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*Production Technique, External Shocks, and Unemployment**

The relationship between production technique and short-run unemployment is examined. This is done by considering the unemployment creating potential of an external shock in an economy characterized by a short-run fixed coefficients technology which utilizes a fixed-price imported input. This type of production structure attributes a short-run fixed user cost to labor. As a result, short-run unemployment can arise even if wages are perfectly flexible. The adjustment path from a short-run unemployment equilibrium to a long-run full employment equilibrium is analyzed. Unlike most adjustment cost models, the speed of adjustment may not reach its maximum immediately following the shock.

Unemployment has been variously attributed to intertemporal labor-leisure choice (Lucas and Rapping 1969), labor market search (Mortensen 1970; Lucas and Prescott 1974), and wage stickiness (Dixit 1978; Taylor 1980; Neary 1980). The analysis which follows examines another potential cause of short-run unemployment—the slow adjustment of the technique of production. It does this by considering the unemployment creating potential of an external shock when the ratio in which firms combine variable factors (the production technique) is fixed in the short run. With this type of production structure, short-run unemployment will result under certain reasonable circumstances even if wages are perfectly flexible. Furthermore, unlike most adjustment cost models, the speed of adjustment may not reach its maximum immediately following the shock.

The short-run fixed coefficients nature of production, the foundation of the analysis developed below, arises because physical capital is embedded with a particular production technique when it is constructed. Altering this technique in response to a change in relative factor prices is unlikely to be instantaneous since the costs of adjustment (that is, construction and training costs, production in-

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terruptions, etc.) are likely to increase rapidly as the speed of adjustment accelerates.

The paper is divided into two principal sections. In the first section, a simple one-sector static model is developed which combines a short-run fixed coefficients production structure with a long-run neoclassical production structure. This basic framework is used to identify the factors that determine the unemployment creating potential of an external shock when wages are flexible. In the second section, the cost of changing the technique of production is made explicit and the path of adjustment from a short-run unemployment equilibrium to a long-run full employment equilibrium is characterized.

1. The Static Analysis

The Model

The economy produces and consumes one good, X, the price of which, P_x, is fixed abroad. The supply side of the economy is represented by a single firm. This firm acts as a price taker in both its output and input markets and uses three factors of production—capital (K), labor (L), and an imported input (I). In order to emphasize the role of factor substitutability and the retooling and refitting of existing capital, the size of the capital stock is fixed at its initial level, K_o, throughout the analysis. In addition, it is assumed that the opportunity cost of using capital is zero, and as a result, the firm always uses its entire capital stock. Abstracting from capital accumulation and the determination of the capital utilization rate greatly simplifies the analysis, but does not alter the qualitative results.

In its plant of fixed size, the firm combines a bundle, V, of the variable inputs, L and I, to produce output, X. The set of production techniques available to the firm is described by the Cobb-Douglas production function:[1]

$$X = K_o^{\gamma} V^{\theta}\,, \qquad \gamma + \theta < 1\,,\ 0 < \gamma\,,\ \theta < 1\,; \tag{1}$$

where $V = L^{\alpha} I^{1-\alpha}$, $0 < \alpha < 1$. The use of an explicit functional

[1]This production function exhibits decreasing returns to scale. This characteristic, arising perhaps from technical or managerial factors, allows for a determinate non-zero level of output below the full employment level. Similar results to those given below could be derived by assuming constant returns to scale in production and less than infinite elasticity of demand for good X.

form facilitates the nesting of the short-run production function within its long-run counterpart. The Cobb-Douglas function is chosen for its tractability and general familiarity.

Equation (1) implies that the level of V can be changed instantly in order to alter the ratio of V to K and, thereby, total output. This characteristic is analogous to changing the number of hours a plant of fixed size is used each day.

An infinite number of different imported input to labor ratios (henceforth referred to as techniques of production) are consistent with Equation (1). At any point in time, however, only one of these techniques is used to produce output. Changing this technique is assumed to be costly and, as a consequence, is unlikely to be instantaneous. (This is shown to be the case in Section 2 below using an explicit cost of adjustment function.) As a result, the technique of production embedded in the plant, K_o, can be taken to be fixed in the short run. This constraint can be explicitly incorporated in the production function of Equation (1) by specifying V to be a Leontief function of L and I. That is, in the short run, the production function can be represented by a Leontief function of the two variable inputs nested within the Cobb-Douglas function of K and V:

$$X = K_o^\gamma \left[\min\left(Lv^{1-\alpha}, \frac{I}{v^\alpha} \right) \right]^\theta , \tag{2}$$

where v is the fixed short-run import-labor ratio. In the long run, through the retooling of existing plant, the firm can choose the optimal v from the set represented by Equation (1). Thus, Equation (1), the envelope of Equation (2) for different values of v, can be thought of as the long-run production function faced by the firm. Changes in v lead to a movement along this envelope and cause a change in the labor-capital and imported input-capital ratios as well as the imported input-labor ratio.

The economy is endowed with a given number of workers, L_o, who are each willing to supply one unit of labor as long as the wage is non-negative. In other words, the supply of labor is perfectly elastic at a zero wage up to L_o, at which point it becomes perfectly inelastic.[2]

[2]The wage could be bounded at a level greater than zero if the government imposed a minimum wage or if there existed a socially accepted reservation wage. In order to preclude the case of long-run employment less than L_o, it is assumed that the lower bound on the wage is zero.

The supply of the imported input is perfectly elastic in both the short run and long run at the exogenous domestic currency price, P_I. This imported input and the fixed nature of its price are crucial to the results derived below. In combination with the short-run fixed coefficients production technology, they attribute a fixed user cost to labor over and above the wage actually paid.

Since the firm's goal is to maximize profit, it chooses to produce that level of output which equates its short-run marginal cost as derived from the Leontief cost function,

$$C(w, P_I, v, K_o, X) = \left[\frac{w}{v^{1-\alpha}} + v^{\alpha}P_I\right]\left[\frac{X}{K_o^{\gamma}}\right]^{1/\theta}, \tag{3}$$

to the exogenous output price. This procedure yields the short-run output supply function which, in conjunction with Shephard's Lemma, can be used to derive the short-run labor demand function,

$$L_{SR}^{d} = \left[\frac{\theta v^{\theta(1-\alpha)}P_x K_o^{\gamma}}{w + vP_I}\right]^{1/1-\theta}. \tag{4}$$

Equation (4) implies that if the wage goes to zero, the demand for labor will not become infinite as would be the case if the short-run production technology had been strictly neoclassical. As a consequence, if a negative shock causes the demand for labor to fall, the wage may decline to zero, but this may not reduce the cost of labor by enough to absorb the available labor supply. On the other hand, excess demand for labor can always be eliminated by an increase in the wage. The model is, therefore, characterized by a critical asymmetry in the short run. Wage movements can eliminate an excess demand for labor, but may not eliminate an excess supply.

In contrast, long-run profit maximization, employing the Cobb-Douglas production function given in Equation (1), yields a long-run labor demand function in which flexible wages always eliminate excess labor supply:

$$L_{LR}^{d} = \left\{\left[\frac{1-\alpha}{P_I}\right]^{\theta(1-\alpha)}\left[\frac{\alpha}{w}\right]^{1-\theta(1-\alpha)}\theta P_x K_o^{\gamma}\right\}^{1/1-\theta}. \tag{5}$$

Equilibrium in the labor market is sufficient to determine the level of output and the demand for both labor and the imported input in the short run and the long run. In Figure 1, the short-run wage is given by the intersection of the labor supply curve, L^s, and the short-run labor demand curve, L^d_{SR}. Similarly, the long-run market clearing wage is determined by the intersection of the labor supply curve and the long-run labor demand curve, L^d_{LR}. This long-run demand for labor curve must be flatter than the short-run curve at every (w, L) combination. This follows because, in the long run, a decline in the wage causes the firm to substitute labor for the imported input, which leads to an increase in the demand for labor relative to its short-run level.

The Effect of an External Shock

In Figure 1, starting from a position of both long- and short-run equilibrium, a fall in the price of X shifts the short-run and long-run demand for labor curves down to $L^{d'}_{SR}$ and $L^{d'}_{LR}$, respectively.[3] The downward shift in the short-run demand curve must be greater than that of the long-run curve since, for the continued

[3]The analysis is qualitatively the same for an increase in the price of the imported input.

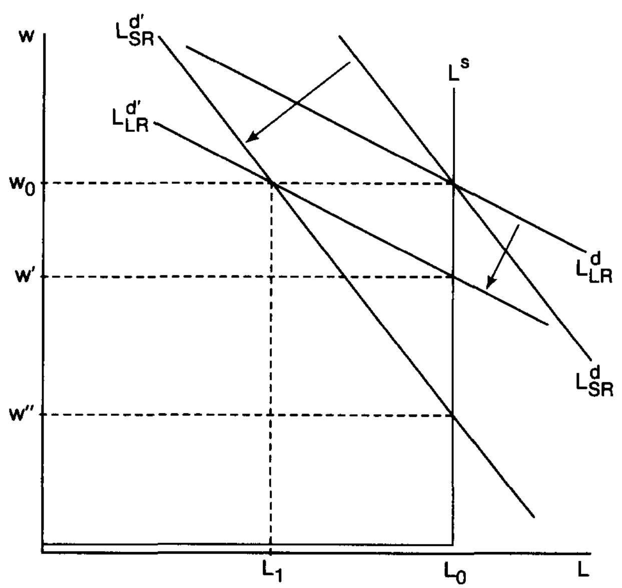

Figure 1.

employment of a given amount of labor, a lower wage is necessary when the import-labor ratio is fixed and the firm cannot substitute toward relatively cheaper labor than when this ratio is flexible. As a result, the wage falls to w'' in the short run, overshooting its long-run value of w'.[4]

Depending on the size of the decline in the price of X, the initial downward shift in the short-run demand for labor curve could shift the short-run equilibrium from the vertical to the horizontal segment of the labor supply curve. If this occurs, employment will fall below L_o and, since the Cobb-Douglas production function implies that the total labor force must be employed in the long run, both the wage and employment will overshoot their long-run values.[5]

An approximation of the minimum change in the price of X necessary to cause a decline in short-run equilibrium employment is

$$\Delta P_x \cong \left[\frac{-1}{1 + \frac{vP_I}{w_o}} \right] P_x .$$

Since the coefficient on P_x is less than one in absolute value, this change is certainly feasible. The magnitude of the fall in the price of X necessary to bring about less than full employment will be smaller the greater is the price of the import relative to the wage and the larger the import to labor ratio. That is, the larger is the exogenous nonwage user cost of labor, the smaller the change in the output price necessary to drive the wage to zero. This follows because the wage is the only component of the cost of labor which can adjust in the short run. Thus, when it comprises a relatively small portion of labor's user cost, it takes a smaller change in the product price to drive the wage to zero.

In the absence of short-run unemployment, output and the use of both factors remain at their initial levels. When the fall in the price of output is sufficiently large to cause unemployment, both the use of the imported input and output must decline since the use of labor has fallen and the technique of production is fixed.

[4]This is a direct application of the Le Chatelier Principle (Samuelson 1983).

[5]Unemployment of the type described here can occur if the two variable factors are substitutable in the short run, but only if they are substitutable over a finite range of the labor endowment space, outside of which substitution is impossible.

In the long run, the fall in the price of X causes a decline in the wage relative to the exogenous price of the imported input and leads the firm to choose a more labor intensive production technique. Since labor is fully employed in the long run, this implies a reduction in the use of the imported input and, therefore, a decline in final good output.

2. Dynamic Adjustment

In Section 1, the technique of production, v, is taken to be fixed in the short run, due to unspecified adjustment costs, and as a consequence, the firm's short-run production set is partly Leontief in form. In the long run, the firm could choose the optimal v, given the wage-imported input price ratio, from the set of different techniques represented by the Cobb-Douglas production function, Equation (1). In the present section, the costs of adjustment which prevent the instantaneous adjustment of v are made explicit and the path of adjustment following an unemployment inducing external shock is characterized.

We introduce adjustment costs by assuming that the firm must sacrifice some quantity of final output in order to alter its technique of production. More specifically, the cost of adjustment is

$$\tilde{X} = h(\dot{v})^2 \,, \tag{6}$$

where h is a multiplicative parameter and $\dot{v}$ is the rate of change of the technique of production. Thus, $\dot{v}$ is the speed at which the short-run Leontief isoquant moves along its envelope, the long-run Cobb-Douglas isoquant.

The adjustment cost function given in Equation (6) is consistent with large adjustment cost literature (Gould 1968; Brechling 1975; Purvis 1976). An important characteristic of this type of function is that the cost of adjustment does not include changes in the productivity of factors. Instead, adjustment involves costs that can be simply added on to the other costs of production. Costs of this type would include the production revenues used directly for investment—hiring, firing, and retraining costs—and the output lost during the full or partial shutdown of a plant for modifications. Since these costs arise only when the technique of production is changing, Equation (6) depends solely upon $\dot{v}$. In addition, this adjustment cost function implies that the marginal cost of adjustment is increasing, thereby precluding the instantaneous adjustment of the technique of production, and both positive and negative v yield positive costs of adjustment. The quadratic functional form of Equation (6) has been used extensively in the literature because it is the simplest function with these properties.

The goal of the firm is to choose a path for output and $\tilde{X}$ which maximizes the present discounted value of its profits. That is, the firm maximizes the objective function:

$$\max \int_0^\infty e^{-\rho t}(P_x X - wL - P_I I - P_x \tilde{X})dt \, ; \qquad (7)$$

(where ρ is the firm's discount rate) subject to Equations (3) and (6), $\tilde{X} \geq 0$, and $v(0) = v_o$ (where v_o is the initial value of v).

The current valued Hamiltonian associated with this problem is

$$H_{cv} = P_x X - \left[\frac{w}{v^{1-\alpha}} + v^\alpha P_I\right]\left[\frac{X}{K_o^\gamma}\right]^{1/\theta} - P_x h u^2 + \lambda u \, , \qquad u = \dot{v} \, , \quad (8)$$

where λ is the marginal benefit associated with an increase in the import intensity of production.

Maximization of this Hamiltonian yields optimal values for the two control variables:

$$u^* = \frac{\lambda}{2P_x h} \qquad (9)$$

and

$$X^* = \left[\frac{\theta P_x K_o^{\gamma/\theta} v^{1-\alpha}}{w + vP_I}\right]^{\theta/1-\theta} . \qquad (10)$$

Differentiation of the Hamiltonian gives the canonical equations

$$\dot{v} = \frac{\lambda}{2P_x h} \qquad (11)$$

and

$$\dot{\lambda} = \rho\lambda - [(1 - \alpha)w - \alpha v P_I]\left[\frac{\theta P_x K_o^\gamma v^{2\theta-\alpha\theta-1}}{w + vP_I}\right]^{1/1-\theta} . \qquad (12)$$

Using Equation (10), the short-run production function (Equation [2]), and the labor supply function, the wage at any point in time is given by

$$w = \max\left[0, \qquad \frac{\theta P_x K_o^\gamma v^{\theta(1-\alpha)}}{L_o^{1-\theta}} - vP_I\right]. \tag{13}$$

This expression implies that the import-labor ratio associated with a zero wage at full employment is

$$v' = \left[\frac{\theta P_x K_o^\gamma}{P_I L_o^{1-\theta}}\right]^{1/1-\theta(1-\alpha)} . \tag{14}$$

v' forms the boundary between the unemployment and full employment regions. At values of v greater than v', the import intensity of production leads to a nonwage user cost of labor which is of sufficient magnitude to drive the wage to zero and precipitate unemployment. Conversely, if v is less than v', the wage is positive and the labor force is fully employed. The long-run import-labor ratio must be less than v' and the total labor force must be fully employed at a positive wage, since the long-run production function is Cobb-Douglas.

Because the firm has perfect foresight and acts as a perfect competitor, the expression for the wage, Equation (13), can be substituted into Equation (12). This gives

$$\dot{\lambda} = \rho\lambda + \alpha\left[\frac{\theta P_x K_o^\gamma}{P_I^\theta v^{1-\theta(1-\alpha)}}\right]^{1/1-\theta} , \qquad \text{if } v \geq v' , \tag{15a}$$

and

$$\dot{\lambda} = \rho\lambda - (1-\alpha)\theta P_x K_o^\gamma v^{\theta(1-\alpha)-1} L_o^\theta + P_I L_o , \qquad \text{if } v \leq v' . \tag{15b}$$

With $\dot{\lambda}$ and $\dot{v}$ set equal to zero, Equations (11), (15a), and (15b) are depicted in Figure 2. The $\dot{\lambda} = 0$ and $\dot{v} = 0$ curves intersect at two points and, as a result, there exist two possible long-run equilibrium values for v:

$$v^* = \infty ,$$

or

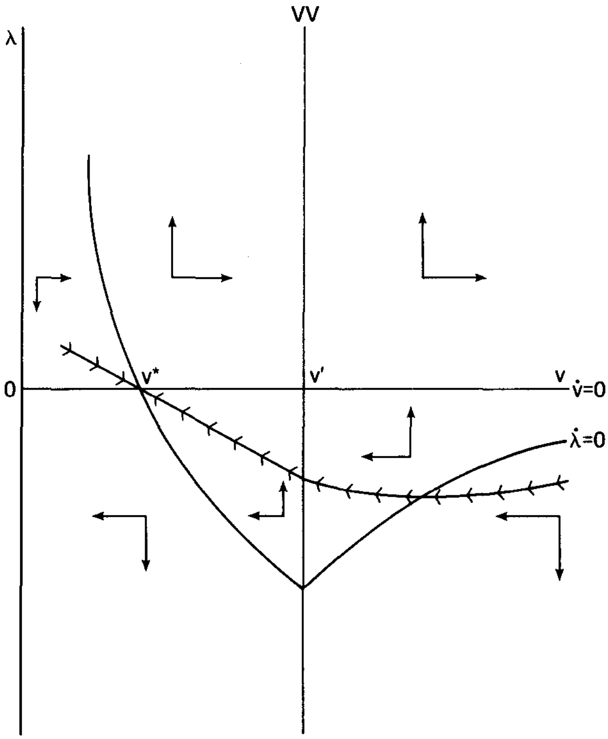

Figure 2.

$$v^* = \left[\frac{(1-\alpha)\theta P_x K_o^{\gamma}}{P_l L_o^{1-\theta}}\right]^{1/1-\theta(1-\alpha)}$$

The first of these is always in the unemployment region (as long as P_l does not equal zero). The second is always within the full employment region and is identical to the steady-state value of v associated with the unconstrained Cobb-Douglas production function, Equation (1).[6]

The form of the $\dot{v} = 0$ curve is determined by the exogenously given technology of the adjustment cost function. As can be seen

[6]The unconstrained Cobb-Douglas production function, Equation (1), implies the immediate and costless substitutability of factors. Thus, Equation (8) for the Cobb-Douglas case collapses to a static profit-maximization problem. The second value of v^* can be derived from this problem.

in Equation (11), the supply price of new techniques, λ, depends upon the speed of adjustment, but not upon the current technique. The $\dot{\lambda} = 0$ curve represents the marginal benefit of a more import intensive technique if that technique is expected to last forever. It follows that an intuitive interpretation of the $\dot{v} = 0$ and $\dot{\lambda} = 0$ curves is that they represent the static supply and demand functions, respectively, for different techniques of production (see Davidson 1977).

The $\dot{\lambda} = 0$ curve differs distinctly in the two regions of Figure 2. In the full employment region ($v < v'$) at levels of v below v^*, the marginal benefit of higher v rises at an increasing rate because not only is production becoming more inefficient as the import-labor ratio falls, but in addition, the wage is rising. At levels of v above v^*, the marginal benefit of an increase in v is negative, but it falls slower as v rises because the wage declines as the import-labor ratio increases, counteracting to some extent the decrease in profits caused by the utilization of a more inefficient v.

In the unemployment region, the $\lambda = 0$ curve has a positive slope, but never leaves the negative quadrant. This negativity of the $\dot{\lambda} = 0$ curve implies that profits fall as v increases, while its positive slope indicates that profits fall by smaller amounts as v rises. This contrasts with the full employment region in which a unit movement in v away from v^* causes profits to fall by more than the previous movement. This difference arises because, in the unemployment region, the cost of the imported input comprises the total factor cost. As v gets large, output becomes more import intensive and profits fall to such an extent that the increase in v causes marginal profit, though always negative, to be smaller in absolute value. As v approaches infinity, both profits and the level of output go to zero.

The determinant of the matrix of partial derivatives of the canonical equations in the full employment region is negative. This implies that one root of the differential equation system describing the dynamics in this region is negative and the other positive. It follows that this region's only stable trajectory is the saddle path depicted in Figure 2.

Since the determinant of the matrix of partial derivatives of the canonical equations in the unemployment region is positive, the equilibrium in this region, given by v equals infinity, is a minimum (thus confirming the negativity of the $\dot{\lambda} = 0$ curve). Because the trace of this matrix is also positive, the two roots describing movement in the unemployment region must both be positive as well. This implies, as indicated by the directional arrows in Figure 2, that all paths are unstable with respect to the equilibrium at v equals infinity. Since the full employment region has a stable perfect foresight trajectory while the unemployment region does not, long-run equilibrium can never occur in the unemployment region and the optimal path of adjustment cannot re-enter this region once it has left.[7]

Response to an External Shock

A decline in the price of X does not affect the $\dot{v} = 0$ curve since it does not impact on the exogenously given technology of adjustment. On the other hand, because the fall in price reduces the benefit of more import intensive techniques by causing a decline in the wage-rental ratio, the $\dot{\lambda} = 0$ curve shifts inward to $\dot{\lambda}' = 0$ as illustrated in Figure 3. Furthermore, with the decline in the output price, the import-labor ratio, which can be supported at full employment, must decline. As a result, the VV curve, the boundary between the full employment and unemployment regions, shifts in to $V'V'$.

Figure 3 depicts the case in which the decrease in the price of output is sufficient to cause unemployment on impact. That is, immediately following the shock, the initial equilibrium level of the import-labor ratio, v^*, falls in the newly expanded unemployment region. As a consequence, the wage falls to zero and there is down-

[7]General sufficient conditions for a maximum to the type of problem examined here are given in Lambert (1985). The two most important of these are that the Hamiltonian be concave in the state variable and that there exists a solution to the differential equation system composed of Equations (11), (15a), and (15b). It is shown above that there are only two equilibrium values for v. The first of these is in the full employment region in which the Hamiltonian is concave and the second is in the unemployment region, at which v equals infinity, in which the Hamiltonian is convex. The continuity of the Hamiltonian and its concavity in the full employment region, in conjunction with its convexity in the unemployment region and the equilibrium at v equals infinity, ensures that the equilibrium in the full employment region is a global maximum if it exists. The existence of this maximum depends upon there being a solution to the differential equations describing the movement of v and λ. Conditions ensuring the solution to a system of this type are given in Takayama (1974). The principal requirement for existence, that the two differential equations be continuous, is satisfied. A sufficient condition for this solution to be unique is that both equations be continuously differentiable in v and λ. This condition is not satisfied here because $\dot{\lambda}$ is not continuously differentiable in v. This does not mean that the solution will necessarily be non-unique since it will also be unique if the two differential equations are Lipschitz continuous. In order to ensure the uniqueness of the solution, it is assumed that the parameters of the model satisfy this condition.

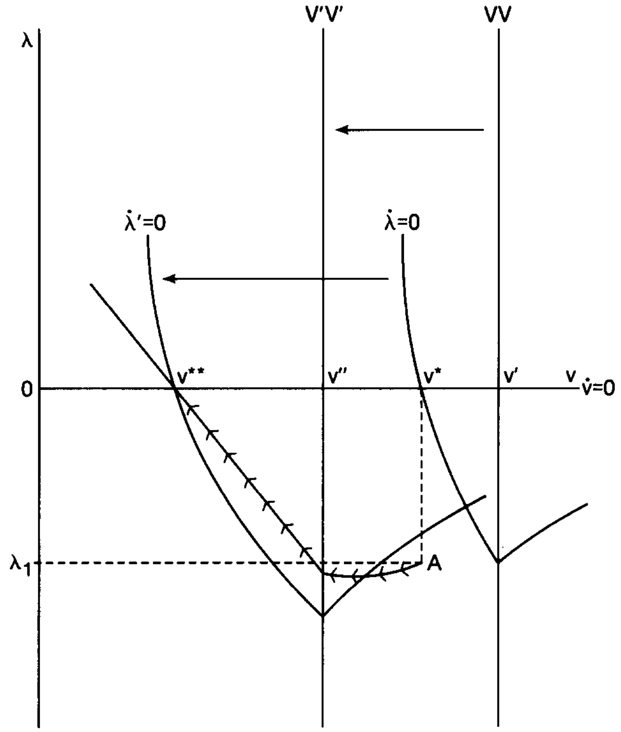

Figure 3.

ward pressure on the import-labor ratio. This is reflected in the immediate decline in λ to λ_1. Since the firm has perfect foresight and is profit maximizing, it chooses the rate of adjustment associated with the one unstable path in the unemployment region which connects with the stable arm at the boundary with the full employment region.

As the firm slowly changes its production technique, production becomes more labor intensive, employment rises, and λ moves along the optimal path in the unemployment region. When the production technique reaches v'' at the boundary between the two regions, the whole labor force is employed and the wage begins to rise. The process of adjustment ceases when the economy has moved up the stable trajectory in the full employment region to the new long-run equilibrium at v^{**}, the profit-maximizing import-labor ratio.

As can be seen from Equations (11) and (6), starting from a position in which λ is negative, the cost of adjustment falls as λ rises. An increase in λ reflects a decline in the benefit of reducing the import-labor ratio and, as a result, implies a fall in the adjustment cost which should be borne to alter the technique of production. This can only be done by slowing the speed of adjustment.

Unlike most adjustment cost models (see Harris, Lewis, and Purvis 1984), the speed of adjustment need not reach its maximum on impact. To see this, first note that the $\dot{\lambda} = 0$ curve measures the benefit to a marginal change in the technique of production if that change is expected to last forever. The adjustment path chosen by a firm with perfect foresight takes into account the complete movement to the new equilibrium. Thus, in the unemployment region, profits may have fallen to such an extent that the marginal benefit of a change in technique is fairly small. However, when the whole path is taken into account, the benefit from adjustment is greater than the static marginal benefit. This case is illustrated in Figure 3 where Point A is below the $\dot{\lambda}' = 0$ curve and the speed of adjustment is greater than would be called for if the technique at A was expected to last forever. Nevertheless, Point A is not associated with the maximum speed of adjustment along the optimal path. At A profits are low, the change in profits from reducing v is small and this holds down profits in total over the whole path. However, as v falls, profits increase at an ever increasing rate, warranting an increase in the speed of adjustment. This occurs until the benefit from adjusting even more quickly falls as the firm approaches the boundary between the two regions and, with it, the upcoming slowdown in the growth of profits due to the increase in wages which follows the return to full employment.

On impact, the fall in the price of the firm's output causes the wage to fall to zero, and employment, import use, and output to decline. As the technique of production begins to adjust toward the new long-run equilibrium at v^{**}, employment increases. At the import-labor ratio, v'', full employment is restored and the wage begins to rise toward its new long-run value (which must be less than the initial wage because the real wage must decline). As production becomes less import intensive, output and the use of the import initially increase. This occurs because the increase in employment caused by the fall in the import-labor ratio outweighs the substitution effect away from the imported input. However, once full employment is reached, continued substitution away from the import leads to a decline in its use and a fall in the level of output. During the entire adjustment process, the amount of the import employed in production and the level of output both remain below their initial values. Nevertheless, it is uncertain whether output and the use of the imported input will be larger on impact following the price decline than in the new long-run equilibrium. It may be that both output and import use overshoot their long-run values in the short run.

3. Summary and Conclusions

This paper has examined the relationship between the technique of production and the level of unemployment. The first section develops a one-sector static model characterized by a production technique which is fixed in the short run, but variable in the long run. With the wage flexible, a decline in the price of output causes the wage to overshoot its long-run value on impact. This results because the price of the imported input and the factor use ratio are both fixed in the short run, and as a consequence, the wage must bear the entire pressure of the price decline.

If the fall in the price of output is of sufficient magnitude, the wage will fall to zero and less than the complete endowment of workers will be employed. This follows because the user cost of labor does not go to zero along with the wage when both the production technique and the price of the imported input are fixed. The price change necessary to yield this result is smaller the greater the price of the import relative to the wage and the more import intensive the industry.

The second section makes explicit the cost of adjustment and characterizes the path of adjustment from a short-run equilibrium with unemployment to a long-run full employment equilibrium. An example is given in which, unlike most adjustment cost models, the speed of adjustment does not reach its maximum on impact. This results because the profits of the firm are so low in the unemployment region that it is unprofitable to invest in rapid adjustment. As a consequence, the speed with which the economy moves out of the unemployment region may initially increase as the level of unemployment falls.

While the model used to examine the relationship between the technique of production and unemployment is simple, the basic assumptions upon which the results rely are common to many countries and industries. These are that production requires a fixed-price imported input, the good produced be sold in a world market in which producers have little influence over price, the technique of production be costly to adjust, and labor costs be a fairly small component of total cost.[8]

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[8]In the model analyzed above, unemployment is the result of insufficient labor demand in the short run and can be eliminated by any policy which would increase labor demand (that is, factor or production subsidies). Permanent labor demand inducing policies will alter the steady-state equilibrium while temporary policies will alter the adjustment path. The number of potential paths (depending upon the type and duration of the policy as well as whether it is perfectly anticipated or not) is large and their characterization is beyond the scope of this paper. The welfare properties of these policies would depend upon the welfare cost of unemployment, whether the social and private costs of adjustment differ, the extent of policy induced distortions in production and adjustment, and the distortions related to policy financing.

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