utility of individual *i* as:

$$(1) \qquad U_i = U_i(y_i, L_i \mid x_i)$$

The standard labour supply model maximises this utility function subject to a budget constraint. The slope of the budget constraint is the wage rate the individual can command in the labour market. For any given wage rate and preferences an optimal level of labour supply is defined by the point where the highest indifference curve is tangential to the budget constraint. The individual at that point has no reason to offer either more or less labour to the market. The principle underlying this choice is shown in Figure 1 below, where H* denotes the optimal choice of hours worked given an individual's preferences.

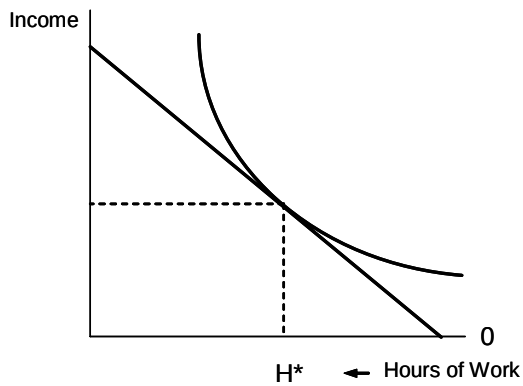

Figure 1: The Static Labour Supply Model and Optimal Choice of Hours Worked.

We now drop the assumption of preference homogeneity. We use the simplest possible model by assuming only two types of preferences: Preferences A belong to Person A, who finds work not very onerous and has problems with finding how to use their leisure time. Person A's indifference curve between leisure and income will be flat (Figure 2), in order to reflect that if they are asked to work more hours (say from H_0 to H_1) they would demand a modest income increase amounting to (Y_1-Y_0). By contrast, Person B seems to be more reluctant to give up their leisure and they demand a higher compensation in terms of additional wage for a much smaller increase in their working hours (Figure 3).

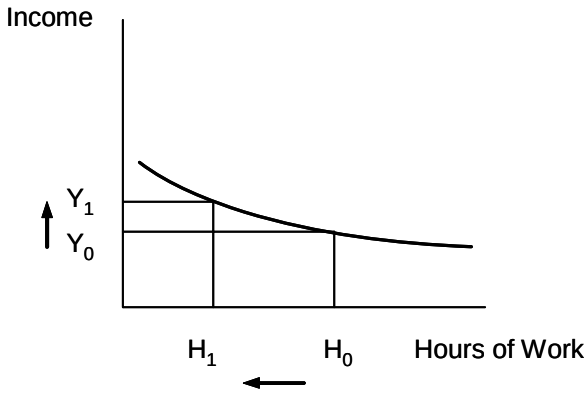

Figure 2. (Relatively Flat) Indifference Curve of Person A. Person A is Indifferent Between (Y_0,H_0) and (Y_1,H_1).

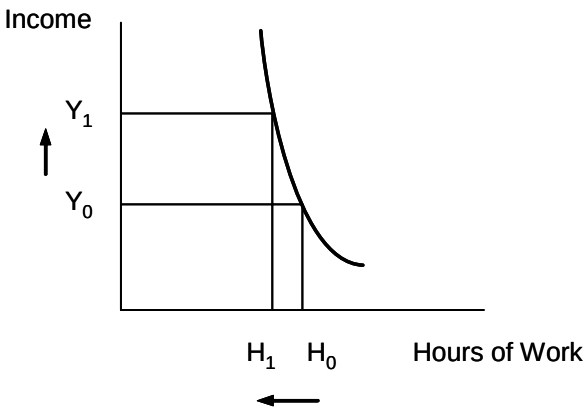

Figure 3. (Relatively Steep) Indifference Curve of Person B. Person B is Indifferent Between (Y_0,H_0) and (Y_1,H_1).

It is important to note that these differences reflect only preferences and have nothing to do with earnings ability and the like. There are many real-life circumstances that could contribute to such differences. For example, a married parent who shares child caring responsibility with their partner, may have flatter indifference curves than a sole parent who has to shoulder all responsibilities alone. A disabled person may exhibit steeper indifference curves. A young person with few financial obligations and a strong preference for surfing may have steeper indifference curves. A married person with a high mortgage may have flatter indifference curves. There is no hard and fast rule here and it would be an over-interpretation of theory to try to talk about individual cases. The only assumption that one needs to make for this model to work is that, for some reasons, different individuals may have different relative valuations of income and leisure and that these differences may in part depend on factors which we can observe (e.g. age, marital status, disability, parenthood etc.).

The next step is to drop the assumption of simple linear budget constraints. There is ample evidence that government tax and transfer policies affect the shape and slope of the budget constraint in different ways for different people, often resulting in a *non-linear* budget constraint. To start with, the budget constraint never hits the zero income point. That is, it reaches the maximum leisure (zero work hours) point at a positive income level, as people with no job and no prospect of market earnings receive a positive amount of welfare income. Then, as one starts building working hours (i.e. working upwards and leftwards on the budget constraint) the slope of this constraint does not remain constant as additional income ends up being taxed at different rates (or, equivalently, welfare receipt ends up enjoying different tax rebates). Empirically estimated budget constraints show this clearly. We use evidence derived from the Melbourne Institute's Tax and Transfer Simulator (MITTS) which provides a good picture of what budget constraints look like in reality for typical sub-groups of the population.

An example of a budget constraint for a single person without children on a wage of $11.79 per hour under the Australian income support system after the July 2000 reforms is portrayed in Figure 4. The intuition behind this pattern is that at the very right (maximum leisure point G) the state will still provide a minimum support, so that the constraint does not meet the horizontal axis. Point G represents the benefit amount that one receives if unemployed and has no earned income. The non-linearity and the kinks around points A, B, C and D clearly deviate from the textbook model shown in Figure 1. The kinks represent changes in marginal effective tax rates as hours of work and income levels increase.

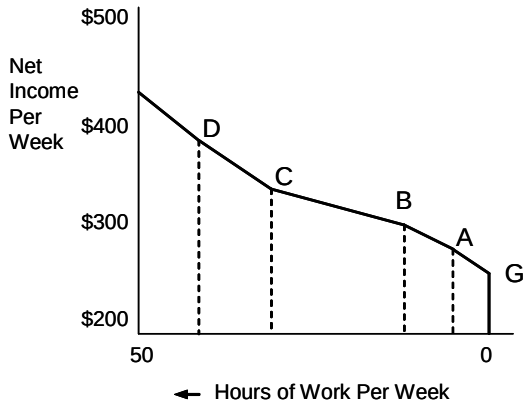

Figure 4: The Budget Constraint for a Single Person without Children on a Wage of $11.79. (Source: Adapted from Kalb et al. (2002), Figure 2.4a).

Having introduced the two types of simple heterogeneity (in indifference curves and in budget constraints) we can now put them together to investigate resulting optimal choices. By superimposing Figures 2 and 3 onto Figure 4 we get Figure 5 which indicates how the two different types of indifference curves may be affecting the optimal amount of hours and the resulting welfare reliance levels.

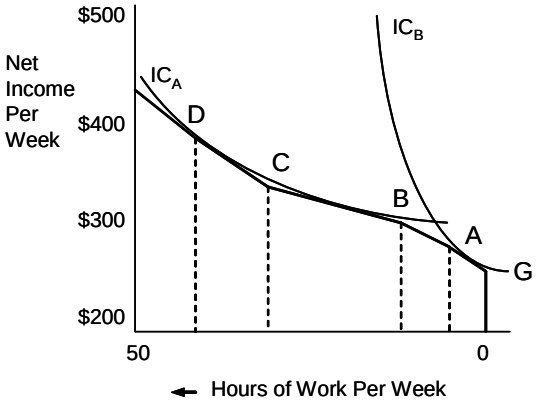

Figure 5: Combination of Figures 2, 3 and 4. IC_A and IC_B are the Indifference Curves of Persons A and B Respectively.

Person A finds their optimal labour supply to be much higher than Person B who is meeting the budget constraint very close to the zero working hours point. Although this is an example of high abstraction, it still serves to indicate the way a large proportion of individuals (those with steep indifference curves) may be bunched together towards the low (or zero) working hours, and the resulting low earned income and high welfare reliance area at the very right end of the budget constraint. Theory will thus predict distributions of hours worked and welfare related measures which have bimodal shapes (with large numbers of observations concentrated in the right and left tails of the distribution rather than, as is often the case, in the centre of the distribution). Simply put, theory suggests that in the presence of non-linear budget constraints similar to the ones that we know apply to welfare recipients, and given preference heterogeneity regarding work and leisure, there will be a bunching up of hours worked and welfare reliance towards the two ends of the distribution of both hours and welfare receipt.

The example used in Figure 5 is illustrative. The Australian income support system is complex and Kalb et al. (2002) show examples of various budget constraints for different subgroups of individuals. For example, the taper rate (i.e. the rate at which benefits are reduced) and cut-off points for programmes like disability support and carer payments are different than those for Parenting Payment Partnered and Newstart Allowance. Different

budget constraints and the different types of people that select themselves into these programmes will lead to different utility maximising equilibrium points, leading to a more continuously spread out distribution of hours worked and welfare reliance than that suggested in Figure 5. But such detailed simulations are beyond the scope of the present report.[8] For now, we hypothesize that Figure 5 provides a useful way to think about the incentives facing welfare recipients.

As it is seen below, when the HILDA data are analysed, this simple picture is supported by the data for welfare recipients. Hours worked per week and welfare reliance are observed to have a bimodal distribution.

3.4 Defining Welfare Reliance

The project defines *Welfare Reliance* as the degree to which one depends on welfare for their financial well-being. Denoting any received state benefits by B and suppressing individual subscripts, we measure welfare reliance as the Total Proportion of Income (*TPI*) received in the form of welfare in the form of the following index:

$$(2) \qquad TPI = \frac{B}{B + Hw + U}$$

where H is hours worked, w is the hourly wage rate (so Hw represents earned income) and U is unearned income. Total income is given by $B + Hw + U$ and *TPI* can be interpreted as a measure of reliance on state welfare ranging from 0 (where $B = 0$ and there is no dependence on state welfare at all) to 1 (where $Hw + U = 0$ and there is total dependence on state welfare, as income consists exclusively of welfare payments).[9] *TPI* is then a continuous index which takes the values $0 \leq TPI \leq 1$ for all individuals in the labour market. Within the Australian context, there is an open question as to whether B contains Family Tax Benefit (*FTB*) or not. Clearly, there is no single answer to this question, as the definition should depend on the focus of the research and related policy issues. Including *FTB* introduces into the category of

[8] MITTS can be used to simulate distributions of hours worked and *TPI* if utility preferences are specified since the complex budget constraints are already built into the programme. It would be interesting to see how the simulated distributions reflect the actual distributions. If they do, we would have a very good theory explaining how the interaction of incentives and preferences result in observed behaviour of welfare recipients.

[9] Barr and Hall (1981) first introduced a model along these lines trying to explain dependence on public assistance in the US.

welfare recipients a large number of people with substantially higher family income than the recipients of the other welfare payment types. Given that this research concentrates on the lower segments of the income distribution, it was decided to exclude *FTB* from the calculation of *TPI*. The report notes that further basic research in the different possible definitions of *TPI* and by extension of welfare reliance could be developed in the future.[10]

TPI is analysed in the following sections in various ways as the main measure of welfare reliance. First, *TPI* is analysed without making any parametric assumptions by looking at levels of *TPI* as indicators of different levels of welfare reliance.[11] Four categories of welfare recipients are defined and examined: *strongly reliant* ($TPI \geq 0.9$), *moderately reliant* ($0.9 > TPI \geq 0.5$), *weakly reliant* ($0.5 > TPI \geq 0.2$) and *not reliant* ($TPI < 0.2$).[12] Second, *TPI* changes over time are examined through the investigation of different exhibited trajectories during consecutive HILDA waves: *Rising*, *Flat*, *Falling* and *Other*. These different indicators for viewing welfare reliance are used to construct profiles of sub-groups which may be of specific policy interest.

Finally, welfare reliance is examined in a multivariate econometric framework where the static properties of *TPI* are examined conditional on individual characteristics and other observable factors. The static model is both simple and informative. The implicit assumption here is that when we examine a static model we are observing an equilibrium position and see what levels of associations can be observed between different levels of the observed characteristics of welfare recipients and their level of *TPI*.[13] The limitations of the static

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[10] Including FTB in the numerator and denominator of *TPI* increases mean *TPI* for PPP recipients by about 0.2 and for PPS recipients by about 0.1. The mean *TPI* values for the other payment types are largely left unaffected.

[11] *TPI* has been analysed at the monthly level (Barr and Hall 1981), at the annual level (U.S. Department of Health and Human Services 2005), and also over seven-year periods (Gottschalk and Moffitt 1994). Defining *TPI* using monthly data could overstate welfare dependence if a cross-sectional snapshot comprises a disproportionate amount of short-term welfare users (for example, sudden unexpected plant closings that do not occur uniformly over the year could dramatically increase the number on labour market assistance and if we took this monthly cross-sectional snapshot, we would be overstating welfare dependence). Defining *TPI* using a longer time span offers some protection against this measurement bias to the extent that the numerator and denominator used to define *TPI* are over the exact same time interval and do not suffer from substantial measurement error.

[12] The cutoff of $TPI \geq 0.9$ was chosen from a definition used in the Reference Group on Welfare Reform (2000): "People who receive 90 percent or more of their income from government cash benefits are clearly financially reliant on income support." (p. 65) The cutoff of $TPI \geq 0.5$ was used in the U.S. Annual Report to Congress on indicators of welfare dependence (2005). The remaining cutoffs for the weakly reliant and not reliant were chosen based on the cross-sectional distributions of *TPI*. Clearly, these arbitrary chosen cutoffs are subject to limitations. But they are a convenient way of summarizing the dynamics in a diagram. We later do not use such cutoffs in our multivariate analysis (for example, using a multinomial logit model with these categories as outcomes) so that no information is unnecessarily discarded.

[13] A compatible and better interpretation may be that we are observing a point in a continuous disequilibrium situation which is converging towards its long term equilibrium position, but perhaps never gets the chance to rest there because of continual exogenous shocks. Although one never observes the long term equilibrium, for

model in explaining causal effects should be clear. The *TPI* index has been used for the construction of a reduced form empirical model which can be estimated as follows:

$$(3) \qquad TPI_i = \beta_0 + \beta_1 X_i + u_i$$

where *TPI* and *X* are observed for a sample of $i=1,2,3,\ldots,n$ individuals, β_0 and β_1 are parameters to be estimated and *u* is an error term. Equation 3 can be estimated in order to study the associations between levels of *TPI* and covariates reflecting personal characteristics, employment circumstances, environmental circumstances and other pertinent variables.[14] As explained below, the level of *TPI* at any specific point in time is of policy interest as it reflects the degree to which the state sees fit to intervene. As explained above, the level of state intervention will be trying to reach a compromise between the conflicting objectives of equity and protection of citizens (such as maintaining standards of living, providing insurance against unforeseen adverse labour market shocks, providing a welfare net, which all call for higher levels of entitlement and provision) and efficiency and flexibility of the labour market (in the shape of many work disincentives that may be encouraged through welfare provision, which call for lower levels of entitlement and provision alongside with the prudent handling of the public funds used to finance welfare).

3.5 Defining the Persistence of Welfare Reliance

The project uses two measures for the persistence of welfare reliance. The first persistence measure we name *Payment Type Persistence* and is a simple binary index of being the recipient of a specific type of welfare payment or not. By design, this is an either/or measure which is independent of the level of financial help received. The advantage of such a measure is that it captures the effect of all these factors that define the *incidence* of welfare participation, but is unaffected by many factors that define the level of assistance. Empirically, Payment Type Persistence can be approximated in different ways. In this project we use several measures which include (i) the frequency of observing an individual within a welfare payment over a period of time, (ii) the probability of observing an individual in a

sufficiently strongly converging processes, the static model can generate good measures of long-term associations. The investigation of the dynamics of welfare later in the project suggest that the static model is providing useful information in this context.

[14] It is not clear from the outset if there will not be any observable factors which may be caused by *TPI* as opposed to causing *TPI*. In econometric terms, this two-way causal relationship is termed endogeneity and is an issue of intense study in the current empirical labour markets literature.

welfare payment in the current period conditional on having observed them in a welfare payment in the previous period. In practical terms these measures convey the same message, so the choice of measure in the project is guided primarily by the need for simplicity and exposition clarity. In brief, the analysis of *Payment Type Persistence* aims to capture the degree to which having been a welfare recipient in the past makes someone more likely to continue being a welfare recipient.[15]

The second persistence measure we name *Level Persistence*. The aim of this measure is to reflect the degree of financial reliance of an individual over time. This is a much more complex measure both in its conception and its empirical realisation. The objective of this measure is to detect the effect of all those factors which influence the degree of financial reliance over time. In order to do this, we investigate the behaviour of *TPI* over time. We do this in several ways: (i) we present several patterns of *TPI* change over time, (ii) we investigate the transition from different levels of reliance over time, (iii) we analyse the dynamic structure of *TPI* over time using a multivariate Partial Adjustment Model (PAM). PAMs have been used in several instances in the empirical economics literature for the study of (methodologically) similar problems. The most complex part of the analysis of Level Persistence is the adaptation and interpretation of the PAM to the case of welfare payment receipt, so the remainder of this section concentrates on this. In brief, the analysis of level persistence aims at capturing the degree to which individuals may become reliant not so much on welfare participation, but on the level of support that this participation entails. Simply put, to what degree does the level of support in the past make someone reliant on that level of support in the future?

3.6 Estimating the Partial Adjustment Model of TPI

Whilst overall *TPI* trends have been studied in several instances, the dynamics of individual-level *TPI* have not attracted sufficient attention.[16] The introduction of dynamics of *TPI* in the study of welfare persistence needs some explanation. Simply put, the policy question asked relates to the degree to which the current level of *TPI* of an individual may have been influenced by their past levels of *TPI*. To address this question we rewrite Equation 3 to include persistence by introducing a lagged dependent variable in the right-hand side:

[15]Section 7.2 details the estimation method used here.

[16] For analyses of *TPI* trends in Australia and the U.S., see Gottschalk and Moffitt (1994), Tseng and Wilkins (2003) and the U.S. Annual Report to Congress on 'Indicators of Welfare Dependence' (2005).

(4) $$TPI_{t,i} = \beta_0 + \beta_1 X_{t,i} + \beta_2 TPI_{t-1,i} + u_{t,i}$$

Subscript *t* denotes time and past values of *TPI* are allowed to influence the present values of *TPI*. The model depicted in Equation 4 is a variant of the standard PAM in the literature. In order to link the estimation specification with the underlying behavioural theoretic relationship described in the previous sections, the adjustment process of present and past *TPI* could be viewed as follows. Individuals have an optimal long run level of *TPI* which depends on their characteristics and their environment. We call this level *TPI**. Individuals are subjected to external shocks which remove them from their long run optimal *TPI* level (such as a lay off, a negative health shock, being offered an opportunity to increase their earned income whilst remaining on welfare, and other). After such a shock individuals need to adjust and relocate themselves to their new equilibrium position. The speed of this adjustment will depend in part on the "stickiness" of their initial position. Intuitively, this stickiness will reflect the degree to which individuals themselves can adapt to their new circumstances and also the degree to which their environment may assist them or not in doing so. It is the latter that can form an important policy issue, in terms of the incentive structure that is in place to facilitate individuals to move from one equilibrium position to another.

It is a fact of economic and social phenomena that things do not happen instantaneously and that often the adjustment speed to a new equilibrium can be slow. Labour markets are notorious for this, due to many factors, such as institutional lack of flexibility, costly information, the wrong incentive structure and other. The PAM allows for the estimation of an empirical counterpart of the persistence of welfare reliance, as it estimates the degree to which past *TPI* levels influence current *TPI* levels. Formally, we can write

(5) $$TPI_t - TPI_{t-1} = \delta(TPI_t^* - TPI_{t-1})$$

where $0 \le \delta \le 1$ denotes the speed of adjustment and *TPI** is the (unobserved) optimal *TPI* level. Partial adjustment models have gained their name in the literature because they portray a situation where a desired adjustment to the optimal level may not be feasible in the short run. When an individual is taken away from their equilibrium, it may take them several periods to return to it. This (unobserved) equilibrium level can be written as:

(6) $TPI_t^* = \beta_0 + \beta_1 X_t^* + u_t$

In the context of a labour market outcome, a clear example of such a move away from an optimal *TPI* level would be that of a skilled individual who has been in a steady employment relationship for a long time and who is laid off due to a factory closure. This individual's optimal *TPI* would be zero and their return to that *TPI* will only be a matter of time. For a while however, their actual and optimal level of reliance will differ. At the population level, the mechanism of adjustment could be described and estimated as follows. In each period a proportion δ of the distance between actual and optimal *TPI* is covered. The extreme case of $\delta = 1$ (where TPI_{t-1} vanishes from Equation 5) reflects the case where $TPI_t = TPI_t^*$ and the process becomes a static one, in the sense that adjustment to the optimal level is *instantaneous* and the dynamic properties of the process are of little interest and/or consequence.

In the context of the present study, $TPI_t = TPI_t^*$ would represent a labour market with no stickiness at all, where everybody finds themselves in their desired employment or otherwise status immediately after any shock they may experience. Clearly, there is little empirical evidence to support the presence of instantaneous adjustments in the labour market and, therefore, little interest in studying them. The other extreme case of $\delta = 0$ (where TPI_t^* vanishes from Equation 5) reflects the case where $TPI_t = TPI_{t-1}$ because changes in the optimal level TPI_t^* do not have any impact on *TPI* itself, which stays unaltered even after external shocks have taken place. Again, there is little empirical evidence to suggest that external shocks do not cause any adaptive reactions.[17] Values of δ that are between 0 and 1 are empirically pertinent. The closer to 1 (0), the larger (smaller) the proportion of the distance between actual and optimal *TPI* levels covered per period, and the faster (slower) the adjustment of the process at hand.

The problem with estimating the process described above is that TPI_t^* is not observed by market data. In order to derive an expression that can be estimated, one can rearrange Equation 5 so that TPI_t is the dependent variable, and rewrite TPI_t^* as a function of X (like in Equation 3) in order to derive an expression which only contains observable variables

[17] Take an external health shock, which makes actual work harder: it will raise the reservation wage. Take layoffs due to factory closures which make finding a job harder: they will reduce the market wage of the laid off. One way or another, external shocks influence some of the prime determinants of labour market participation behaviour. These are estimated below and found to be of empirical relevance.

(7) $$TPI_{t,i} = \delta\beta_0 + \delta\beta_1 X_{t,i} + (1-\delta)TPI_{t-1,i} + u_{t,i}$$

Equation 7 can be re-written and then estimated in the form of

(8) $$TPI_{t,i} = \gamma_0 + \gamma_1 X_{t,i} + \gamma_2 TPI_{t-1,i} + u_{t,i}\,.$$

After estimation, $\hat{\delta} = 1 - \hat{\gamma}_2$ can be calculated and the original estimates $\hat{\beta}_0 = \hat{\gamma}_0 / \hat{\delta}$ and $\hat{\beta}_1 = \hat{\gamma}_1 / \hat{\delta}$ can be retrieved. The interpretation of $\hat{\gamma}_2 = (1-\hat{\delta})$ once it has been estimated is as follows. The closer the value of $(1-\hat{\delta})$ is to zero, the closer the value of $\hat{\delta}$ is to one, and the faster the adjustment process back towards the equilibrium unobserved *TPI** defined in Equation 5. For $\hat{\delta}$ values close to one, estimated dynamic adjustment is almost instantaneous and there is no obvious dynamic interpretation of the data, apart from the suggestion that shocks appear to be absorbed almost immediately.[18]

Let us put this interpretation in the context of welfare reliance and welfare persistence. An estimated $\hat{\delta}$ *close to one* would suggest that no matter how reliant individuals may be on welfare (that is no matter how large a proportion of their income comes from welfare), their reliance level is not self-perpetuating and will quickly change in the presence of external shocks. In other words, estimated $\hat{\delta}$ *close to one* would be supporting the proposition that there is no level persistence, suggesting that there is no empirically verifiable effect of past level of welfare reliance on present level of welfare reliance. Intuitively put, if someone were moved from one level of optimal reliance to another level of optimal reliance, they would adjust straight away and not look back at all. By contrast, an estimate of $\hat{\delta}$ *close to zero*, would suggest that there is no relationship whatsoever between optimal and current reliance, and that external shocks which alter optimal reliance make no difference to observed reliance and that reliance is totally persistent.[19] Such an extreme result would imply that we are either

[18] An implicit assumption in Equation 8 is that the lagged error term contained in the lagged dependent variable (which is now included in the RHS) is not associated with the error term *u* in Equation 8. If this assumption does not hold, the possibility of bias in the estimates arises. There are ways to either overcome or test for this problem (which retain the possibility to provide an estimate of the lagged variable), but the length of the panel does not support them at present. Alternately, one could try to use a GMM panel estimation method, but then any time-invariant welfare reliance specific to the individual, would be absorbed by the individual fixed term.

[19] This argument should not be confused with the situation of persons who are highly reliant and may experience an external shock which reduces their optimal reliance (e.g. someone who has been ill for a long time with a very high reliance level, and is getting better (optimal reliance gradually dropping below actual reliance) and wanting

looking at the wrong question (that is, a process which has no dynamic properties), or we are using the wrong model (that is, there may be a dynamic process, but we are using variables that cannot detect any of its dynamics). Either way, an estimated $\hat{\delta}$ *close to zero* should send the researcher very quickly back to the drawing board. In practice, the interpretation of $\hat{\delta}$ involves the understanding that its higher values imply faster dynamic adjustment (and its mirror image of lower level of welfare persistence) and *vice versa*. We use this understanding in order to link economic theory with econometric application.

3.7 Putting Theory and Policy Together

Before we move to the data description, we sum up the intuitive interpretation of the models and the definitions we presented and explain the links between the theory, the econometric application and the policy. We presented a simple theory of time allocation between work and leisure. We then introduced the possibility that individual preferences may differ across individuals in a systematic way which is related to the circumstances that determine their eligibility for welfare. We then introduced the possibility of non-linear budget constraints, using Australian estimates from the Melbourne Institute MITTS. Combining these two, the adapted work/leisure model indicated that choices for welfare recipients will tend to be bunched up towards the two extremes of low reliance on welfare or high reliance on welfare. The very nature of the model suggests that there are built-in incentives that drive individuals *away* from the middle values and towards either low or high values of reliance. This theory described a stable equilibrium, that is, where we would expect things to settle down in the long run. This model is used as the behavioural benchmark for the whole project. It is shown below that the project provides empirical support for the picture suggested by this theory.

Now, the problem is that labour markets are not static. There is a lot of movement, due to continual structural or cyclical changes and due to continuous frictional turnover. A lot of this movement is unavoidable and some of it is beneficial for the efficient functioning of a changing economy. The dynamics of this process take people in and out of welfare. The aim of welfare policy is to minimise the suffering of these people, without creating adverse incentives. Moral hazard and human capital deterioration were explained to be detrimental possible side effects. The hard policy problem is the possibility that over and above the

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to get back to employment. The case of $\hat{\delta}$ *close to zero* is one where optimal reliance has no effect on present reliance, hence, totally counter intuitively, an individual who wishes to adjust to a new equilibrium are never able to do so.

reasons why people may enter a specific welfare regime (both in terms of the type and the level of support this generates) their actual presence in welfare and the actual level of the support may be self-perpetuating. This we defined as welfare persistence. The presence of welfare persistence has been argued in the international empirical literature, but the precise quantification of its impact is a disputed issue.

We defined two main types of persistence: *payment type persistence*, i.e. whether being on a specific welfare payment or not is a self-perpetuating state, and *level persistence*, i.e. whether the level of welfare financial support (independently of the welfare payment type generating it) is self-perpetuating or not. We define several prospective empirical avenues for estimating persistence and follow these in the remainder of the project using the first three waves (2001, 2002 and 2003) of the HILDA longitudinal data. Understanding welfare persistence is an important policy issue as it is necessary for any attempts to reduce welfare reliance. Reducing welfare reliance is a well understood policy target as it encourages individuals to improve their long term position in the labour market and frees public resources.

4. HILDA Data Description

The data used in this analysis come from the Household, Income and Labour Dynamics in Australia (HILDA) Survey.[20] The HILDA Survey is a longitudinal household survey that is designed to be representative of the Australian population. Commencing its first wave in 2001, HILDA consisted of a large national probability sample of Australian households in private dwellings, followed by personal interviews with all household members aged 15 years and older. It is the members of these responding households in wave 1 that became the foundation of the panel to be tracked in all future waves. In wave 1 there were 7,682 households at which interviews were conducted, from which 13,969 persons were successfully interviewed. From this group of persons, 11,993 were interviewed again in wave 2 and 11,190 interviewed again in wave 3. Interviews take place between August and March, and are aimed to be conducted on roughly an annual basis. For further elaboration on the introduction and progression of the HILDA Survey see Watson and Wooden (2004).

The HILDA Survey contains a large array of information on each person's current circumstances, with particular emphasis given to household structure, family formation, income, labour force participation, and employment conditions. A significant benefit of HILDA for the analysis of welfare reliance is the collection of detailed information at the individual-level on income that enables us to separately identify amounts of income received from numerous sources, including government pensions and allowances. In particular, HILDA enables us to ascertain which specific government benefits a person may have received during the previous financial year and the total amount of income they accumulated from such benefit/s over that period. This information is drawn from survey questions G31 and G32 in the Person Questionnaire (see Figure A.1 in Appendix A) where persons are asked to estimate annual amounts of income they received, or average amounts of income per fortnight and the number of weeks they received them, over the previous financial year from a list of government benefits. We use this data in order to identify the specific government pensions and allowances that were received and in order to estimate each person's annual amount of income drawn from welfare in the previous financial year, which we then combine with total (gross) income from the previous financial year to construct our measure of welfare reliance (*TPI*).

[20] More specifically, the data used are HILDA Waves 1-3 (Version 3.0) from the confidentialised unit-record files, January 2005.

As a form of validation of the HILDA data concerning welfare receipt in Australia, we compare HILDA estimates of the numbers of persons receiving specific government pensions and allowances with figures reported by the Australian Bureau of Statistics (ABS). The HILDA estimates of the number of persons receiving government benefits each year in Australia are generated by weighting the raw numbers of persons that indicate receiving these benefits in the HILDA sample using the population weights from each wave (which effectively inflates the raw figures so that they are representative of the total number in the Australian population). The ABS figures being used for comparison are taken from June each year for 2001 to 2003.[21] As these figures are 'point-in-time' estimates of welfare receipt, we do not use the previously discussed identifiers of welfare receipt in HILDA because they cover each person's entire previous financial year. Instead, we require 'point-in-time' estimates of welfare receipt from HILDA, which we are able to obtain from survey question G15 in the Person Questionnaire (see Figure A.2 in Appendix A), where persons are asked whether they are 'currently' receiving specific government pensions and allowances. It must be noted, however, that using these measures will not be perfectly comparable to the ABS figures due to the nature of the HILDA data collection, whereby personal interviews may take place anywhere between August and March (of the following year). Thus, figures may not be entirely comparable due to possible seasonal differences since the HILDA figures are not all taken at the same 'point-in-time' and because they are not all taken at the same time as the ABS figures (ie. June of each year). A further limitation in making this comparison is that it is not always the case that the benefit categories are defined identically in ABS documentation as in HILDA (see notes below Table B.1 in appendix B)

Examination of Table B.1 shows that HILDA figures possibly understate welfare receipt in Australia when compared to the ABS figures. The notable exception is for Family Tax Benefits, where HILDA possibly overstates this receipt due to the method by which it calculates total financial year income and then estimates taxes paid based on family information collected. This comparison is also replicated using raw numbers of observations in HILDA rather than weighted figures in Table B.2 (see Appendix B).

The sample we focus upon in this investigation is a balanced panel of persons from the first three waves of HILDA who were of working-age in each wave. We define working-age as 21-64 years for males and 21-59 years for females, since the age of retirement (eligibility for Age Pension) for women varied from 60 years and older during the period analysed.

[21] ABS figures are from 'Year Book Australia, 2005' (Cat. No. 1301.0)

Furthermore, we omit any persons that report receiving the Age Pension at any stage during the three waves to maintain our focus on working-age persons. We omit persons aged below 21 years and persons that are full-time students (attending secondary or post-school education) or who report receiving Austudy/Abstudy at any stage, since we seek to abstract from the consideration of persons who combine welfare receipt with youth allowances and education. These restrictions reduce the balanced panel of all persons of 10,777 to a sample of 7,289 persons. Following our definition of *TPI*, we further reduce this sample to 7,086 persons by omitting persons that have a 'missing' value for their *TPI* in any wave.[22] The reasons a person may have a 'missing' value for *TPI* are that they reported a non-sensible annual gross income amount, or they refused to state or did not know either the amount of government benefits they received, or the number of weeks they received benefits for during the previous financial year.

Finally, since our analysis seeks to examine the dynamics of welfare receipt we omit persons who do not receive a government pension or allowance at any stage during the three waves, which is the case for 5,083 persons of the sample. Consequently, our specified sample for conducting our analyses consists of 1,995 persons.

5. The Analysis of TPI as a Measure of Welfare Reliance and Persistence

5.1 A Cross-Sectional View of TPI

The study of welfare reliance dynamics is of intrinsic social relevance and policy significance. Welfare dependence, like poverty, is a continuum, with variations in degree and in duration. Families may be more or less dependent if larger or smaller shares of their total resources are derived from welfare payments. The amount of time over which a family depends on welfare might also be considered in assessing its degree of dependence. Nevertheless, for a summary measure of dependence to be used as an indicator for policy purposes, it must have some fixed parameters that allow one to determine which families should be counted as dependent. This is similar to the way in which the poverty line defines who is poor under the official standard.

[22] Here the issues relating to over time representativeness of panel samples arises as we have a sample with both unit and item non-response. Considerable research in this area accompanies all large household surveys in the international literature. Due to the shortness of the present panel, we do not expect the issue of attrition/selection to be a problem. However, this report has not examined this using econometric models that account for attrition, as this would be well beyond the scope of the study. Research along these lines is currently underway at the Melbourne Institute.

The definition of dependence used in the U.S. Annual Report to Congress for Indicators of Welfare Dependence (2005) for this purpose is as follows:

"A family is dependent on welfare if more than 50 percent of its total income in a one-year period comes from AFDC, food stamps and/or SSI, and this welfare income is not associated with work activities. Welfare dependence is the proportion of all families who are dependent on welfare." (pp. 1-3)[23]

Clearly, in addition to choosing a time frame and cut-off point, what one includes in the numerator and denominator of the *TPI* formula would also affect its interpretation. Ignoring the issue of the time frame used (which was discussed above), *TPI* has been defined in several ways in the U.S. context. Both Barr and Hall (1981) and Gottschalk and Moffitt (1994) focus on using AFDC in the numerator when defining *TPI*. In contrast, the U.S. Annual Report to Congress for Indicators of Welfare Dependence (2005) uses the sum of three distinct welfare payments.

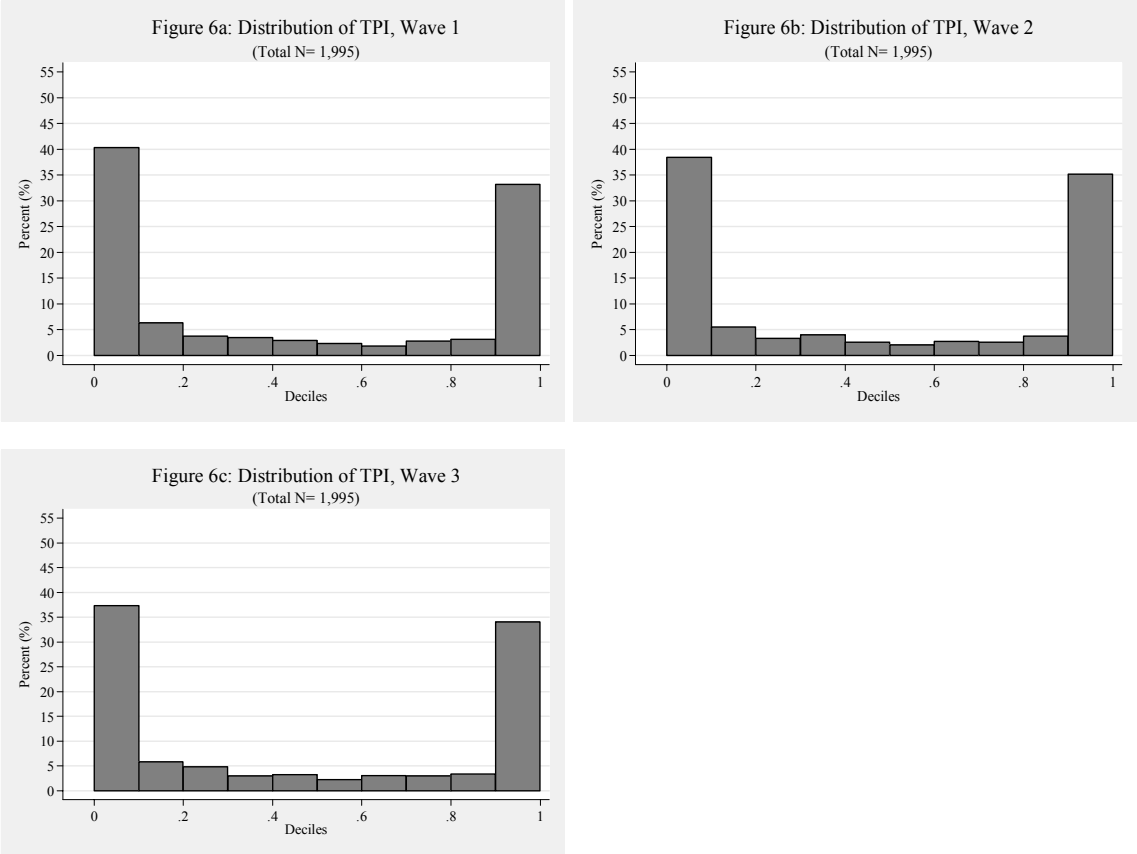
This report defines *TPI* using the formula in Equation 2, that is, the ratio of welfare payments over the sum of welfare payments plus earned income plus unearned income. Welfare income is measured as the annual sum of pensions and benefits that persons reported receiving in the previous financial year. 'Total income' is measured as persons gross income from previous financial year, which is a derived variable in HILDA for 'financial year final income', that is, income after imputation, and is the sum of market income, private transfers, Australian and foreign pensions and benefits, family tax transfers (for example, bequests and gifts) and child care benefits, and does not include windfall (irregular) income (for further information regarding calculation of variables see diagram Financial Year Income Model Release 2.0 in technical paper "HILDA Survey Users Manual"). As discussed above, we have excluded both types of FTB from both the numerator and denominator of *TPI*.

Discussions in the past have generally focussed on the assumption that figures for welfare reliance describe a static group of people trapped in a culture of welfare reliance. Figures 6a-6c show the distribution of *TPI* for our balanced sample for waves 1-3 (years 2001, 2002 and 2003).

[23] AFDC refers to Aid to Families with Dependent Children and was the main welfare payment in the U.S. prior to 1996, when it was renamed and replaced by Temporary Aid to Families with Dependent Children (TANF) under Clinton's welfare reform. It is for the most part a cash transfer programme for female heads of households with children under the age of 18. Food stamps are in-kind benefits which allow recipients to exchange coupons for food (their equivalent cash value is used here), while supplemental security income (SSI) is the main disability support programme in the U.S. which provides monthly cash payments to elderly, blind, or disabled individuals or couples whose income and assets are below levels set in Federal law.

The three distributions look very similar with about 40% individuals showing *TPI* less than 0.2, about 30% showing *TPI* between 0.2 and 0.8, and about 40% showing *TPI* more than 0.8. It is best to view these as equilibrium distributions. The bimodal nature of the *TPI* distribution (i.e. a distribution with two large tails and not many observations in between) could be the empirical manifestation of labour supply in the presence of individual heterogeneity and non-linear budget constraints as described in the theoretical section. In brief, following the theoretical outline offered earlier, there appear to be three types of welfare recipients:

Figures 6a to 6c: Distribution of *TPI* Waves 1-3.



Note: *TPI* = Annual Welfare Income / Annual Gross Income, where any income received from Family Tax Benefits has been excluded from both welfare and gross income measures.

- *Very low TPI (less than 20%)*: This is a group that may raise fewer policy concerns. It obviously contains a large number of individuals with sufficiently high earning potential in the market. Their reliance on welfare is low and the cost of their reliance is also relatively low. There is a certain homogeneity between these individuals in that it is obvious that their earning capacity (that is, the value the market attaches to their product)

is in fact matched by their wage demands (that is, the value they attach to their product). Hence, a large part of their income consists of own earnings.

- *Mid range TPI (between 20 and 80%)*: Here, as *TPI* increases, things get more serious. Reliance increases as own earnings decrease considerably and welfare income increases considerably. This group contains individuals with an increased difference between their earning capacity and their wage demands. Given that a higher *TPI* can be the result of lower own earnings and/or the result of higher welfare, this is the least homogenous group of the three.
- *High TPI (more than 80%)*: Here *TPI* is much closer to 100%. As with the very low *TPI* group, this is a homogeneous group of individuals in that the difference between the value the market attaches to their product and their own wage demands have been almost impossible to bridge.

In essence, one could understand the main difference amongst these three groups as follows. *TPI* gaining higher values is a manifestation of a market imbalance, namely the difference between the wage individuals are able to command in the market (the wage employers are willing to offer for their labour) and the wage they are willing to accept (the reservation wage). As this difference increases, so will their *TPI* increase. The main conclusion from the investigation of Figures 6a to 6c is that for a large proportion of welfare recipients there may be such considerable market imbalances, which for some 30% of them lead to almost total reliance on welfare as their source of income. However, it should be noted that such figures conceal any counterbalancing flows and only show the net result. Hence, a stock that appears constant between two waves may be so because nobody moved, or because a large but equal number of people moved in and out of it between the two waves. This is an important empirical issue which is addressed below.

For all its valuable information, this picture does not answer the important question of whether welfare receipt is an absorbing state (i.e. a trap, both in terms of its incidence and its level of support) or not. Do people who once become reliant on welfare get trapped in that state and remain reliant in the future? If they remain reliant, is this because their characteristics changed permanently (into these characteristics that make people reliant), or do they remain reliant because welfare receipt has had a damaging effect on them? The next section addresses this issue. Finally, there may be several different reasons why individual wage offers and reservation wages may differ across individuals. The following sections will

investigate these issues in many contexts, ranging from individual profiling to multivariate estimations.

5.2 A Dynamic View of TPI

Table 1 presents a matrix of transition probabilities between eleven *TPI* levels for HILDA waves 1 and 3. This matrix provides a descriptive overview of *TPI* level persistence. For example, the value in the first row and column (25.9%) indicates that 25.9% of the individuals in our sample who had *TPI* = 0 in wave 1, also had *TPI* = 0 in wave 3. Likewise, the value in the eleventh row and eleventh column (68.0%) indicates that 68.0% of the individuals in our sample who had 90 ≤ *TPI* ≤ 100 in wave 1, still had 90 ≤ *TPI* ≤ 100 in wave 3.

Table 1: Welfare Reliance (*TPI*) Transitions between Waves 1 and 3

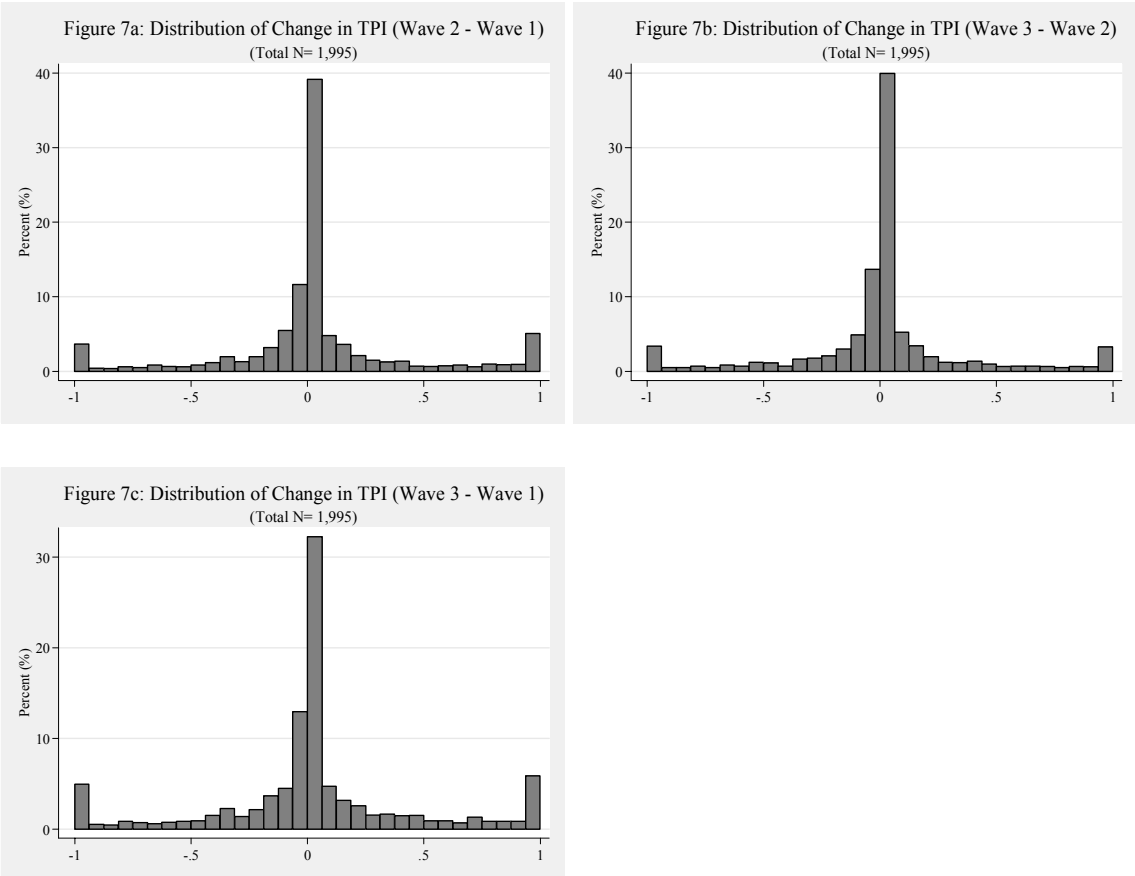
***TPI* values Wave 1**	***TPI* values Wave 3 (% of initial group)**												
	0%	**0-10%**	**10-20%**	**20-30%**	**30-40%**	**40-50%**	**50-60%**	**60-70%**	**70-80%**	**80-90%**	**90-100%**	**All**	**N**
0%	**25.9**	20.4	9.6	4.8	3.3	4.4	2.1	2.3	2.1	1.8	23.5	100	569
0-10%	53.7	**20.2**	5.1	3.1	1.6	2.9	2.4	2.7	2.4	0.8	5.1	100	235
10-20%	47.1	11.5	**12.5**	10.4	0.6	2.1	1.4	0.0	3.0	1.5	10.0	100	126
20-30%	32.8	2.3	9.1	**13.5**	1.5	2.6	1.3	5.1	5.5	1.2	25.2	100	75
30-40%	47.5	3.3	0.8	10.9	**5.6**	8.0	5.8	1.6	2.4	1.1	13.1	100	69
40-50%	30.9	8.8	9.7	5.9	11.1	**7.2**	8.0	4.6	0.0	6.4	7.5	100	61
50-60%	18.1	0.0	3.6	4.1	2.3	2.5	**15.1**	11.2	10.7	7.2	25.3	100	43
60-70%	20.3	0.0	9.3	4.4	2.1	7.5	2.9	**11.9**	7.4	5.7	28.5	100	37
70-80%	20.9	3.1	3.2	5.4	6.3	4.6	3.4	12.8	**3.8**	16.9	19.7	100	56
80-90%	7.6	1.3	3.1	2.1	8.5	10.0	3.7	9.5	8.2	**7.2**	38.9	100	62
90-100%	14.9	1.6	1.3	1.4	1.4	1.1	0.7	1.8	2.6	5.2	**68.0**	100	662
N	539	206	117	96	59	66	44	61	59	68	680		1,**995**

Notes: The figures represent proportions of persons in each *TPI* category in Wave 3 by their *TPI* category in Wave 1, such that each row sums to 100%. Here we have created 11 categories for *TPI* level based upon persons' actual *TPI* values (i.e. 0%, 0-10%, 10-20%,..., 90-100%). Note that for these categories upper bound is inclusive but lower bound is not (i.e. 0-10% = persons with 0 < *TPI* ≤ 0.10, 90-100% = persons with 0.90 < *TPI* ≤ 1.0), whilst '0%' is exclusively for persons with *TPI*=0. These proportions are weighted using the longitudinal population weights constructed in HILDA.
Source: HILDA Waves 1-3 (Version 3.0).

Values in the leading diagonal of the matrix therefore depict level persistence, while values off the main diagonal indicate mobility from one decile of *TPI* to another. If there were complete immobility, all the positive entries would be on the main diagonal and be equal to 100. Table 1 shows that there is a lot of level of *TPI* mobility for *TPI* values between 0-90. For the nine groups (0-10, 10-20, … , 80-90), less than 21 percent of each group are in the same *TPI* group 2 waves later.

Figures 7a (2001 to 2002), 7b (2002 to 2003) and 7c (2001 to 2003) are another way of looking at *TPI* mobility across waves. Here, the focus is on examining the distribution of *TPI* changes across waves. About 40 percent have little or no change in their *TPI* between each wave (the tallest bin in each figure), implying that about 60 percent of welfare recipients showed some variation in their *TPI* from one wave to the next. A large proportion of the wave-to-wave changes in *TPI* are between plus and minus 20 percentage points (accounting for about 70% in each figure) but there is a sizeable minority that make *TPI* changes of larger than 20 percentage points between two waves. The distributions of *TPI* differences across waves therefore clearly indicate that there is sizeable *TPI* movement among individuals over time.

Figures 7a, 7b and 7c: Distribution of Changes in *TPI*



An interesting observation is that there is a small percentage of individuals who move from zero reliance to full reliance (the right tail of the distribution) and an almost equally sized small percentage of individuals who do the exact opposite (the left tail of the distribution).

We now turn to Figures 8-11 which give detailed pictures of *TPI* mobility. These figures allow us to understand the data in a more complex way than what can be achieved from the

two-dimensional transition matrices.[24] Figures 8-11 show how welfare recipients move between four levels of welfare reliance – *Strongly reliant* ($TPI \geq 0.9$), *Moderately reliant* ($0.5 \leq TPI < 0.9$), *Weakly reliant* ($0.1 \leq TPI < 0.5$), *Not reliant* ($TPI < 0.1$) – over the three waves. As this generates a total of 64 possible trajectories, separate figures are drawn for each of the groups for visual clarity, where each group has 16 possible trajectories. Actual sample sizes rather than percentages are given in the boxes. These figures are highly informative and worth studying in some detail.[25]

Figure 8 shows that 73% of the 662 strongly reliant individuals in 2001 are still in the same reliance category in 2002 and 60% in 2003. Interestingly, a large proportion of the remaining 27% moved to the lowest reliance category in 2002 (12%), and a large majority of this 12% stayed in this lowest reliance category (53 out of 80) in 2003. By contrast a good third of those who moved from strong reliance into moderate or weak reliance between 2001 and 2002, returned to strong reliance in 2003. This is a picture of polarised moves, very reminiscent of the outcomes generated in Figure 5 because of the non-linear budget constraint.

Figure 9 shows that only 34% of the 201 moderately reliant individuals in 2001 are still in the same reliance category in 2002 and only 19% in 2003. About 52% move either to strong reliance (34%) or no reliance (17%), again showing the same picture of polarised moves suggested by theory. Overall there seems to be a lot of *TPI*-level mobility in the category of moderately reliant individuals in both directions of higher and lower reliance.

Figure 10 shows that only 38% of the 328 weakly reliant individuals in 2001 are still in the same reliance category in 2002, and only 19% in 2003. A small percentage (a total of 21%) move to the two higher reliance categories, and a large percentage (41%) move to the no reliance category. Of this 41%, 79% are still in the no reliance category in 2003 (105 of the 133). The picture of polarised moves is supported in this reliance category too. Overall there is a lot of *TPI*-level mobility in the category of weakly reliant individuals, most of it towards lower reliance levels.

Finally, Figure 11 shows that 64% of the 804 not reliant individuals in 2001 are still in the same reliance category in 2002, and 43% in 2003. A sizeable proportion moved to the strong

[24] Note that what Figures 6a to 6c concealed earlier, becomes evident when we look at Figures 8 to 11, where the movements between different *TPI* levels are presented.
[25] Different cutoff points were also used, but the overall picture does not differ by very much.

Figure 8: Trajectories in Waves 1 to 3, persons 'Strongly Reliant' on welfare in Wave 1 (TPI ≥ 90%)

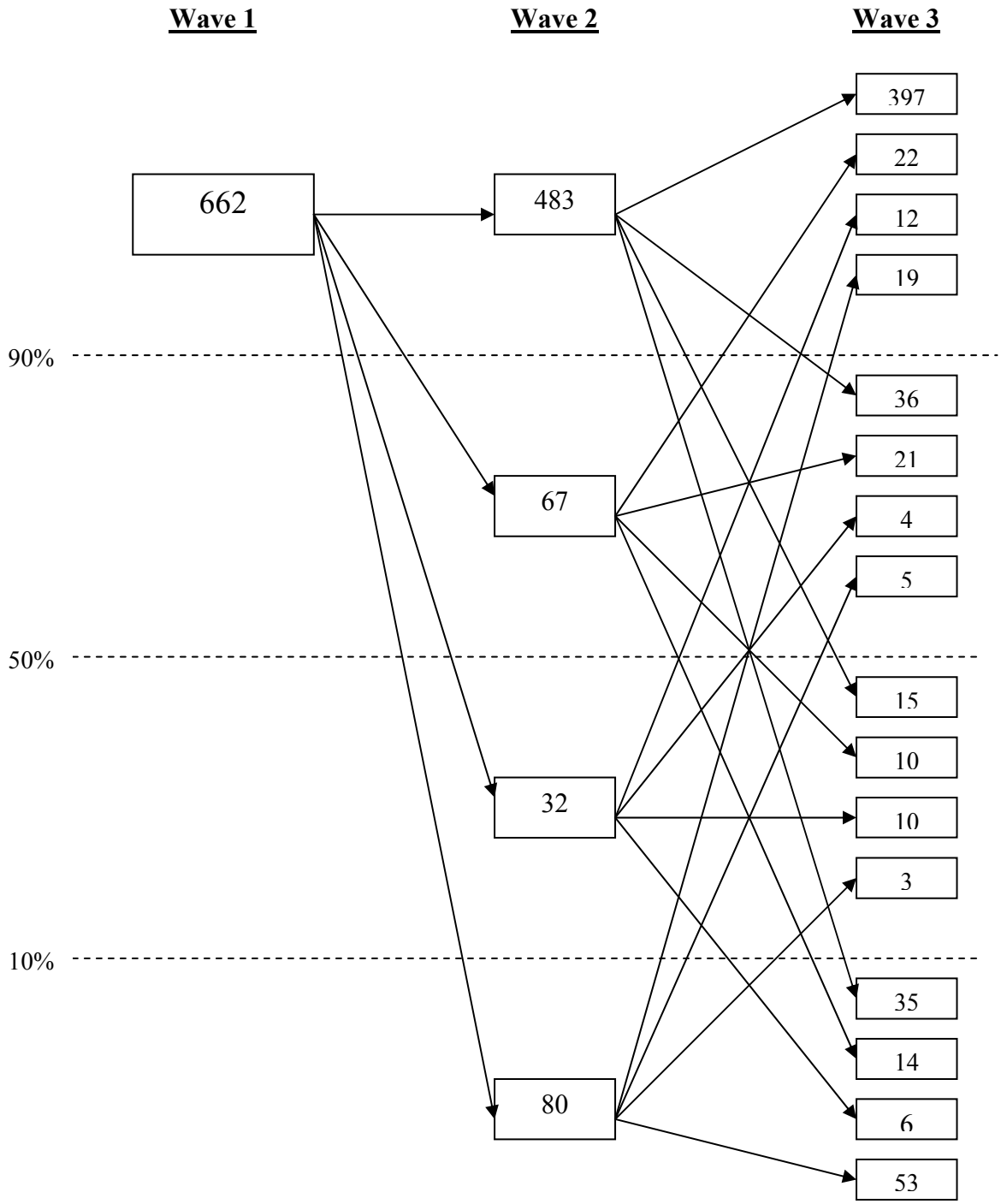


Figure 9: Trajectories in Waves 1 to 3, persons 'Moderately Reliant' on welfare in Wave 1 (50% ≤ TPI < 90%)

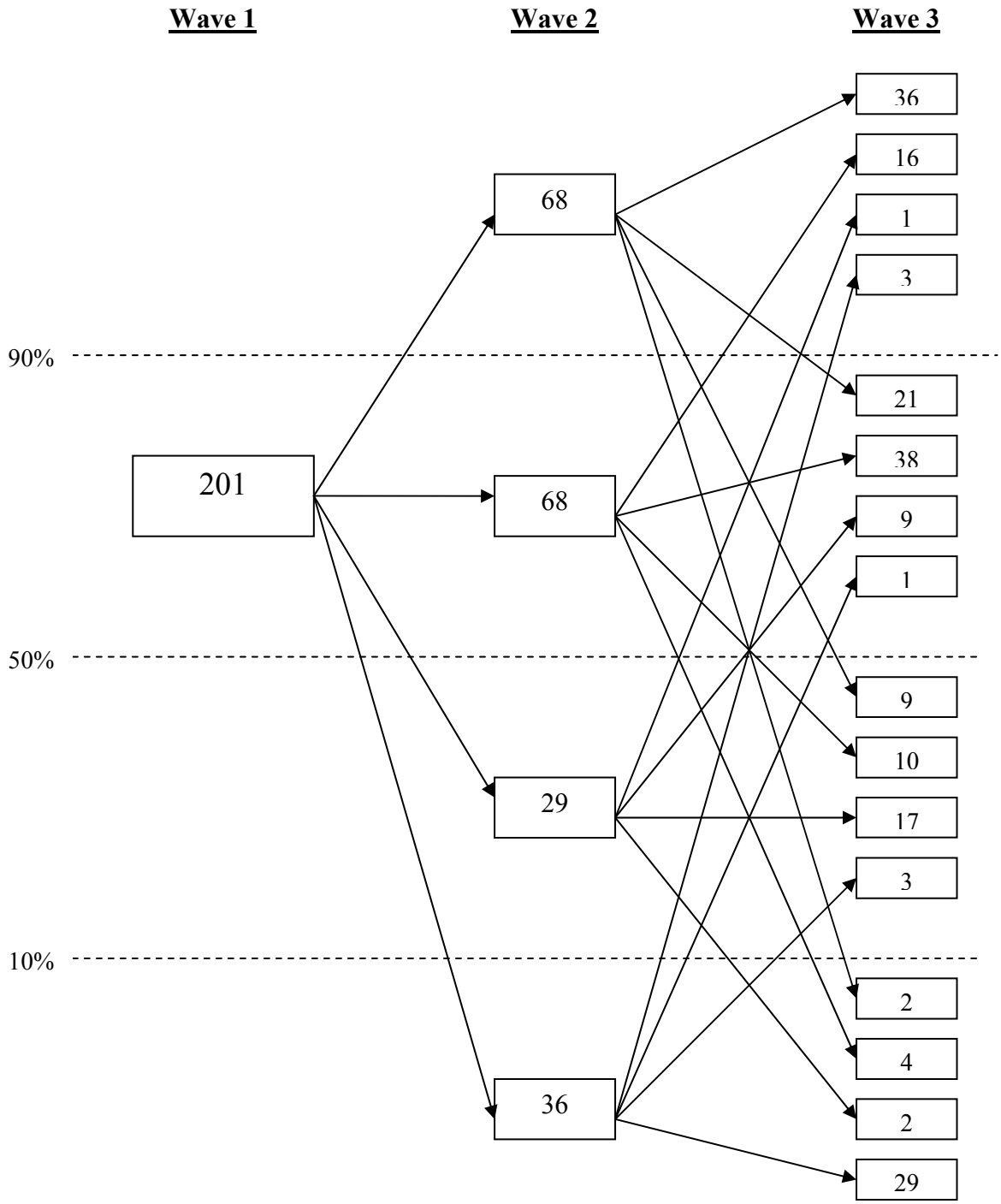


Figure 10: Trajectories in Waves 1 to 3, persons 'Weakly Reliant' on welfare in Wave 1 (10% ≤ TPI < 50%)

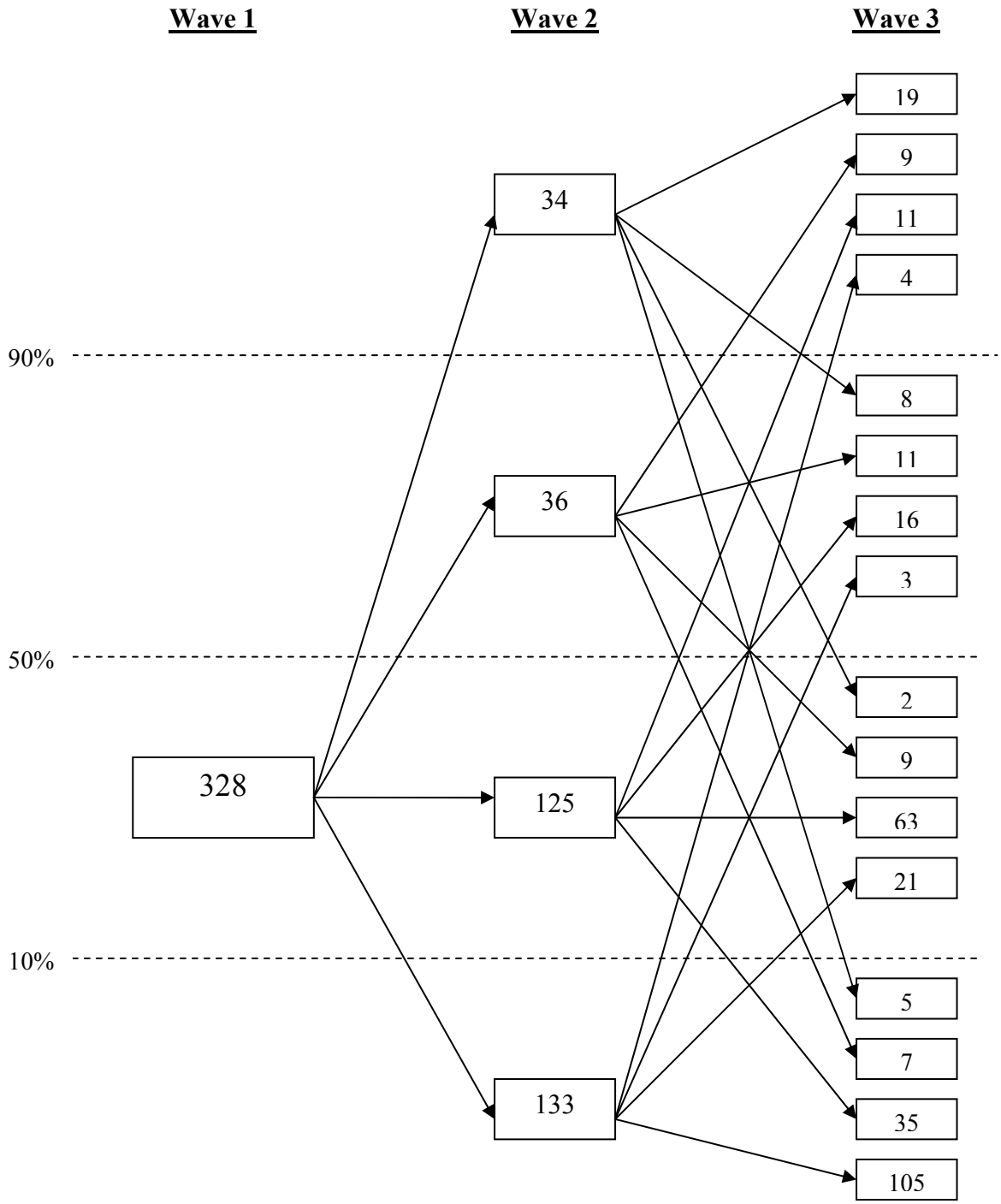
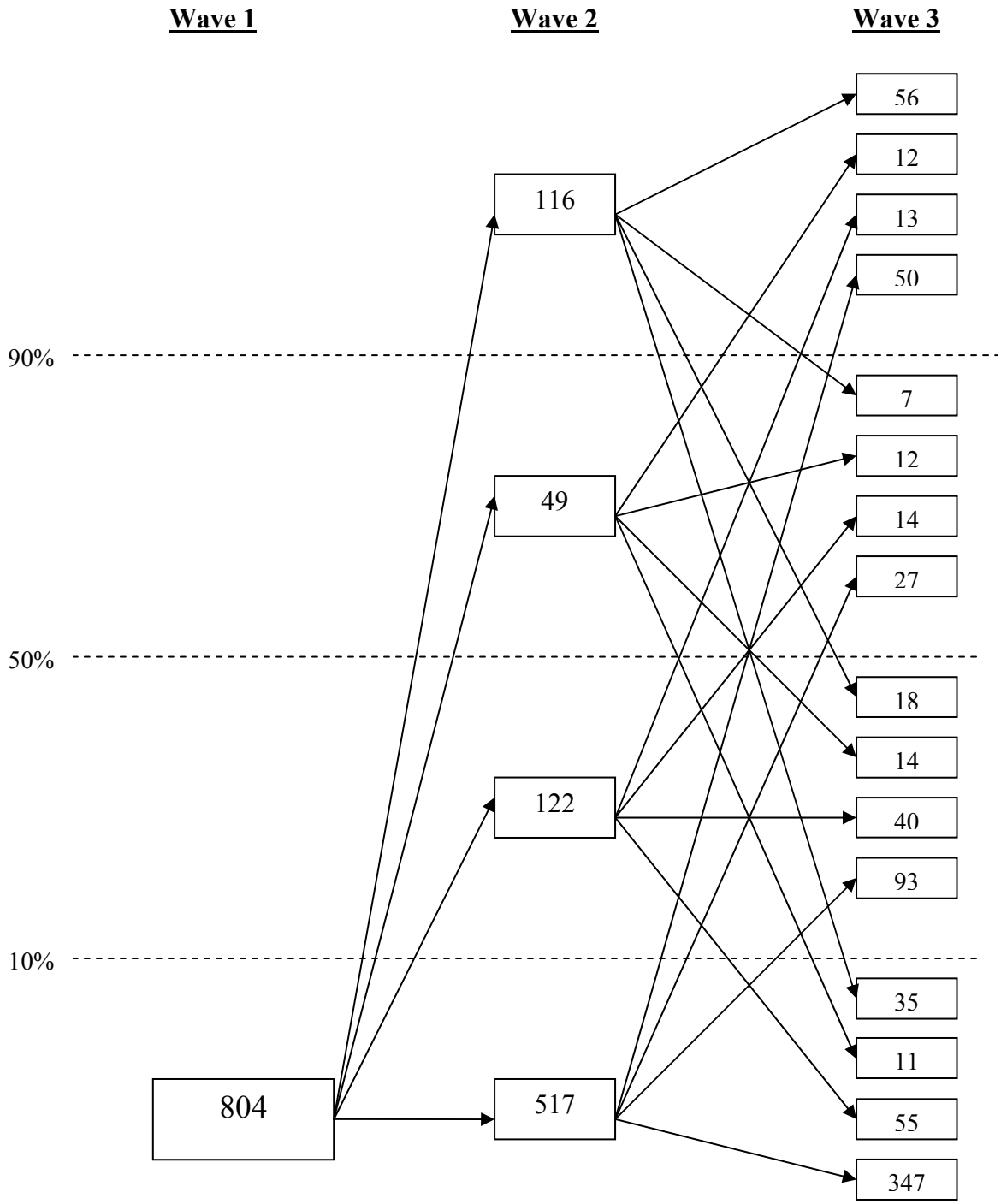


Figure 11: Trajectories in Waves 1 to 3, persons 'Not Reliant' on welfare in Wave 1 (0% ≤ TPI < 10%)



reliance category (14%) and 48% of those were still in the strong reliance category in 2003 (56 out of 116). This Figure too, shows signs of polarised moves.

In general there are clear signs of polarised *TPI*-level persistence with the two extreme categories (strongly reliant and not reliant) doing both of (i) retaining a large proportion of those in that category and (ii) attracting a large number of those movers who left the opposite pole. To the degree to which these states can become absorbing (that is, once in, there are few chances of exiting in the long run) data with only a few waves can present the researcher with estimation problems. The two middling categories of moderate and weak reliance show a very different picture. Moves towards both directions appear to happen at a high rate. Two limiting observations have to be made regarding this analysis. First, these are unconditional statistics. The observed differences may be in part the result of the different characteristics of the individuals in each reliance category and in part the result of the differences between the levels of reliance. We already know this to be the case, as we know that the different types of welfare payment are unevenly distributed amongst the different reliance categories (e.g. DSP recipients have a much higher *TPI* than PPP recipients). Second, the data used here consists of only three waves. This is too short in order to provide conclusive information about strong persistence patterns. Two or more extra waves will improve the usefulness of the data for this research question considerably.

Given that some people do leave the state of being strongly reliant on *TPI* and that the process does not appear to be random, it would be helpful for policy makers to understand why different people follow different trajectories. Although Figures 8-11 established the complexity of *TPI* mobility patterns, they give us little indication as to who the people that move across the various *TPI* categories are. Following Gardner and Hills (1999) and adapting their methodology for studying income mobility, we divide the sample into four broad *TPI* movement trajectory types between the years 2001 and 2003 (a two-year period):

- *Flat*: *TPI* does not change value by more than 10% in either direction during the two years.
- *Rising*: *TPI* rises by more than 10% and does not fall by more than 10% in any of the two years.
- *Falling*; *TPI* falls by more than 10% and does not rise by more than 10% in any of the two years.

- *Other*; any other combination of rises and falls (e.g. rising by more than 10% between 2001 and 2002 and falling by more than 10% between years 2002 and 2003).

Table 2 shows the division of our sample into the four trajectory classifications, while Table 3 cross-tabulates the *TPI* classification scheme we used in Figures 8-11 with the trajectory classifications. Consistent with the evidence presented in Figures 8-11, there are relatively large proportions of individuals who are strongly reliant (n = 429) and not reliant (n = 358) who have flat trajectories (i.e. exhibiting strong *TPI*-level persistence).

Table 2: Trajectory Classification Waves 1 to 3 (using '10 percentage point' rule)

Trajectory	Proportion of cases (%)	Number of cases (N)
Rising	19.4	372
Flat	45.4	903
Falling	16.6	337
Other	18.6	383
All	100.0	1,995

Note: Proportions are weighted using the longitudinal population weights constructed in HILDA.

Table 3: Welfare reliance Wave 1 and Dynamic Trajectory of *TPI* Waves 1 to 3

***TPI* Classification Wave 1**	**Trajectory Classification Waves 1 to 3**				
	Rising	**Flat**	**Falling**	**Other**	**N**
Strongly Reliant (*TPI* ≥ 90%)	0	429	167	66	662
Moderately Reliant (*TPI* 50-90%)	31	50	51	69	201
Weakly Reliant (10-50%)	53	66	119	90	328
Not Reliant (*TPI* < 10%)	288	358	0	158	804
N	372	903	337	383	1,995

5.3 TPI and Personal Profiling: Welfare Reliance

In the previous section, we established that there is considerable mobility of welfare recipients between *TPI*-level categories between 2001 and 2003 in the HILDA data. This underscores the importance of looking beyond the cross-sectional evidence and the need to investigate individuals over time. In the next two sections, we perform some *TPI* profiling in both a static (welfare reliance) and dynamic (welfare persistence) framework and contrast the results.

Table 4 tabulates person-level characteristics by the four levels of *TPI* reliance used in Figures 8-11. Only cross-sectional tabulations based on the wave 1 data are presented, as the results of using wave 2 and wave 3 cross-sections are very similar (recall the similarities in Figures 6a-6c). Several findings emerge. *TPI* reliance appears to increase with age. 46% of those aged 55+ are strongly reliant as compared to less than 31% for those aged 44 and below.

Table 4: Person Characteristics by *TPI* Classification, Wave 1

Characteristics	Degree of Welfare Reliance				Average *TPI* (scale 0-100)
	Strongly Reliant (%) (*TPI* ≥ 90%)	Moderately Reliant (%) (*TPI* 50-90%)	Lightly Reliant (%) (*TPI* 10-50%)	Not Reliant (%) (*TPI* < 10%)	
Males	32.3	8.8	15.9	43.0	43.1
Females	34.9	10.7	15.5	38.9	47.0
Aged 20-24	27.7	12.4	22.7	37.3	43.4
Aged 25-34	27.5	7.7	15.9	48.9	37.5
Aged 35-44	31.0	11.1	15.6	42.4	43.1
Aged 45-54	39.2	7.0	15.1	38.8	48.5
Aged 55 plus	46.1	14.1	11.6	28.2	59.6
Australian-born (non-ATSI)	31.8	10.9	16.7	40.6	44.3
ATSI	51.6	12.9	14.5	21.0	63.7
Immigrant (ESB)	27.4	10.0	17.3	45.4	40.0
Immigrant (NESB)	41.9	5.5	10.9	41.7	48.9
Bachelor degree or higher	16.4	9.0	17.4	57.2	28.7
Diploma	17.2	8.0	23.5	51.3	29.1
Trade certificate	29.6	8.9	15.8	45.8	40.3
Year 12	35.5	11.5	15.2	37.9	48.2
Year 11 or below	44.1	10.8	13.8	31.3	55.7
Long Term Health Condition	48.1	9.7	13.2	29.0	58.8
Do Not have access to registered car, van or truck	62.1	11.9	10.4	15.6	73.6
Own or have access to registered car, van or truck	30.7	9.7	16.3	43.4	42.2
Do Not have access to registered motorcycle	34.0	10.2	15.6	40.2	45.7
Own or have access to registered motorcycle	28.9	3.7	17.7	49.7	36.8
Family					
Married or Defacto	32.5	6.9	12.8	47.8	41.2
Separated, Divorced, Widowed	35.0	13.5	19.2	32.4	50.1
Never married (Single)	36.4	15.4	20.8	27.4	53.1
Have children aged 0-4	31.8	10.1	12.8	45.3	42.5
Have children aged 5-14	31.9	10.7	15.5	41.9	44.1
Have children aged 15-24	35.9	11.1	14.1	38.9	48.0
Parents Divorced/Separated	34.2	10.3	19.3	36.2	46.9
Under age 18 when parents Divorced/Separated	34.0	10.3	21.0	34.6	47.3
Had first child under age 18	63.1	8.2	14.8	14.0	72.3
New South Wales	35.1	10.9	12.9	41.1	46.6

Victoria	30.8	7.4	16.8	45.0	40.8
Queensland	33.4	9.3	18.1	39.2	45.2
South Australia	34.5	13.7	16.7	35.2	49.5
Western Australia	33.4	11.9	15.2	39.4	46.3
Tasmania	51.3	8.6	12.8	27.3	61.1
Northern Territory	0.0	0.0	10.0	90.0	3.6
A.C.T	32.5	14.6	37.1	15.8	52.9
Welfare Benefits and Income					
Labour Market Assistance	32.6	12.0	32.3	23.2	49.6
Disability Support Pension	65.9	15.7	13.9	4.5	81.2
Parenting Payment Single	35.5	23.2	27.1	14.2	59.5
Parenting Payment Partner	55.0	11.3	18.5	15.2	68.5
Other welfare benefits	48.4	13.2	17.7	20.8	63.5
No welfare benefits	0.0	0.0	0.0	100.0	0.0
Annual Welfare Income ($)	8,031.64	8,088.26	5,555.50	376.65	
Annual Gross Income ($)	8,033.15	11,517.02	22,187.47	26,613.31	
TPI	99.5	71.6	26.4	1.2	
Life Satisfaction (mean values, scale 0-10)					
Employment opportunities	3.73	5.21	5.61	6.13	
Financial situation	4.24	4.90	4.60	5.24	
Overall life satisfaction	7.27	7.53	7.27	7.61	
Self-Reported Health (mean values, scale 0-100)					
General health	54.6	66.3	64.4	69.4	
Mental health	63.5	70.0	65.7	71.5	
Physical functioning	69.2	78.8	80.5	83.9	
Social functioning	63.8	77.3	72.7	78.4	
Bodily pain	58.0	70.8	68.1	72.1	
Vitality	51.0	59.5	53.8	58.1	
Role-physical	58.5	69.9	70.7	77.2	
Role-emotional	65.8	76.8	69.6	78.2	
Overall health and well-being	60.3	71.0	68.2	73.5	
Sample size (N)	662	201	328	804	

Notes: The figures represent proportions of persons with each personal characteristic in Wave 1 by their *TPI* classification in Wave 1, such that the first four columns in each row sums to 100% (except for income, *TPI*, life satisfaction and health variables where reported figures are the means of these variables for each *TPI* classification). Welfare Benefits classification: (a) *Labour Market Assistance*; Newstart Allowance, Mature Age Allowance, Mature Age Partner Allowance, Youth Allowance; (b) *Disability Support Pension*; DSP, DSP (Department of Veterans Affairs); (c) *Parenting Payment Single*; Parenting Payment (and report being not married and not *de facto*); (d) *Parenting Payment Partner*; Parenting Payment (and report being either married or *de facto*) (e) *Other Welfare Benefits*; Service Pension, Wife Pension, Carer Payment, Carer Allowance, Sickness Allowance, Wife Allowance (Widow B Pension), War Widow's Pension, Special benefit, Partner Allowance, Austudy/Abstudy, Mobility Allowance, Bereavement Allowance, Pensioner Education Supplement, GST compensation/Government pension bonus, Double Orphan Pension, Community Development Employment Project (CDEP), and Other – not enough information. Proportions are weighted using the longitudinal population weights constructed in HILDA. "Annual Gross Income ($)" excludes any family tax benefits received.

Higher education appears to be associated with a lower likelihood of being strongly reliant on income support. Of those with bachelor degrees and higher, 16% are strongly reliant and 57% are not reliant. Of those with less than 11 years of formal education, 44% are strongly reliant and 31% are not reliant. Being single seems to be associated with slightly stronger welfare reliance. About 36% of persons who never married are strongly reliant, against 32% who are either married or in *de facto* relationships. By contrast, about 48% of those married are not reliant, against 27% of single persons who are not reliant. Having a long term health condition increases the likelihood of being strongly welfare reliant. Of those with such conditions, 48% are strongly reliant as compared to 29% who are not reliant.

Not owning or not having access to a car, van or truck is clearly associated with strong reliance. 62% of the strongly reliant individuals do not have access to a car/van/truck against only 16% of those who are not reliant. Immigrants of a non-English speaking background are more likely to be strongly reliant than English speaking immigrants (42% against 27%). As one would expect, having had a child before the age of 18 is strongly associated with high levels of welfare reliance (63% strongly reliant against 14% not reliant).

Overall life satisfaction does not appear to be influenced by the level of reliance suggesting that people either adapt or compensate. By contrast strong reliance is associated with lower satisfaction with one's financial situation and much lower satisfaction with one's employment opportunities. In terms of all measures of health, strong reliance is associated with lower health status.

Although these observations can be informative, one limitation must be borne in mind, namely that this type of descriptive analysis cannot inform on the direction of causality of observed relationships. A good example in the economics literature is the observed negative association between health status and income. This is a very clear empirical regularity which arises in all data sets that the authors of this report have come across. The question that arises from this observed association is what causes what? Does bad health cause low income, or does low income cause bad health? Both causal effects appear to be plausible and both effects have found empirical support in the literature. The important question for the design of evidence-based policy however, is to distinguish between these two simultaneous effects, as the two different causal direction would call for very different corrective policy interventions. One can easily trace the similarities with some of the empirical regularities observed here. For example, it appears that the strongly reliant welfare recipients are also the least mobile with a much lower rate of motorcycle/car/van/truck access. It is well established that job search and

the ability to take up a new job is often influenced by the area of search and by the area of possible commuting. Hence, one could argue that strong reliance is the result of lack of access to independent transport. Equally well, it is well established that access to transport increases with income, so one could argue that the low income associated with strong welfare reliance is causing the lack of access to independent transport. It is clear that many of the associations established in this report should be viewed with the possibility that causality can be working both ways in mind.

5.4 TPI and Personal Profiling: Welfare Persistence

Table 5 looks at the same individual characteristics as Table 4 and explores their association with different *TPI* trajectories. Its contents could be thought of as a dynamic variant of the contents of Table 4. In Table 5 a rising (flat, falling) *TPI* trajectory can be taken to indicate a, increasing (unchanging, declining) level of welfare reliance over time. Being younger (age less than 44), and having more education (bachelor degree and higher) are associated with a higher likelihood of having a falling trajectory. People with falling trajectories tend to state that they have better overall health and well-being (69.3 against 63.0). As explained in the previous section this could mean either that lower *TPI* increases health, or that better health lowers *TPI*. Since being able to find an appropriate long-term job is often viewed as a solution to lowering welfare reliance, one would expect that those with falling trajectories would be more satisfied with their employment opportunities than those with rising or flat trajectories. Similarly, one also would expect that those with falling trajectories would state higher levels of overall life satisfaction than those with rising trajectories. Neither of these hypotheses is borne out by the evidence in Table 6.

Most people with long term health conditions (55%) and most people who are on disability payments (66%) have flat trajectories. Welfare recipients on labour market assistance or parenting payment partner have the highest proportions of falling trajectories (30% and 44% respectively). This agrees with the rest of the evidence presented which suggests that these two types of welfare payment are the least persistent ones and are used for transitory purposes by people who intend to get back into the labour force. Having children (aged 0-4 and aged 5-14) is associated with flat trajectories.

Table 5: Person Characteristics by *TPI* Trajectories Waves 1 to 3

Characteristics	Dynamic Welfare Reliance Trajectories				Average *TPI* (scale 0-100)
	Rising (%)	Flat (%)	Falling (%)	Other (%)	
Males	19.6	47.9	15.0	17.5	43.1
Females	19.2	43.6	17.8	19.4	47.0
Aged 20-24	14.5	40.6	28.3	16.7	43.4
Aged 25-34	18.9	39.3	18.0	23.8	37.5
Aged 35-44	17.0	44.0	20.0	18.9	43.1
Aged 45-54	22.8	51.6	11.1	14.5	48.5
Aged 55 plus	22.8	52.7	8.0	16.5	59.6
Australian-born (non-ATSI)	18.3	44.4	17.1	20.2	44.3
ATSI	15.1	49.8	15.0	20.1	63.7
Immigrant (ESB)	22.9	50.9	12.9	13.3	40.0
Immigrant (NESB)	22.3	46.3	16.9	14.6	48.9
Bachelor degree or higher	11.2	48.0	20.0	20.9	28.7
Diploma	22.0	41.2	19.1	17.7	29.1
Trade certificate	19.8	42.6	17.5	20.2	40.3
Year 12	15.7	46.8	18.1	19.5	48.2
Year 11 or below	21.8	47.3	14.2	16.8	55.7
Long Term Health Condition	18.5	54.7	10.1	16.7	58.8
Do Not have access to registered car, van or truck	11.2	52.7	15.4	20.7	73.6
Own or have access to registered car, van or truck	20.3	44.6	16.8	18.4	42.2
Do Not have access to registered motorcycle	19.4	45.6	16.4	18.6	45.7
Own or have access to registered motorcycle	18.6	41.3	21.1	19.1	36.8
Family					
Married or Defacto	21.7	44.8	16.8	16.7	41.2
Separated, Divorced, Widowed	18.7	47.5	12.7	21.2	50.1
Never married (Single)	13.4	45.4	19.3	21.9	53.1
Have children aged 0-4	18.2	35.6	22.8	23.4	42.5
Have children aged 5-14	17.0	41.2	21.6	20.2	44.1
Have children aged 15-24	21.1	48.8	14.1	16.0	48.0
Parents Divorced/Separated	16.7	41.0	20.2	22.1	46.9
Under age 18 when parents Divorced/Separated	16.0	40.0	20.8	23.2	47.3
Had first child under age 18	12.8	54.0	16.6	16.6	72.3
New South Wales	20.1	47.9	13.4	18.6	46.6
Victoria	21.1	44.7	17.3	16.9	40.8
Queensland	19.6	42.2	19.6	18.6	45.2
South Australia	16.5	46.5	18.5	18.5	49.5
Western Australia	18.3	41.6	17.8	22.2	46.3
Tasmania	13.5	55.5	14.2	16.9	61.1
Northern Territory	8.6	61.7	0.0	29.6	3.6
A.C.T	15.8	40.7	29.2	14.4	52.9
Welfare Benefits and Income					
Labour Market Assistance	10.2	41.9	29.7	18.1	49.6

Disability Support Pension	9.5	65.7	10.9	14.0	81.2
Parenting Payment Single	11.8	46.6	19.9	21.8	59.5
Parenting Payment Partner	3.2	36.3	43.8	16.7	68.5
Other welfare benefits	6.9	61.4	13.9	17.7	63.5
No welfare benefits	47.4	31.0	0.0	21.6	0.0
Annual Welfare Income ($)	1,396.69	5,255.27	6,460.00	4,336.87	
Annual Gross Income ($)	19,902.96	20,309.64	12,784.00	15,839.51	
TPI	8.7	55.8	69.3	36.6	
Life Satisfaction (mean values, scale 0-10)					
Employment opportunities	5.35	5.35	5.35	5.02	
Financial situation	4.98	4.78	4.88	4.43	
Overall life satisfaction	7.55	7.34	7.72	7.32	
Self-Reported Health (mean values, scale 0-100)					
General health	63.0	59.8	69.3	67.7	
Mental health	67.6	66.5	72.5	67.0	
Physical functioning	76.9	74.3	85.8	81.3	
Social functioning	71.7	70.2	79.1	73.5	
Bodily pain	64.7	63.1	74.8	70.1	
Vitality	53.4	53.5	61.3	56.1	
Role-physical	66.7	65.7	80.7	70.7	
Role-emotional	69.3	71.7	79.3	72.5	
Overall health and well-being	66.6	65.3	75.4	69.6	
Sample size (N)	372	903	337	383	

Note: Proportions are weighted using the longitudinal population weights constructed in HILDA. "Annual Gross Income ($)" excludes any family tax benefits received. See notes to Table 4 for what payments "Labour Market Assistance", "Disability Support Pension", "Parenting Payment Single", "Parenting Payment Partner", "Other Welfare" refer to.

6. *TPI* and Life Events Associated with Welfare Reliance

This section focuses on the question of what life events may be associated with changes in welfare reliance. We analyse this question using descriptive techniques in this section and multivariate regression techniques in the next section. We start with the examination of the association between personal life events and *TPI* trajectories, as these were defined in the previous section. In general, life events can be viewed as transitory or permanent shocks that remove individuals from their long run optimal *TPI* level (recall the theoretical discussion in section 3.5). Here we investigate life events that fall into the following broad categories: (i) Household composition changes, (ii) Individual health changes, (iii) Earned income level changes, and (iv) Type of welfare payment changes.

One has to be careful with relating life event variables to welfare reliance and *TPI* changes, because the experience of such specific events may be synonymous with a transition into

stronger or weaker welfare reliance (that is, higher or lower values of *TPI*). For example, looking at changes between waves 1 and 3, average annual earnings declined considerably for the group with rising welfare reliance (from $12,466 to $3,866), whilst annual earnings increased substantially for the group with falling welfare reliance (from $5,023 to $12,954). Since earnings feature in the denominator of *TPI*, the qualitative observation is almost tautological and should not come as a surprise. However, the amount of earnings change that is involved in such cases is of interest, as, of course, will be the underlying reasons that made this income change to happen.

Table 6: Life Events and Changes between Waves 1 to 3

Characteristics	Wave 1	Wave 2	Wave 3	% Change W1 to W2 (W2-W1)	% Change W2 to W3 (W3-W2)
Persons with 'Rising' welfare reliance					
Long-term health condition that limits type of work possible (%)	32.5	34.0	44.9	1.6	10.9
Annual Gross Earnings (imputed) ($)	13,434.30	9,484.11	4,507.89	- 3,950.19	- 4,976.22
Labour Market Assistance (%)	9.9	21.5	27.6	11.6	6.1
Disability Support Pension (%)	8.7	16.5	24.7	7.7	8.2
Parenting Payment Single (%)	6.7	9.1	10.5	2.4	1.5
Parenting Payment Partner (%)	2.1	10.1	23.0	8.0	12.9
Other welfare benefits (%)	5.5	14.4	22.0	8.9	7.5
No welfare benefits (%)	71.0	32.7	0.0	-38.3	-32.7
Annual Welfare Income ($)	1,396.69	4,564.85	8,006.04	3,168.16	3,441.20
Annual Gross Income ($)	19,902.96	18,700.46	14,318.32	- 1,202.50	- 4,382.14
TPI (%)	8.7	41.4	73.2	32.7	31.8
Sample size (N)			**372**		
Persons with 'Falling' welfare reliance					
Long-term health condition that limits type of work possible (%)	16.8	13.8	19.9	-3.0	6.0
Annual Gross Earnings (imputed) ($)	5,242.56	10,598.96	13,921.11	5,356.40	3,322.15
Labour Market Assistance (%)	33.4	18.2	8.4	-15.2	-9.8
Disability Support Pension (%)	11.7	8.6	4.8	-3.1	-3.8
Parenting Payment Single (%)	13.1	10.0	7.3	-3.1	-2.7
Parenting Payment Partner (%)	33.5	13.5	3.0	-20.0	-10.5
Other welfare benefits (%)	12.9	10.3	7.0	-2.6	-3.2
No welfare benefits (%)	0.0	43.5	71.7	43.5	28.2
Annual Welfare Income ($)	6,460.00	3,996.95	1,732.38	- 2,463.05	- 2,264.56
Annual Gross Income ($)	12,784.00	16,382.74	19,386.16	3,598.74	3,003.42
TPI (%)	69.3	35.9	10.8	-33.4	-25.1
Sample size (N)			**337**		

Note: Proportions are weighted using the longitudinal population weights constructed in HILDA. "Annual Gross Income ($)" excludes any family tax benefits received. More detailed results in Table D.1 in the appendix. See notes to Table 4 for what payments "Labour Market Assistance", "Disability Support Pension", "Parenting Payment Single", "Parenting Payment Partner", "Other Welfare" refer to.

A limitation of the present analysis is that the data used cannot be expected to trace the effect of life events that take a long time to work their way through. Hence, it must be clear that results presented here refer to life events that influence welfare reliance quickly after they happen. A clear example of such a life event is health changes. Indeed the way data picks these up can be shown by contrasting the changes in percentages between persons with rising and falling *TPI* trajectories in Table 6. To explain we use persons with rising welfare reliance trajectories as an example. For persons with rising trajectories, the incidence of a long term health condition increased from 32.5% to 44.9%. That is, the proportion of those with a long term health condition rose by 12.4% within two years amongst those with rising welfare reliance. By all accounts this is a large change. By contrast, the corresponding change amongst those with falling welfare reliance was a mere 3.1% (from 16.8% to 19.9%). The observation that both groups show a decrease in their health status, may be attributable to a declining trend for all welfare recipients.

The comparison of the composition of welfare support by type of payment between those with rising and falling welfare reliance can be of interest. There is relative stability in the DSP and PPS payments. However, one has to look at the asymmetry of the DSP picture (rising reliance group goes from 8.7% to 24.7% and falling goes from 11.7% to 4.8%) and the PPS picture (rising reliance group goes from 6.7% to 10.5% and falling goes from 13.1% to 7.3%). A time trend in the level of support offered by DSP can be discerned here given its relatively large changes, but not for PPS where the changes between Waves 1 and 3 are considerably smaller. The two payment types with higher mobility (LMA and PPP) show large differences between 2001 and 2003, but in a symmetrical fashion, which implies that there is no discernible time trend in the level of support offered by these two payments. This section concludes with the presentation of a transition matrix which shows the movement between types of welfare payment between 2001 and 2003 in Table 7.

Table 7: Transitions between Waves 1 and 3 by Welfare Payment Type

Welfare Payment type in 2001	Welfare Payment type in 2003 (as a percentage of the initial group)								
	DSP	**PPS**	**LMA**	**PPP**	**Other Welfare**	**Multiple Benefits**	**None**	**All**	**N**
DSP	**84.8**	0.3	0.2	0.0	3.2	4.4	7.1	100	315
PPS	0.0	**59.6**	2.4	8.2	5.0	8.6	16.3	100	203
LMA	5.4	0.0	**42.1**	1.9	3.7	3.9	43.1	100	319
PPP	1.4	6.0	3.0	**26.8**	6.0	4.0	52.9	100	257
Other Welfare	7.0	3.6	7.7	2.1	**50.0**	8.0	21.7	100	235
Multiple Benefits	25.2	9.8	8.7	5.8	14.5	**25.7**	10.4	100	97
None	9.9	8.1	21.6	16.0	14.9	3.8	**25.9**	100	569
N	380	207	284	205	261	119	539		**1,995**

Note: HILDA longitudinal population weights have been used. See notes in Table 4 for definition of "Other Welfare." "Multiple Benefits" refers to any combination of DSP, LMA, PPS, PPP and Other Welfare.

This table is similar to Table 2 where mobility between *TPI* level categories was presented. The purpose of Table 7 is to show the considerable but also very heterogeneous mobility between different types of welfare payment. It is clear that DSP recipients do not move a lot between different types of payment. To a lesser extent, PPS is a rather immobile group. By contrast both PPP and LMA show a considerable level of mobility, especially out of the welfare system with 43.1% of the 2001 LMA recipients and 52.9% of the 2001 PPP recipients being out of welfare altogether in 2003. The corresponding percentages for DSP and PPS are much lower at 7.1% and 16.3%. The observed considerable movement across welfare payment types is a strong advocate of the use of *TPI* as a measure of welfare reliance as it is an overall welfare measure and is not affected by shifts within the welfare system.

Key Concepts: Understanding What High or Low *TPI* Means

The analysis in this report revolves around using *TPI* as our dependent variable where we examine transitions from low *TPI* values to high *TPI* values and vice versa, claiming that it represents a meaningful spectrum of welfare reliance. But what does it really mean to have a high *TPI* or a low *TPI*? Are persons with high *TPI* much worse off than persons with low *TPI*? Since *TPI* is a ratio, it is worth looking at its components to get a better sense of what it means.

In Figure 12, based on the Wave 3 data (2003-2004 data), we see what average benefits, average earnings and average income levels correspond to each *TPI* decile for our analysis sample of welfare recipients. In general, we see that a higher *TPI* implies a lower gross annual income.[26] For example, for those with *TPI* between 0.2 and 0.3, average gross annual income is $26,686 while for those who are more dependent on welfare and have higher *TPI* values of between 0.6 and 0.7, average gross annual income is $18,283. As expected, we also see annual welfare income increase as *TPI* increases. Annual welfare income seems to peak around *TPI* values of 0.8 to 0.9 ($10,255) and is a shade lower for those with *TPI* values between 0.9 and 1.0. The figure also suggests that persons with *TPI* values below 0.6 engage in some paid work, but that for persons with *TPI* greater than 0.6, there is practically no income from earnings.

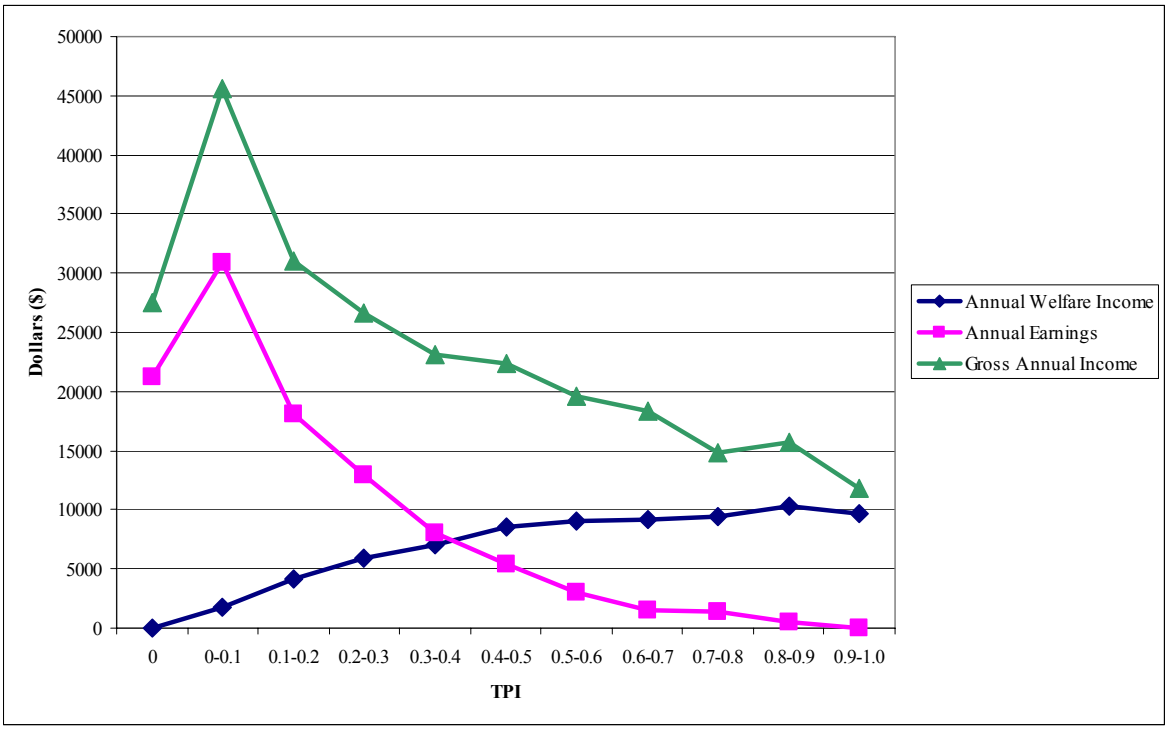


Figure 12: The Averages of Annual Welfare Income, Annual Earnings and Annual Income by TPI Deciles in Wave 3

[26] *TPI* does not include FTB.

***TPI* Distributions for Different Payment Types**

To get a better sense of the types of people that are on different income support programmes, Figure 13 shows the distribution of *TPI* in Wave 3 (2003-2004) for each of the different payment types. What clearly stands out are the distributions for DSP. Welfare reliance is in general highest for DSP recipients, where nearly 70% of DSP recipients had *TPI* values close to or equal to 1. What this also implies is that a large percentage of DSP recipients survive on about $12,000 in annual gross income.[27]

Figure 13: The Distribution of *TPI* in Wave 3 by Welfare Payment Type

[27] Annual gross income is measured as gross income from the previous financial year and is a derived variable in HILDA. It is income after imputation and is the sum of market income, private transfers, Australian and foreign pensions and benefits, family tax transfers and child care benefits, and does not include windfall (irregular) income (For information regarding variables calculation see the diagram 'Financial Year Income Model Release 2.0' in the HILDA Survey Users Manual.

7. Multivariate Estimations and Results

A set of multivariate estimations were carried out in accordance with the plan detailed in Section 2, which is to study the dynamics of the Australian social support system as a whole for welfare recipients who are of working age. We distinguish between the three concepts defined in section 3: welfare reliance, programme persistence, and level persistence. We use different models to estimate them. Welfare reliance and Welfare level persistence are estimated using the Partial Adjustment model explained above. Welfare reliance is measured by the determinants of *TPI* (the RHS of Equation 8). Welfare level persistence is measured by the inclusion of lagged values of *TPI* in the RHS of the *TPI* estimation. Welfare payment type persistence is estimated separately using a limited dependent variable model with the type of payment in the left hand side as the dependent (explained) variable and the lagged type of payment in the RHS of the estimation as one of the independent (explanatory) variables.

Here we present the main results and discuss their interpretation, first individually and then jointly.[28] Full results are presented in the Appendix.

7.1 Factors Associated with Welfare Reliance and Welfare (TPI) Level Persistence

We use *TPI* as the dependent variable in order to estimate the association between observed individual characteristics and welfare reliance as presented in Equation 8. One estimation was carried out for each of the main welfare payment types: *DSP*, *LMA*, *PPS*, *PPP*, *Other* and *Multiple*. The value of *TPI* in the previous wave was used in the right-hand side as an explanatory variable representing *TPI-level Persistence* in accordance with the Partial Adjustment Model methodology. Main results are presented in Table 9 below. Full results are in Tables E.2 and E.3 in the Appendix. Before results are presented and discussed, we clarify the main thrust of the following argument. This estimation provides two main sets of results in the context of this project. First, this estimation shows what factors are associated with the level of welfare support received by individuals. In the process of doing this, this model provides valuable information on the individual factors that influence *TPI reliance*. This information can be used to understand what the predominant individual characteristics are, of those who rely on welfare (i.e. those who have a high level of *TPI*). Second, this estimation shows the speed of adjustment of *TPI* over time by the inclusion of lagged *TPI* amongst the

[28] The profiles of welfare recipients by programme and the main results are summed up in Table E.1 in the Appendix.

explanatory variables. In the process of doing this, the model estimates *TPI-level persistence* as was defined in Section 3. To the degree that this estimate is statistically significant and different between different welfare payments, it will tell us if:

(i) the receipt of welfare payment may be self-perpetuating. It is important to note that this estimates an effect over and above the effect of all other observed individual characteristics of welfare payment recipients.

(ii) Whether there are any differences in the self-perpetuation of welfare receipt between different welfare payments.

Table 8: Estimating the Persistence of the Level of *TPI*

	DSP	*LMA*	*PPS*	*PPP*	*Other Welfare*	*Multiple Benefits*	*All*
TPI lagged by one wave (OLS)	0.429 (0.030)	0.420 (0.035)	0.502 (0.039)	0.252 (0.038)	0.506 (0.034)	0.325 (0.045)	0.368 (0.016)
TPI lagged by one wave (Tobit)	0.590 (0.052)	0.533 (0.045)	0.545 (0.043)	0.331 (0.051)	0.655 (0.046)	0.431 (0.058)	0.510 (0.027)
Mean TPI at t if e(sample)	0.82	0.52	0.64	0.67	0.63	0.83	0.58
Mean TPI at t-1 if e(sample)	0.78	0.43	0.63	0.61	0.56	0.74	0.57
Sample size	613	536	389	393	455	202	**3135**

Note: Estimations of the Partial Adjustment Model for Pooled Data, splitting the sample by Benefit type at time *t*. Standard errors in brackets. Detailed results in Tables E.2 and E.3 in the Appendix. See notes in Table 4 for definition of "Other Welfare." "Multiple Benefits" refers to any combination of DSP, LMA, PPS, PPP and Other Welfare.

All lagged *TPI* coefficients lie (as they should) between zero (no persistence) and one (full persistence). The standard errors are very small, indicating that these estimates are very precise. Two types of estimation methods have been used, the method of Ordinary Least Squares (OLS) and the Tobit. The Tobit method is designed to account for bunching of the *TPI* distribution to the right tail of its values. Where the bunching is severe (e.g. for DSP payments) the OLS estimates suggest lower *TPI*-level persistence than the Tobit ones. Where the bunching is less severe (e.g. for PPS payments) the OLS and Tobit estimates are very similar.[29] This accords with intuition as one would expect the use of the Tobit estimator to

[29] A simple way to look at this is to take the estimated standard error of one model, multiply it by two and use it to construct a one-sided confidence interval (at 5%). Then one can see if this confidence interval contains the estimate of the other model. For DSP the Tobit estimate is 0.59, minus 0.052 twice makes 0.486, which is still higher than the OLS estimate at 0.429 (so we can reject the crude hypothesis that the two models are the same). This very rough test also shows the PPS Tobit estimate to be very close to the OLS one as 0.545 minus twice

make more of a difference where the bunching is more severe. To interpret these results one has to go back to the definition of level of *TPI-level* persistence: this is the degree to which the level of past *TPI* receipts influences the level of current *TPI* receipts *after the effects of other observable characteristics have been accounted for*. So, the lagged *TPI* coefficients in Table 8 are *not* estimating the degree to which, say, a long term health problem may influence the level of *TPI* of a DSP recipient, or the way that age may influence the level of *TPI* of a LMA recipient. Observable factors such as health problems, age and many other (see Appendix for full results) have already been accounted for by the multivariate nature of the estimation. What is estimated by the coefficient of the lagged *TPI-level* variable, is the net effect of past *TPI* levels on current *TPI* levels. So, where the lagged *TPI-level* coefficient is higher (lower), we have a good indication that the level of *TPI* in itself is more (less) persistent over time.[30] Conversely, as discussed in Section 3, we can also interpret the results using the mirror image concept of speed of adjustment. The results here therefore suggest that *PPP* recipients have the fastest adjustment process back towards their desired equilibrium, and *DSP* recipients have the slowest adjustment process, with *LMA* and *PPS* recipients much slower than *PPP* recipients, but not as slow as *DSP* recipients. In summary, low persistence (or high speed of adjustment) over time suggest that shocks that take individuals away from their equilibrium (which we do not observe) do not last for long.

We now turn to the examination of the factors that are associated with the level of *TPI*. Full results are presented in Table E.2 in the Appendix. Here we discuss briefly some highlights from these tables. We find that work experience is associated with lower welfare reliance as measured by *TPI*. Welfare recipients with high work experience are individuals who have had the most labour market exposure amongst all recipients. It is therefore to be expected that they will have more means to support themselves than other welfare recipients and will hence have lower values of *TPI*. The effect does not seem to be very different by welfare payment, with the sole exception of *PPP* recipients for whom work experience is associated with considerably lower welfare reliance. Having a long term health condition is associated with higher *TPI* values but only for *LMA* recipients. The remaining health related variables do not seem to be associated with the level of *TPI*. Gender is only associated with

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0.043 makes 0.459 which is lower than the OLS estimate at 0.502 (so we cannot reject the hypothesis that the two models are the same).

[30] The precision of the estimates in Table 9 suggests that these are pretty well defined effects. The R-square of the estimations is sufficiently high (in all cases above 50%, which by all accounts is high for a cross-section OLS estimation) and a sufficiently large number of relevant variables has been used in the estimation. Of course, we always have to bear in mind the possible presence of systematic, relevant, but unobservable factors associated with *TPI*.

the level of *TPI* for *PPS* recipients. Children up to 4 years of age are associated with higher levels of *TPI* for *PPP* recipients. It is interesting that *PPS* and *PPP* recipients with lower than year 11 education level are more likely to have lower levels of *TPI*. There is a positive association between level of *TPI* and English as the first language amongst *DSP* recipients. The intuition behind this result is not clear, but the estimate is sufficiently precise to warrant future investigation. Urban and regional indicator variables do not show any clear association with *TPI* level with the sole exception of ACT showing a higher level of *TPI* for *PPS* recipients than in other regions. Tobit coefficients do not show any great differences in the direction of the associations they estimate.

7.2 A Markov Chain Model of Welfare Payment Persistence

This section presents the results from the estimation of programme persistence. Here the dependent variable is the type of welfare payment and the explanatory variables also contain lags of the dependent variable (i.e. whether one received the same type of welfare payment in the previous waves). In order to capture the degree to which having been on a particular welfare payment in the past makes someone more likely to continue staying on that welfare payment, we estimate a Markov chain model that accounts for past type of payment receipt alongside with individual characteristics. Given the descriptive evidence in Table 7, we choose to estimate welfare participation persistence using a *second-order* Markov chain model. This is tantamount to estimating the probability that receiving a specific type of payment today (at time *t*) depends on receipt of that type of payment at times *t-1* and *t-2*. Our data limits us from investigating more than two years into the past. The relative sizes of the coefficients (where coefficients for *t-2* are substantially lower than those for *t-1* would lend support to this intuition) and their significance suggest that in general the type of welfare payment of two years back has little influence on current payment (that is *over and above* the combined influence of the type of welfare payment of one year back and all other control variables).[31]

The general form of the model still follows Equation 8 as in the previous set of estimations, with the only difference that in the present estimations the dependent variable is a categorical variable, that is a variable that takes several discrete values the difference between which cannot be quantified. This type of estimation is common where a process gives rise to discrete

[31] Although this may appear to be a sensible and generalisable result, PPP receipt goes against the flow with a negative and significance coefficient for two years back and a close to zero coefficient for one year back.

but not quantifiable choices such as the choice of the mode of transport (e.g. bus, car or train), the type of treatment on offer (e.g. hospital A, hospital B, home, other), or labour market status (employed, unemployed, self employed, retired, other) etc. Although there may be some information on some of the attributes of the alternative choices which may be continuous and quantifiable, each choice is treated as a complete and distinct package, belonging to a set of inter-related choices. This describes well the situation where alternative types of welfare payments are on offer to individuals on welfare. We estimate Equation 9 using a multinomial Logit model.

$$W_{t,i} = \gamma_0 + \gamma_1 X_{t,i} + \gamma_2 W_{t-1,i} + \gamma_3 W_{t-2,i} + u_{t,i} \tag{9}$$

Table 9 presents the multinomial Logit estimates of the lagged payment type coefficients. Results suggest that there is very high payment type persistence for DSP and PPS recipients. Some payment type persistence is also traced for LMA recipients and none for PPP recipients.

Table 9: Estimating the Persistence of Receiving a Specific Type of Welfare Payment

	DSP	*LMA*	*PPS*	*PPP*	*Other Welfare*
Payment type at t-1	4.40	1.32	4.74	0.01	2.00
	(0.51)	(0.22)	(0.49)	(0.23)	(0.26)
Payment type at t-2	-0.05	-0.46	-0.47	-1.18	0.44
	(0.05)	(0.22)	(0.46)	(0.24)	(0.26)
Mean TPI at t	0.82	0.52	0.64	0.67	0.63
Mean TPI at t-1	0.78	0.43	0.63	0.61	0.56
Cases in category	613	536	389	393	455

Note: Multinomial Logit estimation. Standard errors in brackets. Detailed results in Table E.4 in the Appendix. See notes in Table 4 for definition of "Other Welfare."

The association between current welfare payment type and that received two years ago (the second row in Table 9), is not as clear. On first inspection, DSP receipt two years ago appears to play no role. However, when one removes from the estimation the variable representing DSP receipt one year ago, the effect of past payment type is readily captured by the variable representing DSP receipt two years ago. Results suggest that the two variables are too collinear so that the estimation cannot distinguish between them and when they are both included in the RHS it simply picks up the effect of the stronger of the two. Very similar arguments hold for PPS receipt. By contrast, persistence of LMA receipt suggests that one is

more likely to receive LMA if they received LMA last year *and* less likely if they received LMA two years ago. This would suggest that any LMA persistent effect is short lived and reversed after having spent one to two years on LMA. Finally, PPP receipt appears to be unaffected by PPP receipt one year back and negatively affected by PPP receipt two years back. This is very clearly the least persistent welfare payment type amongst the four major payment types on which this report focuses.

Payment type receipt is negatively associated with work experience in all categories except for PPS recipients. Work limiting health conditions and disabilities are positively associated with DSP receipt but no other type of payment. This finding is not surprising given the stated objectives of DSP payments. Mental health problems appear to be negatively associated with receipt of LMA, PPP and PPS, presumably due to selection that has taken place before these individuals qualified for either of these welfare payments. Mental health problems are not associated with DSP receipt. Men are more likely to receive LMA payments and less likely to receive PPS payments. Living in a major city is negatively associated with LMA, PPP and PPS receipt, presumable due to the higher opportunity cost of doing so. The relationship between children and PPP and PPS payments is interesting. Both payments are positively associated with having children in the family. The association between PPS receipt and number of children is independent of the age of the children for the PPS recipients. The association between PPP receipt and number of children for PPP recipients is highly dependent on the age of the children. It starts very strong for children below 4, is more than halved for children between 5 and 14, and pretty well disappears for children between 15 and 24. The very different circumstances of the two types of recipients are reflected in these results.

Although few of the results presented to now are particularly surprising, it should be borne in mind that the present analysis does not allow us to establish the causal directions that lie behind the estimated associations.

We now bring these results together and present an overview of welfare level reliance and welfare level and payment type persistence in Table 10. This table provides a conceptual overview of the most prominent results stemming from the multivariate results presented hitherto. The levels reported in Table 10 are levels relative to the other groups for comparison purposes. There are three main results.

Table 10: Combining Results on Reliance and Persistence

Payment Type	Welfare Reliance (*TPI* Absolute level)	Over-time Persistence (Type of Welfare Payment)	Over-time Persistence (Level of Payment: *TPI*)
PPP	Average	Very Low	Low
PPS	Average	High	Average/High
LMA	Low/Average	Average	Average/High
DSP	High	High	High

Over time persistence patterns do not follow point-in-time welfare reliance patterns. This means that the proportion of income that comes from welfare in a single year does not seem to correlate with the persistence of welfare over several years, despite the high level of observed mobility between payment types. This is an important result. It indicates that there is no empirical support for the proposition that the Australian welfare system suffers from the problem of moral hazard in a way that can be traced by this data. The argument here runs as follows. Moral hazard is the situation where higher welfare payments would make being on welfare less undesirable for both potential and actual welfare recipients. One of the prime observable outcomes of moral hazard in the welfare system would be that higher payment levels would be associated with stronger persistence over time. Clearly, the results of this report show no such link.

Payment type persistence differs by the type of payments received. Controlling for all observed factors that can contribute towards higher probability to be in a type of welfare payment, there remain differences in persistence across payment types. These differences accord with intuition in that the most dependent group, the DSP recipients, are also the ones with the highest welfare payment persistence. This is both expected and welcome (assuming all those on DSP are truly technically eligible), as it shows that this needy group receive the necessary support as and when required. By contrast, the PPP recipients, predominantly female and married (and as one would presume more than all other groups likely to be a second earner in the family) are the least dependent and the least payment type persistent group. This is again expected and welcome as it indicates that the system is not being abused by this group. PPS recipients who are predominantly female and single with the responsibility of bringing up children in the absence of sufficient partner contributions, exhibit high payment type persistence. Again this is a needy group, who are often subject to pretty strict and inflexible budget and time constraints. Finally, the estimate that LMA recipients show

average payment type persistence can be a cause for concern, as one would expect and wish it to be lower. This is especially so given the rather favorable labour market conditions in the years 2001 to 2003.

TPI persistence differs by type of payments received. Controlling for observed factors that can contribute towards higher level of *TPI*, there remains *TPI* level persistence, which again differs by welfare payment. DSP recipients show the highest *TPI* level persistence. The continuous nature of the work limiting nature of disabilities could be a prime cause for this. At the other side of the spectrum are the PPP recipients who show a low level of persistence, but an average welfare reliance. That is, they shift in and out of this type of payment a lot (low type of payment persistence), their payment varies a fair bit over time (low level of payment persistence), but, when on welfare, they receive a sizeable proportion of their income from welfare (average welfare reliance). In the middle lie PPS and LMA payment recipients who show average/high level of payment persistence over time.

7.3.Fixed Effects Estimations

We have isolated some life events which appear to be sufficiently well represented in the HILDA data set and have tested the degree to which they could be considered to have caused changes in *TPI*. We use a fixed effects panel model which has two advantages in this context. First, it can identify the life events that have happened before a *TPI* change from those that may have happened concurrently. Hence the detection of causality, although still very precarious with a panel of only three waves, starts becoming feasible. Second, it can control for unobserved individual heterogeneity (i.e. unobserved differences between welfare recipients) and remove any bias that may be caused by time-invariant unobserved variables.[32] Whereas with a longer panel we would have had to worry for the "time-invariant" part of the last sentence, clearly here we do not. Estimation results are clear and their details are presented in Table E.5 in the Appendix. Getting married appears to affect male *TPI* negatively. This could mean several things. First, men who wish to get married try to reduce their *TPI*, by getting a job to start facing their new responsibilities. Second, that some of the men who get married lose some of their welfare entitlement due to their wife's income. The

[32] Note that the interpretation of results now shifts to the effect of changes at the individual level. Whereas in the cross section context we would compare the married part of the sample with the not married part of the sample to establish any differences, and then, on the assumption of unobserved homogeneity of the two sub-samples, we would look at the differences between married and not married, here we only use the information provided by those who actually got married during the observation period. Clearly, if the information is there, causality can be established under much weaker assumptions.

fact that this result does not appear for women (where one would expect it to be even stronger if it had to do with entitlement loss after marriage), may suggest that the second interpretation is probably incorrect, as male labour market participation rate is higher.[33] A change in the total number of persons in the household does not seem to influence the level of *TPI*. The addition of a person aged 0 to 4 does not appear to have an effect on men but it increases *TPI* for women. This is the reflection of parenting payments which are principally received by women. The presence of a Long-Term Health Condition in the household has a positive but imprecise effect on the level of *TPI*. There are two main reasons why this may be the case. First, it may simply be that there is an effect and this effect is weak. Second it may be that there is an effect, but the data is too weak to estimate it clearly. It should be noted that this form of estimation relies on information on over-time changes and not on information on the current status of individuals. Given that (i) the change from having no long-term health condition to having one happens very infrequently for any single individual (usually only once in one's lifetime), and (ii) that the analysis uses only three panel waves, we would tend to support the view that there is an effect that the data is too weak to estimate clearly. The fact that when the sample is split the size of the effect remains very similar for both men and women but the precision of both estimates drops gives further indirect support for this suggestion. The onset of a long term health condition which *limits work*, increases *TPI*. The result is sufficiently precise for men, but not so for women. Given the higher labour market participation of men and the previous discussion on the results on a general Long-Term Health Condition, this result can be expected to become more precise as the length of the panel increases in the future. *TPI* is age related. It is estimated that, other things equal, age has a U-shaped effect on *TPI*. *TPI* decreases with age until the age of 36 is reached. Then *TPI* starts rising again steadily all the way to retirement. In this U-shaped relationship the decreasing effect of age on *TPI* at age 18 equals in absolute value the increasing effect at age 47. Finally, experimentation with other life changes using different model specifications did not produce any further statistically significant results.

[33] Current data does not allow to go into this any deeper. However, with another couple of waves, HILDA should become useful for addressing more such questions. Another related question will be the degree to which family formations and dissolutions influence welfare receipt. For these questions more advanced modelling and at least another two HILDA waves would be necessary.

8. Conclusion

The project investigated welfare payment reliance and over time welfare payment persistence in the Australian labour market between the years 2001 and 2003 using the first three waves of the HILDA longitudinal data set. Section 2 reviewed the Australian and international literature on welfare reliance to draw attention to the methodology and the results that this study incorporated. The first half of Section 3 (3.1 to 3.3) presented the theoretical foundations which are used for the analysis. The second half of Section 3 (3.4 to 3.6) presented the empirical implementation of the theoretical model. The model was based on an underlying structure of heterogeneous economic agents who suffer occasional external shocks in their labour market status. These shocks lead to adjustments of their welfare recipient status. This model was presented in Section 4. Some of these adjustments are long-term and individuals do not recover their previous labour market position (e.g. the onset of serious health problems). Some of these adjustments are not necessarily of a long-term nature (e.g. a lay off), and then arises the policy concern of the incentives generated by welfare payments in terms of their influence on the probability of leaving welfare and/or the speed at which this may happen.

Several empirical dimensions of this research issue were examined in Sections 5 and 6. Reliance on welfare payments was measured using an index of the proportion of total income from all different welfare payments, the *TPI*. This type of general measure of reliance was used in order to study the properties of the welfare system as a whole. Three individual but inter-connected facets of welfare reliance were examined using *TPI*. First the absolute level of *TPI* (Welfare Reliance) as a proportion of total income. Second, the over time persistence for any given type of welfare payment (Type of Welfare Payment Persistence) as a measure of the mobility between different types of payment. Third, the over time persistence of the level of *TPI* (*TPI*-level persistence).as a measure of the variation of level of *TPI* within each type of welfare payment. Section 6 concentrated on the examination of the impact of life events, finding some evidence on the effect of health changes on changes in welfare receipt.

Several multivariate econometric models were estimated in Section 7, including a Partial Adjustment Model which aimed at estimating the degree to which different agents are reliant on welfare receipt by way of estimating the speed at which agents adjust to new positions after being subjected to external shocks. A multinomial LOGIT model was used in order to estimate the degree of persistence of specific types of welfare payment. A panel estimation Fixed Effects model was used in order to examine the multivariate evidence on the impact of life events on welfare receipt.

From the policy point of view, *welfare reliance* is important for a set of well known and extensively researched budgetary and incentives reasons, which were explained in Sections 3.2 and 3.5. By contrast the concept of the *persistence of welfare* is less obvious and less well understood at the practical level. Nonetheless the persistence of welfare is important *per se*, as it indicates the degree to which being presently a welfare recipient influences (i) the chances of future welfare receipt and (ii) the amount of future welfare receipt. Using multivariate analysis which controls for observable factors it can be argued that the estimate of the persistence of welfare forms an approximation of the possible indirect damage of welfare receipt through human capital deterioration and/or moral hazard. Low persistence is important for effective policy implementation and for increased market flexibility. Results on reliance and persistence by welfare payment can be summed up as follows.

DSP: High *TPI*-level reliance. Slow *TPI-level* adjustment/High persistence. Those observed on DSP in the last period, are highly likely to be on DSP in the current period. Last period's *TPI-level* affects current period's *TPI-level* by a lot. Shocks that cause deviations away from the equilibrium last long and individuals adjust slowly back to their high level of reliance. This could be a reflection of the fact that recipients who get into or out of DSP and its associated high levels of reliance do so slowly and for a long time. Clearly most of this result is driven by recipients moving into DSP.

LMA: Low/average *TPI*-level reliance. Average-Slow *TPI-level* adjustment/High-Average persistence. Those observed on LMA in the last period, have an average likelihood of being on LMA in the current period. Last period's *TPI-level* affects current period's *TPI-level* quite a bit. This could imply that shocks that cause deviations away from the equilibrium level of *TPI* last longer as adjustment is slower. Slower adjustment could be the manifestation of more thorough job search being associated with longer search whilst on welfare. Further research into the way search takes place and an assessment of the relative intensity and effectiveness of alternative search methods could be useful in this context.

PPS: Average *TPI*-level reliance. Average-Slow *TPI-level* adjustment/High-Average persistence. Those observed on PPS in the last period, have a high likelihood of being on PPS in the current period. Last period's *TPI-level* value affects current period's *TPI-level* quite a bit. Shocks that cause deviations away from the equilibrium last longer as adjustment is slower. The very nature of the reasons that generate this payment (usually single motherhood)

explain the reliance characteristics. This is a group of individuals with fairly tight time and budget constraints and typically idiosyncratic family and non-family support.

PPP: Average *TPI*-level reliance. Fast *TPI-level* adjustment/low persistence. Those observed on PPP in the last period, have the lowest likelihood amongst all types of welfare payment of being on the same payment in the current period. Last period's *TPI-level* has an average effect on current period's *TPI-level*. Shocks that cause deviations away from the equilibrium do not last long as they adjust quickly. These are principally females who move in and out of welfare receipt more often than others. Longer panel information would be needed to investigate their behaviour in more detail. This should become possible with about 5 HILDA waves. An important topic of research would be to investigate the degree to which this behaviour may be caused by expected or unexpected fluctuations in the income and/or labour market status of their partner.

The project also estimated the impact of life events on welfare, but found little empirical support for this analysis. Health status changes and marital status changes were the main life events that caused changes in welfare receipt. We believe that this is not because there are no life events that are important regarding labour market behaviour. It is rather that such other life events are too infrequent to be able to produce sufficiently precise estimates in the first three waves of HILDA used for this analysis. We recommend that this issue be revisited in two-three years when there will be 5-6 years of panel information and there will be more observations of people who experienced such events.

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Appendix A

HILDA Questions Used to Measure Welfare Reliance

G31 Including only your share, how much did you receive in total income from [specify pension / allowance] last financial year? Please include any lump sum advances you received.

IF RESPONDENT DOES NOT KNOW YEARLY AMOUNT ASK:
What about the average received per fortnight from [specify pension / allowance]? Are you able to estimate what that amount was?

and

G32 For how many weeks last financial year did you receive this [pension / allowance]?

		Annual Amount	OR	Average per fortnight	Number of Weeks Received
Age pension (from Australian Govt)	01	$		$	
Newstart Allowance	02	$		$	
Mature Age Allowance	03	$		$	
Mature Age Partner Allowance	04	$		$	
Service Pension (Paid by DVA) Exclude superannuation	05	$		$	
Disability Support Pension (paid by Centrelink)	06	$		$	
Disability Pension (Paid by DVA)	07	$		$	
Wife Pension	08	$		$	
Carer Payment	09	$		$	
Carer allowance (Child disability allowance)	10	$		$	
Sickness allowance	11	$		$	
Wife allowance (Widow B Pension) paid by Centrelink	12	$		$	
War Widow's Pension (Paid by DVA)	13	$		$	
Special Benefit	14	$		$	
Partner Allowance	15	$		$	
Youth Allowance	16	$		$	
Austudy/Abstudy	17	$		$	
Parenting Payment	18	$		$	
Pensions/Benefits from overseas governments	19	$		$	
Other government pensions / allowances (specify)	98	$		$	

NB: DO NOT INCLUDE FAMILY ALLOWANCE OR FAMILY TAX BENEFIT

Figure A.1. HILDA question used to create the numerator in the *TPI* measure.

G15 Looking at SHOWCARD G15, do you *currently* receive any of these government pensions or allowances?

[Code all that apply.]

Newstart Allowance	01	
Mature Age Allowance	02	
Mature Age Partner Allowance	03	
Service Pension (paid by Dept of Veteran Affairs) *[exclude superannuation, e.g., DFRDB]*	04	
Disability Support Pension (paid by Centrelink)	05	
Wife Pension	06	
Carer payment	07	
Sickness Allowance	08	
Widow Allowance (Widow B Pension) (paid by Centrelink)	09	
Special Benefit	10	
Partner Allowance	11	
Parenting Payment (*NOT Family Allowance or Family Tax Benefit*)	12	
Youth Allowance	13	
Austudy / Abstudy payment	14	
None of these	97	➔G17
Don't know	99	➔G17

Figure A.2. HILDA question used for benchmarking with the ABS data in Appendix B.

Appendix B

Comparison of HILDA versus ABS Figures Regarding Welfare Receipt

Table B.1: Weighted Numbers of Persons 'Currently' Receiving Government Welfare Benefits

Benefit type (in HILDA)	HILDA data (Weighted figures)			ABS data		
	Wave 1 (2001)	Wave 2 (2002)	Wave 3 (2003)	June 2001	June 2002	June 2003
Age Pension (a)	1,699,839	1,724,615	1,771,539	1,793,708	1,818,205	1,861,055
Newstart Allowance	413,659	413,527	375,302	575,971	545,535	512,332
Mature Age Allowance	49,850	63,265	67,734	38,903	40,125	41,070
Mature Age Partner Allowance	15,217	23,793	20,659	-	-	-
Service Pension	254,790	240,857	222,982	290,695 (b)	279,518 (b)	267,504 (b)
Disability Support Pension	582,213	620,732	614,297	623,926	658,915	673,334
Wife pension (a)	62,090	46,263	39,036	75,048 (c)	68,061 (c)	58,199 (c)
Carer Payment	140,259	175,211	189,707	57,190	67,260	75,937
Sickness Allowance	40,732	24,470	26,040	11,058	9,540	8,755
Widow Allowance (Widow B Pension) (d)	38,757	29,254	37,351	43,242	46,401	46,188
Special Benefit	33,566	25,457	41,749	12,691	13,091	12,228
Partner Allowance	103,009	108,535	114,108	92,106	102,325	102,805
Parenting Payment	557,244	505,776	502,992	621,237	619,422	618,363
Youth Allowance	350,943	350,679	381,913	393,205	395,496	400,639
Austudy/Abstudy	147,841	135,342	102,927	41,992 (e)	41,007 (e)	39,092 (e)
War Widows Pension	68,085	90,098	90,205	110,656 (f)	113,059 (f)	114,235 (f)
Disability Pension (DVA)	140,730	157,105	132,032	162,505 (g)	159,425 (g)	157,865 (g)
Carer Allowance	97,646	107,853	127,915	235,041	272,045	299,609
Overseas Pensions	96,324	70,457	65,029	-	-	-
Mobility Allowance	10,136	0	6,671	37,574	41,456	44,239
Bereavement Allowance	850	0	0	51	41	55
Pensioner Education Supplement	5,960	1,297	15,132	45,540	50,865	52,923
GST Comp./Gov't Pension Bonus	0	0	0	-	-	-
Child Care Benefit (h)	291,755	353,480	325,628	-	-	-
Double Orphan Pension	976	0	0	1,242	1,207	1,137
Community Development Employment Project	2,780	0	0	-	-	-
'Other'	8,313	0	4,976	-	-	-
Family Tax Benefit (Part A) (i)	2,083,447	2,103,450	2,092,784	1,801,285	1,795,355	1,785,123
Family Tax Benefit (Part B) (i)	1,435,883	1,400,253	1,376,040	1,181,069	1,199,233	1,223,572

Notes: HILDA figures weighted using the cross-sectional responding person population weights in each wave; ABS figures from 'Year Book Australia, 2005' (Cat. No. 1301.0).

(a) ABS figures include Pension Savings Bonus Scheme, and amounts paid by the Department of Veterans' Affairs in relation to the Aged Pension, related Wife Pension and Disability Support Pension.

(b) These figures are approximations taken from ABS '*Services provided to veterans and their families*' section, and are Service Pensions paid to 'veterans' and 'wives and widows'.
(c) Reported as 'Wife Pension (Age)' and 'Wife Pension (DSP)' in ABS, but just as 'Wife Pension' in HILDA. The ABS figures in this table are the addition of the two categories 'Age' and 'DSP'.
(d) Widow Allowance and Widow B Pension figures reported separately by ABS, thus ABS figures in this table are the addition of these two values.
(e) ABS figures do not appear to include 'Abstudy' recipients.
(f) These figures are approximations taken from ABS '*Services provided to veterans and their families*' section, and are Pensions paid to 'war widows ad widowers'.
(g) These figures are approximations taken from ABS '*Services provided to veterans and their families*' section, and are Pensions paid to 'incapacitated veterans'.
(h) HILDA figures are in terms of number of families and are taken from 'Household' files. ABS have multiple definitions of Child Care Benefit, which makes ascertaining comparable figures difficult.
(i) Figures are in terms of number of families receiving benefit. HILDA figures are from 'Household' files and are weighted using household population weights.

Table B.2: Unweighted Numbers of Persons 'Currently' Receiving Government Welfare Benefits

Benefit type (in HILDA)	HILDA data (Raw numbers)			ABS data		
	Wave 1 (2001)	Wave 2 (2002)	Wave 3 (2003)	June 2001	June 2002	June 2003
Age Pension (a)	1,570	1,497	1,480	1,793,708	1,818,205	1,861,055
Newstart Allowance	389	353	297	575,971	545,535	512,332
Mature Age Allowance	49	58	55	38,903	40,125	41,070
Mature Age Partner Allowance	14	20	18	-	-	-
Service Pension	226	205	174	290,695 (b)	279,518 (b)	267,504 (b)
Disability Support Pension	551	530	498	623,926	658,915	673,334
Wife pension (a)	58	38	34	75,048 (c)	68,061 (c)	58,199 (c)
Carer Payment	131	142	143	57,190	67,260	75,937
Sickness Allowance	38	18	21	11,058	9,540	8,755
Widow Allowance (Widow B Pension) (d)	36	28	38	43,242	46,401	46,188
Special Benefit	26	19	29	12,691	13,091	12,228
Partner Allowance	105	91	83	92,106	102,325	102,805
Parenting Payment	578	466	432	621,237	619,422	618,363
Youth Allowance	302	296	296	393,205	395,496	400,639
Austudy/Abstudy	134	104	77	41,992 (e)	41,007 (e)	39,092 (e)
War Widows Pension	66	79	85	110,656 (f)	113,059 (f)	114,235 (f)
Disability Pension (DVA)	125	127	101	162,505 (g)	159,425 (g)	157,865 (g)
Carer Allowance	103	103	110	235,041	272,045	299,609
Overseas Pensions	81	65	52	-	-	-
Mobility Allowance	8	0	5	37,574	44,238	44,239
Bereavement Allowance	1	0	0	51	41	55
Pensioner Education Supplement	6	2	11	45,540	50,865	52,923
GST Comp./Gov't Pension Bonus	0	0	0	-	-	-
Child Care Benefit (h)	337	365	330	-	-	-
Double Orphan Pension	1	0	0	1,242	1,207	1,137
Community Development Employment Project	3	0	0	-	-	-
'Other'	8	0	4	-	-	-
Family Tax Benefit (Part A) (i)	2,298	2,054	1,962	1,801,285	1,795,355	1,785,123
Family Tax Benefit (Part B) (i)	1,581	1,384	1,318	1,181,069	1,199,233	1,223,572

Notes: HILDA figures are raw sample sizes from each wave; ABS figures from 'Year Book Australia, 2005' (Cat. No. 1301.0).

(a) ABS figures include Pension Savings Bonus Scheme, and amounts paid by the Department of Veterans' Affairs in relation to the Aged Pension, related Wife Pension and Disability Support Pension.

(b) These figures are approximations taken from ABS '*Services provided to veterans and their families*' section, and are Service Pensions paid to 'veterans' and 'wives and widows'.

(c) Reported as 'Wife Pension (Age)' and 'Wife Pension (DSP)' in ABS, but just as 'Wife Pension' in HILDA. The ABS figures in this table are the addition of the two categories 'Age' and 'DSP'.

(d) Widow Allowance and Widow B Pension figures reported separately by ABS, thus ABS figures in this table are the addition of these two values.

(e) ABS figures do not appear to include 'Abstudy' recipients.

(f) These figures are approximations taken from ABS '*Services provided to veterans and their families*' section, and are Pensions paid to 'war widows ad widowers'.

(g) These figures are approximations taken from ABS '*Services provided to veterans and their familie*s' section, and are Pensions paid to 'incapacitated veterans'.
(h) HILDA figures are in terms of number of families and are taken from 'Household' files. ABS have multiple definitions of Child Care Benefit, which makes ascertaining comparable figures difficult.
(i) Figures are in terms of number of families receiving benefit. HILDA figures are from 'Household' files.

Appendix C

Description of Restrictions Imposed to Create Sample

Table C.1: Sample Restrictions and Numbers of Observations Omitted

	Number of Observations Omitted	Sample Size
Wave 1 cross-section (no restrictions)	-	13,969
Restrict to balanced panel, wave 1 – wave 3	3,192	10,777
Restrict to Males aged 21-64, Females aged 21-59 in all waves	3,137	7,640
Restrict to no full-time students (attending secondary or post-school education) and no persons receiving Austudy/Abstudy in any wave	322	7,318
Restrict to no persons receiving Age Pension in any wave	29	7,289
Restrict to persons with 'non-missing' *TPI* values in all waves	211	7,078
Restrict to no persons who do not receive a government pension or allowance (ie. *TPI* =0) in all 3 waves	5,083	**1,995**

Appendix D

Life Events and Changes, Full Results

Table D.1: Life Events and Changes between Waves 1 to 3, Full Results

Characteristics	Wave 1	Wave 2	Wave 3	Change W1 to W2 (W2-W1)	Change W2 to W3 (W3-W2)
Persons with 'Rising' welfare reliance					
Household (HH):					
Number persons in HH	3.21	3.08	3.10	-0.13	0.03
Number persons aged 0-4 in HH	0.35	0.36	0.35	0.01	0.00
HH contains at least one person with long-term health condition	54.9	56.5	67.1	1.6	10.5
HH type has changed	-	-	-	22.9	22.5
Individual:					
Has long-term health condition that limits type of work possible	32.5	34.0	44.9	1.6	10.9
Percent of previous financial year spent unemployed	6.3	11.6	14.4	5.3	2.8
Annual Gross Earnings ($)	13,208.81	9,290.13	3,971.54	- 3,918.68	- 5,318.59
Annual Gross Earnings (imputed) ($)	13,434.30	9,484.11	4,507.89	- 3,950.19	- 4,976.22
Labour Market Assistance	9.9	21.5	27.6	11.6	6.1
Disability Support Pension	8.7	16.5	24.7	7.7	8.2
Parenting Payment Single	6.7	9.1	10.5	2.4	1.5
Parenting Payment Partner	2.1	10.1	23.0	8.0	12.9
Other welfare benefits	5.5	14.4	22.0	8.9	7.5
No welfare benefits	71.0	32.7	0.0	-38.3	-32.7
Annual Welfare Income ($)	1,396.69	4,564.85	8,006.04	3,168.16	3,441.20
Annual Gross Income ($)	19,902.96	18,700.46	14,318.32	- 1,202.50	- 4,382.14
TPI	8.7	41.4	73.2	32.7	31.8
Sample size (N)			**372**		
Persons with 'Falling' welfare reliance					
Household (HH):					
Number persons in HH	3.50	3.39	3.35	-0.10	-0.05
Number persons aged 0-4 in HH	0.45	0.39	0.33	-0.06	-0.05
HH contains at least one person with long-term health condition	43.9	34.6	45.2	-9.4	10.6
HH type has changed	-	-	-	21.6	19
Individual:					
Has long-term health condition that limits type of work possible	16.8	13.8	19.9	-3.0	6.0
Percent of previous financial year spent unemployed	16.0	14.5	7.2	-1.5	-7.3
Annual Gross Earnings ($)	4,806.37	10,637.65	13,839.67	5,831.28	3,202.02
Annual Gross Earnings (imputed) ($)	5,242.56	10,598.96	13,921.11	5,356.40	3,322.15
Labour Market Assistance	33.4	18.2	8.4	-15.2	-9.8
Disability Support Pension	11.7	8.6	4.8	-3.1	-3.8
Parenting Payment Single	13.1	10.0	7.3	-3.1	-2.7
Parenting Payment Partner	33.5	13.5	3.0	-20.0	-10.5

Other welfare benefits	12.9	10.3	7.0	-2.6	-3.2
No welfare benefits	0.0	43.5	71.7	43.5	28.2
Annual Welfare Income ($)	6,460.00	3,996.95	1,732.38	- 2,463.05	- 2,264.56
Annual Gross Income ($)	12,784.00	16,382.74	19,386.16	3,598.74	3,003.42
TPI	69.3	35.9	10.8	-33.4	-25.1
Sample size (N)			**337**		
		All Persons			
Household (HH):					
Number persons in HH	3.20	3.13	3.09	-0.07	-0.03
Number persons aged 0-4 in HH	0.35	0.33	0.30	-0.01	-0.03
HH contains at least one person with long-term health condition	57.3	53.0	59.9	-4.3	6.9
HH type has changed	-	-	-	21.8	19.3
Individual:					
Has long-term health condition that limits type of work possible	32.7	30.7	37.0	-2.0	6.3
Percent of previous financial year spent unemployed	10.7	12.7	10.5	2.0	-2.1
Annual Gross Earnings ($)	10,539.68	10,431.51	10,860.58	- 108.17	429.07
Annual Gross Earnings (imputed) ($)	10,931.44	10,575.23	11,202.55	- 356.21	627.32
Labour Market Assistance	18.7	20.1	17.2	1.5	-2.9
Disability Support Pension	17.8	20.0	22.3	2.2	2.2
Parenting Payment Single	11.0	11.7	11.2	0.8	-0.5
Parenting Payment Partner	12.7	11.1	10.5	-1.7	-0.6
Other welfare benefits	15.4	16.6	17.9	1.2	1.3
No welfare benefits	29.0	25.4	26.8	-3.6	1.4
Annual Welfare Income ($)	4,537.63	5,374.12	5,670.40	836.49	296.28
Annual Gross Income ($)	18,149.21	19,120.94	20,046.91	971.73	925.97
TPI	45.3	49.2	48.5	3.9	-0.7
Sample size (N)			**1,995**		

Note: Proportions are weighted using the longitudinal population weights constructed in HILDA.
"Annual Gross Income ($)" excludes any family tax benefits received.

Appendix E

Multivariate Regression Full Results

Table E.1: Profile of Payment Types for Pooled Data

	DSP	LMA	PPS	PPP	Other Welfare	Multiple Benefits
Ann Welfare Income ($)	8,801.8	5,731.4	8,147.5	5,309.0	6,493.9	12,586.5
Annual Gross Earnings ($)	3,078.9	10,313.1	9,271.9	7,530.9	10,881.6	3,128.1
Gross Income ($)	15,793.1	19,136.4	28,773.8	19,087.9	22,770.9	22,141.8
Age	49.0	43.0	37.7	35.8	47.3	42.9
Male	0.60	0.70	0.07	0.09	0.28	0.41
Married	0.51	0.50	0	1	0.81	0.53
Year 11 and below	0.48	0.38	0.39	0.37	0.48	0.44
Bachelor degree or more	0.06	0.12	0.10	0.13	0.10	0.07
General Health	39.7	64.3	69.9	74.5	63.2	54.0
Work Experience	0.60	0.71	0.58	0.58	0.60	0.59
Parents Divorced	0.22	0.25	0.35	0.26	0.17	0.23
Parents Divorced Before Age 18	0.16	0.19	0.30	0.20	0.11	0.18
Teen Parent	0.03	0.01	0.06	0.03	0.04	0.05

Note: See notes in Table 4 for definition of "Other Welfare." "Multiple Benefits" refers to any combination of DSP, LMA, PPS, PPP and Other Welfare.

Table E.2: Estimating the Persistence of the Level of *TPI* using a Partial Adjustment Model (OLS) for Pooled Data, by Benefit Type at *t*

	All	DSP	LMA	PPS	PPP	Other Welfare	Multiple Benefits
TPI (t-1)	0.3685***	0.4291***	0.4204***	0.5016***	0.2523***	0.5064***	0.3247***
	[0.0159]	[0.0301]	[0.0355]	[0.0386]	[0.0382]	[0.0341]	[0.0450]
Work experience	-0.3303***	-0.2167***	-0.2772***	-0.2940***	-0.5801***	-0.2161***	-0.2165***
	[0.0255]	[0.0406]	[0.0653]	[0.0556]	[0.0715]	[0.0556]	[0.0802]
Long term Health condition	0.1260***	0.0537	0.1055***	0.0602	0.0749	-0.0123	0.0544
	[0.0153]	[0.0336]	[0.0327]	[0.0376]	[0.0458]	[0.0297]	[0.0457]
General Health	-0.0006*	-0.0010**	-0.0008	-0.0003	0.001	-0.0001	0.0004
	[0.0003]	[0.0005]	[0.0008]	[0.0009]	[0.0010]	[0.0007]	[0.0009]
Mental Health	-0.0007*	0.0001	-0.0013	0.0005	0.0003	-0.0008	-0.0001
	[0.0004]	[0.0005]	[0.0009]	[0.0008]	[0.0011]	[0.0008]	[0.0009]
Male	-0.0049	0.0214	-0.0178	0.1637***	-0.0906	-0.0268	0.0292
	[0.0137]	[0.0218]	[0.0313]	[0.0523]	[0.0596]	[0.0334]	[0.0462]
Parents Divorced	0.0195	-0.013	-0.0089	-0.0486	0.1375*	-0.0973*	-0.0306
	[0.0271]	[0.0436]	[0.0607]	[0.0674]	[0.0720]	[0.0543]	[0.0761]
Parents Divorced Before Age 18	-0.024	0.0353	-0.0062	0.0434	-0.2162***	0.1137*	0.0232
	[0.0297]	[0.0490]	[0.0666]	[0.0706]	[0.0779]	[0.0660]	[0.0857]
Teen Parent	0.0124	-0.0018	-0.0861	0.0303	-0.1711*	0.0541	0.045
	[0.0349]	[0.0613]	[0.1250]	[0.0581]	[0.0886]	[0.0718]	[0.0830]
Age	-0.0036	0.0027	-0.0064	0.0046	-0.0279	-0.0118	0.0157
	[0.0046]	[0.0088]	[0.0090]	[0.0147]	[0.0191]	[0.0124]	[0.0145]
Age Squared	0.0001**	0	0.0001	-0.0001	0.0005*	0.0002	-0.0001
	[0.0001]	[0.0001]	[0.0001]	[0.0002]	[0.0003]	[0.0001]	[0.0002]
Married	-0.0682***	-0.0690***	-0.0057	0	0	0.0168	-0.0315
	[0.0127]	[0.0208]	[0.0313]	[0.0000]	[0.0000]	[0.0339]	[0.0343]
Children Aged 0-4	0.0605***	-0.0001	-0.0122	0.0402	0.1050***	0.0504	0.0055
	[0.0108]	[0.0386]	[0.0323]	[0.0253]	[0.0245]	[0.0326]	[0.0287]
Children Aged 5-14	0.001	0.0370**	-0.0037	-0.0134	0.0327*	-0.0549***	0.0021
	[0.0067]	[0.0162]	[0.0241]	[0.0151]	[0.0190]	[0.0154]	[0.0171]
Children Aged 15-24	-0.0258**	-0.0084	-0.0283	0.019	-0.0535	-0.0555***	-0.0638**
	[0.0104]	[0.0197]	[0.0254]	[0.0235]	[0.0327]	[0.0203]	[0.0285]
Diploma	0.0552**	-0.0148	0.0577	0.0764	0.2129***	-0.0222	0.0998
	[0.0270]	[0.0511]	[0.0694]	[0.0610]	[0.0670]	[0.0656]	[0.0916]
Certificate	0.0934***	0.0097	0.0625	0.1382***	0.2796***	0.0282	0.0099
	[0.0205]	[0.0428]	[0.0457]	[0.0465]	[0.0519]	[0.0481]	[0.0691]
Year 12	0.0916***	-0.0728	0.0896	0.0762	0.2018***	0.0452	0.0787
	[0.0256]	[0.0494]	[0.0608]	[0.0598]	[0.0645]	[0.0571]	[0.0846]
Year 11 and below	0.1399***	0.0788*	0.1103**	0.1260***	0.2221***	0.1078**	0.0767

	[0.0205]	[0.0413]	[0.0466]	[0.0469]	[0.0524]	[0.0475]	[0.0681]
Major City	-0.0361**	0.0062	0.005	-0.0342	0.0561	-0.1039***	0.0477
	[0.0170]	[0.0273]	[0.0408]	[0.0364]	[0.0449]	[0.0387]	[0.0483]
Inner Region	0.0042	-0.0041	0.0359	0.0099	0.0657	-0.0469	0.0132
	[0.0178]	[0.0272]	[0.0430]	[0.0386]	[0.0453]	[0.0418]	[0.0517]
Country of Birth (English speaking)	0.0197	0.1005***	0.0091	-0.0152	-0.0829	-0.0394	-0.0013
	[0.0202]	[0.0325]	[0.0442]	[0.0473]	[0.0675]	[0.0388]	[0.0652]
Country of Birth (Other)	0.0272	0.0439	-0.0094	0.0205	0.0556	0.1336***	0.1059*
	[0.0189]	[0.0340]	[0.0399]	[0.0449]	[0.0515]	[0.0395]	[0.0551]
Victoria	0.0052	0.0034	-0.0126	-0.0053	0.0896*	0.021	0.0139
	[0.0173]	[0.0286]	[0.0398]	[0.0385]	[0.0483]	[0.0358]	[0.0576]
Queensland	-0.0204	-0.0346	0.042	-0.0591*	0.0726*	-0.0504	-0.0386
	[0.0163]	[0.0269]	[0.0381]	[0.0355]	[0.0429]	[0.0378]	[0.0495]
South Australia	0.0041	0.0191	-0.0823*	-0.0052	0.0501	-0.0223	0.0368
	[0.0211]	[0.0322]	[0.0473]	[0.0472]	[0.0605]	[0.0456]	[0.0604]
Western Australia	0.0074	-0.024	0.0059	0.0081	0.0689	0.0777*	-0.0052
	[0.0213]	[0.0386]	[0.0498]	[0.0486]	[0.0538]	[0.0459]	[0.0612]
Tasmania	-0.0196	-0.0127	-0.0608	-0.0866	-0.0168	0.0181	-0.0205
	[0.0297]	[0.0394]	[0.0788]	[0.0718]	[0.0780]	[0.0719]	[0.0793]
Northern Territory	-0.1506*	0	-0.1409	0.1242	-0.3023	-0.2216	0
	[0.0834]	[0.0000]	[0.3069]	[0.1492]	[0.1834]	[0.1462]	[0.0000]
ACT	-0.0039	0.035	0.0105	0.3022**	-0.0192	0.0103	-0.3242**
	[0.0704]	[0.1357]	[0.3096]	[0.1363]	[0.2168]	[0.1591]	[0.1395]
Constant	0.4570***	0.4677**	0.5680***	0.3112	0.7501**	0.7442***	0.2012
	[0.1023]	[0.2138]	[0.2083]	[0.2949]	[0.3628]	[0.2749]	[0.3166]
Observations	3135	613	536	389	393	455	202
R-squared	0.44	0.49	0.45	0.58	0.5	0.63	0.45

Note: See notes in Table 4 for definition of "Other Welfare." "Multiple Benefits" refers to any combination of DSP, LMA, PPS, PPP and Other Welfare.
Standard errors in brackets
* significant at 10%; ** significant at 5%; *** significant at 1%

Table E.3: Estimating the Persistence of the Level of *TPI* using a Partial Adjustment Model (Tobit) for Pooled Data, by Benefit Type at *t*

	All	DSP	LMA	PPS	PPP	Other Welfare	Multiple Benefits
TPI (t-1)	0.5104***	0.5903***	0.5335***	0.5449***	0.3312***	0.6546***	0.4310***
	[0.0267]	[0.0521]	[0.0450]	[0.0431]	[0.0513]	[0.0465]	[0.0577]
Work experience	-0.5475***	-0.5494***	-0.3269***	-0.3405***	-0.7979***	-0.2814***	-0.3567***
	[0.0439]	[0.0813]	[0.0821]	[0.0623]	[0.0970]	[0.0753]	[0.1097]
Long term Health condition	0.2204***	0.0569	0.1274***	0.067	0.0719	0.0439	0.1140*
	[0.0258]	[0.0590]	[0.0407]	[0.0422]	[0.0607]	[0.0405]	[0.0603]
General Health	-0.0012**	-0.0022**	-0.0015	-0.0004	0.0007	0.0006	0.0006
	[0.0006]	[0.0009]	[0.0010]	[0.0010]	[0.0014]	[0.0010]	[0.0012]
Mental Health	-0.0013**	0.0004	-0.0014	0.0005	0.0004	-0.0014	-0.0008
	[0.0006]	[0.0009]	[0.0011]	[0.0009]	[0.0014]	[0.0011]	[0.0012]
Male	-0.0125	0.0086	-0.0336	0.2164***	-0.0817	-0.0213	0.0644
	[0.0233]	[0.0411]	[0.0389]	[0.0599]	[0.0753]	[0.0446]	[0.0618]
Parents Divorced	0.015	-0.0129	-0.0513	-0.0699	0.1828*	-0.1498**	-0.033
	[0.0456]	[0.0794]	[0.0747]	[0.0736]	[0.0944]	[0.0719]	[0.0990]
Parents Divorced Before Age 18	-0.0344	0.0589	0.0344	0.0738	-0.3064***	0.1659*	0.0173
	[0.0500]	[0.0906]	[0.0822]	[0.0774]	[0.1022]	[0.0873]	[0.1110]
Teen Parent	-0.0142	0.0444	-0.1273	0.0108	-0.2415**	0.0393	-0.025
	[0.0594]	[0.1262]	[0.1519]	[0.0654]	[0.1182]	[0.1001]	[0.1050]
Age	0.0008	0.0185	-0.0107	0.004	-0.0435*	-0.0076	0.0314
	[0.0078]	[0.0160]	[0.0112]	[0.0164]	[0.0261]	[0.0167]	[0.0193]
Age Squared	0.0001	-0.0001	0.0002	-0.0001	0.0007*	0.0001	-0.0003
	[0.0001]	[0.0002]	[0.0001]	[0.0002]	[0.0003]	[0.0002]	[0.0002]
Married	-0.1154***	-0.0885**	0.0053			0.0106	-0.0414
	[0.0216]	[0.0391]	[0.0391]			[0.0464]	[0.0453]
Children Aged 0-4	0.0934***	-0.0444	-0.0013	0.0511*	0.1463***	0.051	0.0174
	[0.0183]	[0.0655]	[0.0400]	[0.0288]	[0.0322]	[0.0433]	[0.0378]
Children Aged 5-14	-0.0131	0.0295	-0.0086	-0.0137	0.0252	-0.0713***	0.0007
	[0.0114]	[0.0290]	[0.0297]	[0.0171]	[0.0253]	[0.0202]	[0.0234]
Children Aged 15-24	-0.0493***	-0.0367	-0.0353	0.0236	-0.0821*	-0.0824***	-0.0734**
	[0.0176]	[0.0362]	[0.0313]	[0.0263]	[0.0418]	[0.0271]	[0.0368]
Diploma	0.0820*	0.047	0.0756	0.0914	0.2343***	-0.0439	0.1712
	[0.0451]	[0.0890]	[0.0843]	[0.0669]	[0.0843]	[0.0838]	[0.1217]
Certificate	0.1531***	0.0931	0.0711	0.1515***	0.3602***	0.0378	0.0359
	[0.0344]	[0.0760]	[0.0556]	[0.0509]	[0.0667]	[0.0621]	[0.0881]
Year 12	0.1448***	-0.054	0.1021	0.0887	0.2380***	0.0456	0.1329
	[0.0429]	[0.0859]	[0.0749]	[0.0658]	[0.0837]	[0.0747]	[0.1139]
Year 11 and below	0.2353***	0.2210***	0.1459**	0.1399***	0.2601***	0.1513**	0.112

	[0.0344]	[0.0740]	[0.0569]	[0.0516]	[0.0670]	[0.0614]	[0.0875]
Major City	-0.0642**	0.0145	0.0154	-0.0462	0.0746	-0.1317**	0.1046*
	[0.0289]	[0.0520]	[0.0509]	[0.0407]	[0.0590]	[0.0528]	[0.0633]
Inner Region	-0.0023	-0.0201	0.0506	0.0101	0.0897	-0.0482	0.0424
	[0.0305]	[0.0516]	[0.0538]	[0.0432]	[0.0591]	[0.0577]	[0.0671]
Country of Birth (English speaking)	0.0494	0.1747***	0.0226	-0.0333	-0.0959	-0.0132	-0.0134
	[0.0343]	[0.0629]	[0.0552]	[0.0521]	[0.0863]	[0.0521]	[0.0832]
Country of Birth (Other)	0.0393	0.0833	-0.0181	0.0228	0.1029	0.2097***	0.1255*
	[0.0320]	[0.0644]	[0.0495]	[0.0501]	[0.0683]	[0.0555]	[0.0755]
Victoria	0.0086	-0.0083	-0.0231	-0.022	0.1504**	0.056	-0.0578
	[0.0293]	[0.0527]	[0.0493]	[0.0428]	[0.0639]	[0.0488]	[0.0769]
Queensland	-0.0357	-0.0677	0.0338	-0.0737*	0.1136**	-0.0614	-0.071
	[0.0278]	[0.0500]	[0.0475]	[0.0397]	[0.0560]	[0.0505]	[0.0673]
South Australia	0.0034	0.0544	-0.1224**	-0.0031	0.1175	-0.0273	-0.0497
	[0.0357]	[0.0612]	[0.0588]	[0.0531]	[0.0797]	[0.0610]	[0.0794]
Western Australia	-0.0041	-0.0746	-0.0025	0.003	0.1033	0.1143*	-0.0569
	[0.0361]	[0.0713]	[0.0620]	[0.0545]	[0.0700]	[0.0629]	[0.0823]
Tasmania	0.0157	0.0395	-0.1017	-0.0851	0.0093	0.0488	-0.0296
	[0.0517]	[0.0790]	[0.0970]	[0.0808]	[0.1011]	[0.0999]	[0.1096]
Northern Territory	-0.1704		-0.1345	0.1485	-0.3492	-0.214	
	[0.1391]		[0.3671]	[0.1662]	[0.2273]	[0.1849]	
ACT	-0.0383	-0.1273	0.0009	0.3679**	-0.0632	0.0937	-0.4392**
	[0.1160]	[0.2219]	[0.3701]	[0.1642]	[0.2675]	[0.2131]	[0.1719]
Constant	0.4221**	0.2807	0.7112***	0.3485	1.1296**	0.6935*	-0.0643
	[0.1739]	[0.3858]	[0.2586]	[0.3322]	[0.4908]	[0.3708]	[0.4142]
Observations	3135	613	536	389	393	455	202

Note: See notes in Table 4 for definition of "Other Welfare." "Multiple Benefits" refers to any combination of DSP, LMA, PPS, PPP and Other Welfare.
Standard errors in brackets
* significant at 10%; ** significant at 5%; *** significant at 1%

Table E.4: Multinomial Logit Regression to Estimate Welfare Payment Persistence (Dependent Variable: Welfare Payment Type in Wave 3)

	DSP	LMA	PPS	PPP	Other Welfare	Multiple Benefits
DSP (wave2)	4.394**	-1.495	-1.038	-33.577	0.239	2.095**
	[8.605]	[1.349]	[0.705]	[0.000]	[0.424]	[3.665]
DSP (wave1)	-0.051	-2.246*	-1.102	-34.701	-0.165	0.837
	[0.095]	[2.014]	[0.938]	[0.000]	[0.325]	[1.459]
LMA (wave2)	-0.652	1.316**	-1.512*	-1.359**	-0.115	0.772
	[1.368]	[6.020]	[2.108]	[2.632]	[0.331]	[1.866]
LMA (wave1)	-0.994*	-0.457*	-1.263*	-1.492**	-1.460**	0.124
	[2.185]	[2.046]	[2.115]	[3.477]	[3.859]	[0.319]
PPS (wave2)	0.668	-0.046	4.745**	1.111*	0.519	3.380**
	[0.584]	[0.063]	[9.717]	[2.219]	[0.829]	[5.851]
PPS (wave1)	-1.778	-0.497	-0.474	-0.976*	-0.965	0.061
	[1.546]	[0.810]	[1.040]	[2.083]	[1.744]	[0.115]
PPP (wave2)	-1.358	-1.634**	-0.922	0.008	-0.288	0.870*
	[1.678]	[2.913]	[1.924]	[0.034]	[0.886]	[2.063]
PPP (wave1)	-1.372*	-1.590**	-1.682**	-1.185**	-1.447**	-0.705
	[2.244]	[3.533]	[3.985]	[4.893]	[4.514]	[1.662]
Other welfare (wave2)	-0.174	-0.745	0.313	-0.807	2.008**	2.408**
	[0.389]	[1.837]	[0.667]	[1.785]	[7.800]	[6.792]
Other welfare (wave1)	-0.896*	-0.44	-1.339**	-1.096**	0.442	0.212
	[2.045]	[1.311]	[2.659]	[2.679]	[1.698]	[0.604]
Work experience	-1.908**	-1.553**	-0.303	-1.123**	-1.347**	-1.619**
	[3.148]	[3.563]	[0.545]	[2.577]	[2.988]	[3.047]
Long Term Health Condition	1.974**	0.226	0.559	0.214	0.358	0.796*
	[4.965]	[0.973]	[1.529]	[0.747]	[1.411]	[2.479]
General Health	-0.019*	0.006	0.015	0.015*	0.004	-0.013
	[2.460]	[0.983]	[1.744]	[2.255]	[0.585]	[1.770]
Mental Health	-0.006	-0.014*	-0.031**	-0.021**	-0.019**	-0.022**
	[0.751]	[2.229]	[3.597]	[3.135]	[3.024]	[2.870]
Male	0.01	0.751**	-1.024*	-1.402**	-0.647*	0.179
	[0.029]	[3.414]	[2.384]	[4.041]	[2.451]	[0.537]
Parents Divorced	0.301	-0.308	0.862	0.471	-0.294	0.144
	[0.467]	[0.687]	[1.398]	[1.010]	[0.586]	[0.248]
Parents Divorced Before Age 18	-0.317	-0.339	-0.538	-0.625	-0.083	-0.381
	[0.441]	[0.696]	[0.804]	[1.225]	[0.147]	[0.598]
Teen Parent	-0.59	-0.145	0.369	0.703	-0.095	0.296
	[0.633]	[0.164]	[0.499]	[1.086]	[0.143]	[0.432]

Age	0.024	-0.078	0.224	0.171	-0.079	-0.075
	[0.198]	[1.151]	[1.558]	[1.473]	[0.857]	[0.726]
Age Squared	0	0.001	-0.003	-0.002	0.002	0.001
	[0.202]	[1.609]	[1.567]	[1.529]	[1.561]	[0.949]
Children Aged 0-4	-0.101	-0.364	0.521*	0.905**	0.153	0.523*
	[0.255]	[1.774]	[2.153]	[5.833]	[0.742]	[2.448]
Children Aged 5-14	-0.012	-0.423**	0.396**	0.227*	0.117	0.247
	[0.057]	[2.836]	[2.713]	[2.031]	[1.027]	[1.750]
Children Aged 15-24	-0.264	-0.023	0.513*	0.28	-0.032	0.028
	[1.030]	[0.131]	[2.223]	[1.511]	[0.183]	[0.123]
Diploma	0.615	-0.415	0.682	-0.163	0.239	0.591
	[0.880]	[0.967]	[1.155]	[0.372]	[0.509]	[0.863]
Certificate	0.286	0.267	0.042	0.509	0.702	0.92
	[0.501]	[0.907]	[0.090]	[1.563]	[1.955]	[1.737]
Year 12	1.165	0.274	0.813	0.517	1.060*	1.246*
	[1.774]	[0.701]	[1.389]	[1.287]	[2.497]	[1.998]
Year 11 and below	0.481	0.463	0.83	0.804*	0.979**	0.986
	[0.847]	[1.540]	[1.769]	[2.433]	[2.741]	[1.851]
Major City	0.226	-0.646*	-0.659	-0.600*	-0.201	0.112
	[0.501]	[2.166]	[1.676]	[2.034]	[0.636]	[0.297]
Inner Region	0.331	-0.599	-0.25	-0.259	-0.208	0.436
	[0.703]	[1.879]	[0.610]	[0.852]	[0.619]	[1.086]
Country of Birth (English speaking)	0	-0.103	-0.506	0.397	0.471	-0.427
	[0.000]	[0.314]	[0.979]	[1.058]	[1.415]	[0.829]
Country of Birth (Other)	-0.303	-0.321	-0.097	0.780*	-0.245	-0.723
	[0.627]	[1.109]	[0.210]	[2.519]	[0.758]	[1.563]
Victoria	0.116	0.058	0.131	-0.257	0.277	0.154
	[0.276]	[0.208]	[0.325]	[0.848]	[0.942]	[0.379]
Queensland	-0.099	-0.162	-0.05	0.181	-0.062	0.129
	[0.243]	[0.609]	[0.134]	[0.668]	[0.212]	[0.353]
South Australia	0.085	0.355	0.914	0.773*	-0.247	0.717
	[0.156]	[1.013]	[1.799]	[2.078]	[0.625]	[1.550]
Western Australia	-0.903	-0.027	0.464	0.035	-0.076	0.415
	[1.618]	[0.078]	[0.949]	[0.097]	[0.200]	[0.911]
Tasmania	0.24	0.147	0.94	0.354	-0.049	0.566
	[0.317]	[0.268]	[1.402]	[0.715]	[0.083]	[0.875]
Northern Territory	-33.659	-0.289	-2.429	-1.39	1.699	-34.949
	[0.000]	[0.231]	[1.519]	[1.041]	[1.791]	[0.000]
	1.503	0.55	0.605	-0.509	-0.661	0.136

ACT						
	[1.137]	[0.464]	[0.443]	[0.427]	[0.552]	[0.100]
Constant	-1.894	2.307	-5.559	-2.863	0.767	-0.595
	[0.660]	[1.500]	[1.869]	[1.268]	[0.377]	[0.260]
Observations	1801	1801	1801	1801	1801	1801

Note: See notes in Table 4 for definition of "Other Welfare." "Multiple Benefits" refers to any combination of DSP, LMA, PPS, PPP and Other Welfare. Coefficients shown with absolute value of z statistics in brackets. The omitted group are those not on welfare in wave 3.

Table E.5: Fixed Effects Panel Regressions (Dependent Variable: *TPI*)

	All	Males	Females
Age	-0.0767***	-0.0909***	-0.0657***
	[0.0175]	[0.0252]	[0.0252]
Age Squared	0.0010***	0.0012***	0.0009***
	[0.0002]	[0.0003]	[0.0003]
Married	-0.0491**	-0.0629*	-0.0358
	[0.0233]	[0.0354]	[0.0311]
Household Persons	0.0052	0.0109	0.0019
	[0.0086]	[0.0114]	[0.0128]
Household Persons Aged 0-4	0.0397**	0.0000	0.0570***
	[0.0160]	[0.0270]	[0.0201]
Long Term Health Condition in HH	0.0282*	0.0278	0.0271
	[0.0148]	[0.0225]	[0.0196]
Long Term Health Condition Limits Work	0.0477***	0.0603**	0.0415
	[0.0184]	[0.0259]	[0.0257]
Constant	1.6875***	1.9591***	1.4868***
	[0.3777]	[0.5872]	[0.5156]
Observations	5985	2379	3606
R-squared	0.02	0.03	0.01

Standard errors in brackets
* significant at 10%; ** significant at 5%; *** significant at 1%

Appendix F

Measuring *TPI* and *TPI* Changes and the Size of the Window

TPI is calculated as the ratio of welfare income to total income in the previous financial year. In our analysis in this report, for measuring changes in *TPI* over time, we used a one-year window based on the HILDA wave/financial year definitions. Wave 1 is from July 1, 2000 to June 30, 2001; Wave 2 is from July 1, 2001 to June 30, 2002; and Wave 3 is from July 1, 2002 to June 30, 2003. Given these arbitrary windows, there may be concern that the changes in *TPI* that are captured by our analyses are not genuine changes but instead artifacts generated by our choice of window. For example, suppose that we measure a person's *TPI* changes using different windows. How will the choice of window affect the distribution of *TPI*? Will it also affect the measurement of *TPI* changes?

Before we answer this question, let us first recall the motivation behind the use of *TPI* as a measure of dependence. In many studies, the most common definition of welfare dependence focuses on the length of individual welfare spells, with longer spells taken as representing greater dependence. Many studies focus on the length of the first welfare spell and benefits received during that spell. Unfortunately, this measure does not account for re-entry into welfare. Since re-entry rates are high, it is essential to move to a measure of dependence that captures the effect of multiple spells of welfare receipt. Given large movements on and off welfare, if detailed spell data are available, techniques are being developed to analyse multiple spells (e.g., Stevens 1999). An alternative way to account for multiple spells is a measure of welfare dependence that measures an individual's total time on welfare (*TTO*) and total proportion of income from welfare (*TPI*) in a fixed time interval (Gottschalk and Moffitt 1994). According to these measures, individuals or families who spend a greater fraction of time on welfare or derive a greater income from welfare are defined as more dependent. The definition of *TTO* and *TPI* ignores whether a given total amount of time is composed of a small number of long spells or a large number of short spells. Individuals with short spells may be less dependent than individuals with long spells according to *TPI* even though they have the same value of *TTO*. For example, individuals with short spells may have more human capital and better opportunities and hence are "better off" than those with long spells. Their superior opportunities might be the probable cause of their frequent moves off the rolls. Furthermore, the damage caused by many small spells on welfare will not, in principle, be the same as that caused by few long spells on welfare. Notwithstanding these issues, the question remains, how does one define the 'fixed time

interval' used to measure *TPI*? This issue has to our knowledge not been addressed adequately in the literature.

In our first example, we consider a person who cycles between welfare and full-time employment over a 12 month period and who has 2 spells of welfare during that period. Let E represent employment, where earnings are $1000 and W represent welfare, where benefits are $500.

Table F.1: Exploring the Use of Different *TPI* Windows

Month	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
Status	E	E	W	W	E	E	E	W	W	W	E	E
TPI in a 1 month window	0.00	0.00	1.00	1.00	0.00	0.00	0.00	1.00	1.00	1.00	0.00	0.00
TPI in a 2 month window	0.00		1.00		0.00		0.33		1.00		0.00	
TPI in a 3 month window	0.20			0.20			0.50			0.20		
TPI in a 4 month window	0.33				0.14				0.33			
TPI in a 6 month window	0.20						0.33					

Using a 1 month window, we see in Table F.1 large changes in *TPI* (from 0 to 1) as the person cycles on and off welfare. Although an analysis of *TPI* levels in any one month (i.e., a cross-section) would be meaningful (e.g., Barr and Hall 1981), an analysis of *TPI changes* using a 1 month window might be misleading as it could be sensitive to factors that are spuriously related to these volatile spikes in *TPI*. As we increase the size of the window, changes in *TPI* are not as volatile and arguably more accurately reflect the true state of affairs: the person is someone who is partially dependent on welfare trying to find stable employment and not someone who is heavily dependent on welfare (as a *TPI* value of 1 would suggest) or completely self-sufficient (as a *TPI* value of 0 would suggest). The point here is that the bimodal distributions of *TPI* in Figures 4a-4c (with bunching around 0 and around 1) could easily be the artifact of the chosen window size. But as we can see, the wider the time interval used for the window, the less likely we expect to find such a spurious bimodal distribution. The choice we make in this report is one made on pragmatic grounds as it balances between shorter windows (with high volatility and many observation points) and longer windows (with lower volatility and fewer observation points). Given that HILDA is an annual survey, the shortest window we can define is a one-year window. The alternative option of using two or three year windows would deprive us of studying any *TPI* dynamics in HILDA given that we are using only 3 waves of data. The recent U.S. Annual Report to Congress on indicators of welfare dependence (2005) also used a one-year window to define *TPI*. This important research question will only be answered by using considerably longer panel data.

A related question concerns the choice of starting and ending points for our window. Since we do not observe the first time a person becomes a welfare recipient, the so-called 'initial conditions' problem arises. The initial conditions problem arises when the start of the observation period does not coincide with the start of the stochastic process generating a person's welfare experiences. While we do not solve the initial conditions problem in our multivariate analysis, we believe that using a larger window helps to mitigate the problem of observing people in different phases of their stochastic process for *TPI*.

For example, suppose that there are several individuals who both move on and off welfare in exactly the same fashion, except that they do so in a different time sequence. Table F.2 depicts such a scenario. Person B is a replica of person A, with all observations moved one period forward. Similarly, person C is a replica of person B, and person D a replica of person C (so person D is really person A but 3 months ahead in terms of the stochastic process). How will the choice of window affect the measurement of *TPI* changes, given that we do not observe the start of the stochastic process generating a person's welfare experiences?

Just as in the example in Figure F.1, we see that when using a small interval like a 2 month window, there is a lot of artificial variation in *TPI*, even though persons A to D are essentially the same person. However, when using a larger window like 6 months, both the mean and the variance are reduced. The point here is that our use of a relatively large one-year window for measuring *TPI* changes should help reduce any bias that might result from the initial conditions problem.

Table F.2: Initial Conditions and Different *TPI* Windows

Month	1	2	3	4	5	6	7	8	9	10	11	12
Person A	E	E	W	W	E	E	E	W	W	W	E	E
Person B	E	W	W	E	E	E	W	W	W	E	E	E
Person C	W	W	E	E	E	W	W	W	E	E	E	W
Person D	W	E	E	E	W	W	W	E	E	E	W	W
TPI in a 2 month window	0.00		1.00		0.00		0.33		1.00		0.00	
	0.33		0.33		0.00		1.00		0.33		1.00	
	1.00		0.00		0.33		1.00		0.00		0.33	
	0.33		0.00		1.00		0.33		1.00		0.00	
TPI in a 3 month window	0.20			0.20			0.50			0.20		
	0.50			0.00			1.00			0.00		
	0.50			0.20			0.50			0.20		
	0.20			0.50			0.20			0.50		

TPI in a 4 month window	0.33	0.14	0.33
	0.33	0.33	0.14
	0.33	0.60	0.14
	0.14	0.60	0.33
TPI in a 6 month window	0.20	0.33	
	0.20	0.33	
	0.33	0.33	
	0.33	0.33	

The examples used in this appendix are deliberately simple. Future research using Monte Carlo simulations could further generalise the result of optimal choice of window size, which would be a useful addition to the literature relating to *TPI*.