The Effects of Border Patrol on Illegal Immigration

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This paper extends Ethier's (1986) small one-country model of illegal immigration. We construct a standard (two-country, one-good, two-factor) model, and examine the welfare effects of border enforcement on the home country, the foreign country and the world. We consider these effects both in the presence and in the absence of capital mobility. We conclude that in the absence of capital mobility, border enforcement may be *costly* in terms of global welfare, whereas in the presence of capital mobility, it may *benefit* global welfare. (*JEL* Classifications: F21, F22)

I. Introduction

Ethier (1986) pioneered a *small* one-country model that focused on illegal immigration issues, using a crime-theoretic analysis (Becker 1968). In his paper, Ethier examined the welfare effects of a border enforcement policy by the host country's government. He concluded that border enforcement necessarily leads to a decrease in the host country's welfare, generating a welfare *cost* to the host country.

In this paper, we extend the Ethier (1986) model of illegal immigration by constructing a standard (two-country, one-good, two-factor)

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model[1,2]. Within this model we explore some issues not considered by Ethier. We analyze the welfare effects of border enforcement on the home country, the foreign country and the world, both in the presence and absence of capital mobility.

We obtain the following results. (1) When capital is not mobile between the two countries, border enforcement causes a decrease in the welfare of both the home country and the foreign country, leading to a decline in global welfare. (2) When capital is mobile between the two countries, border enforcement causes an increase in the home country's welfare (under some circumstances) and the foreign country's welfare, and hence, global welfare increases. We conclude from our results (1) and (2) that, in the absence of capital mobility, border enforcement by the host country's government may be *costly* in terms of global welfare, whereas in the presence of capital mobility it may *benefit* global welfare. Hence, we conclude that border enforcement may be a *Pareto-inferior* (*improving*) *policy* in the absence (presence) of capital mobility.

In the next section, we examine the welfare effects of border enforcement in the absence of capital mobility. Section III examines the welfare effects of border enforcement in the presence of capital mobility. Section IV offers some concluding remarks.

[1]Bond and Chen (1987) constructed a standard (two-country, one-good, two-factor) model of illegal immigration to examine the effects of an *internal* enforcement policy by the host country's government on the host country's welfare, both under capital mobility and capital immobility. They showed that an imposition of internal enforcement may or may not improve the home country's welfare in the absence of capital mobility. Brecher and Choudhri (1987) also analyzed the effects of internal enforcement in a model similar to that of Bond and Chen. However, neither paper examined the effects of *border* enforcement policy.

[2]Ramaswami (1968) examined the income effects of labor importing or capital exporting by a capital abundant country. He found that labor importing is more desirable than capital exporting by the capital abundant country in terms of its national income. Our model, on the other hand, assumes that labor importing and capital exporting are endogenously determined. We can differentiate our model from a neoclassical one, such as that of Ramaswami (1968), by considering whether levels of factor movements are exogenously or endogenously determined.

II. The Basic Model and Main Results

We introduce a standard (two-country, one-good, two-factor) model of illegal immigration in which capital is assumed to be internationally immobile. The home country is also known as the host country. Both the home country and the foreign country have a firm that produces a single output, using constant returns to scale technology. Technologies are assumed to differ between the two countries. Each output is produced by labor and capital. The production functions of the home firms and foreign firms are denoted, respectively, by $F(L, K)$ and $F^*(L^*, K^*)$, where L, K, L^* and K^* are the employment of home labor, home capital, foreign labor and foreign capital, respectively. We assume the home wage rate, w, exceeds the foreign wage rate, w^*, in the absence of factor mobility. The output is assumed to be the numeraire in our model.

We assume that there are legal barriers to factor movements that prevent labor and capital from moving freely between the two countries. Foreign labor may illegally move into the host (home) country and work illegally in the home firm. If caught at the border, the host country government will arrest the would-be illegal immigrants and levy penalties. If caught working within the host country, the host country will determine the internal enforcement level against the home firms that employ illegal foreign workers. The home firms are subject to penalties from the home government if they are found employing illegal foreign workers.[3]

We abstract from the penalties suffered by the home firms when they are found hiring illegal foreign workers, since we assume that the level of internal enforcement is constant throughout the model. The policy tool we analyze is the host country's border enforcement, which limits immigration attempts on the part of foreign workers.

A. Factor Market Equilibrium

We develop the standard (two-country, one-good, two-factor) model,

[3]In our model, home workers do not have incentives to legally or illegally migrate to the foreign country because the home wage rate w exceeds the foreign wage rate w^* in the absence of capital mobility. The foreign country's government may not need to introduce both the border enforcement and internal enforcement policies. Therefore, the expenditure levels on these enforcement policies are zero.

in which capital is internationally immobile. A single product is produced in each country, using labor and capital with constant returns to scale technology. Technologies differ between the two countries. In the absence of factor mobility, we assume that the home wage rate, w, exceeds the foreign wage rate, w^*, thereby attracting foreign workers to the host country.

The home country's government implements a border enforcement policy. If caught at the border, a risk-neutral illegal immigrant (from the foreign country) is fined a penalty, k, and prohibited entry. We assume that the probability of detection at the border is $g(B)$, where B represents the expenditure on border enforcement by the host country's government, and $g(0)=0$, $g'>0$, $g''<0$ and $g<1$. Then the risk-neutral foreign workers adjust their mobility decisions, so as to equate the expected reward from illegal migration to their own local wage, w^*:

$$(w^*-k)g+w(1-g)=w^*.$$

Note that host country firms pay the same wage, w, to both their own country's workers and to illegal immigrants.

The above equation can be rewritten as:

$$w=w^*+k\{g(B)/(1-g(B))\}. \tag{1}$$

Thus, when the home country's government carries out border enforcement, the illegal immigrants not caught at the border earn a higher wage,[4] w, than the wages in their own country, w^*.[5]

[4]We assume that a foreign would-be immigrant, regardless of his success or failure in crossing the border, incurs a psychic cost in leaving his mother country, $\tilde{k}$, once he tries to illegally emigrate to the home country. Moreover, k is implicitly assumed to contain not only the penalty but also this psychic cost for each foreign would-be immigrant. (1) can be rewritten as follows:

$$w=w^*+kg/(1-g)+\tilde{k}. \tag{1$'$}$$

Therefore, foreign illegal labor will receive a higher wage than the foreign country's wage, w^*, even if the level of border enforcement is zero, i.e. $B=0$. Throughout the paper, we ignore the psychic cost $\tilde{k}$ since it is assumed to be constant.

[5]As seen in footnote 10, the value of k is zero since the host country's government cannot collect penalties from the arrested would-be immigrants. However, we cannot consider the value of k as zero if we regard k as the opportunity cost of being caught. This implies that it is meaningful to examine the effects of tightening border patrols.

The production function for the home firm is expressed as $F(L, K)=Kf(\lambda)$, where $\lambda=L/K$ and $f'>0$, $f''<0$. Given wage rates, w, and capital rental rates, r, the first-order conditions of cost-minimization for the domestic firm are:

$$f'(\lambda)=w, \tag{2a}$$

$$f(\lambda)-\lambda w=r. \tag{2b}$$

It is clear from (2a) that

$$\lambda=\lambda(w), \quad \lambda'=1/f''<0. \tag{3}$$

The total differential of (1) and (2b) gives the effects of changes in enforcement expenditures, B, on home country wages and capital costs, w and r, and on foreign country wages, w^*:

$$dr=-\lambda\, dw, \tag{4}$$

$$=-\lambda\,[dw^*+\{kg'/(1-g)^2\}dB], \tag{5}$$

where λ is assumed to be chosen optimally.

In the foreign country, foreign firms minimize total costs given foreign wage and rental rates, w^* and r^*. Hence, equations similar to (3) and (4) are obtained:

$$\lambda^*=\lambda^*(w^*), \quad \lambda^{*\prime}=1/f^{*\prime\prime}<0, \tag{6}$$

$$dw^*=-dr^*/\lambda^*. \tag{7}$$

From (4), (5) and (7), we can derive the effects of changes in border enforcement expenditures, B, on w^* and r^*:

$$dr^*/dB=-\lambda^* dw^*/dB. \tag{8}$$

We find from (8) that the effect of changes in enforcement expenditures, B, on the foreign cost of capital, r^*, is opposite in sign to the effect of B on the foreign cost of labor, w^*. This is also true of the home country.

Let us examine the equilibrium condition in factor markets. The condition for the home market is

$$\overline{K}(1-a)\lambda\{w^*+kg/(1-g)\}=\overline{L}, \tag{9}$$

where $\overline{K}$ and $\overline{L}$, respectively, are the initial capital and labor endowments of the home country; a is the fraction of the home country's labor force that is illegal, which is equal to $I/(\overline{L}+I)$; and I is the number of illegal immigrants presently working in the host

country. Note that $\lambda = (\overline{L}+I)/\overline{K}$. The left-hand side of (9) is the demand for home country labor, while the right-hand side is the supply of home country labor.

In the foreign market equilibrium, the following equation holds:

$$\lambda^*(w^*)\overline{K}^* + a\lambda\{w^* + kg/(1-g)\}\overline{K} = \overline{L}^*, \tag{10}$$

where $\overline{L}^*$ and $\overline{K}^*$, respectively, are the capital and labor endowments of the foreign country. We know $\lambda^* = (\overline{L}^* - I)/\overline{K}^*$ from (10). The left-hand side of (10) is the demand for foreign country labor, composed of the foreign country's own-labor demand and the host country's demand for illegal immigrant labor. The right-hand side of (10) is the supply of foreign labor.

Total differentiation of (9) and (10) yields the effects of an increase in enforcement expenditures, B, on w^* and a as follows:

$$dw^*/dB = \overline{K}\lambda\overline{K}\lambda' kg'/\Delta_1(1-g)^2 < 0, \tag{11a}$$

$$da/dB = -\overline{K}\,\overline{K}^*(1-a)\lambda'\lambda^{*\prime} kg'/\Delta_1(1-g)^2 < 0, \tag{11b}$$

where $\Delta_1 = -\overline{K}\lambda(\lambda^{*\prime}\overline{K}^* + \lambda'\overline{K}) > 0$. Therefore, from (11b) and the definition of a, the effect enforcement on the level of illegal immigration, I is

$$dI/dB = \{(\overline{L}+I)/(1-a)\}(da/dB) < 0. \tag{12}$$

Next, from (4), (5), (11a) and (11b), the effect of an increase in the enforcement expenditure, B, on w is:

$$\begin{aligned} dw/dB &= dw^*/dB + kg'/(1-g)^2, \\ &= -\overline{K}\,\overline{K}^*\lambda\lambda^{*\prime} kg'/\Delta_1(1-g)^2 > 0. \end{aligned} \tag{13}$$

We find from (13) that the effect of B on w is positive. The effects of B on r and r^* are obtained from (4), (8), (11a) and (13):

$$dr/dB = \overline{K}\,\overline{K}^*\lambda^2\lambda^{*\prime} kg'/\Delta_1(1-g)^2 < 0, \tag{14}$$

and

$$dr^*/dB = -\lambda^*\overline{K}\lambda\overline{K}\lambda' kg'/\Delta_1(1-g)^2 > 0, \tag{15}$$

With these comparative static results, we know that the border enforcement policy will impose adverse (favorable) effects on home capital (labor) and foreign labor (capital).

B. Welfare effects

In this subsection we examine the effects of border enforcement on the welfare of the home country, the foreign country and the world. First, we consider the effect of enforcement on the home country's welfare.[6] This welfare is expressed as follows:

$$Y = w\bar{L} + r\bar{K} - B. \tag{16}$$

The home country's welfare[7] is composed of factor payments, $w\bar{L} + r\bar{K}$, minus the expenditure, B, of apprehending foreign illegal immigrants at the frontier between the home country and the foreign country.

By differentiating (16) with respect to B and making use of (4), we obtain the welfare effect of enforcement:

$$dY/dB = -Idw/dB - 1 < 0. \tag{17}$$

We find from (13) that the sign of (17) is negative. This implies that border enforcement by the host country's government causes the host country's welfare to decrease[8] (see Ethier 1986).

Secondly, we examine the effect of border enforcement on the foreign country's welfare. This welfare is defined as:

$$Y^* = \{w^*(\bar{L}^* - I) + r^*\bar{K}^*\} + wI - \{Ig/(1-g)\}k, \tag{18}$$

where the first term, $\{w^*(\bar{L}^* - I) + r^*\bar{K}^*\}$, on the right-hand side represents factor payments[9]; the second term, wI, is the earnings of

[6]We can change the levels of penalties so as to alter the opportunity costs of being arrested (see footnote 5) without raising the costs of the border enforcement, B. However, it could bring about increases in the incentive to bribe officials engaging in border patrol. Because we have not constructed a full model of all aspects of the enforcement process, we will assume that k is constant.

[7](16) should be added to the amount in penalties levied from apprehended foreign workers $\{Ig/(1-g)\}k$. However, the host country's government may not be able to collect the penalties from the arrested workers, since they may not *all* have the ability to pay the penalty when they have not worked. Hence, (16) does not include the sum of penalties $\{Ig/(1-g)\}k$.

[8]We assume that k is constant and also that the effect of B on Y is negative. Hence, the full optimal levels of k and B cannot be found, even if the objective function, Y is assumed to be a function of k and B.

[9]Note that the number of foreign migrants who were not successful in emigrating into the home country is included in $(\bar{L}^* - I)$. The fraction of foreign labor who fail to successfully emigrate into the home country return to their native country and earn the foreign country wage, w^*, by legally working

illegal immigrants; and the third term, $\{Ig/(1-g)\}k$, is the total amount in penalties paid to the home country's government by foreign workers caught attempting to cross the border.[10]

Now let us examine the effect of an imposition of border enforcement, B, on the foreign country's welfare, Y^*. By differentiating (18) with respect to B and making use of (4), (5) and (8), its effect is derived as follows:

$$dY^*/dB = Idw^*/dB < 0. \tag{19}$$

We find from (11a) that the sign of (19) is negative.

***Proposition* 1**

In the absence of international capital mobility, the welfare of the labor-exporting country will decrease when the labor-importing country implements a border enforcement policy.

The effect of border enforcement on global welfare, $(Y+Y^*)$, is obtained from (17) and (19):

$$d(Y+Y^*)/dB = -\{kg'I(1-g)^2\} - 1 < 0. \tag{20}$$

It is clear that the sign of (20) is negative. Hence, we obtain the next proposition:

***Proposition* 2**

In the absence of international capital mobility, global welfare will decrease when the host country's government implements a border enforcement policy.

It is shown, therefore, that border enforcement is undesirable from a global welfare perspective, and hence, it is a *Pareto-inferior*

in the country where per capita income is (w^*-k). Therefore, (18) can be rewritten and follows:

$$Y^* = [w^*\{\overline{L}^* - (Ig/(1-g)) - I\} + r^*\overline{K}^*] + wI + \{Ig/(1-g)\}(w^*-k).$$

Note that the last term in the right-hand side of the above equation is income attributed to foreign workers' who failed in their attempt to emigrate to the host country.

[10]Although k is zero from an earlier assumption (see footnote 5), the foreign workers who failed in their attempt to emigrate to the host country could not have earned a wage during the time they spent on their emigration attempt. Hence, we can consider the penalty as the opportunity cost of being arrested.

policy. For example, if capital immobility characterizes the world economy, then the Japanese Government's present border enforcement policy against possible immigrants would be detrimental to the global economy.

III. Capital Mobility

In this section, we analyze the effects of border enforcement by the home country's government on the home country's welfare, the foreign country's welfare and on global welfare, when capital is mobile between countries. In subsection A, we examine the comparative static effects of border enforcement. In subsection B, we derive the welfare effects of an increase in border enforcement, by using the comparative static results derived in subsection A.

A. Factor Market Equilibrium

We assume that the home country's government levies a tax on home capital located in the foreign country, K_F. Thus, the net return to home capital in the foreign country is $r^*(1-t)$, where t is the tax rate and $0<t<1$. Furthermore, production technologies in both countries are assumed to be identical. Note that in equilibrium,[11] there are both (legal) capital movements and illegal labor flows. Home capital shifts to the foreign country until the rental rates of home capital located in the home country equal after-tax returns of home capital, K_F, located in the foreign country:

$$r=r^*(1-t). \tag{21}$$

Let us examine the equilibrium conditions in factor markets. The equilibrium condition for the home market is

$$(\overline{K}-K_F)(1-a)\,\lambda\,\{w^*+kg/(1-g)\}=\overline{L}. \tag{22}$$

The left-hand side of (22) is the demand for home labor, while the right-hand side is the supply of home labor.

In foreign market equilibrium we have

$$(\overline{K}^*+K_F)\,\lambda^*(w^*)+(\overline{K}-K_F)a\,\lambda\,\{w^*+kg/(1-g)\}=\overline{L}^*. \tag{23}$$

[11]Given B and t, factor prices are not equal between the two countries (see (1) and (21)). Therefore, levels of factor movements, I and K_F are determined at a level where (1) and (21) are satisfied, respectively. We can call the resulting state an equilibrium state given B and t.

The left-hand side in (23) is the foreign country's demand for their own labor as well as the home country's demand for immigrant labor, while the right-hand side is the supply of foreign labor. The three equations of (21), (22) and (23), simultaneously determine w^*, a and K_F.

We examine the effects of border enforcement on w^*, a and K_F by totally differentiating (21) through (23). By totally differentiating (21) and making use of (5) and (7), we can obtain the following equation:

$$dw^*/dB = \lambda kg'/\{\lambda^*(1-t)-\lambda\}(1-g)^2, \tag{24}$$

where the tax rate of capital t is assumed to be given. We assume that the sign of $\{\lambda^*(1-t)-\lambda\}$ is positive (see Jones (1971) and Neary (1978)). Therefore, we find from (24) that the effect of border enforcement on foreign labor's wages is positive.

Total differentiation of (21), (22) and (23) yields the following three-equation system, eliminating dw using (1):

$$\begin{bmatrix} \lambda^*(1-t)-\lambda & 0 & 0 \\ (\overline{K}-K_F)(1-a)\lambda' & -(\overline{K}-K_F)\lambda & -(1-a)\lambda \\ (\overline{K}^*+K_F)\lambda^{*\prime}+a\lambda'(\overline{K}-K_F) & (\overline{K}-K_F)\lambda & \lambda^*-a\lambda \end{bmatrix} \begin{bmatrix} dw^* \\ da \\ dK_F \end{bmatrix}$$

$$= \begin{bmatrix} \{\lambda kg'/(1-g)^2\}dB \\ -\{(\overline{K}-K_F)(1-a)\lambda' kg'/(1-g)^2\}dB \\ -\{(\overline{K}-K_F)a\lambda' kg'/(1-g)^2\}dB \end{bmatrix} \tag{25}$$

The determinant of the system of equations, (25), is

$$\Delta_2 = \{\lambda^*(1-t)-\lambda\}(\overline{K}-K_F)(\lambda-\lambda^*)\lambda,$$

where the sign of Δ_2 is negative because the sign of $\{\lambda^*(1-t)-\lambda\}$ is assumed to be positive.

From (25) we can obtain the effects of B on a and K_F:

$$da/dB = -kg'(1-a)\{(1-t)(\overline{K}-K_F)\lambda'\lambda^{*2} + (\overline{K}^*+K_F)\lambda^2\lambda^{*\prime}\}/\Delta_2(1-g)^2 < 0, \tag{26a}$$ [12]

$$dK_F/dB = kg'\lambda(\overline{K}-K_F)\{(1-t)\lambda^*\lambda'(\overline{K}-K_F) + \lambda\lambda^{*\prime}(\overline{K}^*+K_F)\}/\Delta_2(1-g)^2 > 0. \tag{26b}$$

[12]From the definition of a and (26a), the effect of border enforcement on the level of illegal immigration, I is negative:

$$dI/dB = \{(\overline{L}+I)/(1-a)\}\cdot(da/dB) < 0.$$

From (4), (5) and (24), the effect of B on w is:

$$\begin{aligned} dw/dB &= dw^*/dB + kg'/(1-g)^2 \\ &= \lambda^*(1-t)kg'/\{\lambda^*(1-t)-\lambda\}(1-g)^2 > 0. \end{aligned} \tag{27}$$

And the effects of B on r and r^* are obtained from (4), (8), (24) and (27):

$$dr/dB = -\lambda\lambda^*(1-t)kg'/\{\lambda^*(1-t)-\lambda\}(1-g)^2 < 0, \tag{28}$$

and

$$dr^*/dB = -\lambda^*\lambda kg'/\{\lambda^*(1-t)-\lambda\}(1-g)^2 < 0. \tag{29}$$

It can be seen from these comparative static results that given international capital mobility, border enforcement brings about adverse (favorable) effects to home and foreign capital (home and foreign labor).

We find from (27) that border patrol by the host country's government causes an increase in the foreign country's wages. This arises because border enforcement causes home capital to shift from the home country to the foreign country. Capital immobility causes a match of illegal foreign country labor and home country capital in the home country. Capital mobility causes a match of (legal) foreign country labor and home country capital in the foreign country. Thus, capital mobility allows the elimination of production penalties that would be incurred under capital immobility.

An increase in distortion, i. e., border enforcement, will bring about further separation from the equilibrium point where the factor prices are equal between countries; $w = w^*$ and $r = r^*$. Since the home country's output is produced by a capital-intensive technique in a value-sense as long as $\lambda^*(1-t)-\lambda > 0$, border enforcement causes a decrease in the capital costs for both the home and foreign country.

B. Welfare Effects

In this section we examine the effects of border enforcement by the home country's government on the welfare of the home country, the foreign country and the world.

Firstly, we consider the welfare of the home country, or labor-importing country. This is defined as follows:

$$Y = w\bar{L} + r\bar{K} + tr^*K_F - B. \tag{30}$$

The host country's income consists of (16) plus the tax imposed on returns earned by home capital in the foreign country, tr^*K_F.

We examine the effect of enforcement on the home country's welfare. By differentiating (30) with respect to B and manipulating the equation by making use of (1), (4), (5), (8) and $\lambda = (\bar{L}+I)/(\bar{K}-K_F)$, the effect of enforcement on Y is derived:

$$dY/dB = (r^* - r)dK_F/dB - Idw/dB - \lambda^* K_F dw^*/dB - 1. \tag{31}$$

We find from (24), (26b) and (27) that the sign of (31) is indeterminate. However, we know that the sign of (31) is positive if the following condition,

$$(r^* - r)dK_F/dB > Idw/dB + \lambda^* K_F dw^*/dB + 1 \tag{C1}$$

is satisfied.[13] This necessary condition implies that the marginal tax-revenue from home capital outflows that arise due to enforcement, $(r^* - r)dK_F/dB$, outweighs the effects of enforcement on home and foreign labor's wages, $Idw/dB + \lambda^* K_F dw^*/dB$, and the marginal costs of enforcement, 1.

***Proposition* 3**

Border enforcement by the host country will increase the host country's welfare when condition (C1) holds.

Secondly, we consider the effect of border enforcement on the foreign country's welfare. The foreign country's welfare is expressed as:

$$Y^* = \{w^*(\bar{L}^* - I) + r^*\bar{K}^*\} + wI - \{Ig/(1-g)\}k. \tag{32}$$

Y^* consists of factor expenditures, $\{w^*(\bar{L}^* - I) + r^*\bar{K}^*\}$, and immigrant earnings, wI, less the sum of penalties[14] that the arrested foreign-migrants paid to the home country's government, $\{Ig/(1-g)\}k$. By differentiating (32) with respect to B and using (4), (5) and (8), the effect of enforcement on Y^* is obtained:

$$dY^*/dB = Idw^*/dB + \lambda^* K_F dw^*/dB > 0. \tag{33}$$

The sign of (33) is unambiguously positive given (24). Y^* will rise

[13]Notice that (C1) is the necessary condition for the optimal enforcement level to be positive.

[14]See footnote 5.

when border enforcement is implemented.

***Proposition* 4**
In the presence of international capital mobility, the welfare of the labor-exporting country will rise when border enforcement is carried out by the host (labor-importing) country.

Thirdly, we consider the effect of border enforcement on global welfare ($Y+Y^*$). It is derived from (31) and (33), and from (4) and (5):

$$d(Y+Y^*)/dB=(r^*-r)dK_F/dB-\{kg'I/(1-g)^2\}-1. \qquad (34)$$

It is clear that the sign of (34) is positive, if condition (C1) is satisfied. In short, the effect of border enforcement on ($Y+Y^*$) is positive when the marginal tax-revenue of home capital outflows, $(r^*-r)dK_F/dB$, outweighs the marginal opportunity costs (see footnote 5) of would-be migrants being caught and fined, $kg'I/(1-g)^2$, plus the marginal costs of enforcement, 1.

***Proposition* 5**
In the presence of international capital mobility, global welfare will be increased by the implementation of border enforcement if (C1) holds.

It can be seen from our welfare analyses that when (C1) holds, border enforcement by the host country's government increases the host country's welfare, the foreign country's welfare, and global welfare. We conclude that in the presence of capital mobility, border enforcement may, under some circumstances, be a *Pareto-superior policy*. For example, the Japanese Government's present border enforcement against potential illegal immigrants is desirable from the viewpoint of global welfare, if capital is mobile between Japan and the foreign country.

IV. Concluding remarks

We developed a standard (two-country, one-good, two-factor) model of illegal immigration. We analyzed the effects of border enforcement by the home country's government on the welfare of the home country, the foreign country and the world, both in the

presence and absence of international capital mobility.

We obtained the following results: (1) When capital is not mobile between the two countries, border enforcement causes a decrease in the home country's welfare, the foreign country's welfare, and global welfare. (2) When capital is mobile between the two countries, border enforcement causes an increase in the home country's welfare (under some circumstances) and the foreign country's welfare, and hence, causes an increase in global welfare.

We can conclude from our results (1) and (2) that border enforcement by the host country's government may be a *Pareto-inferior policy* in the absence of capital mobility, whereas it may be a *Pareto-improving policy* in the presence of capital mobility. We can generally regard the real world as being closer to the model of Section III that has perfect factor mobility. Hence, border enforcement based on immigration laws by the host country (e.g., Japan) can be justified in terms of economic welfare.

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