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Immigrant Decisions Concerning Length of Stay And Frequency of Visit

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Immigrant Decisions Concerning Length of Stay and Frequency of Visit

1. Introduction

Two of the more interesting aspects of the migration patterns of undocumented Mexican workers are that their residential status in the U.S. is typically nonpermanent and that they travel repeatedly between the two countries. A traditional explanation of this behavior would point to large and frequent variations in the U.S./Mexican wage differential. However, data on border apprehensions of undocumented workers are not particularly cyclical, and large changes in wage differentials are too infrequent to explain the number of trips and the relatively short lengths of stay of an average immigrant. This paper suggests an alternative explanation. It is assumed that an immigrant's utility depends not only upon his lifetime income, but also upon the location of his work effort. First, he has a preference for home-country residence. This preference must be weighed against any pecuniary advantage to working in the foreign country. But if an immigrant diversifies his consumption of "goods", he will choose to spend much of his working life in the home country even if the foreign wage is permanently higher than the home wage. Second, he is assumed to be concerned not only about how much total time he spends in the home country, but also about how that time is distributed over his life cycle. Following a popular theory of intertemporal consumer behavior, the immigrant is assumed to have a preference for smoothing his life-cycle consumption of home residence. This implies that, other things being equal, his utility

will vary directly with the number of trips he makes to the foreign country, and it suggests another basic tradeoff between the benefits of more frequent visits and his income net of travelling costs.

The paper is organized as follows. Section 2 develops the general model of immigrant decision-making. The model simultaneously determines the immigrant's net lifetime income, the total time allocated to home-country and foreign-country residence, and the number of trips made to the foreign country. Section 3 examines some special cases of the model which parallel some simple theories of migration. Section 4 examines the general case. It is shown that lifetime participation in the foreign labor market will be more responsive to changes in the home wage than to equal, but opposite, changes in the foreign wage. It is also shown that changes in travelling costs have predictable consequences for the number of border crossings, but not for the total time spent in the foreign labor market. Section 5 summarizes the principal results and discusses some of their empirical and policy implications.

2. The model

We can generally think of an immigrant's life-cycle utility as depending upon the time paths of his consumption of goods and place of residence. His problem is to maximize utility by choosing time paths of consumption which are financially feasible. Such a framework is so general, however, as to offer little insight into immigrant behavior. The strategy will then be to impose further structure on the problem by making some assumptions about the financial environment within which the immigrant

must operate and about the class of location paths which are analytically tractable. These assumptions will be introduced sequentially so as to make clear what additional structure is provided by each assumption.

First assume that capital markets are perfect, i.e. that the rate of interest at which the immigrant can lend is equal to the rate at which he can borrow. The financial constraints on his decisions can then be expressed as an equality between the present discounted value of his goods consumption and the present discounted value of his income net of travelling costs. Moreover, it is possible to separate his decisions regarding the location of work effort from decisions concerning the time distribution of goods consumption. This requires no assumption of separability in his life-cycle preferences for goods and location, only the conceptual construction of an indirect utility function which expresses the maximum utility possible given a particular discounted value of lifetime goods consumption and a particular time path of location. Thus, if capital markets are perfect, the immigrant's locational problem can be expressed as

$$(1) \qquad \text{Max} \quad U(y,L)$$
$$\text{s.t.} \quad y = PV(L)$$

where y is the discounted value of lifetime goods consumption, L is the time path of location (with L(t) being a binary variable which equals 1 if the immigrant chooses to reside in the home country at time t and 0 if he resides in the foreign country), and PV is the discounted value of lifetime income net of travelling costs.

While (1) does impose some structure on the immigrant's decision problem, it is still intractable given the generality allowed in choosing location paths. To proceed any further, we need to restrict the class of location paths to those with a simple parametric representation. Let us consider only those location paths for which the length of stay in each of the home and foreign countries is the same for all visits. Also assume that the immigrant begins and ends his working life in the home country.[1] Then all such location paths can be described by two parameters: the total time spent in the home country (M) and the number of trips made to the foreign country (n). Two examples are shown in Figures 1 and 2. In these examples, n is varied from 2 to 4 and M is held constant. A greater variety of location paths can be generated by varying M.

By so restricting the class of admissible location paths, the immigrant's decision problem can be expressed as

$$
\begin{aligned}
(2) \qquad & \text{Max} \quad U(y,M,n) \\
& \text{s.t.} \quad y = PV(M,n),\ 0 \le M \le T, \\
& \qquad n \in \{0,1,2,\ldots\},\ \text{and} \\
& \qquad n = 0 \ \text{implies}\ M = T
\end{aligned}
$$

where T is the length of the immigrant's working life. The restriction "n = 0 implies M = T" excludes the possibility of spending time in the foreign country without making a trip. It simply recognizes that the immigrant begins his life in the home country.[2]

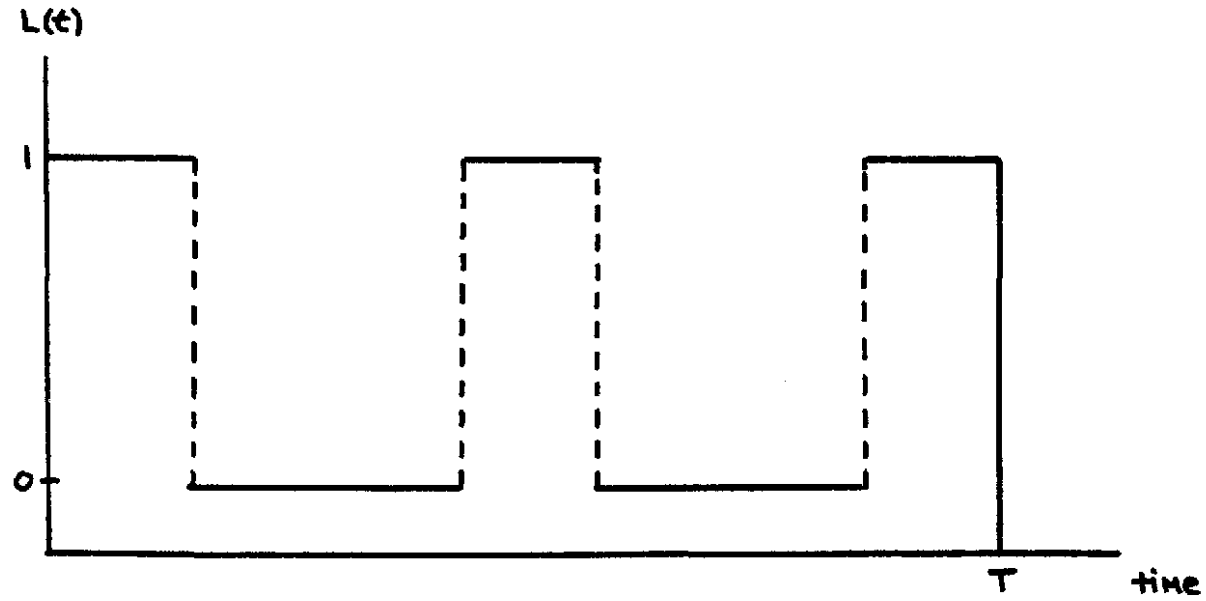

Figure 1

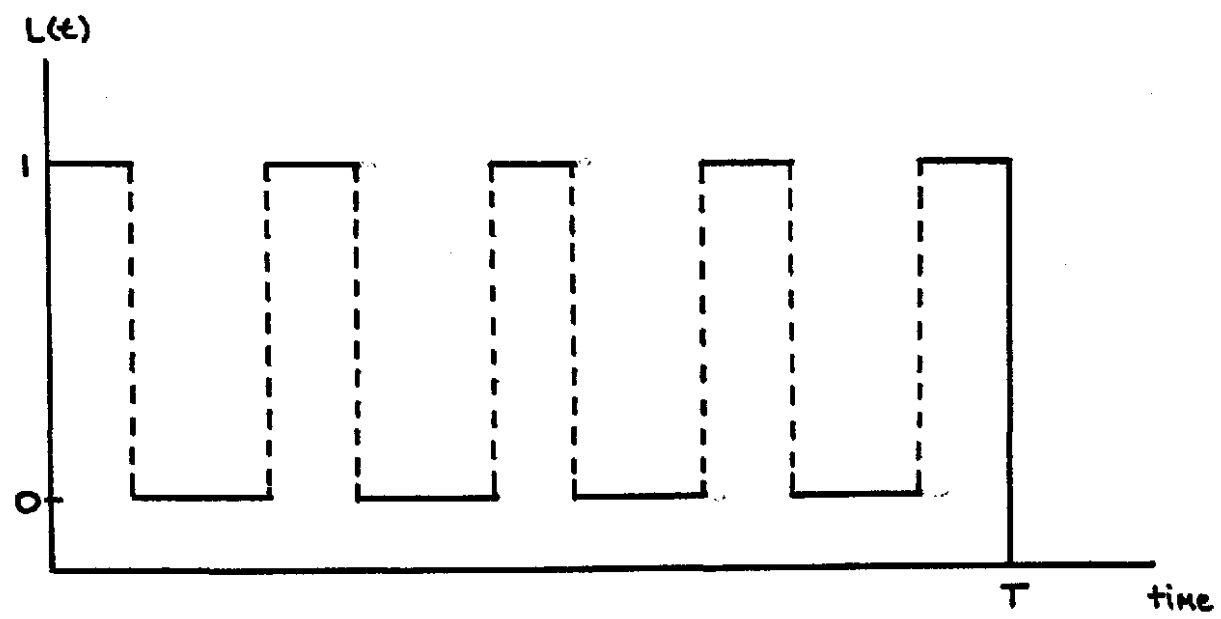

Figure 2

As a final simplification, suppose that the interest rate is zero and that expected wages are constant across time.[3] Then (2) can be written as

$$
\begin{aligned}
(3) \qquad & \text{Max} \quad U(y,M,n) \\
& \text{s.t.} \quad y = w^*(T-M) + wM - cn, \\
& \qquad 0 \leq M \leq T, \; n \in \{0,1,2,\ldots\}, \text{ and} \\
& \qquad n = 0 \text{ implies } M = T
\end{aligned}
$$

where w and w^* are the wages in the home and foreign countries and c is the round-trip cost of each border crossing. The problem described by (3) is offered as a basic model of immigrant behavior. The model determines net lifetime income, the total time allocated to home and foreign residence, and the number of trips made to the foreign country. Some special cases of (3) will be considered in section 3. An analysis of the general case is provided in section 4.

3. Some special cases

We begin the analysis of problem (3) by considering three special cases: (a) where life-cycle utility depends only upon lifetime net income; (b) where, after achieving a particular level of lifetime income, utility then depends only upon the total time spent in the home country; and (c) where utility depends upon lifetime income and total time spent in the home country, but not upon the number of visits made to the home country.

(a) If utility is independent of M and n, the immigrant's objective is simply to maximize the discounted value of lifetime income net of

travelling costs. Since travelling confers no direct benefit, and since both wages are assumed constant over time, optimal n is either 0 or 1. Because utility is independent of the amount of time spent in the home country, optimal M is either 0 or T. Thus there are two solution candidates:

$$M = 0,\ n = 1 \text{ which implies } y = w^*T - c;$$

$$M = T,\ n = 0 \text{ which implies } y = wT.$$

It is optimal to emigrate, and to do so only once, if and only if the difference between lifetime income in the foreign country and lifetime income in the home country exceeds the cost of a single trip. Otherwise, it is optimal to remain permanently in the home country.

This is, of course, a very simple and very familiar economic criterion for migration. For purposes of comparison, however, it is useful to note some of its implications. First, the theory suggests that, if we aggregate over all immigrants, the number of trips made to and the total time spent in the foreign country will be bound up with one another and will, therefore, move together. Any policy which succeeds in reducing the number of trips made to the foreign country will necessarily reduce the total time spent working in the foreign labor market. Second, the theory is quite strict concerning the effect on the location of work effort of changes in wages or travelling costs. Specifically, immigrants will spend less time working in the foreign labor market the higher is the home wage, the lower is the foreign wage, or the higher are the travelling costs. Finally, note that any given change in the home wage will have the same impact on the location of work effort as an equal, but opposite, change in the foreign

wage. It is this property of the theory which provides justification for treating labor supply to a particular location simply as a function of the absolute wage differential.

(b) Suppose now that the immigrant's objective is to reach a particular level of net lifetime income (y^o), but to then spend as much time as possible in the home country.[4] Then assuming that y^o can be attained and that some time must be spent working in the foreign country, it is optimal to emigrate once and to choose M so that

$$y^o = w^*(T-M) + wM - c.$$

This is quite similar to the simple theory used to explain temporary migration patterns in Africa. In contrast to case (a), the theory suggests that more time will be spent working in the foreign labor market the lower is the foreign wage or the higher are the travelling costs.

(c) The last special case to be considered contains elements of both of the previous cases. Here we assume that the immigrant's utility varies directly with both net lifetime income and total time spent in the home country. We ignore until section 4 the possibility of utility also being dependent upon the number of trips. Thus the optimal number of trips to the foreign country is at most one. In what follows, we shall assume that it is optimal to migrate.

Figure 3 provides a diagrammatic treatment of the immigrant's problem. His preferences are defined by indifference curves that are convex to the origin. The constraints on his choice of y and M are represented by the line segments AB and BC. The slope of AB, the cost of M in terms of y, equals (w^*-w). The optimal solution occurs at point Z where the highest

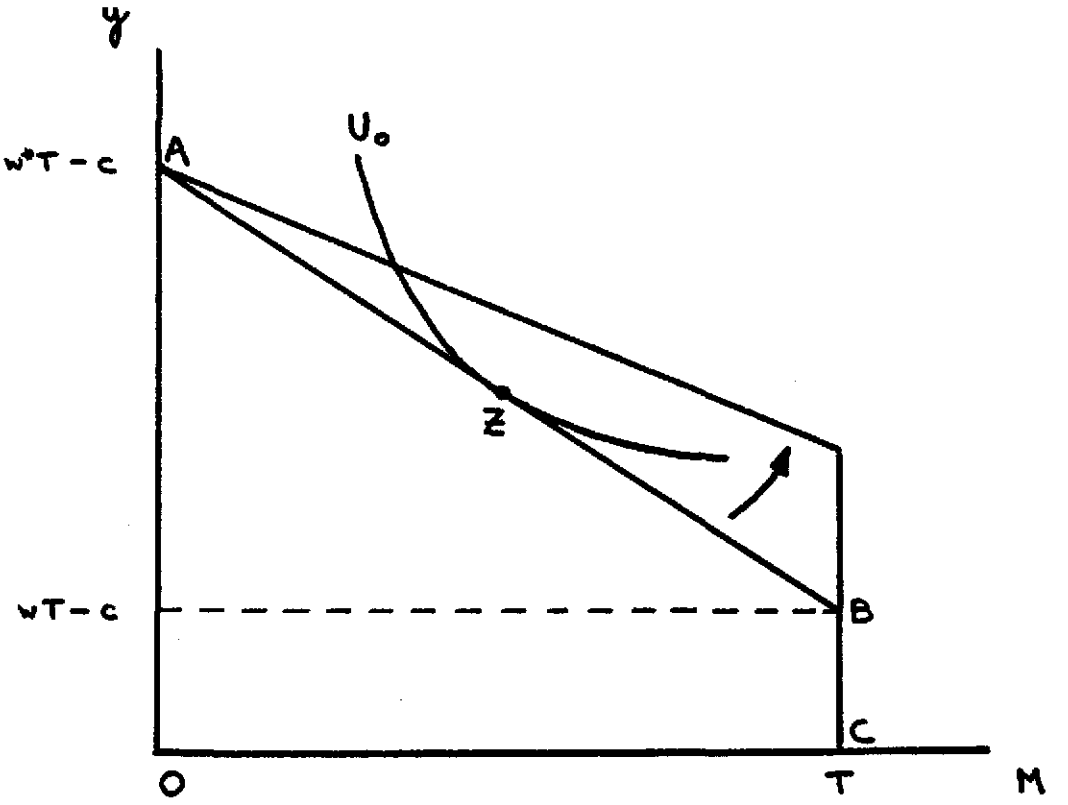

Figure 3

attainable indifference curve lies tangent to the constraint. We now determine the effect on M of changes in w, w*, and c.

Consider first an increase in home wages. As shown in Figure 3, an increase in w serves to lower the relative cost of M and to enable the immigrant to reach a higher indifference curve. Assuming M is a normal commodity, the immigrant will unambiguously choose to spend more time working in the home country and less in the foreign country. The lower relative cost of home residence encourages him to substitute toward M along his original indifference curve, and, since maximum utility is increased, this increase in M is reinforced by the "income" effect.

Figure 3 can also be used to show the effect of a decrease in the foreign wage (not shown). Once again, the relative cost of M is lowered, and there is a substitution effect toward spending more time in the home country. Here, however, maximum utility is reduced and the income effect discourages home residence. Increases in home wages and decreases in foreign wages are not symmetric in their impact on the location of work effort. Indeed, if substantial time had been originally allocated to foreign residence, it is quite conceivable that a fall in foreign wages could induce immigrants to spend more of their lives working in the foreign country.

Finally consider the effect of an increase in travelling costs. As is clear from Figure 3, the increase in c is equivalent to a lump sum tax. There is no substitution effect, only an income effect which encourages the immigrant to spend more time working in the foreign country. This result is, however, sensitive to the assumption that utility is independent of the

number of trips. More generally, an increase in c will reduce the number of trips which, in turn, will shift the constraint line out toward its original position and may alter the slopes of indifference curves in the (y,M) plane.

4. General analysis

The location paths in Figures 1 and 2 were drawn so as to offer the same total quantity of home residence. They differ only in the lengths of stay per visit. Would an immigrant then be indifferent between the two if his lifetime income net of travelling costs were the same in each case? The assumption made now is that he would not be. In particular, he would prefer the location path shown in Figure 2 because it provides a more even life-cycle distribution of home residence. More generally, an immigrant's utility will vary directly with the number of trips he makes if his lifetime income net of travelling costs and the total time he spends in the home country are held constant.

One reason, of course, for allowing the number of trips to affect utility directly is to explain the migration patterns of temporary workers. As previously discussed, if there is no non-pecuniary benefit to changing location, and if the differential between home and foreign wages varies little over time, the optimal number of trips to the foreign country is at most one. But there is another, more basic reason. A premise which underlies much of the economic theory of intertemporal allocation is that individuals prefer to smooth their consumption over time. Such a preference is quite familiar from the life-cycle theory of saving, and it

is implicit whenever multi-period utility is expressed as a sum of periodic utilities which increase at a decreasing rate with periodic consumption. But if individuals are so motivated in making intertemporal choices about consumption of food, housing, etc., would they not have similar preferences for consumption of other "goods"?[5] If immigrants have a preference for home residence, they should also prefer to evenly distribute that time over their life cycles. In our parametric representation of location paths, the evenness with which home residence is consumed is determined by the number of trips made to the foreign country.

An analysis of this case can be readily accomplished by rewriting (3) as

$$
\begin{aligned}
(4) \qquad & \text{Max} \quad U(y,M,n) \\
& \text{s.t.} \quad w^*T = y + (w^*-w)M + cn, \\
& \qquad 0 \leq M \leq T, \; n \in \{0,1,2,\ldots\}, \text{ and} \\
& \qquad n = 0 \text{ implies } M = T.
\end{aligned}
$$

Apart from the integer constraint on n, the immigrant's decision is a standard 3-commodity consumer problem with a time endowment. There are three "commodities" -- y, M, and n -- with own prices 1, (w*-w), and c, respectively. The remainder of this section will explore the implications of (4) for immigrant responses to changes in wages and travelling costs. In doing so, we shall ignore the integer constraint on n to make use of comparative-statics properties which apply to continuous-choice problems with a similar structure.

First consider an increase in the home-country wage rate. As shown earlier in section 3, an increase in w reduces the price of home residence. There will then be a substitution effect encouraging the immigrant to spend more time working in the home country and discouraging his consumption of one, but not necessarily both, of the other two goods, y and n. The number of trips, in particular, will fall or rise depending upon whether total time spent in the home country is substitutable for or complementary with frequency of visit. By raising the immigrant's utility, an increase in home wages also creates an income effect which encourages consumption of all goods. On balance, the immigrant will unambiguously choose to spend more of his working life in the home country, but he may or may not make fewer trips to the foreign country. With utility directly affected by the place of residence, we cannot expect the total time spent in and the number of trips made to the foreign country to move together.

Suppose now that wages in the foreign country fall. This is simply another way in which the price of home residence can fall. The substitution effects will then be the same as those associated with an increase in home wages. Total time spent working in the home country will rise, and the number of trips made to the foreign country can either fall or rise. The symmetry in an immigrant's responses to changes in the two wages are confined only to the substitution effects, however. If foreign wages fall, utility is reduced. In this case, the income effect serves to reduce both total home residence and the number of trips. On balance, the immigrant may or may not choose to spend less of his working life in the foreign country, depending upon the relative strengths of the substitution and income effects.

Since the price of home residence is the absolute wage differential, (w^*-w), the substitution effects associated with a decrease in the foreign wage are not only qualitatively identical to those created by an increase in the home wage, they are quantitatively identical if the changes in the two wages are equal in absolute value. This allows us to theoretically rank an immigrant's marginal responses to changes in wages. For example, consider his choice concerning the total time to be spent working in the foreign country. An increase in the home wage will have the same substitution effect as an equal, but opposite, change in the foreign wage. But while the income effect discourages foreign work effort when the home wage rises, it encourages foreign work effort when the foreign wage falls. Therefore, the combined response in (T-M) will be less in the first case than in the second. This can be mathematically expressed by the inequality

$$(5) \qquad \partial(T-M)/\partial w < -\partial(T-M)/\partial w^*.$$

Through similar reasoning, it is clear that the sense of the inequality would be reversed if we were to consider the differential responses in the total time spent in the home country or the number of border crossings.

Finally, turn to the case of an increase in travelling costs. In section 3, an increase in c was seen to produce no substitution effects. Such is not the case if utility is directly affected by the number of trips. An increase in c represents an increase in the own price of n and, therefore, creates a substitution effect which discourages the number of border crossings. The compensated effect on total home residence is

ambiguous, depending once again on whether M is substitutable for or complementary with n. What does carry over from the previous section is an income effect which reduces both total home residence and the number of trips. On balance, an increase in travelling costs will unambiguously reduce the number of border crossings, but it may or may not reduce the total time spent working in the foreign country. Sufficiently large increases in c must, of course, increase M if all migration is made prohibitively expensive. However, marginal increases in travelling costs have an indeterminate impact on the location of work effort.

6. Summary and Implications

This paper has presented a simple model of immigrant decision-making which explicitly recognizes a subjective preference for home residence. The model determines the immigrant's net lifetime income, the total time spent working in each of the home and foreign countries, and the number of lifetime border crossings. The main results and their implications are summarized below.

(1) The number of trips made to and the total time spent working in the foreign country are distinct choice variables for the immigrant and, as such, need not move together. This simple point has important implications, for example, for studies of illegal Mexican immigration which make use of data on U.S. border apprehensions.[6] These studies are frequently criticized for failing to distinguish increases in apprehensions which result from greater apprehension effort from increases which stem from a greater number of immigrants seeking entry. However, there is a

more basic problem with these studies. Even if apprehension effort, population, etc. are adequately controlled for, variations in apprehensions will likely represent changes in the number of border crossings by an average immigrant rather than changes in the total time he plans to spend working in the U.S. It is the latter which is most crucial to issues regarding the impact of illegal Mexican immigration on U.S. labor markets.

(2) A related point has to do with the effects of extra border enforcement. An immigrant will certainly make fewer trips if he must expend more effort and resources in getting across the border. However, the impact on total time spent in the foreign labor market is unclear. The substitution effect associated with an increase in travelling costs is of unknown sign, depending upon whether total home residence is complementary with or substitutable for frequency of visit. The income effect unambiguously encourages the immigrant to spend more time in the foreign country. A policy of more vigorous border patrol enforcement may well prove counterproductive.[7]

(3) It was also shown that lifetime participation in the foreign labor market will be more responsive to changes in the home wage than to equal, but opposite, changes in the foreign wage. Thus, policies which seek to raise the wages of native workers who directly compete with immigrants by raising wages in the source country (such as trade preferences or subsidies to foreign investment) will be more effective than policies which do so by reducing the wages earned by immigrants in the host country (employer penalties, for example, whose incidence would likely involve a reduction in immigrant wages). Whether the first set of policies is ,in fact, to be

preferred is more problematic, of course, depending upon which set is more expensive to implement.

Endnotes

[1]It is always possible to spend all but two instants of time in the foreign country, but this would entail a round trip between the two countries and hence the associated travelling costs.

[2]A subsequent algebraic development of PV will recognize the necessity of making a final return trip to the home country whenever $n > 0$.

[3]The model abstracts from transitory changes in economic conditions and focuses upon the effects of long-term changes in wages on immigrant behavior. In my opinion, this is an appropriate way of thinking about decisions concerning the allocation of lifetime work effort or the number of trips to be made between countries. And it is certainly the right framework for discussing changes in immigration policy, changes which would permanently alter wage differentials and/or travelling costs. However, the model is not well-equipped to determine the precise timing of trips made to the foreign country. A transitory increase in the foreign wage, for example, need not affect M or n, but it would certainly cause immigrants to hasten their departures.

[4]In other words, assume that the marginal utility of net income is infinite whenever $y < y^o$, but that it is zero whenever $y > y^o$. The marginal utility of travelling is, as in case (a), everywhere zero.

[5]I have been reminded of the practice of spreading out vacation time over the year so as to smooth consumption of leisure.

[6]Two such studies are Mario I. Blejer, Harry G. Johnson, and Arturo C. Porzecanski, "Un analisis de los determinantes economicos de la migracion mexicana legal e ilegal hacia los Estados Unidos," Demografia y economia 11, no.3 (1977): 326-40 and Walter Fogel, "Twentieth-Century Mexican Migration to the United States," in The Gateway: U.S. Immigration Issues and Policies, ed. Barry R. Chiswick (Washington, D.C.: American Enterprise Institute for Public Policy Research, 1982): 193-221.

[7]Border enforcement is also shown to have an ambiguous impact in Wilfred J. Ethier, "Illegal Immigration,"unpublished paper, University of Pennsylvania, February 1984. The reasoning there is very much different, however. In Ethier's model, enforcement expenditures are financed by a proportional tax on the wages of all host-country workers. Unlike the present model, increases in enforcement effort necessarily reduce the supply of immigrant labor and raise the net wages of native unskilled workers. But, because of the tax, gross unskilled wages can either rise or fall. Extra enforcement effort can then result in an increase in the number of immigrants who work in the host country.