Labour Market Programs and the Australian Beveridge Curve: 1978 to 1996

Elizabeth Webster

Melbourne Institute of Applied Economic and Social Research
The University of Melbourne

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Melbourne Institute of Applied Economic and Social Research
The University of Melbourne
Parkville, Victoria 3052 Australia

Telephone **(03) 9344 5288**
Fax **(03) 9344 5630**
Email **r.qin@iaesr.unimelb.edu.au**

WWW Address **http://www.ecom.unimelb.edu.au/iaesrwww/home.html**

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Publications

Melbourne Institute of Applied economic and Social Research

The University of Melbourne

Parkville, Victoria 3052, Australia

Tel: +61 3 9344 5330

Fax: +61 3 9344 5630

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Abstract

Labour market programs are often advocated on the basis that by re-introducing unemployed people to the culture of the workplace, they will re-skill and motivate them enough to make them suitable employees to prospective employers. Accordingly total employment will rise and vacancy rates will fall. If successful, we should be able to detect a systematic relationship between labour market program expenditure and the distance of the Beveridge curve from the origin *ceteris paribus*. There are few studies in the world which have directly tired to assess the impact of labour market program expenditure on the Beveridge curve. Our estimates for Australia over the last 18 years do not support the view that labour market programs have moved the Beveridge curve inwards, that is there is no evidence that they lead to an expansion of aggregate employment.

Introduction

Policy makers promote labour market programs on the basis that they will re-skill and motivate the long term unemployed and thus introduce a pro-employment hysteresis into the labour market.[1] It is hoped that this process will either shift the Beveridge curve inwards or reduce the sensitivity of wage inflation to aggregate demand pressures. Both mechanisms are a response to an apparent tendency since the 1960s for product market pressures to be expressed as labour market bottlenecks and nominal wage rises rather than higher employment.[2] This paper addresses the first aspect of the problem. For reasons of data quality, the empirical analysis has been restricted to the period since 1978.[3]

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[1] See Layard, Nickell & Jackman (1991), Chapman (1993), Chapman (1997).

[2] There is limited microeconomic analysis of vacancies across firms, but a recent UK study by Holzer (1994) has found that higher vacancy rates are found in industries with above average wage rates.

[3] Since 1978 we have had consistent survey based data collections of unemployed over 52 weeks and vacancy levels. Unlike many overseas data which depend solely upon formal contact with government job centres or 'help wanted' indices, Australian vacancy data since 1978 are derived from a stratified sample of about 5000 firms. Firms are asked for the number of unfilled positions they have on a given day each quarter which had not been filled. They must be jobs available to any one outside the firm for which action such as, newspaper advertising, a notice the windows, word of mouth or contact with a recruitment agency, has been undertaken. Data prior to November 1983 were based on a sample of 3100 firms drawn from Payroll tax records. This excluded very small firms. Data before this period have been adjusted upwards by 1.5759 to compensate for under-enumeration based on numbers record

There is some doubt that the Australian Beveridge curve has shifted outwards, at least since 1978 however data limitations make it is harder to test for earlier years. It is quite possible that current vacancy rates are purely frictional and we have been moving along the flat portion of the hyperbola for the last 20 years. In this paper we will try to identity which factors may have influenced the position of the Australian Beveridge curve and whether Commonwealth Government labour market programs have had any influence in moving it inwards. It has been argued that the experience of prolonged unemployment so de-skills and de-motivates a person, that employers would rather continue to advertise a vacancy and search than use them to fill the position. It is reasoned that the experience of participating in a labour market program, may restore or instil the confidence and prudent work habits which the 'unsuitable job seekers' lack and thus make them desirable employment options. Vacancy rates, for given rates of unemployment, will accordingly, fall.

A test of this hypothesis amounts to testing for whether labour market programs have shifted the Beveridge curve inwards, regardless of whether the curve has shifted out over time or not. To do this requires us to model the Australian Beveridge curve. We will argue below that since both unemployment and vacancy rates are endogenous variables to the economy, they should be modelled as a set of simultaneous equations. Many studies model the relationship as a single equation, an application which can produce biased and inconsistent estimates.[4]

We have found that when we estimate the relationship this way, the results do not provide evidence that labour market program expenditure per unemployed person has caused the Beveridge curve to shift inwards. There is some evidence though that a rising incidence of long term unemployment[5] and higher unemployment payments relative to wages may cause the curve to shift out. However, as with all empirical work, the results are indicative, not definitive, and complementary forms of analysis are required to determine their validity.

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via both survey methods in November 1983. Unemployment data is based on the ILO definition and is derived from a stratified sample of households.

[4] See Harper (1980), Jackman, Pissarides & Savouri (1990), Christl (1992: 105). Recent overseas estimates use the instrumental variables techniques but they do not derive the estimating equation from a set of simultaneous equation and give little explanation for their regressors in their choice of instruments.

[5] Following the ABS, the incidence of long term unemployment is the portion of long term unemployment of total unemployment. The rate of long term unemployment is the portion of long term unemployment expressed as a portion of the labour force.

Has the Australian Beveridge curve shifted?

Similar to their overseas counterparts, Australian economists have discussed the apparent tendency since the early 1970s for the trade off between unemployment and vacancies to worsen.[6] That is, given the level of economic activity (or our position on the normal trade cycle), the unemployment rate is higher for given vacancy rates. Most often this change has been described as an incremental outward shift in the Beveridge curve. This curve plots the level of unemployed per member of the labour force against the level of vacant jobs per member of the labour force at defined dates.

To illustrate this process we will describe variations in the vacancy and unemployment rates since 1978. To avoid confusion with changes in the trade cycle we will confine our discussion to high growth periods indicated by a low unemployment to vacancy ratio. Since 1978 there have been three main periods of relatively high activity. The first period ran from early 1978 to April 1982; the second, from April 1985 to October 1990; and the final period began in October 1994 and is still underway (see Figure 1).

[6] See various issues of the *Australian Bulletin of Labour* during this time.

Figure 1

Source: ABS PCAUSSTATS. Vacancy data before 1984 has been adjusted up by a factor of 1.5759 to account for the change of survey method in November 1983.

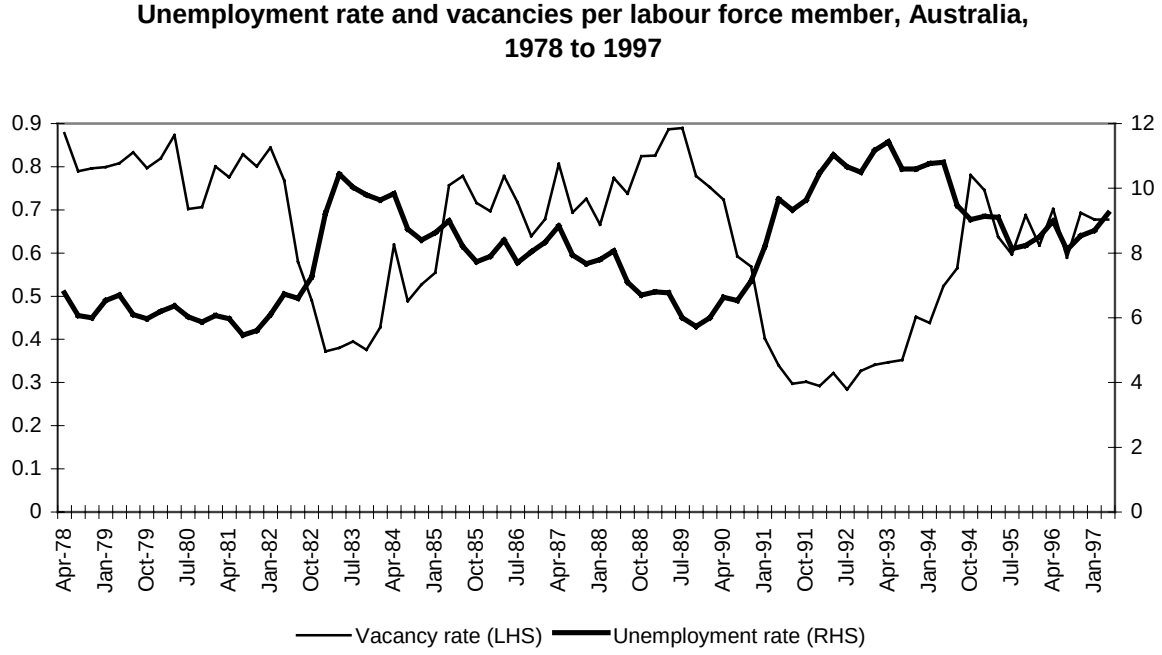

Figure 2

Source: ABS PCAUSSTATS. Vacancy data before 1984 has been adjusted up by a factor of 1.5759 to account for the change of survey method in November 1983.

If we examine the vacancy and unemployment rates in Figure 2, it can be seen that the gap between the vacancy rate and the unemployment rates have progressively narrowed over successive high activity periods. Regressing the unemployment rate on the vacancy rate and a trend yields a positive and significant estimate for the time coefficient. This estimate implies that the rate of unemployment for given rates of vacancies is rising by about 0.8 percentage points every decade. However, it is also apparent that during each economic upturn, it is the higher unemployment rate which gives the impression of a worsening trade-off, for vacancy rates reach a similar level during each boom.

Current job duration and vacancy rates, Australia, 1978 to 1996

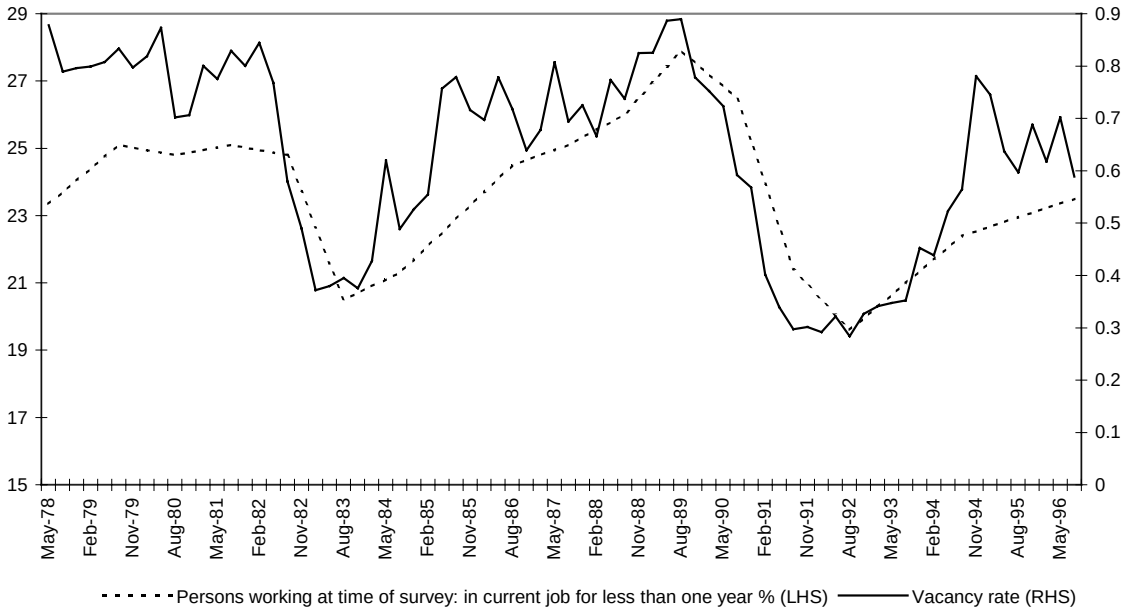

Figure 3

Source: ABS cat. 6209.0 various issues.

To test whether these vacancies are primarily frictional rather than a growing pool of hard-to-fill positions, we have charted the vacancy rate against a measure of gross job creation (see Figure 3). The latter measures the portion of the workforce who took up at least one new position during the previous twelve months. It is the filling of a new position or an existing position which has been vacated by the incumbent, that gives rise to a vacancy. A casual inspection of this graph indicates that it is quite plausible to suppose that a large portion of vacancies since 1978 are those associated with gross job creations (including existing jobs which are filled with

a new employee). While there does appear to be some short term excess of vacancies during cyclical upswings, there has not been a positive trend in excessive vacancies. Very crudely we can say that during 1996 there were 11 vacancy days for every person who took up a new job. While this seems rather quick, it may mask a significant pool of recalcitrant vacancies. Unfortunately Australia does not collect comprehensive data on vacancy durations.

If we accept that vacancies are currently and have been for some time at their minimal frictional level, then it is unlikely that labour market programs will have any effect on the speed at which they are filled and thus the aggregate employment level. Unless we invoke a Say's Law type of effect, there can be little reason why programs to make the unemployed more employable will increase the process of job creation.

Nevertheless, it is probably premature to rule out entirely the possibility that the Beveridge curve has shifted, especially given the results of Beveridge curve studies prior to the 1970s (see below). The unemployment rate is still more highly correlated with the vacancy rate than the current job duration data presented above and the former appears to have greater explanatory power in regression estimates. Moreover, earlier work by Hughes (1974) and Harper (1980) does find some evidence of a deteriorating Beveridge curve around either 1972 or the late 1960s.

Vacancy data prior to 1978 is less reliable than the data set we use being based largely on Commonwealth Employment Service (CES) notifications, but still provides information content. With the exception of the short 1973-74 boom, this data shows that the gap between the unemployment and vacancy rates at each period of high economic activity have also grown since 1966 (see Figure 4).

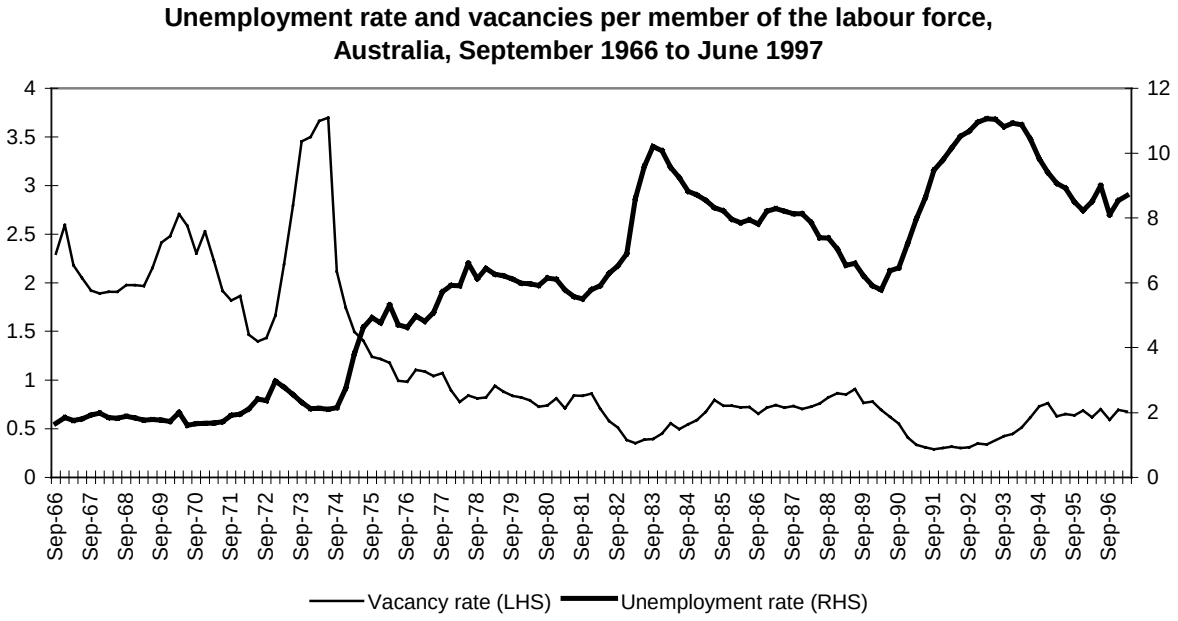

Figure 4

Source: NIF database, Econdata (DX).

The changing profile of vacancies and the unemployed

In terms of understanding why the vacancy unemployment relationship may change over time it is important to have some knowledge of who the unemployed are and what are the jobs that they are, in general, thought unsuitable for. We will again confine our discussion to the three identified high activity periods. During the high activity period from 1978 to early 1982, the unemployed were mainly tradespeople and related workers, former workers who had not worked in the last 2 years, new labour force entrant and sales, sport and service workers.

During the second high activity period which covered the last part of the 1980s, vacancy rates were almost as high as the late 1970s and recorded over-time was high. Most vacancies were for trade, professional para-professional workers.[7] Unemployment was concentrated among former workers, labourers and related workers, new labour force entrants and sales and personal service workers. Long term unemployment (those who reported they had been unemployed for over 52 weeks) was much higher than the first period and was over whelmingly concentrated in former workers.[8]

[7] See the Skilled Vacancy Survey, various issues, DEETYA.
[8] See ABS The Labour Force, cat 6203.0, various issues.

In the current high activity period, vacancy rates have been nearly as high as earlier two periods. Most vacancies have been for professional, trade and para-professional workers.[9] However, unlike the 1980s, recorded over-time rates have been low. Despite these high vacancy rates the unemployment rates have been well above the previous two high activity periods. Similar to the last period, unemployment has been concentrated among former workers, new labour force entrants, and labourers and related workers, for the first time unemployment has been high among tradespeople. Two thirds of the long term unemployed are former workers. [10] This is likely to be due to high retrenchment levels and rates for these groups. Since 1990, labourers and related workers, tradespeople, sales and personal service workers and plant and machine operators, and drivers have had the highest rates of retrenchment and account for about three quarters of all retrenchments. [11]

Despite, the apparent growth in vacancies for skilled workers, there has been an equivalent growth in the numbers of unemployed skilled workers, that is people who cited their last job as being in a managerial, administrative, professional, para professional and trade jobs. This is confirmed by the more limited data we have on the educational background of the unemployed. Between 1976 and 1996, there has been a growth in both the absolute number and the proportion of unemployed people who hold some form of post-school qualification (see Table 1). During 1996, the number of unemployed people with post-school qualifications appeared to greatly outnumber the level of job vacancies for skilled workers.[12] This rise has been due to the general increase in educational attainment across the board however for unemployment rates remain negatively correlated to ones level of formal education.[13]

[9] See the Skilled Vacancy Survey, various issues, DEETYA.
[10] See ABS The Labour Force, cat 6203.0, various issues.
[11] ABS cat 6255.0, February 1994.
[12] Our data on skilled vacancies are taken from monthly counts of newspaper advertisements and are thus not the full enumeration we would expect from a firm based survey. Nevertheless, even after accounting for the likely under-estimation of skilled job vacancies, there are more skilled workers without a job than vacancies for them.
[13] See ABS cat. 6227.0 various issues.

Table 1. Persons looking for work by duration of unemployment and educational attainment

Unemployment duration under 26 weeks

		Post school qualifications	No qualifications				Total
			year 12 only	age left school 17/16	age left school under 16	Still at school	
May-76	**'000**	**35.3**	**21.7**	**34.1**	**77.2**	**20.9**	**189.2**
	%	*18.7*	*11.5*	*18.0*	*40.8*	*11.0*	*100.0*
Jun-86	**'000**	**89**	**43.7**	**60.2**	**64.5**	**35.3**	**292.7**
	%	*30.4*	*14.9*	*20.6*	*22.0*	*12.1*	*100.0*
Jul-94	**'000**	**108**	**69**	**73.5**	**68**	**25.7**	**344.5**
	%	*31.3*	*20.0*	*21.3*	*19.7*	*7.5*	*100.0*
May-96	**'000**	**138.2**	**97.0**	**.....**	**167.4**	**.....**	**441.6**
	%	*31.3*	*22.0*	**.....**	*37.9*	**.....**	*100.0*

Unemployment duration 26 weeks and over

		Post school qualifications	No qualifications				Total
			Year 12	Age left school 17/16	Age left school under 16	Still at school	
May-76	**'000**	**7.7**	*****	**10.5**	**28.1**	**3.6**	**49.9**
	%	*15.4*	***	*21.0*	*56.3*	*7.2*	*100.0*
Jun-86	**'000**	**59.4**	**28.7**	**49.6**	**100.5**	**28.3**	**254.8**
	%	*23.3*	*11.3*	*19.5*	*39.4*	*11.1*	*100.0*
Jul-94	**'000**	**123.8**	**71.0**	**97.7**	**123.1**	**12.5**	**429.6**
	%	*28.8*	*6.5*	*22.7*	*28.7*	*2.9*	*100.0*
May-96	**'000**	**92.2**	**64.2**	**.....**	**189.4**	**.....**	**314.5**
	%	*29.3*	*20.4*	**.....**	*60.2*	**.....**	*100.0*

Source: ABS cat. 6235.0. 1979, 1986, 1994, cat. 6227.0 1996.

* too small too report

Existing literature

Outward shifts in the Beveridge curve have been found in other OECD countries as well as Australia.[14] Studies have found outward (and occasional inwards shifts) in the UK, USA, France, Belgium Austria and West Germany, but no shifts in

[14] See Layard, Nickell & Jackman (1991).

Sweden and the Netherlands. The most popular way to estimate this relationship during the late 1980s and early 1990s has been to define an equation based on the theories of job search and job and worker matching and then estimate it as a single equation using an instrumental variable in lieu of the vacancy rate. Common shift parameters include measures of the proportion of long term unemployed in total unemployment (to represent skill hysteresis or loss of job search skills), the unemployment benefits to wage ratio (to represent job search intensity) and mismatch variables (to represent regional or occupational mismatch). Recent studies in the UK (Budd, Levine & Smith 1988, Layard, Nickell & Jackman 1991), Austria and Australia have found the proportion of long term unemployment to be a major explanatory shift factor. However, another UK study by Jackman, Layard & Pissarides (1989) did not find it significant. A summary of these studies is presented in Table 2.

Table 2. Summary of some empirical estimates of the Beveridge curve.

Author(s)	Countries	Period	Method	Shift variables	Results
Jackman, Pissarides &Savouri (1990)	14 OECD incl. Australia	1970-88	2SLS	LMP, RR, BD,	LMP is significant and negative, RR and BD are significant and positive.
Jackman, Layard & Pissarides (1989)	UK	1967-87	IV	LTU, RR, MM, SR, time, GD	SR, GD and time significant and positive, LTU, MM, RR not significant
Layard, Nickell & Jackman (1991)	UK	1968-88	OLS	LYU*, MM, lagged U, S, time	LTU*, time, S significant.
Fahrer & Pease (1993)	Australia	1979-92	IV	LTU*, MM, time, RR, OG, S	LTU* and time significant
Connolly (1996)	Australia	1979-96	OLS	LTU, GDP, UB, ULC, LOAN	LTU marginally significant and positive, GDP & UB, significant and positive, ULC & LOAN significant and negative
Hughes (1987)	Australia	1962-79	IV	lagged V/L, RR, I, LTU, S	RR, LTU, S are positive and significant. I not significant.
Harper (1980)	Australia	1952-78	OLS	Lagged values of U/L, V/L, S	Lagged values, S significant.
Withers & Pope (1985)	Australia	1948-92	OLS	lagged values of U/L and V/L, RR, S, I	Lagged values, S and RR significant and correct sign. I is not.
Blanchard OJ & Diamond P (1989)	USA	1952-88	OLS, AR1, IV	Labour force shocks, reallocation shocks, agg activity shocks, time	Labour shocks important
Budd, Levine &	UK	1966-82	IV	LTU, RR,	LTU significant, time significant and

Smith (1988)				GD, MM, time	negative, RR, MM and GD not significant
Christl (1992)	Austria	1966-87	OLS, IV	LTU, RR, MM, VD, GD	LTU significant, some MM significant.

where LTU are variables which reflect the prominence of long term unemployment in the labour market. LTU* is a transformed index of unemployment duration.

S are seasonal dummies

GD are dummies due to institutional and regulatory changes

RR is the replacement ratio of unemployment benefit (some but not all studies allow for taxes)

BD duration of unemployment benefits

LMP is expenditure on labour market programs

SR is separation rates

MM are mismatch indices

OG is the output gap

I represents immigration

ULC is unit labour costs

UB is real unemployment benefits

LOAN is consumer loan affordability

This literature however says little directly about the effect labour market programs may have on the Beveridge curve. Many labour market programs will reduce the relative proportion of long term unemployment merely because placing these people in an employment based program re-sets their duration counts. However, econometric relationships between the past behaviour of long term unemployment and the Beveridge curve may not hold in the future if the new short term unemployed are merely re-cycled long term unemployed.[15] Put another way, short duration labour market programs may not make people with poor work career histories as work ready and suitable for the hard-to-fill vacancies as 'normal short term or frictional' unemployed.

Accordingly, even if we accept the hypothesis that there has been a rising level of hard-to-fill vacancies, we must be wary about inferring that if a rise in the portion of long term unemployed is associated with an outward movement of the Beveridge curve, then labour market programs which are believed to reduce this portion will cause it to shift inwards. Labour market programs may not reverse the damage to people's informal labour market skill.

[15] Under the ABS Labour Force Survey, duration counts are re-set if a person has had at least two weeks full-time work.

There is some merit in testing for whether the Beveridge curve is sensitive to aggregate labour market expenditures. However, studies which have followed this approach are particularly scarce. In a study which spanned 14 countries including Australia, Jackman, Pissarides & Savouri (1990) tested successfully for this sensitivity. Unfortunately they did not include the portion of long term unemployed as a regressor.

There are a limited number of papers which have sought to estimate the Beveridge relationship for Australia. Harper (1980) estimated the relationship for the period 1952 to 1978 in log form as a single OLS equation. Apart from the lagged vacancy and unemployment rate variables the only significant variable was the level of real unemployment benefits. However he notes that there is still a 'good deal of structural shift in the relationship which is not explained by increasing unemployment benefits'.[16] This sentiment was expressed earlier by Hughes (1975) who thought falls in immigration could reduce the speed at which vacancies were filled and could explain shifts in the Beveridge curve. However, given the international nature of the changes we are dealing with, the immigration explanation, to the extent it is validated, is likely to be a superficial or derived cause of the true primary cause we are seeking.

Withers & Pope (1985) reproduced Harper's work using unpublished immigration data but did not find evidence that immigration (using several different measures) had any causal effect on the Beveridge curve. However, they note their concern with specification errors and the fact that the model focuses on frictional and structural unemployment to the exclusion of cyclical unemployment. In their quest for an explanatory relationship for unemployment, they discard the general Beveridge curve mismatch approach. Hughes (1987) using some simulated data found the Beveridge curve sensitive to the incidence of long term unemployment, and the replacement ratio. While he did not find convincing and consistent evidence that migrations had an effect, he did find some evidence that non-British male arrivals could have shifted the curve inwards.

Following Layard, Nickell & Jackman (1991), Fahrer & Pease (1993) estimated the relationship effectively using the proportion of long term unemployed as a regressor. The approach involved first estimating equations for the labour market

[16] Harper (1980: 241). The CUSUM and CUSUM SQUARED tests revealed some instability around 1962 and 1973.

flows between employment, unemployment and out-of-the-labour force and then using these estimated relationships to derived the stock U:V relationship. The main (successful) explanatory variable for the rate of employment hires is an index based on the current distribution of unemployment across the unemployed which has similarities to the rate of long term unemployment. However, if employers prefer to hire the short term unemployed in preference to the long term unemployed (a preference widely supported by the empirical data), the current incidence of long term unemployment can be endogenous to the rates of in- and outflow to unemployment and these results should be treated with caution. We discuss this difficulty in the appendix.

Leeves (1997) estimates a version of the Layard, Nickell & Jackman relationship but he more carefully lagged the long term unemployment variable. However, he does not extend this to a Beveridge curve analysis and we are thus unable to estimate the extent of 'displacement' caused by labour market programs. Finally, Connolly (1996) estimated the Australian Beveridge curve as a single curve. He did not include labour market program expenditure as an explanatory variable but found GDP, real unemployment benefits, real labour costs and consumer loan affordability significant variables.

The relationship: theory

To test the sensitively of the Australian Beveridge curve to labour market program variables requires us to define and estimate the relationship anew. We will begin by defining two simple relationships: the Beveridge curve and an economic activity curve.

The Beveridge Curve

If jobs and labour are homogeneous and the matching service is instant and costless then the Beveridge curve (which we define here as vacancies per labour force member and unemployed per labour force member), follows the two axis. We will never have vacancies simultaneously with unemployed persons and vice versa. If the matching service takes a given defined period, because of the cost-time trade-off associated with search, advertising, screening and recruitment, then the Beveridge

curve forms the right angled line *aa* (see Figure 5). The distance of *aa* from the two axes represents the level of frictional vacancies or unemployment respectively.

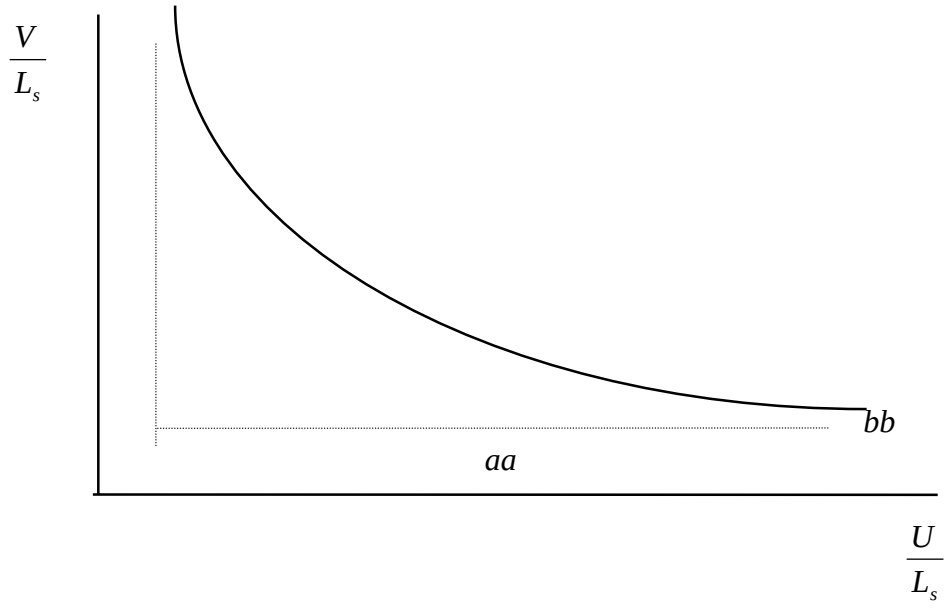

Figure 5

If, in addition to this, jobs and labour are heterogeneous, then the curve changes shape and loosely speaking flattens to form *bb*. The greater the disparity between the long and short side of the market, the faster will the scarce job or worker find a match because there is more likely to be a specific worker or job on the long side of the market which meet his/her specific requirements. Accordingly, at the extreme points of the curve, *bb* is likely to meet the homogenous jobs/labour curve, *aa*.

The activity curve

Several functional forms have been suggested to represent the *bb* curve, and most commonly people have used a hyperbolic or logarithmic relationships. However, to estimate this curve and accordingly to ascertain why it has shifted outwards over time, requires another relationship. Where the economy lies on the Beveridge curve depends on the level of aggregate economic activity. Since the mid-1970s the trend level of activity has been below full capacity or full employment, but trade cycles have continued to move the economy up and down the curve.

We will use two identities to describe this 'activity' relationship:

$L_d = E + V$

$L_s = E + U$

where L_d = total demand for labour

L_s = total supply of labour

E = total employment

V = total vacancies (as measured by firm-based survey)

U = total unemployed persons (as measured by a household survey).

Rearranging and dividing by L_s gives:

$$\frac{V}{L_s} = \frac{L_d - L_s}{L_s} + \frac{U}{L_s}.$$

The first term on the right hand side represent the degree to which the economy is operating at full capacity. Graphing this equation gives us a straight line and together with the Beveridge relationship discussed above, a determinant rate of vacancies and unemployment. A rise in the level of relative economic activity will cause the *cc* function to shift left and depending on both the matching technology and the degree of heterogeneity of jobs and labour, a rise in vacancies and fall in unemployment. Any movement along the line *cc*, in figure 6, indicates a change in the matching technology and heterogeneity of jobs and labour, for a given relative level of economic activity. A fall in matching technology and rise in heterogeneity will shift the *bb* curve outwards and cause both the vacancy and employment rates to rise for a given relative level of economic activity.

One advantage of including the activity relationship in our Beveridge curve estimates is that it implicitly holds the contribution to aggregate activity from the government sector constant as we vary the level of labour market program expenditures. Thus it provides a counterfactual, albeit rough and ready, for a change in the level of government spending on labour market programs. That is, it assumes that variation in the level of labour market program expenditures comes at the expense or to the benefit of other form of government expenditure.

Both the Beveridge and activity curve relationships are steady state, in the sense that they represent the frictional-cum-structural level of vacancies and unemployment which would arise at a given level of relative economic activity and given matching technology and heterogeneity in the labour market. A transitory change in either labour demand and/ or labour supply will be expected to cause a short term departure from these curves for the same reason a change in stock levels is

associated with a once-off rise or fall in flows.[17] Two regular but brief rises or falls in demand or supply include the normal movement in the trade cycle and the large entry into the labour market from the education system during the first quarter of each year. Where the matching technology is such that jobs and people were instantly matched then this temporary effect would disappear. However, this is clearly not the case in reality.

A short run rise in aggregate demand may be shown graphically as a temporary shift in the Beveridge curve from *bb* to *b'b'* as the ability of the job and worker matching services are temporarily swamped by additional jobs; and a permanent increase in the function *cc*. The economy to move first from ***A*** to ***B*** and then as the Beveridge curve subsides, from ***B*** to ***C***.

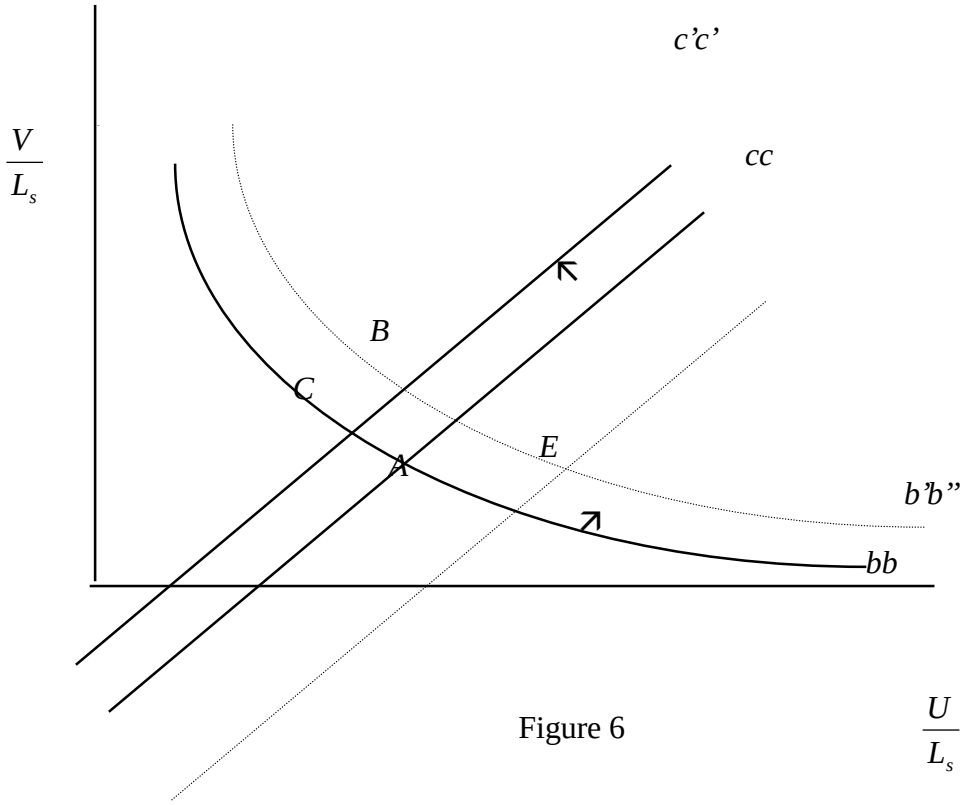

Figure 6

To cater for these temporary excursions, we should include in the Beveridge relationship, a variable to represent the effect of changes in economic activity.

The effect of a temporary rise in new entrants to the labour force can be analysed along similar lines. The temporary rise in the flow rate into the labour force

[17] This assumes that we move smoothly from one equilibrium position to another and that the transition is not path dependant, such that movement off the curve causes the curve to shift itself. We test for this in part by testing for whether the U:V curve shifts as a result of a greater incidence of long term unemployment.

will for the same reason outlined above cause a temporary rightward displacement of the *bb* curve but will also temporarily shift *cc* right, for clearly $\frac{L_d - L_s}{L_s}$ has fallen in this period (there being no reason for a seasonal rise in L_d as well). The economy will experience a seasonal shift from ***A*** to ***E*.**

To summarise our position so far; the observed pairs of unemployment and vacancy rates are the outcome of two relationships, first the Beveridge curve whose steady state shape and distance from the origin is determined by the contemporary matching technology and the degree of heterogeneity within the pool of workers and the pool of jobs. Short term excursions from this curve occur when there are transitory rises (or falls) in the flow rate of jobs or job seekers due to either trade cycles or seasonal entrants to the labour force from schools etc. Second, the economic activity function which determines the overall level of tightness of the labour market. This tightness is expected to suffer from short term slackening during the high season period for new entrants from the education system.

Deriving proxy variables for the shift parameters

The Beveridge curve

To avoid convoluted reduced from equations we have chosen to model the structural relationship for the Beveridge curve in linear form.[18] Specifically we assume

(1) $$\frac{V}{L_s} = -\alpha_1 \frac{U}{L_s} + \alpha_2 MH + \alpha_3 TC + \alpha_4 S + \varepsilon_1$$

where MH = variables to represent the matching and heterogeneity of the labour market

TC = is change in the level of economic activity.

S = seasonal dummy for normal time of entry for school leavers

α are coefficients and ε_1 is the disturbance term.

Economic theory suggests several factors which may affect matching and heterogeneity.

Matching efficiency

[18] An early attempt to use a logarithmic function did not appear to affect the significance and overall results of the equation and so it was not considered worth pursuing this type of function further.

We have identified four major factors which may affect the efficiency of matching technologies.

First, the firms' cost-time trade-off for advertising, screening and recruitment of new workers. While this may have improved over our time horizon due to the increased usage of computers and private employment services, we have not attempted to measure this other than to assume it may be captured in the time trend.

Secondly, government subsidies towards matching. Government expenditures on special placement services has been included to represent this. These services, which have been funded since 1989, include SkillShare, JobSearch Training Programs (ie Job Clubs), Special Intervention Program and Employment Assistance Australia.[19] Experimental evaluations conducted in the USA during the 1980s found that job search assistance reduced the length of unemployment by between 0.5 to 4 weeks. However, this may have been at the expense of other job seekers.[20]

Thirdly, how uncertain firms are about the risks they believe they will bear under the proposed employment relationship. Depending on the content, the introduction of employment protection laws may heighten the risk employers feel they may bear upon appointing some-one. Jobs which require labour who is suitable for training and positions which have significant externalities within the firm, all increase the costs to the firm of employing an unsuitable person. It may be preferable to continue to search for the 'right' person than hire some-one who appears doubtful. A routine process worker who is inept will do less damage than some-one who is in charge of complex capital equipment or is supervising other people. While this factor may have become important the difficulties of measuring this has precluded it from the econometric analysis.[21]

Fourthly, the pecuniary and non-pecuniary incentives for the unemployed to accept a position. This affects how quickly the unemployed will seize upon a job possibility. It is difficult to get variables to measure these type of factors and we have had to use rather crude indicators. We tried several measures of the replacement ratio, all with the same results and so only one measure has been reported. These included

[19] Data are provided in Webster (1997: appendix).
[20] See Björklund & Regnér (1996).
[21] However, to the extent that a growth in these forms of complex jobs has accompanied the growth in skilled jobs then the measure we employ to account for growing skill heterogeneity will capture this effect.

several combinations of actual unemployment benefits per client, the maximum level of unemployment benefits per client, an index of all award wages and a measure of minimum award wages. [22] Not only will this reflect the economic gain one can expect from taking a job, but the actual level of benefits per client also reflects changes to the incomes test and effective marginal tax rates. When the income test is loosened or activity tests strengthened (as it did under Newstart in 1989 and in 1994/95[23]), the unemployed are more likely to take up part-time jobs and have their benefits reduced accordingly.[24]

The relative incidence of long term unemployment [25] may indicate greater economic desperation but may also, following the 'hysteresis' theories, indicate a more de-moralised, less work ready and less search efficient pool of jobseekers. For reasons discussed in the appendix, we have lagged this variable by one period to eliminate possible endogeneity. Higher immigration rates may also indicate a greater incidence of economically desperate job seekers. Because it takes some time for a new immigrant to become an active labour market participant we have lagged this by two quarters. This lag should also remove the likely effect the unemployment rate has on Government immigration policies and emigration.[26]

Heterogeneity of labour and jobs

The existence of heterogeneous labour and jobs could imply that for some reason the unemployed are unsuitable for the available jobs. Conventional occupational mismatch is a frequently cited form of unsuitability, but over the past decade it has been common to argue the experience of prolonged unemployment, rejection and lack of work experience has made many unemployed unsuitable for any work. It is difficult in Australia to get detailed enough data on the unemployed and vacancies to measure whether or not occupational mismatch, in the traditional sense, has increased. However, in aggregate there is no shortage of skilled labour. During

[22] It is possibly more relevant to use one of the minimum award wages here but because of easily available data we have not pursued this option.
[23] According to Saunders (1995; 57). Marginal tax rates declined from 100 to 70 or 80 per cent over a broad range of incomes. Work tests were also introduced for partners without children under 16 years.
[24] The Commonwealth Government White Paper on Employment and Growth 1994, estimated that easing of the income test would induce an extra 33 000 unemployed into part-time work and existing part timers on benefits to incurred their hours.
[25] The portion of total unemployed who have been unemployed for over 52 weeks.
[26] Withers & Pope (1985) find a positive relationship for this. It is also observable if we view the data, see Figure 7.

most of 1997 there was a stock of about 60 000 vacancies at any point in time and about 127 000 unemployed person whose last job had been in one of the four skilled ASCO occupations.[27] Accordingly, even if all the available vacancies had been for skilled workers there is clearly not an aggregate shortage of skilled labour. However, aggregate data may mask important structural mismatches between specific occupations.

Over the past 20 years it is possible that heterogeneity may have risen for several reasons.

First, labour supply institutions may have failed to adjust as quickly to demand as they had in earlier decades. This includes the standard labour supply institutions from the training, education, and immigration fields as well as the internal adjustment mechanisms offered through relative wage changes and employment opportunities. It is hard to get reliable and quantifiable evidence for institutional variations but from what we know about the education, training and wages setting institutions, they do not appear to have become *more* rigid and less responsive to labour market pressures in the last 20 years than previous decades. An increased flexibility will show up in our regression analysis as a negative time trend. It is possible however to proxy the contribution of immigration to labour market flexibility for econometric estimation, with the immigration rate.

Secondly, there may be more heterogeneity in the workplace due to the growth of more specialised and sophisticated occupations. The unskilled are relatively homogeneous but many skilled occupations cannot ordinarily be substituted for another. Measuring this effect is also difficult but we have tried to approximate it by the portion of skilled workers in total employment.

Thirdly, the experience of unemployment, rejection and lack of a developed work culture may so de-motive and de-skill the person, that an employer would rather continue to advertise that vacancy, import, contract off-shore, replace by automation or poach a worker already in employment (and in so doing put upward pressures on wages) than hire him or her. This process, which represents one of the path dependent hysteresis effects, does not merely state that an employer will hire a long term unemployed person last; but the they will not hire them at all. Accordingly both

[27] Data on the unemployed by qualifications less frequent but during 1994, 200 000 unemployed persons had some form of post-school qualification.

vacancies and unemployment are higher than in the former case and the Beveridge curve shifts out.

There is some evidence that the long term unemployed are discriminated against in the hiring decision. A Melbourne Institute Survey of Staff Selection and Recruitment (1996) found that about one in five employers would have some doubts about employing some-one who had been unemployed for over 12 months. However, this evidence is also consistent with the labour queue version of the labour market, which holds that labour is hired in rank order according to a set of desirable characteristics.

It is common to use the ratio of long term unemployed to total unemployed as a measure of the level of de-skilled and de-moralised workers but special care is required in econometric estimation because under certain (empirically verified) hiring preferences rules such as, changes to the level of unemployment and the rate of hiring will lead to certain predictable effects on the rate of long term unemployment. The hysteresis theory, which explains an outward shift in the Beveridge curve implies the incidence of long term unemployment causes the rate of unemployment to rise and the Beveridge curve to move out. However, hiring rules which give preference to the short term unemployed can lead to the reverse causation. To clearly distinguish the two effects we have used the lagged rate of long term unemployment as a regressor for this should preclude the latter effect. This issue is discussed further in the appendix.

Fourthly, if a poor work history has rendered many unemployed people unsuitable for vacancies, then employment and placement based labour market programs may reverse these de-skilling de-moralising effects. Effectively the government is trying to instigate positive hysteresis. If successful, much of this effect may be felt via a reduction in the numbers of long term unemployed. A former long term unemployed labour market program participant becomes so confident and work ready that they move from the labour market program into relatively hard-to-fill open employment.

However, if the labour market program is not successful, it may be expressed in several ways. It may move a person from long term unemployment into short term unemployment, for the effect of an employment based program and a placement program which is successful in achieving at least two week full-time work for the participant, is to re-set the duration counts on unemployment. Alternatively, it may

displace from easy-to-fill employment some-one else who now becomes short term unemployed, out-of-the-labour force or medium term unemployed. Thus as an almost automatic consequence of the operation of a labour market program, we expect to find the incidence of long term unemployment falling.[28]

Essentially what we are saying is that the incidence of long term unemployment is not a perfect measure of the portion of the pool of unemployed who are, for some reason, considered unsuitable by employers. The nature of the way duration counts are determined means that not all people who are still deemed unsuitable by employers will be recorded as long term unemployed. Now these sort of inaccuracies are common enough and part of the normal use of summary data to measure fuzzy concepts and it is not usually a problem in errors are unbiased. However, the existence of employment and placement based labour market programs suggest that a systematic bias is likely if the programs have not been effective in making the long term unemployed 'suitable' for the harder-to-fill vacancies.

Consequently, if labour market programs are not effective, then we expect that the incidence of long term unemployment will understate the true portion of 'unsuitable ' labour and thus we expect to get a positive coefficient on the labour market program variables (not because the labour market program causes the Beveridge curve to shift out but because it leads to an understatement of the true effect of long term unemployment on the curve). On the other hand, if labour market programs are effective in shifting the Beveridge curve inwards, then the estimated coefficient could well be insignificant if the actual effect is transmitted through the long term unemployment variable.

In our model we have alternately lagged the labour market program variable by one and two periods to eliminate possible endogeneity of Government policy.[29] However, it is possible that this has not been enough to remove the endogeneity. Furthermore there has been a shift in emphasis over the estimation period towards specifically targeting the long term unemployed but this has not been explicitly modelled. Most of this change in emphasis occurred from 1989 which coincided with the introduction of the special placement services, and to the extent that this targeting

[28] The incidence of long term unemployment will not fall if it displaces another to-be-long term unemployed person.
[29] As both alternatives produced similar results we have only shown the single lag results.

has made our labour market programs more effective in shifting the Beveridge curve inwards, then we expect to see it reflected in the special placement services variable.

The activity curve

To represent the second equation, curve *cc,* we assume:

$$(2) \qquad \frac{V}{L_s} = \beta_0 + \beta_1 A + \beta_2 S + \frac{U}{L_s} + \varepsilon_2$$

The first three terms on the right had side represent the relative level of economic activity. Because the activity index which we use for *A* is seasonally adjusted, we have to insert a seasonal dummy *S* to capture the seasonal effect of school leavers on the relative level of economic activity to capacity. Effectively we are assuming that:

$$\frac{L_d - L_s}{L_s} = \beta_0 + \beta_1 A + \beta_2 S \, .$$

Coefficients β_0 and β_1 should crudely reflect changes in rates of labour hoarding, hidden unemployment and the use of imports and offshore production in response to intransigent vacancies. For example, a fall in labour hoarding which may have been associated with fashionable 'corporate down-sizing' and contracting out, will lead to a lower β_0 and thus a higher $\frac{U}{L_s}$.

Estimation results

While the issues of cointegration are important for time series analysis, they appeared to be tangential in our case. While several of our data series are non-stationary it is not due to a unit root process, but rather shifting intercepts and structural breaks. It does not appear feasible (or sensible from an economic perspective) to reduce the data series to a common order of integration (in our case this would be I(0)) and test to see whether the final relationship is cointegrated.[30]

As such, a more traditional simultaneous equations approach was adopted. Australian Beveridge curve studies are dominated by problems of autocorrelation and a common approach has been to include a lagged dependent variables. Both our

[30] This may be why hardly any of the Beveridge curve literature takes a cointegration approach.

reduced form equations indicated some presence of first-order autocorrelation[31] (one equation had a DW statistic in the indeterminate zone and the other was just below it) so we used the generalised difference equation estimation method recommended by Fair (1970) and Pindyck & Rubinfeld (1981) for dealing with simultaneous equations in the presence of autocorrelation. Briefly, Fair recommends that one:

- calculate an instrumental variable by regressing $\frac{U}{L_s}$ or $\frac{V}{L_s}$ on a set of

variables which includes $\frac{U}{L_{s_{-1}}}$, $\frac{V}{L_{s_{-1}}}$, MH, MH_{-1}, A, A_{-1}, TC, TC_{-1}, S, S_{-1},

- re-write the structural equation for the Beveridge curve in generalised difference form
- estimate this structural equation for a given ρ (using an iterative procedure) with the instrument variable by choosing a consistent estimate of ρ..

As there is no clear reason whether $\frac{U}{L_s}$ or $\frac{V}{L_s}$ should be modelled on the left hand side of the equation, we have estimated the relationship both ways. Entering the dependent variable $\frac{U}{L_s}$ or $\frac{V}{L_s}$ as an inverse or log function did not affects sign and significance of the results and for simplicity we left it as a linear function. The results are for estimating structural equation (1) using the vacancy rate on the left hand side Table3.

[31] Estimates for $\rho 2$, $\rho 3$, and $\rho 4$ are absolutely less than 0.12 in both equations.

Table 3.

Dependent variable: Vacancies per labour force member, Australia

Period: 1/78 to 1/96, quarterly data

Coefficient	Estimate (*t statistic)*	Estimate (*t statistic)*	Estimate (*t statistic)*
Constant	-0.46 *(-0.58)*	0.20 *(0.67)*	0.48 *(1.91)*
$\frac{U}{L_s}$ †	-0.10 *(-9.06)*	-0.10 *(-10.84)*	-0.10 *(-11.21)*
$\frac{UB}{AW}$	1.34 *(3.63)*	1.33 *(3.78)*	1.15 *(3.25)*
$\frac{LTU}{U_s}^{t-1}$	0.01 *(2.87)*	0.01 *(4.38)*	0.01 *(3.84)*
$\frac{PA}{L_s}^{t-2}$	0.42 *(1.70)*	0.35 *(1.67)*	
TC	0.01 *(0.79)*		
$\frac{Skill}{E}$	0.03 *(1.00)*		
$\frac{LMP}{U}^{t-1}$	0.001 *(2.31)*	0.001 *(2.66)*	0.004 *(1.95)*
Special placement services	0.001 *(0.59)*		
Time	-0.01 *(-2.93)*	-0.01 *(-4.67)*	0.01 *(-4.24)*
S (seasonal dummy)	0.12 *(6.92)*	0.12 *(7.52)*	0.12 *(7.77)*
Adj. R^2	0.80	0.80	0.75
DW	1.84	1.82	1.84
ρ	0.32	0.33	0.41
n	72	72	72
Method	Prais-Winsten	Prais-Winsten	Prais-Winsten

† instrumental variable

Where *UB/AW* is the maximum level of unemployment benefits paid per client over the award wages index.

(source: NIF10 data base, ABS).

Skill/E represents the share of employment in the three major skilled occupations, managerial & administrative, professional, technical and para-professional. Tradespersons were excluded because it was not possible to estimate their number pre-1986. An adjustment factor was made for the switch from CCLO to ASCO in 1986.

PA is the number of permanent arrivals (immigration) during the quarter.

LTU is the number of persons unemployed for more than 52 weeks

L_s is the labour force.

TC is the change in the level of the Westpac-Melbourne Institute Coincident indicator of economic activity relative to the trend level of the same index for the period 1960-1974. The latter is taken as an indicator of the full capacity of the economy.

S = 1 for the first quarter; 0 otherwise.

LMP is real Commonwealth Government expenditure on labour market programs [32]

Special placement services = Government expenditure on placement programs such as SkillShare, JobSearch Training Programs (ie Job Clubs), Special Intervention Program and Employment Assistance Australia. These began from 1989.

Unless otherwise specified, the data is derived from ABS PC AUSSTATS.

The results for estimating the same structural equation using the unemployment rate on the left hand side are presented in Table 4.

Table 4.

Dependent variable: Unemployed per labour force member, Australia

Period: 1/78 to 1/96, quarterly data

Coefficient	Estimate (*t statistic)*	Estimate (*t statistic)*
Constant	-3.08	-1.55
	(-0.71)	*(-0.41)*
$\frac{V}{L_s}$ †	-8.42	-7.58
	(-13.66)	*(-14.61)*
$\frac{UB}{AW}$	9.46	8.16
	(3.76)	*(3.42)*
$\frac{LTU}{U}_{t-1}$	0.09	0.09
	(3.65)	*(3.97)*
$\frac{PA}{L_s}_{t-2}$	1.95	
	(1.25)	
TC	0.08	
	(1.45)	
$\frac{Skill}{E}$	0.29	0.27
	(2.13)	*(2.11)*
$\frac{LMP}{U}_{t-1}$	0.01	0.004
	(3.03)	*(3.22)*
Special placement services	0.001	
	(0.48)	
Time	-0.07	-0.05
	(-3.55)	*(-4.12)*
S (seasonal dummy)	1.08	1.03
	(12.19)	*(12.44)*
Adj. R^2	0.90	0.88
DW	1.86	1.86
ρ	0.44	0.51
n	72	72
Method	Prais-Winsten	Prais-Winsten

† instrumental variable

Whether this estimation method has produced valid estimates is not at this stage clear. Autocorrelation may have been caused by the inclusion of extrapolated data for inertia or because important variables have been omitted. As our discussion in

[32] Data for labour market program expenditure were quarterly estimates extrapolated from annual data complied by S Knights in Webster (1997). It builds upon the earlier data collected by Stretton & Chapman (1990).

the previous section suggests, some causal factors such as the cost effectiveness of firms' matching technology, firms perceived uncertainty about hiring an unsuitable persons, have been omitted because we are unable to effectively measure them.

If we admit the hypothesis that vacancies since 1978 have been mainly frictional in nature then there is a reasonably strong *a priori* case for accepting that labour market programs will have little impact on the aggregate level of employment. They may have had important equity effects however. On the other hand, if we believe that there has been some longer term shift in the Beveridge curve, or that vacancies are not at their functional minima, then the empirical estimates above may allow us to draw some conclusions.

While there are some differences between the results derived for the two different equations, together they suggests that:

- The effect of labour market programs are positive and significant in both regressions, which is consistent with the displacement and re-cycling hypotheses. This argues that labour market programs are not enough to make clients appear suitable employees for the slow-to-fill vacancies. It is also possible however, that our variable has either not properly netted out the endogenous government policy factor or that the programs have not been large enough to make significant inroads into the aggregate labour market.

- Expenditure on special placement services is positive in both equations (but insignificant in one). This does not suggest that they have been instrumental in reducing the slow-to-fill vacancies. While they certainly have been successful at the microeconomic level, [33] this may have amounted to placing clients in the relatively easy-to-fill vacancies which in the main displaces other people who are not suitable for the slow-to-fill vacancies either.

- The rate of long term unemployment is positive and significant in both equations. A positive coefficient is consistent with the hysteresis theories of the labour market but it is also consistent with theories which argue that both phenomena are the outcome of other changes in the labour market.

[33] See Webster (1997).

- All the measures of the ratio of unemployment benefits to award wages is positive and highly significant. This suggest that pecuniary gains give people an important incentive to take up some form of employment.
- The time trend factor is significant and negative in both equations. This suggests that we are missing an explanatory factor which is closely correlated with a time trend which has caused the Beveridge curve to shift inwards over time. It could possibly be a greater efficiency in the technology of matching services because of the improvement to information technologies or greater flexibly of conventional labour market institutions.
- The proportion of new immigrants it positive (not the expected negative) but only marginally significant.
- The relative level of demand for skilled workers is positive and significant only in the second equation. This may reflect the rise in the heterogeneity of workers and jobs over time, but given the very approximate nature of this variable we would draw back from imputing strong conclusions from this result.

Conclusion

The existence of a broader array of data over the last 20 years casts doubt but does not entirely dismiss earlier views that the Australian Beveridge curve is shifting north-east over time. If vacancies are at the frictional level, then labour market programs are unlikely to hasten the rate at which vacant positions are filled. An improvement in overall employment depends on higher rates of gross job creation and lower rates of job destruction.

If we accept the view that the Beveridge curve is shifting then our empirical analysis suggests that either the hysteresis hypothesis is correct or there is some other long term change that is causing both the incidence of long term unemployment to rise and the portion of recalcitrant vacancies to increase. It does not support the view that labour market programs are effective in improving the suitability of certain labour market groups for the hard-to-fill vacancies, were they to exist. Like earlier studies and several overseas studies, the nature and generosity of unemployment benefits does appear to be a contributing factor and this should be of concern to policy makers. However, given the complexity of modelling the relationship between the incidence of

long term unemployment, the rate of unemployment and labour market programs, this finding should be treated as with due caution.

Appendix: Modelling the relationship between unemployment and long term unemployment

The hysteresis theory of the labour market argues that unemployment is a path dependent process. Specifically, the experience of unemployment so scars, de-skills and de-motivates the individual that it has a semi-permanent effect on the functioning of the aggregate labour market. In our context, the long term unemployed becomes less able to find a suitable job and the employer becomes more wary about hiring some one with a long unemployment record, so much so that excess demand is expressed as prolonged vacancies or wage inflation rather than higher employment and lower unemployment. It is not just that employers discriminate against the long term unemployed in their hiring but that they prefer to continue to keep searching than hire them at all. The chain of causation runs from a high ratio of long term to total unemployment to a higher rate of unemployment for a given rate of vacancies.

However to model this causal link we must be able to distinguish it from the likely effect a change in the rate of unemployment has on the rate of long term unemployment. The nature of the two effects are quite distinct. If we find that the level or change in the rate of unemployment causes the long term rate to rise we may be over stating the hysteresis effect but if we believe that is cause the rate of long term unemployment to fall we may be understating the hysteresis effect and finding it insignificant when in fact it is important. Most of the difficulties arise from modelling the current rate of long term unemployment together with the rate of unemployment (or hiring rate or vacancy rate according to the specified equation). A more prudent approach would be to used the lagged rate of long term unemployment when it appears as a regressor. We will now discuss the details of the issue.

While it is possible that a change in the level of unemployment may affect the rate of long term unemployment, this is not necessarily the case, and we will briefly describe the situation under which a causal relationship can arise.

There is no innate relationship between the unemployment rate and the distribution of unemployment weeks across individuals. A recorded level of unemployment of one person is consistent with both one person experiencing 52

weeks unemployment in a year or 52 people being sequentially unemployed for a week each. A constant rate of unemployment can be associated with a rise, no change or a fall in the concentration of unemployment, and the effects depend upon the inflow and exits rates of unemployment by duration. A change in the distribution may or may not affect the rate of unemployment, a change in this rate may or may not affect the distribution and it is possible that both are affected by a third factor.

However, if hiring preferences follow a regular pattern, then it is likely that a change in the rate of unemployment will have a predictable effect on the rate of long term unemployment. Consider a stylised example. Assume that the unemployed are hired strictly on a last-into unemployment first-to be hired. Assume also that there are only two labour market states, employment and unemployment. If we start from a position where inflows into unemployment just equal outflows, then the number and ratio of long term unemployed $\left(\frac{LTU}{U}\right)$, will keep increasing until all the unemployed except for the very short term unemployed have been unemployed for over 52 weeks. If the inflow into unemployment rises permanently, but the outflow remains constant, there will be a continual growth in the rate of unemployment and an asymptotic growth in the rate of long term unemployment. However in the very short term, a disproportionate jump in inflows into the unemployment pool will lead to a fall in the long term rate as the new entrants are by definition, short term unemployed. Whether the an change in the unemployment rate causes the current rate of long term unemployment to rise or fall will depend on the size of the changes in outflows from the unemployment pool and the frequency of the data. Since 1978, there has been a positive correlation (0.68) between the rate of unemployment and the rate of long term unemployment but a negative correlation between the quarter-on-previous-quarter change to the rate of unemployment and the same change to the rate of long term unemployment.[34]

So much for rise in the rate of unemployment. In our stylised example, the effect of a change in the unemployment rate is not symmetrical. A fall in the outflow rate below the inflow rate does not lead to a fall in the long term ratio but an asymptotic rise as well. This is because the numbers of long term unemployed are not

[34] These association also include possible hysteresis and so are only indicative of the likely effect of the rate of unemployment on the rate of long term unemployment.

reduced until all the short term unemployed have a job. In fact under our hiring rule the number of long term unemployed continue to rise as the total number of unemployed falls.

To use an analogy, assume we have a bucket of beans and we fill it up at the top and also take from the top when we want to extract a few to eat. We will find that unless we run awfully short, the ones at the bottom get staler and staler and there has to be a long period of net outflow before the stale ones are eaten. The proportion of stale ones are only reduced if we add a lot of new beans to the bucket. If we eat so many that we exhaust the fresh ones, the proportion of stale ones will still remain at 100 per cent.

Current Australian and overseas estimates on the exist rate from unemployment by duration indicate that the probability of being hired in any period is strongly related to one's unemployment duration.[35] While the actual hiring preference function is not as extreme as our stylised example, this example serves to illustrate how the ratio of long term unemployed to total unemployed is likely to be an outcome of past high levels of unemployment, regardless of whether unemployment in recent years has risen or fallen.

Models which enter the current ratio of long term unemployed as a regressor may run into simultaneity problems outlined above. Take for example Layard, Nickell & Jackman (1991) and Fahrer & Pease (1993).[36] Their case is slightly unusual because they in the first instance estimate hiring functions, but the ultimate problem remains.

They estimate the equation

$$\frac{H}{U} = \phi_0 + \phi_1\left(\frac{LTU}{U}\right)^* + \phi_2\left(\frac{V}{U}\right) + \phi_3 MM + \phi_4 time + seasonal dummies$$

where $\left(\frac{LTU}{U}\right)^*$ is an index of the rate form of the long term unemployment rate which is supposed to represent the search effectiveness of the unemployed

H is the flow of hires per period.

In terms of our U:V diagram, a rise in hires per period *for a given V/U ratio* can be represented as a movement along the dotted line, from **A** to **B** (see Figure 7).

[35] See for example Fahrer & Pease (1993: Table1), Layard, Nickell & Jackman (1991: p474), ABS cat. 6255.0 (Figure 4.7).

[36] This problem does not exist for Leeves (1997) for he enters the incidence of very long term unemployment as a lagged variable.

We expect that more hires will be associated with a higher vacancy rate, however because the equation holds *V/U* constant, we also have a higher level of unemployment, *ceteris paribus.* Given the hiring rule we has discussed above, the effect of a rise in the unemployment rate (we have a rise in both inflows and outflows but a proportionality higher inflow rate than outflow) is to lower the portion of long term unemployed in the current period. Thus because of the chain of causation from a change in the unemployment rate to the current portion of long term unemployed, we cannot be certain that what we are measuring above is measuring job search effectiveness instead the unemployed the outcome of the move from **A** to **B.**

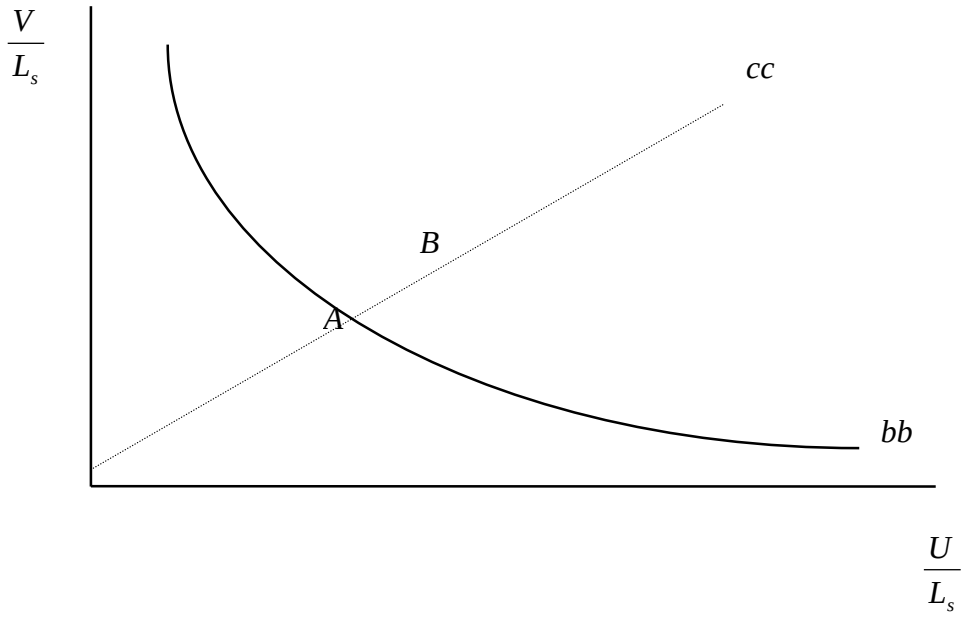

Figure 7

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