E C O N O M I C S B U L L E T I N

Migration and unemployment in an efficiency wage model of a small open economy

Michael Bleaney
University of Nottingham

Abstract

International migration affects equilibrium unemployment in a small open economy characterised by efficiency wages. Immigration into employment reduces unemployment rates, and immigration into unemployment increases them. The effect of emigration depends on its impact on the aggregate job turnover rate.

The author wishes to thank Mark A. Roberts for helpful comments on an earlier version of this paper. Any errors that remain are of course the author's responsibility.
Citation: Bleaney, Michael, (2005) "Migration and unemployment in an efficiency wage model of a small open economy." *Economics Bulletin*, Vol. 6, No. 21 pp. 1−6
Submitted: September 20, 2005. **Accepted:** November 9, 2005.
URL: http://www.economicsbulletin.com/2005/volume6/EB−05F20007A.pdf

1. Introduction

Immigration is a considerable political issue in most advanced countries, at least in part because of its labour market effects. For example, the enlargement of the European Union has created anxiety about the effects on local employment of migration from poorer to richer states, many of which have chosen to retain controls on such migration for a while. Moreover it seems quite likely that labour markets will become increasingly internationalised in the future, particularly in the case of skilled labour, which implies that we can expect to see larger two-way labour flows between countries at similar levels of development. Although the literature on globalisation has addressed the labour market implications of increased international competition in product markets in some depth (Andersen, 2005; Feenstra and Hanson, 2001), the effect of labour migration in aggregate models of unemployment seems to be a neglected issue. Empirical work has tended to focus on the local labour market effects of migration (Lalonde and Topel, 1997).

This paper considers the impact of international labour migration in the efficiency wage model of Shapiro and Stiglitz (1984). This model is a convenient vehicle for considering the effects of migration on aggregate unemployment. The economy is assumed to be small relative to the rest of the world. In the model, higher wages are paid to elicit extra effort from workers, if that is more profitable than paying low wages for low effort. The threat of dismissal if low effort is detected is only effective if unemployment is significant, so the high-wage equilibrium is associated with unemployment. The equilibrium depends on the exogenous parameters of the model: the disutility of effort, the level of unemployment benefits, the frequency of job separations, the discount rate and the probability of detection of low effort. In what follows we assume that the economy is always in the high-wage/high-effort equilibrium.

In this paper international migration is added to the model. For simplicity migration propensities are treated as exogenous; otherwise the model becomes very complex. Both employed and unemployed workers have some probability of emigration, and immigrants may enter employment or unemployment. The lifetime utility of someone who moves abroad is assumed exogenous and independent of their employment status.

2. The model

We consider a small open economy, which cannot influence the outside world to any significant extent, and which therefore takes external variables as exogenous. At date t the economy has a labour force of M_t, a stock of U_t unemployed individuals and a stock of L_t employed individuals. In what follows these tend to appear as the unemployment rate $u_t = U_t/M_t$ and the employment rate $1–u_t = L_t/M_t$.

There is a fixed component to the job separation rate (c) that results in a flow into unemployment. In addition a proportion f of employed workers choose to emigrate in each period, as do a proportion h of unemployed workers. These probabilities presumably depend on the attractions of emigration, but we do not model this explicitly. Thus $(c + f)L_t$ job vacancies are created in each period (the possibility that c is negatively

related to f is considered later). These job vacancies are filled either by the unemployed or by immigrants. We assume that immigration into employment and unemployment represents proportions g and k of the existing labour force respectively. Thus total immigration is equal to $(g + k)M_t$, and total emigration is equal to $[f(1–u_t) + hu_t]M_t$.

Apart from migration, the model is as in Shapiro and Stiglitz (1984). Those in employment have to choose between low effort (shirking) and high effort (not shirking). If discovered, which happens with probability p, shirking results in dismissal and a spell of unemployment. The disutility of high effort is e, and of low effort is zero. All workers receive the same wage (w). There is no natural population growth. In the steady state, net migration can occur provided that it leaves the unemployment rate unchanged. The steady-state condition is then that the stock of unemployed has to fall at a rate equal to the unemployment rate times the rate of net emigration.

In equilibrium the lifetime expected utility of a non-shirking employee (V^N) is:

$$V^N = w – e + [1/(1 + r)][(1 – c – f)V^N + cV^U + fV^*] \qquad (1)$$

where V^U is the expected lifetime utility of an unemployed person and V^* that of an emigrant. The equivalent equation for a shirker is:

$$V^S = w + [1/(1 + r)][(1 – c – f – p)V^S + (c + p)V^U + fV^*] \qquad (2)$$

In order to induce high effort, $V^N \geq V^S$. The supply curve of high effort is where this is an equality, which from (1) and (2) gives:

$$(1 + r)(w – e) = (1 + r)(r + c + f)(e/p) + (r + f)V^U – fV^* \qquad (3)$$

The lifetime expected utility of an unemployed person, on the assumption that when employed the individual is a non-shirker, is:

$$V^U = b + [1/(1 + r)][(1 – a – h)V^U + aV^N + hV^*] \qquad (4)$$

where b represents unemployment benefits and a is the probability of moving into domestic employment. Substitution from (1) yields:

$$V^U = J^{-1}\{(r + c + f)b + a(w – e) + [af + h(r + c + f)](1 + r)V^*\}$$

$$J = (1 + r)[(r + c + f)(r + h) + a(r + f)] \qquad (5)$$

Substitution of (5) into the non-shirking condition (3) gives, after manipulation:

$$w = e + Zb + (r + c + f + aZ)(e/p) – (Z – 1)[r/(1 + r)]V^*$$

$$Z = (r + f)/(r + h) \qquad (6)$$

The steady-state condition requires that net emigration (n) leaves the unemployment rate unchanged. This means that the rate of decline in unemployment (the outflow rate minus the inflow rate) is equal to the unemployment rate times net emigration, or in other words:

$$(a + h)u - k - c(1 - u) = u[f(1 - u) + hu - g - k] \qquad (7)$$

Using (7) to substitute for a in (6) yields the supply curve of high effort:

$$w = e + b + \{r + c + f + [(1 - u)(f - h + k/u + c/u) - g]Z\}(e/p) + (1 - Z)\{[r/(1 + r)]V^* - b\} \qquad (8)$$

Any increase in the right-hand side of (8) for a given value of u shifts the supply curve of high effort upwards. With a downward-sloping demand curve for labour, both wages and unemployment would then increase. In other words, $\text{sign}(\partial u/\partial x) = \text{sign}(\partial w/\partial x|_u)$ in equation (8). Since $(1+r)b/r$ is the lifetime utility of someone who is permanently unemployed, we assume that $[r/(1 + r)]V^* > b$ (i.e. that emigration is preferable to permanent unemployment).

3. Results

It is convenient to consider first the special case where the employed and the unemployed have equal probabilities of emigrating ($f = h$). Note that this implies that $Z = 1$. Equation (8) then simplifies to:

$$w = e + b + (r + n + k/u + c/u)(e/p) \qquad (9)$$

where $n = f - g - k$ is net emigration. This only reduces to the closed-economy solution of Shapiro and Stiglitz (1984) if there is no net migration ($n = 0$) and if all immigrants enter employment directly ($k = 0$). To the extent that immigrants are unemployed ($k > 0$), they leave more vacancies open to the local unemployed, thus shortening unemployment spells and reducing the punishment for shirking. Hence unemployment is increasing in k. Net emigration works in a similar way. With positive net emigration, more job vacancies and more direct emigration opportunities are created for the domestic unemployed, relative to the competition for jobs from immigrants. Thus net emigration also increases the unemployment rate.

In the general case where $f \neq h$, equation (8) shows that immigration into *employment* tends to decrease the unemployment rate and immigration into *unemployment* tends to increase it (i.e. $\partial w/\partial g|_u < 0$ and $\partial w/\partial k|_u > 0$). Matters are more complicated with respect to emigration, because f and h also affect $Z = (r + f)/(r + h)$. Essentially, $\partial w/\partial f|_u > 0$ and $\partial w/\partial h|_u < 0$ unless V^* is sufficiently large. Thus emigration from employment tends to reduce wages and emigration from unemployment to increase them. This is because a greater probability of emigration for the employed reduces the fear of dismissal for shirking (since they are more likely to leave the job anyway), thus tightening the non-

shirking condition. Although with a lower h the unemployed have a lower probability of emigration, they have a compensating higher probability of domestic employment when f is higher, because more vacancies are created.

Another feature of (8) is that, for given migration rates, unemployment can be either increasing or decreasing in the attractions of emigration (V^*), depending on whether or not $f > h$ (because this affects the sign of $1 - Z$). If the employed are more likely to emigrate than the unemployed (which in reality is more probable when V^* is high), then $\partial w/\partial V^*|_u < 0$ and a higher V^* implies lower unemployment. If the *unemployed* are the more likely emigrants, a higher V^* implies *higher* unemployment. This is because V^* has conflicting effects on unemployment. From equation (3), we can see that a higher V^* relaxes the non-shirking condition, but from (4) we can also see that it tightens it indirectly by raising V^U. The former effect is strengthened by a higher f, and the latter by a higher h.

Perhaps the most significant feature of these results is that increasing gross international labour flows, but with zero net flows ($n = 0$), affect unemployment unless all immigrants go straight into employment ($k = 0$) and unless both employed and unemployed have the same probability of emigrating ($f = h$). An increase in gross flows, keeping net immigration constant, tends to increase the unemployment rate, because k increases.

As mentioned earlier, it is possible that emigration substitutes for flows into domestic unemployment. To the extent that this occurs we might write $c = c_0 - \lambda f$, where $0 \leq \lambda \leq 1$. If we consider the special case of $f = h$, equation (9) then becomes:

$$w = e + b + [r + f - g - k + k/u + (c_0 - \lambda f)/u](e/p) \qquad (10)$$

The effects of immigration are as before, but emigration is now likely to *reduce* unemployment rather than increase it. This happens whenever $\lambda > u$, which is not a very stringent condition, because u is likely to be a small fraction. The reason for this is that additional emigration does not create as many new job vacancies as in the case where $\lambda = 0$, so it does not shorten prospective unemployment spells so much. From (3), we can see that this relaxes the non-shirking condition.

Because of this, when emigration substitutes for flows into domestic unemployment, it is no longer necessarily true that an increase in gross migration, keeping net migration constant, tends to increase unemployment. This is only true in (10) if $k > \lambda f$. This condition may also be expressed as:

$$k/(k + g) > \lambda f/(k + g) \qquad (11)$$

which says that the share of immigrants that enter the pool of unemployed must be greater than λ times the ratio of emigration to immigration (since we are assuming that $f = h$). This condition is more likely to be met when there is net immigration.

4. Conclusions

In the efficiency wage model of Shapiro and Stiglitz (1984), migrant flows affect the equilibrium rate of unemployment in a small open economy. It matters whether emigration of employed individuals increases job turnover or merely substitutes for flows into domestic unemployment. *If the former*, then larger gross flows, with a given net flow, are associated with higher unemployment except in the special case where all immigrants enter employment immediately (in which case only the net flow matters). *If the latter*, then the effect depends on parameter values, but larger gross flows will always increase unemployment if a sufficient proportion of immigrants enter the pool of unemployed.

Considering immigration and emigration separately, it is always true that immigration into employment tends to reduce unemployment rates and that immigration into unemployment tends to increase them, because of the effect on the length of unemployment spells, and hence on the incentive to shirk. Higher emigration rates result in lower unemployment in almost all cases; the only exception is when flows into domestic unemployment are almost unaffected by emigration (i.e. when emigration raises the job turnover rate almost one for one).

Although these results emerge from a particular model of unemployment, they are not unique to this model. For example, the union wage-bargaining model of Layard and Nickell (1990) generates similar results through a similar mechanism – migration affects the prospective length of unemployment spells, which causes unions to adjust their wage bargaining.

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