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Dollarization and the Mexican Labor Market

This paper examines how dollarization affects wages and employment in the Mexican labor market. Dollarization is modeled as a fixed real exchange rate and also as a potentially increased inflow of capital from abroad. The effects of dollarization depend upon whether adopting a fixed exchange rate reduces the rate of return on emigration and helps to attract foreign capital. The paper investigates how Mexican emigration to the United States responds to changes in bilateral economic conditions. The evidence indicates that the flow of illegal immigrants from Mexico into the United States is sensitive to economic conditions and is more volatile when the Mexican monetary authorities have fixed the exchange rate in the past. In contrast, the legal immigrant flow is not sensitive to changes in relative economic conditions.

THE ADOPTION OF THE U.S. DOLLAR as legal tender in Mexico may have a profound impact on the Mexican labor market as well as on the important—and politically sensitive—link between the Mexican and American economies, the large-scale migration of Mexican nationals to the United States. There is some uncertainty about whether dollarization will make the Mexican labor market more sensitive to economic shocks or help stabilize the Mexican economy. Dollarization might increase volatility in employment and lead to a larger emigrant flow. On the other hand, dollarization and the concomitant dependence on the Federal Reserve System's monetary policy might reduce economic volatility.[1] This "dollarization externality" could hasten the process of economic convergence between Mexico and the United States and greatly reduce the incentives of Mexican nationals to emigrate.

The decision to emigrate is essentially the choice to increase the expected return on one's human capital by paying the fixed cost of uprooting oneself and moving across international borders.[2] This paper presents a general equilibrium model of that decision. It is an extension of Rogerson (1988), and its essence is that the deci-

1. Studies of the impact of dollarization on other developing economies include Calvo (1999) and Moreno-Villalaz (1999).

2. Sjaastad (1962) first made this point.

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sions to work or to emigrate involve fundamental nonconvexities. In particular, one must work full-time or not at all, or one must migrate or stay at home. The equilibrium involves a lottery, in which individuals who are identical ex ante end up being unemployed, participating in the domestic labor force, or emigrating. The share of people who emigrate depends upon the relative rate of return on going abroad. An attractive aspect of the equilibrium is that foreign remittances can be an important part of national income. Since the fixed cost of emigrating from Mexico into the United States may be relatively small, any theoretical analysis of the effects of dollarization on the Mexican economy cannot ignore the potentially strong interplay between macroeconomic policy and migration patterns. Our model does not have an explicit role for monetary policy, but it does have a double factoral terms of trade that can be interpreted as the real exchange rate. Also, it allows for the analysis of stochastic capital flows, perhaps a very important concomitant of Mexican dollarization.

The model shows that emigration might dampen cyclical increases in Mexican unemployment, especially if the return on emigrating rises when the demand for labor falls in the domestic economy. If dollarization is a signal that helps to attract more foreign capital, the relative rate of return on emigrating might drop. In that case, dollarization might hasten the process of economic convergence between Mexico and the United States, perhaps leading to a large reduction in the number of Mexican emigrants.

In analyzing the potential importance of dollarization on the politically sensitive issue of Mexican emigration to the United States, the paper also presents an empirical study of how both legal and illegal flows of Mexican immigrants respond to relative changes in economic conditions between the two countries.[3] There has been a very rapid rise in the number of Mexicans who have migrated to the United States in the past few decades, with Mexican nationals becoming an ever-more important component of the foreign-born population in the United States. During the 1950s, about 30,000 thousand Mexican immigrants entered the United States *legally* during a typical year. By 1996, the United States was admitting 164,000 Mexican nationals legally. The Immigration and Naturalization Service also estimates that another 150,000 Mexicans entered—and stayed in—the United States illegally. If we account for both the legal immigrants and the undocumented workers, the Mexican immigrant flow in the 1990s was ten times as large as it was in the 1950s. As a result of these trends, Mexican nationals made up only 6.2 percent of the foreign-born population in the United States in 1960, but made up over 27.1 percent of the foreign-born population by 1998.

The evidence reported in this paper indicates that the number of illegal immigrants is very sensitive to relative economic conditions. The number of apprehensions rises when the real wage in the U.S. labor market increases or when the real wage in the Mexican labor market falls. Moreover, the elasticity of apprehensions

3. Studies of the economic performance of Mexican immigrants in the United States include DeFreitas (1991) and Trejo (1997). Borjas, Freeman, and Katz (1997) and Schoeni (1997) analyze the labor market impacts of the large-scale migration of less-skilled workers, particularly Mexican immigrants.

with respect to the Mexican wage is larger when the Mexican monetary authorities adopt a fixed exchange rate regime. Dollarization, therefore, is likely to be associated with much greater volatility in illegal immigration. In contrast, the evidence indicates that the flow of legal immigrants is unresponsive to changes in economic conditions, probably because of the types of immigration policies that regulate legal immigration into the United States.

The rest of this paper is structured as follows. Section 1 presents a model of the employment and emigration decision. Section 2 presents reduced form empirical analyses of the flow of illegal and legal Mexican immigration into the United States; it also shows that the flow of illegal emigrants does seem to reduce Mexican unemployment. Section 3 gives some brief conclusions.

1. THE MODEL

To illustrate the impact of dollarization on the Mexican labor market—as well as on the incentives of Mexican workers to migrate to the United States—it is convenient to examine a highly stylized theoretical framework.[4] The model in this section is an extension of Rogerson (1988) that allows for the possibility of emigration.[5] Because we draw so heavily from Rogerson, the exposition of parts of the model will be cursory.

There is a continuum of agents indexed by $t \in [0,1]$. Each agent is endowed with one unit of capital and an indivisible unit of time.[6] The national revenue of the Mexican economy (inclusive of net factor payments from abroad) is described by a neoclassical production function $f(K,L,N)$, where K is the input of capital, L the number of workers employed domestically, and N is the number of workers employed abroad.[7] The representative agent has preferences $u(c) - v(z)$where $z \in \{0,1,2\}$. The interpretation of $z = 0$ is that an agent supply no units of labor and is thus unemployed, that of $z = 1$ is that he work (full-time) in the domestic labor market, and that of $z = 2$ is that he makes the (lumpy) decision to emigrate. Without loss of generality, write $v(0) = 0$, $v(1) = m_1$ and $v(2) = m_2$. It is natural to assume that $0 < m_1 < m_2$ and that $u(\cdot)$ is increasing, twice differentiable, and concave.

Because the decision to work or to emigrate is inherently indivisible, an agent's consumption set is $X = \{(c,z,k) \in R^3 \mid c \geq 0, z \in \{0,1,2\}, 0 \leq k \leq 1\}$, where k de-

4. Classic studies that investigate how exchange rate regimes affect economic outcomes include Friedman (1953) and Mundell (1961). Although a large literature examines how these regimes affect macroeconomic outcomes, few of these studies focus on labor market issues. Sachs (1980) is an exception.

5. We are grateful to Stephanie Schmitt-Grohé for suggesting that we use the indivisible labor model.

6. In the description of the economy below, we impose that a person who emigrates earns the same rate of return on his capital as a person who does not. Since an unemployed person earns "rents" on this capital, we are assuming that foreign factor payments are measured net of the domestic return on (human) capital.

7. Dixit and Norman (1980) popularized using the national revenue function in international trade theory. It is the maximal revenue that can be earned at given goods prices among all feasible output choices. In a one-sector model, it is the maximal feasible output given the endogenous choices of factor supplies.

notes "consumption" of capital. We will follow Rogerson's insight and allow for lotteries in describing a more general class of allocations. This assumption implies that the representative agent will be unemployed, working in the domestic labor force, or emigrating as the result of the random outcome of a process that maximizes social welfare in the Mexican economy. Let $X_i = \{(c,z,k) \in X \mid z = i\}$ for $i = 0,1,2$, and write $\Delta^3 = \{\pi \in R^3_+ \mid \pi_0 + \pi_1 + \pi_2 = 1\}$ for the space of lotteries with three outcomes. Then $\bar{X} = X_0 \times X_1 \times X_2 \times \Delta^3$ is the new consumption set for the representative agent.

The expected utility of an arbitrary employment-emigration lottery is $\pi_0[u(c_0)] + \pi_1[u(c_1)-m_1] + \pi_2[u(c_2)-m_2]$. To simplify notation, we write $c(t) = (c_0(t),c_1(t),c_2(t))$, $k(t) = (k_0(t),k_1(t),k_2(t))$, and $\pi(t) = (\pi_0(t),\pi_1(t),\pi_2(t))$. Let w be the domestic wage, let r be the domestic rate of return on capital, and let w^* be the rate at which an emigrant is remunerated. Then an *equilibrium* for the Mexican economy is a list $(c(t),k(t),\pi(t),K,L,N,w,r,w^*)$ such that:

(i) for each $t \in [0,1]$, $(c(t),k(t),\pi(t),K,L,N,w,r,w^*)$ is a solution to

$$\max_{c,k,\pi} \pi_0[u(c_0)] + \pi_1[u(c_1) - m_1] + \pi_2[u(c_2) - m_2]$$

subject to $\pi_0 c_0 + \pi_1 c_1 + \pi_2 c_2 \leq \pi_0 r k_0 + \pi_1(w + rk_1) + \pi_2(w^* + rk_2)$, $c_i \geq 0$, $0 \leq k_i \leq 1$, $i = 0,1,2$, and $\pi \in \Delta^3$;

(ii) K, L, N are a solution to

$$\max_{K,L,N} f(K,L,N) - rK - wL - w^* N$$

subject to $K \geq 0$, $L \geq 0$, and $N \geq 0$; and

(iii) the following material balances conditions hold

$$K = \int_0^1 [\pi_0(t)k_0(t) + \pi_1(t)k_1(t) + \pi_2(t)k_2(t)]dt\,;$$

$$L = \int_0^1 \pi_1(t)dt\,;$$

$$N = \int_0^1 \pi_2(t)dt\,;$$

$$f(K,L,N) = \int_0^1 [\pi_0(t)c_0(t) + \pi_1(t)c_1(t) + \pi_2(t)c_2(t)]dt\,.$$

Condition (i) states that each agent chooses consumption, investment and the "employment-emigration" lottery optimally, taking domestic and foreign factor prices as

given. Condition (ii) states that mix of inputs maximizes profits taking domestic and foreign factor prices as given. Condition (iii) states that the input of capital is the aggregate endowment of that factor, the input of labor is the share of people working in the domestic market, and the outflow of emigrant labor is the share of people choosing to work abroad. Finally, the domestic economy faces a unified budget constraint that includes remittances from abroad.

It is easy to show that the solution to the representative agent's problem will entail full insurance. So we can write $c = c_0 = c_1 = c_2$. Also, everyone uses all his capital, and thus $1 = k_0 = k_1 = k_2$. These two insights give rise to a simpler problem for the social planner. Now we are seeking a solution to:

$$\max_{c,\pi} u(c) - \pi_1 m_1 - \pi_2 m_2 \tag{1}$$

subject to $c \leq \pi_0 r + \pi_1(w + r) + \pi_2(w^* + r)$, $c \geq 0$, and $\pi \in \Delta^3$.

Thus we need to find a list (c,π,K,N,w,r) such that (i) c solves (1), (ii) K, L, and N are a solution to $\max_{K,L,N} f(K, L,N) - rK - wL - w^* N$ subject to $K \geq 0$, $L \geq 0$, and $N \geq 0$, and (iii) $\pi_1 = L$, $\pi_2 = N$, $K = 1$, and $c = f(K,L,N)$. Rogerson emphasizes that this economy is completely neoclassical without a nonconvexity. Indeed, the technology is described by $f(K,L,N)$, and the representative agent has utility specified by $u(c) - m_1 z_1 - m_2 z_2$, with consumption set

$$X = \{(c,z,k) \in R^3 \mid c \geq 0, 0 \leq z_1 + z_2 \leq 1, 0 \leq k \leq 1\} .$$

The First Welfare Theorem implies that an equilibrium for this economy can be described by a solution to

$$\max_{c,\pi} u(c) - \pi_1 m_1 - \pi_2 m_2 \tag{2}$$

subject to

$$c \leq f(\pi_0 + \pi_1 + \pi_2, \pi_1, \pi_2),\ c \geq 0, \text{ and } \pi \in \Delta^3.$$

Write the Langrangean:

$$L(c,\pi,\lambda,\mu) = u(c) - m_1\pi_1 - m_2\pi_2 + \lambda(f(\pi_0 + \pi_1 + \pi_2, \pi_1, \pi_2) - c)$$
$$+ \mu(1 - \pi_0 - \pi_1 - \pi_2) .$$

The necessary conditions are[8]

8. We are ignoring the non-negativity constraints. Since the constraints are linear in the choice variables, the second-order conditions are satisfied as long as the national revenue function has the usual neoclassical properties.

$$u'(c) = \lambda ; \tag{3.1}$$

$$\lambda \partial f / \partial K = \mu ; \tag{3.2}$$

$$\lambda(\partial f / \partial K + \partial f / \partial L) = \mu + m_1 ; \tag{3.3}$$

$$\lambda(\partial f / \partial K + \partial f / \partial N) = \mu + m_2 ; \tag{3.4}$$

$$c = f(\pi_0 + \pi_1 + \pi_2, \pi_1, \pi_2) ; \tag{3.5}$$

$$1 = \pi_0 + \pi_1 + \pi_2 . \tag{3.6}$$

Condition (3.1) states that the marginal utility of consumption is equal to the shadow value of the unified budget constraint. Thus foreign remittances are used to "ensure" the unemployed in the domestic economy. Condition (3.2) states that the real rate of return on capital rate is the shadow value of the social planner's lottery. Condition (3.3) implies that the real wage is equated with the utility cost of holding a full-time domestic job. Likewise, (3.4) implies that the net return from foreign earnings—adjusted for the domestic rate of return on human capital—is equated with the (presumably larger) utility cost of emigrating. Condition (3.5) is just the national income identity, including factor payments from abroad, and (3.6) is the constraint on the social planner's choice of lottery.

Conditions (3.2), (3.3), and (3.4) imply that $w/w^* = m_1/m_2$. Thus,

$$\hat{w} = \hat{w}^* + \hat{m}_1 - \hat{m}_2 \tag{4}$$

where $\hat{w} = dw/w$ and the other logarithmic derivatives use the same conventional notation. Equation (4) is an important result, and it underlies much of our empirical analysis below. We can always take the foreign wage as numéraire and impose that $\hat{w}^* = 0$. Then (4) states that—in perfect foresight equilibrium—a marginal decrease in the utility cost of emigrating will raise the domestic real wage. Now fix the relative costs of migrating. Then (4) states that any increase in the foreign wage must be accompanied by a concomitant change in the shadow value of domestic employment. Since the supply of domestic capital is fixed, this can only be accomplished by a change in domestic employment.

Of course, an increased net return on emigration will induce some domestic residents to seek employment abroad. But what does a lower cost of emigration imply for the rate of Mexican unemployment? The answer depends upon the full structure of the model, including both the demand and supply sides. A particularly simple case occurs when we parameterize the model by postulating that $u(c) = \ln(c)$ and $f(K,L,N) = K^{\alpha}L^{\beta}N^{\gamma}$where $\alpha + \beta + \gamma = 1$. Then $\pi_1 = \beta/m_1$, $\pi_2 = \gamma/m_2$, and $\pi_0 = 1 - \pi_1 - \pi_2$. We have assumed that $m_1 > \beta$ and $m_2 > \gamma$, so that the employment-emigration lottery is not degenerate. Thus a decrease in the utility costs of emigrating raises the share of the population working abroad, and lowers the domestic unemployment.

Indeed, every marginal worker emigrating will come from the pool of domestically unemployed. An increase in the real return to working abroad can be thought of as an outward shift in marginal social product of an emigrant. For a fixed real cost of emigrating, this change will induce more workers to go abroad and perhaps lower domestic unemployment.

A particularly attractive feature of Rogerson's setup is that it allows for a simple analysis of stochastic extensions of the underlying model. Assume that the probability of state $s_i \in S$ is $p(s_i)$. Assume further that state-dependent preferences are summarized by $u(c,s_i)-m_1(s_i)z_1-m_2(s_i)z_2$, the technology is described by $f(K,L,N,s_i)$, and these functions have the same properties as before in each state. The social planner chooses state-contingent consumption and lotteries to maximize expected welfare $\sum_i p(s_i)[u(c,s_i)-\pi_1(s_i)m_1(s_i)-\pi_2(s_i)m_2(s_i)]$ subject to $c_i \leq f(K,L,N,s_i)$ and the usual non-negativity and material balances constraints. Then equilibrium can be characterized with the aid of random variables, and the necessary conditions are:

$$u'(c_i) = \lambda_i \; ; \tag{5.1}$$

$$\lambda_i \partial f(s_i)/\partial K = \mu_i \; ; \tag{5.2}$$

$$\lambda_i(\partial f(s_i)/\partial K + \partial f(s_i)/\partial L) = \mu_i + m_{1i} \; ; \tag{5.3}$$

$$\lambda_i(\partial f(s_i)/\partial K + \partial f(s_i)/\partial N) = \mu_i + m_{2i} \; ; \tag{5.4}$$

$$c_i = f(\pi_{0i} + \pi_{1i} + \pi_{2i},\pi_{1i},\pi_{2i},s_i) \; ; \tag{5.5}$$

$$1 = \pi_{0i} + \pi_{1i} + \pi_{2i} \; . \tag{5.6}$$

for each $s_i \in S$.

All the intuition derived from the perfect foresight equilibrium carries through. For example, consider a random inflow of capital from abroad that is modeled as Hicks-neutral technical progress, and assume that the utility costs of work and emigration are constant. Then the shadow values of working at home and working abroad both rise at the same rate. This kind of technical progress is an inward shift of the isoquant defined by $f(K,L,N,s_i) = s_i f(K,L,N) = 1$; we have also assumed that $m_j(s_i) = m_j$ for all $s_i \in S$. For fixed inputs, the marginal rate of technical substitution is independent of the state, and (5.3) and (5.4) imply that $\lambda_i = \lambda/s_i$ where s_i is the measure of technical progress. Hence (5.2) implies that $\mu_i = \mu$, independent of the state. Thus the rates of unemployment and emigration remain unchanged, and if utility is logarithmic, the level of gross national product—including foreign remittances—rises at the (presumably bilateral) rate of technical progress.

Another interesting possibility is to model a random inflow of foreign capital as differential rates of domestic labor-augmenting and emigrant labor-augmenting technical change, again holding the costs of employment and emigration constant. Assume again that the production function is homothetic. Then such a phenomenon

is an inward shift in the isoquant $f(K,L,N,s_i) = f(K,s_{1i}L,s_{2i}N) = 1$ with $m_j(s_i) = m_j$ for all $s_i \in S$. For simplicity, we again concentrate on neutral technical change and assume that $f(K,L,N,s_i) = K^{\alpha}(s_{1i}L)^{\beta}(s_{2i}N)^{\gamma}$, but now for increased generality we will assume that $u(c) = (1-\theta)^{-1}(c^{1-\theta} - 1)$ with $\theta > 0$. The parameter θ is the Arrow-Pratt measure of relative risk aversion. Using (5.1), (5.3), and (5.4) to construct a log-linear approximation to equilibrium, we have

$$\begin{bmatrix} 1 & \theta\beta & \theta\gamma \\ 1 & \beta-1 & \gamma \\ 1 & \beta & \gamma-1 \end{bmatrix} \begin{bmatrix} \hat{\lambda} \\ \hat{L} \\ \hat{N} \end{bmatrix} = -\begin{bmatrix} \theta \\ 1 \\ 1 \end{bmatrix} \hat{s}_i ,$$

where the diacritical marks again denote logarithmic differentiation and $\hat{s}_i = \beta\hat{s}_{1i} + \gamma\hat{s}_{2i}$ is the appropriate measure of aggregate rate of technical progress in state s_i. Thus,

$$\begin{bmatrix} \hat{\lambda} \\ \hat{L} \\ \hat{N} \end{bmatrix} = -\begin{bmatrix} 1-\beta-\gamma & \theta\beta & \theta\gamma \\ 1 & \gamma(1-\theta)-1 & -\gamma(1-\theta) \\ 1 & -\beta(1-\theta) & \beta(1-\theta)-1 \end{bmatrix} \begin{bmatrix} \theta \\ 1 \\ 1 \end{bmatrix} \hat{s}_i = \begin{bmatrix} -\theta \\ 1-\theta \\ 1-\theta \end{bmatrix} \hat{s}_i , \tag{6}$$

Consider a state in which $\hat{s}_i > 0$; thus there has been—on average—a rise in the productivity of a worker. This is a positive income shock for the Mexican economy. Equation (6) states that $\hat{L} = \hat{N}$, and both rise if and only if $\theta < 1$. Thus proportional changes in employment and emigration will be quite high if the representative agent is not too (relatively) risk averse. On the other hand, if $\theta > 1$, then such a shock will decrease both emigration and the domestic labor force participation rate. In this case the positive technology shock causes an increase in measured unemployment, as the social planner uses some of the increased domestic income to consume more leisure. A plausible outcome of dollarization is that there will be a long-term inflow of foreign capital and an accompanying increase in the productivity of domestic workers. Then (6) implies that emigration from Mexico will decrease even at fixed real wages as long as the representative agent is sufficiently risk averse.

Finally, how does the real exchange rate affect the equilibrium? The real exchange rate is the relative price of traded goods to not-traded goods. Since this model has only one final good, it is perhaps too facile for international economic analysis. But another serviceable definition of the real exchange rate is the double factoral terms of trade. The natural definition of these terms of trade in this model is the ratio w/w^*. Indeed, this is the marginal rate of technical substitution that the social planner faces, and a decrease of this ratio connotes an increase in international competitiveness, also called a real depreciation. This is where equation (4) comes in handy. It states that the marginal rate of technical substitution between working at home and going abroad is fixed by the relative utility costs of these two activities.

We interpret (4) as an arbitrage relationship that the social planner faces. It states

that any deviation w/w^* from m_1/m_2 will give rise to emigration flows. This observation lends itself well to econometric analysis. In the next section, we will show that emigration flows have responded more elastically to changes in w/w^* during periods when the Mexican monetary authority seems to have stabilized the real exchange rate. In our model, this empirical fact is explained most easily if non-neutral technology shocks create a higher correlation between emigrant flows and our measure of w/w^* during those periods. Consider, for example, a capital flow or technology shock that tends to raise domestic real wages. This will cause a decrease in the outflow of emigrants, as (4) indicates. Then reasoning similar to that underlying (6) shows that the income effect will create an additional decrease in emigration if $\theta > 1$. Indeed, the empirical evidence in the next section indicates that representative agent's coefficient of relative risk aversion is greater than unity.

The real exchange rate has been more volatile during the periods when the Mexican monetary authority has allowed the nominal exchange rate to float, and the evidence below shows that emigration has been less elastic with respect to changes in w/w^* during these periods. Why would non-neutral technology shocks be less correlated with income shocks (or flows of capital) when the nominal exchange rate floats? The simplest explanation is that the flows of capital from abroad are attenuated when the nominal exchange rate floats. Another possibility is that labor market rigidities curtail inflows of foreign capital when domestic real wages are high. Indeed, in the next section, we will present evidence on the relationship between unemployment and real wages during the two different regimes. A simple regression shows that high real wages are correlated with low unemployment during the floating regime; perhaps this is evidence of a labor market imperfection.

2. EXCHANGE RATE REGIMES AND EMIGRATION FROM MEXICO

The theoretical framework suggests that the number of Mexican emigrants depends not only on differences in economic conditions between the United States and Mexico, but also perhaps on the exchange rate regime adopted by the Mexican monetary authorities. The empirical analysis presented in this section investigates if the flow of both legal and illegal emigrants from Mexico responds to economic factors, and if this response depends on the exchange rate regime. It is useful to first examine the determinants of illegal immigration into the United States because this flow may to respond swiftly to changing economic conditions in the two countries.

Empirical Determinants of Illegal Immigration

The latest wave of illegal immigration from Mexico began in the late 1960s, after the discontinuation of the bracero program. This program was launched in 1942, when the U.S. and Mexican governments agreed to allow the temporary migration of agricultural workers owing to a labor shortage caused by World War II. The program continued in various guises until 1964, when it was ended unilaterally by the United States. The main reason given for the discontinuation at the time was the undocu-

mented presumption that the bracero program depressed the wages of native-born American workers in the agricultural industry.

The number of illegal aliens apprehended by the Border Patrol began to increase soon after the bracero program ended. In 1964, fewer than 42,000 Mexican illegal aliens were apprehended; by 1974, nearly 710,000 Mexican illegal aliens were apprehended. The number of apprehensions peaked in 1986 when 1.7 million Mexican illegal aliens were apprehended. In 1986, Congress enacted the Immigration Reform and Control Act (IRCA), hoping to stem the flow of illegal aliens by providing amnesty to a large number of illegal aliens already residing in the United States. The IRCA also set up a system of employer sanctions designed to penalize employers who knowingly hire illegal aliens. Nearly 2.7 million illegal aliens were granted amnesty (about 2 million of whom were Mexicans). The employer sanctions, however, did not achieve their objective. After a temporary dip, the number of annual apprehensions of Mexican illegal aliens rose steadily in the early 1990s. By the mid-1990s, over 1 million Mexican illegal aliens were being apprehended annually.

Figure 1 shows the trend in the number of monthly apprehensions made by the Border Patrol on "linewatch" duty. The data on "linewatch" apprehensions are useful because the illegal aliens are apprehended while they are attempting to enter the United States illegally.[9] As a result, the trend in linewatch apprehensions is likely to be most correlated with changing economic conditions. Although the data on linewatch apprehensions refers to all apprehensions made by the Border Patrol, it turns out that 99.2 percent of linewatch apprehensions in the 1977–96 period occurred at the U.S.-Mexico border. The figure illustrates the highly seasonal nature of

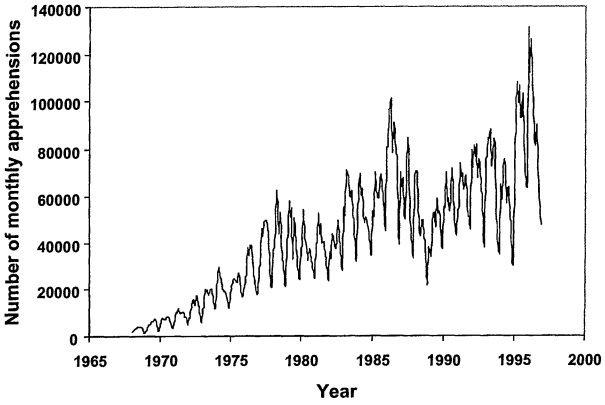

FIG. 1. Number of Baseline Apprehensions, 1968–96 (monthly data) Source: Hanson and Spilimbergo (1999).

9. The Border Patrol also captures many persons in locations away from the border. However, we do not have any information on when the illegal aliens captured in "non-linewatch" duty entered the United States. As a result, the data on "non-linewatch" apprehensions need not reflect bilateral economic conditions at the time of the arrest.

apprehensions. Linewatch apprehensions tend to peak in the spring (at the height of the growing season), and typically reach their annual lows in December.

It is worth noting that studies of the determinants of the size of the illegal immigration flow typically focus on the trends in the apprehension data summarized in Figure 1 because we do not know how many illegal aliens actually enter the United States at any point in time. The use of the data on apprehensions is problematic because 1 million annual apprehensions may imply that 1 million different persons were caught trying to enter the United States illegally, or that 100,000 persons were each caught ten times during the entry attempt. In other words, the number of apprehensions depends on the probability that someone attempting to enter the country illegally is caught by the Border Patrol, and there are no reliable estimates of the apprehension probability or of how this probability has changed over time.

Despite this measurement problem, it is not difficult to isolate the impact of economic conditions on the flow of illegal aliens. We can write the number of illegal aliens who are apprehended at time t as

$$a_t = q_t + n_t$$

where all variables are expressed in logarithms and a_t is apprehensions, q_t is the probability of being caught, and n_t is the number of emigrants from Mexico, all at time t. It is crucial to control for differences in the probability of apprehension over time if one wishes to isolate the impact of economic factors on migration rates.

Using a measure of Border Enforcement activities to adjust for secular variations in the probability of apprehension, the empirical analysis estimates a reduced-form regression based upon the following linear specification:

$$a_t = \delta(L)a_t + \alpha(L)h_t + \beta(L)w_t + \gamma(L)w_t^* + X_t\phi + u_t \tag{7}$$

where all variables are in logarithms and the frequency of the data is monthly. Here a_t is the number of baseline apprehensions, h_t gives the number of person-hours spent patrolling, w_t is the real wage in the manufacturing sector of the Mexican economy, w_t^* is the real wage in the United States adjusted using the real exchange rate, and u_t is a term having to do with measurement error. The polynomial $\delta(L)$ includes first and second lags of the apprehension data. Each of $\alpha(L)$, $\beta(L)$, and $\gamma(L)$ includes a contemporaneous value and the first lag. The vector of variables X_t includes fixed effects indicating the month of the year to control for seasonal effects in apprehensions, a time trend, and a constant.[10] Both of the wage variables are in units of Mex-

10. The regressions also include dummy variables indicating if the data is for the post-1977 period or for the post-1990 period, as well as interactions between these dummy variables and the time trend. These variables control for administrative changes in the way that the Immigration and Naturalization Service measures apprehensions (see Hanson and Spilimbergo 1999). The regression also includes dummy variables to control for three changes in political regimes. One dummy captures the years after 1986 and controls for the impact of IRCA on illegal immigration). Another indicates that the post-1994 period and controls for both the impact of the enactment of Proposition 187 and for a policy change, discussed below, that regulates how illegal immigrants can adjust their status to become legal residents of the United States. Also, there are interaction terms between these dummy variables and the time trend.

ican pesos adjusted for Mexican prices and that the regression allows for lagged effects in the key variables.[11] The regression is estimated using data for the period January 1968 through December 1996.

Figures 2 and 3 illustrate the trends in the real wage data for Mexico and the United States, respectively. Figure 4 shows the nominal exchange rate. The Mexican real wage has experienced several periods of substantial decline, typically associated with a major devaluation of the currency, as in 1982–83 and in 1994–95. The trends in the exchange rate illustrate the impact of the severe devaluation of the Mexican peso in the past two decades.

The first two columns of Table 1 report the estimates of the key parameters of the regression. The first column simplifies the specification of (7) by omitting the lagged variables from the regression, while the second column reports the estimates of the full specification. It is evident that both specifications generate similar qualitative results. In particular, the number of Mexican illegal aliens apprehended by the U.S.

TABLE 1

DETERMINANTS OF APPREHENSIONS OF MEXICAN ILLEGAL IMMIGRANTS

	All years		Flexible rate regime		Fixed rate regime	
Log apprehensions ($t-1$)	—	.787	—	.641	—	.714
		(.054)		(.116)		(.063)
Log apprehensions ($t-2$)	—	−.120	—	−.309	—	−.068
		(.052)		(.100)		(.060)
Log enforcement hours (t)	.475	.454	1.051	.750	.331	.407
	(.084)	(.084)	(.222)	(.254)	(.108)	(.091)
Log enforcement hours ($t-1$)	—	−.335	—	.069	—	−.381
		(.086)		(.269)		(.093)
Log real wage in Mexico (t)	−1.337	−.830	−.850	−.514	−2.034	−.988
	(.138)	(.188)	(.144)	(.288)	(.277)	(.250)
Log real wage in Mexico ($t-1$)	—	.540	—	.002	—	.539
		(.188)		(.294)		(.257)
Log real wage in United States (t)	.386	.156	.267	.104	.524	−.219
	(.064)	(.112)	(.136)	(.162)	(.140)	(.189)
Log real wage in United States ($t-1$)	—	.036	—	−.008	—	.551
		(.117)		(.140)		(.194)
Long-run elasticities:						
Enforcement hours	—	.216	—	.630	—	−.140
		(.190)		(.487)		(.187)
Mexican wage	—	−.645	—	−.554	—	−1.108
		(.313)		(.423)		(.412)
U.S. wage	—	.610	—	−.297	—	.723
		(.248)		(.333)		(.376)
R-squared	.978	.989	.936	.958	.978	.991
Sample size	348	347	97	96	251	250

NOTE: Standard errors are reported in parentheses.

11. The data on apprehensions, border enforcement, real wages in Mexican manufacturing, unemployment, and the exchange rate are drawn from Hanson and Spilimbergo (1999). The U.S. data on wages in the manufacturing sector and the consumer price index are available at http://www.bls.gov/.

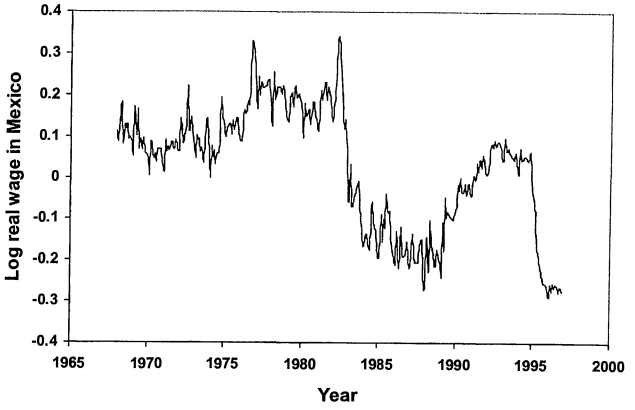

FIG. 2. Mexican Real Wage, 1968–96 (monthly data) Source: Hanson and Spilimbergo (1999).

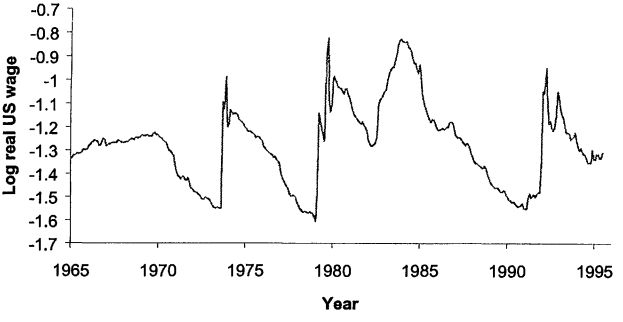

FIG. 3. U.S. Real Wage, Adjusted for the Real Exchange Rate, 1968–96 (monthly data) Source: Hanson and Spilimbergo (1999) and U.S. Bureau of Labor Statistics website.

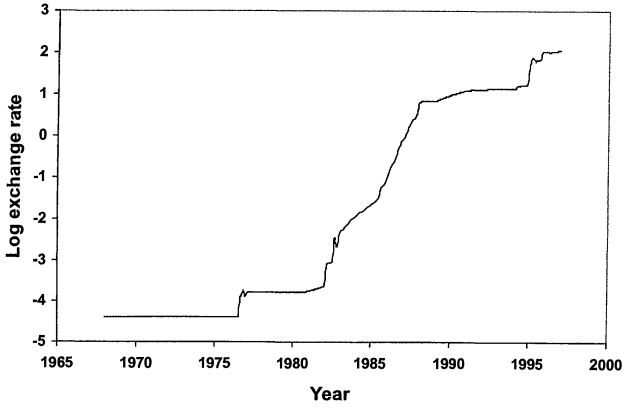

FIG. 4. Mexican Nominal Exchange Rate, 1968–96 (new pesos per dollar) Source: Hanson and Spilimbergo (1999).

Border Patrol is quite sensitive to enforcement expenditures, as well as to changes in economic conditions in Mexico and the United States.

The lagged specification implies that the long-run elasticity of apprehensions with respect to enforcement is .216, so that doubling the number of person-hours spent by the Border Patrol policing the border increases the number of apprehensions by about 20 percent.[12] The long-run elasticity of apprehensions with respect to the Mexican real wage is −.65, suggesting that a substantial reduction in the Mexican real wage will lead to a large increase in the number of apprehensions. Finally, the regression reveals that the long-run elasticity of apprehensions with respect to the U.S. real wage is .61. It seems, therefore, that the number of illegal aliens apprehended depends on economic conditions in both Mexico and the United States, one of the primary implications of the theoretical model as indicated by equation (4).

The theoretical analysis suggests that the response of emigration to changes in economic conditions may depend upon how the exchange rate regime affects the correlation between income shocks and differences in real wages. The Mexican monetary authorities changed the exchange rate regime several times between January 1968 and December 1996.[13] Prior to February 1982, Mexico had a pegged exchange rate. In practice, however, the exchange rate did not change much during this period—so that, in effect, Mexico had a fixed exchange rate until early 1982. The exchange rate was then allowed to float freely between February 1982 and August 1982, at which time Mexico adopted an exchange rate regime of "predetermined depreciation." The monetary authorities, however, set a relatively high depreciation rate, so that the exchange rate was allowed effectively to float from February 1982 until February 1988. In March 1988, the predetermined depreciation rate was set to zero for one year—essentially re-imposing a fixed rate regime, and this depreciation rate was kept low until December 1994. The exchange rate was then allowed to float beginning in January 1995. These changes in regimes are evident in Figure 4, which shows the secular trend in the nominal Mexican exchange rate in terms of the U.S. dollar over the 1968–1996 period.

We estimated the regression (7) separately in each of two periods: the months during which Mexico adopted a flexible exchange rate, and the months during which Mexico adopted a fixed exchange rate.[14] The remaining columns of Table report these regressions. It is evident that the exchange rate regime has a significant impact on the estimated elasticity of apprehensions with respect to the Mexican wage. The long-run elasticity was −0.55 during the years in which Mexico adopted a flexible exchange rate. In contrast, the elasticity was twice as high, or −1.11, during the years in which Mexico adopted a fixed exchange rate. A 20 percent drop in real

12. The standard errors of the long-run elasticities are calculated using the delta method.

13. The International Monetary Fund (various issues) documents the timing of changes in exchange rate regimes. Del Negro and Obiols-Homs (1999) present a very useful history of the changes in Mexican monetary policy and exchange rate regimes during the period under analysis.

14. In particular, we classify the data so that Mexico had an effective floating rate between February 1982 and February 1988, and after January 1995. Mexico is assumed to have adopted a fixed rate in all other months.

wages, therefore, generates a 10 percent increase in apprehensions when Mexico adopts a flexible rate and a 20 percent increase when Mexico adopts a fixed rate. It should be noted, however, that the difference between the two elasticities is not statistically significant at conventional levels (although the difference is significant in the simpler regression specification that omits the lags).[15]

The data suggest that a decline in the Mexican real wage leads to a larger emigrant flow during the periods when the Mexican monetary authorities adopt a fixed rate regime.[16] The theory offers a possible explanation. Dollarization may create a higher correlation between real wages and shocks to domestic income. If emigrant flows depend upon both wage differences and a more general income shock, then it is easy to imagine that a downturn in the Mexican economy would cause a significant outflow of migration. Both the theory and the evidence, therefore, seem to suggest that dollarization may make illegal immigration to the United States much more volatile in the sense that it may become more responsive to changes in the economic opportunities offered by the Mexican labor market.

The model also has implications for the relationship between emigration and unemployment. Using Mexican unemployment data for the months from January 1985 through April 1996, we analyzed another empirical implication of a simple version of the model. We estimated a linear model based upon the following specification:

$$z_t = \beta_1 a_t + \beta_2 h_t + \beta_3 w_t + \beta_4 w_t^* + X_t \phi + u_t , \tag{8}$$

where z_t is the unemployment rate and all the other right-hand variables are as in equation (7).[17] The theory suggests that increases in emigration are negatively correlated with domestic unemployment, even when one controls for the costs of working and emigrating. Table 2 gives the estimated coefficients for (8) from three simple regressions. It shows that increased emigration does indeed lower the measured unemployment rate, in the full sample and in each subsample. In the full sample, a 1 percent increase in the rate of emigration, controlling for real wages and border enforcement, decreases Mexican unemployment by about half a percent. Still, the effect is not statistically significant at the standard levels.

There is another point worth emphasizing in Table 2. The domestic unemployment rate is significantly negatively correlated with real wages only during the periods when the exchange rate floats. Thus unemployment rises when the real wage is low, even when one controls for emigration. This evidence indicates that rigidities in

15. The regressions also indicate that the elasticity of apprehensions with respect to the U.S. wage is much more positive during the years in which Mexico adopted a fixed exchange rate.

16. It is important to stress that the empirical evidence does not provide a direct test of the theory. In the presence of a fixed rate regime, the theory that emigration patterns are determined by the full array of demand and supply side parameters and the link between exchange rate regime and capital flows. The regression estimated in this section, however, measures the correlation between illegal emigration to the United States and changes in the Mexican real wage. Our interpretation of the empirical evidence implicitly assumes that (unobserved) productivity shocks are correlated with movements in the real wage.

17. Now the explanatory variables in X_t do not include dummy variables defined outside this restricted subsample of data.

TABLE 2
THE EFFECT OF ILLEGAL EMIGRATION ON UNEMPLOYMENT IN MEXICO

	All years	Flexible rate regime	Fixed rate regime
Log apprehensions (t)	−.551	−1.039	−.138
	(.333)	(.748)	(.292)
Log enforcement hours (t)	.201	−.877	−.037
	(.510)	(2.578)	(.536)
Log real wage in Mexico (t)	−6.315	−7.518	.231
	(.984)	(1.927)	(1.701)
Log real wage in United States (t)	2.562	−2.533	−.151
	(.646)	(1.800)	(1.450)
R-squared	.896	.851	.816
Sample size	136	54	82

NOTE: Standard errors are reported in parentheses.

the domestic labor market were more pronounced during the floating exchange period. Perhaps this rigidity creates a negative correlation between shocks to real wages and shocks to economy-wide income.

Empirical Determinants of Legal Immigration

Many Mexicans also migrate legally to the United States. Immigration policy in the United States, however, introduces a number of important rigidities into the system, making it unlikely that the flow of legal immigration from Mexico can be as responsive to changing economic conditions as the flow of illegal immigration.

Before 1965, U.S. immigration policy was guided by the national-origins quota system. Under this system, visas allocated to persons from the Eastern Hemisphere were awarded mainly on the basis of national origin, with two countries, Germany and the United Kingdom, receiving about 60 percent of the available slots. In contrast, persons from the Western Hemisphere were exempt from the quotas and faced no numerical restrictions on the number of visas, presumably because of the close economic and political ties between the United States and its geographic neighbors. Visas for Western Hemisphere applicants were awarded on a first-come, first-served basis as long as the persons satisfied a long list of requirements concerning health, morality, and politics.

The 1965 Amendments to the Immigration and Nationality Act and subsequent minor legislation repealed the national origins quota system, set a worldwide numerical limit (507,000 visas in 1996), and established a new objective for awarding entry visas among the many applicants: the reunification of families. The United States now sets aside the bulk of immigration visas (62 percent in 1996) to persons who have relatives already residing in the country, including the adult children and siblings of U.S. citizens, as well as the spouses and minor children of permanent resident aliens. "Immediate" relatives of U.S. citizens—such as spouses, parents, and minor children—are exempt from the numerical limits, and are entitled to immediate entry. In the mid-1990s, 32 percent of the immigrants entered with an "immediate

relative" visa, and over 70 percent entered through one of the family reunification provisions of the law.[18]

The family reunification provisions at the heart of U.S. immigration policy probably create a "multiplier effect." The presence in the United States of a certain number of immigrants from a particular country of origin virtually ensures that more immigrants will originate from that country in the future, as recently arrived immigrants sponsor the entry of additional relatives. Consider, for instance, the long-run impacts of admitting a married couple into the United States. After five years (the time required for naturalization), both of these immigrants can sponsor the entry of their siblings. Once the siblings arrive in the United States, they can then sponsor the entry of their own spouses, who can in time sponsor the entry of their siblings, and so on. Because there are numerical restrictions on the number of visas allocated to particular types of family preferences in any given year, the multiplier effect generates long queues that determine when the sponsored relatives can actually enter the United States. In September 1999, for example, the State Department was processing applications for the entry of unmarried (adult) sons and daughters of U.S. citizens that were filed in October 1993, as well as applications for the entry of the siblings of U.S. citizens that were filed in August 1988.

These long queues suggest that the legal immigration flow is likely to be quite insensitive to transitory changes in economic conditions in either country. After these longs waits, the legal immigrant will choose to move to the United States when he or she reaches the head of the queue regardless of transitory movements in relative real wages. In the long run, of course, the legal immigrant flow should be more responsive to permanent trends in economic variables, such as a narrowing of the wage gap between Mexico and the United States. But the long-run elasticity of legal immigration with respect to relative wages may be relatively small simply because family reunification plays such a central role in U.S. immigration policy.

We used the Immigrants Admitted to the United States surveys, a set of micro data files constructed by the Immigration and Naturalization Service (INS), to analyze the link between exchange rate regimes and legal immigration. These data files contain a record for each person admitted legally to the United States between 1972 and 1996.

There are two types of legal Mexican immigrants in these data.[19] Some of the immigrants admitted in any given year are "new arrivals," namely, Mexicans who have migrated to the United States legally at that particular time. The INS reports the month and year of admission for these new immigrants. Other immigrants in the files, however, are Mexicans who have "adjusted status." An immigrant who adjusted status in March 1982, for example, might have entered the United States in September 1975 using a foreign student visa. This immigrant might have married a U.S. cit-

18. U.S. Immigration and Naturalization Service (1997, p. 34). The period refers to 1994–96, so that the statistics are unaffected by the large number of illegal aliens who received amnesty and were awarded permanent residence in the early 1990s.

19. A large number of the Mexican legal immigrants admitted in the 1990s were illegal aliens who had received amnesty through the 1986 Immigration Reform and Control Act. The INS data files do not contain any information on these immigrants.

izen in the intervening years. He or she then applied to the INS to adjust status (that is, to receive a permanent resident visa or "green card"), and the INS granted this adjustment in March 1982. The INS does not report the year and month of admission for these types of immigrants.[20] Instead, the date reported in the INS data files gives the month and year in which the immigrant adjusted status.

To provide a closer link between changing economic conditions and the flow of legal immigrants from Mexico to the United States, we restrict the analysis to immigrants who are "new arrivals." We then used the INS data files to construct a monthly time series of newly arrived Mexican immigrants in the United States for the period from January 1972 to September 1996. Figure 5 shows the flow of newly arrived Mexican immigrants during this period, and contrasts this flow with the baseline apprehensions used earlier. It is evident that there is little connection between the two series. The apprehension data reveal a steady increase in illegal immigration over the period (although some of the rise may be accounted for by more intensive border enforcement), while the size of the legal immigrant flow is relatively steady over much of the period. In fact, the correlation between the two series is −.073.[21] It seems, then, that the determinants of the flow of new Mexican immigrants might be quite different from those of illegal Mexican immigration.

We again estimated the regression model in equation (7), but this time we used the number of legal immigrants as the dependent variable.[22] Not surprisingly, the evi-

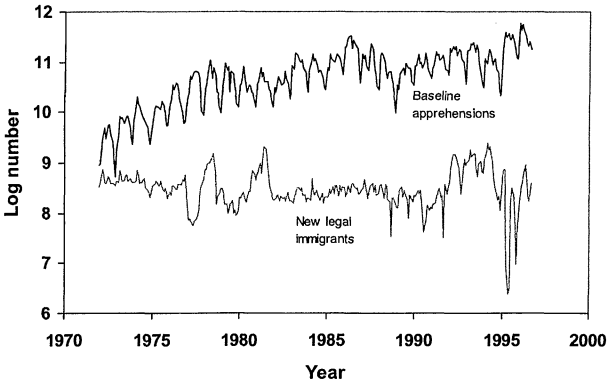

FIG. 5. Illegal and Legal Immigration, 1972–96 (monthly data) Source: Hanson and Spilimbergo (1999) and Immigration and Naturalization Service, Immigrants Admitted to the United States data files.

20. Actually, the INS data files have a field that is supposed to report the year (though not month) of entry for the immigrants who adjusted their status. This field, however, is typically blank for the Mexicans who adjusted status.

21. The partial correlation, after adjusting for month of entry, is −.137. The partial correlation, after adjusting for month of entry and enforcement hours, is −.052.

22. The regressions also include dummy variables indicating if the data is for the post-1989 period or for the post-1994 period, as well as interactions between these dummy variables and the time trend. The 1989 dummy variable controls for an administrative change in the way that the data categorizes immigrants into new arrivals and adjustments. The 1994 dummy variable controls for a significant change in the policy that regulates adjustment of status (known as the 245I program). This policy change particu-

dence reported in Table 3 suggests that there is little link between the flow of legal immigrants and the Mexican wage rate. It also indicates there is an *inverse* correlation between legal Mexican immigration and the U.S. wage. (Thus fewer Mexican immigrants come to the United States legally when the U.S. wage is high). The weak and erratic evidence reported in Table 3 indicates that the timing of legal immigration to the United States is perhaps not determined by transitory economic conditions. It may be influenced largely by the rigidities inherent in an immigration policy that determine who gets to enter the United States and when.

We again estimated the regression in (8), but now we included legal immigrants as an extra explanatory variable. The evidence presented in Table 4 shows legal emigration has only a small effect on Mexican unemployment. Indeed, these estimated coefficients show that *illegal* immigration into the United States seems to have a statistically significant effect on lowering unemployment in Mexico, whereas the effect of legal immigration into that country may not be large in magnitude nor statistically significant. Thus our model is perhaps a more apt explanation of illegal immigration into the United States than it is one of legal migration.

3. SUMMARY

This paper investigates how the dollarization of the Mexican economy will affect economic conditions in the Mexican labor market. In particular, it studied how dollarization might alter the incentives of Mexican workers to migrate to the United States. In the past two decades, the Mexican economy has reacted quite strongly to major devaluations of its currency. During the currency crisis of 1994–95, for example, the unemployment rate in large urban areas of Mexico more than doubled in less than a year.

A simple economic model of unemployment and migration suggests that perhaps the most important effect of dollarization will be the degree to which it raises the relative real wage in Mexico. If dollarization also leads to greater capital inflows, then productivity shocks may cause more volatile emigration flows. The theoretical and empirical analyses indicate that emigration tends to lower Mexican unemployment rate. The flow of workers between the two countries will be felt most immediately in the effects of illegal immigration into the United States.

It is also possible, however, that dollarization generates a number of beneficial externalities, such as providing a signal to foreign investors that the Mexican economy

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larly affected the counts of Mexican immigrants. Beginning in September 1994, immigrants who had entered the United States illegally could adjust their status without having to leave the United States. This administrative change created huge backlogs for the INS and dramatically changed how Mexican immigrants were categorized into "new arrivals" or "adjustments." For instance, 88 percent of the Mexican immigrants in the INS data in 1992 and 1993 were classified as new arrivals. This fraction dropped to 40 percent in 1995 and 1996. The change in policy—and the implication that many of the Mexican immigrants who were classified as new immigrants before 1994 should probably have been classified as adjustments—suggests that the regression results for legal immigration reported in Tables 3 and 4 must be interpreted with some caution.

TABLE 3

DETERMINANTS OF THE NUMBER OF MEXICAN LEGAL IMMIGRANTS

	All years		Flexible rate regime		Fixed rate regime	
Log legal immigrants ($t-1$)	—	.952	—	.878	—	.810
		(.059)		(.099)		(.075)
Log legal immigrants ($t-2$)	—	−.274	—	−.547	—	−.035
		(.059)		(.100)		(.074)
Log enforcement hours (t)	−.113	−.062	−.417	−.226	−.614	−.056
	(.212)	(.301)	(.694)	(.718)	(.248)	(.289)
Log enforcement hours ($t-1$)	—	.105	—	−.224	—	−.038
		(.302)		(.778)		(.290)
Log real wage in Mexico (t)	−.142	.602	.646	.300	.563	.690
	(.252)	(.441)	(.498)	(.883)	(.371)	(.474)
Log real wage in Mexico ($t-1$)	—	−.762	—	.080	—	−.635
		(.432)		(.876)		(.476)
Log real wage in United States (t)	−.365	.269	.288	.854	−.504	.015
	(.148)	(.248)	(.478)	(.519)	(.171)	(.342)
Log real wage in United States ($t-1$)	—	−.427	—	−.634	—	−.162
		(.254)		(.405)		(.344)
Long-run elasticities:						
Enforcement hours	—	.130	—	−.225	—	−.312
		(.578)		(1.034)		(.575)
Mexican wage	—	−.497	—	2.086	—	.077
		(.836)		(1.893)		(.921)
U.S. wage	—	−.491	—	−.100	—	−.624
		(.513)		(.937)		(.781)
R-squared	.257	.698	.305	.678	.444	.795
Sample size	297	296	94	93	203	202

NOTE: Standard errors are reported in parentheses.

TABLE 4

THE EFFECT OF LEGAL IMMIGRATION INTO THE UNITED STATES ON UNEMPLOYMENT IN MEXICO

	All years	Flexible rate regime	Fixed rate regime
Log legal immigrants (t)	−.193	−.299	−.031
	(.106)	(.181)	(.153)
Log apprehensions (t)	−.583	−1.28	−.489
	(.272)	(.505)	(.304)
Log enforcement hours (t)	−.134	2.69	1.09
	(.566)	(1.75)	(.501)
Log real wage in Mexico (t)	−5.86	−6.46	−3.68
	(1.11)	(2.15)	(1.31)
Log real wage in United States (t)	1.168	−.344	-.954
	(.527)	(1.55)	(1.89)
R-squared	.892	.901	.703
Sample size	136	54	82

NOTE: Standard errors are reported in parentheses.

may become more stable. In doing so, dollarization might help attract more foreign capital, stabilize the Mexican economy, and hasten the process of economic convergence between Mexico and the United States. This convergence might then reduce the number of Mexican emigrants. There is, however, little empirical evidence to suggest that these externalities have been important by-products of fixing the nominal exchange rate in the past.

The paper also examined the extent to which the migration flow from Mexico to the United States—both of illegal and legal immigrants—responds to differences in economic conditions between the two countries. It turns out that the illegal immigrant flow is quite responsive to economic variables, and that it is much more volatile during those periods when the Mexican monetary authorities adopted a fixed rate regime. In contrast, the legal immigrant flow is not sensitive to economic conditions.

The differential response of legal and illegal immigration to economic conditions has important implications for the impact of dollarization on migration from Mexico to the United States. Suppose that adopting a fixed rate regime does not lead to a very rapid convergence in real incomes between the two countries and thus the dollarization externalities are small. Dollarization will then lead to more volatility in the flow of illegal immigrants—an outcome that is likely to be politically sensitive in both countries—and may barely affect the number of persons who migrate legally to the United States.

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