

ISSN 0819-2642  
ISBN 0 7340 2559 9



**THE UNIVERSITY OF MELBOURNE**  
**DEPARTMENT OF ECONOMICS**

**RESEARCH PAPER NUMBER 903**

MAY 2004

**THE INCIDENCE OF LONG-TERM  
UNEMPLOYMENT IN AUSTRALIA 1978-2003**

by

Robert Dixon  
&  
G. C. Lim

Department of Economics  
The University of Melbourne  
Melbourne Victoria 3010  
Australia.

## **The incidence of long-term unemployment in Australia 1978-2003.\***

Robert Dixon and G. C. Lim

Department of Economics

The University of Melbourne

Melbourne Vic. 3010

### *Abstract*

*This paper explores the following question - Has there been any long-run increase (or decrease) in the 'incidence' of long-term unemployment once we have corrected for cyclical factors? Our research leads us to conclude: (i) that the incidence of male long-term unemployment has been neither rising nor falling, once we allow for 'cyclical factors' and, (ii) that the incidence of female long-term unemployment has been rising, once we allow for 'cyclical factors'. We conjecture that there is a link between increasing female participation (which we take to be a proxy for 'attachment to the labour market' – and thus attachment to unemployment as well as employment) and an increasing incidence of long-term unemployment. Experimenting with policy dummies, we find no evidence of policy effects on the incidence of long-term unemployment in the case of males and females but there is some evidence that policy had temporary effects on females.*

KEYWORDS: Unemployment Business Cycle

JEL CODE: J64

---

\* We are grateful to Jeff Borland for helpful comments on an earlier draft.

## 1. Introduction

This paper explores the following question - Has there been any long-run increase (or decrease) in the 'incidence' of long-term unemployment once we have corrected for cyclical factors? The issue is of importance for well known reasons relating to efficiency (especially vis a vis the functioning of the labour market) and equity.

The paper is organised as follows. In the next section of the paper we briefly summarise past research on the time series behaviour of long-term unemployment and explain why there is need for a new study. We then look at graphical and econometric evidence on the relationship between the incidence of long-term unemployment and the unemployment rate. We find that there is compelling evidence to suggest that, unlike the case for males, the incidence of long-term unemployment for females is increasing after we have adjusted for cyclical factors. We offer some reasons for this. We also examine whether policy has influenced the incidence of long-term unemployment. The final section concludes.

## 2. Long-term unemployment

If someone were to ask, "what is the accepted stylized fact concerning the trend incidence of long-term unemployment once we have allowed for cyclical influences", what would the answer be? Borland and Kennedy in their survey of the Australian labour market report: "it does not appear that – correcting for cyclical factors – there has been any long-run increase in the rate of long-term unemployment" (1999, p 80). The econometric work by Chapman, Junankar & Kapuscinski (1992) and EPAC (1996) and possibly also Junankar & Kapuscinski (1998)<sup>1</sup> and Chapman & Kapuscinski (2000), found that the two variables (the long-term unemployment ratio and the unemployment rate) were cointegrated implying that, corrected for cyclical factors, there has not been any long-run increase (or decrease) in the incidence of long-term unemployment.<sup>2</sup> On the other hand Norris, is of the view that it "appears as if a ratchet effect is operating, each recession lifting the average long-term unemployment ratio upwards" (Norris, 2000, p 191) and this stance is supported by a recent ABS survey of long-

---

<sup>1</sup> Unlike the other studies referred to here Junankar & Kapuscinski (1998) define long-term unemployed as those unemployed for eighteen months or more.

<sup>2</sup> Strictly speaking, only Chapman, Junankar & Kapuscinski (1992) and EPAC (1996) report explicitly the results of tests for cointegration and that the variables in their study are cointegrated. Junankar & Kapuscinski (1998, p 31) report that the data in their study "were consistent with the standard prerequisite of cointegration (same order of stationarity for all regressors) but in the context of their paper and given that they say they "follow the approach ... by Chapman, Junankar & Kapuscinski (1992)" (ibid, p 30) we take it that they too found the variables to be cointegrated. Also since Chapman & Kapuscinski (2000, p 6) "utilise techniques developed by Chapman, Junankar & Kapuscinski (1992)", we take it that, although they do not say so, they also found their variables to be cointegrated.

term unemployment where it is conjectured that “the general trend has been an increase in the chance that a period of unemployment would last for at least a year” (ABS, 2000, p 122).

We think that this issue is worth another look. Perhaps the most important reason is that it is an important issue and yet the last published study (Chapman & Kapuscinski (2000)) examined a data set which concluded five years ago (in 1999). We also think that it is important to model males and females separately (for reasons that will become evident in the following section) but the most recent study (again, Chapman & Kapuscinski (2000)) does not do this and the last study to do so (Junankar & Kapuscinski (1998)) was examining a data set which concluded in 1994.<sup>3</sup> Consequently, there does not seem to be a commonly agreed recent ‘stylised fact’ and this is not a satisfactory state of affairs. For these reasons we believe it is worthwhile to revisit the matter.

For the purposes of this paper we will define long-term unemployment (as do most authors) as persons who have not held a full-time job<sup>4</sup> for 52 weeks or more. Data on this is readily available back to 1978:02.<sup>5</sup> A related issue concerns the measurement of the ‘incidence’ of long-term unemployment. A number of possibilities exist but the two most likely candidates are the ‘long-term unemployment rate’ (which is the ratio of the number of long-term unemployed to the labour force) and the ‘long-term unemployment ratio’ (which is the ratio of the number of long-term unemployed to the total number unemployed).<sup>6</sup> The two series are highly correlated and so we will follow the practice of previous authors and examine the behaviour of the long-term unemployment ratio.

Figures 1a-1c show how the long-term unemployment ratio and the unemployment rate for males, females and persons have evolved over the period 1978:2 – 2003:3. The data is

---

<sup>3</sup> Chapman et al (1992), looked at males, females and persons over the period 1978:2-1991:4; EPAC (1996) looked only at persons over the period 1978:2-1995:4; Junankar & Kapuscinski (1998) looked at males, females and persons over the period 1980:2-1994:1; Chapman & Kapuscinski (2000) looked only at persons over the period 1978:4-1999:4.

<sup>4</sup> Data also exists recording the number of persons who have not held a job (whether full-time or part-time) for 52 weeks or more but this data is only available back to 1986:04. However, for the period 1986:04-2003:11 the two series (the one based on the length of time since the last full-time job and that based on the length of time since the last job) for males, females and persons are almost perfectly correlated. Given this, and the benefits of working with a longer data set that includes the two recession episodes, we will look at data based on the time since last full-time job.

<sup>5</sup> The data examined in this paper (and in the other cited studies) can be found in the DX time series data bank, ABS Labour Force Statistics, Duration of Unemployment, series LMDL 904-6.

<sup>6</sup> The “long-term unemployment ratio” is also referred to as the “incidence of long-term unemployment”.

seasonally adjusted with the figure for each quarter being the average of each of the three months in the quarter.

[FIGURE 1 NEAR HERE]

The two recession episodes are clearly evident in the data as is the lagged response of the long-term unemployment ratio to changes in the unemployment rate. It is also clear from these figures that the time-series behaviour of ‘males’ differed from that of ‘females’. Consequently, for the remainder of the analysis we eschew discussion of ‘persons’, instead we examine separately the behaviour for ‘males’ and for ‘females’.

Of particular interest, given that we are ultimately interested in whether there has been any long-run increase (or decrease) in the ‘incidence’ of long-term unemployment once we have corrected for cyclical factors, is a plot of the bi-variate relationship between the long-term unemployment ratio and the unemployment rate. Figures 2a and 2b present the relationships based on quarterly data, for the period 1978:2 – 2003:3, with the long-term unemployment ratio on the vertical axis and the unemployment rate on the horizontal axis. To see the underlying bi-variate relationship between the long-term unemployment ratio and the unemployment rate more clearly, Figures 2c and 2d present the plots based on yearly data.

[FIGURE 2 NEAR HERE]

For both males and females the earliest (1978:2) observation is at the bottom of the chart (for males the evolution starts from the bottom LH corner, for females it starts from the center of the horizontal axis). In each case from the start point the relationship between the two variables takes the form of series of loops or spirals moving in an anti-clockwise direction. The right-hand end of each loop corresponds to the end of the contraction phase in the two recessions (ie the highest unemployment rate reached in the recessions) while the left-hand end of each loop corresponds to the start of each recession. These loops result from two features of the labour market. First, the unemployment rate rises and falls with the business cycle and second, the long-term unemployment ratio lags behind the unemployment rate (in part this is simply a matter of definition in that to be long-term unemployed one has to have been unemployed for at least 12 months). As the economy moves into a recession we observe that the immediate impact is for a marked rise in the flow into unemployment

relative to the number becoming long-term unemployed. As a result the long-term unemployment ratio may increase a little or may even fall immediately following a sharp rise in the unemployment rate. However, after a time, if the unemployment rate remained constant at its new level, the number of long term unemployed would adjust to its new level. The reverse is true if the unemployment rate were to fall sharply.<sup>7</sup>

Inspection of Figure 2b suggests that at least in the case of females the relationship may be spiraling or drifting upwards. Any tendencies for drift should be more clearly evident in Figures 2c and 2d which show yearly (rather than quarterly) observations of the long-term unemployment ratio and the unemployment rate for 1979 – 2003.

While the yearly data presented in Figure 2c for males is consistent with there being no systematic drift in the loops upwards over time, Figure 2d does quite clearly suggest that – correcting for cyclical factors – there has been a long-run increase in the incidence of long-term unemployment for females. If true, can we say when this increase began and what might account for it?

One way to approach this is to observe the behavior of the slope of a line drawn from the origin in either of the charts in Figure 2 to any point on the bi-variate curve relating LTUR (the vertical axis in Figure 2) to UR (the horizontal axis in Figure 2). The slope of that line will measure the value of the change in the long-term unemployment ratio ( $\Delta\text{LTUR}$ ) divided by the change in the unemployment rate ( $\Delta\text{UR}$ ). In other words, the slope of that line would be equal to  $(\text{LTUR}/\text{UR})$ , since we are measuring relative to the origin. If we measured this for each period and then plotted it as a time series we would expect, if no drift was present, for the series to move up and down over the business cycle (as we move around the loops in Figure 2) but for there to be no evidence of any trend. If any drift were present we would expect to see the series moving up and down around a rising (or falling) trend.

[FIGURE 3 NEAR HERE]

Figures 3a and 3b show the evolution over time of  $(\text{LTUR}/\text{UR})$  for males and for females (broken line and LH scale) as well as the variable indicating the state of the cycle i.e., the

---

<sup>7</sup> Preston & Harwood (1994) give an excellent description of the dynamics connecting the incidence of long-term unemployment with the unemployment rate.

unemployment rate (solid line and RH scale). For both males and females the ratio (LTUR/UR) moves up and down with the unemployment rate. However, while Figure 3a suggests that there is no obvious trend in the ratio for males, Figure 3b suggests that there is an upwards trend in the ratio (LTUR/UR) for females.<sup>8</sup> Given this, and the impression given by Figures 2, and 3, it would seem reasonable to hypothesise that, once we allow for cyclical factors, the incidence of long-term unemployment for males has not been changing, while the incidence of long-term unemployment for females has been rising.

While the graphical evidence is suggestive it must be followed up with formal econometric work and that is the task of our next section. However, before proceeding it is useful to consider what possible explanations there could be for the trend increase in the LTUR for females. Any explanation must surely be guided by two things. First, and most obviously, it would seem we are after an explanation which applies to females alone and not to both males and females. Second, the drift upwards in the case of females seems to be a feature of the whole of the period as indicated by Figure 3b. In short we need to identify a factor (or factors) which have been present over the whole of the period, which is specific to females, and which has been trending upwards or downwards over the period and hence which can reasonably be expected to explain the upward drift in the incidence of female long-term unemployment. In our view the most likely candidate is associated with the (dramatic) increase in the participation of females in the labour market over the 80s and 90s.

### *Participation Rates*

Figure 4 shows seasonally adjusted quarterly data for the female participation rate over our sample period. The figure attests to a well known phenomenon, namely that over the sample period female participation rose markedly and that, at least in the 80s this was especially the case with older females.<sup>9</sup>

[FIGURE 4 NEAR HERE]

As older (35+) females entered or re-entered the labour force in relatively large numbers in the 80s and 90s their share of female unemployment increased (in part this is because of the

---

<sup>8</sup> ADF tests show that the series for males is stationary while the series for females is not stationary.

<sup>9</sup> There are a number of reasons that might be given to account for the rise in the female participation rate and the fact that the rise was most marked for married and/or older females. Amongst them one should mention rising divorce rates, the passing of the Sex Discrimination Act in 1984 and the Affirmative Action (Equal Opportunity for Women) Act in 1986. Kenyon & Wooden (1996) provide further discussion and an evaluation of competing explanations.

rise in secondary and tertiary retention rates for young females).<sup>10</sup> As a result, “the strong growth in female labour force participation was a contributing factor to the persistence of high levels of long-term unemployment” (ABS, 1994a, p 6). A recent survey of long-term unemployment has noted that it was also the case that over the period 1989-1999, older females comprised an increasing proportion of the long-term unemployed (ABS, 2000, p 122). The ABS remarks that “this may reflect an increased tendency for women who had left the labour force for family reasons to seek to regain employment, coupled with increased difficulty in securing such employment” but was also “influenced by the changes to the age and sex composition of the broader labour force population which occurred over the period” (ABS, 2000, p 122). Given that over our sample period there has been increasing attachment to paid work on the part of females, and especially older females, it is not surprising that the result will be for the profile of the female labour force and the profile of the male labour force to have become more alike and that accompanying this increased ‘attachment’ will be a tendency for the incidence of female long-term unemployment to increase. In short, it seems plausible to conjecture that there is a link between increasing female participation (which we take to be a proxy for ‘attachment to the labour market’) and an increasing incidence of long-term unemployment.<sup>11</sup>

For completeness, Figure 4 also includes a plot of the male participation rate. As is well known, the behaviour of the male participation rate is quite different to that for females. The male rate fell over the period while the female rate rose and the change in the male rate was slight by comparison with the change in the female rate.

We turn now to our econometric work.

### 3. Econometrics

#### *Modeling the relationship between LTUR and UR*

As mentioned earlier, we are interested in the relationship between the long-term unemployment ratio and the unemployment rate for both males and females over the period 1978:2 – 2003:3. All of the data we use is seasonally adjusted with the figure for each

---

<sup>10</sup> The proportion of all female unemployment which was made up of females aged 35 and over rose from around 20% in the early 80s to 30% in the early 90s and is now close to 40%. (Source: ABS Labour Force Statistics in DX.)

<sup>11</sup> But the reader should note that when we talk of an association between the LTUR and the participation rate for females we are using the information on the participation rate as a summary for a vast constellation of social and economic and institutional forces.



quarter being the average of each of the three months in the quarter. We will be primarily interested in three variables, the long-term unemployment ratio (LTUR), the unemployment rate (UR) and the participation rate (PR) and we will confine our attention to males and females taken separately.

Not surprisingly, given the evolution of the LTUR and UR variables as displayed in Figure 1 and given the well known trends in male and female participation rates, we find that all of the variables (LTUR, UR and PR) are non-stationary and  $I(1)$ .<sup>12</sup> We also find, again not surprisingly given the lags evident in Figure 1, that for both males and females the changes in the unemployment rate ( $\Delta UR$ ) Granger-causes the changes in the long-term unemployment ratio ( $\Delta LTUR$ ). Given the properties of the data and the importance of lags in the relationship we estimated an Error Correction Model (ECM) to sort out the short-run dynamic relationship from the fundamental long-run relationship.

Before doing any modeling involving these variables an important issue is whether it makes sense for the relationship between the long-term unemployment ratio and the unemployment rate to include a constant term. As noted earlier, it must be the case that when the unemployment rate is zero the long-term unemployment ratio is zero.<sup>13</sup> We will impose this on all of our equations linking the two. An implication of this is that any permanent change in the relationship must be associated with a change in the slope linking the long-term unemployment ratio with the unemployment rate (a rotation of the loops, if you like) and not a mere vertical shift in an intercept parameter.

There is also need to take into account a policy shift which occurred during the sample period. Policies directly targeted towards the long-term unemployed were introduced by the Keating Labor government in May 1994 as part of their 'Working Nation' initiative, the 'Job Compact' being one element of this program. The coalition government which took office in March 1996 continued the Labor government's scheme until May 1998 when it was

---

<sup>12</sup> All appear to be  $I(1)$  on the basis of ADF test and so will proceed on the assumption that all variables have a unit root. However, logic dictates that in truth in the long run neither the long-term unemployment ratio nor the unemployment rate can be  $I(1)$  as both are bounded and so, strictly speaking, the infinite realisations of the stochastic processes that describe them are ultimately stationary, perhaps with a near unit root. In practice, for finite realisations, particularly in small samples such as ours, it is quite possible for the bounded processes to mimic the appearance of unbounded random walks. In such cases, to avoid potentially spurious results, it is safest to treat the series as if they were generated by unit root processes and we will proceed on that basis.

<sup>13</sup> It is possible in principle for the unemployment rate to be positive and for the long-term unemployment ratio to be zero however we regard this as most unlikely on the grounds that it is unreasonable to expect there to be only short-term unemployment as the unemployment rate approaches zero.

abolished and replaced with a new scheme which has operated since that time. To test for the effect of policy we include in our model a dummy variable ( $D$ ) scored as 0 from 1978:2 through 1994:1 then 1 from 1994:2 until the end of our sample period (2003:3).

The general linear encompassing ECM estimated is thus of the form:

$$\Delta LTUR_t = \lambda(LTUR_{t-1} - (\beta_0 + \beta_1 PR_{t-1} + \beta_2 D_{t-1})UR_{t-1}) + \sum_{i=0}^p \gamma_i \Delta UR_{t-i} + \varepsilon_t$$

where  $p$  is the order of lag and  $\varepsilon_t$  is an error term.<sup>14</sup> When  $\beta_1$  and  $\beta_2$  are both insignificantly different from zero, LTUR and UR are related with a constant slope coefficient  $\beta_0$ . But when  $\beta_2$  is insignificantly different from zero, but  $\beta_1$  is significantly different from zero, LTUR and UR are related with a time-varying slope coefficient  $(\beta_0 + \beta_1 PR_{t-1})$ .

Results of our econometric work for both males and females and also for both the constant and the time-varying case are given in Table 1.<sup>15</sup> The model was first estimated with a high lag order and insignificant lags were then deleted.

[TABLE 1 NEAR HERE]

Consider first the results shown in column marked A in Table 1a and 1b. These results show that coefficient on the dummy ( $\beta_2$ ) is ‘incorrectly signed’ (we would expect it to be negative) and insignificant. We conclude that our time series model provides no evidence of fundamental policy effects on the incidence of long-term unemployment in the case of either males or females.<sup>16</sup>

There are a number of possible explanations for this result. First, it could be that the policy is fundamentally ineffectual, but this is unlikely to be completely true because even if all policy does is to substitute a spell of unemployment followed by training followed by another spell of unemployment for one continuous spell of unemployment we should none-the-less expect

<sup>14</sup> Note that the equation can be re-expressed as a linear ECM model, simply by defining 2 composite variables – one defined as the product of the participation rate  $PR$  and the unemployment rate  $UR$  and the other defined as the product of the policy dummy  $D$  and the unemployment rate  $UR$ .

<sup>15</sup> EViews 4.1 is the package utilized.

<sup>16</sup> We could also not find any evidence of a role for a dummy which covers only the period from mid-1998 on or of two separate dummies one for 1994-8 and one for 1998 on.

to notice a fall in the LTUR on this account alone. Second, it could be that policy is effective but that its influence is temporary. For example it could be that the policy has only a weak effect in terms of job finding but that the policy itself (opportunity for training etc) induces unemployed persons who would otherwise quit the labour force (possibly before they reach a duration of 52 weeks) to remain in the labour force and to engage in this activity. If this were true we might not observe a strong negative fundamental effect of the policy on the number of long-term unemployed. Third, it could be that policy is effective but that its effect is to alter the composition (eg the age and/or duration composition) of the long term unemployed while not altering the overall number of long-term unemployed.<sup>17</sup>

To test for short-run effects of policy, the influence of the policy dummy was tested on the short run coefficients -  $\lambda$  and  $\gamma_i$ . Results show that the policy dummy had a significant short run effect on the proportion of long-term unemployed females (see column marked 'B' in Table 1b), but had no significant effect for males. These findings suggest that overall the reductions in the LTUR observed over the last decade or so had been due mainly to the beneficial effect of sustained growth in the economy.

### *Males*

The best fitting<sup>18</sup> model for males is described in the column marked 'C', namely the constant slope coefficient model. As noted earlier, the decline in the male participation rate is not substantial and adding this variable, as in column 'B', actually resulted in a worse fitting model.

Hence, for males the preferred model is one in which there has been no discernable change in the long-run relationship (or in the error correction term) over the time period under consideration. This result is consistent with the graphical relationship for males depicted in Figures 2 and 3 where there seems to be no marked upward drift in the loops for males. Notice that: the error correction parameter ( $\lambda$ ) is -0.177 suggesting as we would expect slow adjustment in the event of 'disequilibrium'; the coefficient for the contemporaneous change in the male unemployment rate ( $\gamma_0$ ) is negative, indicating (as we would expect) that a change

<sup>17</sup> Table 4.2 in DEETYA (1996) provides information on labour market program participants by duration of unemployment over the period 1992 – 1996. It shows a marked rise in the proportion of participants who had been unemployed for 36 months or more, a fall in the proportion of participants who had been unemployed for 12-36 month and no change in the proportion of participants who had been unemployed for less than 12 months.

<sup>18</sup> Where 'best' is assessed with reference to the model which minimizes the value of the Schwarz criterion and which yields sensible parameter estimates with coefficients that differ significantly from zero.

in the male unemployment rate initially raises short term unemployment relative to long term unemployment, while the coefficient on the male unemployment rate lagged two periods ( $\gamma_2$ ) is positive. The long-run coefficient linking the incidence of male long-term unemployment with the male unemployment rate ( $\beta_0$ ) is positive as we would expect and is estimated to be around 4.0, so a 1 percentage-point permanent increase in the male unemployment rate will result in a permanent increase in the LTUR for males of 4 percentage-points.<sup>19</sup>

Figure 5a plots the actual and predicted values (based on our preferred model) for the male long-term unemployment ratio against the male unemployment rate over the sample period. Apart from the marked over-prediction commencing in 1993:3 and ending in 1997:2 (this is the ‘bubble’ at the top RHS of the figure) the model seems to predict well with no sign of systematic over or under prediction errors.

[FIGURE 5 NEAR HERE]

In summary, based on the econometric evidence in Table 1a, the graphical absence of drift in the loops in Figures 2 and 3 as well as the stationarity of the ratio (LTUR/UR) in Figure 3a we conclude that – correcting for cyclical factors – there has not been any long-run increase or decrease in the incidence of long-term unemployment for males.

### *Females*

Table 1b reports the results of fitting the model to the data for females. In this case the best model is the time-varying coefficient model shown in column B. The long-run coefficients linking the incidence of female long-term unemployment with the female unemployment rate ( $\hat{\beta}_0 + \hat{\beta}_1 PR_{t-1}$ ) are positive and ranged from 2.224 to 3.661 with a sample mean of 2.977 (compared to the constant coefficient estimate of 2.934).<sup>20</sup>

Figure 5b and 5c show the actual and predicted values for the female long-term unemployment ratio, over the sample period, for the two models – the constant and the time varying coefficient cases. It is evident that the constant slope coefficient model is markedly over-predicting initially and then markedly under-predicting. Overall, the empirical analysis shows that the model which incorporates information on both female attachment to the

<sup>19</sup> The mean value of (LTUR/UR) for males over the period was 4.05.

<sup>20</sup> The mean value of (LTUR/UR) for females over the period was 2.99.

labour market (as proxied by the participation rate<sup>21</sup>) and the unemployment rate is to be preferred to the one which only takes into account information on the unemployment rate.<sup>22</sup>

Based on this econometric result, the graphical evidence of the presence of drift in the loops in Figures 2b and 3b, as well as the non-stationary time series property of the ratio (LTUR/UR) in Figure 4b, we conclude that – correcting for cyclical factors – there has been a long-run increase in the incidence of long-term unemployment for females.

#### 4. Concluding remarks

We set out to explore the following question - Has there been any long-run increase (or decrease) in the ‘incidence’ of long-term unemployment once we have corrected for cyclical factors? Our research has led us to conclude: (i) that the incidence of male long-term unemployment has been neither rising nor falling, once we allow for ‘cyclical factors’ and, (ii) that the incidence of female long-term unemployment has been rising, once we allow for ‘cyclical factors’. We conjecture that there is a link between increasing female participation (which we take to be a proxy for ‘attachment to the labour market’ – and thus attachment to unemployment as well as employment) and an increasing incidence of long-term unemployment. Experimenting with policy dummies, we found no evidence of policy effects on the incidence of long-term unemployment in the case of males and females but there is some evidence that policy had temporary effects on females.

---

<sup>21</sup> A model where the error correction parameter varied with the participation rate also yielded significant coefficients but did not perform as well judged by the Schwarz and RMSE criterion as the model where the long-run coefficient was varying with the participation rate.

<sup>22</sup> Note that the long-run relationship for females:  $LTUR = (\beta_0 + \beta_1 PR)(UR)$ , can also be re-expressed linearly as  $LTUR = \beta_0(U/LF) + \beta_1(U/POP)$  simply by utilising the definition of UR (U/LF) and PR (LF/POP).

## References

- Australian Bureau of Statistics (ABS) (1994a), *Social Trends*, ABS Cat. No. 4102.0. Canberra.
- Australian Bureau of Statistics (ABS) (1994b), *Australia's Long-Term Unemployed: A Statistical Profile*, ABS Cat. No. 6255.0. Canberra.
- Australian Bureau of Statistics (ABS) (2000), *Social Trends*, ABS Cat. No. 4102.0. Canberra.
- Borland, J. and Kennedy, S. (1998), 'Dimensions, Structure and History of Australian Unemployment', in G. DeBelle and J. Borland (eds), *Unemployment and the Australian Labour Market*, Sydney, Reserve Bank of Australia, 68-99.
- Chapman, B., Junankar, P. and Kapuscinski, C. (1992), 'Long Term Unemployment: Projections and Policy', *Centre for Economic Policy Research Discussion Paper No. 274*, Canberra, Australian National University.
- Chapman, B. and Kapuscinski, C. (2000), 'Avoiding Recessions and Australian Long-term Unemployment', *Centre for Economic Policy Research Discussion Paper no. 418* Canberra, Australian National University.
- Department of Employment, Education, Training and Youth Affairs (DEETYA) (1996), *Working Nation: Evaluation of the Employment, Education and Training Elements Australia*, Economic and Policy Analysis Division EMB Report 2/96, Canberra, Australian Government Publishing Service.
- Economic Planning and Advisory Commission (EPAC) (1996), *Future Labour Market Issues for Australia*, Commission Paper No. 12, Canberra, Australian Government Publishing Service.
- Junankar, P. and Kapuscinski, C. (1998), 'Was Working Nation Working?', *Journal of Industrial Relations*, 40, 25-41.
- Kenyon, P. and Wooden, M. (1995), 'Labour Supply' in K. Norris and M. Wooden (eds), *The Changing Australian Labour Market*, EPAC Commission Paper No. 11, Canberra, Australian Government Publishing Service, 15-38.
- Norris, K. (2000), *Economics of Australian Labour Markets*, Sydney, Pearson Education Australia.
- Preston, J. and Harwood, J. (1994), 'The Dynamics of Long-Term Unemployment', in ABS, *Australian Economic Indicators*, June 1994, xi-xv.

**Table 1 Estimates of Error Correction models: 1978:2-2003:3****Table 1a; Males**

	<i>A</i>	<i>B</i>	<i>C</i>
$\lambda$	-0.173 (0.000)	-0.173 (0.000)	-0.177 (0.000)
$\beta_0$	-1.223 (0.809)	-1.200 (0.746)	4.033 (0.000)
$\beta_1$	0.070 (0.291)	0.070 (0.156)	
$\beta_2$	0.002 (0.995)		
$\gamma_0$	-1.746 (0.000)	-1.746 (0.000)	-1.675 (0.000)
$\gamma_2$	1.101 (0.011)	1.101 (0.010)	1.112 (0.008)
Schwarz Criterion	3.216	3.169	3.143

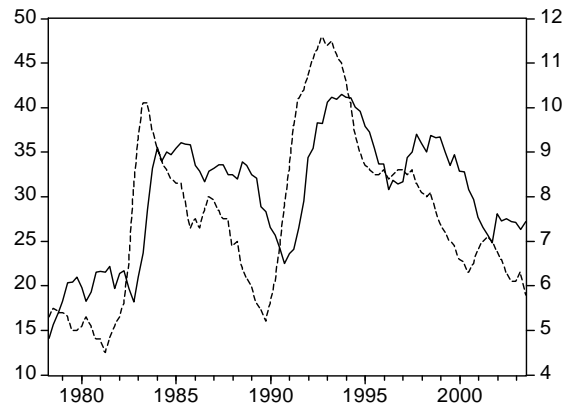
**Table 1b: Females**

	<i>A</i>	<i>B</i>	<i>C</i>
$\lambda$	-0.251 (0.000)	-0.238 (0.000)	-0.097 (0.000)
$\beta_0$	-2.062 (0.017)	-2.183 (0.001)	2.934 (0.000)
$\beta_1$	0.100 (0.000)	0.103 (0.000)	
$\beta_2$	0.109 (0.525)		
$\gamma_4$	1.187 (0.000)	1.577 (0.000)	1.869 (0.001)
dummy		-1.855 (0.009)	-2.199 (0.004)
Schwarz Criteria	3.015	2.953	3.109

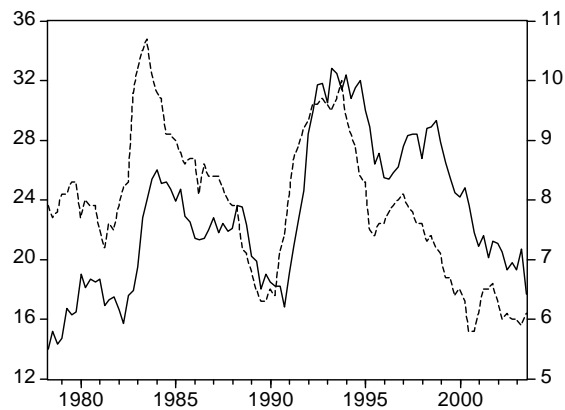
The figures in brackets under the coefficient estimates are p-values (based on Newey-West corrected standard errors).

**Figure 1 Long-term unemployment ratio (solid line and LH Scale) and Unemployment rate (broken line and RH Scale), Australia: 1978:2 – 2003:3.**

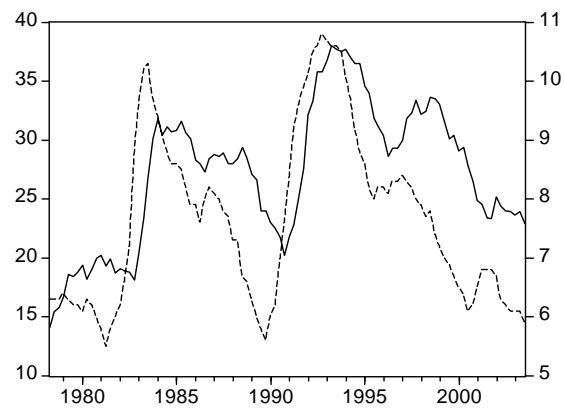
**1a Males**



**1b Females**



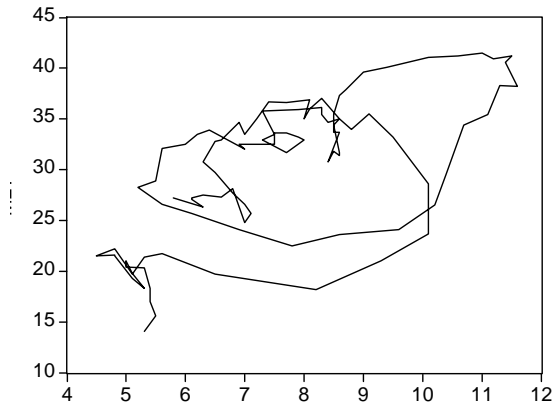
**1c Persons**



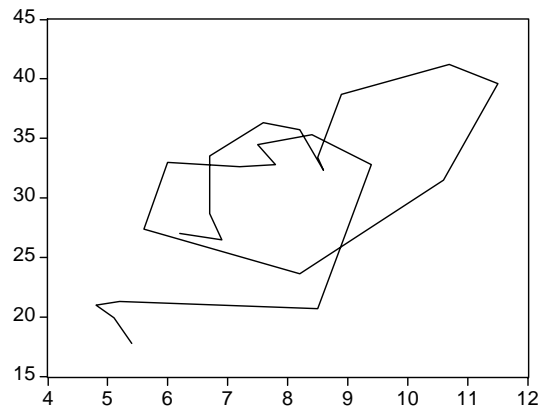


**Figure 2 Long-term unemployment ratio (vertical axis) and Unemployment rate (horizontal axis) in Australia**

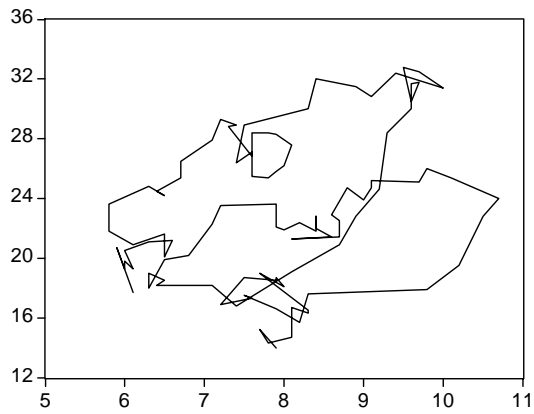
**2a Males (quarterly data)**



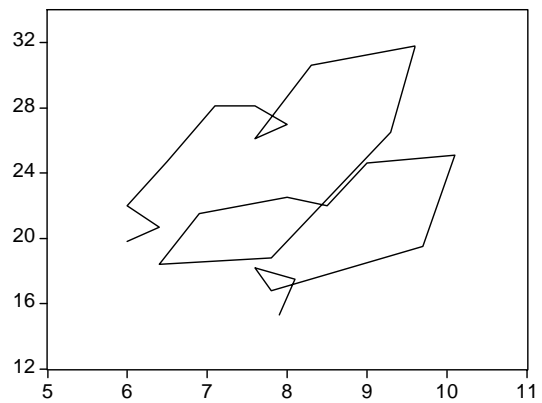
**2c Males (yearly averages)**



**2b Females (quarterly data)**

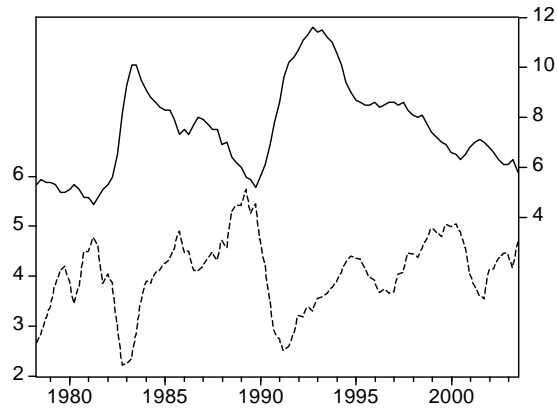


**2d Females (yearly averages)**

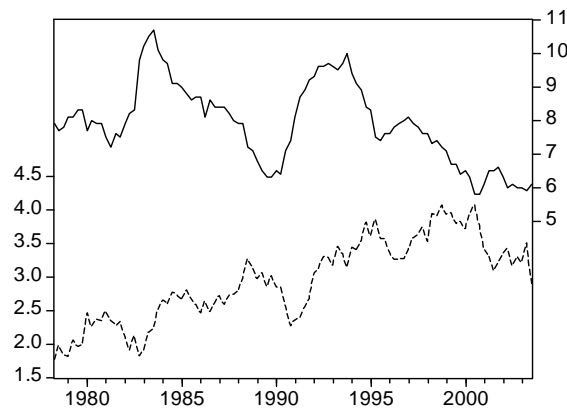


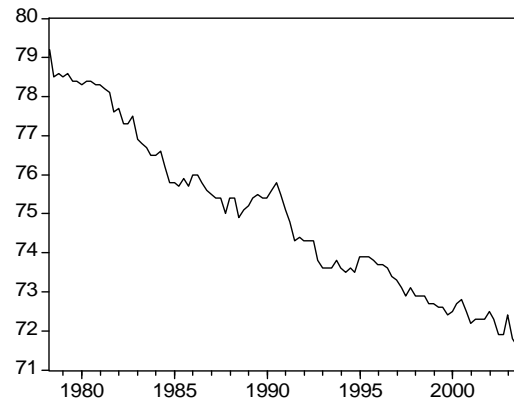
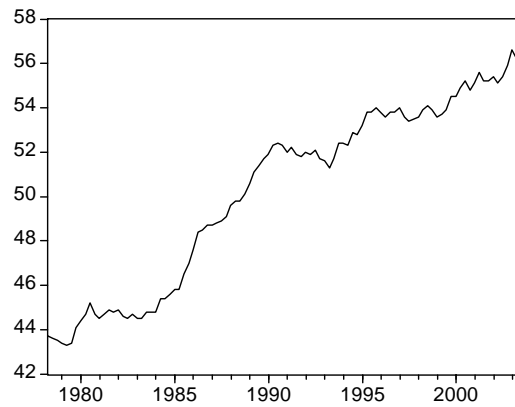
**Figure 3 Time series for UR (solid line and RH Scale) and the ratio LTUR/UR (broken line and LH Scale): Australia: 1978:2 – 2003:3.**

**3a Males**



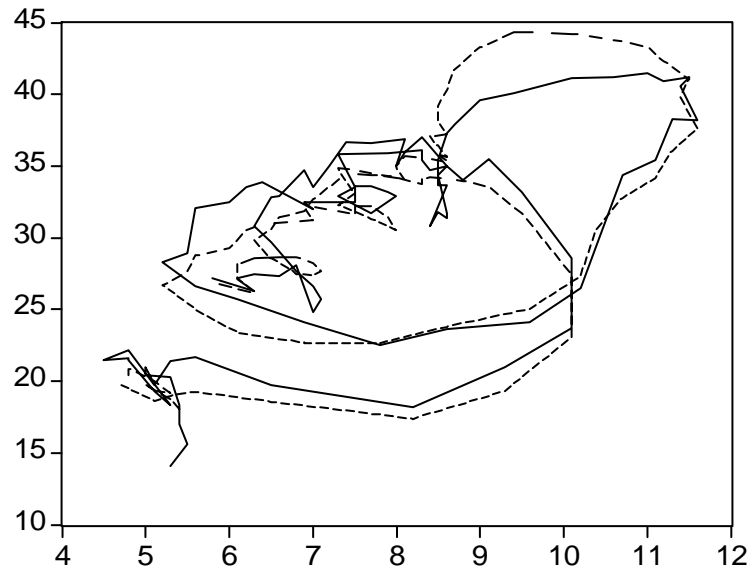
**3a Females**



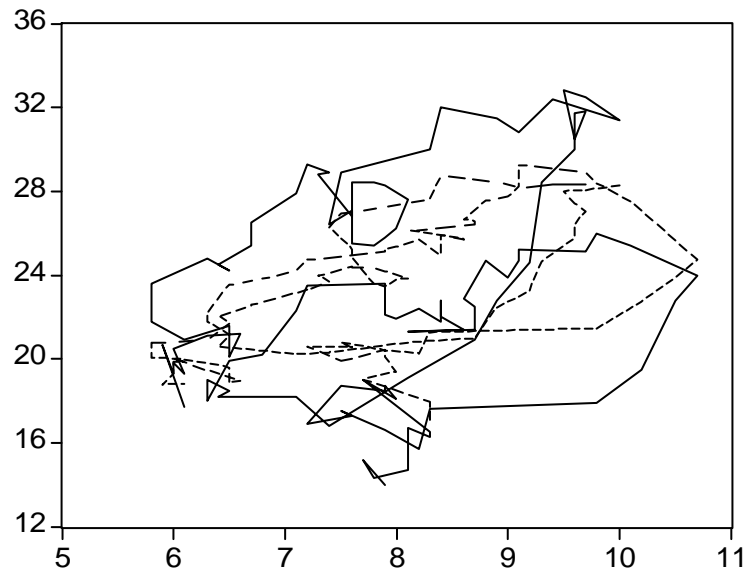
**Figure 4 Participation rates: 1978:2 – 2003:3****4a Males****4b Females**

**Figure 5** Predicted (broken line) and actual values of LTUR (solid line) both plotted against UR on the horizontal axis.

**5a Males: Predictions using  $LTUR_t = (\hat{\lambda} - 1)LTUR_{t-1} - \hat{\lambda}\hat{\beta}_0UR_{t-1} + \hat{\gamma}_0\Delta UR_t + \hat{\gamma}_2\Delta UR_{t-2}$**



**5b Females: Predictions using  $LTUR_t = (\hat{\lambda} - 1)LTUR_{t-1} - \hat{\lambda}\hat{\beta}_0UR_{t-1} + \hat{\gamma}_4\Delta UR_{t-4}$**



**5b Females: Predictions using  $LTUR_t = (\hat{\lambda} - 1)LTUR_{t-1} - \hat{\lambda}(\hat{\beta}_0 + \hat{\beta}_1 PR_{t-1})UR_{t-1} + \hat{\gamma}_4 \Delta UR_{t-4}$**

