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**Unemployment Rate Dispersion in Melbourne:
The Regional Dimension**

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Unemployment Rate Dispersion in Melbourne: The Regional Dimension*

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Abstract

In this paper we examine unemployment rate dispersion across the (statistical) regions in the Melbourne metropolitan area. We find that the level of dispersion is positively correlated with the unemployment rate in all the regions taken together and that the ‘elasticity’ of dispersion with respect to the unemployment rate is unity, with the result that there is a tendency for the level of dispersion relative to the average unemployment rate to remain stationary over our sample period. We discuss the implications of this and show that the unemployment rate differences are persistent in the sense that the same areas exhibit relatively high (or low) unemployment rates over the whole of our sample period. We also estimate equilibrium rates of unemployment for the different regions in Melbourne and conjecture possible explanations for the differences in the level and in the persistence of the equilibrium rates.

Keywords Regional Unemployment Disparities Business Cycle Unemployment

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1. Introduction

In this paper we explore differences in the unemployment rates of the (statistical) regions which together make up the Melbourne metropolitan area. In 2004 the total labour force in the Melbourne metropolitan area totalled 2.27 million persons, this number being 74% of the Victorian labour force and 18% of the national labour force. This paper aims not only to study data for Melbourne's regions but also to introduce some techniques and ideas that might usefully be applied to other areas. The paper is structured as follows. In the second section we examine various measures of the dispersion of unemployment rates across regions. We find that the level of dispersion in absolute terms is positively correlated with the unemployment rate and that the 'elasticity' of dispersion with respect to the unemployment rate is unity, with the result that there is a tendency for the level of dispersion relative to the average unemployment rate in all regions taken together to remain stationary over our sample period. We then discuss the implications of this. In the third section of the paper we explore the possibility that the observed unemployment rate differences are persistent in the sense that the same areas exhibit relatively high (or low) unemployment rates over the whole of our sample period. We find that there has been a remarkable stability in relative rates (especially between those in 'the west' of Melbourne relative to 'the rest'). That section concludes with a presentation of estimates of the equilibrium rates of unemployment for the different regions in Melbourne. In section four we briefly explore some possible explanations for the differences in the level and the persistence of the equilibrium rates. The final section concludes. The main interest (and originality) in the paper lies in the time series measures in sections two and three.

2. Measuring Unemployment Rate Dispersion

Figure 1A shows the unemployment rate for the eight Statistical Regions which make up the Melbourne Major Statistical Region for each quarter over the period 1987:3 – 2005:3 while Figure 1B shows annual averages over the period 1988 – 2004.¹ (Details of the regional groupings and the geographic areas covered by each are given in the data appendix.) The purpose of the two figures is to give the reader some idea of changes in the 'spread' of rates

¹ To save space in tables and figures we will in the main report data for persons and note in the text where this is not representative of both males and females.

over time. Clearly, while there is a general similarity in the evolution of unemployment in the regions over time, there are marked (and persistent) differences in the levels of the unemployment rates across the regions. In the following sections of the paper we will enquire into the sources of differences between the individual regions. In this section we focus instead on developing a formal measure of the extent of dispersion in the regional unemployment rates in any period and ask if the degree of dispersion varies in some systematic fashion over time.² One important issue to be explored is whether or not the degree of dispersion is related to the state of the business cycle and, if so, does it appear to be the case that we can only have low unemployment at the expense of greater dispersion?

[FIGURE 1 NEAR HERE]

Looking at Figures 1A and 1B, there appears to be some indication of an increase in the dispersion of relative rates associated with the recession episode in the period 1989 - 1993 followed by a slow decrease in the dispersion of relative unemployment rates after the recession. Given this, it is useful to have recourse to formal measures of dispersion, to get a more precise picture of movements over time and to facilitate a more considered analysis of the relationship between the dispersion of unemployment rates across regions and the stage of the business cycle.

It is important before we proceed any further to consider which measure(s) of dispersion is (are) the most appropriate. Two issues need discussion. First, in measuring dispersion what should be taken as the common reference point? Specifically, should we use the (unweighted) mean of the regional figures or the weighted mean as the point of reference, as 'the average'? If all regions were of a similar size the two would yield essentially the same result but in fact regions can, and do, vary greatly in size and so it is appropriate to use the weighted mean and also to weight the deviations from that mean. Second, should we use an 'absolute' or

² Ours is not the first study of the time series characteristics of unemployment rate dispersion by geographic area for Australia. Examples of previous studies include: Andrews and Karmel (1993), who looked at SLAs and LGAs in Australia over the period 1984-1991 using the conventional standard deviation as the measure of dispersion; Stubbin and Hart (1991), who looked at ABS labour force regions in Australia and in the different States over the period 1984-1990 using standard deviations and also coefficients of variation as the measure of dispersion; Borland and Kennedy (1998), who looked at unemployment rate dispersion across DEETYA local labour markets for Victoria over the period 1984-1997, using both the coefficient of variation and the Gini coefficient to measure dispersion, and; Dixon et al (2001), who examined dispersion across States and Territories over the period 1978:2 – 1999:1 using a measure of dispersion known as 'Relative Dispersion' (this is one of the measures discussed in the text below).

‘relative’ measure of dispersion?³ The distinction between the two can be best approached this way: Imagine that we have (say) a nation which is made up of two equal sized regions, one with twice the unemployment rate of the other. The national unemployment rate will be exactly in the middle of the two regional rates. The region with the lower unemployment rate will have a rate which is half the national rate and the region with the higher unemployment rate will have a rate which is one and a half times the national rate and exactly twice that of the other region. Now, imagine that the unemployment rate in both regions doubles. Their relative unemployment rates have not changed in the sense that the one with the highest unemployment rate will still be twice that of the other and it will still be one and a half times the size of the national rate and so, in relative terms, there has been no change in the degree of dispersion. However, while the ratio of one to the other remains unchanged, the arithmetic difference between the two will have increased markedly. For example, if the rates were initially 2% in one and 4% in the other they will now be 4% and 8% respectively so the arithmetic difference between the two has doubled - it has gone from 2% to 4%. It is for this reason that we follow others who research in this area (eg Thirlwall, 1966, p207; Taylor, 1991, p 75f; Martin, 1997, p 241) and use an absolute measure of dispersion as the starting point for our analysis. (Having done that, we will then look at a relative measure of dispersion.)

Where we are using the weighted average (e.g. the national unemployment rate) as the reference point, the appropriate measure of absolute dispersion (*AD*) in each period would be the measure suggested by Martin (1997, p 250), that is:

$$AD = \sum (L_r / L_n) |UR_r - UR_n| \quad (1)$$

where: L_r is the size of the labour force in region r ; L_n is the size of the labour force in all regions taken together (eg the nation); UR_r is the unemployment rate in region r , and; UR_n is the unemployment rate in all regions taken together (the nation).

(Note that for ease of exposition and to more easily allow others to apply the measure at different levels of aggregation we talk here about the collection of regions as being ‘the nation’ - as this is the most common application of regional analysis. In practice in this paper the regions are the Statistical Regions (SR) which make up the Melbourne metropolitan area

³ This is akin to wondering if we should use the standard deviation or the coefficient of variation as the indicator of dispersion.

and collectively they make up the Melbourne Major Statistical Region rather than ‘the nation’.)

The *AD* measure has a very straightforward and intuitive policy-related interpretation. It measures the number of persons in all regions taken together who would have to change their labour market status in order for every region to have the (same) percentage unemployed as currently prevails in ‘the nation’, where that number (the total number whose labour market status would have to change) is expressed as a proportion of the total labour force in the nation. The easiest way to see this is to assume that there are only two regions (A, B) and that they are of equal size, so that L_r/L_n is equal to 1/2 for both regions. In this event our expression for Dispersion may be written as:

$$AD = \frac{1}{2}|UR_A - UR_n| + \frac{1}{2}|UR_B - UR_n| \quad (2)$$

Suppose that both regions have a (constant) labour force of 200, giving a national labour force of 400. Imagine that in region A there are 6 people unemployed and so the unemployment rate in region A is 3%. Suppose that there are 18 people unemployed in region B so that the unemployment rate in that region will be 9%. Given these figures the national unemployment rate will be 24/400 (= 1/2*3 + 1/2*9) which is 6%. If we calculate the value of *AD* for this data (using equation (2) above) we find that *AD* is 3%, that is, 3% of the national labour force. Imagine now that the labour market status of some individuals in both region A and region B changes so as to make the unemployment rate in both regions the same (i.e. 6%) while the national rate (obviously) remains at 6%. Since 6% of 200 is 12 it must be the case that, in order for the unemployment rate in both regions to be 6%, an *extra* 6 people must become unemployed in region A and an *extra* 6 people must become employed in region B. Notice that if we add together the number of people in both regions whose labour market status would have to change to equalise the unemployment rates at 6% we get the figure of 12 persons. If we divide this by the aggregate (national) labour force we have 12/400 = .03 or 3%, which is identical in value to the figure for *AD* arrived at above. All of which is to say that the *AD* measure of the dispersion is equal to the number of people whose labour force status would have to change in order to even out unemployment rates between regions – where that number is expressed as a proportion of the total number currently in the labour force in all regions taken together.

Figure 2 shows a time series plot of the level of *AD* for the 8 regions which make up the Melbourne Major Statistical Region (Melbourne MSR) over the period 1987:3-2005:3. This series is shown as the solid line in the Figure. The broken line in the Figure shows the (weighted) average unemployment rate for all 8 regions taken together (this is simply the unemployment rate for the Melbourne MSR) over the same period.⁴

[FIGURE 2 NEAR HERE]

During the recession both the unemployment rate and the level of *AD* rose markedly - in fact they both rose threefold - and both have been trending downwards since then.⁵ Clearly, it is not the case that we can only have low unemployment at the expense of greater dispersion; indeed unemployment rate dispersion and (mean) level appear to be positively, not negatively, related.

Noticing that both *AD* and the (weighted) average unemployment rate both rose to the same extent in the recession leads us to explore the numerical relationship between *AD* and the unemployment rate in more detail. We define Relative Dispersion (*RD*) to be the ratio of Absolute Dispersion to the (overall) unemployment rate (in our case this is the unemployment rate for the Melbourne MSR). Figure 3 displays the evolution of Relative Dispersion over the period 1987:4-2005:3.⁶ It appears that, while Absolute Dispersion has not been constant over time, its level relative to the unemployment rate in all regions taken together (*RD*) has been stationary - fluctuating around 1/5 of the unemployment rate.⁷ All of this suggests that it is important to investigate the size of the elasticity of Absolute Dispersion with respect to the (overall) unemployment rate using time-series econometric techniques.

[FIGURE 3 NEAR HERE]

Not surprisingly, given the evolution of the *AD* and unemployment rate series (separately) as displayed in Figure 2, we find that even in the logarithms they are both non-stationary and

⁴ While the Figure shows the evolution of *AD* and the unemployment rate based on data for persons the time profile shown in the figure accurately depicts the evolution of the time series for *AD* for Males and for Females taken separately.

⁵ We suggest that this is because, as unemployment rates become quite low, the value of *AD* primarily reflects differences in the 'Natural' or 'Equilibrium' rates of unemployment between the regions and we conjecture that differences in the 'natural rate' are less than the differences in the 'natural plus demand deficient rates' combined.

⁶ We have available slightly higher quality data for 9 regions over the period 1997:4-2005:3. Inspection of that data suggests that there may have been a *slight* upwards trend in the ratio of *AD* to the average rate of unemployment over the latter part of our sample period.

⁷ Augmented Dickey-Fuller and other tests for a unit root in the size of Relative Dispersion, reject the null of a unit root in favour of stationarity.

I(1).⁸ We also find that the two variables are cointegrated. Granger causality tests and VECM estimation confirm what is suggested in Figure 2, namely that the unemployment series Granger-causes the *AD* series while the *AD* series does not Granger-cause the unemployment series. Given the properties of the data and given that the unemployment rate can be regarded as exogenous, we use an Error Correction Model (ECM) to estimate the long-run elasticity of *AD* with respect to the unemployment rate.

The general linear encompassing ECM we estimate is of the form:

$$\Delta LAD_t = \lambda(LAD_{t-1} - (\beta_0 + \beta_1 LUR_{t-1})) + \sum_{i=1}^p \gamma_i \Delta LAD_{t-i} + \sum_{i=0}^p \phi_i \Delta LUR_{t-i} + \varepsilon_t \quad (3)$$

where *LAD* is the logarithm of the measure of Absolute Dispersion, *LUR* is the logarithm of the unemployment rate for all regions taken together (that is, the unemployment rate for the Melbourne MSR), *p* is the order of lag and ε_t is an error term.

Results of our econometric work for both males and females separately and for persons (but in this case it is probably best to focus on the results for males and females taken separately) are given in Table 1.⁹ The model was first estimated with a high lag order and insignificant lags were then deleted. The results given here are for quarterly data but essentially the same results are found if we use monthly data. We are primarily interested in the sign and size of β_1 and whether or not we can reject the null hypothesis that it is equal to 1. Given the econometric results we are unable to reject this null and so we conclude that the elasticity of *AD* with respect to the unemployment rate may be regarded for all practical purposes as being equal to unity, implying that the ratio of *AD* to the unemployment rate (that is, the value of Relative Dispersion) does not vary systematically over time.¹⁰

Earlier we saw that the value of *AD* is equal to the number of people whose labour force status would have to change in order to even out unemployment rates between regions – where that number is expressed as a proportion of the total number currently in the labour force in all regions taken together. If we now divide this by the (weighted) average unemployment rate we have an estimate of the number of people whose labour force status would have to change in order to even out unemployment rates between regions expressed as

⁸ This is true of the data for persons as well as for males and females taken separately.

⁹ EViews 5.1 is the package utilized.

¹⁰ This conclusion is robust to the presence or absence of alternative lagged first difference terms on the RHS.

a proportion of the total number unemployed in all regions taken together. This is how the value of Relative Dispersion is to be interpreted and it is this which appears to have been stationary over the period.

Thus far we have approached Relative Dispersion as merely the ratio of our measure of Absolute Dispersion to the overall unemployment rate (by which we mean the (weighted) mean of the unemployment rate in all the regions) and thus as ‘merely’ akin to a Coefficient of Variation. However, as Martin (1997, p 240) has shown there is another way we can derive the Relative Dispersion measure, a way which demonstrates that it has an additional interpretation.¹¹ We begin by noting that the ratio of the observed number unemployed in the region to the observed number unemployed in all regions taken together will be equal to U_r/U_n . However, if the unemployment rate in any region were to be exactly equal to the unemployment rate in all regions taken together (for simplicity we will again refer to the collection of regions as ‘the nation’), it would be the case that $U_r/U_n = L_r/L_n$.¹² The difference between the actual ratio (i.e. U_r/U_n) and the ratio we would observe if the unemployment rate in the region equalled the unemployment rate in all regions taken together, is equal to:

$$U_r/U_n - L_r/L_n \quad (4)$$

Summing across regions, disregarding sign, gives the following measure of dispersion (we will shortly see that this is in fact the value of Relative Dispersion (*RD*) mentioned above):

$$RD = \sum |(U_r/U_n) - (L_r/L_n)| \quad (5)$$

This expression shows that Relative Dispersion can be seen as a measure which compares the distribution of aggregate unemployment across the regions with the distribution of the aggregate labour force across the regions.

It is possible to show the connection between the Absolute Dispersion measure introduced earlier (*AD*) and the measure for Relative Dispersion (*RD*) given in (4), as follows. The ratio of the observed number unemployed in the region to the observed number unemployed in all regions taken together will be equal to $U_r/U_n = (UR_r/UR_n)(L_r/L_n)$, where, as before, *UR* is

¹¹ We are grateful to a referee for drawing our attention to this point.

¹² Where *U* is the number unemployed and *L* is the size of the labour force.

the unemployment rate. Given this, the difference between the actual ratio of U_r/U_n and the ratio we would observe if the unemployment rate in the region equalled the unemployment rate in all regions taken can now be expressed as (notice that this is simply an alternative way of writing (4) above):

$$\left[(UR_r/UR_n)(L_r/L_n) \right] - (L_r/L_n) \quad (4')$$

which can be written as

$$(L_r/L_n) \left[(UR_r - UR_n) / UR_n \right]$$

Summing this across regions disregarding sign, gives an alternative expression for the measure of Relative Dispersion:

$$RD = \frac{\sum (L_r / L_n) |UR_r - UR_n|}{UR_n} \quad (6)$$

Comparing (6) with (1) shows that Relative Dispersion is indeed equal to the ratio of Absolute Dispersion to the overall unemployment rate and is thus analogous to a Coefficient of Variation.

In this section we have found two things: First, that the level of Absolute Dispersion has not remained constant over time and that it is positively correlated with the unemployment rate, and; Second, that the ‘elasticity’ of dispersion with respect to the unemployment rate was unity, with the result that there was a tendency for Relative Dispersion to remain stationary over our sample period. Now, since our sample period spans close to twenty years during which the economy has experienced a major recession followed by more than a decade of sustained and relatively fast economic growth, all of this suggests that the disparities we observe are the result of hysteresis or of persistent differences in ‘equilibrium’ unemployment rates, rather than the result of purely transient, disequilibrium phenomena. In the next section of the paper we look at the unemployment levels in different areas of Melbourne in more detail and explore the possibility that the differences are persistent in the sense that the same areas exhibit relatively high (or low) unemployment rates over the whole of our sample period.

3. Unemployment Levels and Persistence

In this section of the paper we look in more detail at the unemployment rates in the regions which together make up the Melbourne MSR. We begin by looking at the average levels and at the stability in the rankings of the unemployment rates across the regions over time. We then estimate the equilibrium unemployment rate for each of the regions together with the degree of persistence in the rate.

Table 2 below sets out the mean unemployment rates for persons for each of our regions for the whole of our sample period (1987:10-2005:09) and for two sub-periods (1987:10-1997:09 and 1997:10-2005:09). The second sub-period is a period for which we have high quality data for 9 regions. The lowest unemployment rates throughout the whole of the sample period are in the Inner East (IE), Southern (S) and Outer East (OE) regions and this is the case for both males and females as well as for the two taken together.¹³ It is also evident from Figure 1 that these three regions (and especially the Inner East) were the least effected by the recession of the early 90s. The highest unemployment rates throughout the whole of the sample period are in the North West (NW) and the Outer West (OW).

[TABLE 2 NEAR HERE]

There are a number of ways to evaluate stability in the rankings across time. Table 3 shows the correlation between the pattern of unemployment rates in any year and those prevailing in the first (full) year of our sample period, 1988. (The results here are for persons, but the results for males and females separately are essentially the same.) The first data column reports the Spearman rank correlation coefficient while the second data column reports the Product moment correlation coefficients. The message is very clear, there is a good deal of stability across the 8 regions over the two decades. This is also consistent with the visual evidence in Figure 1.

[TABLE 3 NEAR HERE]

Earlier it was noted that the highest unemployment rates throughout the whole of the sample period were in the North Western (NW) and the Outer Western (OW). Indeed, if we combine the two western regions (NW and OW) together and compare their unemployment rate with that for the rest (averages are given in the bottom rows of Table 2) we observe that the

¹³ There is one exception to this statement and that is that in the second part of our sample period the unemployment rate for females in Inner Melbourne is also one of the lowest.

unemployment rate in the West is roughly 1.8 (ie almost double) that for the Rest in all periods and this is true not only for persons but for both males and females taken separately. This is seen most clearly in Figures 4 and 5. Figure 4 shows the unemployment rate for the West (uppermost and solid line) and the unemployment rate in the Rest (lowermost and broken line) over the period 1987:4-2005:3. Figure 5 shows a time series plot of the ratio of the unemployment rate in the West to the unemployment rate in the Rest for the same period. The relative stability in the level of this ratio is quite remarkable.¹⁴ Also, comparing Figures 5 and 3 suggests that in order to explain the relative stability in the value of Relative Dispersion over the period it would probably suffice to explain the stability in the ratio of unemployment rates in the West c.f. the Rest.

[FIGURES 4 AND 5 NEAR HERE]

It would seem a reasonable hypothesis to view these differences as reflecting ‘equilibrium’ outcomes in some sense. In the remainder of this section of the paper we use time series econometric techniques to examine equilibrium rates and the degree of persistence in the actual rates for each region. In the following section we look at some possible explanations for the differences in the equilibrium rates.

Since the univariate time series approach we are going to adopt is most powerful when looking at stationary series we will confine our attention to monthly time series data for the 9 regions which make up the Melbourne MSR over the period 1997:10-2005:09.¹⁵

The first data column of Table 4 sets out the p-values for an ADF test, which is a test for the presence of a unit root in the AR process. For the purposes of the unit root test, the AR model is formulated as

$$\Delta UR_{rt} = c + \rho UR_{rt-1} + \sum_{i=1}^p \theta_i \Delta UR_{rt-i} + \varepsilon_t \quad (7)$$

where, as before, UR_{rt} is the unemployment rate in the region r in period t .

The lagged difference terms are included as appropriate to remove any residual serial correlation and the null of a unit root is rejected or not rejected according to the value of the

¹⁴ This is the regional face of the polarisation of Australian Society into the “work rich and the work poor” as Borland et al (2001) have so aptly described it.

¹⁵ In fact the rankings of the equilibrium rates and other conclusions we draw from looking at the period 1997:10-2005:09 are also found if we estimate AR equations for the whole of the period 1987:10-2005:09, its

test statistic on the lagged unemployment rate term. The results indicate it is reasonable to assume stationarity for all of the regions except possibly the Outer West and the South East. However, since the unemployment rate series are by construction bounded between zero and one and so they cannot in fact have a unit root (and given also that the equilibrium rates we compute turn out to be very close to the mean rates observed over the sample period), we are going to proceed on the assumption that all of the series are stationary, although probably with a near-unit root for some. While there is a degree of uncertainty about the data generating process, the least squares estimates provide the best point estimates of the parameters of the AR process and are for this reason worth examining. The regression is as discussed above (equation (7)) with the lag length p chosen by the Schwarz information criterion. The estimates for c and ρ for the individual regions which make up the Melbourne MSR are given in Table 4. For the moment we focus on the estimate of ρ which is an estimate of the degree of persistence in the series.

When we talk about the degree of persistence, we are referring to the extent to which current shocks have a lingering impact on the series. For the sake of argument, consider the simple AR(1) model

$$UR_t = \rho UR_{t-1} + \varepsilon_t \quad \text{with } \rho < 1 \quad (8)$$

In this model it is straightforward to show that a shock in the current period has a lingering impact on the path of the series, with a duration that rises with ρ , and that the impact diminishes over time but is always positive for any finite period.

Consider the unit impulse $\varepsilon_t = k_t$ where $k_t = 1$ at $t = 0$ and $k_t = 0$ for all $t \neq 0$. The value of UR at time $t = 0$ is given from (8) as

$$UR_0 = \rho UR_{-1} + \varepsilon_0 = k_0$$

We can then solve successively for UR_t at any $t > 0$

$$\begin{aligned} UR_1 &= \rho UR_0 + \varepsilon_1 = \rho k_0 \\ UR_2 &= \rho UR_1 + \varepsilon_2 = \rho^2 k_0 \\ &\dots \dots \dots \\ UR_n &= \rho UR_{n-1} + \varepsilon_n = \rho^n k_0 \end{aligned}$$

just that we feel the technique is more defensible when applied to the shorter sub-period when ADF and other tests suggest that nearly all the data sets are stationary (which they do not for the longer sample period).

Since $\varepsilon_1, \dots, \varepsilon_n = 0$ and $k_0 = 1$, the unit impulse response is given by ρ^n . Notice that so long as $0 < \rho < 1$ then $\rho^n \rightarrow 0$ as $n \rightarrow \infty$, but ρ^n is non-zero for any finite duration and so the shocks do have a permanent impact in any finite time.

[TABLE 4 NEAR HERE]

One feature of the estimates of ρ reported in Table 4 is that the two regions which we have seen consistently have the highest unemployment rates (the North West and the Outer West) both have relatively high degrees of persistence. However it is also the case that one of the regions which consistently has one of the lowest unemployment rates (the Inner East) also has a relatively high degree of persistence, suggesting that there is no simple relationship between a high value for ρ and high (average) unemployment. A second feature of the results is that over nine-tenths of the adjustment to any shock takes place within three-months in every region.

Of more interest (and importance) is the use we may make of (7) to obtain estimates of the ‘equilibrium’ rate of unemployment for each region. Defining ‘equilibrium’ to mean the unemployment rate which could be sustained in the absence of (random) shocks, we may set the error and first difference terms in (7) equal to zero and solve for the equilibrium rate of unemployment (UR^*) as:

$$UR^* = \frac{c}{1-\rho} \quad (9)$$

The second and third data columns in Table 4 report the estimates of c and ρ for each region, while the last data column reports the implied values for the equilibrium unemployment rate for each region over the period 1997:10 – 2005:09 computed using equation (9) above. The first thing to note is that these values are very close to the average observed unemployment rate over the period given in Table 2. The highest equilibrium rates are in the North West and the Outer West while the lowest rates are in the South and the Inner East (especially). The facts that: (i) the unemployment rate in these regions may be regarded as stationary over the period, (ii) we have relatively fast adjustment and also (iii) the computed equilibrium values are very close to the observed average (expected) values over the period – suggests to us that it is reasonable to treat the differences we observe as reflecting ‘equilibrium’ phenomena in some sense. In the following section we will look at possible explanations for our findings.

4. Towards an Explanation for the Differences in the (Equilibrium) Unemployment Rate Between Regions

The results obtained in the previous sections of the paper are consistent with the proposition that the differences in the observed unemployment rates across the regions reflect persistent differences in equilibrium rates. The task of this section of the paper is to begin to explore possible explanations for these differences and their persistence.

While it has become common to appeal to different labour market institutions to explain international differences in both the average level of the unemployment rate and their persistence, that cannot be a very fruitful approach here (this is not to say that common institutions cannot have uncommon impacts on different areas depending upon their demographic and other compositions, degree of unionisation, etc). Instead, studies of unemployment rates amongst various groups in the population (for example Borland & Kennedy (1998)) show that unemployment is concentrated disproportionately amongst particular groups including the young, the less educated, those immigrants who have recently arrived and those who are not fluent in English, those whose occupations are labourer, tradesperson and a production worker (blue-collar type occupations) and those employed in manufacturing and construction (*inter alia*). Even putting to one side the composition of industry located 'within' each area, those areas with a high proportion of residents who are in one or more of these categories will, *cet par*, exhibit high unemployment rates. So we proceed on the assumption that in order to deal with the questions raised above it is useful to look at how these 'predisposing' characteristics are distributed across the regions. We note also that studies such as that by Karmel et al (1993) show that over 70 per cent of the variation in unemployment rates across metropolitan statistical local areas (SLA's) in Australia can be 'explained' by the characteristics of the population who reside in the areas - acknowledging also that 'locality' characteristics, while not the dominant factor, are important. For this reason (and driven also by considerations of data availability) we consider population characteristics at some length first and then talk about the role of 'locality'. Given that our equilibrium rate analysis refers to the period 1997-2005 it seems appropriate to look at data taken from the 1996 Census.

We focus on the two regions which have been seen to have the highest unemployment rates (the North West and the Outer West) and the two regions which have been seen to have the

lowest unemployment rates (the Inner East and Southern regions). There are four questions to be addressed. 1. What do the North West and the Outer West regions have in common? 2. What do the Inner East and Southern regions have in common? 3. In what essential ways do the two high unemployment and the two low unemployment regions differ? 4. Why are the differences so persistent?

We begin by looking at the comparative abundance of those characteristics which we know to be associated with a high probability that the individual will be unemployed. In relation to educational attainment, the Census data (ABS, 2003) shows that, relative to the South and the Inner East, both the Outer West and the North West have low proportions of their populations with a bachelors degree or higher and a relatively high proportion of their populations who have no post-school qualification. Census data (ABS, 1998) also shows that the proportion of 16 year-olds who are still at school is low in the Outer West and the North Inner relative to the East and South. The Outer West and the North West have a very high proportion of people born in a 'non-main English-speaking country' (ABS, 1998) and a very low proportion who speak English at home (ABS, 2002). The Population Census also provides information on the distribution of residents by occupation (ABS, 1997). Managers & Administrators, Professionals and (even) Associate professionals are under-represented in both the Outer West and the North West relative to the South and the Inner East while the occupations in the Trades and Labour areas are over-represented in both the Outer West and the North West. (The regional patterns of occupations is - not surprisingly - related to the regional patterns of educational qualifications.) Relative to the South and the Inner East the Outer West and the North West have low rates of employment in Finance & Insurance, Property and Business Services, Education and Health & Community Services and a relatively high proportion who are employed in Manufacturing (ABS, 2003). To sum up, it does appear that residents of the two western regions possess a relative 'abundance' of those characteristics which we know to be associated with a high probability that the individual will be unemployed.¹⁶

In addition to 'population' characteristics it is likely that 'location' matters – especially, in our view, for the persistence of the unemployment rate differences. There are many ways in this might be possible even putting to one side issues related to the industry-mix 'in' the region. Census data (ABS, 2002) indicates that the Outer West and the North West have low levels of

¹⁶ Hunter (1996) presents an study of employment growth in urban areas and arrives at similar conclusions to those presented here. See also Gregory and Hunter (2001).

median weekly rents and median monthly loan repayment in comparison with the South and the Inner East. To our mind this has two possible implications for the level and persistence of high unemployment in the West. First, we would not wish to rule out the possibility that, because of the presence of low rents and low housing costs, those who become unemployed or who have difficulty making a successful transition into the labour force might move to the West. Second, low sale-values relative to other locations is itself likely to be an impediment to movement. When this is combined with being unemployed, with having a low income and low education (and imperfect capital markets combined with difficulty in borrowing from other family members – perhaps because they also have similar economic circumstances) there is likely to be considerable difficulty in moving. Also, for those located west of the boundary with Inner Melbourne and its radial transport networks even commuting may be very costly and time consuming, especially with Port Phillip Bay between their residence and the fast-growing outer eastern suburbs. For these folk the only viable alternatives to unemployment would be leaving the labour force (perhaps by moving onto a pension), retraining, moving down the job/occupation ladder or migration. However, in relation to the latter, the problem “may not be that mobility is low, but that it is selective” (Martin, 1997, p 245).

5. Concluding Comments

In this paper we examined unemployment rates for the (statistical) regions which together make up Melbourne metropolitan area. In the second section we introduced various measures of the dispersion of unemployment rates across regions. We found that the absolute level of dispersion has not remained constant over time but that it is positively correlated with the unemployment rate such that there is a tendency for the relative level of dispersion to remain stationary over our sample period. In the third section of the paper we explored the possibility that the unemployment rate differences were persistent in the sense that the same areas exhibit relatively high (or low) unemployment rates over the whole of our sample period. We found that there has been a remarkable stability in relative rates and especially between those in ‘the west’ of Melbourne relative to ‘the rest’. Towards the end of section three we presented estimates of the equilibrium rates of unemployment and persistence parameters for the different regions in Melbourne. The two regions in the West would appear to be doubly

unfortunate as they have both high equilibrium rates and high persistence. In section four we explored (but only in a very preliminary fashion) some possible explanations for these differences and their persistence. We argued that differences in equilibrium levels and persistence reflect both attributes of the residents as well as attributes of the location. Our findings here are essentially the same as those reported by others who have studied differences in labour market performance across regions or cities in Australia.^{17,18}

¹⁷ In addition to the studies mentioned in footnote 1 above, we might also draw attention Hunter (1996) who looks at employment growth in urban areas and arrives at similar conclusions to those presented here. See also Gregory and Hunter (2001).

¹⁸ Amongst the many caveats we wish to draw attention to the fact that in this paper we have accepted the boundaries of each 'statistical region' as defined by the ABS. However, it is clear to us that the western part of the North East region (the area close to Sydney Road) has characteristics which are very much in common with those of the West and that for this reason alone a more disaggregated analysis is warranted.

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Data Appendix

Data for the unemployment rates and labour force are taken from the ABS Labour Force Statistics module of DX. Data is available monthly for most of the Statistical Regions in Melbourne for the period Oct 1987-Sept 2005. However because of changes in the boundaries of regions in 1992 and 1997 is only available for some over the period Oct 1992 – Sept 2005. However by aggregation two regions (the South-eastern and the Mornington Peninsula) we are able to work with 8 regions for the whole of the period Oct 1987-Sept 2005 and with 9 regions for the period Oct 1992 – Sept 2005.¹⁹

The regions which make up the Melbourne Major Statistical Region and the associated Local Government Areas are (numbers in brackets are the percentage of the Total Melbourne MSR labour force in the region in 1998):

Outer Western (OW): (15%) Brimbank, Hobsons Bay, Maribyrnong, Melton, Moonee Valley, Wyndham.

North Western (NW): (7%) Hume, Moreland.

Inner Melbourne (IM): (8%) Melbourne, Port Phillip, Stonnington-Prahran, Yarra.

North Eastern (NE): (13%) Banyule, Darebin, Nillumbik, Whittlesea.

Inner Eastern (IE): (17%) Boroondara, Manningham, Monash, Whitehorse.

Southern (S): (11%) Bayside, Glen Eira, Kingston, Stonnington-Malvern.

Outer Eastern (OE): (12%) Knox, Maroondah, Yarra Ranges (Part).

South Eastern (SE): (10%) Cardinia, Casey, Greater Dandenong.

Mornington Peninsula (MP): (6%) Frankston, Mornington Peninsula.

Note that for some Tables and Figures the last two regions have been aggregated to form the SEMP region.

¹⁹ There was a major redefinition of boundaries effecting the inner and outer eastern regions in 1997 but (mainly because both regions had relatively low and similar unemployment rates) we get virtually identical results whether we combine them or keep them separate. In the interests of degrees of freedom when we look at the whole sample period we have not combined them.

Table 1 Estimates of Error Correction Models: 1987:3-2005:3

	<i>Males</i>	<i>Females</i>	<i>Persons</i>
λ	-0.443 (0.098)	-0.519 (0.117)	-0.490 (0.115)
β_0	-1.460 (0.313)	-1.637 (0.369)	-1.742 (0.308)
β_1	0.955 (0.157)	1.072 (0.185)	1.054 (0.154)
γ_2	0.227 (0.104)	-0.256 (0.101)	-0.007 (0.119)
ϕ_0	0.994 (0.295)	0.630 (0.278)	0.370 (0.345)
ϕ_1	-0.580 (0.298)	0.462 (0.282)	-0.293 (0.341)

The figures in brackets under the coefficient estimates are estimated standard errors.

Table 2 Mean Unemployment Rates for Persons

<i>Region</i>	<i>1987:10-2005:09</i>	<i>1987:10-1997:09</i>	<i>1997:10-2005:09</i>
OW	9.6	11.0	7.9
NW	10.1	11.5	8.4
IE	5.4	5.8	4.9
S	6.1	7.3	4.6
IM	7.9	9.7	5.8
SEMP	7.7	8.8	6.4
SE			6.5
MP			6.3
NE	8.0	9.3	6.5
OE	6.0	6.7	5.1
MEL	7.5	8.5	6.1
WEST	9.8	11.1	8.1
REST	5.3	6.1	4.3

Table 3 Stability in the Rankings over Time: Persons

	<i>Spearman rank correlations</i>	<i>Product moment correlations</i>
1988	1.00	1.00
1989	0.76	0.92
1990	0.94	0.94
1991	0.87	0.85
1992	0.92	0.94
1993	0.76	0.89
1994	0.95	0.91
1995	0.92	0.94
1996	0.82	0.79
1997	0.95	0.88
1998	0.89	0.93
1999	0.81	0.83
2000	0.90	0.84
2001	0.92	0.92
2002	0.66	0.69
2003	0.77	0.70
2004	0.89	0.89

All correlations are for the year listed at the left relative to 1988.

Table 4 AR Parameter Estimates and Equilibrium Unemployment Rates 1997:10-2005:09

<i>Region</i>	<i>ADF test p value</i>	<i>c</i>	<i>ρ</i>	<i>UR*</i>
OW	0.206	1.251	0.836	7.6
NW	0.016	1.941	0.759	8.1
IE	0.071	0.921	0.809	4.8
S	0.002	1.339	0.707	4.6
IM	0.000	2.030	0.644	5.7
SE	0.152	1.469	0.765	6.3
MP	0.000	2.325	0.627	6.2
NE	0.001	2.247	0.649	6.4
OE	0.001	1.682	0.667	5.1

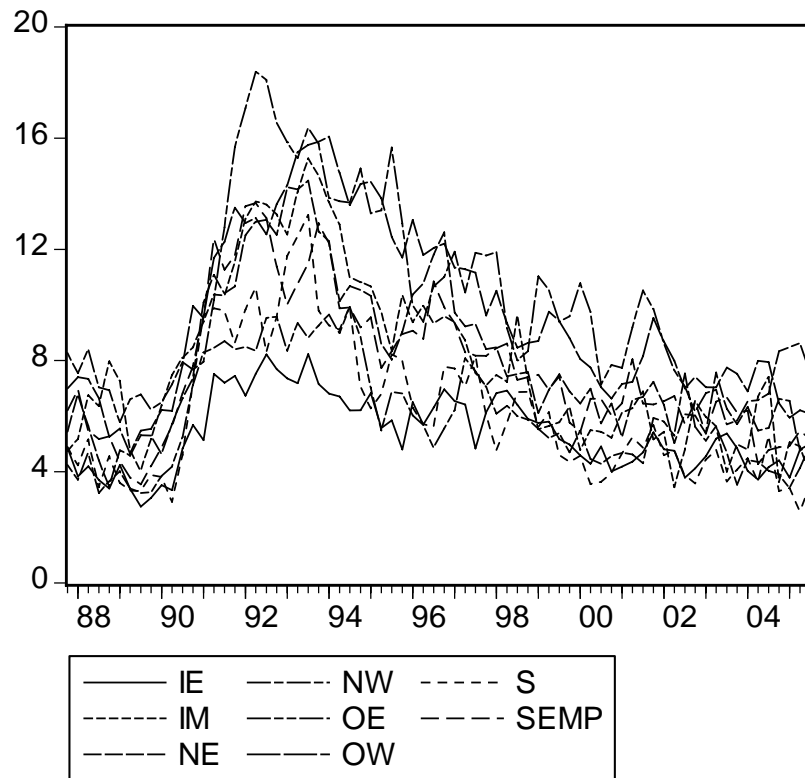
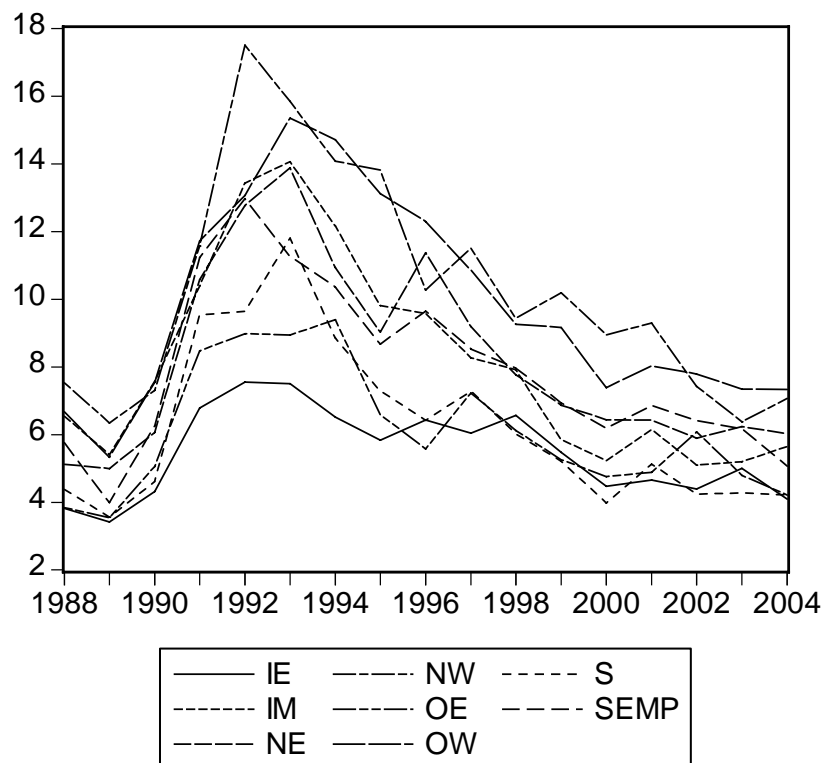
Figure 1A Unemployment Rate by Region, Persons: 1987:3-2005:3.**Figure 1B Unemployment Rate by Region, Persons: 1988-2004.**

Figure 2. Absolute Dispersion (solid line and RH scale) and the Unemployment Rate for the Melbourne MSR (broken line and LH scale), Persons: 1987:3-2005:3

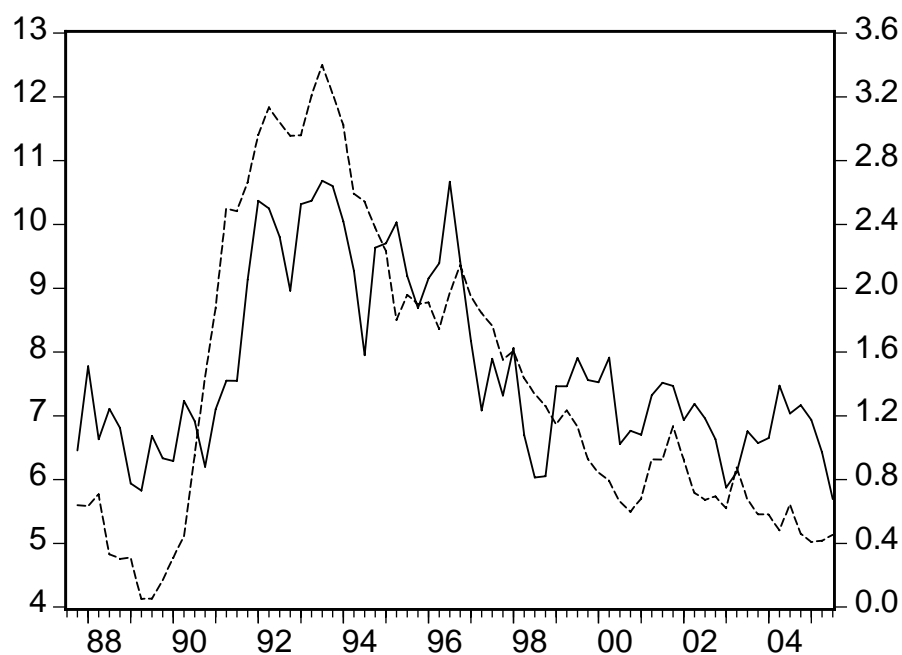


Figure 3 Relative Dispersion, Persons: 1987:4-2005:3.

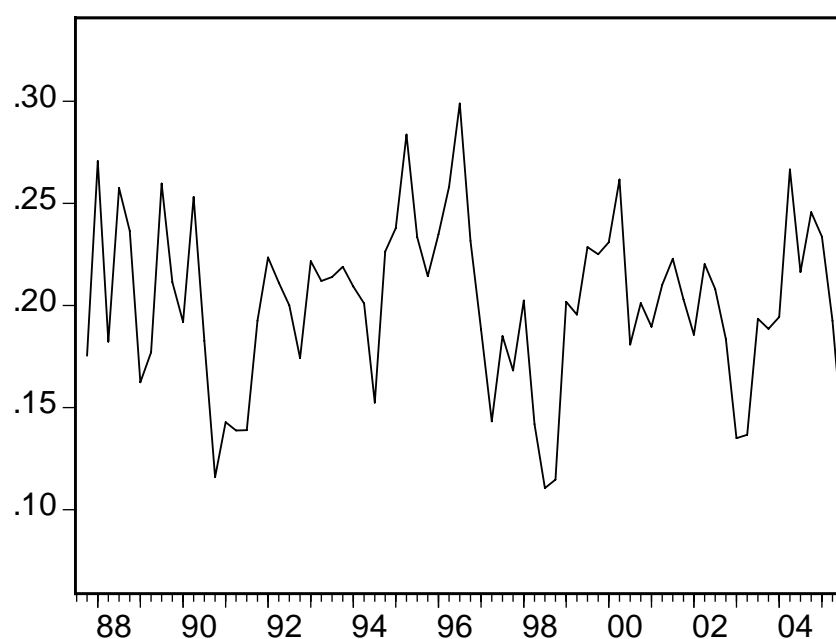


Figure 4 The Unemployment Rate for the West (solid line) and the Unemployment Rate in the Rest of Melbourne (broken line): 1997:4-2005:3.

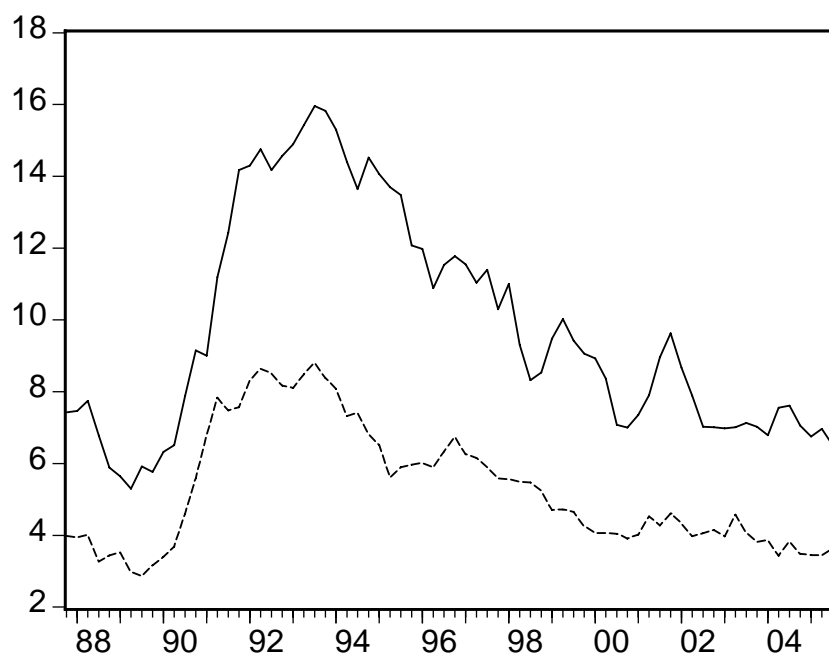


Figure 5 Time Series Plot of the Ratio of the Unemployment Rate in the West to the Unemployment Rate in 'The Rest': 1987:4 – 2005:3

