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ABSTRACT

The Beveridge Curve*

The Beveridge curve depicts a negative relationship between unemployed workers and job vacancies, a robust finding across countries. The position of the economy on the curve gives an idea as to the state of the labour market. The modern underlying theory is the search and matching model, with workers and firms engaging in costly search leading to random matching. The Beveridge curve depicts the steady state of the model, whereby inflows into unemployment are equal to the outflows from it, generated by matching.

JEL Classification: E24, J63 and J64
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The Beveridge curve depicts a negative relationship between unemployed workers (u) and job vacancies (v). The interest in the curve is related to the role it plays in aggregate models, which study labour market outcomes and dynamics. The position of the economy on the curve gives an idea as to the state of the labour market; for example, a high level of vacancies and a low level of unemployment would indicate a 'tight' labour market. The literature has attempted to explain the coexistence of unemployment and vacancies, their negative relationship, and the implied dynamics.

The curve is named after William Beveridge, a British lord, lawyer, head of academic institutions, Member of Parliament, and founder of the modern British welfare state. In a 1944 report (Beveridge, 1944), Beveridge discussed the relationship between the demand for workers, captured by vacancies, and the rate of unemployment. While he did not plot a curve or present a table with a comparison of u and v, he offered detailed data on these variables and discussed them at some length. His analysis implied that there is a negative relationship between them. In this early work he tackled many of the issues that remain under study in this field: the potential mismatch between unemployed workers and job vacancies, aggregate demand factors versus reallocation factors (for example, deficient overall demand for labour as opposed to low demand in particular industries), trend versus cyclical changes (for example, changes in u and v along the business cycle versus long-run changes), and measurement issues (such as the various possible ways of mismeasuring vacancies).

The negative u–v relationship is a robust finding across countries, though shifts of the curve over time are often observed. This can be seen, for example, in a 16-country graphical description of the curve presented in Layard, Nickell and Jackman (2005, pp. 36–7). Detailed descriptions and analyses of the empirical findings concerning the Beveridge curve for the

United States are to be found in Blanchard and Diamond (1989), and for the UK in Pissarides (1986).

What underlies this negative relationship? The early literature of the late 1950s and in the 1960s dealt with the curve in the context of exploring excess demand in the labour market and its influence on wage inflation. This was motivated by the extensive study of the Phillips curve that took place in those years. The literature typically defined excess demand as unfilled vacancies less unemployed workers, considered the data on these variables, and then looked at the relationship between measures of excess demand and wage behaviour. This literature recognized that, even when there is no excess supply, there is positive unemployment due to frictions. It derived a negatively sloped u–v curve from a model of distinct labour markets, interacting at different levels of disequilibrium, with the markets at points off both labor supply and labor demand curves. The u–v curve was shown to be stationary and observed u and v points were expected to cycle around it. Movements up and down the curve reflect increases and decreases in the excess demand for labour. The curve itself can shift as a result of changes in the speed of market clearing or changes in the sectoral composition of labour demand. The observed u–v data may be a compound of structural shifts of the curve together with cyclical movements about it. Key contributions to this strand of work were progressively made by Dow and Dicks-Mireaux (1958), Lipsey (1960), Holt and David (1966), Hansen (1970), and Bowden (1980).

In the 1970s and 1980s an alternative approach was developed – the search and matching model. A key difference between this model and the early literature is its derivation of vacancies and unemployment as equilibria, rather than disequilibria, phenomena. The model was developed in the work of Peter Diamond, Dale Mortensen, and Christopher Pissarides (see Pissarides, 2000, for a detailed exposition, and Yashiv, 2006, for a recent survey). The model may be briefly described as follows. Workers and firms

engage in costly search to find each other. Firms spend resources on advertising, on posting job vacancies, on screening and, subsequently, on training. Workers spend resources on job search, with costs pertaining to activities such as collecting information and applying for jobs. Workers and firms are assumed to be randomly matched. After matching, the worker and the firm engage in bilateral bargaining over the wage. The matching process assumes frictions such as informational or locational imperfections. It is formalized by a 'matching function' that takes searching workers and vacant jobs as arguments and produces a flow of matches (m), and is given by $m = m(u,v)$. It is continuous, non-negative, increasing in both its arguments, and concave. Typically, it is assumed to be constant returns to scale. The flow into unemployment results from job-specific shocks to matches that arrive at the Poisson rate λ. These shocks may be explained as shifts in demand or productivity shocks. Once a shock arrives, the firm closes the job down. The evolution of the unemployment rate ($\dot{u}$) is therefore given by the difference between the separation flow (λ times the employment rate $1 - u$) and the matching flow:

$$\dot{u} = \lambda(1-u) - m(u,v). \tag{1}$$

Denote the rate at which workers are matched to jobs (the job finding rate) by $p = \frac{m}{u}$ so that $m = pu$. In the steady state the rate of unemployment is constant, so setting $\dot{u} = 0$ the following obtains:

$$u = \frac{\lambda}{\lambda + p}. \tag{2}$$

This is the Beveridge curve: as p depends on m, it depends on both u and v, and this equation can be represented in vacancy (v) – unemployment (u) space by a downward-sloping curve. The mechanism is the following. When vacancies v rise, matching m rises, and so the job finding rate p rises. Workers find jobs at a faster rate and unemployment u declines. Vacancies

themselves are determined by a firm optimality equation, equating vacancy costs and benefits at the margin.

As can be seen in the equations above, the matching function plays a crucial role in generating the Beveridge curve. Petrongolo and Pissarides (2001) provide a comprehensive survey of estimation of this function, finding the following main features: (*a*) the prevalent specification is Cobb–Douglas, that is, $m = \mu u^{\alpha} v^{\beta}$; (*b*) usually constant returns to scale ($\alpha + \beta = 1$) is found, though some studies have produced evidence in favour of increasing returns to scale; (*c*) many studies have added other variables – such as demographical or geographical variables, incidence of long-term unemployment, and UI – finding some of them significant, but not changing the preceding findings; (*d*) these general patterns are robust across countries and time periods.

Research along the lines of this model – in progress – is likely to provide a richer account of the Beveridge curve: the matching function is studied for microfoundations, heterogeneity is explicitly explored, endogenous separations are allowed for, interactions with capital investment are considered, and learning and on-the-job search leading to job-to-job movements are incorporated. Going beyond this strand of the literature, research is also beginning to explore equilibrium search models, which feature a Beveridge curve, with alternative u–v meeting processes, not modelled as matching functions. Thus, the Beveridge curve remains a topic of active research in macroeconomics and labour economics, more than 60 years after it was first studied.

Bibliography

Beveridge, W. 1944. *Full Employment in a Free Society*. London: George Allen and Unwin.

Blanchard, O. and Diamond, P. 1989. The Beveridge curve. *Brookings Papers on Economic Activity* 1, 1–60.

Bowden, R. 1980. On the existence and secular stability of the u-v loci. *Economica* 47, 35–50.

Dow, J. and Dicks-Mireaux, L. 1958. The excess demand for labour. a study of conditions in Great Britain, 1946–56. *Oxford Economic Papers* 10, 1–33.

Hansen, B. 1970. Excess demand, unemployment, vacancies and wages. *Quarterly Journal of Economics* 84, 1–23.

Holt, C. and David, M. 1966. The concept of vacancies in a dynamic theory of the labor market. In *Measurement and Interpretation of Job Vacancies*, ed. NBER. New York: Columbia University Press.

Layard, R., Nickell, S. and Jackman, R. 2005. *Unemployment: Macroeconomic Performance and The Labour Market*, 2nd edn. Oxford: Oxford University Press.

Lipsey, R. 1960. The relation between unemployment and the rate of change of money wage rates in the United Kingdom, 1862–1957: a further analysis. *Economica* 27, 1–31.

Petrongolo, B. and Pissarides, C. 2001. Looking into the black box: a survey of the matching function. *Journal of Economic Literature* 39, 390–431.

Pissarides, C. 1986. Unemployment and vacancies in Britain. *Economic Policy* 1, 499–559.

Pissarides, C. 2000. *Equilibrium Unemployment Theory*, 2nd edn. Cambridge, MA: MIT Press.

Yashiv, E. 2006. Labor Search and matching in macroeconomics. *European Economic Review*, forthcoming.