Where is full employment?

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Introduction

Unemployment in Australia is now at its lowest in over 30 years. The rate for April 2007, for example, of 4.4 per cent, is substantially less than the previous trough of 5.6 per cent, in 1989. This experience of low rates of unemployment has prompted a number of statements that the Australian economy is at or very close to full employment. The Prime Minister, John Howard, says Australia is at 'effectively full employment'. The Treasurer, Peter Costello, sees 'an economy which has got full employment or near full employment'. The Secretary to the Treasury, Ken Henry, reportedly said in a leaked speech to Treasury staff, that 'for macro-economic purposes, it's probably reasonably safe to assume that we are already at full employment - or, at least, very close to the NAIRU: the non-accelerating-inflation rate of unemployment'.[1]

However, even though unemployment is low in comparison with the previous 30 years, it is greater than the rates experienced in the 1950s and 1960s, during which the average was slightly below two per cent. Furthermore, the 4.4 per cent rate of unemployment in April 2007 included 84,000 who had been unemployed for more than a year.[2] To be classified as unemployed, a person has to be searching for a job. Searching for a job a year after one's previous job does not sound like the voluntary unemployment which alone comprises full employment. There are also currently substantial numbers of people who would prefer to work but are not searching and others who have moved to disability pension partly at least because of difficulties in finding a job.[3] In addition there are the underemployed-that is people with jobs who would like to work extra hours.[4]The comparison with the 1950s and 1960s and the large numbers of long-term unemployed, of people who can reasonably be thought to desire work at current wage rates and of people who are underemployed casts doubt on whether we are currently at full-employment.

These doubts about whether the Australian economy is currently at full employment are supported by findings of a body of research reported in this paper. This research suggests that, given current policy settings on labour market regulation, microeconomic reform and welfare support, full employment may occur at a rate of unemployment as low as 2.5 per cent.

The estimation of this low rate of unemployment is based on a model of a range of equilibrium rates of unemployment. This range model is an alternative to the natural rate model. Because the latter model dominates the macroeconomic literature we begin with a comparison of the two models.

Keynes versus the natural rate

The natural rate model is based on neoclassical microeconomic foundations and has classical properties. The range model has different foundations and Keynesian properties. The contrast between the two models can be understood through the following historical perspective.

In the 1930s, at the birth of macroeconomics as a distinct area within economics, Keynes (1936) recognised that full employment set a limit on the gains in employment to be obtained from expanding aggregate demand, that is a limit on the influence of aggregate demand on the rate of unemployment. Keynes suggested that inflation would set in if aggregate demand policy aimed for a rate of unemployment less than full employment. However, his concern was with the severely unemployed economy of the time and so he spent little time on exploring the issue of what determines full employment. His disciple, Joan Robinson, in a set of essays expanding on the themes of Keynes' General Theory,[5] did pay more attention to full employment. In one of her 1937 essays, entitled 'Full Employment', she took up the inflation issue raised by Keynes and set out what would later be called the accelerationist hypothesis. This is the hypothesis that attempts to push unemployment below the full employment rate would cause an increasing rate of inflation. The mechanism put forward by Robinson that caused increasing inflation relied on continual upward adjustments to the expected rate of inflation, as employers learnt from experience about increases in actual inflation. As Robinson made clear, this learning by employers would lead to further increases in the rate of inflation, as employers competed for labour in a seller's market.

Three decades later, this expectational analysis of Robinson was taken up, without attribution, by Friedman (1968) and Phelps (1967).[6] However, in contrast to Robinson, and implicitly to Keynes, they postulated symmetry in this expectational mechanism, in that for high rates of unemployment they assumed that the mechanism would operate in reverse, causing a deceasing rate of inflation. This theoretical implication of decreasing inflation at high rates of unemployment will be called here the deceleration hypothesis. It played a crucial role in the development of the natural rate hypothesis by Friedman and Phelps.

Keynes and Robinson rejected the deceleration hypothesis. To them the proposition of classical economics, that at high unemployment wages and prices would fall without limit, was patently unrealistic. They saw this 'plasticity' of wages as the crucial shortcoming of classical economics. Instead the evidence suggested to them that at high levels of unemployment wages would 'find a level' rather than be falling.[7] However, they did not offer a detailed theory of wage determination that would explain this non-classical behaviour. Instead they argued that wages are influenced by social psychology but were sceptical about the state of the discipline of psychology at the time, arguing that psychology had little to offer in the way of systematic rules of behaviour from which a satisfactory theory of wage determination could be developed. They suggested that future developments in psychology may rectify this situation.

The analysis of Friedman and Phelps in the 1960s did not use insights from psychology. Instead their analysis can be described as classical economic theory extended to include imperfect information. According to Friedman and Phelps, it was through imperfect knowledge by workers about the true rate of inflation that the rate of unemployment will be influenced by

the Keynesian aggregate demand mechanism. In as far as imperfect knowledge is temporary, aggregate demand would only have temporary effects on the rate of unemployment. Thus the Keynesian mechanism was severely circumscribed, reduced from the proposition that changes in aggregate demand can have long-lasting impacts on the rate of unemployment to the natural rate proposition that changes in aggregate demand can only have temporary impacts on the rate of unemployment. In this natural rate world, the actual rate of unemployment does not deviate from the natural rate for long.

Behavioural economics as a foundation for Keynes' economics

At the present time, insights from psychology are being used to significantly modify and extend economic analysis. Much of this is based on prospect theory and the associated concept of loss aversion, developed by Kahneman and Tversky (1979).[8] This psychological theory has significant implications for the inflation-unemployment relation. Bhaskar (1990)[9] combined prospect theory with bargaining theory, the latter being an area about which Robinson in the 1930s was sceptical but which has subsequently been developed as a tool of analysis in the study of wage determination.[10] By combining prospect theory and bargaining theory, Bhaskar produced a model with a range of equilibrium rates of unemployment. This model provides a theoretical basis for the empirical views of both Keynes and Robinson referred to above, namely that while the acceleration hypothesis holds at low unemployment, the deceleration hypothesis does not hold at high rates of unemployment. In the range model, aggregate demand management can have the long-lasting effects that characterise Keynes' analysis.

In the range model, the boundary rate of unemployment below which inflation will be increasing is called u^{min}, for minimum equilibrium rate of unemployment. This boundary determines the limit of the influence of aggregate demand on the actual rate of unemployment in that the theory suggests that any excess of the actual rate of unemployment over u^{min} is determined by the level of aggregate demand. u^{min} itself is influenced by supply factors and so u^{min} determines the extent to which aggregate supply policy can have an influence on the possibilities for unemployment.

The estimated series for u^{min}

Estimates for Australia of the range model[11] show that u^{min} is positively influenced by two supply factors: the unemployment-benefit replacement ratio, that is unemployment benefits divided by average weekly earnings; and trade union density, that is trade union membership as a proportion of the labour force. Trade union density is an indicator of trade union power (see below). The level of unemployment benefits can influence both search unemployment and unemployment caused by excessive union real wage demands. The estimated u^{min} series for Australia for the period 1964:1 to 2007:2 is shown in Figure 1. (The series is based on estimates in Lye and McDonald,[12] extrapolated to the quarters after 2005:4).

Figure 1 Umin, Australia, 1964:1 to 2007:2
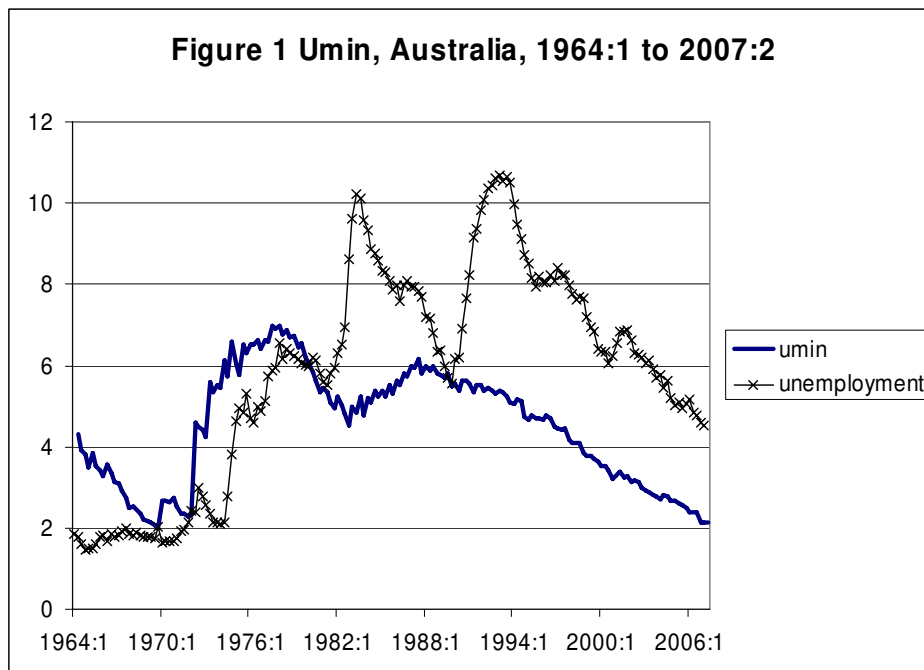
u^{min} is not necessarily full employment. For example, the classical unemployment in the 1970s caused by excessive real wage growth, the real-wage overhang episode[13], is reflected in Figure 1 by the large increase in u^{min} at that time. In the 1970s there was a dramatic increase in the unemployment benefit replacement ratio by the McMahon government in February 1972 followed by further increases by the Whitlam government between 1973:1 and 1974:3, and a more gradual increase in trade union density. These changes, according to the estimates of the determination of u^{min} in the range model, increased u^{min}, and so, by implication created the 'real wage overhang' of the 1970s.

The unemployment caused by such high real wages is involuntary, in that the unemployed would prefer to be employed on the same terms as the employed but are not offered such employment. Thus, u^{min} is not necessarily full employment. At full employment, any person unemployed would be voluntarily unemployed.

Figure 1 shows a large decline in u^{min} since 1988. This decline has been driven by a large decrease in trade union density. The change in the unemployment-benefit ratio has been minor.[14] A lower trade union density implies, both directly and indirectly, lower trade union power. The direct implication of lower trade union density is that the monopoly power of unions is reduced because, with reduced trade union coverage, competition from uncovered firms will increase. The indirect implication is through trade union density responding to changes in trade union power caused by other factors. Less union power will reduce the attractiveness of union membership because unions can offer less in terms of increased wages and improved conditions of work. Legislation to reduce union power and moves to decentralise wage bargaining will reduce union power. Furthermore, increased product market competition, which has occured in Australia through microeconomic reform, such as reductions in tariffs, corporatisation, privatisation, tendering arrangements for utilities and government services and the floating of the exchange rate will also reduce union power.[15]

These considerations suggest that trade union density is a reasonable, albeit somewhat lagging, measure of trade union power and that trade union power is influenced by a range of aggregate supply policies.

From the estimated series shown in Figure 1, the current rate of u^{min} is inferred to be 2.5 per cent. This is the estimate for 2005:4. The slightly lower levels since 2005:4 shown in Figure 1 are extrapolations beyond the data set used for the estimation and so caution suggests using the 2.5 per cent figure. The figure of 2.5 per cent suggests that, with no change in aggregate supply policy the actual rate of unemployment could be reduced to 2.5 per cent by an increase in aggregate demand.

Of course, the inference that u^{min} is indeed 2.5 per cent relies on the estimation method. Other data sets, such as other measures of inflation or other determining variables may yield different results (although our research suggests that the estimates of u^{min} would not change by much). Other specifications, such as non-linear relationships between u^{min} and the supply factors should perhaps be examined. The acid test of our estimate would be to experience an actual unemployment rate of 2.5 per cent with no tendency for inflation to be increasing. Only then could we know that u^{min} is no higher than 2.5 per cent. However, even without this acid test, the estimates give some ground for supposing that u^{min} is 2.5 per cent.

What can u^{min} tell us about full employment?

At full employment, unemployed persons are voluntarily unemployed. That is, anyone who is unemployed can readily get a job at prevailing wage levels but has chosen not to take, at least immediately, the particular jobs that are available. If we assume that, given the current setting of aggregate supply policy, u^{min} is now 2.5 per cent, what does this tell us about the level of full employment?

As the earlier discussion about the experience in the 1970s makes clear, u^{min} is not necessarily equal to full employment. In the 1970s the high level of union power appears to have caused u^{min} to exceed the full-employment unemployment rate. However, by the 2000s union power had decreased considerably. It no longer seems to be the case that union power causes a substantial amount of involuntary unemployment, although perhaps in certain sectors of the economy there is union-determined involuntary unemployment. Even then, if union wage determination causes excessive wages in a few sectors, the job alternatives offered by the rest of the economy would pretty much nullify the involuntariness of any unemployment that results.

With regard to unemployment benefits, the other supply factor of importance in explaining u^{min}, although unemployment benefits relative to wages are twice their level of the 1960s, they are not excessive by OECD comparisons and are also heavily circumscribed by various requirements, such as work for the dole. Given this, unemployment benefits do not seem to be creating excessive wages that would cause involuntary unemployment.
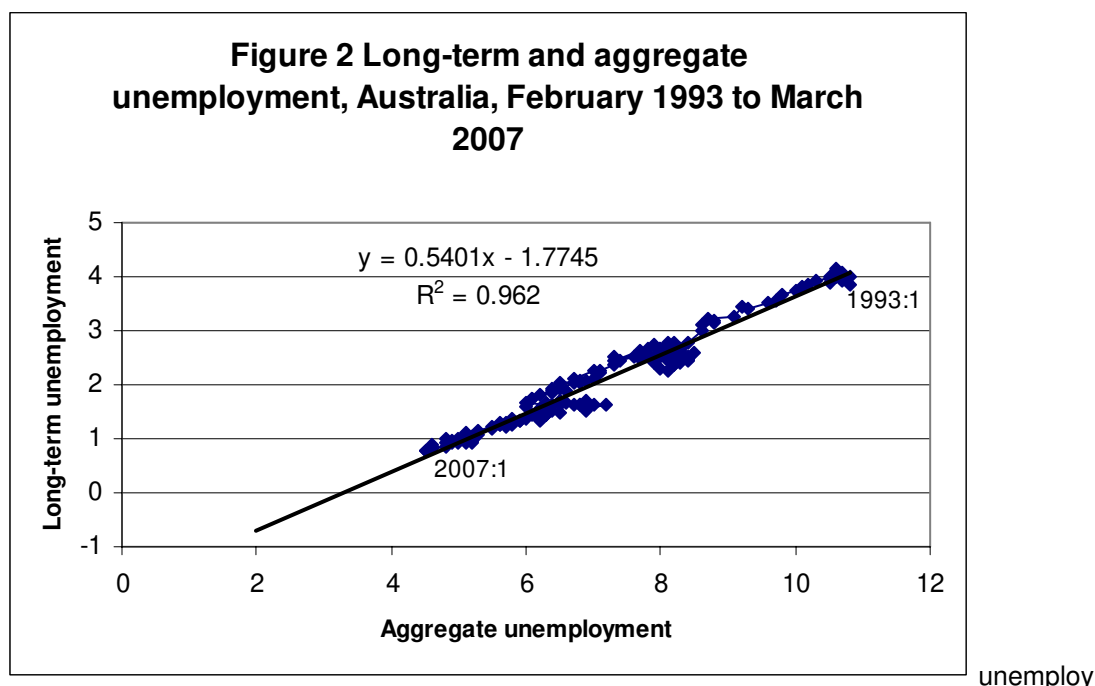
On balance it seems that, with the current levels of the supply factors, to achieve unemployment equal to u^{min} would be to achieve full employment. Thus, subject to the

caveats noted above, full employment in Australia at the current time would be at an unemployment rate of 2.5 per cent.

Long-term unemployment and full employment

As noted earlier, in April 2007 there were 84,000 people who had been unemployed for more than a year. Such long-term unemployment is inconsistent with full employment. In the 1950s and 1960s long-term unemployment was unknown. Are there grounds for expecting long-term unemployment to disappear if the aggregate rate of unemployment decreased further and if so to what rate would the aggregate rate have to decrease in order to eliminate long-term unemployment? The disappearance of long-term unemployment is perhaps a necessary condition for full employment. The consideration of this question gives further information about the reasonableness of our contention that full employment in Australia would occur at a rate of unemployment of 2.5 per cent.

Let us consider the relation between the rate of long-term unemployment, defined as the long-term unemployed as a percentage of the labour force, and the aggregate rate of

Figure 2 Long-term and aggregate unemployment, Australia, February 1993 to March 2007

$$y = 0.5401x - 1.7745$$
$$R^2 = 0.962$$

unemploy
ment. As has been shown, this is a stable and well-defined relation.[16] It is plotted in Figure 2 for Australia for the period February 1993 to April 2007. The closeness of the data to the line of best fit is striking. This line implies that a one percentage point reduction in the aggregate rate of unemployment is associated with a half a percentage point reduction in the rate of long-term unemployment. There is no sign that this degree of association is changing – the curve in Figure 2 is linear throughout the data set.

A similar relation between long-term unemployment and aggregate unemployment is revealed at the state level, where the aggregate measure is the state rate of unemployment. The relation has a positive slope and is well-determined for every state of Australia.

Returning to aggregate data for Australia, the extension of the line relating long-term unemployment to aggregate unemployment in Figure 2 implies that an aggregate rate of unemployment of 3.3 per cent would be associated with zero long-term unemployment. This suggests that reducing unemployment to the full employment rate of 2.5 per cent would eliminate long-term unemployment.[17]

The existence of categories of people who would like to work but have not found jobs, such as discouraged workers and some of those on disability support, implies that even if there were no long-term unemployment we could not conclude that all who wanted jobs at going wages had jobs, that is that full employment would be achieved. However, it is well known that the numbers of discouraged workers and of people on disability pensions would decrease as aggregate unemployment decreases. The proportion of people underemployed has also fallen with the fall in aggregate unemployment in recent years. Thus reducing long-term unemployment to zero will also imply substantial reductions in the numbers in these other categories. Given this, the conclusion that full employment would occur at a rate of unemployment of 2.5 per cent is strengthened.

The two policy approaches – aggregate demand and aggregate supply

Assuming that full employment in Australia would require a rate of unemployment of 2.5 per cent, how can such a rate be achieved?

Policy to reduce unemployment to the full employment level can be usefully divided into aggregate supply and aggregate demand policies. Aggregate supply policies operate through labour market regulation, microeconomic reform and the setting of welfare payments. Aggregate demand policies operate through monetary and fiscal policy. The division of policy into these two categories is necessary for analysis because they operate in different ways. Indeed there is an element of incompatibility between them. For example, aggregate demand policy cannot reduce unemployment below a rate that is determined by aggregate supply policy. This impotence of aggregate demand policy was brought home to Australians in the 1970s when an excessive real wage caused the rate of unemployment to increase dramatically. As discussed above, the concurrent increase in u^{min} was due to aggregate supply factors. This episode brought the low unemployment rates of the 1950s and 1960s to an end. Faced with a real wage fixed above the full-employment real wage, aggregate demand policy had no power to reduce the rate of unemployment. Attempts to do so would instead have caused increasing inflation rather than reduced unemployment. In the event, policy makers in Australia came to realise this and eschewed expansionary aggregate demand policy even although the rate of unemployment was generally regarded as excessively high.

In the range model, increases in aggregate demand, including increases caused by expansionary aggregate demand policy, can reduce unemployment to the rate of u^{min}.[18] Let us call the region of unemployment rates above u^{min} the Keynesian region and any excess of actual unemploypment over u^{min} Keynesian unemployment. Aggregate demand expansion

can get unemployment to the lower boundary of the Keynesian region, reducing Keynesian unemployment to zero. The estimated value of u^{min} of 2.5 per cent suggests that expansions in aggregate demand can reduce the actual rate of unemployment to 2.5 per cent without generating a situation of increasing inflation. Full employment can be achieved through aggregate demand policy alone,

How the inflation target enhances the employment-creating effectiveness of aggregate demand policy

In Australia the setting of aggregate demand policy has to satisfy the inflation target, that CPI inflation averages between 2 and 3 per cent. Does this policy constraint prevent aggregate demand policy from reducing unemployment?

Research by Hugh Sibly and I suggests that it does not.[19] Indeed, we argue that an inflation target can enhance the unemployment-reducing potential of aggregate demand policy. Our argument is that an inflation target is an anchor which keeps inflationary expectations in check. Without an inflation target there is a danger that if an expansion in activity causes an increase in inflation, then expectations will adjust rapidly and convert what could have been a temporary blip in inflation into a permanent increase. An inflation target can prevent such a conversion.

The range model implies that for reductions in unemployment to be achieved the inflation target should not be the only objective of aggregate demand policy. The inflation target should be accompanied by an aim to reduce unemployment to the u^{min} level. Our formulation of this is hierarchical – aggregate demand policy should be set to give the lowest rate of unemployment subject to not violating the inflation target.[20]

Figure 3 Non-inflationary expansions (NIEs), Australia, 1993:1 to 2007:1 (bold sections are NIEs)
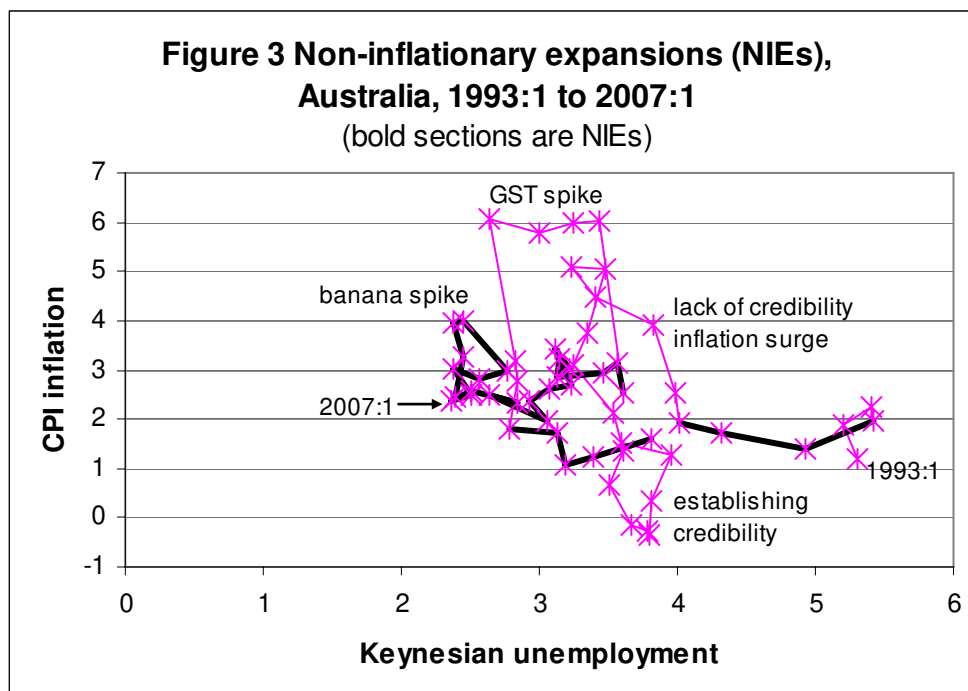
How has Australia fared under the inflation target policy? Does the evidence give grounds for optimism that full employment can be achieved? Figure 3 plots the relation between CPI

inflation and Keynesian unemployment for the period since the introduction in 1993 of the inflation target.[21] It appears that there is justification for optimism. Since 1993:1 there have been three non-inflationary expansions (NIEs) in Australia. (An NIE is a reduction in the rate of unemployment with no trend increase in inflation.) The bold sections of the inflation-unemployment relation in Figure 3 show the three NIEs. The first, 1993:4 to 1994:3, ended with an increase in inflation caused by inflationary pressures; these inflationary pressures were thought to be a sign that the new policy lacked credibility. The Reserve Bank of Australia (RBA) reacted quickly by tightening monetary policy, an act designed in part to establish the credibility of the inflation target policy. It appears to have worked. The increase in inflation was reversed. A second NIE occurred from 1998:4 to 1999:4. The ending of this second NIE was accompanied by an inflationary spike associated with the introduction of the GST in 2000. During this spike, Keynesian unemployment increased by over one percentage point. But the inflation increase was a spike. Inflation quickly returned to the target range, suggesting that the inflation target was effective in keeping inflation under control, albeit at the cost of an increase in Keynesian unemployment. A third NIE began in 2001:3 and has continued to the end of the data period, 2007:1. During this NIE, there was a massive increase in the price of bananas and this made a substantial contribution to the increase in CPI inflation in 2006. The massive increase in the price of bananas and the associated increase in CPI inflation was temporary. During this inflationary spike there was a mild and short-lived increase in Keynesian unemployment. This experience provides similar qualified support to the effectiveness of the inflation target in keeping inflationary expectations under control.

The RBA does not state a target for the rate of unemployment, or even state that it aims to reduce unemployment subject to not violating the inflation target, that is the hiearchical policy described above. The unemployment-reducing aspect of the NIEs experienced by Australia in the 2000s are perhaps driven by increases in aggregate demand coming from non-government sources, especially the buoyancy of the world economy including the very high growth rates of the Chinese economy. Just as the Chair of the Board of Governors of the Federal Reserve Board, Alan Greenspan, 'tolerated' the reduction in unemployment in the US in the 1990s below the existing estimates of the natural rate of unemployment, so the RBA has, perhaps, acted with similar tolerance in the 2000s.

Non-government influences notwithstanding, the theory of the range implies that aggregate demand policy does have the potential to create an NIE. Indeed the first NIE, in 1993-94, was associated with expansionary aggregate demand policy. Governor Bernie Fraser announced at the time of the introduction of the inflation target policy that 'The task now is to hold the gains on inflation while releasing the brake on activity'.[22]

Just how fast the approach to full employment should be is a question of judgement. Policymakers have to allow for the possibility that there is a speed limit effect, namely that a rapid decrease in unemployment could cause an increase in inflation. This possibility should constrain the chosen speed of expansion. As it happens, the wage-inflation speed limit effect

has been absent in the expansions experienced in the Australian economy since the early 1980s. But a wage-inflation speed limit effect would most likely recur if faster rates of expansion were chosen. The fact that the average rate of inflation in the third NIE is slightly higher than that of the preceding NIEs suggests that there was perhaps not much room for a faster decrease in unemployment.

The experience of the NIEs and the estimate of u^{min} suggest that the rate of progress towards full employment in Australia can be maintained and that monetary policy should be set with this in mind, while keeping in mind the need not to violate the inflation target.

Fiscal expansion should also contribute to the progress towards full employment. The interaction of fiscal and monetary policy and the associated implications for interest rates and national saving are beyond the coverage of this paper.

In addition to locking-in inflationary expectations, a further advantage of the inflation target policy is to prevent aggregate demand policy from trying to push unemployment below u^{min}. For example, an inflation target policy in the early 1970s would have reacted more quickly to the actual increases in inflation experienced at that time.

Conclusion

The research reported in this paper suggests that full employment would occur at an aggregate rate of unemployment of 2.5 per cent. Whilst this figure should be treated with caution and should not be regarded as a rigid target, it does suggest that the current unemployment rate of 4.4 per cent can be reduced without causing increasing inflation.

Given the extent of economic reform in Australia since the 1970s, the suggestion that the unemployment rate could be as low as 2.5 per cent without causing an increasing rate of inflation is not surprising. Over the three decades since the early 1970s there has been a stream of microeconomic reform including tariff reductions, decentralisation of wage bargaining and privatisation of government enterprises. Furthermore, the unemployment benefit system has been reformed through measures such as 'work for the dole' schemes. At the macroeconomic level, monetary policy has been reformed by the introduction of an inflation target and fiscal policy has been reformed by a more conscious intention to avoid government budget deficits. Were unemployment outcomes comparable to those achieved in the 1950s and 1960s unattainable, it would cast doubt on the value of these economic reforms.

Some economists argued that the large increase in unemployment in the 1970s was the result of an increase in real wages. The increase at the time in the share of wages in GDP supported these arguments. However, these increases have now been reversed. But an unemployment outcome of 4.4 per cent is substantially higher than the outcomes that were argued to have been ended by the real wage surge of 1974. If Australia could do no better than an unemployment rate of 4.4 per cent, then the validity of the real wage overhang explanation of the 1970s experience would be questionable.

The research on which this paper is based uses a model, the range of equilibria model, which differs from the model of the natural rate of unemployment. The natural rate model dominates economic thinking at the current time. It is based on microeconomic foundations implied by conventional neoclassical theory. By contrast, the range model includes psychological insights from behavioural economics.

The range model is in the Keynesian tradition in that it gives a more important role to the effects of aggregate demand than does the classically-based natural rate model. In the range model there is no automatic tendency for the unemployment rate to gravitate to the rate associated with full employment.

This paper suggests that an increase in aggregate demand could get the Australian economy to a rate of unemployment as low as 2.5 per cent with no further microeconomic reform and no further reform of the unemployment benefit system. Given that there is not an automatic tendency for this outcome to occur purely through the workings of the market, aggregate demand policy should play an important role in getting the economy closer to full employment. This role of aggregate demand policy does not imply that the inflation target policy should be abandoned. Indeed, by anchoring inflationary expectations, an inflation target can enhance the unemployment-reducing potential of aggregate demand policy. The inflation target needs to be joined by the aim of reducing unemployment.

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1 Reported in, respectively, *The Australian*, 23 April 2007, *The Australian* 17 April 2007 and *The Sydney Morning Herald*, 5 May 2007.

2 This is the seasonally adjusted number of people unemployed for more than a year since their last full time job. The number unemployed for more than a year since their last job, full-time of part-time is virtually the same, namely 78,000 in April 2007.

3 See Cai, Lixin and Gregory, Robert (2005). 'Unemployment Duration and Inflows onto the Disability Support Pension Program: Evidence from FaCS LDS Data', *Australian Economic Review*, 38, 3: 233-252, September.

4 Wilkins, R (2007) 'The consequences of underemployment for the underemployed' *Journal of Industrial Relations*, 49: 247-75, finds that life satisfaction for underemployed people is less than that for other employed people, indeed not much greater than life satisfaction for those people who are unemployed. Thus the underemployed are an important component of the loss of social welfare from not being at full employment.

5 Robinson, J (1937). <u>Essays in the Theory of Employment</u>, Oxford, Blackwell (1947 edition). Robinson, in the later edition in 1973, claimed Keynes agreed with the main points. See Keynes, JM (1936). *The General Theory of Employment, Interest and Prices*, London, Macmillan.

[6] See Friedman, M (1968). 'The role of monetary policy' *American Economic Review*, 58: 1-17; Phelps, E (1967). 'Phillips curves, expectations of inflation and optimal unemployment over time', *Economica,* XXXIV, 135: 254-81.

[7] See Keynes (1936): 250; Robinson (1937): 88.

[8] Kahneman, D and Tversky, A (1979). 'Prospect theory: An analysis of decision under risk', *Econometrica*, 46: 263-91. Kahneman was awarded the Nobel prize in Economic Science in 2002 for this work – Tversky, having died in 1996, was not eligible.

[9] Bhaskar, V (1990). 'Wage Relativities and the Natural Rate of Unemployment', *Economic Journal*, 100: 60-66.

[10] See McDonald, IM and Solow, RM (1981), 'Wage bargaining and employment', *American Economic Review*, 71: 896-908.

[11] Lye, JN and McDonald, IM (2006a). 'Union power and Australia's Inflation Barrier, 1965:4 to 2003:3' *Australian Journal of Labour Economics,* 3: 287-304.

[12] Lye, JN and McDonald, IM (2006b). 'An evaluation of unemployment policy in Australia using the range of equilibria', *Australian Economic Review*, 9, 3: 239-56.

[13] See Corden, WM (1979). 'Wages and unemployment in Australia', *Economic Record*, 55, March, 1-19.

[14] The unemployment benefit scheme has been tightened up by various measures, such as the 'work for the dole' scheme. However, these measures are not included in the estimation of the factors determining u^{min}. As a consequence, the reported estimate of u^{min}, on account of this omission probably overstates the true u^{min}.

[15] See Isaac, JE (2007). **'**Reforming Australian Industrial Relations?: The 21st Foenander Lecture, 28 August 2006', *Journal of Industrial Relations*, 49: 410-435.

[16] In McDonald, IM (1993). 'Long Term Unemployment and Macroeconomic Policy' *Australian Economic Review*, 2: 31-4.

[17] For Western Australia, where the rate of unemployment has fallen to 2.7 per cent by April 2007, there appears to be some tendency for the relation to flatten out at state unemployment rates below three per cent. This may qualify the conclusion in the text that long-term unemployment can be reduced to zero through reducing the aggregate unemployment rate. More investigation of state level data is required.

[18] As discussed by McDonald, IM and Sibly, H (2001). 'How Monetary Policy Can Have Permanent Real Effects With Only Temporal Nominal Rigidity', *Scottish Journal of Political Economy*, 48, 5: 532-46 and McDonald, IM and Sibly, H (2005). 'The diamond of macroeconomic equilibria and the non-inflationary expansion', *Metroeconomica*, 56, 3: 393-409.

[19] McDonald and Sibly (2005) *ibid.*

[20] *Ibid.*

[21] Using actual unemployment instead of Keynesian unemployment yields a similar picture for Figure 3.

[22] Fraser, BW (1993). 'Some aspects of monetary policy', *Reserve Bank of Australia Bulletin*, April: 3.