POTENTIAL OUTPUT AND OKUN'S LAW FOR AUSTRALIA
SINCE 1974 - IMPLICATIONS FOR UNEMPLOYMENT
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Discussion Paper 88.10
May 1988

ISSN 0811-6067
ISBN 0-86422-691-8
Potential Output and Okun's Law for Australia since 1974 - Implications for Unemployment

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Abstract


This paper presents estimates of potential output, employment and productivity for the non-farm sector of the Australian Economy from 1974 to 1987. The level of the potential output series has been set on criteria appropriate for post 1974 conditions, and the estimating technique uses an explicitly structural approach. Estimates of Okun's Coefficient suggest that modest reductions in the unemployment rate require growth rates of output which are in the feasible range.

University of Western Australia and Murdoch University.
In order to calculate the size of the cake which will be left for civilian consumption, we have to estimate the maximum current output that we are capable of organising from our current resources of men, and plant and materials...

John Maynard Keynes, How to Pay for the War, (1940)

I Introduction

Interest in the estimation and use of potential output series was initiated by the Arthur Okun's paper (1962) and has continued in the United States in the Council of Economic Advisers and the Brookings Institution. Okun originally posed the problem of measurement in terms of 'how much output can the economy produce under conditions of full employment (of labour)?' but restated the concept of potential output for considering policy implications as one based on a 'target' unemployment rate which takes account of inflationary pressures in the full employment zone. Estimates of potential output provide a benchmark series for deriving such indicators of economic performance as the 'output gap' (the deficiency of actual in relation to potential output) or the 'output ratio' (the ratio of actual to potential output). Moreover, Okun's Law, i.e., the quantitative link between the
unemployment rate and the output gap or ratio, provides a useful input to macroeconomic policy discussion.

It is just over a decade ago since the publication of our series of potential output for the Australian economy (Peters & Petridis, 1977). Those estimates were based on the structural method, originally described by Edwin Kuh (1966) as a subsystem comprising an aggregate production function, a labour force participation equation and a policy restriction that stipulates a minimum unemployment rate that is feasible given the constraints upon employment policy facing the policy makers. We previously argued the case for the advantages of the structural method over the easier and more generally used 'linked peaks' method (pp. 322-3), and the case seems even stronger now because of the problem of establishing peaks in economic activity and extrapolating under conditions of persistent underemployment of resources. The structural method requires continuous and consistent time series of data embracing a sufficient time span of observations for fitting satisfactory estimating equations. Our previous series ranged from 1953 to 1974 and the specification of the estimating equations was partly influenced by data then available. We did indicate at the end of our paper that the labour force participation equation, in particular, could be improved (and better adapted for measuring potential output) by use of the labour force data emanating from the ABS Population Survey conducted since 1966. One distinct advantage of using that data is the
ability to quantify the influences of full-time and part-time employment on labour force participation. Our recent research in this area (1985) suggests that there is now a sufficient time span of observations since 1974 for fitting satisfactory estimating equations for measuring potential output.

This paper presents estimated series of potential output, employment and productivity for the non-farm sector of the Australian economy from 1974 to 1987.¹ These estimates provide the benchmark series for the derivation of the ratios of actual to potential magnitudes. Section 2 describes the estimating equations used to generate the potential output series and briefly discusses the criteria that have been adopted for setting the level of the series. We argue for a criterion that is considered to be appropriate for the post-1974 conditions and problems. In section 3 some initial comment is made on economic performance in the light of the various measures and is followed by a consideration of Okun's Relationship between the unemployment rate and the output gap. Okun's Coefficient linking unemployment and output is discussed in Section 4. In Section 5 consideration is given to the implications of our estimate of Okun's Coefficient for lowering the unemployment rate via the expansion of output. The general conclusion that emerged from our investigation of Okun's Law is that certain features of the post-1974 economy have combined to produce a higher transmission of changes in output into unemployment than previously and that this
changed experience has provided the conditions for feasible growth requirements for lowering the unemployment rate. A concluding section makes some comment on possible avenues of further enquiry within our estimating framework. A Statistical Appendix lists the estimated series and ratios. This listing, together with the estimating equations, provides sufficient information for generating series based on some preferred alternative criterion for setting the level of the series to the one that we have adopted. The information will also facilitate updating and revision.

II Estimating Potential Output by the Structural Method

The structural method of measuring potential output involves estimating the potential labour force from a labour force participation equation, applying a specified unemployment rate to obtain potential employment, and then substituting the estimates of potential employment into an equation linking output to employment. The method has the advantage of using a common set of relationships and data to derive the output ratio (the ratio of actual to potential output) and its component elements, viz., the employment ratio (the ratio of actual to potential employment) and the productivity ratio (the ratio of actual to potential output per employee, i.e., potential output/potential employment). These ratios provide useful indicators of economic performance and inputs to the discussion of the policy implications of past behaviour of the economy. Another advantage of the structural method is
that the estimating equations for generating potential output also underlie Okun's relationship between output and unemployment.

Our specification of the labour force participation equation relates the participation rate, LFPR, (the proportion of the working-age population in the labour force) to the full-time and part-time employment to population rates, FTER and PTER, (the proportions of the working-age population in full-time and part-time employment). Originally used by Alfred Telea (1965) as a specification of the 'employment opportunity effect', the equation is based on the hypothesis that the probability of participating in the labour force is positively related to the probability of being employed. The employment to population rates are treated as proxies for the probability of obtaining employment. A differential effect on participation of full- and part-time employment has been previously shown to be supported empirically and, in the aggregate, to be related to the differential participation response of demographic groups (see Section 3 and Table 5, Peters & Petridis, 1985, for more extended discussion and results). The above relationship, fitted to quarterly, seasonally adjusted data from 1974.3 to 1987.2 (52 observations), gave the estimating equation:
\( \text{LFPR} = .3557 + .3643 \ \text{FTER} + .8087 \ \text{PTER} \)

\[
\begin{align*}
(1) & \\
(0.032) & (0.051) & (0.110)
\end{align*}
\]

R-square adjusted = .8163; SEE = .0021; estimates corrected for first order autocorrelation by Cochrane-Orcutt procedure with Rho = .5532; (0.116) standard errors in parentheses.

The regression clearly shows that the encouragement and discouragement effects of variation in full-time employment are much smaller than those for changes in part-time employment. The aggregate differential effect of full-time and part-time employment is mainly due to the large weighting in full-time employment of males in the 20-54 age group with normally strong attachment to the labour force, and the high proportion of part-time employment taken up by married women who typically enter and exit from the labour force with employment gains and losses. Specifically, the effect of an expansion of employment on labour force participation depends critically on the full-time, part-time mix of the jobs created and the particular demographic groups favoured by the expanded employment opportunities.\(^{(2)}\)

The potential labour force can be generated from the equation (1) by substituting selected employment to population rates and multiplying through by the working-age population. Applying a specified unemployment rate to the estimates of the potential labour force provides estimates of potential employment, i.e., the level of employment estimated to be forthcoming at the specified unemployment rate. Clearly, the
selected employment to population rates and specified unemployment rate should be consistent in terms of labour market relationships, i.e., all rates should refer to the same state of the labour market. By setting the level of the potential employment series, the chosen rates also set the level of the potential output series.

Our earlier measure of potential output for the period 1953 to 1974 was referred to as full employment output because it was based on the unemployment rate that was associated, on the average, with the equality of vacancies and unemployment. In similar vein, David Kalisch (1982) fixes the level of the potential output series on an estimated series of frictional unemployment. The convention in the United States, however, has been to treat the specified unemployment rate as a policy restriction, following Okun's original conception of potential output as the maximum level of output that could be achieved without inflationary pressure or, more generally, an output level that represents a point of balance between more output and greater stability. This convention has recently materialised in the guise of equality of potential output with the 'natural' level of output, i.e., the level of output associated with the (hypothetical) natural rate of unemployment - a rate compatible, in the absence of supply shocks, with a non-accelerating rate of inflation. (Gordon, 1984)

Thus the criterion for setting the level of the potential employment and output series has either been an unemployment
rate which represents a labour market state of full employment or a 'target' rate that is perceived to be a viable policy objective when account is taken of other social objectives. The major problem with the 'target' rate is the practical difficulty of establishing a clear and generally acceptable empirical basis for its selection. The priority weightings attached to the competing objectives are likely to change over time as economic circumstances (and governments) change. However, while there may be problems with the application of a policy restriction, it is also true that the notion of a potential full employment output would now generally be considered an inappropriate concept for policy discussion in the eighties. Taking account of these points, we have opted for the criterion of the minimum unemployment rate achieved in the persistent excess labour supply conditions that have ruled since 1974. Potential output would then be based, in our view, on a relevant and readily identifiable state of the labour market. The preferred criterion did pose a difficulty since the unemployment rate was rising post-1974 from previous full employment levels. However, after the recessionary climb to 6.66 percentage points in early 1978, the unemployment rate fell to an average 5.82 percentage points in 1980-81. Since that year the rate has risen over 10 percentage points in 1983 and fallen to an average 8.27 percentage points in 1986-87. It was considered, therefore, that the unemployment rate in 1980-81 reasonably satisfied our criterion of an achieved minimum. The specified unemployment rate was rounded up to
six percentage points in the light of recent estimates of the 'equilibrium' rate of 6.07 and 6.13, calculated by substituting 1980-81 date into alternative estimating equations for the unemployment rate in Australia.\(^3\) (Trivedi and Baker, 1985, p.640)

The full time and part-time employment to population rates were also set at their 1980-81 levels (.4699 and .0917 respectively) in order to generate the potential labour force. Over the period 1974 to 1987, the full-time rate has trended downwards while there has been a rising trend in the part-time rate. The unemployment rate in 1986-87 was over two percentage points higher than in 1980-81 and, although the full-time rate fell to .4327, the part-time employment to population rate increased to .1020. Given the differential impact of the two categories of employment on labour force participation, it may be necessary to take account of the contrary movements of the full-time and part-time rates when using the estimates of potential employment and the employment ratio for analysis or extrapolation.

The equation for generating potential output from potential employment is a log-linear specification relating output, \(Y\), to total (non-farm) employment, \(E\), and Time. With the capital stock variable suppressed (following Kuh, 1966), the coefficient on employment measures the short-run response of output to labour (in terms of persons employed) operating with an unknown capital input, while any long-run effects related to the capital input are absorbed in the trend term
along with the contribution of disembodied technical progress. A one-period lag of output has been included as an explanatory variable to accord with the generally established proposition that, in the absence of capacity and labour constraints, employment will only be partially adjusted to current output - changes in the rate of production being partly associated with changes in hours worked and in the rate of utilization of the existing work force. Given a positive value of the coefficient on lagged output, potential output is generated from the steady state solution of the estimating equation which raises the coefficient on employment to its full adjustment value. Fitted to quarterly, seasonally adjusted date from 1974.3 to 1987.2 (52 observations), the resulting equation is:

\[ \log Y_t = 3.7751 + 0.0020 \text{Time} + 0.3050 \log E_t + 0.5653 \log Y_{t-1} \]

\[ (1.31) \quad (0.0006) \quad (0.131) \quad (0.134) \]

\text{R-square adjusted} = 0.9990; \text{SEE} = 0.0107; \text{Durbin's h statistic} = 3.8919; \text{first order Rho} = 0.1303; \text{standard errors in parentheses.}

Potential output, PY, is then the anti-log of the estimates generated by substituting potential employment, PE, into the steady state solution of (2), viz.,

\[ \log PY = 8.6846 + 0.00455 \text{Time} + 0.70156 \log PE. \]
A comment is made regarding the use of the measures. The focus of our measurement is on the derivation of the output ratio (and component employment and productivity ratios) and not the estimation of output losses associated with the underutilisation of resources (as, for example in Kalisch, 1982). For our purpose, therefore, the function of the estimates of potential output is to provide a benchmark series that is based on a relevant, historically identifiable state of the labour market. Use of the measures for policy discussion may require reconsideration of the labour market magnitudes selected to set the level of the series in the light of constraints that are perceived to be currently operative or likely to be operative in the medium-term future. It is emphasised that the paper is user orientated. Potential labour force, employment and output series based on alternative criteria can be readily generated from the estimating equations (1) and (2a) and the data listings in the Statistical Appendix.

III Economic Performance and Okun's Relationship

The potential series and the derived ratios of actual to potential magnitudes provide a ready means of showing the salient features of the performance of the economy over the period 1974 to 1987. Potential output grew at a trend rate of 3.12 percent per annum over the period, comprising trend rates of growth of the potential labour force and potential productivity of 1.86 and 1.25 percent respectively. The
AND PRODUCTIVITY - 1974 to 1987

OUTPUT RATIO

EMPLOYMENT RATIO

PRODUCTIVITY RATIO

1.00

.95


Source: Data listings in Statistical Appendix. Trend lines from linear regressions on time.
post-1974 trend rate of growth of potential output is, as would be expected, considerably below that of 4.94 percent calculated from our previous series from 1953 to 1974. A more comparable indication of the reduced trend rates of the potential magnitudes after 1974 is given by calculations from potential series generated from equations (1) and (2a) fitted to quarterly data from 1966 to 1974. These show potential output trending upwards by approximately five percent per annum with the potential labour force growing by 2.48 percent and potential productivity by 2.54 percent. Thus, while part of the reduction in the trend rate of growth of potential output is attributable to a lower trend rate of the potential labour force (mainly because of reduced growth in the working-age population), the most significant factor was the lower trend rate of growth of potential productivity.

The average annual rate of growth of actual output from 1974 to 1987 was 2.77 percent, resulting in a downward trend in the output ratio, i.e., the ratio of actual to potential output. Looking at the graphs of the output, employment and productivity ratios, a striking feature is the extent to which the downward trend and variation of the output ratio mirror those of the employment ratio and the absence of an identifiable pro-cyclical correspondence between the productivity ratio and the employment ratio - a pattern which was clearly in evidence before 1974. The course of economic activity over the period, therefore, is virtually shown by the employment ratio: the downward drift in the ratio from
1974 to 1978, reflecting the gradually falling employment to population rate; the minor improvement in activity culminating in the 1980-81 peak; the marked recessionary phase from late 1981 to the first half of 1983; and the levelling off in 1986-87 after almost three years of steady expansion. Some semblance of a pro-cyclical increase in the rate of growth of productivity above its potential growth rate is evident in the expansionary phase from 1983 to 1986 but any suggestion of a return to the pre-1974 pattern would be premature. Employment continued to grow at the potential growth rate in 1986-87 yet there was a marked decline in the productivity ratio.

Economic performance can be related to unemployment within the potential output framework via Okun's relationship between the output gap and the unemployment rate. Arthur Okun's approach to the measurement of potential output entailed establishing a statistical relationship between output and the unemployment rate. The unemployment rate was viewed as a 'proxy variable for all the ways in which output is affected by idle resources' - a view that followed from the assumption that, whatever the influence of slack activity on labour force participation and productivity, the magnitude of these effects are related to the unemployment rate. He then went on to report a linear regression of the unemployment rate on the relative output gap, i.e., potential less actual output, expressed as a proportion of actual output. (1962, p.99) It has recently been suggested that
this relationship has continued to feature in policy discussion in the United States because of continued empirical support for its regularity (thus warranting the labelling as a 'law') and because it short-circuits the complex interrelationships linking unemployment to output. (Gordon, 1984, p.539) The coefficient relating the unemployment rate to the relative output gap is, in essence, a summary measure of the various responses involved in the transmission of changes in output to unemployment - a point recognised by Okun when he itemised the 'steps that were leaped over in the statistical relationship between output and unemployment". (pp.102-4) This coefficient, when inverted, provides an estimate of the reduction in the relative output gap required to lower the unemployment rate by one percentage point. Since the output ratio (the ratio of actual to potential output) is equal to 1/1 + the relative output gap, a more convenient and meaningful way of stating Okun's Law is in terms of the required percentage increase in the output ratio. Given the rate of growth of potential output, the requirement for lowering the unemployment rate by one percentage point can then be translated into the required increase in the growth rate of actual output. Okun's coefficient can establish important guidelines for macroeconomic policy provided the estimating equation has acceptable predicting properties and provided that due consideration is given to the initial conditions. One further proviso is necessary. Given the well documented lag of unemployment behind output, Okun's Law should be
interpreted as a steady state rather than as a coincident relationship. Okun's coefficient, therefore, should be a full adjustment magnitude to the extent that there is a lag in the response of labour force participation to employment and/or a lag in the adjustment of employment to output.

While our labour force participation equation (1) specifies a coincident relationship, the estimating equation for output (2) confirms a partial adjustment of employment to the current level of output. Consistent with this evidence, we include in the regression a one-period lag of the unemployment rate as an explanatory variable to represent the Koyck transformation of the distributed lag on the output term. The equation specified, therefore, relates the unemployment rate, UR, to the output gap as a proportion of actual output, the 'Gap Ratio', and the lag of the unemployment rate. Fitted to quarterly, seasonally adjusted data from 1974.4 to 1987.2 (51 observations), the resulting equation is:

\[
(3) \quad UR_t = 0.0171 + 0.1400 \text{ Gap Ratio}_t + 0.7083 \text{ UR}_{t-1} \\
(0.0037) \quad (0.0418) \quad (0.0647)
\]

R-square adjusted = 0.9572; SEE = 0.0034; corrected for first order autocorrelation by Cochrane-Orcutt procedure with Rho = 0.3987; 
(0.1284)
Standard errors in parentheses.
The resulting statement of Okun's Relationship viz., the steady state solution of equation (3), is:

\[ (3a) \ \text{UR} = 0.0587 + 0.4800 \ \text{Gap Ratio}. \]

The intercept coefficient on equation (3a) is the steady state estimate of the unemployment rate when the output gap is zero, i.e., actual equal to potential output. At 5.87 percentage points, it is close to the six percentage points which sets the level of the potential output series.

IV Okun's Coefficient

The coefficient on the Gap Ratio in equations (3) and (3a) measures, respectively, the impact and the full adjustment effect on the unemployment rate of a change in output relative to potential output. Inverting the steady state coefficient in (3a) provides the estimate of Okun's coefficient of 2.08. This is considerably lower than the only recent estimate for Australia of which we are aware, viz., 2.71 (Kalisch, 1982, equation C3, p.9). These estimates are not comparable, however, because the measure of the output gap differs in the two estimating equations. Kalisch estimated the output gap by deducting actual output from a potential output series that was obtained by extrapolating to 1980 the trend of output at full employment points during the period 1966 to 1974. The resulting
estimates of the output gap after 1974 would have no definable relationship to our estimates based on a potential output series generated from estimating equations fitted wholly to post-1974 observations. Not only did the trend rate of growth of potential output differ substantially pre- and post-1974 but, with our estimating method, the series of potential output varies with the working-age population.

There are grounds for contending, however, that our historically low estimate of Okun's coefficient is essentially the product of the structural and behavioural characteristics of the post-1974 economy. Okun's coefficient reflects the extent to which changes in the output gap or output ratio are translated into changes in unemployment. There are two features of post-1974 experience which, in combination, point to a higher transmission of output to unemployment than previously: one is the changed cyclical experience involving a higher response of employment to output; the other is the structural break in the labour force participation equation (see note 2.) which has resulted in a lowered sensitivity of participation to employment.

Reference was made above to the close graphical correspondence of the output and employment ratios both in terms of downward trend and cyclical fluctuation. The high cyclical correspondence is indicated more precisely by the closeness of the standard errors of the estimate on the linear trend regressions of the ratios, viz., .0180 for the output ratio and .0162 for the employment ratio. This
evidence is consistent with the noted absence of a pronounced pro-cyclical variation in the productivity ratio. The pattern from 1966 to 1974, for example, was quite different. (see note 4.) In that earlier period the standard error of the estimate on the trend regression of the employment ratio was .0058 - about half of that for the output ratio of .0109 - with the higher cyclical correspondence being between the output and productivity ratios. A strong pro-cyclical association of productivity and output has always been a characteristic feature of manufacturing activity and there is no reason to suppose that it has not existed since 1974, though it may have been weaker on occasions because of historically high levels of excess capacity and high costs of labour hoarding. However, our measures and estimates are for the non-farm sector of the economy and, therefore, the cyclical responses and Okun's coefficient have been influenced by the industrial distribution of output. A recent study of productivity (Haig, 1986) has concluded that the decline in manufacturing industry since 1974 has resulted in a shift of resources from the more efficient manufacturing sector to the less efficient tertiary sector. Thus it is highly likely that the effect of the characteristic pro-cyclical response of productivity to output on the productivity ratio would have been muted or, on occasions, swamped by the larger weighting of tertiary activity. Moreover, it is the tertiary sector that has mainly absorbed
the higher and steadily rising proportion of part-time employment since 1974.

As suggested above, the other factor affecting the size of Okun's coefficient after 1974 is the lower sensitivity of labour force participation to employment. In terms of our labour force participation equation, this can be translated into a higher response of unemployment to employment since equation (1) can be manipulated to give:

\[ U = .3557 \text{WAP} - .6357 \text{FTE} - .1913 \text{PTE}, \]

where \( U \) is the level of unemployment, FTE and PTE are, respectively, full-time and part-time employment, and WAP is the working-age population. As full-time employment was approximately ninety percent of total employment (as measured at the means for the period), the crucial coefficient governing the response of unemployment is clearly that on full-time employment. Our previous study on labour force participation shows that equation (1) yielded a response coefficient of unemployment to full-time employment of only \(-.1472\) for the period 1966 to 1974. This difference in the pre- and post-1974 response was mainly attributed to the greatly increased labour force attachment of males in the 25-54 age group - the demographic group with the largest weighting in full-time employment. (1985, Tables 2 and 3) Higher labour force attachment of this group (and, hence,
greater movement between employment and unemployment pool) could be expected with the more severe labour supply conditions and the persistence of such conditions after 1974.

V Implications for the Unemployment Rate

The policy implications of our estimate of Okun's coefficient can be illustrated by an example of considering the rates of growth of output required to lower the unemployment rate by two percentage points from its 1986-87 level to bring it approximately to the level achieved in 1980-81, viz., six percentage points. The (steady state) unemployment rate for the Gap Ratio in 1986-87 is estimated from equation (3a) to be 7.92 - a little below the actual rate of 8.27 percentage points. To reduce the steady state unemployment rate by two percentage points would require that the output gap be virtually eliminated or, alternatively, that the output ratio (the ratio of actual to potential output) be raised from the 1986-87 level of .9590 to .9990, i.e., by 4.17 percentage - double Okun's coefficient of 2.0833. Since the growth rate of output only averaged 2.77 percent per annum over the period 1974 to 1987, a feasible requirement would be a sufficiently higher rate of growth of output over three years to progressively raise the output ratio to its higher level. With potential output extrapolated at its annual trend rate of growth of 3.12 percent from 1974 to 1987, output would be required to grow at an average rate of 4.54 percent over the three years to establish the higher output ratio. The higher
ratio could then be maintained with output growing at the
trend rate of growth of potential output. Because of partial
adjustment of unemployment to output, the unemployment rate
would only fall by 1.62 percentage points by the end of the
third year and would then gradually approach full adjustment
in the fifth year.

The illustrative example can be compared with the experience
of the recent expansionary phase from 1983 to 1986. Over
that period, the average rate of growth of output was 4.69 percent
marginally above that in the foregoing example. The
unemployment rate fell from a peak of 10.26 percentage points
in the last half of 1983 to 7.94 in the first half of 1986 — a
fall of 2.32 percentage points in just over two years.
However, in that period there were factors that combined to
give a particularly favourable unemployment outcome. The
rate of growth of the working-age population was below the
trend rate from 1974 to 1987 and this contributed to growth
rates of the potential labour force and output which were
less than their trend rates. Under these circumstances the
output ratio rose more rapidly than would have normally been
the case with the higher rate of growth of output. In fact,
the output ratio rose from a level of .9262 in the last half
of 1983 to an average level of .9834 in 1985-86 — an increase
of 6.18 percent which, with the estimated Okun's coefficient,
would be associated with a reduction in the steady state
unemployment rate of three percentage points. Partial
adjustment, of course, would reduce the short-run impact of
the rising output ratio on the unemployment rate. An important additional factor contributing to the favourable unemployment outcome was the relatively higher increase in full-time employment and the proportion of that increased full-time employment taken up by males in the 25-54 age group - the demographic group, as previously indicated that has exhibited a low participation response to increased employment since 1974.

The foregoing examples show that our estimate of Okun's coefficient of around two is a favourable factor for employment policy since it gives quite feasible growth requirements for modest reductions in the unemployment rate. It is emphasised, however, that the estimate is embedded in the range of economic experience and the policy objectives and strategies from 1974 to 1987. Hence, while the low value of the coefficient is conducive to a lowering of the unemployment rate it also reflects the much lower rate of growth of potential productivity. It would seem unlikely that an unemployment rate of around the 1980-81 level of six percentage points would significantly alter the size of Okun's coefficient since the lower target rate of unemployment would remain in the range of experience on which the estimate is based. The point has been made (Gordon, 1984, p.562) that, if there is still slack in the economy, a permanent rise in the output ratio which temporarily increases the rate of growth of employment would be unlikely to materially increase the permanent rate of growth of
productivity. However, this viewpoint should be qualified. The change in policy direction and strategy over the past few years and the possibility of adaptation of productive capacity to lower growth rates might well have produced conditions more favourable to a higher future growth rate of productivity. Finally, a more ambitious target for the unemployment rate than has been considered above would require an output ratio above unity and that would imply an economy of a very different character from the one that underlies our estimate of Okun's coefficient.

VI Conclusion

Our aim in this paper has been to generate a potential output series with a structural method that integrates the measurement of potential output with Okun's Law. The advantage of this approach over the linked peaks method of measuring potential output is that it establishes structural links between output and unemployment. This is considered to be important for policy discussion since the estimate of Okun's coefficient is grounded in the performance and structural relationships of the post-1974 economy. The estimating equations have the merit of utilising regularly published ABS series and therefore are readily amenable to revision and updating. Okun's coefficient should be periodically re-estimated by incorporating the most recent economic experience and, if considered appropriate, eliminating the more dated observations. Our estimates
suggest that to generate modest reductions in the unemployment rate requires a growth rate of output which is in the feasible range given recent economic performance. This relatively optimistic policy scenario is predicated on the continuation of the recent low growth of productivity. Our research points to the importance of productivity performance for employment policy and suggests that further investigation in this area is essential.
Notes

* We are grateful to Jane Cozens for statistical and computational assistance.

1. All magnitudes in the paper are for the non-farm sector with the exception of the unemployment rate which is for the whole economy. With the absence of data for the farm labour force, non-farm population, labour force and employment were derived by deducting farm employment from the economy-wide data. Farm employment is employment in Agriculture and Agricultural Services.

2. It is not possible to generate a continuous potential output series from 1966 to 1987 because of a structural break in the labour force participation equation. Evidence for the structural break in the latter half of 1984 was given in a previous paper (Peters & Petridis, 1985, p.54). After 1974 both the full-time and part-time coefficient were lower - considerably lower in the case of full-time employment.

3. The equations for the unemployment rate were reduced form equations from (a) a non-market clearing (Keynesian) model and (b) a search-turnover model.
4. The estimating equations are not reported. The labour force participation equation was satisfactory but the statistical properties of the output equation were not up to normally acceptable standards. However, we considered that series generated from these equations could support the broad comparisons made in the text.
STATISTICAL APPENDIX

Column Headings for Data Listings:

1. Potential Output (gross non-farm product at constant prices in $ million).

2. Output Ratio (ratio of actual to potential output).


4. Employment Ratio (ratio of actual to potential employment).

5. Productivity Ratio (ratio of actual output per employee to Potential Productivity, i.e., Potential Output/Potential Employment).

6. Working-Age Population for non-farm sector (in thousands): total working-age population less farm employment (employment in Agriculture and Agricultural Services).

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Data Sources:
Data for the labour force, working-age population, employment and unemployment are from *The Labour Force, Australia*, ABS Catalogue Nos. 6303.0 and 6304.0. Output is the series of gross non-farm product at constant prices in the Historical Supplement to the December Quarter, 1986 and the June Quarter, 1987 of *Quarterly Estimates of National Income and Expenditure*, ABS Catalogue No. 5206.0. Seasonally adjusted series were used for the Labour force, employment and output. The farm employment series were independently seasonally adjusted.
References


