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A GENERAL EQUILIBRIUM MODEL OF GUEST-WORKER MIGRATION

The Source-Country Perspective

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This paper examines the problem of guest-worker migration from an economy populated by identical, utility-maximizing individuals with finite working lives. The decision to migrate, the rate of saving while abroad, as well as the length of a migrant's stay in the foreign country, are all viewed as part of a solution to an intertemporal optimization problem. In addition to studying the microeconomic aspects of temporary migration, the paper analyses the determinants of the equilibrium flow of migrants, the corresponding domestic wage, and the level of welfare enjoyed by a typical worker. Effects of an emigration tax are also investigated.

1. Introduction

The relative importance of temporary as opposed to permanent migration has grown considerably since the end of World War II. This is particularly true with respect to the pattern of migration observed between the Mediterranean countries and the economies of northern and central Europe. The recent flows of labor into the oil-rich countries of the Persian Gulf from the less prosperous neighboring economies provide another example in which migration is primarily of the guest-worker type.

The system of temporary migration offers some attractive features to both the guest-workers and the host countries. From the point of view of the guest-worker, this type of international labor mobility enables one to take advantage of the higher wages abroad, without having to incur the relatively

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high economic and psychic costs of permanent migration. From the perspective of the host country, the guest-worker system presents an appealing way of dealing with labor-market shortages, particularly those perceived to be transitory in nature.

In spite of the considerable economic importance of guest-worker migration to both the countries of immigration and emigration, theoretical problems associated with this type of international labor mobility are only beginning to attract attention. Among the few existing studies is the contribution by Ethier (1985), which focuses on a number of host-country issues.[1] However, those aspects of the problem which are of the greatest concern to both the guest workers and to the remaining residents of the source country, have not been adequately addressed in the theoretical literature.[2]

The purpose of the present study is to examine the problem of guest-worker migration from the perspective of the potential migrant and his country of origin. In section 2 we develop a simple model of a small economy from which individuals migrate in order to seek temporary employment abroad. For simplicity and on the basis of the observation that temporary migration involves primarily unskilled labor, we assume that all workers are identical. Each of them has a finite working life over which he maximizes utility from consumption in the foreign and domestic economies. Thus, the decision to migrate, the rate of saving while abroad, as well as the length of a migrant's stay in the foreign country, are all viewed as parts of a solution to an intertemporal utility-maximization problem.

After analysing these microeconomic aspects of guest-worker migration, we turn in section 3 to the problem of determining the market wage in the source country and the equilibrium flow of migrants. In section 4 we employ a simple diagrammatic technique to study the effects of changes in certain parameters of the model on the pattern of international migration and the level of welfare enjoyed by the citizens of our economy. The disturbances considered include a change in the cost of international migration, a shift in preferences of migrants between consumption at home and consumption abroad, and a change in the wage available to guest workers in the host

[1]See also Bhagwati (1976) for an important survey of the issues related to the problem of international migration, including guest-worker migration, and the works of Bhagwati, Schatz and Wong (1984), Djajić (1986a, b), Ethier (1984), Krauss (1976), and Rivera-Batiz (1983). An article by Hill (1987) takes an approach somewhat similar to that of the present paper. There are also several empirical studies and informal discussions on the economics of guest-worker migration. See, for example, Blitz (1977), Chandavarkar (1980), Macmillan (1982), Mehrländer (1980), Piore (1979), Swamy (1981), and Richards and Martin (1983).

[2]The extensive literature on the 'brain-drain' problem focuses on a number of source-country issues, including those involving the welfare of migrants and of the remaining residents. However, it treats migration as permanent and does not deal with the problems which are specific to the guest-worker system.

country. The effects of an emigration tax are considered in section 5. Finally, section 6 offers some concluding remarks and suggestions for future research.

2. The decision to migrate

In an attempt to highlight what we perceive to be the central issues, we make several simplifying assumptions. We assume that at every instant there are N identical workers born in our economy, each endowed with one unit of labor. In addition to workers, there is a class of landlords who competitively employ workers, but do not supply any labor themselves. Each worker is assumed to be continuously employed throughout his working life, a period defined to last from the age of 0 to T.

In order to further simplify the analysis, we assume that the world economy produces a single commodity with the aid of land and labor. Moreover, the home country is small in relation to the rest of the world and relatively abundant in labor. Accordingly, the domestic real wage, w, is lower than the prevailing foreign wage, w^*. Workers are free to migrate across international borders and to seek employment abroad.[3] However, the presence of moving costs – both economic and psychic – prevents the equalization of w with w^*.

The problem facing each potential migrant is whether or not to incur the moving costs in exchange for the opportunity to receive a higher wage abroad. Moreover, if he decides to migrate, he faces the problems of choosing the length of his foreign stay and of dividing his lifetime income between consumption in one country and consumption in the other. In analysing these interrelated problems, we shall assume that the migrants have a stronger preference for consumption in their homeland than they do for consumption abroad. More specifically, letting $u^*(c^*)$ denote the flow of utility from the consumption rate c^* abroad and $u(c)$ denote the flow of utility enjoyed at home from the consumption rate c, we assume that

$$u^{*\prime}(x) < u'(x), \quad \forall\, x. \tag{1}$$

That is, the marginal utility of consumption at home is always higher than that associated with the same rate of consumption abroad. This assumption on the marginal utilities results in behavior consistent with stylized facts that migrants have a higher savings rate while aborad and that their rate of

[3]The model could easily be extended to a world in which migrants are permitted to work in the host country only for a specific period of time [see Djajić (1986b)]. The case of unimpeded migration, as within an economic community, seems to be a more logical starting point for analysis.

consumption rises upon returning to the homeland.[4] Both utility functions $u^*(\cdot)$ and $u(\cdot)$ are taken to be increasing, strictly concave, and twice continuously differentiable.

Let us assume further that the cost of moving to a foreign country in order to become a guest worker is an increasing function of the migrant's age, t. Thus, in the absence of any advantages to migrating later on in life, each migrant will minimize his moving costs by seeking employment abroad at age 0. The corresponding round-trip cost of migration is denoted μ and assumed to be the same for all citizens.

Finally, let us assume that capital markets are perfect and that the constant rate of time preference, δ, is equal to the world rate of interest, r. The latter assumption is made in an attempt to simplify the analysis and to highlight the role of factors influencing saving which are specific to the problem of guest-worker migration. The manner in which the optimal consumption pattern is affected when $\delta \neq r$ is well known.[5]

Considering only stationary equilibria, we may now formulate the problem facing each of the migrants as follows. He must choose the length of his foreign stay, τ, and the rates of consumption abroad and at home, $c^*(t)$ and $c(t)$, so as to maximize the discounted flow of utility,

$$V_m = \int_0^{\tau} u^*(c^*(t))\, e^{-\delta t}\, dt + \int_{\tau}^{T} u(c(t))\, e^{-\delta t}\, dt, \tag{2}$$

subject to the budget constraint,

$$\int_0^{\tau} c^*(t)\, e^{-\delta t}\, dt + \int_{\tau}^{T} c(t)\, e^{-\delta t}\, dt + \mu = w^* \int_0^{\tau} e^{-\delta t}\, dt + w \int_{\tau}^{T} e^{-\delta t}\, dt. \tag{3}$$

[4]Preferences and constraints faced by a typical guest worker give rise to economic behavior which often has the following two features. First, his savings rate while abroad tends to be unusually high. In Germany in 1972, for example, savings of migrants amounted to 25 percent of their average disposable income [Blitz (1977, pp. 498–499)]. For the figures on the other European countries, see Macmillan (1982) and the references cited therein. Second, evidence that a typical guest-worker's consumption undergoes an upward jump following his return to the homeland, particularly with respect to his rate of consumption of luxury goods which tend to be more expensive at home than they are abroad, has been reported by Chandavarkar (1980).

On the basis of these observations and informal interviews with guest workers, one might advance the following hypothesis. A guest-worker's utility is a function of both his consumption rate c and the number R of relatives and friends in whose presence consumption occurs. If c and R are Edgeworth complements, so that the marginal utility of consumption is increasing in R, and if R is higher in the homeland than it is abroad, one would indeed observe that a guest worker has a relatively higher preference for consumption at home in the sense of inequality (1).

[5]If $\delta \neq r$, consumption paths are not constant at home and abroad – consumption declines (rises) over time if $\delta > r (\delta < r)$ – but none of our qualitative results is affected. In particular, eqs. (7)–(15) below hold for both c and c^* just after the just before age τ, respectively.

Defining Z as the Lagrangian associated with the migrant's maximization problem, the first-order conditions are

$$\frac{\partial Z}{\partial c^*(t)} = u^{*\prime}(c^*(t))\,e^{-\delta t} - \lambda e^{-\delta t} = 0, \tag{4}$$

$$\frac{\partial Z}{\partial c(t)} = u'(c(t))\,e^{-\delta t} - \lambda \epsilon^{-\delta t} = 0, \tag{5}$$

$$\frac{\partial Z}{\partial \tau} = u^*(c^*(\tau))\,e^{-\delta t} - u(c(\tau))\,e^{-\delta t} - \lambda[c^*(\tau) - c(\tau) - w^* + w]\,e^{-\delta \tau} = 0, \tag{6}$$

and of course, the budget constraint (3). Since the shadow value of wealth, λ, is independent of time, eqs. (4) and (5) imply that $c^*(t) = c^*$, $c(t) = c$, and

$$u^{*\prime}(c^*) = u'(c) = \lambda. \tag{7}$$

Eq. (7) is the familiar arbitrage condition: the marginal utility of consumption at home must be equal to that abroad. From (1) and (7) it follows that $c^* < c$, indicating that the migrant's consumption rate rises instantaneously upon returning to the homeland. By using (5) and the fact that c and c^* are independent of t, (6) may be expressed as

$$u(c) - u^*(c^*) = u'(c)(w^* - w + c - c^*) > 0. \tag{8}$$

That is, the length of a migrant's foreign stay is optimal only if $u(c) - u^*(c^*)$, the utility sacrificed by remaining an extra instant abroad, is just equal to the gain in utility from saving $w^* - w + c - c^*$ additional units of output for consumption at home. Moreover, eq. (7) enables us to express c^* as a function of c:

$$c^* = \phi(c), \tag{9}$$

where $\phi' = dc^*/dc = u''(c)/u^{*\prime\prime}(c^*) > 0$.

With the aid of (9), we may rewrite (8) as

$$u(c) - u^*(\phi(c)) = u'(c)[w^* - w + c - \phi(c)], \tag{10}$$

which relates c to the international wage differential, $w^* - w$. That it does so uniquely, may be seen by differentiating (10) to obtain $dc/d(w^* - w) = u'(c)/u''(c)[\phi(c) - c - w^* + w] > 0$. This enables us to write eq. (10) as

$$c = \psi(w^* - w), \qquad \psi' = c/\rho[w^* - w + c - \phi(c)] > 0, \tag{11}$$

where $\rho \equiv -u''(c)c/u'(c) > 0$ is the elasticity of marginal utility with respect to consumption. The positive relationship between c and $w^* - w$ may be interpreted as follows. For a given pattern of a migrant's consumption in the two economies, the higher the international wage differential, the greater the value of $w^* - w + c - c^*$, his 'net' rate of asset accumulation abroad. To restore balance between the cost and the benefit of staying abroad and accumulating assets, c must rise to lower $u'(c)$ and hence lower the utility value of the higher savings rate.[6] The sensitivity of consumption to changes in $w^* - w$ is inversely related to ρ, a measure of the degree of concavity of the utility function.

In summary, the first-order conditions (4)–(6) determine by themselves c, c^*, and λ as functions of $w^* - w$. The remaining first-order condition, the budget constraint, then determines the optimal value of τ, given c and c^*. Integrating the terms in (3), and rearranging, we have

$$e^{-\delta\tau} = e^{-\delta T} + \frac{(w^* - c^*)(1 - e^{-\delta T}) - \delta\mu}{(c - c^* + w^* - w)}. \tag{12}$$

Because $c - c^* + w^* - w > 0$, it follows that $\tau < T$ if and only if

$$\mu < (w^* - c^*)\frac{(1 - e^{-\delta T})}{\delta}. \tag{13}$$

That is to say, an internal solution for τ emerges if and only if the cost of migration, μ, is smaller than the present value of savings in the foreign country by a migrant who follows the optimal consumption program and spends his entire working life abroad.

Substituting the optimal values of c and c^* into (12), we obtain the following relationship between the length of a migrant's foreign stay, τ, and the parameters of the model:

$$e^{-\delta\tau} = e^{-\delta T} + \frac{\{w^* - \phi[\psi(w^* - w)]\}(1 - e^{-\delta T}) - \delta\mu}{\psi(w^* - w) - \phi[\psi(w^* - w)] + w^* - w}, \tag{14}$$

which we shall denote as

$$\tau = \theta(w; w^*, \mu). \tag{15}$$

[6]It should be noted that while an increase in w (for a given w^*) lowers c and c^*, it does not lower a migrant's discounted utility. As is shown in section 3 below, discounted utility of a migrant *rises* with w as he responds to an increase in the domestic wage by reducing the duration of his stay abroad.

To find the effects on τ of changes in w, w^*, and μ, we differentiate (14). Throughout the rest of the paper, c^* and $\phi(c) \equiv \phi[\psi(w^*-w)]$, and c and $\psi(w^*-w)$, will be used interchangeably where it simplifies the algebra. In addition, let us define

$$k \equiv (1-e^{-\delta\tau})\phi'(\cdot)\psi'(\cdot)+(e^{-\delta\tau}-e^{-\delta T})\psi'(\cdot)>0,$$

where the derivatives of functions are with respect to their arguments (which are suppressed). For a given value of τ, k/δ measures the change in the discounted value of a migrant's optimal consumption stream from a one unit increase in the international wage differential. Because both c^* and c increase with this wage differential, $k/\delta>0$. From (14) it follows that the partial derivatives of the function θ are

$$\theta_w=[(e^{-\delta\tau}-e^{-\delta T})+k]/\delta e^{-\delta\tau}(c^*-c-w^*+w)<0, \tag{16}$$

$$\theta_{w^*}=[(1-e^{-\delta\tau})-k]/\delta e^{-\delta\tau}(c^*-c-w^*+w) \gtreqless 0, \tag{17}$$

$$\theta_\mu=-1/e^{-\delta\tau}(c^*-c-w^*+w)>0. \tag{18}$$

The signs in (16)–(18) may be explained as follows.

An increase in w reduces the international wage differential and, according to eqs. (9) and (11), lowers a migrant's rate of consumption both at home and abroad. At the same time it raises the present value of his lifetime earnings for any given $\tau<T$. Thus, an increase in w enables a migrant to attain his optimal consumption program with a shorter stay abroad (i.e. $\theta_w<0$). On the other hand, an increase in w^* widens the international wage differential, leading to an increase in a migrant's optimal rates of consumption in both countries. Although for a given τ the present value of his lifetime income also rises with w^*, it may increase by more or less than desired spending, depending on the sensitivity of c to changes in w^*-w. Because this sensitivity is inversely related to the degree of relative risk aversion, we may conclude that for relatively high (low) values of ρ, the cost of a migrant's optimal consumption program rises by less (more) than his income, resulting in a reduction (increase) in the required length of his foreign stay. Finally, we note that an increase in the cost of migration, μ, does not affect the rates of consumption enjoyed by a migrant in either economy. It does, however, lower the present value of his net lifetime income. Thus, in order to satisfy his intertemporal budget constraint, a migrant must stay in the foreign country for a longer period of time.

3. The equilibrium flow of migrants and welfare

In considering a migrant's maximization problem, we have treated the

domestic wage rate as exogenous. Given the technology and the economy's endowment of land, the equilibrium value of w is inversely related to the size of the country's labor force. It is therefore a direct function of M, the number of citizens of the home country employed abroad. The purpose of this section is to solve for the stationary value of w and the corresponding flow of migrants, M/τ, to and from the home country. In our analysis, we shall deal with internal solutions which yield an equilibrium flow of migrants smaller than N, the number of individuals born at each instant.

Eqs. (9), (11), and (15) provide the solutions for the optimal pattern of consumption and the length of a migrant's foreign stay as functions of w and the exogenous variables. Noting that w is a direct function of the number of migrants, M, and that the equilibrium value of τ is given by eq. (15), we may express the discounted utility of a typical migrant [defined by (2)] as

$$V_m = u^*(\phi\{\psi[w^* - w(M)]\}) \int_0^{\theta[w(M);\, w^*,\, \mu]} e^{-\delta t}\, dt$$

$$+ u\{\psi[w^* - w(M)]\}) \int_{\theta[w(M);\, w^*,\, \mu]}^{T} e^{-\delta t}\, dt. \tag{19}$$

A resident who chooses not to migrate (referred to as a remaining worker) maximizes $\int_0^T u(\tilde{c}(t))\, e^{-\delta t}\, dt$, subject to the budget constraint,

$$\int_0^T \tilde{c}(t)\, e^{-\delta t}\, dt = w \int_0^T e^{-\delta t}\, dt.$$

The solution to this problem is $\tilde{c}(t) = w$ for all t, so that the discounted utility achieved by a remaining worker is given by

$$V_r = u[w(M)] \int_0^T e^{-\delta t}\, dt. \tag{20}$$

We observe that both V_m and V_r are functions of $w(M)$. By differentiating (19) and (20) with respect to $w(M)$ and rearranging terms, we can express the slopes of these functions as

$$\frac{\partial V_m}{\partial w(M)} = \frac{u'(c)(e^{-\delta\tau} - e^{-\delta T})}{\delta} > 0, \tag{21}$$

$$\frac{\partial V_r}{\partial w(M)} = \frac{u'[w(M)](1 - e^{-\delta T})}{\delta} > 0. \tag{22}$$

Since $c > w(M)$, $u'(c) < u'[w(M)]$. Moreover, $e^{-\delta\tau} < 1$. Consequently,

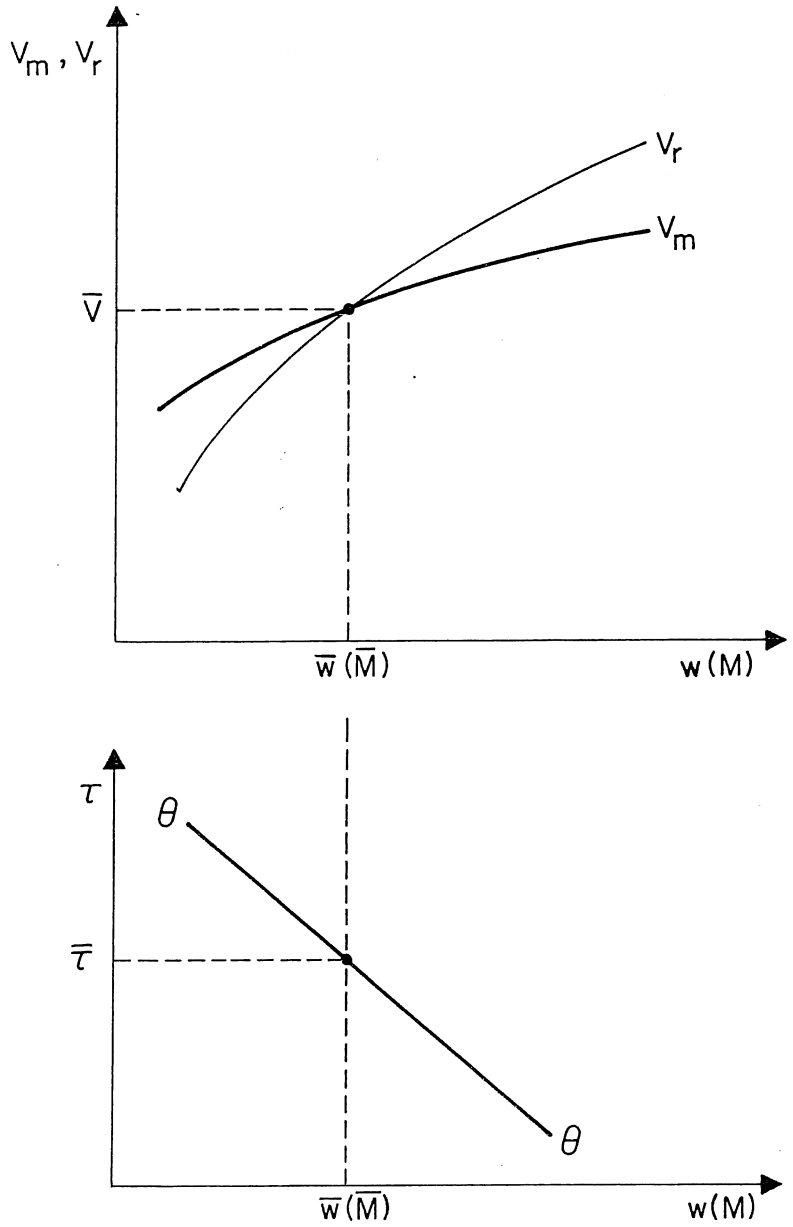

Fig. 1. Determination of equilibrium w and τ.

$\partial V_r/\partial w(M) > \partial V_m/\partial w(M)$. Assuming that $V_m > V_r$ when $M = 0$ (otherwise it would not pay for anyone to migrate), we may use the schedules V_m and V_r in the top panel of fig. 1 to depict the relationships between $w(M)$ on the one hand, and the levels of discounted utility enjoyed by the migrants and by the remaining workers on the other.

Because all workers are identical, in a stationary equilibrium there can be no advantage to being a migrant rather than a remaining worker. The value of V_m must therefore be equal to V_r, as at the point of intersection between the V_m and V_r schedules. Corresponding to this point is the equilibrium domestic wage $\bar{w}$. Once this wage is determined, one can easily solve (with the aid of the production function) for the corresponding number of migrants, $\bar{M}$.

The lower panel of fig. 1 displays the relationship between the domestic

wage and the optimal length of a migrant's foreign stay. From (16), τ and w are inversely related so that the link between the two can be represented by the negatively sloped $\theta\theta$ schedule. This schedule may now be used to determine $\bar{\tau}$, the optimal value of τ corresponding to the equilibrium wage, $\bar{w}(M)$. Finally, if $\bar{M}$ is the equilibrium number of migrants and $\bar{\tau}$ is the length of time that each of them spends abroad, $\bar{F}=\bar{M}/\bar{\tau}$ is the stationary flow of migrants leaving and returning to the home country per unit of time.

4. Comparative statics

This section examines the effects of changes in certain parameters of the model on the pattern of migration and welfare in a stationary equilibrium. It is most convenient to proceed with the analysis geometrically; algebraic derivations are presented where appropriate.

4.1. A decline in the cost of international migration

Consider a fall in the cost of migration due, for example, to a reduction in transport and communication costs. How does this fall affect the duration of a typical migrant's stay in the foreign country and his savings rate abroad? How does it affect the flow of migrants and the level of welfare enjoyed by the workers remaining in the source country? From (18), at each level of w, a decline in μ reduces the optimal value of τ. This shifts the $\theta\theta$ schedule down to $\theta'\theta'$ in the lower panel of fig. 2. In addition, because a reduction in μ raises the discounted value of a migrant's lifetime utility by $-u'(c)\,d\mu>0$ at each value of w, it shifts the V_m locus upward to V'_m, as illustrated in the top panel of fig. 2. Given that a change in μ has no effect on V_r, the point of intersection between the V_m and V_r schedules must lie above and to the right of the initial equilibrium. The level of welfare enjoyed by each worker rises from $\bar{V}_0$ to $\bar{V}_1$, while the equilibrium domestic wage increases from $\bar{w}_0$ to $\bar{w}_1$. The corresponding increase in the number of migrants is from $\bar{M}_0$ to $\bar{M}_1$.

Because an increase in $\bar{w}$ narrows the international wage differential, it lowers the migrant's optimal rates of consumption both at home and abroad [see eqs. (9) and (11)]. With a constant w^*, this implies that each migrant saves a larger fraction of his foreign income.

In the lower panel of fig. 2 the optimal length of a typical guest worker's stay in the foreign country falls from $\bar{\tau}_0$ to $\bar{\tau}_1$. This is because a reduction in μ lowers the optimal value of τ both directly (by relaxing the migrant's intertemporal budget constraint at each value of w) and indirectly (by raising the equilibrium level of w). An implication of a fall in $\bar{\tau}$ is that the stationary *flow* of migrants, $\bar{F}$, increases proportionately more than the number of migrants, $\bar{M}$.

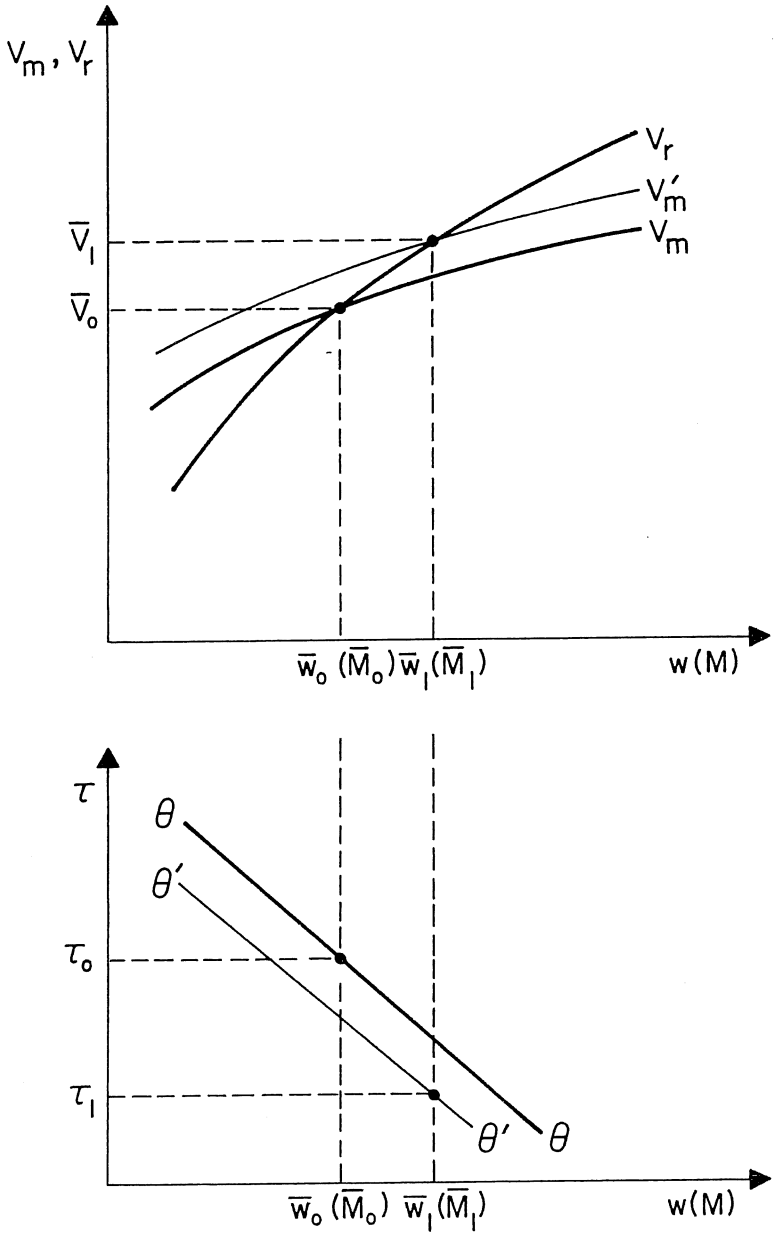

Fig. 2. Effect of a reduction in μ.

4.2. An increase in the foreign wage

It was shown in eq. (17) that an increase in w^* has an ambiguous effect on the position of the $\theta\theta$ schedule. However, it improves the welfare of migrants at each level of w, shifting the V_m locus up and to the left. This can be seen by differentiating (19) and obtaining $\partial V_m/\partial w^* = u'(c)[1-e^{-\delta\tau}]/\delta > 0$. At the same time, a change in w^* leaves the position of the V_r locus unaffected. Thus, as in the case of a reduction in μ (depicted in fig. 2) the level of welfare of each worker rises from, say, $\bar{V}_0$ to $\bar{V}_1$ and the domestic wage rises from $\bar{w}_0$ to $\bar{w}_1$. The corresponding increase in the stock of migrant labor is from $\bar{M}_0$ to $\bar{M}_1$.

The effect of an increase in w^* on $\bar{\tau}$ is ambiguous. However, because an increase in w^* raises the domestic wage, τ must fall if the $\theta\theta$ schedule shifts

downward (i.e. if $\theta_{w^*}<0$). Alternatively, in the event that $\theta_{w^*}>0$, as when ρ is relatively 'small' [see the discussion following eq. (17)], there exists the possibility that $d\bar{\tau}/dw^*>0$.

4.3. A shift in preferences

Consider next the effects of a change in tastes which increases the flow of utility and the marginal utility associated with each rate of consumption abroad. Such a change in tastes could, for example, be the result of an improvement in the social atmosphere that the migrants face in the host country. It will be viewed in what follows as an upward shift of the function $\phi(\cdot)$ in eq. (9). Differentiation of eq. (10) with respect to $\phi(\cdot)$ reveals that this shift in preferences raises c^* while leaving c unchanged for any given values of w^* and w.[7] In order to finance the higher rate of consumption abroad, each migrant must now work in the foreign country for a longer period of time. Accordingly, in fig. 3, the $\theta\theta$ schedule shifts up and to the right.

The rise in the flow of utility associated with any given rate of consumption abroad shifts the V_m schedule up and to the left in the upper panel of fig. 3. In consequence, the stationary level of welfare enjoyed by both the migrants and the remaining workers increases from $\bar{V}_0$ to $\bar{V}_1$. The domestic wage $\bar{w}$ also increases, as does the equilibrium number of migrants. However, the net effect on the length of each migrant's foreign stay (shown in the lower panel of fig. 3 to be positive) is ambiguous. While the direct effect of an increase in the attractiveness of living abroad tends to increase τ, the associated rise in the domestic wage operates in the opposite direction.

5. Emigration tax and welfare

The effects of taxing emigration have been analysed primarily in the context of models where the earning power differs among individuals.[8] Assuming that the foreign wage is higher than that available at home, there is an economic rent associated with the opportunity to migrate for all but the marginal migrant (the individual who is just indifferent between being a migrant and a nonmigrant). By taxing this rent, the government of the source country can improve the welfare of the remaining residents as well as the distribution of income among them.

In contrast with the assumptions made in these studies, we have posited that all workers are identical. This assumption is particularly appropriate for the analysis of temporary migration of manual workers whose abilities are essentially the same as those of the remaining residents. Consequently, each

[7]It increases, however, the elasticity of c with respect to the international wage differential.

[8]See, for example, Bhagwati and Hamada (1982), Baumol (1982), Djajić (1985), McCulloch and Yellen (1975), Mirrlees (1982), and Wilson (1982).

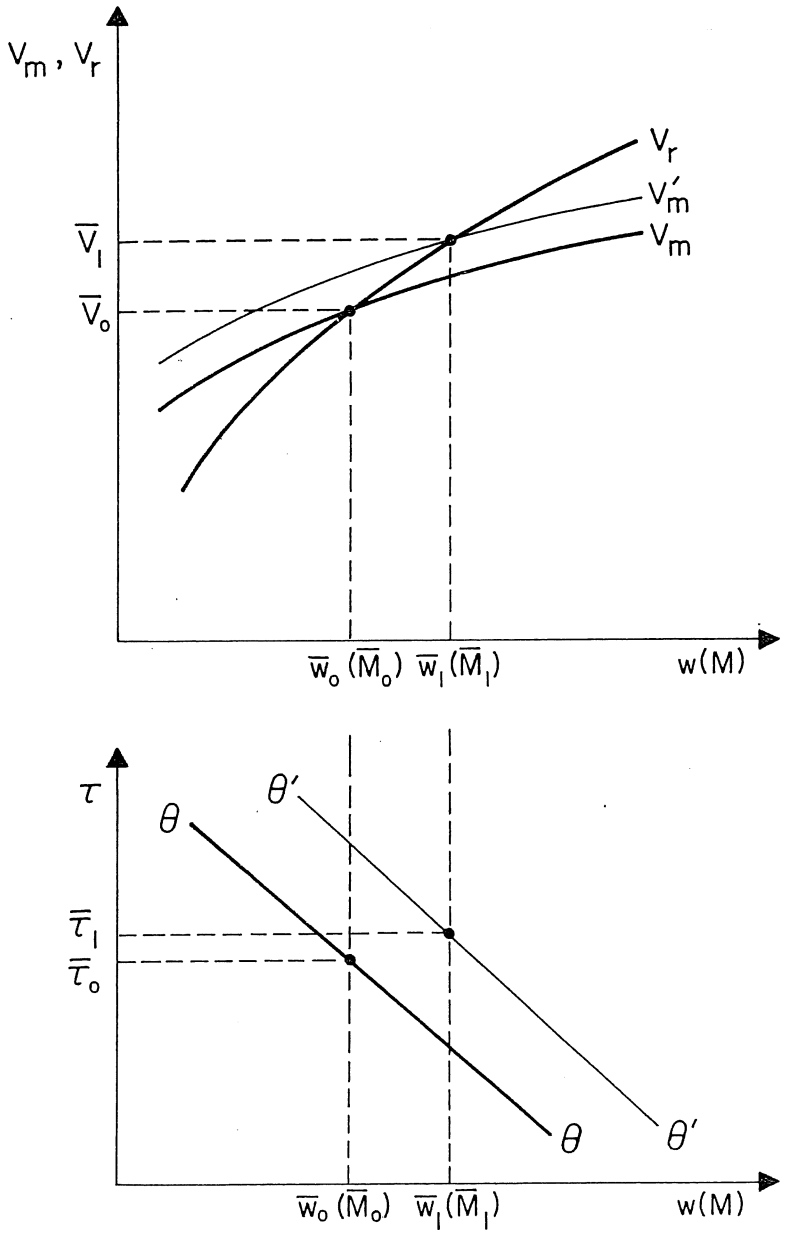

Fig. 3. Effect of a change in preferences favoring consumption abroad.

migrant is a 'marginal migrant', earning no rent that could be taxed and used by the authorities to improve the welfare of the remaining residents. On the contrary, it can be shown that the imposition of an emigration tax necessarily lowers welfare, not only of migrants, but also of those workers who choose not to migrate. It is only the landlords who benefit from this policy measure.

Let us assume that the government of the source country imposes an exit tax on those who leave the economy in order to seek employment abroad. This tax raises the cost of migration, the effects of which are already familiar, given the analysis of a change in μ in subsection 4.1. Thus, as shown in fig. 4, the V_m schedule shifts down from V_m to V'_m, while the $\theta\theta$ schedule shifts up and to the right. Assuming that the tax revenue is given to the landlords, the position of the V_r schedule remains unaffected. Under those conditions, the

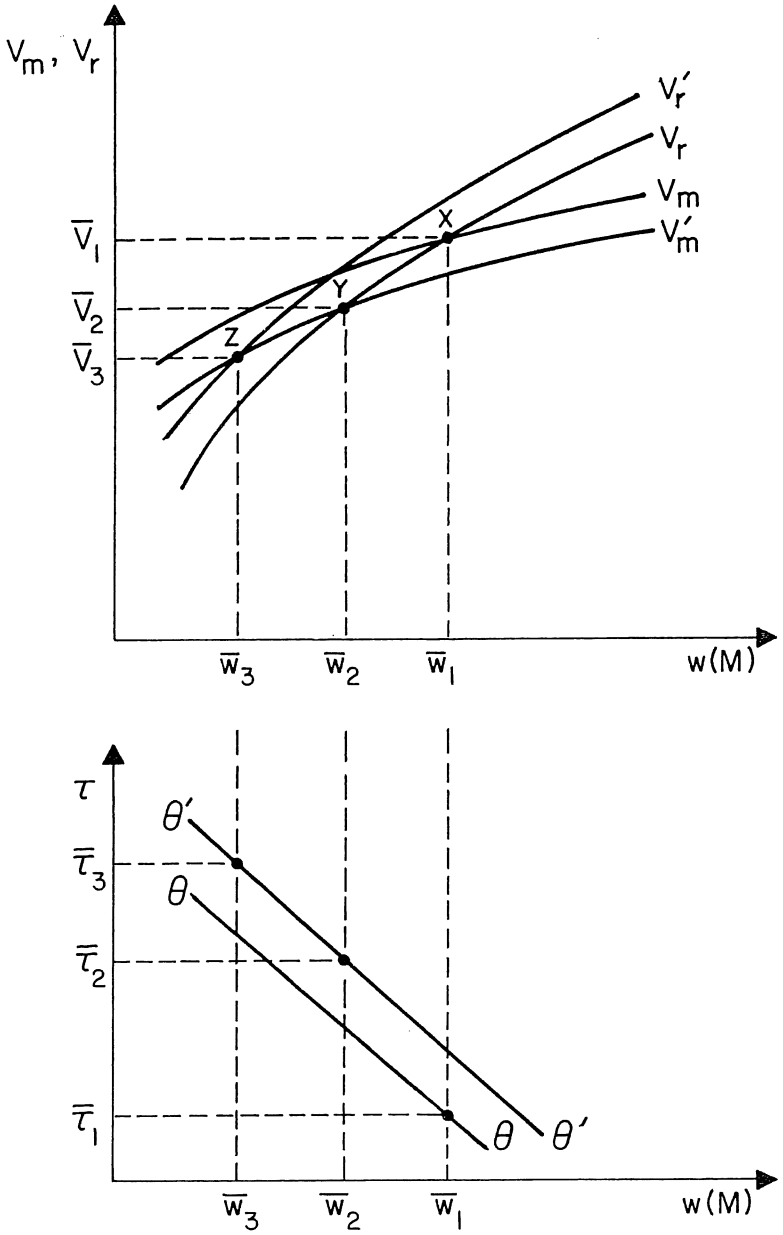

Fig. 4. Effect of the imposition of an emigration tax.

level of welfare of each worker falls from $\bar{V}_1$ to $\bar{V}_2$, the equilibrium wage declines from $\bar{w}_1$ to $\bar{w}_2$, and the length of each migrant's stay abroad rises from $\bar{\tau}_1$ to $\bar{\tau}_2$.

Alternatively, if the proceeds of the tax are redistributed to those workers who agree never to migrate, the welfare locus of the remaining workers shifts up from V_r to V_r'. This is because at any given w, the income of each remaining worker is now higher due to the transfer. As a result of this shift of the V_r locus, w falls to $\bar{w}_3$ and the stationary level of welfare enjoyed by each worker declines to $\bar{V}_3$. Thus, the welfare loss of workers is *larger* than that experienced when the tax proceeds are turned over to the landlords.

The intuition behind these somewhat paradoxical results is rather simple. In the absence of monopoly power in the international market for labor, an emigration tax is a welfare-reducing distortion for the economy as a whole.

Moreover, by discouraging emigration, the tax is an instrument which shifts the economy's distribution of income away from labor and in favor of the landlords. Thus, given the assumption that all workers are identical, each of them must unambiguously suffer a welfare loss, regardless of whether he chooses to migrate or to remain at home. If the tax revenue is distributed to the remaining workers, the size of the distortion is greater, and hence the welfare loss experienced by workers larger.[9]

It is interesting to examine the effects of the emigration tax on the standards of living enjoyed *in the home country* by the returning migrants and by the remaining workers. If the tax proceeds are distributed to the landlords, $\bar{w}$ falls to $\bar{w}_2$, *lowering* the constant rate of consumption and utility enjoyed by the remaining workers. The fall in $\bar{w}$, however, *increases* the international wage differential and hence the rate of consumption that the migrants undertake after resettling in their homeland. Thus, the gap between the rates of consumption enjoyed in the home country by the two groups of workers is now wider.

This gap can be shown to increase even further if the proceeds of the tax are not distributed to the landlords, but rather to the workers who agree not to migrate. It was argued earlier that this change in the manner of distributing the proceeds shifts the V_r schedule up and to the left in fig. 4 and lowers the discounted utility of each worker from $\bar{V}_2$ to $\bar{V}_3$. The constant rate of consumption enjoyed by the remaining workers must be correspondingly lower in spite of the transfer. On the other hand, the further fall in w from $\bar{w}_2$ to $\bar{w}_3$ increases the international wage differential and hence the migrant's rate of consumption at home. It follows that the act of distributing the tax proceeds to the remaining workers lowers their rate of consumption, while raising that enjoyed in the home country by the returning migrants. Thus, in the context of the present model, the policy of taxing emigration in an attempt to reduce the gap between the standard of living enjoyed by the returning migrants and by the remaining workers will generate precisely the opposite effects. It should be emphasized, however, that the migrants enjoy a higher consumption level at home at the cost of a longer period of low-utility consumption abroad.

6. Concluding remarks

The main contribution of this paper lies in its approach to the problem of international migration. In contrast with most of the earlier studies, the approach is based on the notion that migrants are utility-maximizing individuals with finite working lives. Accordingly, the decision to migrate, the

[9]Our results rely, of course, on the structure of our model. If we consider instead an economy where skilled and unskilled workers – rather than land and labor – are used to produce output, a tax on emigration of skilled (unskilled) workers would *benefit* unskilled (skilled) workers.

length of a guest-worker's stay and his rate of asset accumulation in the foreign country, are all viewed as parts of a solution to an intertemporal optimization problem.

In addition to analysing the behaviour of guest workers and their optimal response to a number of exogenous disturbances, we have examined the effects of these disturbances on the equilibrium flow of migrants, the domestic wage, and the level of welfare enjoyed by the remaining workers of the source country. Although none of the results was found to be particularly striking, they all serve to highlight the present model's unique ability to deal with issues related to the optimal length of a migrant's stay in the foreign country and his intertemporal pattern of consumption within a general equilibrium framework.

While the model is capable of addressing a range of important source-country issues, its ability to explain a number of observed phenomena is limited by some of our simplifying assumptions. For example, by dropping the assumptions that all individuals are identical and that a migrant's preferences are invariant with respect to the length of time spent away from the home country, one would be able to offer economic reasons why some migrants make several trips to the foreign country, why some stay longer than others, and why some migrants never return. Furthermore, to relax the assumption of perfect capital markets and to introduce physical capital into the model as a factor of production would allow one to gain insights into the important and controversial relationship between international migration and economic growth of the source country. Explicit consideration of tariffs – which in the context of the present model amount to a tax on remittances – and other economic policies which have a direct influence on the decision to migrate (e.g. minimum-wage laws, immigration restrictions, and labor-market subsidies) would also be useful in future research.

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