On the Political Economy of High Skilled Migration and International Trade

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Abstract

We develop a two-country, two-sector model with a continuum of workers to address the link between migration and trade where policy is determined by a simple referendum. In particular, we address two questions. First, are states already in free trade areas more likely to support full integration than states without free trade? Second, is trade liberalization more likely to be supported by a simultaneous referendum on trade and migration than in one on trade alone? The key to our analysis is the recognition that for free trade, migration, or trade and migration to be adopted, the relevant policy must pass the referendum in both countries. We identify conditions under which that occurs. Our model provides an interpretation of the evolution of the politics of economic integration related to NAFTA and European Union.

JEL-Code: F150, F220, F590.

Keywords: skilled labor, migration, trade, political economy.

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1 Introduction

The textbook standard presention of economic integration involves a series of steps from a free trade area (elimination of tariffs on trade between members), to a customs union (adoption of a common external tariff), to full economic integration involving, among other things, free movement of factors of production. To economists, this seems a sensible progression from more distorted to less distorted markets; but to most others, especially when "factor mobility" means "labor mobility", this step seems one step too many.[1] Nonetheless, institutionalized programmes of international economic integration often seek liberalization of labor mobility. This is true of both the European Union (which has successfully implemented liberalization of labor mobility within the Union) and the WTO (which seeks at least some liberalization of labor mobility as Mode IV liberalization of service trade).[2] By contrast, many preferential trade agreements appear not to contemplate extension to liberalized migration of labor at all. NAFTA is one such case. Sometimes the full progamme is successful, other times it is not. This is ultimately a political phenomenon. With the expanding number of preferential trade arrangements (PTAs), we expect the link between trade liberalization and migration to be of continuing interest.

In this paper we develop a two-country, two-sector model with a continuum of workers to address the link between migration and trade where policy is determined by a simple referendum.[3] After developing the framework and some preliminary results, we address two questions. First, are states already in free trade areas more likely to support full integration than states without free trade? Second, is trade liberalization more likely to be supported by a simultaneous referendum on trade and migration than in one on trade alone? The key to our analysis is the recognition that for free trade, migration, or trade and migration to be adopted, the relevant policy must pass the referendum in both countries. We identify conditions under which that occurs. In parts 2 and 3 below we present the basic structure of our model. From there we analyze the interaction of trade and migration policy in the political economy of economic integration broadly considered. That is, we are interested in situations in which all (both in our case) parties must ratify an agreement before it can be implemented.

2 The Model

There are two countries *A* and *B* each populated by a continuum of workers of unit measure. Each worker is endowed with one unit of indivisible labor and some level of human capital *h*. In both countries human capital is uniformly distributed on the interval [0,1]. In each country there are two competitive sectors. Sector *X* produces a high-tech product while sector *Y*

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[1] It is not clear that freeing capital mobility is any more popular with the general public, but it certainly is the case that in virtually all countries the public politics of immigration are more heated than those attending liberalization of capital markets to international competition.

[2] Perhaps ironically, liberalization of trade and capital is also seen in some cases as a substitute for labor mobility. Such an argument was regularly made during the run up to NAFTA and it has also been made in support of more general trade liberalization both unilateral and via the WTO.

[3] There is, of course, a sizable literature on the link between trade and migration. For a survey, see Gaston and Nelson (2012). The particular class of general equilibrium model we apply here is developed, in other contexts, in (Bougheas and Nelson, 2012; Bougheas and Riezman, 2007; Davidson et al., 2007). The paper by Bougheas and Nelson applies this model to the study of the welfare effects of trade and migration.

produces a primary commodity. The productivity of workers depends on their level of human capital and their sector of employment. Let $z_{AX}(h)$ denote the productivity of a worker with human capital h who works in country A in sector X (other types of employment are similarly defined). All four technologies are linear in h:

$$z_{AX} = h$$
$$z_{BX} = kh; \quad k > 1$$
$$z_{AY} = z_{BY} = v; \quad 0 < v < 1;$$

Both countries use the same technology to produce the primary commodity but country B has a superior technology in sector X. In addition, the marginal return to human capital is higher in the high-tech sector.

All workers have identical Cobb-Douglas preferences given by

$$U = X^{\alpha} Y^{\beta}; \quad 0 < \alpha, \beta < 1; \quad \alpha + \beta = 1$$

Given that technologies are CRS and that all markets are competitive worker incomes equal their productivities and each workers spend a fraction α of her income on product X.

2.1   Autarky

Throughout we use good X as the numeraire and let p_A and p_B denote the autarky prices in countries A and B respectively. In what follows we are going to concentrate our analysis on country B since by setting $k = 1$ we can obtain the corresponding solutions for country A.

Workers choose their sector of employment by comparing wages. A worker with human capital h will receive income kh if employed in sector X while the same worker will receive income $p_B v$ if employed in sector Y. This implies that all workers with human capital higher than $h_B \equiv \dfrac{p_B v}{k}$ will be employed in the high-tech sector while workers with human capital below this threshold will be employed in the primary sector. Given our specification of preferences the equilibrium autarky price is proportional to the ratio of aggregate production in sector X divided by the aggregate production in sector Y:

$$p_B = \frac{\beta}{\alpha} \frac{\int_{h_B}^{1} kh \, dh}{h_B v}$$

The corresponding closed form solution for the autarky price is given by:

$$p_B = \frac{k}{v} \sqrt{\frac{\beta}{2\alpha + \beta}}$$

Notice that the above solution implies that $p_B > p_A$ which follows from the fact that country B has a superior technology for producing the high-tech product (i.e. that $k^B > 1 = k^A$). It also follows that $h_A = h_B$.

Later we will need expressions for the utilities derived by each agent according to her country and sector of employment. Let U_{ij}^A $(i = A, B; j = X, Y)$ denore the utility under autarky of an agent working in country i and employed in sector j. Then,[4]

$$U_{AY}^A = p_A \left(\sqrt{\frac{\beta}{2\alpha + \beta}} \right)^{-\beta} v^{1+\beta} = (p_A)^\alpha v$$

$$U_{AX}^A = p_A \left(\sqrt{\frac{\beta}{2\alpha + \beta}} \right)^{-(1+\beta)} hv^{1+\beta} = (p_A)^{-\beta} h$$

$$U_{BY}^A = p_B \left(\sqrt{\frac{\beta}{2\alpha + \beta}} \right)^{-\beta} v^{1+\beta} k^{-\beta} = (p_B)^\alpha v$$

$$U_{BX}^A = p_B \left(\sqrt{\frac{\beta}{2\alpha + \beta}} \right)^{-(1+\beta)} hv^{1+\beta} k^{-\beta} = (p_B)^{-\beta} kh$$

--Figure 1 about here--

We illustrate the autarky equilibrium in figure 1. The horizontal axis shows the (uniform) distribution of skill from 0 to 1. The left vertical axis shows value marginal product in *Y*, while the right vertical axis shows value marginal product in *X* (the numeraire). Since both countries share the same distribution of skill, both can be shown on the same graph. Our assumptions imply that the value marginal product curve for *X* in country *B* lies above that in country *A*. Finally, we see both $p_B > p_A$ and $h_A = h_B$ (which we simply denote *h* in the diagram).

2.2 Trade

When the two economies trade, country *A* exports the primary commodity *Y* and country *B* exports the high-tech product *X*. The world price p^T lies between the two autarky prices and is given by

$$p^T = \frac{\beta}{\alpha} \frac{\int_{h_A^T}^1 h\,dh + \int_{h_B^T}^1 kh\,dh}{(h_A^T + h_B^T)v}$$

where $h_A^T = p^T v > h_A = h_B > \frac{p^T v}{k} = h_B^T$. The corresponding closed form solution for the world

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[4]All utilities have been divided by $\left(\dfrac{\alpha}{\alpha + \beta} \right)^\alpha \left(\dfrac{\beta}{\alpha + \beta} \right)^\beta$.

price is given by:

$$p^T = \frac{\sqrt{k}}{v}\sqrt{\frac{\beta}{2\alpha+\beta}}$$

Once more we provide expressions for the utility levels derived by each agent under international trade according to her country of residence and sector of employment.

$$U_{AY}^T = p^T\left(\sqrt{k}\sqrt{\frac{\beta}{2\alpha+\beta}}\right)^{-\beta}v^{1+\beta} = \left(p^T\right)^{1-\beta}v$$

$$U_{AX}^T = p^T\left(\sqrt{k}\sqrt{\frac{\beta}{2\alpha+\beta}}\right)^{-(1+\beta)}hv^{1+\beta} = \left(p^T\right)^{-\beta}h$$

$$U_{BY}^T = p^T\left(\sqrt{k}\sqrt{\frac{\beta}{2\alpha+\beta}}\right)^{-\beta}v^{1+\beta} = \left(p^T\right)^{1-\beta}v$$

$$U_{BX}^T = p^T\left(\sqrt{k}\sqrt{\frac{\beta}{2\alpha+\beta}}\right)^{-(1+\beta)}khv^{1+\beta} = \left(p^T\right)^{-\beta}kh$$

--Figure 2 about here--

Figure 2 illustrates the equilibrium with trade. With a common world price, we see country *B* specializing in the production of good *X*, in which it has a comparative advantage, by allocating more labor to its production. Similarly for country *A* and good *Y*.

2.3 Migration

Suppose that the two economies do not trade but migration is allowed.

2.3.1 Costless Migration

Given that the two countries use the same technology to produce the primary commodity but country *B* has a superior technology for producing the high-tech product every worker in country *A* will emigrate in country *B*. The integration equilibrium price is equal to p_B, i.e. country *B*'s autarky price.

2.3.2 Costly migration

Now suppose that migration entails a cost γ measured in numeraire units. We are going to assume that this cost is sufficiently high so that workers in the primary sector do not wish to

emigrate.[5] Let p_A^M and p_B^M denote the two new autarky prices. The utility of a worker who is a citizen of country A, employed in sector X and does not emigrate is equal to $(h)^\alpha \left(\dfrac{h}{p_A^M} \right)^\beta = h \left(p_A^M \right)^{-\beta}$.[6] If the same worker emigrates to country B her new utility will be

$(kh - \gamma)^\alpha \left(\dfrac{kh - \gamma}{p_B^M} \right)^\beta = (kh - \gamma)\left(p_B^M \right)^{-\beta}$. Then there exists a threshold level of human capital

$h^M = \dfrac{\gamma \left(p_B^M \right)^{-\beta}}{k \left(p_B^M \right)^{-\beta} - \left(p_A^M \right)^{-\beta}}$ such that all workers with human capital above it and who initially

were citizens in country A emigrate to country B. Letting h_A^M and h_B^M denote the new threshold levels of human capital that separates those employed in sector X from those employed in sector Y, in countries A and B respectively, the new autarky prices are given by the system of equations:

$$p_A^M = \frac{\beta}{\alpha} \frac{\int_{h_A^M}^{h^M} h \, dh}{h_A^M v}$$

and

$$p_B^M = \frac{\beta}{\alpha} \frac{\int_{h^M}^{1} (kh - \gamma) dh + \int_{h_B^M}^{1} kh \, dh}{h_B^M v}$$

Notice that the two equations need to be solved simultaneously since h^M depends on both new autarky prices. This complication implies that it is not possible to derive closed-form solutions for the two prices. Nevertheless, the effect of migration is to increase the gap between the autarky prices, i.e. $p_B^M > p_B > p_A > p_A^M$. The intuition is that in country A the old threshold level of human capital that separates those employed in sector X from those employed in sector Y is too high, given that only high ability workers have migrated while the corresponding threshold in country B is too low.[7] Given that $h_A = h_B$ then we must have that $h_A^M < h_B^M$ from where the above inequalities directly follow.

--Figure 3 about here--

While the principle is straightforward, our graphical apparatus gets messier here. Since all workers with human capital above h^M migrate from A to B, we truncate the A distribution at h^M and append the μ skilled workers to the B distribution. It is easy to see

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[5]When we introduce trade, these workers will not have an incentive to emigrate. Thus, by restricting their movement in the absence of trade allows for clearer comparisons between the two cases.

[6]All utilities have been divided by $\alpha^\alpha \beta^\beta$.

[7]Let μ denote the proportion of migrants. Given that both populations originally were of unit measure the new population of country A is of measure $1 - \mu$ and human capital is uniformly distributed on the interval $[0, 1 - \mu]$
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that, with unchaged preferences and no international trade, the migration of workers that produce only good X results in too little X production in country A and too much in country B. This results in an increase in the relative price of X in country A and a reduction country B (i.e. a fall in p_A^M and a rise in p_B^M) and, of course, an increase in the allocation of labor to X production in A and to Y production in B.

3 Migration and Trade

3.1 Costless Migration

When migration is costless it is optimal that the whole production of the high-tech product takes place in country B. In the absence of trade costs, the production location of the primary product is inconsequential. In the presence of trade costs it is optimal that all workers move to country B. In either case we have full integration. The full integration equilibrium price p^{FI} is given as the solution of

$$p^{FI} = \frac{\beta}{\alpha} \frac{\int_{h^{FI}}^{1} khdh}{h^{FI}v}$$

where $h^{FI} = \dfrac{p^{FI}v}{k}$. It is clear that the equilibrium world trade price and the critical threshold are the same as those for the autarky case for country B.

3.2 Costly Migration

Once again suppose that migration entails a cost γ measured in numeraire units. Given that when the two countries trade all workers face the same price, the only workers that move across borders are some of those workers who were citizens of country A and employed in sector X and now move to country B and are employed in the same sector. For these workers their pre-migration income was equal to h while their post-migration income is equal to $kh - \gamma$. This implies that there exists a threshold level of human capital $h^* \equiv \dfrac{\gamma}{k-1} < h^M$ such that all workers with human capital above it and who initially were citizens in country A emigrate to country B.[8] Letting h_A^* and h_B^* denote the new threshold levels of human capital that separates those employed in sector X from those employed in sector Y, the new equilibrium price p^* is given by

$$p^* = \frac{\beta}{\alpha} \frac{\int_{h_A^*}^{h^*} hdh + \int_{h^*}^{1}(kh - \gamma)dh + \int_{h_B^*}^{1} khdh}{(h_A^* + h_B^*)v}$$

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[8]Notice that here it is sufficient to compare incomes because the prices in the two countries are equal. Earlier we examined the case where there is no trade and therefore the prices in the two countries were different.

The corresponding closed form solution is:

$$p^* = \frac{\sqrt{k}}{v}\sqrt{\frac{2k-\gamma}{1+k}}\sqrt{\frac{\beta}{2\alpha+\beta}}$$

Given that $\sqrt{k} > \sqrt{\frac{2k-\gamma}{1+k}}$ we have $p^B > p^*$. In addition, the inequality $\gamma < k-1$ implies that $p^* > p^T$ which in turn implies that $h_B^* > h_B^T$ and $h_A^* > h_A^T$. This is because migration has allowed a more efficient allocation of resources by moving high skilled workers to country B which has a superior technology for producing the skill-intensive product X.

Below we provide expressions for the utilities of each agent when there is free trade and free movement of workers acroos international borders.

$$U_{AY}^* = \left(p^*\right)^\alpha v$$

$$U_{AX}^* = \left(p*\right)^{-\beta} h$$

$$U_{BY}^* = \left(p^*\right)^\alpha v$$

$$U_{BX}^* = \left(p^*\right)^{-\beta} kh$$

Figure 4 illustrates the equilibrium with trade and migration.

--Figure 4 about here--

There is more migration under free trade and the skilled migration to the skill abundant country supports increased comparative advantage based trade. The intuition is that, under trade, prices converge which further boosts the incomes of the migrants and thus the incentive to migrate. Of course this is not a new result. Markusen (1983) and Razin and Sadka (1994) have, within more traditional trade models, demonstrated the complementarity bertween trade and migration when countries differ in technologies.

4   Political Economy - Referenda Outcomes

The preceding sections identify the political preferences of agents. The next step is to map these preferences into policies via some political mechanism. In this paper the mechanism we choose is the referendum. As with much other research on political economy (e.g. Mayer, 1984), one of the prime virtues of the referendum model is its simplicity. In particular, we need not be concerned with strategic behavior or with accounting for resources used in political activity. Ultimately, we need only be concerned with the identity of the median voter. For all its simplicity, the referendum model seems to be a good representation of the check on policy imposed by public opinion. Furthermore, in the context of broad decisions about membership in integrated areas, referenda may actually be part of the political process. We consider the outcomes of various

voting patterns under the supposition that those agents that stand to make losses under the new regime will not be compensated. It is clear for a change in regime to take place it is required that both countries vote for the change. For each vote and for each country we have to consider the votes of three distinct groups (excluding migrants, who will always vote in favor of migration): the first two groups are comprised of those agents whose emloyment sector is the same irrespective of the regime (S_{YA} , S_{XA} , S_{YB} and S_{XB}) and the third group incudes those agents who are reallocated to a new sector after a change in regime (R_A and R_B).

4.1 Referenda on Trade Liberalization without Migration

In this section, we consider the outcomes of free trade referenda in the two countries under the supposition that worker movements across international borders are not allowed.

4.1.1 Country A

We begin by considering the vote of those agents who will be employed in the same sector under both regimes.[9]

$$S_{YA}: U_{AY}^T - U_{AY}^A = \left(p^T \right)^\alpha v - \left(p_A \right)^\alpha v = \left(\left(p^T \right)^\alpha - \left(p_A \right)^\alpha \right) v > 0$$

$$S_{XA}: U_{AX}^T - U_{AX}^A = \left(p^T \right)^{-\beta} h - \left(p_A \right)^{-\beta} h = \left(\left(p^T \right)^{-\beta} - \left(p_A \right)^{-\beta} \right) h < 0$$

Not surprisingly, we find that those employed in the secor with the comparative advantage (sector Y) vote in favor of trade liberalization while those employed in the other sector vote against the referendum. Next, we consider the vote of those agents who will change sector of employment should the referendum go through. Given that $h_A^T = \sqrt{k} \sqrt{\dfrac{\beta}{2\alpha + \beta}} > \sqrt{\dfrac{\beta}{2\alpha + \beta}} = h_A$ some agents who are employed in sector X under autarky will move to sector Y under free trade.

$$R_A: U_{AY}^T - U_{AX}^A = \left(p^T \right)^\alpha v - \left(p_A \right)^{-\beta} h = \left(\frac{\sqrt{k}}{v} \sqrt{\frac{\beta}{2\alpha + \beta}} \right)^\alpha v - \left(\frac{1}{v} \sqrt{\frac{\beta}{2\alpha + \beta}} \right)^{-(1-\alpha)} h$$

$$= \left(\frac{1}{v} \sqrt{\frac{\beta}{2\alpha + \beta}} \right)^\alpha \left(\left(\sqrt{k} \right)^\alpha v - \left(\frac{1}{v} \sqrt{\frac{\beta}{2\alpha + \beta}} \right)^{-1} h \right)$$

The last expresion is positive for $h = h_A$ and negative for $h = h_A^T$ and thus we have the following voting outcome:

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[9]In all comparisons we subtract the status quo utility from the utility that will be derived in the case that the referendum is successful. Thus, a positive difference implies that the vote is in favor of the referendum.

Lemma 1: *Country A will vote in favor of trade liberalization iff* $\left(\sqrt{k}\right)^{\alpha}\sqrt{\dfrac{\beta}{2\alpha+\beta}} > \dfrac{1}{2}$.

All agents below the critical human capital level will vote in favor of the referendum. The lemma follows form the fact that human capital is uniformly distributed on $[0,1]$.

4.1.2 Country B

Once more we consider first the vote of those agents who will remain employed in the same sector after a change in regime.

$$S_{YB}: U^{T}_{BY} - U^{A}_{BY} = \left(p^{T}\right)^{\alpha} v - \left(p_{B}\right)^{\alpha} v = \left(\left(p^{T}\right)^{\alpha} - \left(p_{B}\right)^{\alpha}\right) v < 0$$

$$S_{XA}: U^{T}_{BX} - U^{A}_{BX} = \left(p^{T}\right)^{-\beta} kh - \left(p_{B}\right)^{-\beta} kh = \left(\left(p^{T}\right)^{-\beta} - \left(p_{B}\right)^{-\beta}\right) kh > 0$$

Sector X has the comparative advantage and thus its workers vote in favor of the referendum while those workers employed in sector Y vote against it. Next we consider those agents who will change sector of employment. Given that $h^{T}_{B} = \dfrac{\sqrt{k}}{k}\sqrt{\dfrac{\beta}{2\alpha+\beta}} < \sqrt{\dfrac{\beta}{2\alpha+\beta}} = h_{B}$ some agents who are employed in sector Y under autarky will move to sector X under free trade.

$$R_{B}: U^{T}_{BX} - U^{A}_{BY} = \left(p^{T}\right)^{-\beta} kh - \left(p_{B}\right)^{\alpha} v = \left(\dfrac{\sqrt{k}}{v}\sqrt{\dfrac{\beta}{2\alpha+\beta}}\right)^{-\beta} kh - \left(\dfrac{k}{v}\sqrt{\dfrac{\beta}{2\alpha+\beta}}\right)^{1-\beta} v$$

$$= \left(\dfrac{\sqrt{k}}{v}\sqrt{\dfrac{\beta}{2\alpha+\beta}}\right)^{-\beta} k\left(h - \left(\sqrt{k}\right)^{-\beta}\sqrt{\dfrac{\beta}{2\alpha+\beta}}\right)$$

The last expresion is positive for $h = h_{B}$ and negative for $h = h^{T}_{B}$ and thus we have the following voting outcome:

Lemma 2: *Country B will vote in favor of trade liberalization iff* $\left(\sqrt{k}\right)^{-\beta}\sqrt{\dfrac{\beta}{2\alpha+\beta}} < \dfrac{1}{2}$.

In contrast to country A, in country B those who vote in favor of the refendum are the agents with human capital above the critical level.

4.1.3 Politico-Economic Equilibrium

Of course, for trade liberalization to be attained we need both referenda to be successful.

Proposition 1: *Trade liberalization will be attained iff*

$$\left(\sqrt{k}\right)^{-\beta}\sqrt{\frac{\beta}{2\alpha+\beta}} < \frac{1}{2} < \left(\sqrt{k}\right)^{1-\beta}\sqrt{\frac{\beta}{2\alpha+\beta}} \tag{1}$$

The proposition implies that the higher the productivity difference between the two sectors (the higher the value of k) the more likely is that trade liberalization will be attained. The intuition is that those who benefit from an increase in the discrepancy in productivity are the workers who work in the comparative advantage sectors.

4.2 Joint Referenda on Trade Liberalization and Migration

In this section we assume that citizens of the two countries have to vote on trade liberalization and migration in a single referendum.

4.2.1 Country A

Once more, we begin our analysis with those agents who will remain employed in the same sector should the referendum succeed.

$$S_{YA} : U_{AY}^* - U_{AY}^A = \left(p^*\right)^\alpha v - \left(p_A\right)^\alpha v = \left(\left(p^*\right)^\alpha - \left(p_A\right)^\alpha\right)v > 0$$

$$S_{XA} : U_{AX}^* - U_{AX}^A = \left(p^T\right)^{-\beta} h - \left(p_A\right)^{-\beta} h = \left(\left(p^*\right)^{-\beta} - \left(p_A\right)^{-\beta}\right)h < 0$$

The above expressions reveal that the voting patterns of those who remain in the same sector of employemnt are the same as in the case when the referendum decides only the trade regime. This is because the voting patterns are still determined by whether or not the sector of employment is the one with the comparative advantage. The last observation is an immediate consequence of the inequality $p^B > p^* > p^A$. Next, consider those agents who, in the case that the joint referendum is successful, will change sector of employment. Given that $h_A^* = \sqrt{k}\sqrt{\frac{2k-\gamma}{1+k}}\sqrt{\frac{\beta}{2\alpha+\beta}} > \sqrt{\frac{\beta}{2\alpha+\beta}} = h_A$ some agents who are employed in sector X under autarky will move to sector Y under free trade and migration.

$$R_A : U_{AY}^* - U_{AX}^A = \left(p^*\right)^\alpha v - \left(p_A\right)^{-\beta} h$$

$$= \left(\frac{\sqrt{k}}{v}\sqrt{\frac{2k-\gamma}{1+k}}\sqrt{\frac{\beta}{2\alpha+\beta}}\right)^\alpha v - \left(\frac{1}{v}\sqrt{\frac{\beta}{2\alpha+\beta}}\right)^{-(1-\alpha)} h$$

$$= \left(\frac{1}{v}\sqrt{\frac{\beta}{2\alpha+\beta}}\right)^\alpha \left(\left(\sqrt{k}\sqrt{\frac{2k-\gamma}{1+k}}\right)^\alpha v - \left(\frac{1}{v}\sqrt{\frac{\beta}{2\alpha+\beta}}\right)^{-1} h\right)$$

The last expresion is positive for $h = h_A$ and negative for $h = h_A^*$ and thus we have the following voting outcome:

Lemma 3: *Given that the migrants will always vote in favor of the referendum country* A *will vote in favor of both trade liberalization and migration iff*

$$\left(\sqrt{k}\sqrt{\frac{2k-\gamma}{1+k}}\right)^{\alpha}\sqrt{\frac{\beta}{2\alpha+\beta}}+\left(1-\frac{\gamma}{k-1}\right)>\frac{1}{2}.$$

Comparing the above result with the corresponding voting patterns when agents vote only for trade liberalization we find that the citizens of country A are more likely to vote for trade liberalization when they are also voting for free labor movements. This follows from (a) the inequality $\dfrac{2k-\gamma}{1+k}>1$ which shows that under migration the terms of trade for those employed in the sector with the comparative advantage are more favorable, and (b) from the mass of migrants $\left(1-\dfrac{\gamma}{k-1}\right)$ who clearly prefer the new regime.

4.2.2 Country B

For exactly the same reasons as those offered for country A, in country B the votes of those agents who will remain in the same sector of employment after a successful referendum are exactly the same as in the case when agents only vote for trade liberalization.

$$S_{YB}:U^{*}_{BY}-U^{A}_{BY}=\left(p^{*}\right)^{\alpha}v-\left(p_{B}\right)^{\alpha}v=\left(\left(p^{*}\right)^{\alpha}-\left(p_{B}\right)^{\alpha}\right)v<0$$

$$S_{XA}:U^{*}_{BX}-U^{A}_{BX}=\left(p^{*}\right)^{-\beta}kh-\left(p_{B}\right)^{-\beta}kh=\left(\left(p^{*}\right)^{-\beta}-\left(p_{B}\right)^{-\beta}\right)kh>0$$

Now consider those agents who will change sector of employment after a successful referendum. Given that $h^{*}_{B}=\dfrac{\sqrt{k}}{k}\sqrt{\dfrac{2k-\gamma}{1+k}}\sqrt{\dfrac{\beta}{2\alpha+\beta}}<\sqrt{\dfrac{\beta}{2\alpha+\beta}}=h_{B}$ [10] some agents who are employed in sector Y under autarky will move to sector X under free trade and migration.

$$R_{B}:U^{*}_{BX}-U^{A}_{BY}=\left(p^{*}\right)^{-\beta}kh-\left(p_{B}\right)^{\alpha}v$$

$$=\left(\frac{\sqrt{k}}{v}\sqrt{\frac{2k-\gamma}{1+k}}\sqrt{\frac{\beta}{2\alpha+\beta}}\right)^{-\beta}kh-\left(\frac{k}{v}\sqrt{\frac{\beta}{2\alpha+\beta}}\right)^{1-\beta}v$$

$$=\left(\frac{\sqrt{k}}{v}\sqrt{\frac{\beta}{2\alpha+\beta}}\right)^{-\beta}k\left(\left(\sqrt{\frac{2k-\gamma}{1+k}}\right)^{-\beta}h-\left(\frac{1}{\sqrt{k}}\right)^{\beta}\sqrt{\frac{\beta}{2\alpha+\beta}}\right)$$

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[10] This follows directly from the inequality $p^{B}>p^{*}$.

The last expresion is negative for $h = h_B^*$ and positive for $h = h_B$ and thus we have the following voting outcome:

Lemma 4: *Country B will vote in favor of both trade liberalization and migration iff*

$$\left(\sqrt{\frac{2k-\gamma}{(1+k)k}}\right)^{\beta} \sqrt{\frac{\beta}{2\alpha+\beta}} < \frac{1}{2}.$$

As is the case of country A, country B is more likely to vote for trade liberalization under the joint referendum. The intuition is the same as the first explanation offered in the case of country A, namely, the fact that the terms of trade for those who work in the sector with the comparative advantage have been improved $\left(\dfrac{2k-\gamma}{(1+k)k} < 1\right)$.

4.2.3 Politico-Economic Equilibrium

Combine the rsults of the two lemmas we get the following proposition

Proposition 2: *Migration will be allowed and trade liberalization will be attained iff*

$$\left(\frac{1}{\sqrt{k}}\sqrt{\frac{2k-\gamma}{1+k}}\right)^{\beta} \sqrt{\frac{\beta}{2\alpha+\beta}} < \frac{1}{2} < \left(\sqrt{k}\sqrt{\frac{2k-\gamma}{1+k}}\right)^{\alpha} \sqrt{\frac{\beta}{2\alpha+\beta}} + \left(1-\frac{\gamma}{k-1}\right) \tag{2}$$

4.3   Referenda on Migration under Free Trade

We have already derived the political outcome when agents vote only for trade liberalization. Under the supposition that both countries voted in favor of trade liberalization we analyze the migration referendum outcome.

4.3.1 Country A

Consider those who would choose to work in the same sector under both regimes.

$$S_{YA} : U_{AY}^* - U_{AY}^T = \left(p^*\right)^{\alpha} v - \left(p^T\right)^{\alpha} v = \left(\left(p^*\right)^{\alpha} - \left(p^T\right)^{\alpha}\right) v > 0$$

$$S_{XA} : U_{AX}^* - U_{AX}^T = \left(p^*\right)^{-\beta} h - \left(p^T\right)^{-\beta} h = \left(\left(p^*\right)^{-\beta} - \left(p^T\right)^{-\beta}\right) h < 0$$

As in the referenda considered above, those who will vote in support to the referendum are the workers employed in the sector with the comparative advantage. The reason is that the benefits of these workers from the improvement in the terms of trade are even greater when migration is also allowed. The observation follows directly form the inequality $p^* > p^T$. Consider next those that

would change sector of employment. Given that $h_A^* = \sqrt{k}\sqrt{\dfrac{2k-\gamma}{1+k}}\sqrt{\dfrac{\beta}{2\alpha+\beta}} > \sqrt{k}\sqrt{\dfrac{\beta}{2\alpha+\beta}} = h_A^T$

some agents who are employed in sector *X* under trade liberalization will move to sector *Y* under trade liberalization and migration.

$$R_A : U_{AY}^* - U_{AX}^T = \left(p^*\right)^{\alpha} v - \left(p^T\right)^{-\beta} kh$$

$$= \left(\frac{\sqrt{k}}{v}\sqrt{\frac{2k-\gamma}{1+k}}\sqrt{\frac{\beta}{2\alpha+\beta}}\right)^{\alpha} v - \left(\frac{\sqrt{k}}{v}\sqrt{\frac{\beta}{2\alpha+\beta}}\right)^{-\beta} h$$

$$= \left(\sqrt{k}\sqrt{\frac{\beta}{2\alpha+\beta}}\right)^{-\beta}\left(\sqrt{k}\sqrt{\frac{\beta}{2\alpha+\beta}}\left(\sqrt{\frac{2k-\gamma}{1+k}}\right)^{\alpha} - h\right)$$

The last expresion is positive for $h = h_A^T$ and negative for $h = h_A^*$ and thus we have the following voting outcome:

Lemma 5: *Given that the migrants will always vote in favor of the referendum, country A will vote in favor of migration iff* $\sqrt{k}\sqrt{\dfrac{\beta}{2\alpha+\beta}}\left(\sqrt{\dfrac{2k-\gamma}{1+k}}\right)^{\alpha} + \left(1 - \dfrac{\gamma}{k-1}\right) > \dfrac{1}{2}.$

The left-hand side of the inequality which is equal to the mass of agents in country *A* that will support the referendum includes the mass of the migrants.

4.3.2 Country B

For country *B* the voting patterns are in stark contrast in relation to the voting patterns obtained for the referenda considered above. Consider those who will work in the same sector under both regimes

$$S_{YB} : U_{BY}^* - U_{BY}^T = \left(p^*\right)^{\alpha} v - \left(p^T\right)^{\alpha} v = \left(\left(p^*\right)^{\alpha} - \left(p^T\right)^{\alpha}\right) v > 0$$

$$S_{XA} : U_{BX}^* - U_{BX}^T = \left(p^*\right)^{-\beta} kh - \left(p^T\right)^{-\beta} kh = \left(\left(p^*\right)^{-\beta} - \left(p^T\right)^{-\beta}\right) kh < 0$$

As is the case for country *A*, workers employed in sector *Y* will vote in support of which for country *B* is *not* the sector with comparative advantage. The reason is that, as is the case for country *A*, the increase in the relative price benefits those employed in sector *Y*. Next, consider those workers that would change sector of employment under the new regime. Given that $h_B^* = \dfrac{\sqrt{k}}{k}\sqrt{\dfrac{2k-\gamma}{1+k}}\sqrt{\dfrac{\beta}{2\alpha+\beta}} > \dfrac{\sqrt{k}}{k}\sqrt{\dfrac{\beta}{2\alpha+\beta}} = h_B^T$ some agents who are empolyed in sector *X* under trade liberalization will move to sector *Y* under both trade liberalization and migration.

$$R_B : U^*_{BY} - U^T_{BX} = \left(p^*\right)^\alpha v - \left(p^T\right)^{-\beta} kh$$

$$= \left(\frac{\sqrt{k}}{v}\sqrt{\frac{2k-\gamma}{1+k}}\sqrt{\frac{\beta}{2\alpha+\beta}}\right)^\alpha v - \left(\frac{\sqrt{k}}{v}\sqrt{\frac{\beta}{2\alpha+\beta}}\right)^{-\beta} kh$$

$$= k\left(\sqrt{k}\sqrt{\frac{\beta}{2\alpha+\beta}}\right)^{-\beta}\left(\frac{\sqrt{k}}{k}\sqrt{\frac{\beta}{2\alpha+\beta}}\left(\sqrt{\frac{2k-\gamma}{1+k}}\right)^\alpha - h\right)$$

The last expresion is positive for $h = h^T_B$ and negative for $h = h^*_B$ and thus we have the following voting outcome:

Lemma 6: *Country B will vote in favor of migration iff* $\dfrac{1}{\sqrt{k}}\sqrt{\dfrac{\beta}{2\alpha+\beta}}\left(\sqrt{\dfrac{2k-\gamma}{1+k}}\right)^\alpha > \dfrac{1}{2}$.

4.3.3 Politico-Economic Equilibrium

Combining the two lemmas we get the following proposition

Proposition 3: *Under free trade, migration will be allowed iff*

$$\frac{1}{\sqrt{k}}\sqrt{\frac{\beta}{2\alpha+\beta}}\left(\sqrt{\frac{2k-\gamma}{1+k}}\right)^\alpha > \frac{1}{2} \tag{3}$$

The proposition follows by comparing the left-hand sides of the inequalities in the two lemmas and noticing that the one for country B is greater than the corresponding for country A.

5 The Political Economy of Economic Integration

Now we are ready to address the two questions that we asked in the introduction of the paper.

5.1 When Is Trade Liberalization More Likely to be Supported by a Migration/Trade Referendum?

Suppose the goal of a group of countries is to liberalize trade among themselves. The question we ask here is whether this goal is more easily advanced if liberalization of migration is included as part of a package of general liberalization. In order to address this question we need to compare inequalities (1) and (2). The following proposition summarizes our results

Proposition 4: *Trade liberalization is more likely to be supported by a joint migration/trade referendum when* (a) *k is low, and* (b) *γ is high.*

Proof:

(a) When the vote is only on trade liberalization an increase in k encourages employment in sector X in country B and in sector Y in country A thus increasing support for the referendum in both countries. In contrast, when migration is also allowed there is also an additional positive effect on the relative price that diminishes the support from those employed in sector X in country B.

(b) Country A is more likely to vote for the trade/migration referendum given that the referendum is supported by the potential migrants. In contrast, country B is more likely to support the trade liberalization only referendum given that the agents who vote in favor of the two referenda are those employed in sector X and are also the agents who suffer losses from migration. The losses are due to the deterioration in the terms of trade and are decreasing with γ.

Our results with respect to the size of migration costs are surprising. We would expect that lower migration costs will encourage a vote in favor of migration. However, we need to keep in mind that in order to change regime we need both countries to support the relevant referendum. Given that the potential migrants are citizens of country A it is more likely that the joint referendum will be supported there. Thus, the binding constraint is more likely to be the one of country B where unambiguously an increase in migration costs boosts the support for the joint referendum.

One might view the differing integration experiences in Europe and North America through the lens provided by this result. The result says that we are more likely to observe trade and migration liberalized together between countries with relatively similar technologies (i.e. low k) and high costs of migration (γ). What we observe in the case of NAFTA (especially the case of the US and Mexico) is a very large k and (at least arguably) quite low γ, with the result being liberalization of trade only. Furthermore, we observe quite aggressive anti-Mexican immigrant politics, suggesting that this is likely to be the equilibrium for an indefinite period of time. By conrast, the European experience involved integration between countries at quite similar levels of technological development (i.e. low k) and (again, at least arguably) relatively high γ.[11] Here the ultimate outcome was full integration. It is the case that there was considerable lag—the Treaty of Rome that created the customs union dates to 1958, while the EU Posted Worker Directive that permitted free migration is 1996. Nonetheless, the Treaty of Rome did not lead to anti-immigrant politics directed at the natives of the customs union partners of the sort that we observe in the US, and the expectation of more complete integration that was common at the time was ultimately realized.

5.2   When Does Free Trade Encourage Support for Full Economic Integration?

A surprisingly large body of research has addressed the question of whether preferential trade agreements are "stepping stones or stumbling blocks" on the road to broader trade

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[11]It is probably worth commenting on the claims relative to γ. By the time of NAFTA, there was a substantial Mexican immigrant population already in the US, by standard network theoretic arguments, this rendered the costs of migration considerably lower than they would otherwise be. Similarly, physical proximity renders the costs low. In the European context, although the future members were physically close, the cultural and linguistic barriers render mobility costs rather high.

liberalization (Baldwin and Seghezza, 2010; Lawrence, 1992; Wei and Frankel, 1996). A number of these analyses turn on domestic politics (Hoekman and Leidy, 1993; Krishna, 1998; Levy, 1997; McLaren, 2002; Wei and Frankel, 1996). We ask a different question, but one that is in the same broad class of question: when is free trade between countries as "stepping stone" to full integration. In order to answer this question we need to compare inequalities (2) and (3). Our results are summarized in the following proposition.

Proposition 5: *Countries located in free trade areas are more likely to support full economic integration relative to countries that are not open to international trade when* (a) γ *is low*, (b) k *is low*, and (c) α *is low*.

Proof:

(a) Under free trade the vote in country B is pivotal. As migration costs increase the relative price declines. The agents who suffer from the change in price are those who work in the primary sector and who vote in favor of migration. Under the joint referendum the vote in country B is also likely to be pivotal given that in country A the potential migrants will vote in favor of the referendum. Again those who suffer from a relative price decline are those agents employed in sector Y but now they are the ones who vote against the referendum.

(b) An increase in k encourages more migration and thus boosts the vote in favor of the joint referendum. A higher k benefits those who work in sector Y in country A and those who work in sector X in country B. Thus as k increases there will be more support for the joint referendum.

(c) In free trade areas those who vote in favor of migation are those who work in the primary sector and are also those who benefit from a stronger preference for the primary good.

The main intuition for the above results is as follows. Those agents that are citizens of countries in free trade areas vote on whether or not to allow migration. While those agents who are citizens of countries under autarky vote for both trade liberalization and free migration but as we have seen the trade effects dominate the migration effects. Migration is more likely to be popular when migration costs are low, the technological gap between the two sectors is low and there is a strong preference for the good produced by the sector that has a technological disadvantage.

This result provides an interpretation of the evolution of the politics of integration within Europe. Relative to the current enlargement to the East, the creation of the EEC was a programme among countries with relatively similar technological levels (i.e. low k) and relatively low costs of migration (low γ). The pattern predicted in the theorem, then, involves liberalization of trade first, followed by liberalization of migration. By contrast, relative to the original members of the EEC, accession to the EU by Eastern European countries in transition would be characterized by less efficient technologies (i.e. relatively high k) and higher costs of migration (i.e. relatively high γ). In this case, the model would predict movement to integration via simultaneous trade and migration liberalization.[12] That is, where the original members found it

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[12] Letting subscripts denote as follows—U = US, M = Mexico, W = Western Europe, and E = Eastern Europe—we can briefly clarify the relationships among the parameter values implied by our two examples. The first example requires: $k_U > k_M$, $k_W \approx k_W$, and $\gamma_{WW} > \gamma_{MU}$. The second example requires: $k_W > k_E$, $k_W \approx k_W$, and $\gamma_{EW} > \gamma_{WW}$. The

politically necessary to liberalize trade first, followed later by liberalization of migration; the eastern accession countries found it politically easier to liberalize both at the same time.

We are well aware that both the European programme of integration and that in North America are complex phenomena, driven at least as much by political goals as economic goals. We simply argue that nothing in the observed patterns of integration experience is radically inconsistent with the predictions of the our theoretical framework.

6   Directions for Further Research

Although the model developed here is extremely simple, thus permitting us to consider trade and migration in the same framework, the results seem broadly sensible. A next step, and taking full recognition of the extreme simplicity, would be to econometrically examine the question of whether the variables we identify as significant in supporting both trade and migration, versus just trade are in fact significant in explaining integration outcomes. That is, our examples are purely informal, and very broad, checks on the applicability of the model. In principle, all of our main parameters (k, γ and α) are observable. Furthermore, while we treat the original (1958-1967) members of what is now the EU as essentially identical, there is an interesting asymmetry in the adoption of full integration: where Sweden and the UK permitted free migration on accession, the other members required an adjustment period. It would be interesting to study whether the pattern of parameters for the two sets of EU current members had the pattern of parameters suggested by theorem 2.

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approximate equalities relating Western European technologies mean that any two countries within Western Europe have approximately the same level of technology. For rhetorical consistency across our examples, we should also have $\gamma_{EW} > \gamma_{WW} > \gamma_{MU}$ and $(k_U - k_M) > (k_W - k_E)$. These all seem plausible restrictions at the level of analysis at which our examples are pitched. The chain of inequalities relating the γ's may seem problematic. However, using superscripts to denote dates at which comparisons are made, we really only need: $\gamma_{EW} > \gamma_{WW}^{1958} > \gamma_{MU} > \gamma_{WW}^{1994}$, which certainly seems reasonable.

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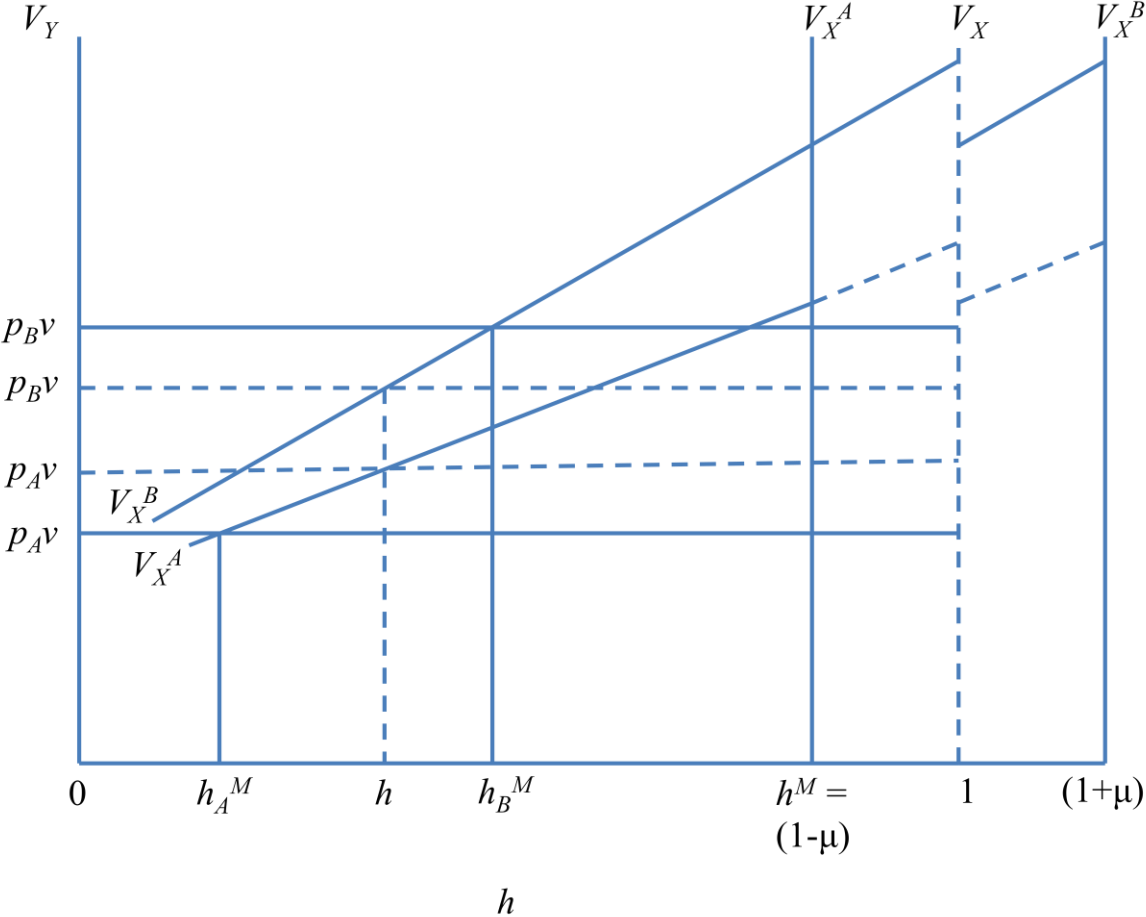
Figure 1: Autarky Equilibrium
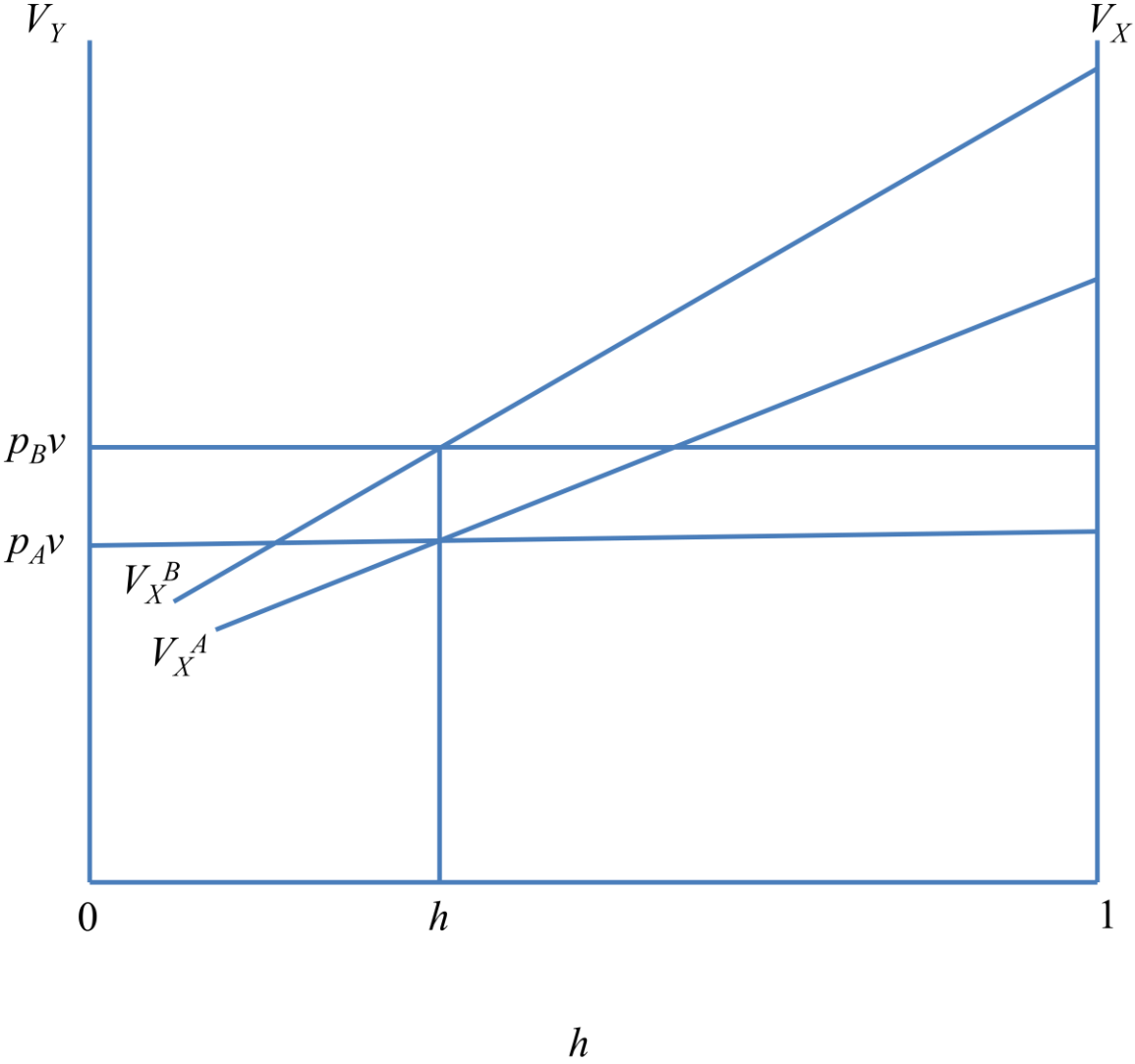
Figure 2: International Trade without Migration
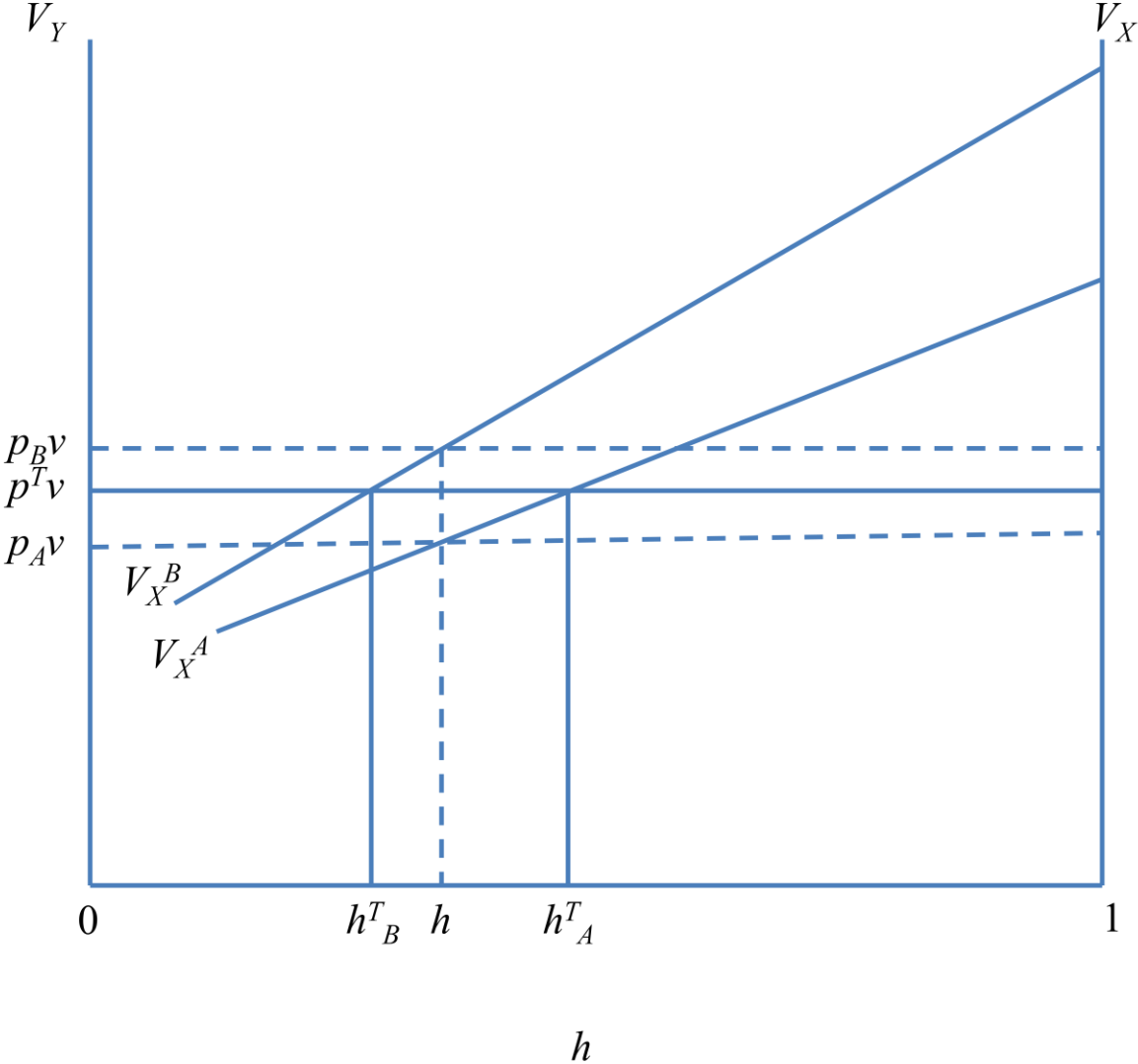
Figure 3: Migration without International Trade

Figure 4: International Trade and Migration