Final Report

How Does the Level of Employment Affect the Level of Income Support Receipt?

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Final report prepared for the Australian Government Department of Education, Employment and Workplace Relations under the Social Policy Research Services Agreement

June 2008

THE UNIVERSITY OF MELBOURNE

MELBOURNE INSTITUTE of Applied Economic and Social Research

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Executive summary

Background and objectives:

- This study estimated the effect of labour market conditions, as measured by the total and full-time employment rates, on the levels of receipt of unemployment benefits (UB), disability support pensions (DSP) and sole parent pensions (SPP).
- Two approaches were used to estimate the effects. First, we used the aggregate data on the recipient stock to estimate the effect of the employment rate on the receipt rate directly. Second, we examined the effects of the employment rate on the inflows and outflows of recipients first, and then used the stock-flow accounting relationship to simulate the effect of the employment rate on the receipt level.
- To reflect gender differences in the labour market, the effects were estimated separately for male and female recipients using gender-specific variables on labour market conditions.

Main results:

- Estimation results suggest that labour market conditions affect (i) the UB receipt rates for both males and females, (ii) the DSP receipt rates for males and (iii) the SPP receipt rates for females. These results hold using both measures of total employment rate and the full-time employment rate as a reflection of labour market conditions.
- The effect of labour market conditions on UB receipt rates lasts for a shorter period of time than the effect on SPP receipt rates. The effect on DSP receipt rates appears to last the longest among the three payments examined.
- Stock-flow estimation results suggest that an improvement in labour market conditions, as measured by an increase in the employment rate, is likely to reduce the entry and continuation rates of the typical recipient and thus drive down the income support receipt level.

- Despite the theoretical appeal of the stock-flow modelling approach, the estimated effects derived from this model of the employment rate on the three different types of receipt rates are much smaller than the effects derived using the aggregate data model. This result holds for all three payment types.
- We believe that the lack of sufficient variation in the data that measure the labour market conditions, may have led to an underestimation of the effects of labour market conditions on the flows. This in turn would lead to the under-estimation of the effect on the receipt level, which would explain the differences between the aggregate data and flow data modelling results. To test this hypothesis we would need flow data on income support recipients that cover a much longer period than are currently available.

1. Introduction

This study examines how changes in labour market conditions as measured by the level of employment affect the number of income support recipients. It focuses on the payment types: unemployment benefits (UB), Disability Support Pension (DSP) and Sole Parent Pension (SPP). The results of the project would be useful for forecasting models that evaluate the effects on the number of income support recipients of policies aimed at increasing the level of employment, or improving labour market conditions. The project results would also be useful for understanding how the recent changes in labour market conditions have influenced the number of income support recipients or the level of income support receipt.

The term unemployment benefit (UB) used here does not refer to a single payment type. We use UB to refer to all payments that relate to unemployment. They include: Unemployment Benefit (prior to July 1991), Job Search Allowance (from January 1988), Newstart Allowance (from July 1991), non-student Youth Training Allowance (from July 1998) and the Mature Age Allowance (from March 1994). Similarly, DSP also refers to the Invalid Pension paid before 1991. By Sole Parent Pension (SPP), we refer to the Widow's Pension Class A (prior to July 1973), Supporting Mother's Benefit (commenced 3 July 1973), Supporting Parent's Benefit (commenced 10 November 1977), Sole Parent Pension (before 1 March 1989) and the Parenting Payment (Single) (from 1 March 1998). Although males became eligible for SPP in the 1970s, because the number of male SPP recipients was small, only female SPP recipients are included in this study.

The level of employment, or labour market conditions in general, affects the number of income support recipients through the effect on individuals' decisions to take up a payment (income support entry) and to leave a payment (income support exit). Individuals' decisions on entry into and exit from income support are affected by changing labour market conditions because these alter the opportunity costs of income support participation. For example an improvement in labour market conditions increases the opportunity cost of receiving income support, because in a booming economy both the probability of finding a job and the potential earnings from employment are higher than in a weaker labour market. As a result, one would expect an improvement in labour market conditions to lead to a decrease in the probability of entering income support and to an increase in the probability of exit from payments,

thus contributing to reductions in the number of income support recipients and the level of income support receipt.

Depending on data availability, we use two approaches to examine the effect of labour market conditions (as represented by the employment rate) on the level of income support receipt. First we use aggregate recipient stock data to estimate the effect of labour market conditions on the level of income support receipt directly. Second we use the relationship between the recipient stock and flows to assess the effect of labour market conditions on the level of income support receipt indirectly. Each approach has its advantages and disadvantages, as will be discussed in detail later.

This report is organised as follows. Section 2 presents a stylised model of welfare participation to illustrate how labour market conditions can affect the level of welfare receipt. Section 3 provides an overview of the methods used in our analysis. Section 4 discusses the method used to analyse aggregate data and presents the estimation results. Section 5 describes the stock-flow modelling approach, the data used to estimate the model, and the estimation results. Section 6 sets out our conclusions.

2. A stylised model of welfare participation

To motivate the study, in this section we describe a stylised and thus simplified model of welfare participation. Using the model we illustrate how individuals' welfare participation decisions can be affected by labour market conditions.

Suppose a population consists of only two groups of individuals at a given time: those who are not employed and are thus on welfare, and those who are working and are thus not on welfare.[1] At any point in time those who are employed face two contingencies for the next period: they will either be still at work or they will have stopped working and will have gone onto welfare. We denote the decision faced by the group in employment as the 'welfare entry decision' which can have the two outcomes: entry or no entry. Similarly, those who are on welfare payments also face two contingencies for the following period: staying on welfare or leaving welfare for

[1] In reality there are more groups than the two outlined here, such as those who are neither employed nor on welfare, and those who combine work and welfare. The model described simplifies such complications to illustrate the key argument on how welfare participation and labour market conditions may be related.

work. We denote their decision as the 'welfare exit decision', which can also have two outcomes: exit or no exit. Labour market conditions may affect both decision processes, and in turn they may influence the number of people on welfare (or the level of welfare receipt).

Take those who are employed this period and who are faced with a welfare entry decision for the next period: they will compare the expected utility of the two options they face. If they think they will be worse off continuing to work than entering welfare, an employed individual will leave employment and enter welfare participation. Otherwise, the person will continue in their employment.[2] The expected utility of continuing to work depends on the probability of being employed in the next period, the income associated with employment and the income associated with being on a welfare payment.[3] The expected utility of entering welfare is determined by the income associated with being on welfare in the next period. Labour market conditions may affect this decision process by affecting the probability of staying in employment, and also the likely income associated with employment in the next period. When labour market conditions improve in a booming period, the probability of staying in employment is high, because of increased labour demand. The income associated with employment may also be high because increases in labour demand bid up wages. On the other hand, welfare benefits are normally predetermined by public policies and are unlikely to respond to changing labour market conditions in the short term. On balance, the income associated with being on welfare is unlikely to change when labour market conditions change. As a result, an improvement in labour market conditions is assumed to raise the expected utility of continuing to work, which consequently reduces the relative attractiveness of welfare and results in a lower probability of transition from employment into welfare. When labour market conditions deteriorate in a downturn in the economy, the probability of keeping employment is lower and the income from employment may also fall. These factors

[2] It should be noted that this is an abstract model which describes possible states and transitions, completely abstracting from the probability that these states may be realised. Clearly, in the real labour market, few people leave their employment in order to enter benefit. For an exit from employment to happen, something new has usually happened. This may be a change in the circumstances of the employee (e.g. a family member started needing care), or it may be a change in the labour market (e.g. product demand decreased and layoffs followed). It should be stressed that the model presented here has to include all possibilities (for reasons of logical consistency and completeness) and the statistical estimations will inform us about those possibilities that are most likely to happen according to our data.
[3] The expected utility should also depend on personal characteristics, but again the model abstracts from this complication.

both drive down the expected utility of continuing to work and thus increase the relative attractiveness of welfare participation.

To present the above ideas in a slightly formal way, let $E_t[V(e_{t+1})]$ denote the expected utility at time *t* of someone who intends to continue working in the next period *t+1*. This can be written as

$$E_t[V(e_{t+1})] = P(lm_{t+1}, x_{t+1})U[I(lm_{t+1}, x_{t+1}), L_e] + [1 - P(lm_{t+1}, x_{t+1})]U[W(x_{t+1}), L_n]$$

where *P(.)* is the probability of staying in employment at *t+1*, which depends on labour market conditions lm_{t+1}, and individual characteristics x_{t+1} at *t+1*. [4] Term *U(.)* denotes an individual utility function, the level of which depends on income and leisure. $I(lm_{t+1},x_{t+1})$ refers to income associated with employment, which depends on labour market conditions and individual characteristics. Labour income *I* depends on labour market conditions because wages are affected by labour demand. $W(x_{t+1})$ refers to the level of welfare income and is assumed to depend on individual characteristics only (e.g. marital status and the presence of young children). L_e and L_n are two different levels of leisure time enjoyed by the individual, dependent on whether one is employed or unemployed respectively.

The expected utility of being not employed at period *t+1* (denoted by $E_t[V(n_{t+1})]$) depends on the level of welfare income and the amount of leisure time associated with unemployment, that is, $E_t[V(n_{t+1})] = U[w(x_{t+1}), L_n]$.

Clearly, if the expected utility of being employed exceeds that of being unemployed (i.e. $E_t[V(e_{t+1})] > E_t[V(n_{t+1})]$), an individual would prefer to be in employment during the next period. Since $\frac{\partial P(.)}{\partial lm} \geq 0$, $\frac{\partial U(.)}{\partial I} \geq 0$ and $\frac{\partial I(.)}{\partial lm} \geq 0$ hold, an improvement in labour market conditions increases $E_t[V(n_{t+1})]$ and thus the probability that $E_t[V(e_{t+1})] > E_t[V(n_{t+1})]$ will also hold. Consequently an improvement in labour market conditions would reduce the probability of welfare entry. On the contrary, a

[4] Even if people choose to continue working for the next period, they still face the possibility that they may lose their jobs for reasons out of their own control, e.g. being laid off.

deterioration of labour market conditions reduces $E_t[V(n_{t+1})]$ and increases the probability of welfare entry.

When those who are on welfare make an exit decision, they also compare the expected utility associated with the two options they face. If the expected utility of staying on welfare is less (more) than the expected utility of leaving welfare for work, individuals will be more (less) likely to exit welfare. The expected utility of staying on welfare is determined by the level of welfare income, which, as mentioned above, is unlikely to be affected immediately by labour market conditions. The expected utility of leaving welfare for work is determined by the probability of finding a job in the next period, the income associated with the job, and the income from being on welfare. Again, labour market conditions affect both the probability of finding a job and the income associated with the job in the next period, but not welfare income. When labour market conditions deteriorate in a recession, the probability of finding a job is lower because labour demand is falling. In addition, low labour demand drives down wages, implying that the income associated with employment is relatively low, even if an individual can find a job. That is, when labour market conditions worsen, the expected utility of leaving welfare for work decreases. Given that income on welfare does not respond to changes in labour market conditions, worsening labour market conditions reduce the probability of welfare recipients leaving welfare. A similar line of argument suggests that an improvement in labour market conditions will increase the probability of exits from welfare. This verbal description of the welfare exit decision can be presented formally in a similar way to the welfare entry decision, as described above. We do not present it here to preserve space.

In summary, the stylised model indicates that when labour market conditions improve, both the probability of entering welfare and the probability of staying on welfare fall, leading to decreases in the number of welfare recipients. On the contrary, deteriorating labour market conditions would cause the probability of welfare entry to rise, and the probability of welfare exit to decrease, thus resulting in an increase in the number of welfare recipients. This model allows an alternative method of understanding the data. It shows that, in principle, when we observe better labour market conditions (that is, when the employment stock increases) these will be accompanied by weaker flows into welfare and stronger flows out of welfare. It also shows that when we observe worse labour market conditions (that is, when the

employment stock decreases) these will be accompanied by stronger flows into welfare and weaker flows out of welfare. This type of models is of great practical value, as it allows us to test hypotheses involving better or worse labour market conditions by using either stock data or flow data.

The stylised model outlined above treats all payment types as if they were a single welfare program. Because of the differences in eligibility criteria and other features across payment types, the decision process will differ for different payments. However in terms of theoretical arguments regarding the effect of the changing labour market on individuals' income support participation decisions, the stylised model should apply to all payment types that are targeted at the working-age population.

3. Overview of methods

The number of income support recipients can increase solely because of population growth. To control for the effect of this, we use the receipt rate as the dependent variable in the analysis. The receipt rate for a particular welfare payment is defined as the number of recipients of the payment per 100 of the working-age population. For males, the working-age population refers to those aged 16 to 64 (inclusive) years; for females it is those aged 16 to 59 years.

In this study we use the employment rate as the measure of labour market conditions. Some studies use the unemployment rate, but it is closely correlated with the employment rate.[5] Alternative employment rate measures are used here. The total employment rate is defined as the number of persons employed (full-time or part-time) per 100 of the working-age population; the full-time employment rate is defined as the number of persons employed full-time per 100 of the working-age population. We use these two measures because, as shown later, the two rates do not always move in the same direction, and there is an argument suggesting that the full-time employment rate might be a better reflection of the true labour market situation.

Depending on data availability, we take two basic approaches to examine how labour market conditions affect the level of income support receipt. First we use national

[5] There is also a practical reason for using the employment rate. As stated in the project description, the objective is to examine how the level of employment affects the number of income support recipients.

aggregate time-series data on the number of recipients (the stock) to assess the effect of labour market conditions on the receipt rate of a payment directly. Then we use administrative data to estimate first how labour market conditions affect the inflows and outflows of recipients, and then using the stock-flow accounting relationship we assess the effect of labour market conditions on the receipt rate indirectly. Each approach has its advantages and disadvantages, as will be discussed in detail shortly.

The number of income support recipients at any time is the result of previous inflows and outflows. Labour market conditions and other determinants of welfare participation affect the number of recipients (or the stock) indirectly through their impacts on those flows. In addition, because recipients may include persons who just commenced the payment, as well as others who commenced long ago, the current number of recipients is not simply affected by present labour market conditions, but may also be affected by past labour market conditions, possibly those of many years ago. Therefore, an ideal framework for analysing the effect of labour market conditions on the number of recipients is a dynamic stock-flow framework, where the effects of labour market conditions on inflows and outflows are first estimated and the accounting identity between the stock and flows is then used to estimate the impact of labour market conditions on the number of recipients (Klerman and Haider, 2004; Haider et al., 2002).

In Section 5 of this report we undertake the stock-flow approach to assess the effect of labour market conditions on the receipt rate. Although this modelling approach has theoretical appeal, there is a disadvantage arising from data availability. The data that can be used to derive the flows of recipients are the administrative record data on income support recipients from January1995 to February 2006. During this period the Australian economy experienced (almost) uninterrupted growth. Labour market conditions were continuously improving as seen both from the total employment rate and the unemployment rate, or they varied little when the full-time employment rate is considered (see Section 3). The variations of labour market conditions across geographic regions may help to identify the effects of the employment rates on the flows of income support recipients. However since Australia is a relatively homogenous economy, variations of labour market conditions across regions may not be substantial. As a result, the effect of labour market conditions on the flows, and thus on the receipt rate, may not be detected or accurately estimated by using the

short-period administrative data. A longer data period covering multiple business cycles would be very useful for such purposes, but flow data for a longer period, even at the national aggregate level, are not available.[6]

To complement the stock-flow approach, in Section 4 we use national aggregate data on the recipient stock to examine the effect of labour market conditions on the receipt rate directly. The data used for this approach cover the period 1965 to 2004. In addition to the fact that the data contain multiple business cycles, and thus more variations in labour market conditions, the modelling approach used is simple and easily understood. The interpretation of the results is also straightforward. Similar models have been used in the United States to examine the effects of labour market conditions on the recent decline in the number of recipients on the Aid for Families with Dependent Children (AFDC) program (see Haider et al., 2002; Ziliak et al., 2000) and the references therein). We need to keep in mind that this estimation approach is *ad hoc* and does not have a theoretical basis.

4. Analysis using aggregate stock data

4.1. Data sources

The receipt rates of UB, DSP and SPP are the dependent variables examined in this section. To calculate the receipt rates, we collected the annual numbers of recipients of these payments for the period 1965 to 2004 (inclusive). Data are mainly from publications of the social security administrative authorities, such as the Department of Family and Community Services (FaCS) and the Department of Families, Community Services and Indigenous Affairs (FaCSIA). The major data sources on the numbers of income support recipients are the *Income Support Annual Data Base (Edition 1.1) 1901–1999* (FaCS, 2000)[7], and the *Characteristics of Disability Support*

[6] Providing input for forecasting models is one of the major objectives of this research project. Even if flow data were available for earlier years, the structural relationship between labour market conditions and income support receipt might have changed. As a result estimates using earlier data may not be very useful for the purpose of forecasting the number of income support receipts.

[7] The database was compiled by Kim Bond in the Social and Economic Analysis Section, Strategic Policy and Analysis Branch of FaCS in 2000. The database covers the number of people receiving, and the expenditure on, income support payments since 1909–10, estimates of States' payments of age and invalid pensions from 1900–01 to 1908–09 and widows' pensions from 1925–26 to 1941–42, War and Service Pension recipients from 1915–1999, student assistance since 1951 and payments to Aboriginal

Pension Customers: June 2004 (FaCS, 2004). The raw data on the numbers of recipients on UB, DSP and SPP can be found in Appendix Table A1. The notes to the table provide further information on the data sources.

Although our interest is in the relationship between the level of employment and the number of income support recipients, the dependent variables and the labour market condition variables are normalised by the size of the working-age population. This is to control for the effect of population growth on the number of income support recipients and employment growth. That is, instead of using the number of income support recipients as our dependent variable, we use the receipt rate (the number of recipients per 100 of the working-age population) as the dependent variable. To calculate the receipt rate, we collected data on the working-age population from the ABS publication *Population by Age and Sex, Australian States and Territories* (ABS, various years).

To construct the two employment rates (total employment and full-time employment), we collected data on the number of persons employed (including part-time and full-time) mainly from the ABS publication, *Labour Force, Australia* (ABS, various years). Male and female UB and DSP recipients are analysed separately using gender-specific employment rates.

In addition, we use the ratio of income support payments to average weekly earnings, usually called the replacement rate, to control for the opportunity costs of income support participation.[8] For such a purpose, we need to collect data on allowances and pension rates, and average weekly earnings for males and females respectively. We use the maximum payment rate for a single person to represent the payment level. We collected the maximum single pension and allowance rates from the publications of the social security administrative authorities. For average weekly earnings by gender, we rely on the ABS publication *Average Weekly Earnings, Australia* (ABS, various years).

Communities in lieu of income support (under the Community Development Employment Projects program) since 1975. It also includes a range of useful annual demographic and economic data.

[8] Given the preponderance of low-skilled income support recipients, average earnings may overstate their opportunity costs. A preferred measure would be something like minimum wages, but we could only obtain data on minimum wages for the most recent few years.

4.2. Graphical presentation of the key variables

Raw data on the number of income support recipients, employment, the working-age population, the maximum single payment rate of allowances and pensions and average weekly earnings are presented in Appendix Tables A1 to A3. In this subsection we use graphs to examine whether there is an association between the employment rate and the payment receipt rates of UB, DSP and SPP, and the variations of the replacement rates for allowances and pensions for the period 1965 to 2004. The time trend patterns may differ for these variables. This may then disguise the true association between the variables. To facilitate our graphical inference, we present the figures that use the growth rate, alongside the figures that use the level of the variables.

Figures 1a and 1b present the UB receipt rate for males and females respectively, together with the gender-specific employment rate. The left panel in each figure uses the level of the variables and the right panel uses the growth rate of the variables. Male and female UB receipt rates show a similar pattern over the period 1965 to 2004. They increased almost continuously from 1965 to the early 1980s, fell during the 1980s, rose sharply from the end of the 1980s to the early 1990s, and fell again afterwards. Looking at the figures that use the level of the variable, for males there appears to be a negative association between the UB receipt rate and the employment rates, particularly the total employment rate. For example, the falls of the employment rate during 1965 to the early 1980s and the early 1990s were accompanied by increases in the UB receipt rate. When the employment rate improved during the 1980s, the UB receipt rate fell as well. However for females this kind of association did not seem to occur by just looking at the level of the variable. Despite substantial variations of the female UB receipt rate over the period, the female total employment rate shows a trend of almost continuous increase, while the female full-time employment rate seems to fluctuate within a narrow band around a constant.

Figure 1a: UB reciept and Employment: Female

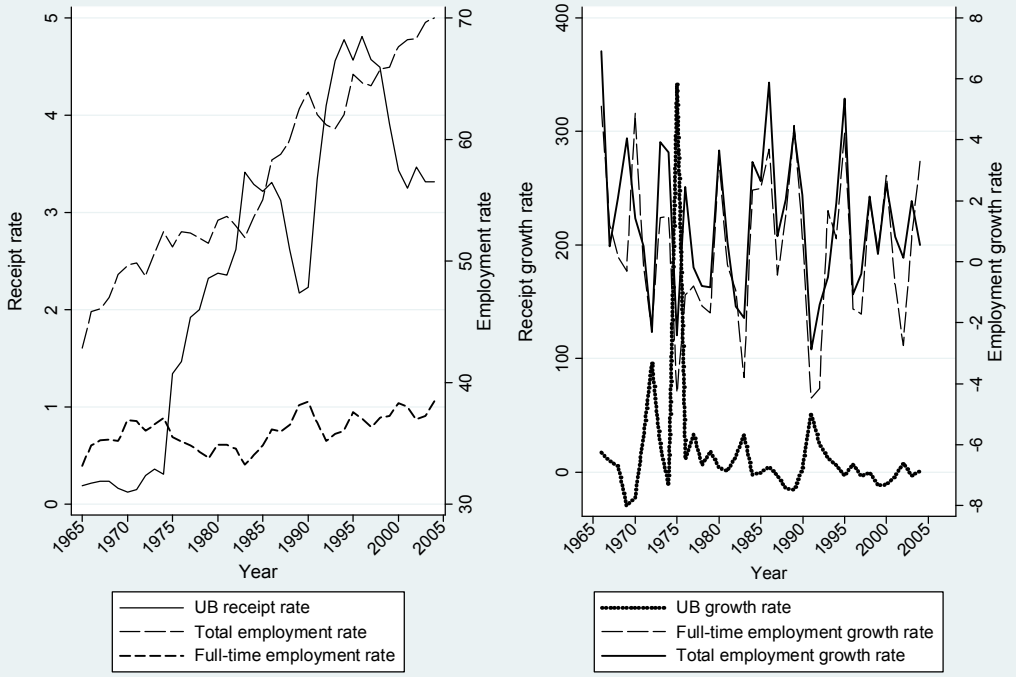
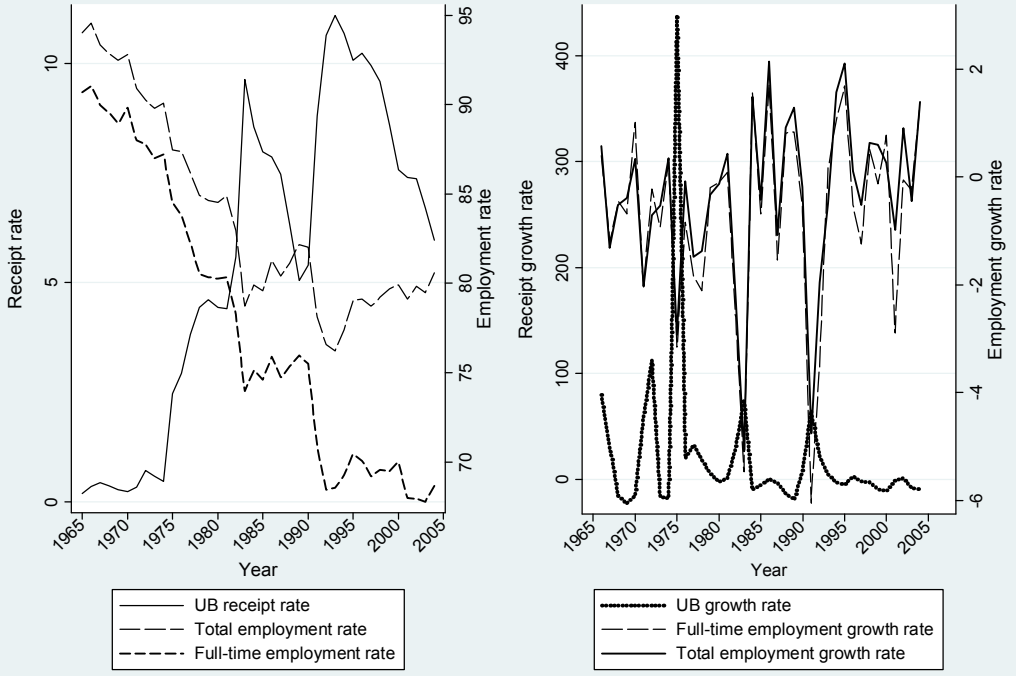


Figure 1b: UB reciept and Employment: Male

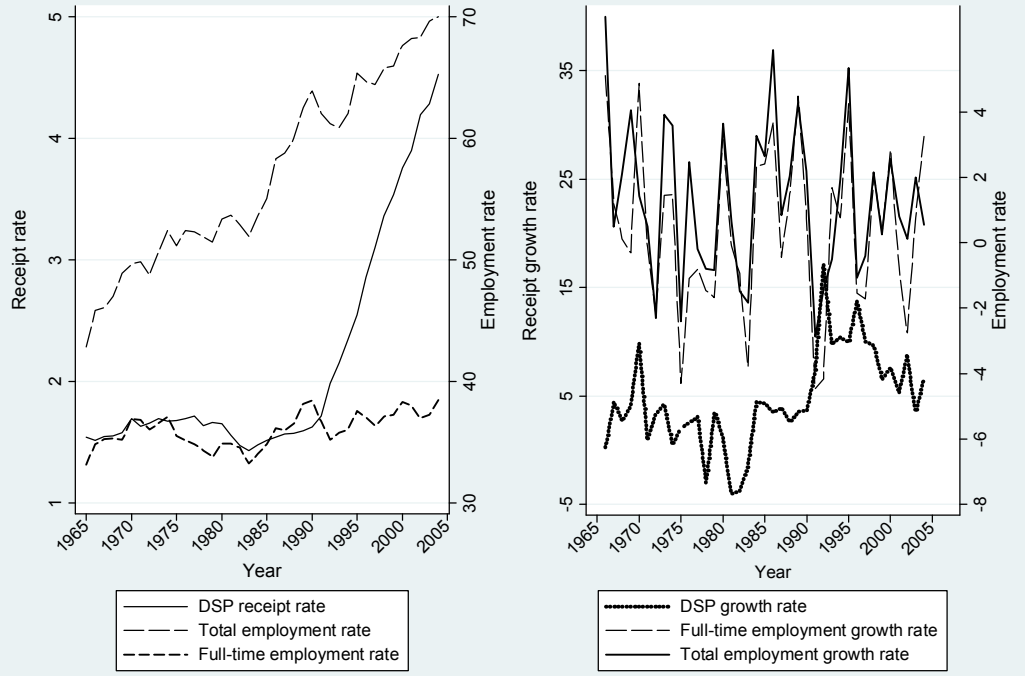


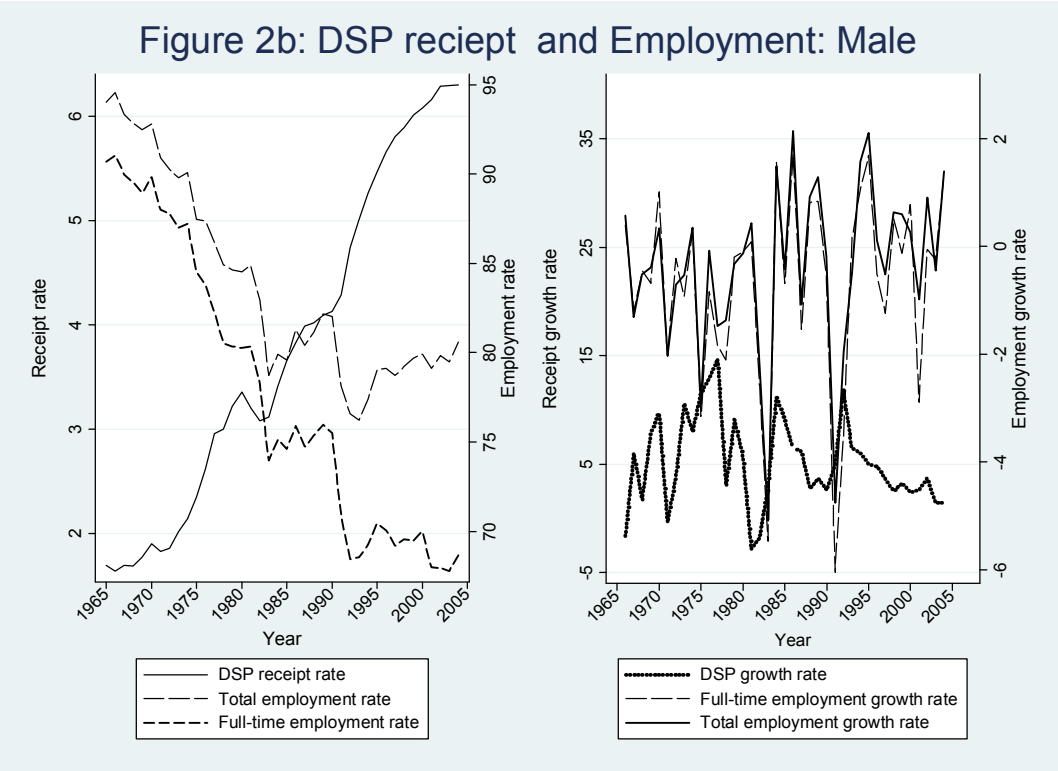
However, when looking at the figures that use the growth rate of the variables, there seems to be a close association between the growth rate of UB receipt and the growth rate of employment for both males and females. That is, a fall in the growth rate of employment is often followed by an increase in the growth rate of UB receipt, and an

increase in the growth rate of employment is followed by a fall in the growth rate of the UB receipt.

Figures 2a and 2b show the DSP receipt rate and the employment rates for males and females respectively. For females the DSP receipt rate was relatively flat over the period 1965 to the early 1990s, but then it increased sharply. For males the DSP receipt rate increased across the whole period except for a brief decrease around 1980. From the figures that use the level of the variable there seems to be no association between the DSP receipt rate and any of the employment measures. However this does not necessarily mean that labour market conditions have no effect on DSP receipt. Changing labour market conditions may have a direct effect on flows into and exits from the DSP, but because the flows are small relative to the number of recipients (the stock), the net effects on the receipt rate may not be discernible from a graph on the stock alone.

Figure 2a: DSP reciept and Employment: Female





Some association between the variables seems to appear when the growth rate of the variables is considered. For example, the recessions in the early 1980s and the late 1990s seem to be followed by increases in the growth rate of DSP receipt for both males and females. But overall, the association is not that strong even from the growth rate figures.

Figure 3 shows the female SPP receipt rate and the female employment rate.[9] Except over the period 1985 to 1989 when the receipt rate decreased, for the other time periods the female SPP receipt rate increased. Like the DSP receipt rate, the SPP receipt rate appears not to be associated with the employment rate when looking at the level of the variables. When looking at the growth rate, there seems to be some association between the growth rate of the variable, but the association is not strong overall.

Figure 4 shows the replacement rates of allowances and pensions for males and females respectively. There are variations in the allowance replacement rates in the earlier data period, say from 1965 to the early 1980s. The replacement rates became

[9] As noted earlier, for SPP we restrict our analysis to females because the number of male SPP recipients is very small.

relatively stable in the later part of the period. Both the allowance and pension replacement rates are higher for females than for males, reflecting the relatively lower average weekly earnings of females. Because of the small variation in the replacement rate over time, we may not expect it to have a significant effect on the receipt rates.

Figure 3: SP reciept and Employment: Female

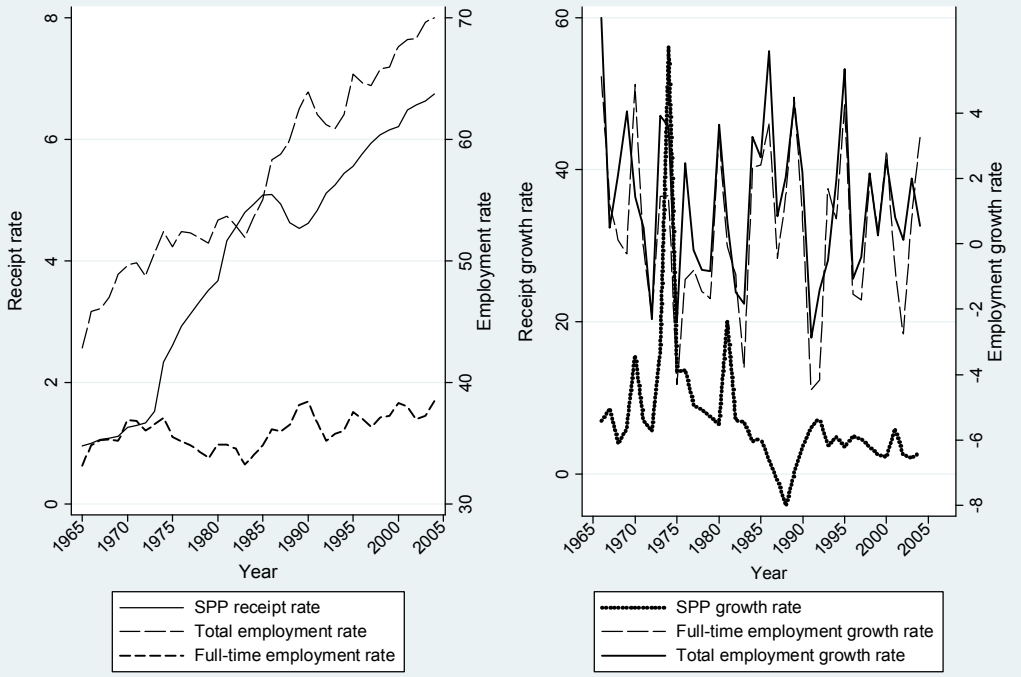
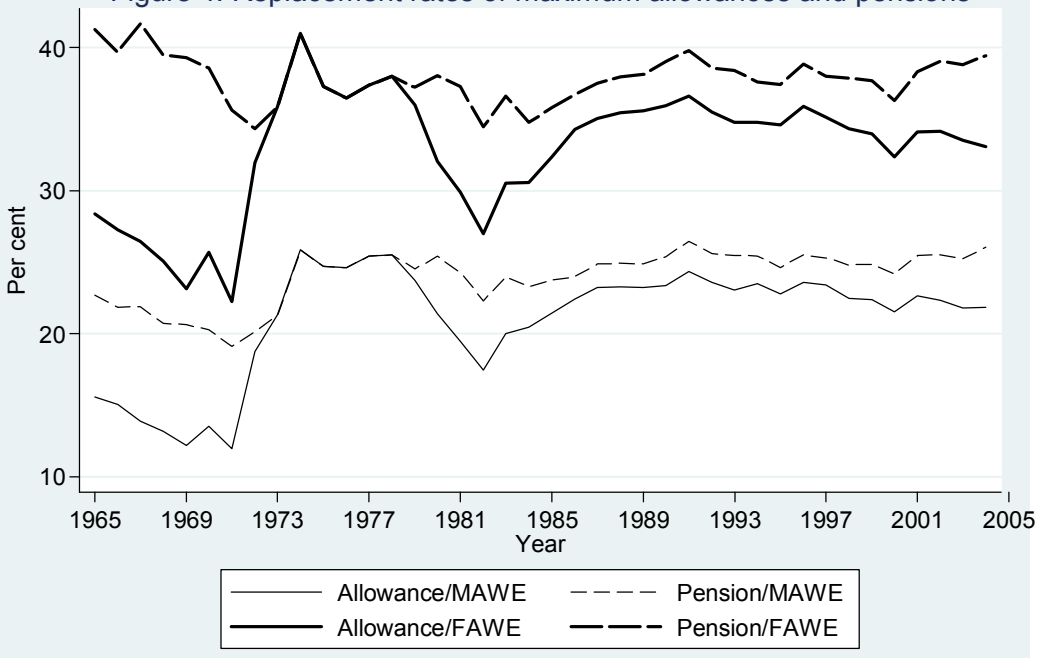


Figure 4: Replacement rates of maximum allowances and pensions



Note: M(F)AWE - Male (female) average weekly earnings.

4.3. Econometric analysis

For the national aggregate data model, we regress the receipt rate on the employment rate variable and other controls, as in equation (1)

$$(1)\ R_t^k = \sum_{j=1}^{J} \alpha_j^k E_{t-j} + X_t^k \beta^{k'} + \gamma^k t + \varepsilon_t^k ,$$

where R_t^k is the receipt rate for payment type *k* in year *t*; E_t refers to the employment rate in year *t*; X_t^k includes other control variables, such as the replacement rate and any major policy changes that have occurred. The time trend is controlled for through the inclusion of *t*. To reflect the fact that the current stock of recipients is the result of past inflows and outflows, we include lagged employment rates in the model with the length of the lag being determined by the model. That is, we add further lags to the model until the last one becomes insignificant. The preferred models are highlighted in bold in the tables that present the estimation results.

We estimate the model separately for each payment type: UB, DSP and SSP. For UB and DSP, the model is also differentiated by gender. When models are estimated separately for males and females, the explanatory variables such as the employment rate are gender-specific. For example, when the female UB receipt rate is analysed, the female employment rate is used in the regression.

There are several reasons for including lagged employment rate variables in the regressions. First, as will be detailed in the next section, the current recipient stock consists of people who came into the program in previous time periods. The payment participation decision of those people who entered earlier was affected by the labour market conditions then. Second, it may take time for individuals to make decisions on entering or leaving a payment in response to changes in labour market conditions. Third, because people on welfare are often low-skilled, they are likely to be the last ones hired during an economic recovery and thus may not move from welfare to work instantaneously. Fourth, for some payments, such as DSP, the application and the establishment of eligibility may be a lengthy process. The number of lagged employment rates that should be included in the regression is an empirical issue.

4.3.1. Unemployment benefits

Table 1 presents the model estimation results for the UB receipt rate. The upper panel is for males and the lower one is for females. The left panel uses the total employment rate as the measure of labour market conditions and the right panel use the full-time employment rate. If the preferred model, as indicated in bold in the table, includes lagged employment rate variables, the last row in each panel shows the long-term effect of the employment rate, which is essentially the sum of the coefficients on all included employment rate variables.

As might be expected, unemployment benefit recipients do indeed respond to changes in labour market conditions as represented by the employment rates. For males and females alike, the current total employment rate and the full-time employment rate variables are statistically significant. For male UB, the one-year-lagged full-time employment rate variable is also statistically significant. The results for females show that a 1 percentage point increase in the female total employment rate reduces the female UB receipt rate by 0.31 percentage points; a 1 percentage point increase in the female full-time employment rate reduces the female UB receipt rate by 0.45 percentage points. For males the estimated effects are more than double those for females. A 1 percentage point increase in the male total employment rate reduces the male UB receipt rate by 0.79 percentage points, while a 1 percentage point increase in male full-time employment rate reduces the male UB receipt rate by 0.76 percentage points for one year, and reduces the receipt rate by 1.06 percentage points in two year's time. The larger effects of labour market conditions on males than on females are perhaps because there are more payment types available for females than males.

Table 1: Model estimation results for UB receipt rate

	Total employment rate		Full-time employment rate	
	Model 1	Model 2	Model 1	Model 2
	Females			
Current year emp	**-0.3114*** **	-0.2612***	**-0.4478*** **	-0.3693***
	0.0608	0.0819	**0.0760**	0.1052
Lagged 1 year emp		-0.0908		-0.1443
		0.0813		0.1050
Replacement rate	**0.0363**	0.0391	**0.0212**	0.0266
	0.0246	0.0248	**0.0229**	0.0231
Time trend	**0.3100*** **	0.3338***	**0.1449*** **	0.1460***
	0.0395	0.0434	**0.0100**	0.0099
Constant	**12.6660*** **	14.3517***	**14.9055*** **	17.0754***
	2.7033	2.9601	**2.7316**	2.9248
No of observations	**40**	39	**40**	39
R-squared	**0.8707**	0.8707	**0.8862**	0.8906
Adjusted R-squared	**0.8599**	0.8555	**0.8767**	0.8777
Long-term effect	n/a	n/c	n/a	n/c
	Males			
Current year emp	**-0.7852*** **	-0.6372***	-0.9724***	**-0.7601*** **
	0.0623	0.1119	0.0640	**0.0858**
Lagged 1 yr emp		-0.1944		**-0.2970*** **
		0.1171		**0.0893**
Replacement rate	**-0.1071** **	-0.1102**	-0.0093	**-0.0056**
	0.0487	0.0473	0.0393	**0.0353**
Time trend	**-0.0549* **	-0.0748**	-0.3860***	**-0.4489*** **
	0.0272	0.0291	0.0427	**0.0424**
Constant	**74.6534*** **	79.0562***	89.1773***	**97.1480*** **
	6.1647	6.3967	6.0636	**5.9092**
No of observations	**40**	39	40	**39**
R-squared	**0.9458**	0.9494	0.9604	**0.9685**
Adjusted R-squared	**0.9412**	0.9435	0.9571	**0.9648**
Long-term effect	n/a	n/c	n/a	**-1.0571**

Note: *** significant at 1% level, ** 5% level and * 10% level.
n/a stands for not available.
n/c stands for not calculated because the model is not preferred.

The replacement rate variable has the expected sign in Table 1, but is insignificant in many cases, perhaps reflecting the fact that the payment rate of unemployment benefits is relatively flat with little variation over the period examined.

4.3.2. Disability support pension

For DSP recipients, the model in equation (1) was slightly modified. We excluded the current labour market conditions variables from the model for several reasons. First,

the establishment of DSP entitlement is more complicated than other payments (such as UB) and thus may involve a long processing time. Further, those who may be responsive to labour market conditions when making a DSP participation decision are presumably at the margin of eligibility for DSP and may thus be aware that they need to make a greater effort to establish their case. For this reason they may not immediately apply for DSP when they lose their jobs in an economic recession, rather they may wait to see whether they still have a chance in the labour market. For similar reasons, those who are on DSP may not immediately leave the payment for work when labour market conditions improve. It may be the case for the DSP program that the effect of labour market conditions on recipients would take some time to emerge. Indeed, there is empirical evidence showing that it is the one-year-lagged labour market conditions (represented by the unemployment rate) and not the current labour market conditions, that significantly affect the DSP application and grant rates (Cai and Gregory, 2004). In addition, when we included the current employment rate variables (total or full-time) in the model, we found that they had an unexpected sign, which in some cases was statistically significant. This is counter-intuitive. Consequently, in Table 2 we present estimation results from the models that do not include the current labour market conditions variables.

In addition to the replacement rate variable, for the DSP receipt rate we include more control variables in the model. The proportion of the population aged 50 or over is included to capture the effect of population ageing on the receipt of DSP. As shown in Cai (2002) older people are much more likely to enter DSP than younger ones. The set of year dummies in the model is intended to capture the effects of major policy changes that occurred to the DSP program over the period examined.

Given our observations on Figure 2a, perhaps it is not surprising to find that for females the estimate on the employment rate variable is statistically insignificant, no matter how many lagged employment rates are used. This suggests that the number of female DSP recipients may not be affected by labour market conditions, at least as measured by the total employment rate or the full-time employment rate.

Table 2: Model estimation results for DSP receipt rate

	Total employment rate				Full-time employment rate			
	Model 1	Model 2	Model 3	Model 4	Model 1	Model 2	Model 3	Model 4
	Females							
Lag 1yr emp	-0.0064	0.0031			0.0042	0.0165		
	0.0140	0.0180			0.0172	0.0229		
Lag 2yr emp		-0.0218				-0.0222		
		0.0176				0.0228		
Replace rate	-0.0068	-0.0134			-0.0072	-0.0108		
	0.0118	0.0132			0.0118	0.0126		
Pop50+	0.3123***	0.3195***			0.3120***	0.3150***		
	0.0194	0.0205			0.0194	0.0205		
yr 80+	-0.0796	-0.1078			-0.0561	-0.0847		
	0.0883	0.0923			0.0858	0.0926		
yr 87+	0.3572***	0.3922***			0.3278***	0.3375***		
	0.0958	0.1053			0.0943	0.1031		
yr 91+	0.2667***	0.3152***			0.2711***	0.2962***		
	0.0714	0.0814			0.0715	0.0776		
yr 95+	0.2733***	0.2195**			0.2745***	0.2430**		
	0.0845	0.0957			0.0846	0.0922		
time trend	0.0419***	0.0493***			0.0376***	0.0391***		
	0.0105	0.0121			0.0057	0.0063		
constant	-3.7406***	-3.0830***			-4.1455***	-3.7334***		
	0.7315	0.9029			0.7878	0.9393		
No. of obs	39	38			39	38		
R-squared	0.9918	0.9922			0.9918	0.9922		
Adjusted R-squared	0.9897	0.9897			0.9896	0.9894		
Long-term effect	n/a	n/c			n/a	n/c		

Table 2: Continued

	Total employment rate				Full-time employment rate			
	Model 1	Model 2	Model 3	Model 4	Model 1	Model 2	Model 3	Model 4
	Males							
lag 1yr emp	-0.0660**	-0.0193	**-0.0337**	-0.0327	-0.0702***	-0.0261	-0.0395*	**-0.0476****
	0.0257	0.0244	**0.0243**	0.0247	0.0218	0.0220	0.0219	**0.0216**
lag 2yr emp		-0.0916***	**-0.0610****	-0.0680**		-0.0788***	-0.0498**	**-0.0569****
		0.0230	**0.0265**	0.0267		0.0207	0.0240	**0.0230**
lag 3yr emp			**-0.0482****	-0.0237			-0.0454**	**-0.0198**
			0.0229	0.0278			0.0206	**0.0235**
lag 4yr emp				-0.0368				**-0.0479****
				0.0233				**0.0212**
Replace rate	0.0116	0.0092	**0.0066**	0.0079	0.0180	0.0258	0.0319	**0.0417****
	0.0233	0.0195	**0.0191**	0.0189	0.0220	0.0190	0.0189	**0.0184**
Pop50+	0.1504***	0.1955***	**0.2278*****	0.2357***	0.1173***	0.1310***	0.1514***	**0.1722*****
	0.0503	0.0483	**0.0539**	0.0589	0.0369	0.0354	0.0396	**0.0426**
yr 80+	-0.0592	-0.1264	**-0.1676**	-0.2114	-0.1120	-0.2004	-0.2383*	**-0.2858****
	0.1525	0.1334	**0.1368**	0.1434	0.1475	0.1311	0.1328	**0.1330**
yr 87+	0.3506*	0.3663**	**0.3888****	0.3132*	0.2803*	0.2467*	0.2543*	**0.1993**
	0.1760	0.1580	**0.1628**	0.1792	0.1471	0.1341	0.1388	**0.1480**
yr 91+	0.4496***	0.5495***	**0.5993*****	0.6407***	0.3551***	0.3993***	0.4223***	**0.4683*****
	0.1276	0.1119	**0.1163**	0.1239	0.1249	0.1071	0.1057	**0.1037**
time trend	0.0744***	0.0494**	**0.0316**	0.0247	0.0644***	0.0415**	0.0191	**-0.0077**
	0.0200	0.0203	**0.0240**	0.0268	0.0196	0.0202	0.0244	**0.0280**
constant	3.9112*	7.2832***	**9.7070*****	11.2601***	4.7355**	7.5291***	9.7794***	**12.6758*****
	1.9251	1.8114	**2.0883**	2.3374	1.8351	1.7197	1.9390	**2.2347**
No. of obs	39	38	**37**	36	39	38	37	**36**
R-squared	0.9896	0.993	**0.9937**	0.9939	0.9906	0.9934	0.9941	**0.9939**
Adjusted R-squared	0.9873	0.9911	**0.9916**	0.9914	0.9885	0.9916	0.9921	**0.9914**
Long-term effect	n/a	n/c	**-0.1429**	n/c	n/a	n/c	n/c	**-0.1722**

Note: *** significant at 1% level, ** 5% level and * 10% level.
n/a stands for not available.
n/c stands for not calculated because the model is not preferred.

On the other hand, for male DSP recipients we do find some expected effects. That is, the DSP receipt rate decreases when labour market conditions improve and the effect takes more than one year to complete. The model that uses the total employment rate shows that a 1 percentage point increase in the employment rate reduces the male DSP receipt rate by 0.14 percentage points over a three-year period; while the results for the full-time employment rate show that a 1 percentage point increase in the

employment rate reduces the male DSP receipt rate by 0.17 percentage points over a four-year period.

4.3.3. Sole parent pension

Table 3 presents the estimation results for female sole parent pension recipients. Labour market conditions are found to have an expected effect on the SPP receipt rate and it is expected to last for about three years. When the total employment rate is used in the model, a 1 percentage point increase in the employment rate reduces the SPP receipt rate by 0.3 percentage points over three years; when the full-time employment rate is used, a 1 percentage point increase in the employment rate reduces the SPP receipt rate by 0.41 percentage points. Although the estimation results show that the two-year-lagged employment rate variable is significant, and thus Model 3 might be preferred, it is a puzzle as to why the one-year-lagged employment rate variable becomes insignificant when moving from Model 2 to Model 3. It might be because the one-year-lagged rate is closely correlated with the current and the two-year-lagged ones.

4.4. Assessment of the effects of recent changes in labour market conditions on receipt rates

Since the early 1990s the labour market has been improving as shown by the increasing total employment rate of the working-age population (but it is not the case when the full-time employment rate is considered). In this subsection we use the models estimated above to assess how the receipt rates of UB, DSP and SPP were affected by the changes in the labour market conditions over the period 1993 to 2004. For this purpose we calculate the receipt rate predicted from the model and a hypothetical receipt rate where the labour market conditions variables were fixed at their 1993 level for the years after 1993. The difference between these two rates may then be attributed to the effect of the changes in labour market conditions in the period. The model used to calculate the two predicted receipt rates for each payment is the one appearing in bold in the respective tables (the preferred models as indicated earlier).

Table 3: Model estimation results for SPP

	Total employment rate			Full-time employment rate		
	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
Current emp	-0.1925***	-0.1361***	**-0.1543*** **	-0.2739***	-0.1974***	**-0.2393*** **
	0.0396	0.0490	**0.0441**	0.0461	0.0607	**0.0544**
Lag 1yr emp		-0.1122**	**-0.0033**		-0.1332**	**0.0243**
		0.0469	**0.0571**		0.0590	**0.0720**
Lag 2yr emp			**-0.1431*** **			**-0.1948*** **
			0.0425			**0.0531**
Replace rate	-0.0333	-0.0055	**-0.0197**	-0.0598*	-0.0444	**-0.0452**
	0.0359	0.0379	**0.0351**	0.0312	0.0321	**0.0284**
time trend	0.2807***	0.3154***	**0.3481*** **	0.1767***	0.1795***	**0.1846*** **
	0.0259	0.0281	**0.0263**	0.0055	0.0054	**0.0049**
constant	10.5449***	11.8946***	**14.6395*** **	12.5630***	13.9547***	**16.7219*** **
	1.7837	1.7698	**1.7467**	1.7917	1.8033	**1.7041**
No obs	40	39	**38**	40	39	**38**
R-squared	0.968	0.9711	**0.9774**	0.9732	0.9755	**0.9818**
Adjusted R-squared	0.9653	0.9677	**0.9739**	0.971	0.9726	**0.979**
Long term effect	n/a	n/c	**-0.3007**	n/a	n/c	**-0.4098**

Note: *** significant at 1% level, ** 5% level and * 10% level.
n/a stands for not available.
n/c stands for not calculated because the model is not preferred.

The results are presented in Table 4. The upper panel in the table shows the results when the total employment rate is used to measure labour market conditions, while the lower panel shows the results for full-time employment. The effect of the changes in the employment rate is not assessed for female DSP recipients because the labour market condition variables were insignificant, as shown Table 2.

Note that we used the total employment rate as our guide in choosing the beginning year for the exercise. The total employment rate was at its lowest level for both males and females in 1993 for the period from 1991 onwards. However the full-time employment rate did not follow the same pattern. For example, the full-time employment rate was higher in 1993 than in 1992, and there was also a fall in the full-time employment rates from 2001 for both males and females.

For each payment type the first column in Table 4 shows the effect of the changes in the employment rate as compared to its level in 1993. The numbers represent the percentage point increase in the receipt rate if the employment rate was brought back to its 1993 level. The second column under each payment type shows the effect as a proportion of the actual receipt rate. We use the year 2004 to illustrate what the

numbers mean in Table 2. Looking at female UB first, if the employment rate were brought back to its 1993 level in 2004, the UB receipt rate would be 2.85 percentage points higher than the model predicted for its level in 2004. Since 2.85 accounts for 86.85 percent of the female UB receipt rate in 2004, we can say that if the total employment rate were at its 1993 level in 2004, the female UB receipt rate would be 86.85 percent higher than its actual level in 2004. For males, the effect is 3.4 percentage points in 2004, which accounts for 57.72 percent of the male UB receipt rate in that year. For males on the DSP, the effect is 0.47, thus accounting for less than 10 percent of the male DSP receipt rate in 2004. For SPP, the effect is 2.50, accounting for 37 percent of the SPP receipt rate in 2004.

Table 4: Effects of recent labour market conditions on receipt rates

	Female UB		Male UB		Male DSP		Female SPP	
	Effects	As prop of actual rate	Effects	As prop of actual rate	Effects	As prop of actual rate	Effects	As prop of actual rate
Total employment rate								
1994	0.3660	0.0766	0.9378	0.0877	0.0000	0.0000	0.1813	0.0333
1995	1.3998	0.3066	2.2181	0.2205	0.0402	0.0074	0.6975	0.1255
1996	1.1809	0.2457	2.2889	0.2243	0.1681	0.0297	0.7681	0.1336
1997	1.0997	0.2408	1.9675	0.1982	0.3281	0.0565	1.2006	0.2023
1998	1.5299	0.3404	2.3608	0.2466	0.3984	0.0676	1.3124	0.2161
1999	1.5813	0.4048	2.7301	0.3215	0.3947	0.0657	1.3051	0.2122
2000	2.1067	0.6136	2.8988	0.3894	0.4214	0.0693	1.7637	0.2841
2001	2.2780	0.7009	2.2813	0.3145	0.4814	0.0782	1.8777	0.2897
2002	2.3041	0.6648	2.8480	0.3919	0.4907	0.0780	2.1339	0.3248
2003	2.7276	0.8230	2.5685	0.3879	0.4774	0.0759	2.4228	0.3658
2004	2.8450	0.8585	3.4400	0.5772	0.4715	0.0748	2.4974	0.3701
Full-time employment rate								
1994	0.1215	0.0254	0.5482	0.0512	0.0000	0.0000	0.0650	0.0119
1995	0.8063	0.1766	1.6505	0.1641	0.0343	0.0063	0.4243	0.0763
1996	0.5455	0.1135	1.7193	0.1685	0.1310	0.0231	0.3007	0.0523
1997	0.2619	0.0573	0.9494	0.0956	0.1943	0.0335	0.4611	0.0777
1998	0.5981	0.1331	0.9626	0.1006	0.1898	0.0322	0.5427	0.0894
1999	0.6528	0.1671	0.9998	0.1177	0.2060	0.0343	0.4303	0.0700
2000	1.1254	0.3278	1.3835	0.1858	0.1873	0.0308	0.8261	0.1331
2001	0.9959	0.3064	0.0051	0.0007	0.1732	0.0281	0.7551	0.1165
2002	0.5272	0.1521	-0.6234	-0.0858	0.1229	0.0195	0.7173	0.1092
2003	0.6523	0.1968	-0.7622	-0.1151	0.0124	0.0020	0.7532	0.1137
2004	1.2021	0.3627	-0.1377	-0.0231	-0.0119	-0.0019	0.8363	0.1239

The results from the lower panel that uses the full-time employment rate as a measure of labour market conditions show that the effects are generally much smaller than

those in the upper panel. This is despite the fact that the coefficient estimates on the full-time employment rate variable are generally larger than that on the total employment rate. The smaller effect for the full-time employment rate is because the change in the full-time employment rate is small over the period and sometimes it fell.

5. Analysis using a stock–flow model and administrative data

5.1. The stock-flow model

5.1.1. The relationship between the recipient stock and flows

The number of income support recipients at any time can be viewed as a pool (stock) with an inflow and an outflow. When inflows exceed outflows the recipient stock increases and conversely when outflows exceed inflows the recipient stock decreases. The stock-flow relationship can be described by the following accounting identity,

(2) $S_{r,t} = S_{r,t-1} + I_t - O_t$,

where $S_{r,t}$ is the number of recipients at the end of year t; I_t is the number of inflows in year t; and O_t is the number of outflows. In other words, equation (2) states that the recipient stock at the end of a period equals the stock at the end of the previous period, plus the inflows minus the outflows that occurred during that period.

In a simplified scenario where the new entrants (inflows) during a period do not exit the payment in that period, and the outflows do not depend on the duration of the payment equation (2) can be rewritten as

(3) $\begin{aligned} S_{r,t} &= S_{r,t-1} + I_t - (1-c_t)S_{r,t-1} \\ &= I_t + c_t S_{r,t-1} \end{aligned}$,

where c_t is the continuation rate of existing recipients. Thus $(1-c_t)S_{r,t-1}$ equals the outflows. Equation (3) simply states that under the conditions specified above, the number of recipients at the end of period t equals the inflows occurring in that period plus those recipients who continued from the previous period. In equation (3) the assumption on outflows is that the continuation rate is independent of the duration on a payment.

To assume that the continuation rate is independent of duration is unrealistic. In fact empirical evidence suggests that income support receipt is duration-dependent. That is, the longer a person is on an income support payment, the lower is the probability of exit from the payment, and thus the higher is the continuation rate. One of the often-cited explanations for duration dependence is the depreciation of human capital while on income support. The longer an individual is on income support, the longer the person is out of the labour market and the greater the deterioration of their work skills. The duration on income support may also serve as a signal of employability to potential employers. Long durations on income support may be regarded by employers as indicating that the person is less capable of working. This again suggests a positive relationship between the duration on a payment and the continuation rate.

Duration dependence of the outflows makes the description of the stock-flow relationship as shown in equation (3) unrealistic. However the recipient stock can still be expressed using the flows. Denote the continuation rate in year *t* of the recipients who have been on a payment for *k* continuous periods as c_t^k. The number of recipients at the end of year *t,* $S_{r,t}$ can be written as

$$(4)\ S_{r,t} = I_t + c_t^1 I_{t-1} + c_t^2 c_{t-1}^1 I_{t-2} + \ldots + I_{t-K}\prod_{k=1}^{K} c_{t-(K-k)}^k ,$$

where *K* is the longest duration of recipients on the payment; $I_{t-K}\prod_{k=1}^{K} c_{t-(K-k)}^k$ represents the number of recipients who came onto the program in year *t-K* and stayed on the payment for the *K* periods.

Using the same notation, the number of recipients who left the payment in year *t* among those who came onto the program in year *t-K,* and have stayed on the payment for the previous *K-1* periods, can be written as $I_{t-K}(1-c_t^K)\prod_{k=1}^{K-1} c_{t-(K-k-1)}^k$.

Equation (4) simply describes an accounting identity between the recipient stock and the flows. However, it conveys an important message about the dynamics of the recipient stock and labour market conditions. That is, the current recipient stock can be affected by labour market conditions in the past, even if the inflows (I_t) and the outflows, which are determined by c_t^k, are affected by contemporary labour market

conditions. Equation (4) also suggests that when estimating models using recipient stock data, the number of lags required for the labour market condition variables may be very large and may depend on the longest duration in the recipient stock.

5.1.2. Estimating changes in the stock from changes in flows

The stock-flow relationship can be used to estimate the change in the recipient stock resulting from changes in flows which are directly affected by labour market conditions. To illustrate how this can be carried out, we divide the population into different groups depending on whether they are on an income support payment and the length of time on the payment. Denote people who are not on income support at time *t* as $S_{n,t}$, and people who are on income support for *k* continuous periods as $S_{r,k,t}$. The transition of the population across the payment receipt states can be described by the following Markov equation:[10]

$$(5)\quad \begin{bmatrix} S_{r,1,t} \\ S_{r,2,t} \\ S_{r,3,t} \\ \vdots \\ S_{r,\bar{k}-1,t} \\ S_{r,\bar{k},t} \\ S_{n,t} \end{bmatrix} = \begin{bmatrix} 0 & 0 & \cdots & 0 & 0 & e(Y_t) \\ c^1(Y_t) & 0 & \cdots & 0 & 0 & 0 \\ 0 & c^2(Y_t) & \cdots & 0 & 0 & 0 \\ \vdots & \vdots & \ddots & \vdots & \vdots & \vdots \\ 0 & 0 & \cdots & 0 & 0 & 0 \\ 0 & 0 & \cdots & c^{\bar{k}-1}(Y_t) & c^{\bar{k}}(Y_t) & 0 \\ 1-c^1(Y_t) & 1-c^2(Y_t) & \cdots & 1-c^{\bar{k}-1}(Y_t) & 1-c^{\bar{k}}(Y_t) & 1-e(Y_t) \end{bmatrix} \begin{bmatrix} S_{r,1,t-1} \\ S_{r,2,t-1} \\ S_{r,3,t-1} \\ \vdots \\ S_{r,\bar{k}-1,t-1} \\ S_{r,\bar{k},t-1} \\ S_{n,t-1} \end{bmatrix}.$$

The additional notation $e(Y_t)$ is the probability of commencing a payment among those who are not on the payment (the inflow or entry rate) at time *t*. That the entry rate is a function of Y_t makes it explicit that the inflow rate depends on labour market conditions at that time. $c^k(Y_t) = c_t^k$ is the duration-specific continuation rate and it depends on labour market conditions as well.[11]

More compactly, equation (5) can be represented as

$$(6)\quad \underset{(Q\times 1)}{S_t} = \underset{(Q\times Q)}{M(Y_t,\theta)}\,\underset{(Q\times 1)}{S_{t-1}},$$

where S_t is a vector that contains the number of individuals in each of the Q states specified in equation (5) and *M* is the transition matrix between states, which depends

[10] The description of the estimation approach here follows Klerman and Haider (2004).

[11] While we express the entry and continuation rates as a function of contemporary labour market conditions, previous labour market conditions can be easily incorporated into the functions, as we do in our estimation of the flow models.

on labour market conditions, possibly other explanatory variables, and a parameter vector θ governing the relationship between labour market conditions and the entry and continuation rates.

Equation (6) provides the key to simulating the impact of labour market conditions on the recipient stock implied by the underlying stock-flow relationship. We first estimate the models for the flows (the entry rate and the continuation rate) to obtain estimates of the parameter vector θ. Then for any arbitrary specification for labour market conditions, say $\tilde{Y}_t$, we can calculate the implied transition matrix M and simulate the recipient stock for the following period. Thus, given an initial recipient stock S_t and any arbitrary path for labour market conditions $\{\tilde{Y}_{t+h}\}_{h=1}^{H}$, we can simulate the recipient stock path for the period $t+h$ to $t+H$ as

$$(7)\quad \underset{(Q\times 1)}{S_{t+h}} = [\prod_{p=1}^{h} \underset{(Q\times Q)}{M(\tilde{Y}_{t+p}, \theta)}] \underset{(Q\times 1)}{S_t} \ .$$

For example, to explore the effect of labour market conditions on the recipient stock, we can simulate the model for the observed path of labour market conditions and for an explicitly specified counterfactual path of labour market conditions. The difference between the two paths of the recipient stock is the implied effect of the labour market conditions. The recipient stock can always be transformed into the receipt rate using the observed population. Later we report our results in terms of receipt rates.

5.2. Data

In this subsection we describe the sources of data used for the estimation of the stock-flow model, discuss some issues relating to variable definition, and illustrate the main features of the key variables using graphs.

5.2.1. Data sources

To derive the flow data on income support recipients, we draw on an administrative record database on income support recipients known as the Longitudinal Data Set (LDS). We use a 10 percent sample of the LDS covering the period January 1995 to February 2006, which was provided by the Department of Families, Community Services and Indigenous Affairs (FaCSIA) through the Department of Employment

and Workplace Relations (DEWR). The data contain fortnightly records of income support recipients with a range of information such as payment type, payment entitlement and amount received, demographic characteristics, family composition, and labour market activity. What is important for our purpose is that because there is a record for every fortnight that an individual is on a payment, the data not only allow us to estimate the number of recipients for each payment type in each fortnight (recipient stock), they also allow us to estimate the inflows and outflows of recipients on a fortnightly basis and for each payment type. The stock and flow information is crucial for us to undertake the stock-flow modelling approach to examine the effect of labour market conditions.

As in the aggregate data, to control for the effect of population size on the number of inflows, we use the inflow (or entry) rate as the dependent variable in our inflow models. The inflow rate is defined as the number of inflows per 100 persons at risk. To get the 'at risk' population and the data for total and full-time employment, we draw on the ABS *Labour Force Survey* (LFS) (ABS, 2007a). The LFS data comprise the monthly numbers of people employed part-time, full-time, unemployed, and not in the labour force by age group and sex at the level of the Statistical Region (SR), the Major Statistical Region (MSR), the state, and national level. The population at risk at any time is defined as the number of working-age people who were not on income support in the previous period (month in our case). As in the aggregate data, the total employment (or full-time) rate is defined as the number of persons employed (or full-time employed) per 100 of the working-age population. In addition, information in the *Census 2001* (ABS, 2007b) is explored to obtain educational attainment and country of birth profiles at the regional level. These controls are included in some of the flow models. Because these variables are only available for 2001, they have to be used as time-invariant variables.

The geographic unit used in the flow modelling is the MSR. We use postcode information available in the LDS data to assign the MSRs to the recipients in the LDS. The MSRs are then used to match the LDS flow data with the ABS employment and population data. We did not use the lower level geographic region unit SR for two reasons. First, when SRs were used for many regions, the number of monthly inflows (particularly for DSP and SPP) is zero. Second, the SRs may not reflect how the

labour markets are functioning, particularly in the major capital cities, because individuals' residences and workplaces may be located at different SRs.

5.2.2. Some definitional issues

Before estimating the number of inflows and outflows of income support recipients, we must clarify what we mean by 'inflows' and 'outflows'. Ideally inflows in a period (say a fortnight) should consist of persons who are granted the payment in that fortnight, and outflows should consist of those who exit from the payment. However the data do not directly provide information on when a grant or an exit occurs. Consequently, we treat the start of a payment spell as the entry and the end of the spell as an exit. While it is straightforward to define a payment spell when there is no receipt break, difficulty arises when short breaks of payment receipt (say one or two fortnights) occur. A concern is that short breaks of payment receipt may be due to administrative errors in recording payments and thus may not reflect a genuine exit. Therefore, rather than defining an end to a spell by a fortnight break, we adopt a three-fortnight break rule. If a recipient does not receive the payment for more than three fortnights, they are treated as having exited the payment and their subsequent return to the payment is regarded as a fresh entry. The three-fortnight rule is used by Tseng et al. (2006) in their study of welfare dynamics using the same database.

The information on population and employment from the ABS LFS data is on a monthly basis. Monthly flows and the stock of recipients cannot be directly derived from the LDS database because the receipt status is recorded fortnightly. To obtain monthly flows and stock data on income support, the estimates from the LDS are collapsed from fortnightly to monthly statistics. In particular, each fortnight is assigned to the month that contains the date of that fortnight's snapshot. As a result of this approach some months contain three fortnights. The stock in a particular month is calculated as the average stock of the respective fortnights. Also, the aggregate flow statistics are higher for months which contain three fortnights. Hence we divide the flows by the number of fortnights and then further divide by 14 to get the daily flow statistics. These we then multiply by 30.4 (the average number of days in a month) to get the adjusted monthly statistics. The monthly flows are thus an equivalised measure for a common number of days.

As discussed earlier, duration dependence is a common feature of income support receipt. As such, the continuation-rate model to be estimated in the next section will include measures on duration on a current payment to control for duration dependence. For such a purpose we need the exact duration of a payment receipt for each recipient. For those who appeared in the first fortnight of the database, often called left-censored, we cannot estimate the spell duration because we do not know when the spell started. With our three-fortnight break rule for defining a spell, we cannot calculate the duration for those who were on payments in the second and third fortnights of the data period. To address this form of left censoring, we assume that the probability of continuing on welfare is constant after K periods and then we discard the first K periods of the data. Therefore any person continuously on a payment from the beginning of our data to period K is in the group where the continuation probability is constant, which makes the left-censoring matter irrelevant.

The choice of K periods is based on several empirical considerations. As the continuation rate is assumed to be constant after K periods, the continuation rate (1 minus the empirical hazard rate) after K periods should be fairly constant. Second, K should not be too large, so that our data analysis period is insufficient. In the continuation-rate models reported later, K is set equal to 24. This is an implicit assumption that the hazard rate after 24 months on an income support payment becomes independent of duration.

5.2.3. Graphical presentation of the data

To provide the flavour of the data, Figures 5, 6 and 7 show the monthly entry, exit and receipt rates for UB, DSP and SPP respectively. The employment rate in the figures refers to the total employment rate. For clarity, the full-time employment rate is not plotted in the same figures. Figures (similar to Figures 5, 6 and 7) where the full-time employment rate is included are shown in the appendix 2 Figures A1 to A3.

Due to the choice of K (discussed above), the data series used for the flow model estimation starts from January 1997 (1997m1 in the figures). The 10 percent sample from the LDS ends in February 2006. However because of the three-fortnight spell-break rule discussed earlier, the data in the last three fortnights cannot be used to derive the outflows and thus the continuation rate. Consequently, we restrict the data used for the flow model estimation to the period January 1995 to December 2005.

Due to the frequency of variation of the monthly data, it is hard to tell from the figures how the entry and exit rates are associated with the total employment rate on a monthly basis. However when looking at the general trend, an association between the flow rate (particularly the inflow) and the total employment rate is evident. For example, the male UB entry rate and the male total employment rate have opposite trends; as is the case for the SPP entry rate and the female total employment rate. Also, from 2001 the male DSP entry rate and the male total employment rate appear to move in opposite directions.

Figure 5: Entry, exit and receipt rates of UB and total employment rate (Jan. 1997– Dec. 2005)

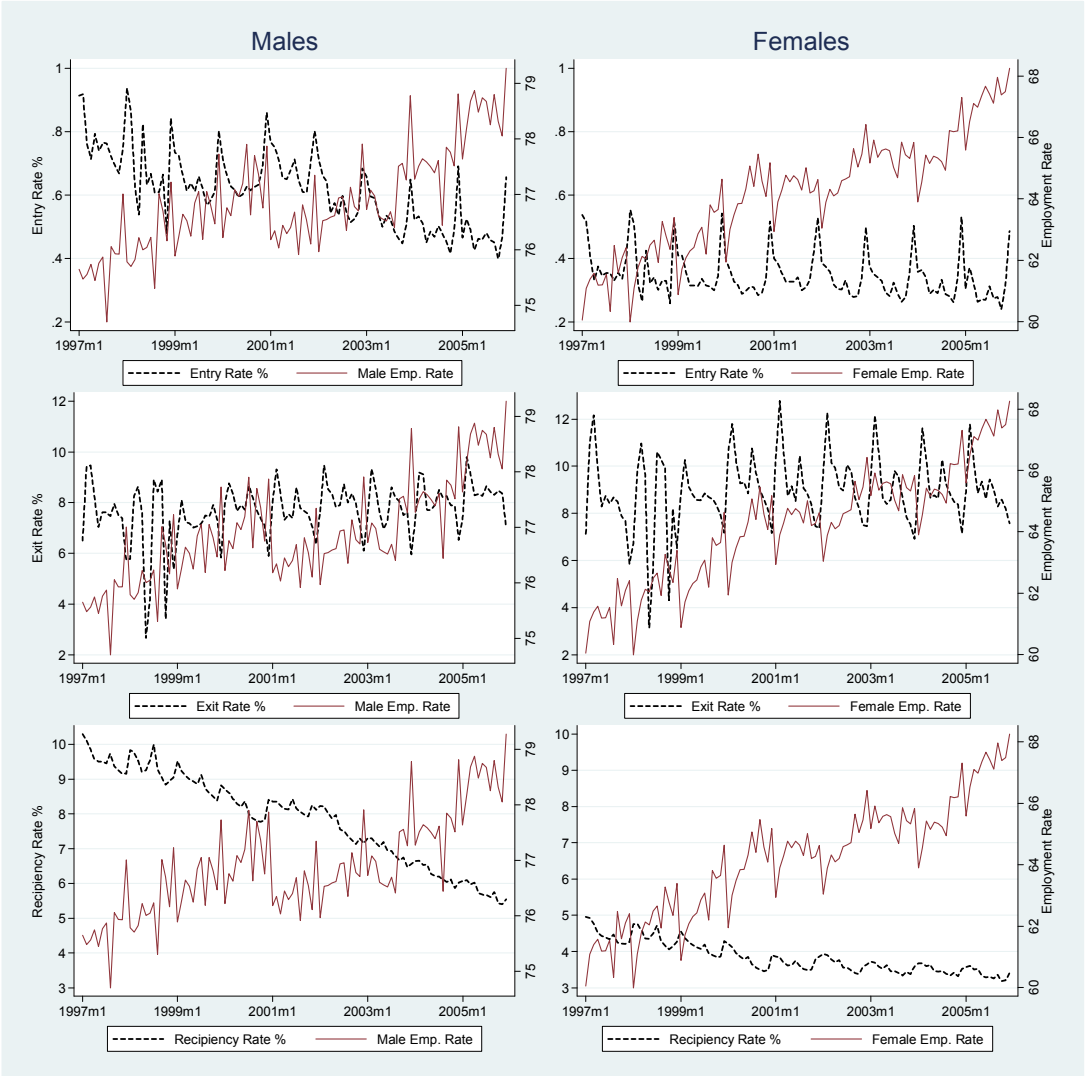
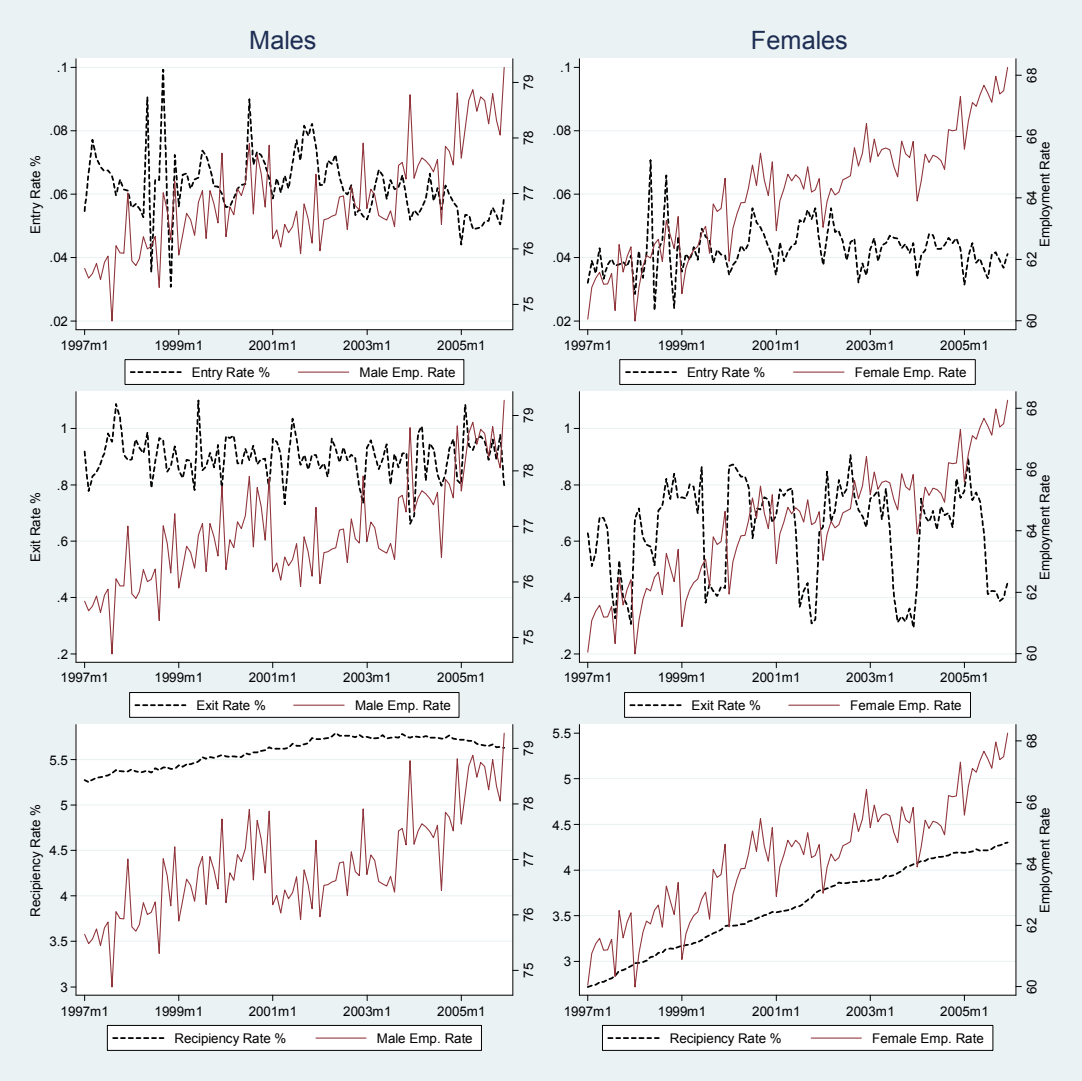
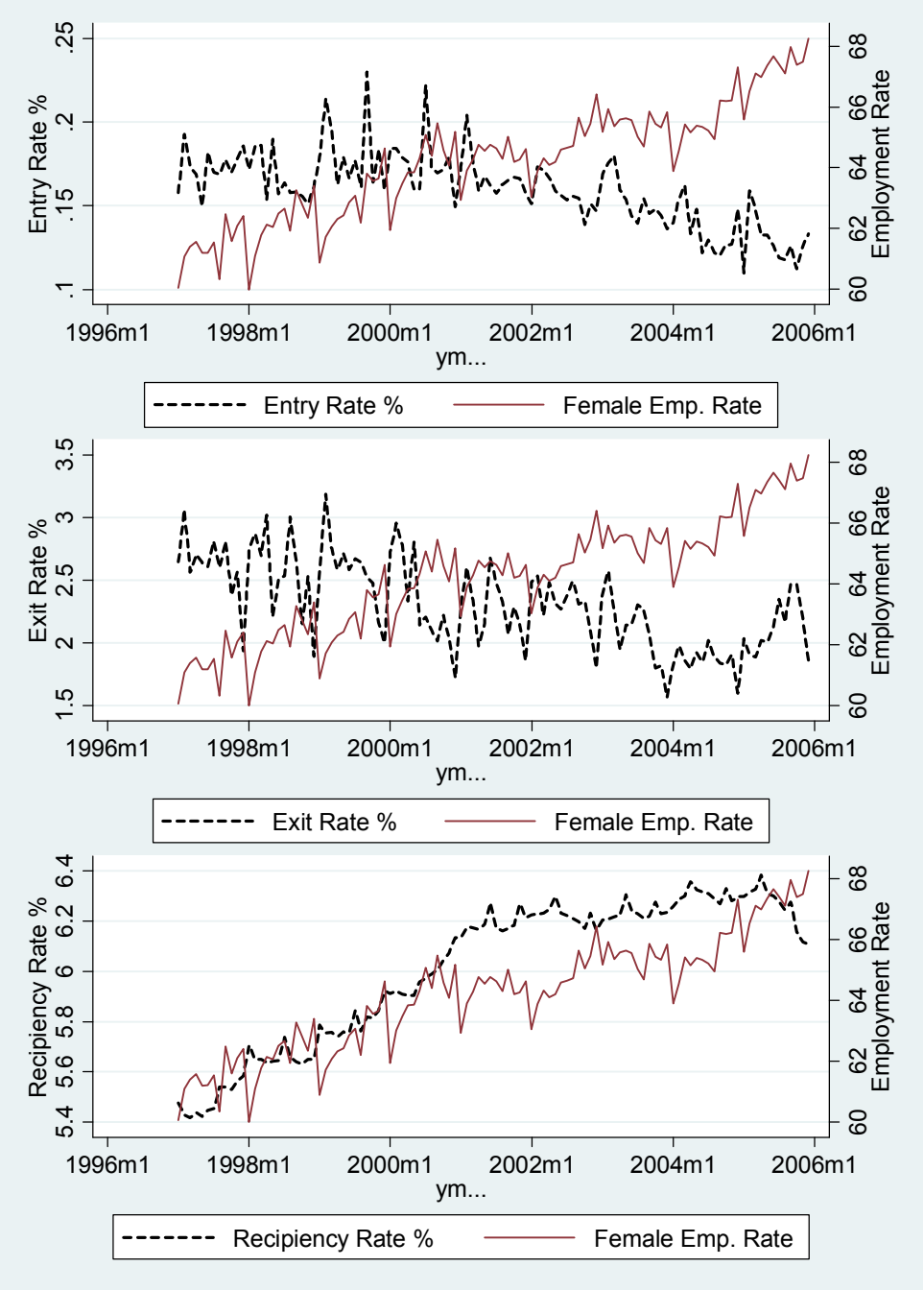


Figure 6: Entry, exit and receipt rates of DSP and total employment rate (Jan. 1997–Dec. 2005)[12]



[12] The regularly deep dips of the exit rate of female DSP recipients are perhaps due to the biannual increases of the female Age Pension entitlement age.

Figure 7: Entry, exit and receipt rates of SPP and total employment rate (Jan. 1997–Dec. 2005)



5.3. Specification of the flow models

5.3.1. The entry rate

Ideally we would estimate the inflow (or entry) rate model based on individual data where we could observe individuals commencing a payment from not being on welfare. Such data are not available. The LDS data include information only for those who are on income support; we therefore estimate our model for the entry rate using a grouped-data equivalent of the individual level logit model[13]. We calculate the entry rate for region i in month t, e_{it}, as the ratio of the number of entrants relative to the number of people at risk of going onto the payment (the number of people who were not on the payment in the previous month). We then estimate the grouped-data logit model at the region and month level as follows

$$(8)\ \ln\frac{e_{it}}{1-e_{it}} = \alpha_e + \beta_e Y_t + \lambda_e X_t + \gamma_t + \delta_i + \varepsilon_{it},$$

where Y_t represents the labour market condition variables; X_t refers to the other control variables, as will be clear later.[14] The model also includes a fixed time effect variable γ_t and a fixed region effect δ_i. For the time effect, we include a linear time trend variable by year to control for the general time trend, calendar month dummies to control for any seasonal effects, and a dummy for post-July 2002 to control for the effect of the introduction of Australians Working Together (AWT). For SPP we also include a dummy for post-September 2003 to capture the effect of the policy change to SPP thereafter.

5.3.2. The continuation rate

We estimate the continuation rate $c^k(Y_t)$ using individual level data. Let k_{ijt} be the number of months an individual j in region i has been on a payment and C_{jit} be the continuation indicator variable which is equal to zero if this individual leaves the payment and is equal to 1 otherwise. We estimate the probability of continuing on a payment using a logit specification as follows

[13] This is the model used in Klermain and Haider (2004)
[14] The variables include in the flow models are described in the Appendix 3 Table A14.

(9) $\log it(C_{jit}=1)=\alpha_c+\beta_c Y_{jit}+\lambda_c X_{jit}+\gamma_{ct}+\delta_{ci}+g(k_{jit})+\varepsilon_{ijt}$,

where $g_c(k_{jit})$ is a function of duration to capture the effect of duration dependence. It includes a censored variable that is equal to k_{ijt} if k_{ijt} <24 and equal to 24 otherwise; a set of dummy variables for the first three months; and for spell duration equal to 24 months or more. We assume that the continuation rate for durations longer than 24 months becomes constant. The duration dummies are used to capture the non-linear relationship between the duration on a payment and the continuation rate during the first few months, and the effect of censoring duration after 24 months. The fixed time effect is specified in the same way as in the entry rate model.

By controlling for the regional fixed effects in the flow models (which is done by including regional dummies in the model), the observed variations in the data across regions cannot be utilised to estimate the parameters of interest, such as the estimates for the employment rate variables. The parameters are identified via the movements through time of the variables. If labour market conditions are correlated with the regional fixed effect, the fixed effect model provides an unbiased estimate for the labour market condition variables. However if the variation in the data is small across time, the effect of the variable we try to estimate cannot be identified from the data. To take an extreme case, if the employment rate is constant over time, the estimate for it must be zero in the model. As shown earlier, our data on the labour market condition variables have just such a problem. That is, because the data only cover a period when the economy is continuously improving, the variation over time of the labour market condition variables may not be sufficient to identify its effects. A more accurate estimation of the relationship between labour market conditions and receipt flows may require a longer time period that covers more than one business cycle.[15]

As an alternative to the fixed effect model, we also estimate the flow models using pooled data, where the panel nature of the data is ignored. In the pooled data estimation, the variations in the data across regions are also used to identify the parameters of interest. In order to mitigate against the potential bias in the pooled data estimation arising from the correlation between the labour market condition variables and the regional fixed effects, we add two sets of additional variables, derived from

[15] Estimation results in Appendix 4 indeed show that using aggregate data, the estimated effects of labour market condition variables on income support receipt are much higher for the period 1965-1995 than for the period 1995-2005.

the 2001 Census data, to the pooled data model. One is the educational composition of the population in a region and the other is the immigration status composition of the population. In the results section we present estimations from both the fixed effect model and the pooled data model.

5.4. Estimation results

Since both the entry and continuation rates are estimated as a logit model, the coefficient estimates for the independent variables do not represent marginal effects and thus are not directly interpretable. However the sign of the estimates does indicate the impact direction of the variable concerned. For example, a negative estimate for a variable implies that the variable has a negative effect on the flow or the continuation rate. The employment rate variables are expected to have a negative effect on both the entry and continuation rates.

We report the results by payment type. For each payment we first show the flow model estimates for the employment rate variables, and we compare the actual receipt rates with those predicted by the model in order to examine the robustness of the model. Second, we simulate the effect of a 1 percentage point increase in the employment rate on the receipt rate. The effect is inferred by comparing the receipt rate path when the employment rate is fixed at its base (January 1997) level with its path when the employment rate is increased by 1 percentage point from the base level. The effect from this simulation can be readily used in forecasting models. Third, we assess the effect of the changes in the employment rate on the benefit receipt rate over the period January 1997 to December 2006. The effect is inferred by comparing the predicted receipt rate path using the observed employment rates with the path when the employment rate is fixed at its January 1997 level. We carry out these exercises for both the fixed effect model and the model that uses pooled data.

Before accepting the model estimation results reported below, we conducted extensive experiments on model specifications for each payment type in terms of whether, and how many, lagged employment rate variables should be included in the flow models. We chose the specifications based on our examination of the flow model estimation results (for example by looking at the sign and significance of the estimates on the employment rate variables) and the resulting fit of the predicted

receipt rate to the observed data. The results reported here represent our preferred model specifications judged by using these two basic criteria.

5.4.1. Stock-flow model estimation results for UB

5.4.1a. Flow model estimation

Table 5 presents the flow model estimates for the employment rate variable. Panel A contains the results from the fixed effect model and panel B from the pooled data model. The estimates for other variables can be found in the appendix Tables A4 to A7. In the UB flow rate regressions, only the current employment rate is included. We experimented with lagged employment rates, but we found that none of them was significant.

In both the entry rate and continuation rate models, the employment rate variables have the expected signs. That is, an increase in the employment rate is found to reduce both the UB entry rate and the continuation rate. However for females the full-time employment rate variable is found to be insignificant in both the fixed effect model and the pooled data model for the entry rate; the total employment rate in the fixed effect model for the entry rate is also insignificant. The lesser responsiveness of the female UB entry rate to the employment rate may be due to the fact that there are many other payments available for females.

Table 5: UB flow model estimates for the employment rate variables

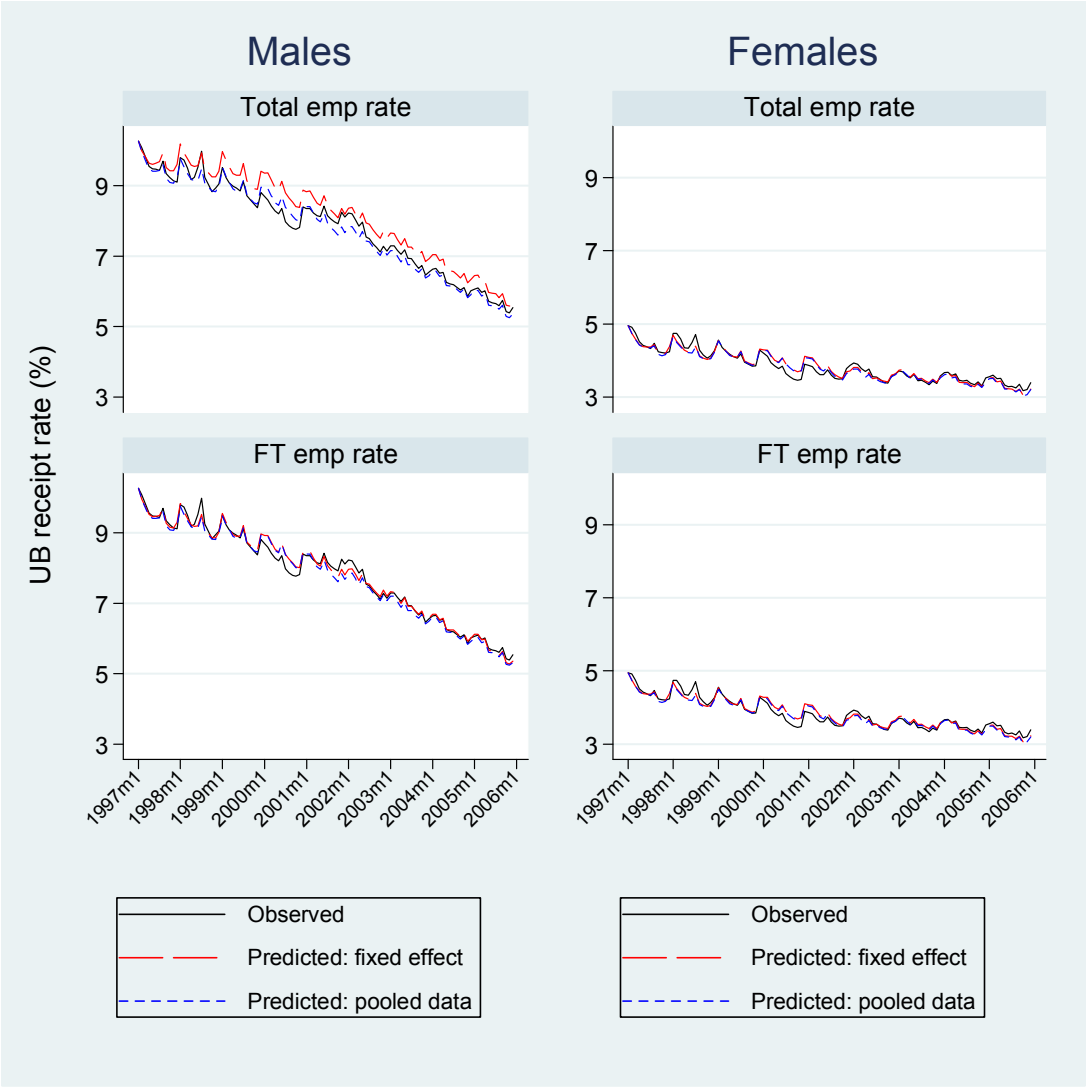
	Entry rate (grouped logit)				Continuation rate (logit)			
	Total Emp. Rate		FT Emp. Rate		Total Emp. Rate		FT Emp. Rate	
	Coef.	*S.E.*	Coef.	*S.E.*	Coef.	*S.E.*	Coef.	*S.E.*
A. Fixed effect model								
Males	-0.021***	0.003	-0.018***	0.002	-0.022***	0.001	-0.018***	0.001
Females	-0.002	0.003	-3.E-05	0.003	-0.015***	0.002	-0.013***	0.002
B. Pooled data model								
Males	-0.018***	0.005	-0.016***	0.005	-0.029***	0.001	-0.024***	0.001
Females	-0.017***	0.004	-0.004	0.008	-0.021***	0.001	-0.023***	0.001

*** Significant at 1% level; ** at 5% level and * at 10% level.

Figure 8 compares the models' predicted UB receipt rate with the actual (or observed) receipt rate. In general the stock-flow model seems to predict the observed data well. One exception is the fixed effect model for males that uses the total employment rate. This model always appears to over-predict the observed receipt rate to some extent. It

appears that the models using pooled data predict the observed data slightly better than do the fixed effect models.

Figure 8: Model-predicted and observed UB receipt rates

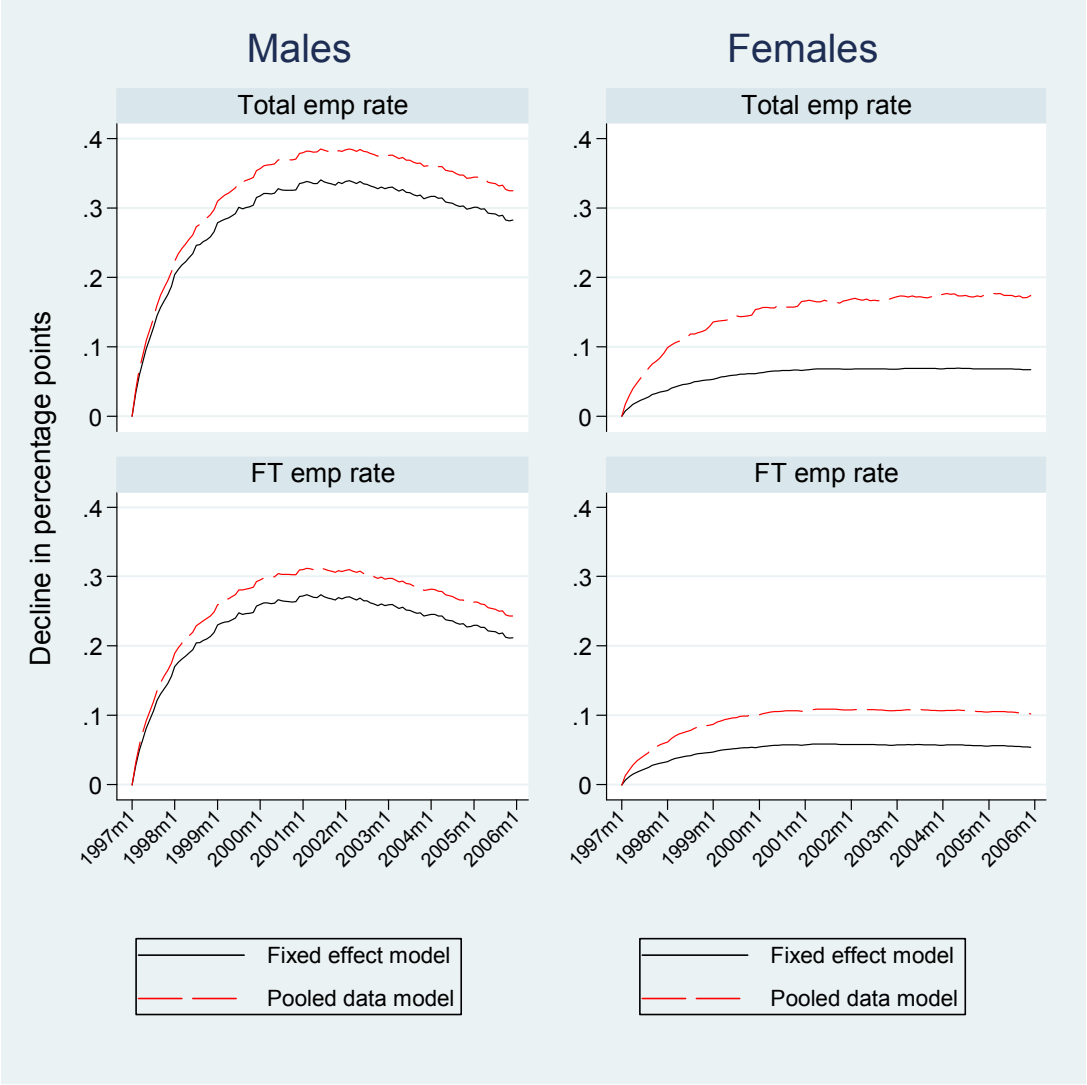


5.4.1b. Simulation of the effect of a 1 percentage point rise in the employment rate

Figure 9 shows the effect of a 1 percentage point increase in the employment rate on the UB receipt rate. This effect is calculated as the difference between the simulated receipt path, when the employment rate is fixed at its January 1997 level, and the simulated path when the employment rate is increased by 1 percentage point from its January 1997 level. For ease of reading, Table 6 presents the results at selected time points (a year apart). The numbers in the figure and the table represent the percentage point decline in the UB receipt rate due to the 1 percentage point increase in the employment rate. As such, a negative number indicates that the effect is to increase

the receipt rate. Recall that because the continuation rate is duration-dependent, the effect of the one-off change in the employment rate can last for many periods; this is implied in the estimated effects.

Figure 9: Simulated percentage point decline in the UB receipt rate due to a 1 percentage point increase in the employment rate



To show how to interpret the results, let us look at the first data column in the upper panel of Table 6. The numbers there show the effect of the 1 percentage point increase in the employment rate on the male UB receipt rate simulated using the fixed effect model; the total employment rate is used as the labour market condition variable. When the total employment rate increases by a percentage point from its January 1997 level, the male UB receipt rate is 0.20 percentage points lower in a year's time

(as in January 1998); in two years the receipt rate reduces by 0.28 percentage points (as in January 1999); and so on. The effect peaks in 5 year's time.

For both males and females, the effect is larger when the total employment rate rather than the full-time employment rate is used. No matter which employment rate is used, the effect from the pooled data model is larger than that from the fixed effect model, particularly for females. As would be expected from the flow model estimation results, the effect on females is much smaller than that on males.

Table 6: Simulated percentage point decline in the UB receipt rate due to a 1 percentage point increase in the employment rates

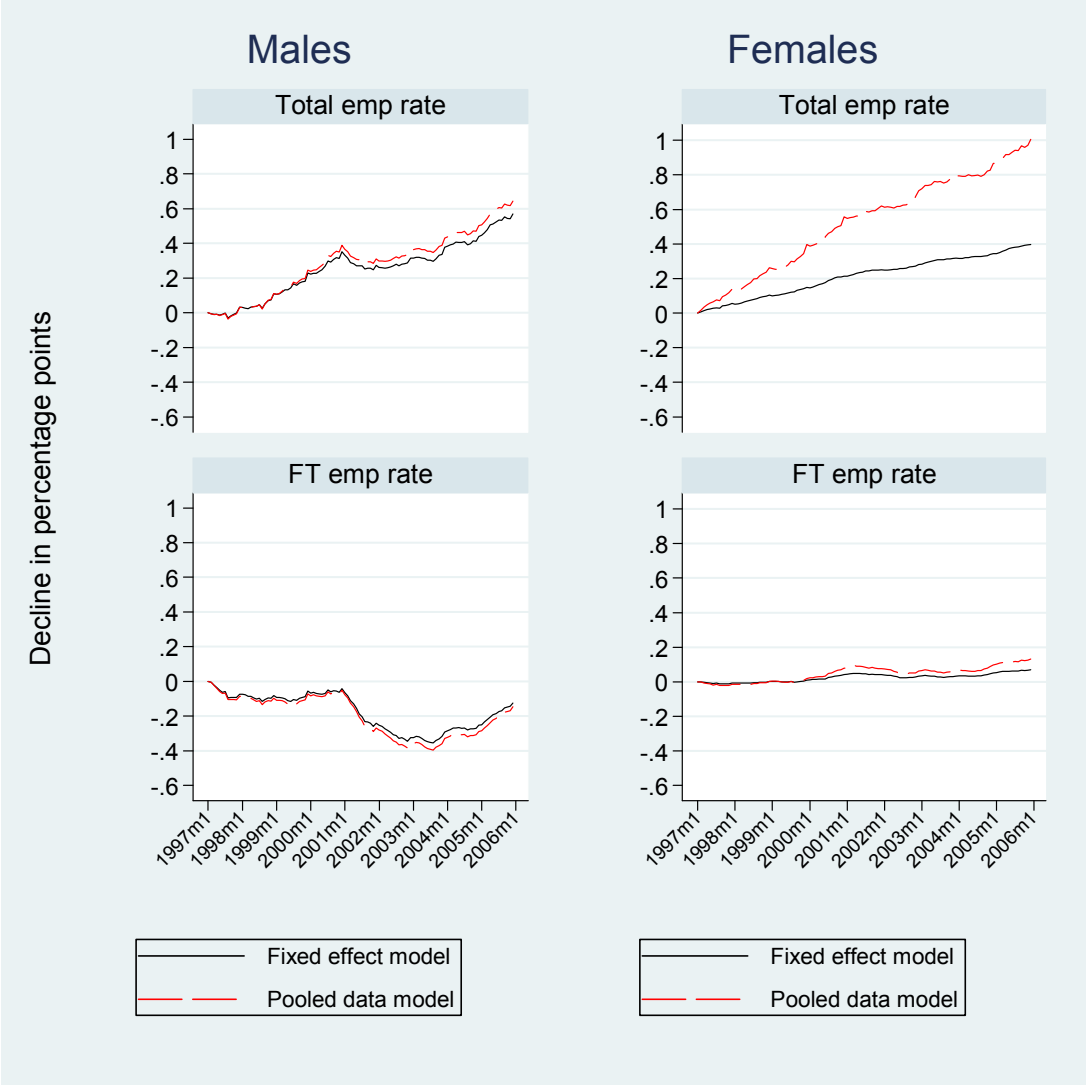
	Males		Females	
	Total employ rate	FT employ rate	Total employ rate	FT employ rate
Receipt rate decline as of				
A. Fixed effect model				
Year 1 (Jan-1998)	0.2037	0.1701	0.0371	0.0332
Year 2 (Jan 1999)	0.2783	0.2302	0.0530	0.0469
Year 3 (Jan 2000)	0.3173	0.2596	0.0622	0.0544
Year 4 (Jan 2001)	0.3363	0.2721	0.0664	0.0575
Year 5 (Jan 2002)	0.3383	0.2701	0.0677	0.0579
Year 6 (Jan 2003)	0.3295	0.2594	0.0677	0.0572
Year 7 (Jan 2004)	0.3164	0.2455	0.0682	0.0571
Year 8 (Jan 2005)	0.3008	0.2298	0.0678	0.0560
Year 9 (Dec 2005)	0.2824	0.2119	0.0666	0.0543
B. Pooled data model				
Year 1 (Jan-1998)	0.2248	0.1904	0.0993	0.0579
Year 2 (Jan 1999)	0.3104	0.2604	0.1355	0.0813
Year 3 (Jan 2000)	0.3574	0.2965	0.1544	0.0940
Year 4 (Jan 2001)	0.3802	0.3114	0.1649	0.0991
Year 5 (Jan 2002)	0.3842	0.3099	0.1679	0.0999
Year 6 (Jan 2003)	0.3758	0.2982	0.1712	0.0989
Year 7 (Jan 2004)	0.3616	0.2819	0.1744	0.0987
Year 8 (Jan 2005)	0.3443	0.2633	0.1751	0.0970
Year 9 (Dec 2005)	0.3245	0.2430	0.1723	0.0942

5.4.1c. Simulation of the effect of recent changes in the employment rate

The difference between the simulated receipt rate where the employment rate is kept at its January 1997 level and the models' predicted receipt rate represents the effect of the changes in the employment rates on the receipt rates during the period from January 1997 to the end of the data period (December 2005). Figure 10 shows the effect expressed as the percentage point reduction in the receipt rate. For ease of reading, Table 7 reproduces the results at one-year intervals (from the second to the

fourth data columns). To put the effect estimate into context, the first data column in the table shows the observed UB receipt rate during the period.

Figure 10: Simulated percentage point decline in the UB receipt rate due to recent changes in the employment rate



For both males and females, the increase in the total employment rate helps to reduce the UB receipt rate over the period examined. Because the male full-time employment rate underwent declines in early 1997 and 2001, the effect of the full-time employment rate works to increase the male UB receipts. The female full-time employment rate has virtually no effect on the female UB receipt rate. While for males the fixed effect model and the pooled data model produce very similar results, no matter which employment rate is used, for females the pooled data model produces a much larger effect than the fixed effect model where the total employment rate is concerned.

Table 7: Simulated percentage point decline in the UB receipt rate due to recent changes in the employment rate

	Observed	Fixed effect model		Pooled data model	
	receipt rate	Total emp rate	FT emp rate	Total emp rate	FT emp rate
	Males				
Year 1 (Jan-1998)	9.8041	0.0315	-0.0731	0.0299	-0.0837
Year 2 (Jan 1999)	9.5145	0.1070	-0.0925	0.1077	-0.1080
Year 3 (Jan 2000)	8.6997	0.2221	-0.0661	0.2389	-0.0824
Year 4 (Jan 2001)	8.3547	0.3304	-0.0654	0.3662	-0.0763
Year 5 (Jan 2002)	8.2319	0.2615	-0.2511	0.2992	-0.2792
Year 6 (Jan 2003)	7.2947	0.3151	-0.3246	0.3636	-0.3593
Year 7 (Jan 2004)	6.6393	0.3837	-0.2850	0.4375	-0.3224
Year 8 (Jan 2005)	6.0658	0.4475	-0.2487	0.5076	-0.2849
Year 9 (Dec 2005)	5.5423	0.5686	-0.1239	0.6441	-0.1465
	Females				
Year 1 (Jan-1998)	4.7405	0.0513	-0.0081	0.1308	-0.0150
Year 2 (Jan 1999)	4.5575	0.1009	0.0027	0.2570	0.0047
Year 3 (Jan 2000)	4.2041	0.1474	0.0120	0.3875	0.0224
Year 4 (Jan 2001)	3.8627	0.2133	0.0431	0.5470	0.0807
Year 5 (Jan 2002)	3.9319	0.2480	0.0398	0.6138	0.0742
Year 6 (Jan 2003)	3.7140	0.2838	0.0341	0.7205	0.0656
Year 7 (Jan 2004)	3.6658	0.3156	0.0342	0.7941	0.0661
Year 8 (Jan 2005)	3.5618	0.3444	0.0538	0.8745	0.1008
Year 9 (Dec 2005)	3.3967	0.3980	0.0698	1.0056	0.1310

5.4.2. Stock-flow model estimation results for DSP

5.4.2a. Flow model estimation

Table 8 presents the DSP flow model estimates for the employment rate variables. Here the employment rate used (both total and full-time) is the 12-month lagged one. As discussed earlier, changes in labour market conditions are unlikely to cause immediate individual responses regarding DSP entry and exit. However, the issue of how lagged the labour market conditions variable should be, is an empirical question. We have experimented with various lagged employment rate variables (such as one-, three-, six- and nine-month lags) and their combinations. In most cases we found the employment rate variables were insignificant in both the entry and continuation rate regressions, particularly when the fixed effect model was estimated. Eventually we settled on the 12-month-lagged employment rate variable using the criteria discussed earlier. As shown in Table 8, even with the 12-month-lagged employment rate variable, the fixed effect model produces insignificant estimates for the employment

rate variable in 7 of the 8 cases. Only when the full-time employment rate is used is the estimate found to be significant in the fixed effect model for the male entry rate. In the pooled data model for the continuation rate, the estimates for females are not significant either. The pooled data model results show that both the male and female entry rates are affected by the employment rate (no matter how it is measured); it is also found that both of the employment rate variables have a significant effect on the male continuation rate.

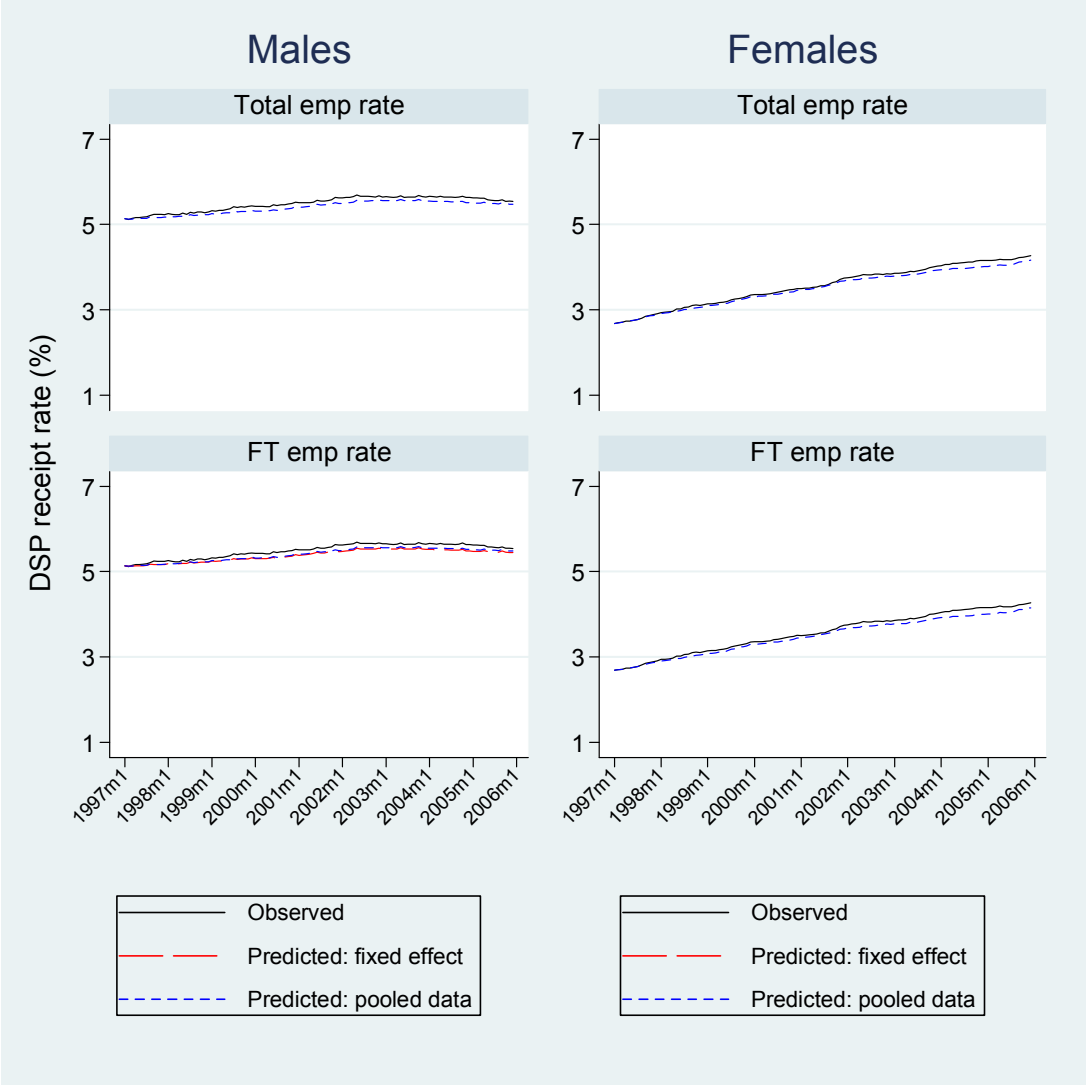
Table 8: DSP flow model estimates for the employment rate variables

	Entry rate (grouped logit)				Continuation rate (logit)			
	Total Emp. Rate[a]		FT Emp. Rate[a]		Total Emp. Rate[a]		FT Emp. Rate[a]	
	Coef.	*S.E.*	Coef.	*S.E.*	Coef.	*S.E.*	Coef.	*S.E.*
A. Fixed effect model								
Males	-0.008	0.007	-0.013**	0.006	-0.005	0.005	-0.004	0.004
Females	0.002	0.008	-0.010	0.009	0.003	0.007	0.004	0.008
B. Pooled data model								
Males	-0.030***	0.004	-0.027***	0.003	-0.015***	0.003	-0.012***	0.003
Females	-0.026***	0.006	-0.030***	0.007	0.002	0.005	0.000	0.006

Note: a) The employment rate refers to the 12 month lagged rate.
*** Significant at 1% level; ** at 5% level and * at 10% level.

Figure 11 plots the models' predicted DSP receipt rate, along with the observed receipt rate. For self-evident reasons, we did not do the prediction for models where the estimates for the employment rate variable are insignificant in both the entry and continuation rate regressions. Except towards the end of the data period, where there is some visible difference between the predicted and the observed receipt rates, the models generally seem to predict the observed data well.

Figure 11: Model-predicted and observed DSP receipt rates



5.4.2b. Simulation of the effect of a 1 percentage point rise in the employment rate

We used the flow models that produced a significant estimate for the employment rate variable in either the entry rate or the continuation rate regressions to examine the effect of a 1 percentage point increase in the employment rate on the DSP receipt rate. The results are presented in Figure 12 and Table 9. The interpretation of the results is the same as for the results in Figure 9 and Table 6.

Since for males the effect can only be estimated when the full-time employment rate is used in the fixed effect model, we focus our discussion on the results from the pooled data model. When the total employment rate is used, a 1 percentage point increase in the employment rate is estimated to lead to 0.03 and 0.01 percentage point reductions in the DSP receipt rate in a year's time for males and females respectively;

in five years the reduction increases to 0.11 and 0.05 percentage points; and in nine years the reductions reach 0.15 and 0.08 percentage points. Compared with the model that uses the full-time employment rate, the effect from the model that uses the total employment rate is slightly smaller for males, and slightly larger for females.

Figure 12: Simulated percentage point decline in the DSP receipt rate due to a 1 percentage point increase in the employment rate

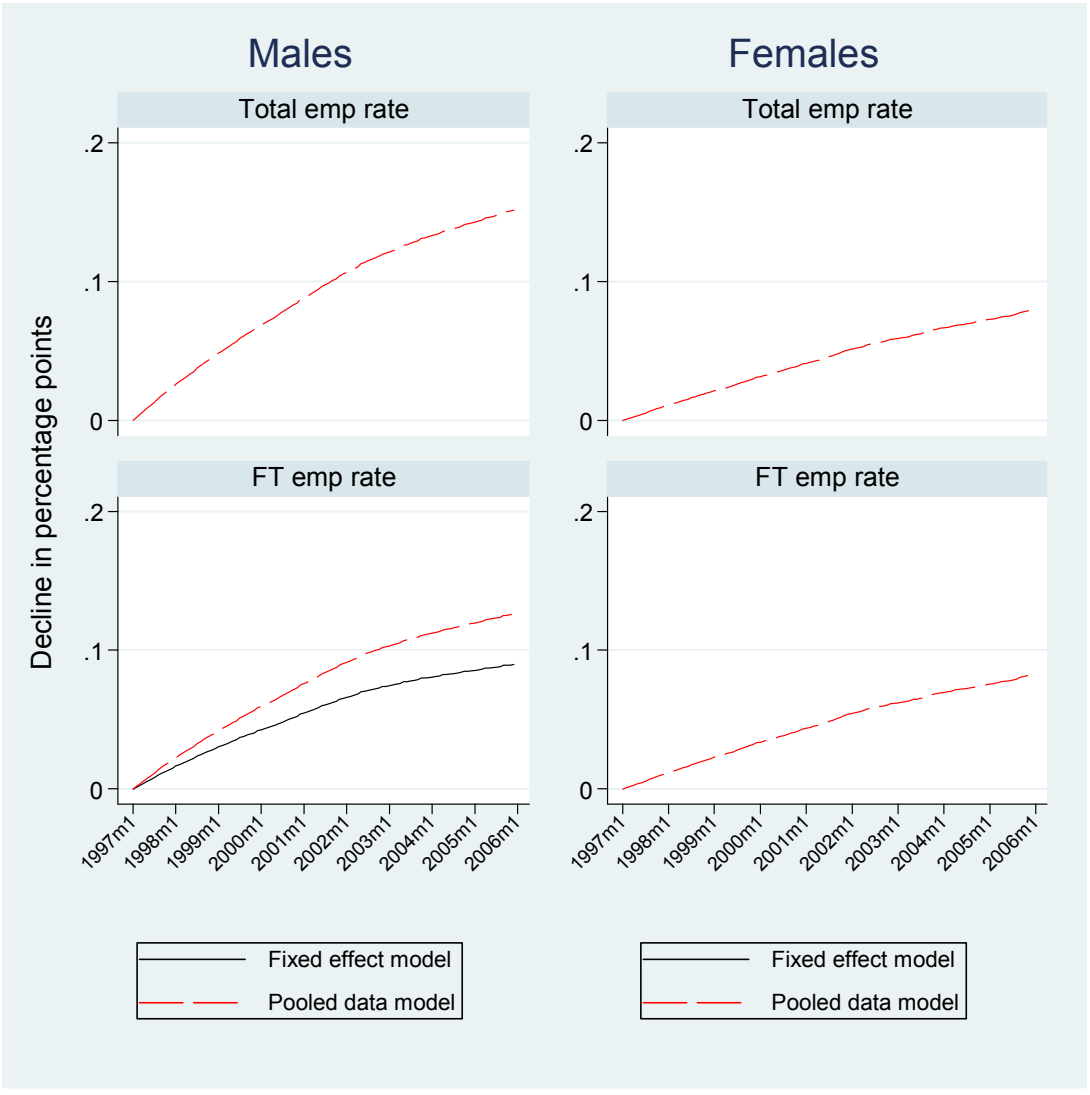


Table 9: Simulated percentage point decline in the DSP receipt rate due to a 1 percentage point increase in the employment rates

	Males		Females	
	Total employ rate	FT employ rate	Total employ rate	FT employ rate
Receipt rate decline as of				
A. Fixed effect model				
Year 1 (Jan-1998)	n.a.	0.0165	n.a.	n.a.
Year 2 (Jan 1999)	n.a	0.0305	n.a	n.a
Year 3 (Jan 2000)	n.a	0.0426	n.a	n.a
Year 4 (Jan 2001)	n.a	0.0547	n.a	n.a
Year 5 (Jan 2002)	n.a	0.0659	n.a	n.a
Year 6 (Jan 2003)	n.a	0.0744	n.a	n.a
Year 7 (Jan 2004)	n.a	0.0806	n.a	n.a
Year 8 (Jan 2005)	n.a	0.0855	n.a	n.a
Year 9 (Dec 2005)	n.a	0.0896	n.a	n.a
B. Pooled data model				
Year 1 (Jan-1998)	0.0259	0.0226	0.0111	0.0119
Year 2 (Jan 1999)	0.0484	0.0421	0.0213	0.0228
Year 3 (Jan 2000)	0.0688	0.0595	0.0315	0.0338
Year 4 (Jan 2001)	0.0882	0.0759	0.0410	0.0437
Year 5 (Jan 2002)	0.1065	0.0912	0.0513	0.0544
Year 6 (Jan 2003)	0.1213	0.1031	0.0589	0.0620
Year 7 (Jan 2004)	0.1330	0.1122	0.0666	0.0696
Year 8 (Jan 2005)	0.1428	0.1197	0.0727	0.0755
Year 9 (Dec 2005)	0.1514	0.1260	0.0796	0.0823

5.4.2c. Simulation of the effect of recent changes in the employment rate

Figure 14 and Table 10 contain the effects of recent changes in employment rates on the DSP receipt rate. The simulation results show that the changes in the total employment rate over the period January 1997 to December 2005 might have helped to reduce the DSP receipt rate for both males and females. However the changes in the full-time employment rates seem to work to increase the DSP receipt rates. The effects are not substantial, even in the case of the total employment rate. For example, compared with the scenario where the total employment rate is fixed at its January 1997 level, the increases in the total employment rate over the period reduce the DSP receipt rate by 0.18 and 0.28 percentage points for males and females respectively at the end of the period where the effect is the largest (December 2005). These reductions account for only about 2 and 6 percent of the receipt rate levels of males and females respectively in December 2005. Therefore, even if labour market

conditions have an effect on DSP receipts, the estimations here suggest that such effects may not be large.

Figure 13: Simulated percentage point decline in the DSP receipt rate due to recent changes in the employment rate

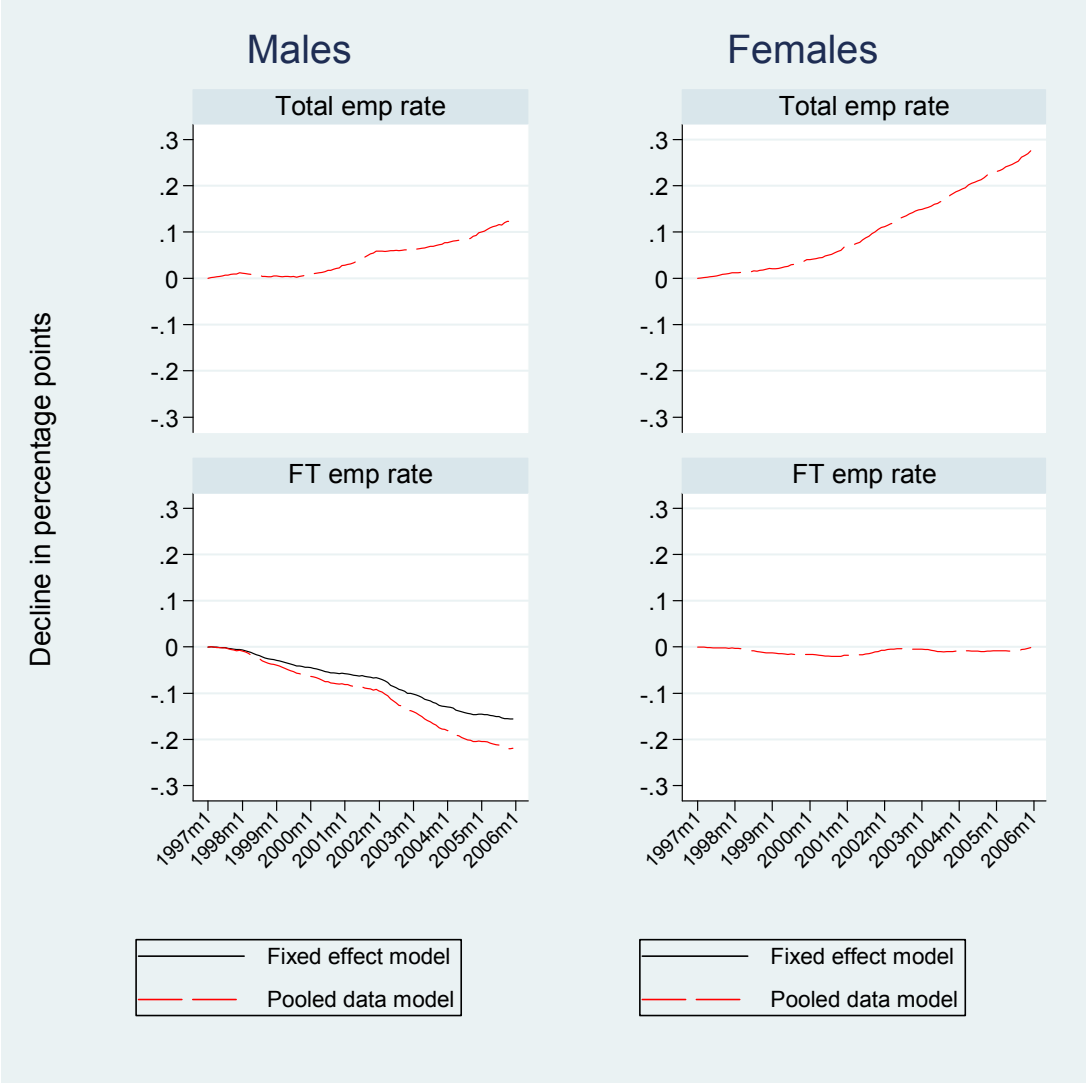


Table 10: Simulated percentage point decline in the DSP receipt rate due to recent changes in the employment rate

	Observed	Fixed effect model		Pooled data model	
	receipt rate	Total emp rate	FT emp rate	Total emp rate	FT emp rate
	Males				
Year 1 (Jan-1998)	5.2567	n.a.	-0.0066	0.0111	-0.0089
Year 2 (Jan 1999)	5.3236	n.a	-0.0287	0.0047	-0.0395
Year 3 (Jan 2000)	5.4271	n.a	-0.0451	0.0092	-0.0634
Year 4 (Jan 2001)	5.5100	n.a	-0.0579	0.0281	-0.0810
Year 5 (Jan 2002)	5.6254	n.a	-0.0684	0.0586	-0.0947
Year 6 (Jan 2003)	5.6520	n.a	-0.1018	0.0627	-0.1404
Year 7 (Jan 2004)	5.6599	n.a	-0.1297	0.0774	-0.1803
Year 8 (Jan 2005)	5.6231	n.a	-0.1455	0.1001	-0.2040
Year 9 (Dec 2005)	5.5380	n.a	-0.1554	0.1289	-0.2193
	Females				
Year 1 (Jan-1998)	2.9389	n.a.	n.a.	0.0116	-0.0029
Year 2 (Jan 1999)	3.1416	n.a	n.a	0.0205	-0.0130
Year 3 (Jan 2000)	3.3583	n.a	n.a	0.0404	-0.0160
Year 4 (Jan 2001)	3.4989	n.a	n.a	0.0676	-0.0174
Year 5 (Jan 2002)	3.7512	n.a	n.a	0.1117	-0.0070
Year 6 (Jan 2003)	3.8595	n.a	n.a	0.1491	-0.0050
Year 7 (Jan 2004)	4.0397	n.a	n.a	0.1894	-0.0084
Year 8 (Jan 2005)	4.1542	n.a	n.a	0.2305	-0.0079
Year 9 (Dec 2005)	4.2665	n.a	n.a	0.2754	-0.0011

5.4.3. Stock-flow model estimation results for SPP

5.4.3a. Flow model estimation

After carrying out extensive experiments for the SPP flow model estimations, we settled on the six-month-lagged employment rate. Table 11 presents the coefficient estimates for the six-month-lagged employment rate variable from the various models. All of the coefficient estimates appear to have the expected sign, but there are three cases where the employment rate variable is insignificant. These are when the total employment rate is used in the fixed effect model for the entry rate and for the continuation rate, and when the full-time employment rate is used in the pooled data model for the entry rate.

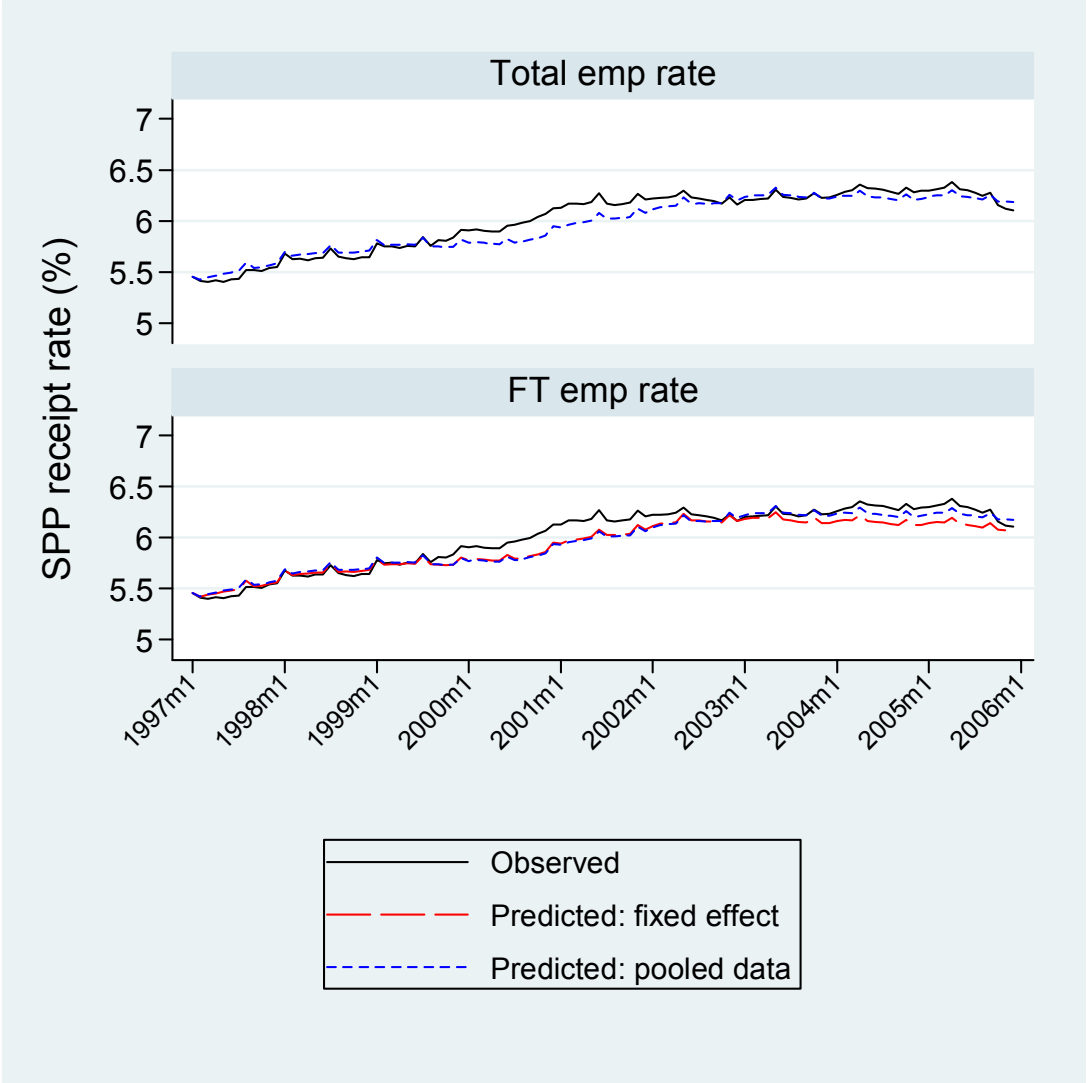
Table 11: SPP flow model estimates for the employment rate variables

	Entry rate (grouped logit)				Continuation rate (logit)			
	Total Emp. Rate[a]		FT Emp. Rate[a]		Total Emp. Rate[a]		FT Emp. Rate[a]	
	Coef.	*S.E.*	Coef.	*S.E.*	Coef.	*S.E.*	Coef.	*S.E.*
Fixed effects model	-0.004	0.003	-0.009**	0.004	-0.004	0.003	-0.009***	0.003
Pooled data model	-0.012***	0.003	-0.005	0.006	-0.007***	0.002	-0.016***	0.002

Note: a) The employment rate refers to the 6 month lagged rate.
*** Significant at 1% level; ** at 5% level and * at 10% level.

Figure 14 provides an assessment of the fit of the model to the observed data by comparing the models' predicted receipt rate with the observed receipt rate. Because in the fixed effect model with the full-time employment rate, the employment rate variable is insignificant in the entry rate and continuation rate regressions, this model is not assessed. The stock-flow models seems to predict the observed receipt rates well, except for the period from 2001 to 2002 where to some extent the models underestimate the observed receipt rate. The second panel in the figure shows that when the full-time employment rate is used, the pooled data model and the fixed effect model have almost the same predictive power for most of the period; towards the end of the period, the pooled data model does appear to predict the observed data better than the fixed effect model.

Figure 14: Model-predicted and observed SPP receipt rate



5.4.3b. Simulation of the effect of a 1 percentage point increase in the employment rate

Figure 15 and Table 12 show the effects of a 1 percentage point increase in the employment rate from its January 1997 level. When both the fixed effect and the pooled data model are used to examine the effect (when the full-time employment rate is used, as indicated in the lower panel of Figure 15), the two models produce very similar results. Estimates from the fixed effect model are slightly higher than the effects from the pooled data model. The estimates from the pooled data models that use the total employment rate are slightly higher than the estimates from the models that use the full-time employment rate. For example, the pooled data models predict that a 1 percentage point increase in the total employment rate would raise the SPP receipt rate by 0.029 percentage points in one year's time, 0.083 in five years, and 0.104 in nine years, while a 1 percentage point increase in the full-time employment rate raises the SPP receipt rate by 0.023, 0.071 and 0.090 percentage points in one, five and nine year's time respectively.

Figure 15: Simulated percentage point decline in the SPP receipt rate due to a 1 percentage point increase in the employment rate

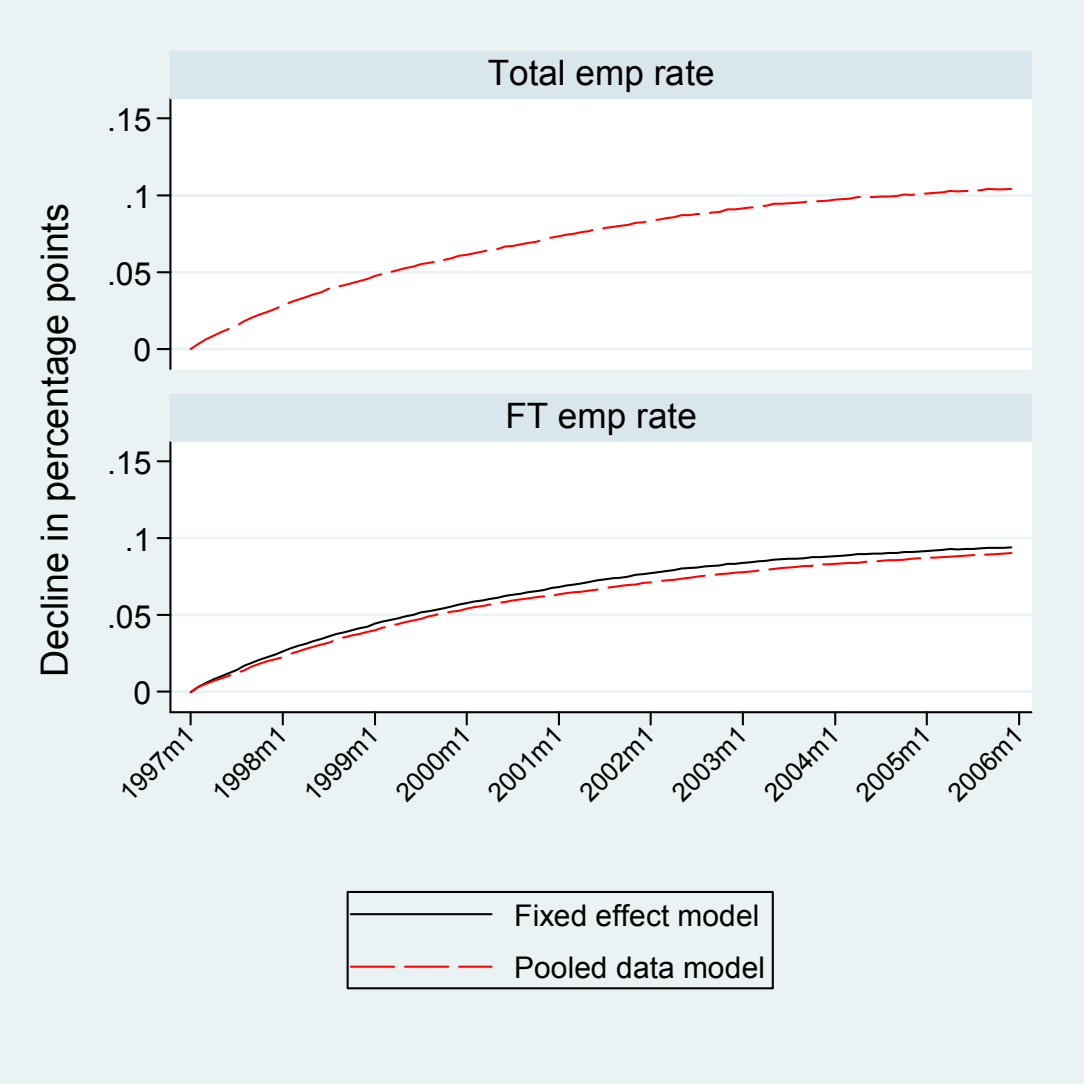


Table 12: Simulated percentage point decline in the SPP receipt rate due to a 1 percentage point increase in the employment rate

	Fixed effect model		Pooled data model	
	Total employ rate	FT employ rate	Total employ rate	FT employ rate
Decline as of				
Year 1 (Jan-1998)	n.a.	0.0264	0.0286	0.0225
Year 2 (Jan 1999)	n.a.	0.0443	0.0476	0.0399
Year 3 (Jan 2000)	n.a.	0.0577	0.0614	0.0541
Year 4 (Jan 2001)	n.a.	0.0684	0.0732	0.0634
Year 5 (Jan 2002)	n.a.	0.0774	0.0834	0.0713
Year 6 (Jan 2003)	n.a.	0.0840	0.0915	0.0780
Year 7 (Jan 2004)	n.a.	0.0884	0.0971	0.0832
Year 8 (Jan 2005)	n.a.	0.0917	0.1012	0.0871
Year 9 (Dec 2005)	n.a.	0.0940	0.1043	0.0903

5.4.3c. Simulation of the effect of recent changes in the employment rate

The estimated effects of the recent changes in the employment rate on the SPP receipt rate are shown in Figure 16 and Table 13. The estimates from both the fixed effect model and the pooled data model show that the changes in the full-time employment rate over the period January 1997 to December 2005 (as compared with the rate at the January 1997 level) have a positive effect on the SPP receipt rate. The estimates from the two models are very close, but both are of very small magnitude. On the other hand, the changes in the total employment rate (as compared with its January 1997 level) initially have a positive effect on the receipt rate, but from 2000 onwards the effects are negative. For example, the estimates using the pooled data models show that the changes in the total employment rate over the period from January 1997 to January 2002 would have reduced the receipt rate by 0.12 percentage points in January 2002; the changes in the total employment rate over the period January 1997 to December 2005 helped to reduce the receipt rate by 0.31 percentage points in December 2005.

Figure 16: Simulated percentage point decline in the SPP receipt rate due to recent changes in the employment rate

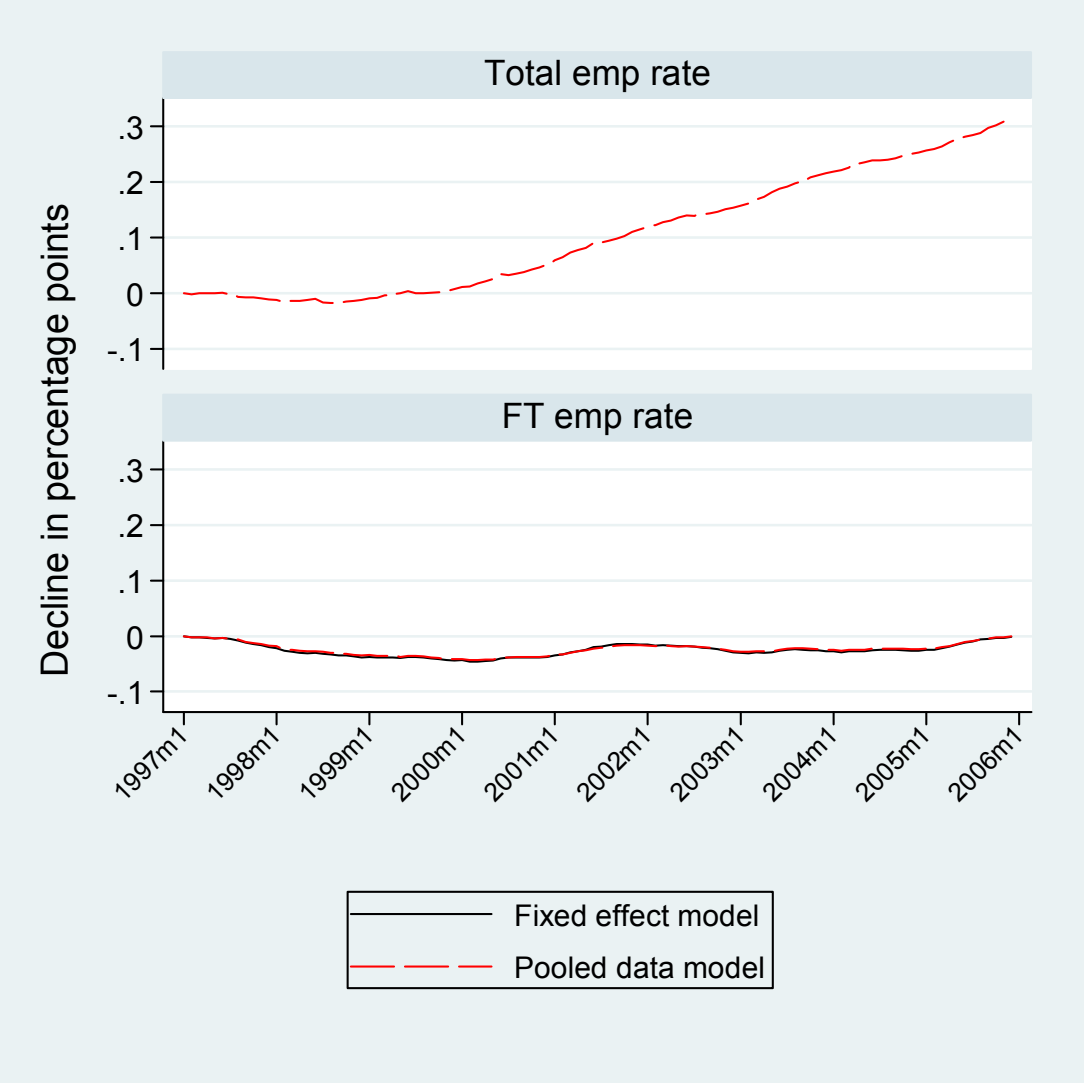


Table 13: Simulated percentage point decline in the DSP receipt rate due to recent changes in the employment rate

	Observed receipt rate	Fixed effect model		Pooled data model	
		Total emp rate	FT emp rate	Total emp rate	FT emp rate
Year 1 (Jan-1998)	5.6781	n.a.	-0.0216	-0.0119	-0.0182
Year 2 (Jan 1999)	5.7814	n.a	-0.0370	-0.0091	-0.0338
Year 3 (Jan 2000)	5.9050	n.a	-0.0433	0.0108	-0.0412
Year 4 (Jan 2001)	6.1274	n.a	-0.0342	0.0592	-0.0336
Year 5 (Jan 2002)	6.2218	n.a	-0.0154	0.1189	-0.0169
Year 6 (Jan 2003)	6.2026	n.a	-0.0300	0.1573	-0.0278
Year 7 (Jan 2004)	6.2568	n.a	-0.0275	0.2185	-0.0249
Year 8 (Jan 2005)	6.2973	n.a	-0.0249	0.2561	-0.0229
Year 9 (Dec 2005)	6.1056	n.a	-0.0013	0.3142	-0.0007

6. Comparison of the stock–flow model results with aggregate data results

In the stock-flow model estimation we simulated the effect of a 1 percentage point increase in the employment rate on the receipt rate. This simulated effect should be comparable to the coefficient estimate on the employment rate variable from the aggregate data. This is because the coefficient also measures the effect of a 1 percentage point change in the employment rate on the receipt rate. However making such a comparison is not straightforward because the simulated effect is (elapsed) time-dependent. For example, as shown in the previous section, the effect in one year's time is different to that in two, three, or five year's time. When lagged employment rate variables are required in the aggregate data model, the effect also depends on time, but there time is limited by the number of lags included in the model. In the stock-flow model estimation there is no such clearly defined time limit. In addition, the fact that the estimation is based on annual data in the aggregate data model, but on monthly data in the stock-flow model, also makes the comparison more difficult. For example we cannot compare the simulated effect in one month's time with the coefficient estimate from the aggregate data model. Given that the aggregate data estimates are based on annual data, the closest comparable stock-flow estimates will be those based on simulated effects in one year's time (provided the aggregate data model includes no lagged employment rates). When the aggregate date model includes one year lagged employment rate, then the closet comparable stock-flow estimate will be a two-year estimate. There are clearly problems in the way we choose the 'comparable' estimates from the simulated effects, but there seem to be no other better options than those chosen here.

For ease of comparison, we collect the 'comparable' estimates from the two estimation approaches in Table 14. Note that for the simulated effects from the stock-flow model estimation we only use the results from the pooled data model. This is for two reasons. First, there are no fixed effect model estimates from the aggregate data model. Second, for DSP and SPP the simulated effects cannot be calculated for all of the fixed effect models, as shown in the previous section.

Table 14: Comparison of stock-flow estimates with the aggregate data estimates

	UB		DSP		SPP	
	Aggregate data	Stock-flow data	Aggregate data	Stock-flow data	Aggregate data	Stock-flow data
	Males					
Total emp rate	-0.7585[a]	-0.2248[b]	-0.1429[e]	-0.0688[f]	n.a.	n.a.
FT emp rate	-1.0571[c]	-0.2604[d]	-0.1722[g]	-0.0759[h]	n.a.	n.a.
	Females					
Total emp rate	-0.3114[a]	-0.0993[b]	n.a.	n.a.	-0.3007[c]	-0.0479[d]
FT emp rate	-0.4478[a]	-0.0579[b]	n.a.	n.a.	-0.4098[c]	-0.0399[d]

Note: a) Refers to the coefficient on the current employment rate. b) Refers to the simulated effect in one year's time. c) Refers to the sum of the coefficients on the current and one-year-lagged employment rate. d) Refers to the simulated effect in two year's time. e) Refers to the sum of the coefficients on the one-, two- and three-year-lagged employment rates. f) Refers to the simulated effect in three year's time. g) Refers to the sum of the coefficients on the one-, two-, three- and four-year-lagged employment rates. h) Refers to the simulated effect in four year's time.

Although both estimation approaches show that an increase in the employment rate reduces the level of income support receipt, there are substantial differences in the size of the estimated effects between the two approaches. That is, the estimates from the stock-flow modelling are much smaller than the effects from the aggregate data model for all payment types, no matter which employment rate is used. There are perhaps several reasons for the differences in the size. First, the estimation methods are different. Although we do not know *a priori* how the differences in the methods would contribute to the different results, we do expect that the two methods should produce different estimates. Second, the data used are also different. The aggregate data cover a period that is 20 years longer than the stock-flow data. If there is a structural difference in the relationship between income support receipt and labour market conditions over time, the estimates from the aggregate data may not be comparable with the stock-flow estimates. For example, when we divided the aggregate data into two periods 1965-1994 and 1995-2005, we found that the effects of labour market conditions on the receipt rate of all the three payments were much smaller in the latter period than in the first period (see Appendix 4), suggesting that the structural relationship between labour market conditions and income support receipt might have changed. Third, the period covered by the stock-flow data is special in the sense that only one upward cycle of the economy is contained in the period. This may not produce sufficient variation in labour market conditions. As a

result, the effects of labour market conditions on the flows may be substantially underestimated.

7. Conclusions

In this study we attempted to estimate the effect of labour market conditions, as measured by the total and full-time employment rates, on the levels of receipt of unemployment benefits, disability support pensions and sole parent pensions. We used two approaches to estimate the effects. First we used the aggregate data on the recipient stock to estimate the effect of the employment rate on the receipt rate directly. The second approach examined the effects of the employment rate on the inflows and outflows of recipients first, and then used the stock-flow accounting relationship to simulate the effect of the employment rate on the receipt level. The effects were estimated separately for male and female recipients using gender-specific labour market conditions variables.

The aggregate data results show that the labour market conditions variable, no matter whether it is measured using the total employment rate or the full-time employment rate, has a significant effect on the UB receipt rates for both males and females; it is also found to affect the male DSP and the female SPP receipt rates significantly. No significant effect is found for the female DSP recipients. The timeframe in which the effect is expected to last is different across payment types. The effect on UB tends to be short relative to the effect on DSP and SPP. The effect on DSP appears to take the longest time among the three payments examined.

The stock-flow model estimation results also show that an improvement in labour market conditions, as measured by an increase in the employment rate, would reduce the entry and continuation rates of the typical recipient and thus drive down the income support receipt level. However despite the theoretical appeal of the stock-flow modelling approach, the estimated effect of the employment rate on the receipt rate from the stock-flow model is much smaller than that from the aggregate data for all three of the payment types examined. Although changes in the structural relationship between labour market conditions and income support receipt might explain some of the differences in the results from the two methods, we tend to believe that the lack of sufficient variation in the labour market conditions variables in the data may have led

to an underestimation of the effects of labour market conditions on the flows. This in turn would lead to underestimation of the effect on the receipt level. To test our hypothesis we need flow data on income support recipients that cover a much longer period than are currently available.

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Appendix

1. Raw aggregate data

Table A1: The number of UB, DSP and SPP recipients 1965–2004 (1000s)

Year	Newstart/ Job search allowance: Male	Non full-time student Youth allowance: Male	Mature age allowance: Male	Total unemployment benefit recipients: male	Newstart/ Job search allowance: Female	Non full-time student Youth allowance: Female	Mature age allowance: Female	Total unemployment benefit recipients: female	Disability support pension: Male	Disability support pension: Female	Sole parent pension: Male	Sole parent pension: Female
1965	6.8			6.8	5.9			5.9	59.4	48.1		29.7
1966	12.2			12.2	6.9			6.9	58.4	48.2		31.8
1967	15.8			15.8	7.6			7.6	62.0	50.4		34.5
1968	13.4			13.4	7.9			7.9	63.0	51.7		35.9
1969	10.3			10.3	5.6			5.6	67.9	53.8		38.0
1970	8.8			8.8	4.3			4.3	74.6	59.1		44.1
1971	13.8			13.8	5.6			5.6	74.4	59.7		47.1
1972	29.3			29.3	11.0			11.0	77.1	61.7		49.8
1973	24.4			24.4	13.5			13.5	85.3	64.3		57.9
1974	20.1			20.1	11.9			11.9	92.1	64.6		90.4
1975	108.0			108.0	52.7			52.7	102.8	66.0		102.5
1976	129.8			129.8	58.6			58.6	116.1	67.7		116.6
1977	172.3			172.3	78.0			78.0	133.2	69.8		127.0
1978	203.3			203.3	82.8			82.8	137.2	67.7	2.1	137.8
1979	214.0			214.0	98.0			98.0	149.8	70.1	3.1	148.0
1980	209.4			209.4	101.8			101.8	158.3	70.9	3.8	157.7
1981	211.7			211.7	102.8			102.8	153.9	68.1	5.0	189.4
1982	274.2			274.2	116.4			116.4	151.1	65.5	5.9	202.8
1983	480.9			480.9	154.1			154.1	155.7	64.6	7.9	216.6
1984	434.0			434.0	150.5			150.5	173.1	67.5	8.9	225.9
1985	411.7			411.7	149.7			149.7	188.7	70.4	9.7	236.6

1986	413.2			413.2	156.5			156.5	200.9	72.9	10.1	240.8
1987	399.7			399.7	151.2			151.2	213.3	75.8	10.2	238.7
1988	345.7			345.7	129.4			129.4	219.2	77.7	9.9	228.7
1989	280.3			280.3	109.5			109.5	227.3	80.5	10.2	229.3
1990	305.0			305.0	114.8			114.8	233.3	83.5	11.3	237.6
1991	502.3			502.3	174.4			174.4	244.7	89.5	13.6	252.1
1992	614.2			614.2	216.9			216.9	273.7	104.9	16.4	270.8
1993	645.7			645.7	243.9			243.9	291.5	115.1	17.5	280.9
1994	600.3		27.528	627.8	248.3		10.23	258.6	309.1	127.1	18.9	294.5
1995	548.2	11.2	39.0	598.5	225.5	9.9	15.1	250.5	324.7	139.8	19.9	305.0
1996	551.3	18.1	45.8	615.2	239.3	16.3	12.1	267.7	340.3	159.0	22.0	320.3
1997	535.2	16.8	52.8	604.8	234.7	15.2	7.9	257.8	352.6	174.9	23.9	335.0
1998	524.0	15.9	49.0	588.8	235.8	14.6	6.2	256.6	361.5	191.8	25.5	346.7
1999	445.3	45.7	43.5	534.6	183.8	38.5	3.4	225.8	373.3	204.3	26.8	355.5
2000	391.0	45.2	39.9	476.1	161.9	37.2	2.0	201.0	382.35	219.93	28.0	363.4
2001	388.0	46.9	36.5	471.4	153.0	37.7	2.4	193.1	392.35	231.57	31.7	385.0
2002	391.5	48.7	36.8	477.0	163.3	41.7	3.3	208.3	406.89	252.02	33.0	394.9
2003	355.5	46.2	37.5	439.2	156.8	41.3	3.6	201.7	412.78	260.56	33.9	403.0
2004	324.5	42.9	29.7	397.1	158.6	41.8	3.2	203.5	418.83	277.91	34.9	414.4

Data sources: (1) Prior to 1988 and earlier: *Income Support Annual Database Edition 1.1 (1901-1999)* (FaCS, 2000, electronic version).

(2) From 1989 to 1999: *Income Support and Related Statistics: A 10-year Compendium 1989-1999* (FaCS, 2001).

(3) 2000 onwards for DSP and SPP: *Income Support Customers: A Statistical Overview 2004* (FaCS, 2006).

(4) 2000 Newstart Allowance: *ABS Year Book 2002* (ABS, 2002).

(5) 2000 total Youth Allowance (other) and : *Income Support Customers: A Statistical Overview 2001* (FaCS, 2003). Males and females are estimated using the male-female ratios in 1999 and 2001.

(6) 2001 onwards for all UBs: *Income support customers: A Statistical Overview 2001 to 2004" (FaCS, 2003, 2006).*

Table A2: Maximum single rates of allowances and pensions and average weekly earnings (AWE)

	Allowance	Pension	AWE: Male	AWE: Female
1965	$8.25	$12.00	$52.90	$29.07
1966	$8.25	$12.00	$54.90	$30.24
1967	$8.25	$13.00	$59.40	$31.19
1968	$8.25	$13.00	$62.70	$32.92
1969	$8.25	$14.00	$67.80	$35.63
1970	$10.00	$15.00	$74.00	$38.89
1971	$10.00	$16.00	$83.70	$44.91
1972	$17.00	$18.25	$90.60	$53.16
1973	$21.50	$21.50	$100.80	$59.99
1974	$31.00	$31.00	$119.90	$75.62
1975	$36.00	$36.00	$145.70	$96.57
1976	$41.25	$41.25	$167.60	$113.04
1977	$47.10	$47.10	$185.20	$125.99
1978	$51.45	$51.45	$201.60	$135.46
1979	$51.45	$53.20	$216.80	$142.93
1980	$51.45	$61.05	$240.30	$160.43
1981	$53.45	$66.65	$274.30	$178.85
1982	$58.10	$74.15	$332.30	$215.27
1983	$68.65	$82.35	$343.30	$224.95
1984	$78.60	$89.40	$383.80	$257.10
1985	$85.20	$94.30	$397.20	$263.40
1986	$95.40	$102.10	$425.50	$278.20
1987	$104.75	$112.15	$450.90	$298.90
1988	$112.10	$120.05	$481.70	$316.40
1989	$120.65	$129.20	$519.10	$339.00
1990	$130.00	$141.20	$555.80	$361.80
1991	$138.75	$150.80	$569.90	$378.90
1992	$140.95	$153.05	$597.40	$397.00
1993	$141.35	$156.05	$612.50	$406.30
1994	$147.05	$159.05	$625.10	$422.80
1995	$148.65	$160.80	$652.70	$429.90
1996	$158.35	$171.30	$671.50	$441.10
1997	$160.75	$173.90	$687.10	$457.40
1998	$160.75	$177.30	$714.50	$468.30
1999	$162.85	$180.70	$727.10	$479.30
2000	$163.35	$183.25	$757.70	$504.80
2001	$178.90	$201.00	$789.40	$524.70
2002	$184.50	$210.90	$826.10	$540.10
2003	$190.05	$220.15	$872.10	$567.20
2004	$194.60	$232.10	$891.20	$588.50

Table A3: Employment and the working-age population 1965–2004 (1000s)

	Full-time employed: Male	Full-time employed: Female	Employed: Male	Employed: Female	Population aged 16-64: Male	Population aged 16-59: female	Population aged 50-64: Male	Population aged 50-59: female
1965	3175	1034	3292	1337	3500.992	3119.918	804.292	571.795
1966	3240.2	1108.6	3365.6	1458.2	3558.673	3182.798	815.5	584.74
1967	3281.1	1150.2	3404.1	1502.4	3647.4	3263.1	831.1	599.5
1968	3342.2	1176.7	3465.3	1567.3	3732.4	3334	842.2	607.6
1969	3406.2	1202.3	3542.4	1671.5	3830.264	3417.169	853.233	616.123
1970	3519.7	1289.1	3636.1	1,733.50	3918.331	3493.809	867.46	626.77
1971	3580.5	1347.6	3699.2	1,823.80	4068.887	3657.541	895.01	648.17
1972	3643.6	1343.5	3745.9	1,816.20	4149.729	3728.044	918.08	664.40
1973	3673	1386.7	3791.1	1,920.00	4222.25	3792.629	938.58	677.98
1974	3754.6	1434.7	3877.9	2,027.90	4304.154	3866.929	959.40	688.91
1975	3692.4	1397.2	3822.5	2,013.80	4370.636	3934.862	976.20	698.78
1976	3710	1402.6	3870.4	2,094.20	4428.744	3993.809	996.50	711.26
1977	3702	1417.4	3876.3	2,129.50	4502.276	4068.661	1010.49	721.97
1978	3682.7	1423.3	3884.966	2152.6	4575.172	4145.922	1025.27	734.48
1979	3730.704	1424.7	3930.362	2172.9	4643.733	4220.555	1035.03	744.91
1980	3786.398	1499.2	3987.994	2291.7	4717.624	4294.519	1044.66	749.01
1981	3859.698	1523.5	4079.197	2346.2	4804.536	4368.367	1057.53	749.52
1982	3838.952	1537.6	4070.172	2355.1	4906.116	4450.728	1070.86	745.97
1983	3691.63	1501.2	3929.41	2345.9	4990.571	4516.54	1084.29	741.44
1984	3807.668	1557.0	4049.917	2455.2	5068.264	4577.252	1097.91	736.46
1985	3846.53	1620.6	4102.056	2561.2	5155.178	4652.139	1104.77	731.98
1986	3982.211	1709.2	4264.221	2758.2	5246.398	4731.465	1113.43	730.55
1987	3994.474	1739.4	4297.396	2843.3	5344.738	4836.695	1120.41	735.27
1988	4107.218	1805.5	4423.141	2966.2	5451.183	4945.525	1130.33	740.91
1989	4220.037	1926.7	4564.602	3159.2	5554.326	5051.489	1141.82	750.17
1990	4259.71	1976.3	4628.417	3286.8	5642.734	5142.925	1155.01	760.02
1991	4046.474	1915.7	4457.398	3238.8	5705.814	5217.849	1167.84	771.82
1992	3947.266	1862.0	4417.16	3238.1	5767.317	5291.565	1183.00	790.63
1993	3985.081	1914.2	4431.005	3257.6	5814.27	5350.044	1197.49	809.73
1994	4064.832	1951.6	4542.713	3359.9	5868.875	5413.551	1223.93	838.71
1995	4181.387	2062.0	4692.253	3587.6	5937.004	5487	1256.48	871.50
1996	4211.871	2060.8	4756.572	3602.8	6011.531	5570.079	1291.21	904.95
1997	4203.526	2052.3	4781.955	3635.7	6075.033	5643.738	1354.15	958.41
1998	4269.335	2119.0	4862.631	3756.8	6138.46	5709.236	1413.14	1006.09
1999	4313.778	2152.5	4948.865	3813.3	6210.451	5780.616	1468.28	1050.57
2000	4401.266	2242.0	5023.771	3961.3	6287.5	5855.131	1525.44	1096.62
2001	4330.77	2257.7	5040.438	4051.9	6371.066	5940.831	1579.41	1144.15
2002	4393.252	2221.3	5162.509	4104.5	6466.375	6010.542	1628.64	1185.75
2003	4444.874	2265.8	5212.832	4238.2	6558.649	6085.09	1677.66	1228.31
2004	4561.447	2362.5	5354.127	4301.1	6643.649	6142.122	1721.29	1261.07

2. Monthly recipient entry and exit rates and the full-time employment rate

Figure A1: Entry, exit and receipt rates of UB and the full-time employment rate (1997–2005)

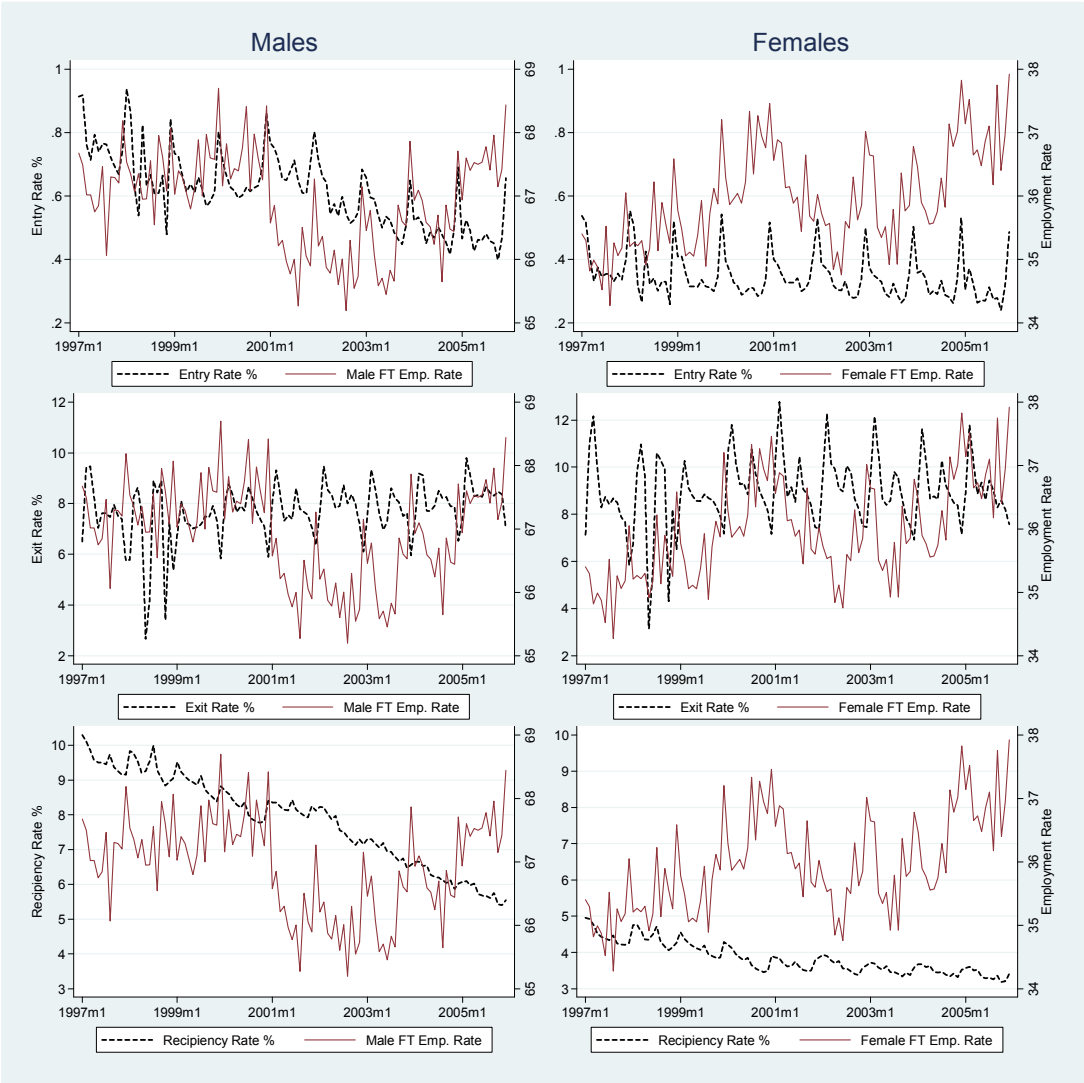


Figure A1: Entry, exit and receipt rates of the DSP and the full-time employment rate (1997–2005)

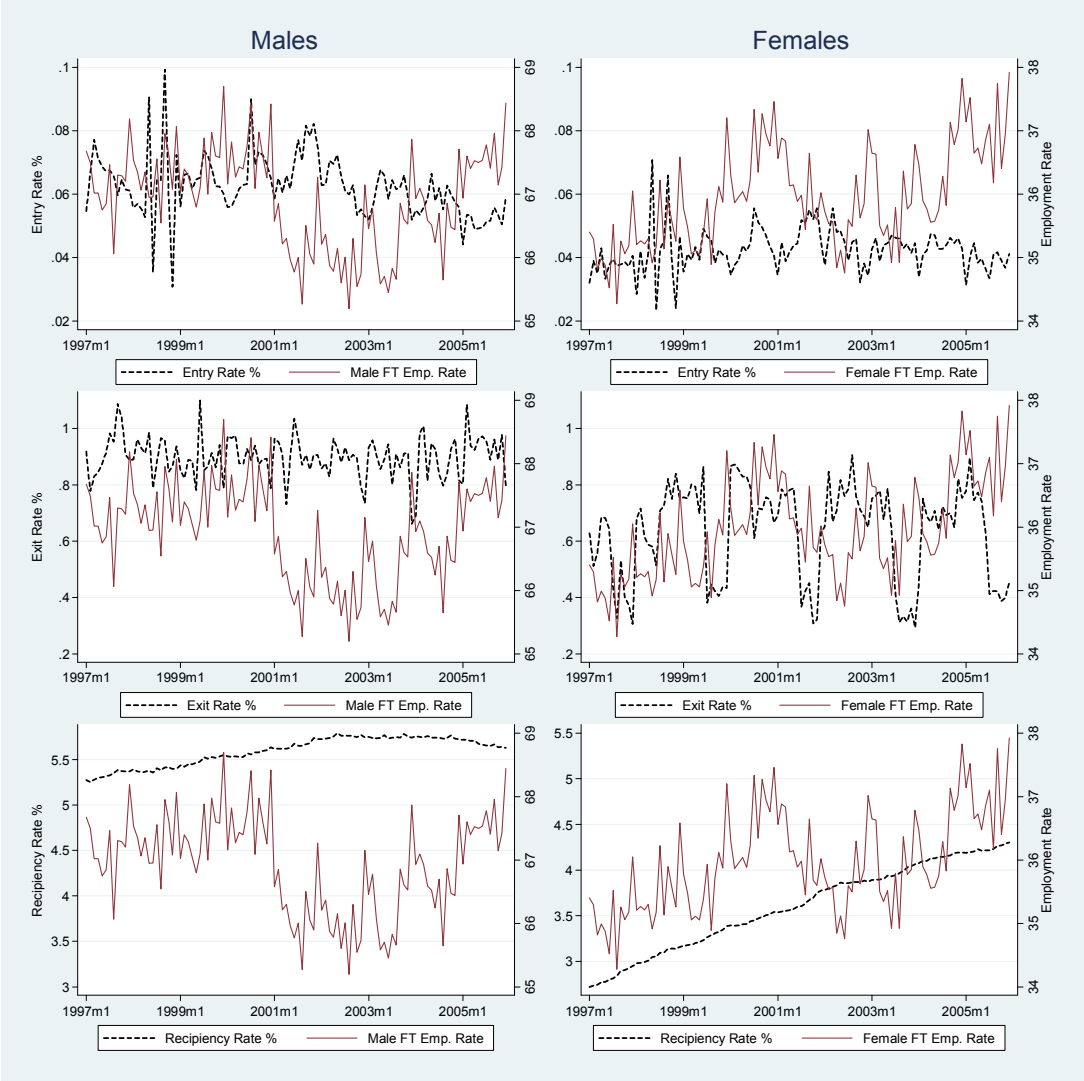
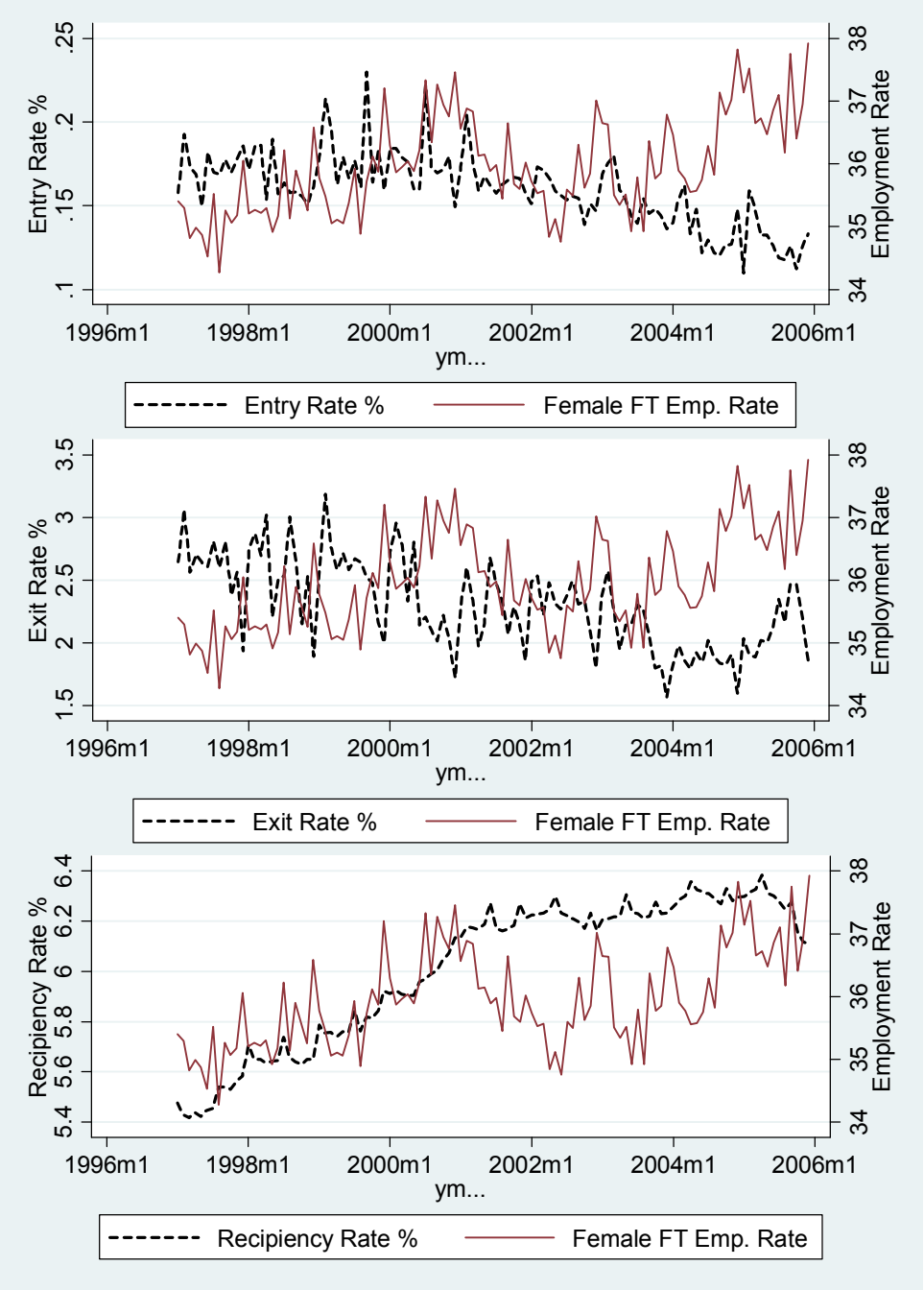


Figure A3: Entry, exit and receipt rates of the SPP and the full-time employment rate (1997–2005)



3: Flow model estimation results

A1. Unemployment benefits

Table A4: Fixed effect models: Male UB

	Entry rate (grouped logit)				Continuation rate (logit)			
	Total emp. rate		FT emp. rate		Total emp. rate		FT emp. rate	
	Coef.	*S. E.*	Coef.	*S. E.*	Coef.	*S. E.*	Coef.	*S. E.*
Employment Rate	-0.021***	0.003	-0.018***	0.002	-0.022***	0.001	-0.018***	0.001
Time trend	-0.034***	0.003	-0.041***	0.003	-0.031***	0.001	-0.038***	0.001
Post-July 2002	-0.113***	0.014	-0.111***	0.014	0.059***	0.006	0.058***	0.006
Feb	-0.023	0.018	-0.025	0.018	-0.212***	0.009	-0.213***	0.009
Mar	-0.127***	0.018	-0.139***	0.018	-0.449***	0.008	-0.460***	0.008
Apr	-0.222***	0.018	-0.236***	0.018	-0.395***	0.008	-0.409***	0.008
May	-0.143***	0.018	-0.155***	0.018	-0.301***	0.008	-0.314***	0.008
Jun	-0.165***	0.018	-0.181***	0.018	-0.179***	0.009	-0.197***	0.009
Jul	-0.095***	0.018	-0.109***	0.018	-0.223***	0.009	-0.235***	0.009
Aug	-0.176***	0.018	-0.188***	0.018	-0.416***	0.008	-0.426***	0.008
Sep	-0.185***	0.019	-0.199***	0.018	-0.344***	0.009	-0.358***	0.009
Oct	-0.214***	0.019	-0.233***	0.018	-0.359***	0.009	-0.376***	0.009
Nov	-0.197***	0.018	-0.211***	0.018	-0.250***	0.009	-0.261***	0.009
Dec	0.108***	0.019	0.092***	0.019	-0.265***	0.009	-0.281***	0.009
First month	-	-	-	-	1.427***	0.009	1.427***	0.009
Second month	-	-	-	-	-0.063***	0.006	-0.063***	0.006
Third month	-	-	-	-	-0.201***	0.006	-0.200***	0.006
Monthly duration	-	-	-	-	0.060***	0.000	0.060***	0.000
IS for ≥ 24 months	-	-	-	-	0.200***	0.008	0.200***	0.008
Balance of NSW	0.335***	0.024	0.340***	0.024	0.127***	0.010	0.137***	0.010
Melbourne	0.092***	0.019	0.076***	0.019	0.042***	0.006	0.025***	0.006
Balance of VIC	0.244***	0.020	0.236***	0.021	0.103***	0.008	0.098***	0.009
Brisbane	0.338***	0.019	0.320***	0.020	-0.066***	0.007	-0.084***	0.007
Balance of QLD	0.606***	0.020	0.600***	0.020	0.008	0.007	0.004	0.007
Adelaide	0.263***	0.021	0.245***	0.023	0.026***	0.009	0.012	0.010
Balance of SA	0.311***	0.020	0.315***	0.020	0.135***	0.012	0.141***	0.012
Perth	0.369***	0.019	0.342***	0.019	-0.054***	0.007	-0.081***	0.007
Balance of WA	0.632***	0.020	0.637***	0.021	0.007	0.010	0.009	0.011
NT	0.829***	0.021	0.804***	0.023	0.111***	0.014	0.087***	0.015
ACT	-0.087***	0.020	-0.142***	0.019	0.064***	0.016	0.006	0.016
Tasmania	0.372***	0.027	0.384***	0.026	0.177***	0.015	0.196***	0.014
Constant	-3.483***	0.196	-3.833***	0.156	3.704***	0.107	3.277***	0.084
Pseudo/adjusted-R^2	0.837		0.837		0.052		0.052	
No. of observations	1,404		1,404		5,500,380		5,500,380	

Table A5: Fixed effect models: Female UB

	Entry rate (grouped logit)				Continuation rate (logit)			
	Total emp. rate		FT emp. rate		Total emp. rate		FT emp. rate	
	Coef.	*S. E.*	Coef.	*S. E.*	Coef.	*S. E.*	Coef.	*S. E.*
Employment Rate	-0.002	0.003	-3.E-05	0.003	-0.015***	0.002	-0.013***	0.002
Time trend	-0.021***	0.004	-0.023***	0.003	-0.026***	0.002	-0.033***	0.002
Post-July 2002	-0.014	0.017	-0.014	0.017	0.128***	0.009	0.126***	0.009
Feb	-0.003	0.022	-0.005	0.022	-0.258***	0.012	-0.273***	0.012
Mar	-0.145***	0.022	-0.148***	0.022	-0.514***	0.011	-0.539***	0.011
Apr	-0.262***	0.022	-0.264***	0.022	-0.422***	0.012	-0.451***	0.011
May	-0.219***	0.022	-0.221***	0.022	-0.285***	0.012	-0.314***	0.012
Jun	-0.234***	0.022	-0.237***	0.022	-0.164***	0.012	-0.197***	0.012
Jul	-0.165***	0.022	-0.168***	0.022	-0.194***	0.012	-0.220***	0.012
Aug	-0.273***	0.022	-0.275***	0.022	-0.404***	0.012	-0.431***	0.012
Sep	-0.269***	0.023	-0.273***	0.022	-0.326***	0.013	-0.358***	0.012
Oct	-0.281***	0.023	-0.285***	0.022	-0.274***	0.012	-0.305***	0.012
Nov	-0.170***	0.023	-0.174***	0.022	-0.148***	0.013	-0.177***	0.012
Dec	0.225***	0.023	0.220***	0.022	-0.157***	0.013	-0.186***	0.012
First month	-	-	-	-	1.386***	0.012	1.386***	0.012
Second month	-	-	-	-	-0.089***	0.008	-0.089***	0.008
Third month	-	-	-	-	-0.191***	0.008	-0.191***	0.008
Monthly duration	-	-	-	-	0.056***	0.001	0.056***	0.001
IS for ≥ 24 months	-	-	-	-	0.132***	0.011	0.132***	0.011
Balance of NSW	0.415***	0.027	0.423***	0.043	0.173***	0.013	0.107***	0.023
Melbourne	0.200***	0.023	0.201***	0.025	0.073***	0.008	0.035***	0.010
Balance of VIC	0.308***	0.024	0.313***	0.042	0.189***	0.012	0.089***	0.024
Brisbane	0.344***	0.023	0.343***	0.025	-0.005	0.009	-0.058***	0.011
Balance of QLD	0.593***	0.023	0.596***	0.032	0.084***	0.009	0.018	0.016
Adelaide	0.342***	0.023	0.344***	0.033	0.105***	0.011	0.029	0.018
Balance of SA	0.332***	0.023	0.335***	0.041	0.182***	0.017	0.072***	0.026
Perth	0.302***	0.023	0.301***	0.030	-0.017*	0.010	-0.101***	0.016
Balance of WA	0.493***	0.023	0.492***	0.036	0.079***	0.014	-0.036*	0.022
Tasmania	0.790***	0.023	0.789***	0.026	0.303***	0.019	0.345***	0.020
ACT	-0.119***	0.032	-0.133***	0.030	0.047*	0.026	-0.001	0.024
NT	0.503***	0.027	0.511***	0.042	0.186***	0.017	0.118***	0.026
Constant	-5.626***	0.166	-5.726***	0.132	2.839***	0.108	2.470***	0.079
Pseudo/adjusted-R^2	0.738		0.738		0.045		0.045	
No. of observations	1,404		1,404		2,505,595		2,505,595	

Table A6: Pooled data models: Male UB

	Entry rate (grouped logit)				Continuation rate (logit)			
	Total emp. rate		FT emp. rate		Total emp. rate		FT emp. rate	
	Coef.	*S. E.*	Coef.	*S. E.*	Coef.	*S. E.*	Coef.	*S. E.*
Employment Rate	-0.018***	0.005	-0.016***	0.005	-0.029***	0.001	-0.024***	0.001
Time trend	-0.035***	0.003	-0.041***	0.004	-0.030***	0.001	-0.039***	0.001
Post-July 2002	-0.113***	0.028	-0.112***	0.030	0.060***	0.006	0.059***	0.006
Feb	-0.024	0.020	-0.025	0.020	-0.210***	0.009	-0.212***	0.009
Mar	-0.128***	0.018	-0.138***	0.017	-0.447***	0.008	-0.461***	0.008
Apr	-0.223***	0.025	-0.236***	0.024	-0.392***	0.008	-0.410***	0.008
May	-0.144***	0.033	-0.155***	0.033	-0.300***	0.008	-0.316***	0.008
Jun	-0.166***	0.031	-0.181***	0.033	-0.177***	0.009	-0.199***	0.009
Jul	-0.097***	0.023	-0.109***	0.024	-0.219***	0.009	-0.235***	0.009
Aug	-0.176***	0.026	-0.187***	0.027	-0.417***	0.008	-0.430***	0.008
Sep	-0.187***	0.029	-0.200***	0.028	-0.338***	0.009	-0.355***	0.008
Oct	-0.216***	0.022	-0.232***	0.022	-0.354***	0.009	-0.376***	0.009
Nov	-0.198***	0.020	-0.211***	0.022	-0.247***	0.009	-0.262***	0.009
Dec	0.105***	0.018	0.090***	0.015	-0.253***	0.009	-0.274***	0.009
First month	-	-	-	-	1.427***	0.009	1.427***	0.009
Second month	-	-	-	-	-0.063***	0.006	-0.063***	0.006
Third month	-	-	-	-	-0.201***	0.006	-0.200***	0.006
Monthly duration	-	-	-	-	0.061***	0.000	0.061***	0.000
On payment for ≥ 24 months	-	-	-	-	0.201***	0.008	0.201***	0.008
Degree	0.028**	0.014	0.024*	0.013	0.002	0.002	0.000	0.002
Diploma	-0.473***	0.067	-0.461***	0.064	-0.015	0.010	-0.014	0.010
Certificate	-0.008	0.019	-0.007	0.019	0.003***	0.001	0.006***	0.001
ESC	0.053***	0.009	0.051***	0.009	-0.011***	0.001	-0.013***	0.001
NESC	0.009**	0.004	0.010***	0.004	0.000	0.000	0.001*	0.001
Constant	-1.029***	0.341	-1.389***	0.326	4.367***	0.081	3.814***	0.069
Pseudo/adjusted-R^2	0.793		0.793		0.052		0.052	
No. of observations	1,404		1,404		5,500,380		5,500,380	

Table A7: Pooled data models: Male UB

	Entry rate (grouped logit)				Continuation rate (logit)			
	Total emp. rate		FT emp. rate		Total emp. rate		FT emp. rate	
	Coef.	*S. E.*	Coef.	*S. E.*	Coef.	*S. E.*	Coef.	*S. E.*
Employment Rate	-0.017***	0.004	-0.004	0.008	-0.021***	0.001	-0.023***	0.001
Time trend	-0.010**	0.004	-0.021***	0.005	-0.021***	0.002	-0.030***	0.002
Post-July 2002	-0.018	0.021	-0.015	0.020	0.126***	0.009	0.121***	0.009
Feb	0.014	0.021	-0.005	0.020	-0.252***	0.012	-0.274***	0.012
Mar	-0.120***	0.024	-0.149***	0.024	-0.505***	0.011	-0.542***	0.011
Apr	-0.234***	0.032	-0.266***	0.033	-0.412***	0.011	-0.456***	0.011
May	-0.193***	0.038	-0.223***	0.038	-0.276***	0.012	-0.320***	0.012
Jun	-0.206***	0.033	-0.240***	0.032	-0.154***	0.012	-0.204***	0.012
Jul	-0.137***	0.032	-0.167***	0.033	-0.183***	0.012	-0.218***	0.012
Aug	-0.249***	0.031	-0.277***	0.031	-0.396***	0.012	-0.438***	0.012
Sep	-0.227***	0.038	-0.270***	0.037	-0.310***	0.012	-0.353***	0.012
Oct	-0.246***	0.034	-0.284***	0.033	-0.262***	0.012	-0.305***	0.012
Nov	-0.133***	0.030	-0.172***	0.027	-0.134***	0.013	-0.177***	0.012
Dec	0.272***	0.028	0.224***	0.025	-0.139***	0.013	-0.177***	0.012
First month	-	-	-	-	1.386***	0.012	1.386***	0.012
Second month	-	-	-	-	-0.089***	0.008	-0.089***	0.008
Third month	-	-	-	-	-0.192***	0.008	-0.191***	0.008
Monthly duration	-	-	-	-	0.057***	0.001	0.057***	0.001
On payment for ≥ 24 months	-	-	-	-	0.134***	0.011	0.133***	0.011
Degree	0.022	0.017	0.018	0.022	0.007***	0.002	0.033***	0.003
Diploma	-0.388***	0.082	-0.394***	0.112	-0.086***	0.014	-0.274***	0.021
Certificate	-0.022	0.021	-0.018	0.025	-0.007***	0.002	-0.005***	0.002
ESC	0.039***	0.010	0.036***	0.012	-0.006***	0.001	0.002	0.002
NESC	0.006	0.005	0.009	0.006	0.000	0.001	0.011***	0.001
Constant	-2.084***	0.303	-2.969***	0.638	3.985***	0.122	4.126***	0.126
Pseudo/adjusted-R^2	0.677		0.664		0.044		0.044	
No. of observations	1,404		1,404		2505595		2505595	

A2. Disability support pension

Table A8: Fixed effect models: Male DSP

	Entry rate (grouped logit)				Continuation rate (logit)			
	Total emp. rate		FT emp. rate		Total emp. rate		FT emp. rate	
	Coef.	*S. E.*	Coef.	*S. E.*	Coef.	*S. E.*	Coef.	*S. E.*
Employment Rate[a]	-0.008	0.007	-0.013**	0.006	-0.005	0.005	-0.004	0.004
Time trend	-0.042**	0.018	-0.043**	0.018	-0.015**	0.007	-0.016**	0.007
Post-July 2000	0.142***	0.042	0.144***	0.042	0.047*	0.024	0.046*	0.024
Post-July 2002	-0.125***	0.038	-0.135***	0.038	0.043*	0.022	0.042*	0.022
Post- Sep 2003	-0.036	0.039	-0.028	0.039	-0.003	0.022	-0.003	0.022
Feb	0.085*	0.045	0.086*	0.045	-0.062**	0.028	-0.063**	0.027
Mar	0.163***	0.045	0.159***	0.045	-0.142***	0.027	-0.144***	0.027
Apr	0.144***	0.046	0.139***	0.045	-0.112***	0.027	-0.115***	0.027
May	0.190***	0.046	0.185***	0.045	-0.073***	0.027	-0.076***	0.027
Jun	0.018	0.046	0.011	0.046	-0.114***	0.027	-0.117***	0.027
Jul	0.168***	0.047	0.167***	0.046	-0.163***	0.027	-0.166***	0.027
Aug	0.085*	0.046	0.078*	0.046	-0.111***	0.028	-0.113***	0.028
Sep	0.198***	0.048	0.195***	0.047	-0.102***	0.028	-0.105***	0.028
Oct	0.115**	0.048	0.109**	0.047	-0.134***	0.028	-0.138***	0.028
Nov	0.028	0.048	0.025	0.047	-0.114***	0.028	-0.117***	0.028
Dec	0.117**	0.049	0.119**	0.048	-0.112***	0.028	-0.117***	0.028
First month	-	-	-	-	1.185***	0.074	1.185***	0.074
Second month	-	-	-	-	-0.096**	0.044	-0.096**	0.044
Third month	-	-	-	-	-0.038	0.045	-0.038	0.045
Monthly duration	-	-	-	-	0.032***	0.002	0.032***	0.002
IS for ≥ 24 months	-	-	-	-	-0.036	0.026	-0.036	0.026
Share 45plus	0.059***	0.020	0.055***	0.020				
Balance of NSW	0.380***	0.114	0.364***	0.113	0.057*	0.033	0.063*	0.033
Melbourne	0.178***	0.047	0.163***	0.048	0.036*	0.019	0.034*	0.020
Balance of VIC	0.222**	0.109	0.217**	0.109	0.029	0.027	0.030	0.028
Brisbane	0.222***	0.048	0.203***	0.049	0.044*	0.024	0.042*	0.025
Balance of QLD	0.215***	0.083	0.210**	0.083	0.039*	0.023	0.040	0.024
Adelaide	0.347***	0.065	0.314***	0.067	0.089***	0.032	0.090**	0.036
Balance of SA	0.251**	0.120	0.255**	0.119	0.095**	0.037	0.097***	0.037
Perth	0.033	0.053	0.019	0.054	-0.021	0.026	-0.026	0.027
Balance of WA	0.321***	0.060	0.349***	0.061	-0.125***	0.035	-0.127***	0.036
Tasmania	0.339***	0.081	0.286***	0.085	-0.191***	0.057	-0.194***	0.059
ACT	-0.188***	0.049	-0.214***	0.048	0.140**	0.058	0.128**	0.057
NT	0.364***	0.103	0.338***	0.102	0.161***	0.049	0.170***	0.047
Constant	-9.044***	0.889	-8.624***	0.815	4.526***	0.380	4.392***	0.310
Pseudo/adjusted-R^2	0.394		0.395		0.004		0.004	
No. of observations	1,403		1,403		3,844,012		3,844,012	

Note: a) Refer to the 12-month-lagged employment rate.

Table A9: Fixed effect models: Female DSP

	Entry rate (grouped logit)				Continuation rate (logit)			
	Total emp. rate		FT emp. rate		Total emp. rate		FT emp. rate	
	Coef.	*S. E.*	Coef.	*S. E.*	Coef.	*S. E.*	Coef.	*S. E.*
Employment Rate[a]	**0.002**	**0.008**	**-0.010**	**0.009**	**0.003**	**0.007**	**0.004**	**0.008**
Time trend	0.023	0.027	0.023	0.027	-0.117***	0.014	-0.116***	0.014
Post-July 2000	-0.005	0.055	0.003	0.054	0.251***	0.045	0.252***	0.044
Post-July 2002	-0.142***	0.050	-0.150***	0.051	0.147***	0.037	0.150***	0.037
Post- Sep 2003	-0.118**	0.052	-0.110**	0.052	0.272***	0.035	0.273***	0.034
Jul-Dec 1997	-	-	-	-	0.363***	0.054	0.361***	0.055
Jul-Dec 1999	-	-	-	-	0.495***	0.051	0.495***	0.051
Jul-Dec 2001	-	-	-	-	0.635***	0.050	0.634***	0.050
Jul-Dec 2003	-	-	-	-	0.593***	0.045	0.594***	0.045
Jul-Dec 2005	-	-	-	-	0.589***	0.047	0.586***	0.048
Feb	0.242***	0.060	0.244***	0.059	-0.206***	0.042	-0.203***	0.041
Mar	0.163***	0.060	0.164***	0.059	-0.328***	0.041	-0.323***	0.040
Apr	0.268***	0.061	0.268***	0.059	-0.264***	0.042	-0.257***	0.041
May	0.298***	0.061	0.297***	0.060	-0.262***	0.042	-0.256***	0.041
Jun	0.105*	0.061	0.102*	0.060	-0.283***	0.042	-0.276***	0.041
Jul	0.300***	0.062	0.303***	0.061	-0.521***	0.045	-0.516***	0.045
Aug	0.313***	0.062	0.310***	0.061	-0.274***	0.047	-0.268***	0.047
Sep	0.347***	0.064	0.355***	0.062	-0.339***	0.048	-0.333***	0.047
Oct	0.284***	0.064	0.287***	0.062	-0.360***	0.047	-0.354***	0.046
Nov	0.191***	0.065	0.195***	0.063	-0.262***	0.048	-0.256***	0.047
Dec	0.275***	0.066	0.288***	0.064	-0.338***	0.049	-0.334***	0.047
First month	-	-	-	-	1.045***	0.105	1.045***	0.105
Second month	-	-	-	-	-0.216***	0.063	-0.216***	0.063
Third month	-	-	-	-	-0.103	0.066	-0.103	0.066
Monthly duration	-	-	-	-	0.027***	0.003	0.027***	0.003
IS for ≥ 24 months	-	-	-	-	0.040	0.038	0.040	0.038
Share 45plus	0.029	0.033	0.032	0.033				
Balance of NSW	0.527***	0.148	0.398**	0.178	0.082*	0.046	0.114	0.089
Melbourne	0.230***	0.062	0.195***	0.069	0.079***	0.029	0.092**	0.039
Balance of VIC	0.379***	0.142	0.253	0.178	0.093**	0.041	0.132	0.092
Brisbane	0.217***	0.062	0.183***	0.070	0.068*	0.035	0.084*	0.044
Balance of QLD	0.273***	0.093	0.190	0.117	0.023	0.036	0.048	0.065
Adelaide	0.529***	0.111	0.444***	0.133	0.132***	0.039	0.160**	0.068
Balance of SA	0.442**	0.172	0.317	0.203	0.198***	0.061	0.238**	0.101
Perth	0.107	0.074	0.042	0.094	-0.009	0.038	0.018	0.061
Balance of WA	0.294***	0.063	0.207**	0.102	0.028	0.057	0.066	0.088
Tasmania	0.281*	0.160	0.330**	0.165	-0.336***	0.080	-0.348***	0.084
ACT	-0.165*	0.091	-0.103	0.080	0.009	0.094	0.009	0.087
NT	0.575***	0.134	0.445***	0.168	0.116*	0.060	0.149	0.097
Constant	-9.303***	0.951	-8.883***	0.892	4.580***	0.415	4.580***	0.315
Pseudo/adjusted-R^2	0.251		0.251		0.009		0.009	
No. of observations	1,386		1,386		2,334,745		2,334,745	

Note: a) Refer to the 12-month-lagged employment rate. B) These dummy variables are included to control for the increase in the female Age Pension entitlement age on the outflow rate of female DSP recipients.

Table A10: Pooled data models: Male DSP

	Entry rate (grouped logit)				Continuation rate (logit)			
	Total emp. rate		FT emp. rate		Total emp. rate		FT emp. rate	
	Coef.	*S. E.*	Coef.	*S. E.*	Coef.	*S. E.*	Coef.	*S. E.*
Employment Rate[a]	**-0.030*****	**0.004**	**-0.027*****	**0.003**	**-0.015*****	**0.003**	**-0.012*****	**0.003**
Time trend	0.001	0.014	-0.005	0.014	-0.014*	0.007	-0.018**	0.007
Post-July 2000	0.165***	0.042	0.161***	0.042	0.051**	0.024	0.050**	0.024
Post-July 2002	-0.144***	0.038	-0.164***	0.038	0.038*	0.022	0.034	0.022
Post-Sep 2003	-0.049	0.039	-0.039	0.039	0.003	0.022	0.004	0.022
Feb	0.095**	0.046	0.093**	0.046	-0.059**	0.027	-0.061**	0.027
Mar	0.180***	0.046	0.165***	0.046	-0.138***	0.027	-0.146***	0.027
Apr	0.167***	0.046	0.148***	0.046	-0.107***	0.027	-0.117***	0.027
May	0.212***	0.046	0.195***	0.046	-0.070**	0.027	-0.079***	0.027
Jun	0.047	0.046	0.024	0.046	-0.110***	0.027	-0.121***	0.027
Jul	0.204***	0.046	0.190***	0.046	-0.156***	0.027	-0.165***	0.027
Aug	0.106**	0.046	0.091**	0.046	-0.114***	0.028	-0.120***	0.028
Sep	0.246***	0.047	0.227***	0.047	-0.094***	0.028	-0.104***	0.028
Oct	0.162***	0.047	0.139***	0.047	-0.128***	0.028	-0.139***	0.027
Nov	0.073	0.047	0.057	0.047	-0.111***	0.028	-0.119***	0.028
Dec	0.187***	0.047	0.170***	0.047	-0.098***	0.028	-0.110***	0.028
First month	-	-	-	-	1.185***	0.074	1.185***	0.074
Second month	-	-	-	-	-0.096**	0.044	-0.096**	0.044
Third month	-	-	-	-	-0.038	0.045	-0.038	0.045
Monthly duration	-	-	-	-	0.032***	0.002	0.032***	0.002
IS for $\geq$ 24 months	-	-	-	-	-0.035	0.026	-0.035	0.026
Share 45+	-0.008	0.011	-0.011	0.011	-	-	-	-
Degree	-0.054***	0.008	-0.061***	0.008	-0.007	0.006	-0.008	0.006
Diploma	0.281***	0.059	0.318***	0.059	0.120***	0.041	0.119***	0.041
Certificate	-0.001	0.008	0.002	0.008	-0.007*	0.004	-0.006	0.004
ESC	-0.030***	0.006	-0.034***	0.006	-0.011***	0.003	-0.012***	0.003
NESC	-0.020***	0.004	-0.021***	0.004	-0.008***	0.002	-0.008***	0.002
Constant	-5.480***	0.385	-5.945***	0.332	4.963***	0.311	4.644***	0.278
Pseudo/adjusted-R^2	0.381		0.383		0.004		0.004	
No. of observations	1,403		1,403		3,844,012		3,844,012	

Note: a) Refer to the 12-month-lagged employment rate.

Table A11: Pooled data models: Female DSP

	Entry rate (grouped logit)				Continuation rate (logit)			
	Total emp. rate		FT emp. rate		Total emp. rate		FT emp. rate	
	Coef.	*S. E.*	Coef.	*S. E.*	Coef.	*S. E.*	Coef.	*S. E.*
Employment Rate[a]	**-0.026*****	**0.006**	**-0.030*****	**0.007**	**0.002**	**0.005**	**0.000**	**0.006**
Time trend	0.032*	0.019	0.034*	0.019	-0.117***	0.014	-0.116***	0.014
Post-July 2000	0.031	0.056	0.017	0.055	0.252***	0.044	0.255***	0.044
Post-July 2002	-0.137***	0.050	-0.174***	0.051	0.147***	0.037	0.147***	0.037
Post-Sep 2003	-0.104**	0.051	-0.104**	0.051	0.272***	0.034	0.274***	0.034
Jul-Dec 1997[b]					0.363***	0.054	0.364***	0.054
Jul-Dec 1999[b]					0.496***	0.051	0.497***	0.051
Jul-Dec 2001[b]					0.635***	0.050	0.637***	0.050
Jul-Dec 2003[b]					0.594***	0.045	0.594***	0.045
Jul-Dec 2005[b]					0.590***	0.047	0.590***	0.047
Feb	0.273***	0.061	0.245***	0.060	-0.206***	0.042	-0.204***	0.041
Mar	0.210***	0.061	0.164***	0.060	-0.327***	0.041	-0.325***	0.040
Apr	0.315***	0.061	0.264***	0.060	-0.263***	0.041	-0.260***	0.041
May	0.343***	0.061	0.292***	0.060	-0.261***	0.041	-0.258***	0.041
Jun	0.154**	0.061	0.092	0.060	-0.282***	0.041	-0.279***	0.041
Jul	0.344***	0.062	0.310***	0.061	-0.520***	0.045	-0.517***	0.045
Aug	0.348***	0.062	0.305***	0.061	-0.274***	0.047	-0.272***	0.047
Sep	0.414***	0.063	0.370***	0.062	-0.338***	0.048	-0.333***	0.047
Oct	0.339***	0.062	0.297***	0.062	-0.359***	0.047	-0.356***	0.046
Nov	0.247***	0.063	0.205***	0.062	-0.261***	0.048	-0.258***	0.047
Dec	0.350***	0.064	0.313***	0.062	-0.337***	0.048	-0.332***	0.047
First month	-	-	-	-	1.045***	0.105	1.045***	0.105
Second month	-	-	-	-	-0.216***	0.063	-0.216***	0.063
Third month	-	-	-	-	-0.103	0.066	-0.103	0.066
Monthly duration	-	-	-	-	0.027***	0.003	0.027***	0.003
IS for ≥ 24 months	-	-	-	-	0.040	0.038	0.040	0.038
Share 45+	0.027**	0.013	0.021	0.013	-	-	-	-
Degree	-0.030**	0.012	-0.003	0.015	-0.038***	0.009	-0.037***	0.013
Diploma	0.122	0.091	-0.069	0.106	0.325***	0.062	0.318***	0.085
Certificate	-0.035***	0.009	-0.032***	0.009	-0.011*	0.006	-0.011**	0.006
ESC	-0.013	0.008	-0.006	0.009	-0.025***	0.005	-0.024***	0.006
NESC	-0.013**	0.005	0.000	0.006	-0.015***	0.003	-0.014***	0.004
Constant	-6.657***	0.466	-6.461***	0.540	3.705***	0.481	3.864***	0.489
Pseudo/adjusted-R^2	0.224		0.222		0.009		0.009	
No. of observations	1,386		1,386		2,334,745		2,334,745	

Note: a) Refer to the 12-month-lagged employment rate. B) These dummy variables are included to control for the increase in the female Age Pension entitlement age on the outflow rate of female DSP recipients.

A3. Sole parent pension: Female

Table A12: Fixed effect models

	Entry rate (grouped logit)				Continuation rate (logit)			
	Total emp. rate		FT emp. rate		Total emp. rate		FT emp. rate	
	Coef.	*S. E.*	Coef.	*S. E.*	Coef.	*S. E.*	Coef.	*S. E.*
Employment Rate[a]	-0.004	0.003	-0.009**	0.004	-0.004	0.003	-0.009***	0.003
Time trend	-0.034***	0.010	-0.035***	0.010	-0.018***	0.005	-0.019***	0.004
Post-July 2000	0.023	0.023	0.022	0.023	0.199***	0.015	0.200***	0.015
Post-July 2002	-0.039*	0.021	-0.046**	0.021	0.012	0.014	0.005	0.014
Post- Sep 2003	-0.125***	0.021	-0.121***	0.021	0.140***	0.014	0.144***	0.014
Feb	0.117***	0.025	0.113***	0.025	-0.256***	0.017	-0.260***	0.017
Mar	0.098***	0.025	0.098***	0.025	-0.334***	0.017	-0.335***	0.017
Apr	-0.027	0.025	-0.028	0.025	-0.232***	0.017	-0.233***	0.017
May	-0.004	0.025	-0.005	0.025	-0.206***	0.018	-0.208***	0.018
Jun	-0.068***	0.025	-0.065***	0.025	-0.213***	0.018	-0.211***	0.018
Jul	-0.023	0.025	-0.016	0.025	-0.247***	0.018	-0.241***	0.018
Aug	-0.046*	0.025	-0.044*	0.025	-0.286***	0.017	-0.285***	0.017
Sep	-0.004	0.026	-0.007	0.026	-0.285***	0.018	-0.288***	0.018
Oct	-0.052**	0.026	-0.056**	0.026	-0.252***	0.018	-0.257***	0.018
Nov	-0.011	0.026	-0.015	0.026	-0.216***	0.018	-0.222***	0.018
Dec	-0.048*	0.026	-0.055**	0.026	-0.186***	0.018	-0.193***	0.018
First month	-	-	-	-	1.302***	0.030	1.302***	0.030
Second month	-	-	-	-	-0.098***	0.018	-0.098***	0.018
Third month	-	-	-	-	-0.097***	0.018	-0.097***	0.018
Monthly duration	-	-	-	-	0.037***	0.001	0.037***	0.001
On IS for ≥ 24 months	-	-	-	-	0.164***	0.014	0.164***	0.014
Share 20-44	-0.027**	0.011	-0.028**	0.011				
Balance of NSW	0.460***	0.067	0.377***	0.078	-0.094***	0.019	-0.170***	0.034
Melbourne	-0.029	0.026	-0.057**	0.029	0.047***	0.013	0.019	0.016
Balance of VIC	0.232***	0.066	0.137*	0.079	-0.046***	0.017	-0.131***	0.036
Brisbane	0.328***	0.030	0.293***	0.033	-0.153***	0.014	-0.185***	0.017
Balance of QLD	0.582***	0.042	0.521***	0.051	-0.184***	0.014	-0.239***	0.025
Adelaide	0.200***	0.047	0.134**	0.056	-0.033*	0.017	-0.093***	0.027
Balance of SA	0.344***	0.064	0.250***	0.077	-0.158***	0.024	-0.243***	0.039
Perth	0.214***	0.039	0.154***	0.046	-0.091***	0.015	-0.145***	0.023
Balance of WA	0.746***	0.027	0.667***	0.042	-0.244***	0.019	-0.320***	0.032
Tasmania	1.012***	0.048	1.046***	0.050	-0.374***	0.026	-0.347***	0.028
ACT	-0.037	0.040	-0.026	0.037	-0.095***	0.036	-0.079**	0.034
NT	0.457***	0.062	0.372***	0.074	-0.141***	0.025	-0.218***	0.038
Constant	-4.701***	0.755	-4.498***	0.752	3.461***	0.163	3.578***	0.118
Pseudo/adjusted-R^2	0.738		0.739		0.19		0.19	
No. of observations	1,404		1,404		3,935,279		3,935,279	

Note: a) Refer to the 6-month-lagged employment rate.

Table A13: Pooled data models

	Entry rate (grouped logit)				Continuation rate (logit)			
	Total emp. Rate		FT emp. rate		Total emp. rate		FT emp. rate	
	Coef.	*S. E.*	Coef.	*S. E.*	Coef.	*S. E.*	Coef.	*S. E.*
Employment Rate[a]	-0.012***	0.003	-0.005	0.006	-0.007***	0.002	-0.016***	0.002
Time trend	0.009	0.009	0.000	0.006	-0.017***	0.005	-0.018***	0.004
Post-July 2000	0.048**	0.024	0.044**	0.022	0.204***	0.015	0.206***	0.015
Post-July 2002	-0.167***	0.011	-0.160***	0.011	0.016	0.014	0.004	0.014
Post-Sep 2003	0.119***	0.013	0.120***	0.015	0.141***	0.014	0.148***	0.014
Feb	0.110***	0.009	0.101***	0.009	-0.264***	0.018	-0.272***	0.018
Mar	-0.015	0.021	-0.020	0.021	-0.331***	0.017	-0.332***	0.017
Apr	0.013	0.022	0.007	0.023	-0.227***	0.018	-0.230***	0.018
May	-0.042*	0.022	-0.052**	0.021	-0.209***	0.018	-0.212***	0.018
Jun	-0.020	0.032	-0.006	0.033	-0.215***	0.018	-0.210***	0.018
Jul	-0.032	0.037	-0.031	0.037	-0.254***	0.018	-0.245***	0.018
Aug	0.024	0.025	0.016	0.024	-0.289***	0.018	-0.287***	0.018
Sep	-0.019	0.014	-0.029**	0.014	-0.286***	0.018	-0.292***	0.018
Oct	0.025	0.022	0.016	0.021	-0.251***	0.018	-0.260***	0.018
Nov	-0.008	0.019	-0.021	0.019	-0.215***	0.018	-0.226***	0.018
Dec	-0.012***	0.003	-0.005	0.006	-0.187***	0.018	-0.199***	0.018
First month	-	-	-	-	1.323***	0.031	1.323***	0.031
Second month	-	-	-	-	-0.108***	0.018	-0.108***	0.018
Third month	-	-	-	-	-0.111***	0.018	-0.111***	0.018
Monthly duration	-	-	-	-	0.039***	0.001	0.039***	0.001
IS for ≥ 24 months	-	-	-	-	0.098***	0.014	0.098***	0.014
Share 20-44	0.046***	0.010	0.043***	0.011	-	-	-	-
Degree	0.028***	0.007	0.030**	0.012	-0.028***	0.003	-0.006	0.005
Diploma	-0.338***	0.050	-0.377***	0.076	0.284***	0.022	0.135***	0.031
Certificate	0.024*	0.013	0.026*	0.016	0.001	0.003	0.000	0.002
ESC	0.029***	0.005	0.030***	0.007	-0.024***	0.002	-0.015***	0.002
NESC	-0.014***	0.003	-0.010**	0.004	-0.004***	0.001	0.004**	0.002
Constant	-6.978***	0.758	-7.231***	1.012	2.315***	0.181	2.953***	0.183
Pseudo/adjusted-R^2	0.717		0.717		0.18		0.18	
No. of observations	1,404		1,404		3,935,279		3,935,279	

Note: a) Refer to the 6-month-lagged employment rate.

Table A14: Description of explanatory variables

Variable name	Description
Time trend	Yearly continuation variable (time trend=Year -1997)
Post-July 2000	Period from July 2000-December 2005
Post-July 2002	Period from July 2002-December 2005
Post- Sep 2003	Period from September 2003-December 2005
Jul-Dec 1997 (a)	*Period July-December 1997*
Jul-Dec 1999 (a)	*Period July- December 1999*
Jul-Dec 2001 (a)	*Period July- December 2001*
Jul-Dec 2003 (a)	*Period July- December 2003*
Jul-Dec 2005 (a)	*Period July- December 2005*
Calendar month dummies	
From Jan to Dec	(January dummy is the omitted category)
Duration-related variables	
First month (b)	First month on payments
Second month (b)	Second month on payments
Third month (b)	Third month on payments
Monthly duration (b)	Duration on payments (monthly)
On IS for ≥ 24 months (b)	Dummy for duration on payments≥ 24 months
Share 45plus ©	Share of individuals aged 45+ among the workforce population
Share 2544 (d)	Share of women aged 25-44 among the work-force population (females)
Major Statistical Region (e)	
Sydney	Sydney (omitted region)
Balance of NSW	Balance of New South Wales
Melbourne	Melbourne
Balance of VIC	Balance of Victoria
Brisbane	Brisbane
Balance of QLD	Balance of Queensland
Adelaide	Adelaide
Balance of SA	Balance of South Australia
Perth	Perth
Balance of WA	Balance of Western Australia
Tasmania	Tasmania
ACT	Australia Capital Territory
NT	Northern Territory
Post school educational attainment (f)	
Degree	Bachelor /postgraduate degree
Diploma	Diploma
Certificate	Certificates
Other	Do not obtain any post-school qualifications/not answered (omitted category)
Country of birth (f)	
AUS	Australian-born (omitted category)
ESC	Immigrant born in one of the main English speaking countries
NESC	Immigrant born in a non English speaking country

(a) time period dummies used for the continuation model for female DSP recipient only. (b) duration variables used in the continuation equations. (c) variable used in the entry rate equations for DSP only and (d) used in the entry rate equation for PPS. (e) regional dummies used in the fixed effect models, and (f) variables used in the pooled data models

4. Model estimation results using aggregate data of two periods: 1965-1994 and 1995-2005

Table A15: UB receipt

Females	**Total Employment Rate**				**FT Employment Rate**			
	years 1965-1994		**years 1995-2005**		**years 1965-1994**		**years 1995-2005**	
	model 1	*model 2*	*model 1*	*model 2*	*model 1*	*model 2*	*model 1*	*model 2*
Females								
Current yr emp	-0.2743***	-0.2428***	0.0014	0.0006	-0.3939***	-0.3520***	0.0199	0.1203
	(0.0334)	(0.0483)	(0.1340)	(0.1447)	(0.0387)	(0.0558)	(0.1697)	(0.1829)
lagged 1 yr emp		-0.0493		-0.0212		-0.0775		-0.2005
		(0.0472)		(0.1818)		(0.0546)		(0.1626)
replace rate	-0.0036	-0.0015	0.1621	0.1766	-0.0133	-0.0090	0.1737	0.2932
	(0.0138)	(0.0142)	(0.1323)	(0.1895)	(0.0116)	(0.0116)	(0.1573)	(0.1801)
time trend	0.3214***	0.3315***	-0.1377	-0.1186	0.1725***	0.1712***	-0.1370**	-0.0950
	(0.0209)	(0.0231)	(0.0879)	(0.1895)	(0.0065)	(0.0065)	(0.0397)	(0.0512)
constant	11.8320***	12.5369***	3.2027	3.4818	13.7146***	14.8602***	2.1287	0.2614
	(1.4599)	(1.6236)	(9.7371)	(10.7752)	(1.3611)	(1.4627)	(11.1655)	(10.8785)
No. of obs.	30	29	11	11	30	29	11	11
R-squared	0.962	0.962	0.980	0.980	0.973	0.975	0.880	0.904
adjusted R-squared	0.958	0.955	0.828	0.800	0.969	0.970	0.828	0.840
Males								
Current yr emp	-0.8409***	-0.7463***	-0.0904	-0.0887	-0.8925***	-0.7843***	-0.0897	-0.0414
	(0.0884)	(0.1029)	(0.2000)	(0.2171)		(0.0599)		(0.1792)
lagged 1 yr emp		-0.1581		-0.0177		-0.2101***		-0.1276
		(0.1043)		(0.2288)	(0.0590)	(0.0593)	(0.1587)	(0.1846)
replace rate	-0.1017**	-0.1017**	0.3921	0.3971	-0.0278	-0.0152	0.3432	0.4428
	(0.0397)	(0.0381)	(0.2649)	(0.2932)	(0.0270)	(0.0230)	(0.2973)	(0.3410)
time trend	-0.1123*	-0.1470**	-0.4212***	-0.4172***	-0.3212***	-0.4073***	-0.4628***	-0.4631***
	(0.0585)	(0.0639)	(0.0559)	(0.0793)	(0.0502)	(0.0494)	(0.0774)	(0.0804)
constant	80.0604***	86.0628***	21.6719	22.6869	82.0395***	91.4930***	23.2655	26.5268
	(8.4736)	(9.2764)	(19.2628)	(24.5705)	(5.4588)	(5.3517)	(18.5069)	(19.8089)
No. of obs.	30	29	11	11	30	29	11	11
R-squared	0.967	0.971	0.976	0.976	0.985	0.990	0.976	0.978
adjusted R-squared	0.963	0.966	0.965	0.960	0.983	0.988	0.966	0.963

Note: *** significant at 1% level, ** 5% level and * 10% level.

Table A16a: DSP receipt: Females

	Total Employment Rate		Total Employment Rate		FT Employment Rate		FT Employment Rate	
	years 1965-1994		years 1995-2005		years 1965-1994		years 1995-2005	
	model 1	*model 2*	*model 1*	*model 2*	*model 1*	*model 2*	*model 1*	*model 2*
lag 1yr emp	-0.0186	-0.0114	0.0363	0.0367	-0.0132	-0.0026	0.0152	0.0127
	(0.0140)	(0.0187)	(0.0326)	(0.0311)	(0.0182)	(0.0249)	(0.0327)	(0.0354)
lag 2yr emp		-0.0258		0.0263		-0.0319		0.0189
		(0.0184)		(0.0210)		(0.0238)		(0.0393)
Replace rate	-0.0110	-0.0182	-0.0065	-0.0063	-0.0128	-0.0182	0.0120	0.0094
	(0.0116)	(0.0127)	(0.0289)	(0.0276)	(0.0120)	(0.0125)	(0.0249)	(0.0272)
Pop50+	0.1595***	0.1684***	0.2867**	0.2784**	0.1586**	0.1536**	0.2784**	0.2488*
	(0.0536)	(0.0535)	(0.0872)	(0.0836)	(0.0564)	(0.0567)	(0.0944)	(0.1184)
yr 80+	-0.1809*	-0.2104**			-0.1567*	-0.1967**		
	(0.0880)	(0.0879)			(0.0895)	(0.0934)		
yr 87+	0.2654**	0.3295***			0.2347**	0.2690**		
	(0.1013)	(0.1052)			(0.1005)	(0.1035)		
yr 91+	0.3477***	0.4103***			0.3518***	0.4001***		
	(0.0715)	(0.0791)			(0.0736)	(0.0791)		
time trend	0.0338***	0.0432***	0.0342	0.0179	0.0226***	0.0218**	0.0596	0.0726
	(0.0107)	(0.0119)	(0.0528)	(0.0521)	(0.0074)	(0.0081)	(0.0499)	(0.0599)
constant	-0.1777	0.7699	-5.0222***	-6.0421***	-0.4430	0.6183	-4.6410**	-5.0687**
	(1.2801)	(1.3548)	(1.1070)	(1.3355)	(1.4491)	(1.6074)	(1.3197)	(1.6693)
No. of obs.	29	28	11	11	29	28	11	11
R-squared	0.847	0.867	0.996	0.997	0.839	0.854	0.995	0.996
adjusted R-squared	0.796	0.881	0.993	0.994	0.785	0.793	0.992	0.991

Table A16b: DSP receipt: Males

	Total Employment Rate							
	years 1965-1994				years 1965-1994			
	model 1	*model 2*	*model 3*	*model 4*	*model 1*	*model 2*	*model 3*	*model 4*
lag 1yr emp	-0.0637**	-0.0349	-0.0370	-0.0370	0.0348	0.0192	0.0212	0.0407
	(0.0264)	(0.0261)	(0.0275)	(0.0294)	(0.0319)	(0.0380)	(0.0441)	(0.0650)
lag 2yr emp		-0.0655**	-0.0590**	-0.0548*		0.0292	0.0268	0.0616
		(0.0237)	(0.0272)	(0.0294)		(0.0357)	(0.0423)	(0.0895)
lag 3yr emp			-0.0141	-0.0196			0.0077	0.0185
			(0.0264)	(0.0299)			(0.0461)	(0.0566)
lag 4yr emp				0.0230				0.0411
				(0.0321)				(0.0897)
Replace rate	0.0021	0.0051	0.0038	0.0029	0.0787*	0.0608	0.0647	0.0714
	(0.0290)	(0.0259)	(0.0273)	(0.0286)	(0.0371)	(0.0439)	(0.0542)	(0.0622)
Pop50+	0.4079**	0.3569**	0.3530*	0.3611*	0.3593***	0.3002**	0.2918*	0.1660
	(0.1800)	(0.1616)	(0.1711)	(0.1822)	(0.0660)	(0.0992)	(0.1213)	(0.3064)
yr 80+	0.0095	-0.0521	-0.0783	-0.0442				
	(0.1266)	(0.1207)	(0.1378)	(0.1615)				
yr 87+	0.5614***	0.5230***	0.5094**	0.5569**				
	(0.1689)	(0.1604)	(0.1778)	(0.2177)				
yr 91+	0.2576**	0.3867***	0.4136***	0.3337*				
	(0.1133)	(0.1125)	(0.1373)	(0.1786)				
time trend	0.0870***	0.0607*	0.0560	0.0691	-0.1211**	-0.0935	-0.0917	-0.0542
	(0.0304)	(0.0300)	(0.0348)	(0.0408)	(0.0369)	(0.0508)	(0.0577)	(0.1041)
constant	-1.9523	2.7092	3.7570	1.4746	-2.9646	-3.1588	-3.7031	-10.5644
	(5.2521)	(4.9571)	(5.5275)	(6.5576)	(2.6072)	(2.6930)	(4.4232)	(15.7766)
No. of obs.	29	28	27	26	11	11	11	11
R-squared	0.986	0.989	0.989	0.988	0.989	0.985	0.984	0.985
adjusted R-squared	0.981	0.985	0.983	0.980	0.969	0.967	0.959	0.949
				FT Employment Rate				
lag 1yr emp	-0.0711***	-0.0414*	-0.0432*	-0.0449*	0.0016	-0.0087	-0.0053	-0.0001
	(0.0204)	(0.0202)	(0.0213)	(0.0231)	(0.0270)	(0.0261)	(0.0268)	(0.0591)
lag 2yr emp		-0.0597***	-0.0543**	-0.0508*		0.0384	0.0329	0.0381
		(0.0186)	(0.0221)	(0.0240)		(0.0275)	(0.0286)	(0.0601)
lag 3yr emp			-0.0140	-0.0195			0.0275	0.0316
			(0.0222)	(0.0252)			(0.0303)	(0.0527)
lag 4yr emp				0.0151				0.0082
				(0.0307)				(0.0787)
Replace rate	0.0130	0.0249	0.0262	0.0235	0.0750	0.0570	0.0588	0.0589
	(0.0265)	(0.0229)	(0.0243)	(0.0264)	(0.0404)	(0.0397)	(0.0404)	(0.0466)
Pop50+	0.3366*	0.2722*	0.2821*	0.2947*	0.3570***	0.2773**	0.2215	0.1886
	(0.1641)	(0.1410)	(0.1483)	(0.1580)	(0.0723)	(0.0881)	(0.1087)	(0.3403)
yr 80+	-0.0469	-0.1218	-0.1353	-0.0884				
	(0.1157)	(0.1056)	(0.1207)	(0.1507)				
yr 87+	0.4712***	0.3999***	0.4050**	0.4663**				
	(0.1491)	(0.1352)	(0.1486)	(0.1879)				
yr 91+	0.1676	0.2495**	0.2760**	0.2480*				
	(0.1031)	(0.0912)	(0.1036)	(0.1337)				
time trend	0.0717**	0.0460*	0.0381	0.0433	-0.1127**	-0.0658	-0.0354	-0.0156
	(0.0265)	(0.0250)	(0.0293)	(0.0380)	(0.0401)	(0.0501)	(0.0610)	(0.2031)
constant	-0.0392	4.0106	4.7574	3.4750	-0.4726	-1.7396	-3.3024	-4.8043
	(4.5125)	(4.0229)	(4.3529)	(5.4429)	(2.3402)	(2.3553)	(2.9511)	(14.8569)
No. of obs.	29	28	27	26	11	11	11	11
R-squared	0.989	0.992	0.992	0.991	0.978	0.984	0.986	0.987
adjusted R-squared	0.985	0.989	0.987	0.985	0.963	0.968	0.967	0.956

Table A17: SPP receipt: Females

	Total Employment Rate					
	years 1965-1994			years 1965-1994		
	model 1	*model 2*	*model 3*	*model 1*	*model 2*	*model 3*
Current yr emp	-0.1870***	-0.1099*	-0.1411**	-0.0904**	-0.0974**	-0.1196**
	(0.0443)	(0.0596)	(0.0519)	(0.0336)	(0.0359)	(0.0451)
lagged 1 yr emp		-0.1227**	0.0257		-0.0339	-0.0421
		(0.0550)	(0.0680)		(0.0448)	(0.0469)
lagged 2 yr emp			-0.1681***			-0.0316
			(0.0494)			(0.0372)
Replace rate	-0.0144	0.0003	-0.0212	0.0160	0.0338	0.0325
	(0.0411)	(0.0428)	(0.0379)	(0.0300)	(0.0389)	(0.0398)
time trend	0.2909***	0.3195***	0.3523***	0.1771***	0.2036***	0.2493**
	(0.0288)	(0.0305)	(0.0274)	(0.0256)	(0.0439)	(0.0701)
Constant	9.4192***	10.8034***	13.7259***	5.3623**	6.4521**	8.9742*
	(2.0344)	(2.0107)	(1.8894)	(1.9583)	(2.4808)	(3.9088)
No. of obs.	30	29	28	11	11	11
R-squared	0.952	0.957	0.970	0.976	0.978	0.981
adjusted R-squared	0.947	0.950	0.963	0.967	0.964	0.962
			FT Employment Rate			
Current yr emp	-0.2655***	-0.1675**	-0.2193***	-0.0970*	-0.0988*	-0.1037
	(0.0545)	(0.0778)	(0.0719)	(0.0427)	(0.0466)	(0.0983)
lagged 1 yr emp		-0.1486*	0.0269		0.0105	0.0115
		(0.0725)	(0.0946)		(0.0461)	(0.0533)
lagged 2 yr emp			-0.1979***			-0.0054
			(0.0672)			(0.0933)
Replace rate	-0.0451	-0.0376	-0.0422	-0.0028	-0.0047	-0.0065
	(0.0365)	(0.0376)	(0.0340)	(0.0358)	(0.0393)	(0.0530)
time trend	0.1859***	0.1881***	0.1914***	0.1316***	0.1307***	0.1323***
	(0.0081)	(0.0079)	(0.0073)	(0.0122)	(0.0137)	(0.0318)
Constant	11.5974***	13.0737***	15.8265***	5.2628*	5.0436*	5.4023
	(2.1624)	(2.1757)	(2.1079)	(2.2284)	(2.5818)	(6.7627)
No. of obs.	30	29	28	11	11	11
R-squared	0.958	0.962	0.971	0.972	0.972	0.972
adjusted R-squared	0.953	0.955	0.964	0.960	0.954	0.945