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Abstract

This paper develops a political-economic analysis of immigration in a developed country that operates in a direct democracy regime. It shows that, in a monopolistic competitive environment with differentiated capital intensive commodities produced under increasing returns to scale, labor liberalization is more likely to come about in the societies that have more taste for varieties. This is due to the availability of more and cheaper varieties. It also shows that, the workers and capital owners could share the same positive stance toward labor liberalization. It follows that the latter is impossible in a perfect competitive environment. Finally, in a two period dynamic model with forward looking voters, it demonstrates that the median voter is willing to accept fewer immigrants in the first period, in order to preserve her domestic political influence in the second period due to the naturalization of the immigrants accepted in the first period. Using this strategy, the median voter maximizes her gains from immigration by accepting more immigrants in total at the end of the second period. However, the richer the forward looking median voter, the less restricted will be the policy of the host country toward immigration in the first period.

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1. Introduction

Labor liberalization is currently the subject of intense debate. According to Hatton and Williamson (2005), the proportion of the world's population that has migrated increased slowly from *2.3%* in 1965 to *2.9%* in 2000. On the other hand, average industrial tariffs' rates around the world have fallen over the last half century from about 40% to 3%. Over the last 30 years the ratio of exports of commodities and services to GDP has doubled. In a short essay, Dani Rodrik (2002) concluded that, since the gains from immigration are enormous and much larger than those of further liberalization of trade and capital movement, the policy makers at the WTO, IMF, World Bank, and OECD should focus less on trade round negotiations and spend more energy on the liberalization of labor movements across countries. He maintained that it is the latter that maximizes worldwide efficiency.

The liberalization of trade has benefited from the powerful push of political forces, but the same forces have been almost nonexistent in the case of immigration. In order to better understand differences in the individuals' attitude toward the liberalization of trade and that of labor, some authors have used data gathered from international surveys. For example, Mayda (2007), by using an individual-level dataset, analyzed attitudes toward trade and immigration across several countries. She found that individuals are on average more pro trade than pro immigration. See also Mayda and Rodrik (2005) for similar results. O'Rourke and Sinnott (2001 and 2004), using variables marked as 'patriotism' and 'chauvinism', found a strong and positive correlation between these variables and individual anti-immigration sentiment. They provided convincing evidence that this kind of intolerance is an important component of individual attitudes. These empirical results suggest that in the near future we might be able to live in a world with no barriers to trade, but barriers to immigration are likely to persist.

In this paper, I focus on the political economic analysis that a host country of immigrants faces when there exists a tendency toward Factor Price Equalization (FPE) between two open economies. This means that under certain price levels there exists a tendency toward equal factor prices between the countries by allowing some amount of labor to move from a labor abundant country to a capital abundant country of immigrants. It is important to focus on cases where FPE initially is invalid, since such cases allow the existence of immigration as an economic phenomenon.

The liberalization of labor depends mostly on the host countries of immigrants. There are only three countries-Cuba, North Korea, and Myanmar-which prevent their citizens from applying for jobs abroad, so it seems reasonable to focus on immigration policy in a host country of immigrants. Most economic immigrants, originating in large part from developing countries, attempt to move into developed countries due to wage differences. The latter countries operate in direct democracy regimes. Thus, it is assumed that the decision of labor liberalization depends on the outcome of the election of an immigration proposal in any developed country, where a majority of votes is required in order for the proposal to pass. Consequently, throughout this paper, I use a median voter similar to Mayer (1984) framework, dealing with the removal of immigration restrictions in a host country in a free trade world with two countries that produce two commodities using capital and labor. Voters respond differently to the proposal because they own different levels of capital. The return to labor is assumed to be homogeneous within the host country. The median voter is the individual with the median capital endowment. As a result, the median voter decides the outcome of a certain proposal because she will always represent the attitude of the majority of voters.

I blend the median voter framework with two different static trade models to show that labor liberalization depends on the stock and distribution of capital and the societies' taste for varieties. In particular, in societies where the taste for varieties is absent, I show that immigration is liberalized only if the median voter's income comes from the return to capital. On the other hand, in societies where there is taste for variety the likelihood of labor liberalization is increasing in the degree of taste for variety. This is because the liberalization of labor provides benefits to all residents of the host country due to the availability of more varieties at lower prices. In this scenario, it is possible for both capital owners and workers to be pro immigration. This will take place only if the positive effect of increased variety is sufficient to offset the negative effect on her income caused by the liberalization of labor. In this extreme scenario, the median voter's income comes entirely from her wage.

A dynamic two period game, where the immigration proposal is put to a vote at the end of each period, also is analyzed in this paper. The voters are considered forward-looking, and the immigrants that were accepted in the first period are able to vote on the immigration proposal re-introduced at the end of the second period. In this two stage approach, I show that the median voter will accept fewer immigrants in the first period, in order to preserve her domestic political dominance in the second period, when the immigration proposal again is put to a vote. I also show that, the richer the forward looking median voter, the higher is the volume of immigrants accepted at the end of the first period in the host country.

Let me provide more details on the trade (long-run general equilibrium) models used in this paper, since they are partly responsible for this paper's results. First, I use a Heckscher-Ohlin trade model, where at least one country completely is specialized in producing one of the two commodities, and blend it with the median voter ala-Mayer (1984) framework. The capital abundant country, which is considered the host country of immigrants, produces a capital intensive commodity and a labor intensive commodity. The labor abundant country, which is considered the origin country of immigrants, completely is specialized in the production of a labor intensive commodity. This model indicates that the liberalization of labor, where there exists a tendency toward FPE, will come about only if a certain level of capital endowment is owned by the median voter. Thus, in this Heckscher-Ohlin setting, where only homogeneous commodities are produced, there is no way that a host country will approve the immigration proposal when the income of the median voter decreases because of labor liberalization. Moreover, in this setting, it is theoretically impossible that the liberalization of labor would take place in an extreme example, where the whole income of the host country's median voter comes from her wage. Thus, in this environment, it is reasonable for labor unions always to lobby against immigration, and for capital owners always to lobby pro immigration. This set-up represents the scenario of the societies that have no taste for variety at all.

Second, I employ a love of variety framework, as in Helpman-Krugman (1985), where the capital intensive differentiated commodities are produced under increasing returns to scale, while the labor intensive commodity homogeneously is produced under constant return to scale. In this framework, I assume that more varieties are preferred to less. Consequently, all residents will obtain identical benefits from the availability of more varieties in the host country because of immigration. As a result, the only variable that provides different changes to different voters due to immigration is the voter's income. Therefore, the median voter theorem still is applicable. I demonstrate that the liberalization of labor in a host country that operates in a direct democracy is more likely to occur in societies with greater taste for variety. This is related to the availability of more and cheaper varieties, caused by immigration. This positive gain from a larger number of varieties relies in part on the assumption of increasing returns to scale in the production of the differentiated commodities. This is because, under increasing returns to scale, firms that double their inputs more than double their output. Consequently, since the labor intensive commodities are produced under constant returns to scale, all immigrants will work in the capital intensive industry. Therefore, more varieties will be created with the same optimal level of production for each variety because of the symmetry assumption of the love of variety approach. Moreover, the main result of the first framework may be reversed when using this framework. In an extreme scenario, when the variety effect overcomes the median voter's negative effect due to labor liberalization, the immigration proposal finds unanimous support in the host country. If the median voter's income originates only from her wage, then workers and capital owners will lobby pro immigration.

Third, I analyze the immigration proposal in a dynamic environment using a simple two stage game. The immigrants, who are accepted in the first period in the host country, if any, earn the voting right in the next period when the new immigration proposal is re-voted. In this dynamic case, I show that the higher the endowment of capital owned by the median voter in one period, the higher the likelihood that the immigration proposal will pass in the next period. As well, the lower the population growth due to immigration, in the host country of immigrants, in one period, the higher the probability that the immigration proposal will pass in the next period. The intuition behind these results is as follows. I assume that there is a population growth from the first to the second period in the origin country of immigrants, while the host country of immigrants enjoys a population growth, from the first period to the second, equal to the amount of immigrants accepted at the end of the second period. Thus, the liberalization of labor in this dynamic approach is to proceed in two stages. In the first stage, the immigration proposal is voted. Again, the median voter decides the outcome of the proposal, since she always is representing the majority of voters. If the median voter rejects the immigration proposal at the end of the first stage, the game ends because in this model (and in all the other models used in this paper) there is no capital accumulation, and therefore, no immigrant ever will be accepted in the host country. However, if at the end of the first period the immigration proposal passes, then the same proposal will be reevaluated by a new, poorer median voter due to the naturalization of the immigrants accepted at the end of the first period. Consequently, since the voters are considered forward looking, with perfect vision and complete information regarding the future, they are fully aware that the volume of immigrants accepted in the first period will affect the outcome of the immigration proposal in the second period. The same stands for the median voter. As a result, regardless of the type of the model used (perfect competition or monopolistic competition), the median voter will be less liberal to immigration at the end of the first period in order to keep the domestic political dominance in the second period. Using this strategy, I show that the median voter will accept more immigrants in total at the end of the second period and therefore maximize her welfare caused by immigration, because the poorer median voter will re-approve the new immigration proposal at the end of the second period. However, applying the love of variety approach in this dynamic game, it is theoretically possible the median voter equally will be liberal to the immigration proposal in both periods, and therefore, she will not worry at all about her political dominance.

This will happen only when the variety effect overcomes the median voter's income effect and the immigration proposal finds unanimous support in the host country.

1.1 Related Literature

In the burgeoning literature on labor liberalization and its effects on the world economy, there are numerous studies. For instance, Freeman (1986, 1995) argued that capital owners (producers) belong to a specific group in an economy that benefits from liberalizing the labor markets. Consequently, this group lobbies toward the liberalization of labor. On the other hand, workers, who belong to the other specific group in an economy, suffer cost rather than reap benefits from immigration, primarily because their wages will go down. Thus, workers lobby against liberalization of labor. Therefore, in Freeman's (1986, 1995) papers, as in the second section of my paper, there is a conflict of interest between individuals who have different sources of income. But, is it theoretically possible to have no conflict of interest between workers and capital owners on the issue of labor liberalization? My paper provides the answer to this question, since I show that the existence of the same, positive attitude toward the labor liberalization between workers and capital owners may occur due to the high taste for variety that societies obtain.

In a influential paper in the literature of political economy, Benhabib (1996) provided a simple one- sector, one-factor model, which under direct democracy regime, explained why the individuals who depend mostly on labor income support raising the capital to labor ratio through immigration (and vice versa for individuals who depend mostly on capital income). [1] Benhabib's model did not take into consideration the two sector model of each economy, unlike the present paper. Hence, Benhabib's model has nothing to say about the volume and incentives of immigrants to move from the origin to the host country. According to Benhabib's model, it is implied that there are always individuals ready to immigrate in the host country. In the present paper, by working with two sector economies (capital intensive sector and labor intensive sector), where their factor endowments are outside the FPE parallelogram, I am able to identify the incentives of individuals willing to immigrate simply by examining the magnitude of the difference of capital over labor (K/L) endowments between two open economies. These two features are explored in the models of the current paper and are missing in Benhabib's model. Moreover, the possibility of the unanimous support of the immigration proposal in the host country of immigrants and the dynamic results, as introduced in the previous page, also are absent in Benhabib's model.

Bilal, Grether, de Melo (2003) employed a three-factor, two-household, two-sector trade model and, among other things, showed that low-skill and high-skill households have contradictory attitudes toward immigration. [2] Regardless of the assumption of the heterogeneous labor force within the host country of immigrants, which is missing in the current paper, but which exists in the Bilal, et.al (2003) paper, my analysis provides more results and gives a richer economic intuition on the political economy of immigration, especially from the analysis given in the third and fourth sections. It is this analysis that makes my paper unique, and thus extends the literature.

Ivlevs (2005), by using a two-sector, specific factor, general equilibrium model with a non-traded good (which is produced in the host country) in a median voter approach, showed that labor liberalization depends on its positive

[1] For an excellent overview of the median voter approach in the literature of political economy of immigration, especially in one sector-one good models, see the volume by Krieger (2005).
[2] See also in Grethen, de Melo and Muller (2001) for similar results.

effect on the purchasing power of median voter's income. This result could be considered as a special case of the general result of the third section of my paper, where I show that the societies that have more taste for variety are more open toward the liberalization of labor. In this section, a variety labels a differentiated capital intensive commodity produced in a monopolistic environment under increasing returns to scale. However, if I label a variety as a differentiated non traded commodity produced in the host country of immigrants, where I even can relax the assumption of increasing returns to scale, the main result of Ivlevs' paper still will stand, but now in a much simpler and more intuitive framework.

This paper is organized as follows: Section 2 demonstrates a political economic approach dealing with the issue of the removal of immigration restrictions from a host country, where both countries operate in a perfect competitive environment. Section 3 describes a political economic analysis of labor's liberalization, using a love of variety framework, where the differentiated capital intensive commodities are produced in a monopolistic competitive environment with increasing returns to scale and the labor intensive commodity is produced homogeneously. Section 4 provides an extension of the model developed in the second and third section, but in a dynamic environment with two periods. Section 5 describes the scenarios where FPE is not valid by looking at the relaxation of the assumption of incomplete specialization for at least one country. Section 6 provides conclusions. The proofs of propositions and corollaries are shown in Appendix.[3]

2. Immigration Proposal under Perfect Competition

In this section, I develop a political-economic approach dealing with the issue of removal of immigration restrictions from a host country. In all the cases examined in this section, I employ a political economy approach similar to Mayer (1984), in which a majority of voters is required to pass a proposal.

As briefly described in the introduction, here I am going to use a two commodities, two factors Heckscher-Ohlin trade model incorporated with the median voter similar to Mayer (1984) scenario. In each country $i \in [1,2]$, I can obtain the cost function for each commodity $j \in [X, Y]$ by solving[4]:

$$C_{j_i}(w_{j_i}, r_{j_i}) = \min_{L_{j_i}, K_{j_i}} \left[(w_{j_i} L_{j_i} + r_{j_i} K_{j_i}) \right]$$

$$s.t. \qquad j_i = A_{j_i} K_{j_i}^{\delta} L_{j_i}^{1-\delta}$$

All the parameters are assumed to be positive and $\beta, \gamma \in (0,1)$ in order to satisfy the Inada conditions for the concavity of our production functions (*X;Y*), where $\delta \equiv \gamma$ in the case when *j* corresponds to *X* and $\delta \equiv \beta$ in the case that *j* corresponds to *Y*. *i≡(1;2)* is used to denote the host country and the origin country of immigrants respectively, j≡(*X*;*Y*) is used to denote the capital intensive commodity and the labor intensive commodity respectively, and p_j denotes the common price for each commodity, in both countries. However, the factor prices might be different between the two countries, but they are the same within a country. This difference is related to the different technologies, or to the existence of sufficient different factor endowments between the two

[3] The derivations of some important equations that appear in the body of this paper are indicated in a separate appendix provided from the author (called LVI-Appendix).
[4] The cost functions and the free entry and the profit max functions for each commodity in the rich country are described in appendix 1A of the LVI-Appendix.

countries, or to both. The technological parameter for each commodity, in each country is denoted by A_{j_i}. The total amount of each commodity produced from both countries is: $j = j_1 + j_2$, where the stock of capital that is used to produce both homogeneous commodities, within each country, is: $K_i = K_{X_i} + K_{Y_i}$, while the stock of labor that is used to produce the same commodities within each country is: $L_i = L_{X_i} + L_{Y_i}$. As a result, the income of each individual in each country can be written as:

$$I_i = w_i\alpha_i + r_i\theta_i \tag{1}$$

where w_i, r_i are the returns to one unit of labor and one unit of capital, respectively, and α_i, θ_i are both positive and correspond to the labor and capital ownership of the median voter respectively. For simplicity, I assume that all individuals have the same skill level and supply one unit of labor, thus $\alpha_i = 1$.[5] However, different individuals within a country own different levels of capital. The individuals within a country spend their whole income on the two commodities. An individual (q) owns θ_q capital and the number of individuals is given by the measure of $N(\theta_q)$ defined on $(0,\ \theta_1, \theta_2, \cdots, \theta_L]$. In other words, θ_q is strictly increasing in q. But, in the labor abundant country (*R*[2]), I assume that a mass of their citizens with zero capital ownership. The number of these citizens is represented by Λ in the equation of the labor stock in the origin country of immigrants. This represents the potential volume of immigrants willing to move in the capital abundant country. Thus, I can write the labor and capital stocks of each country (*R*[i]) as:

$$\{R_1\} \rightarrow \begin{cases} K_1 = \int_0^{\theta_{L_1}} N(\theta_{q_1})\theta_{q_1} d\theta_{q_1} \\ L_1 = \int_0^{\theta_{L_1}} N(\theta_{q_1}) d\theta_{q_1} \end{cases} \qquad \{R_2\} \rightarrow \begin{cases} K_2 = \int_0^{\theta_{L_2}} N(\theta_{q_2})\theta_{q_2} d\theta_{q_2} \\ L_2 = \Lambda + \int_0^{\theta_{L_2}} N(\theta_{q_2}) d\theta_{q_2} \end{cases} \tag{2}$$

Making use of the notation and the assumptions of the above paragraph, equation (1) can, now, be written as:

$$I_i = w_i + r_i\theta_{q_i} \tag{3}$$

The identical preferences of each individual in both countries can be represented by the following felicity function:

$$U_{q_i} = X^{\mu}Y^{(1-\mu)}\ where\ \mu \in (0,1) \tag{4}$$

Having the above costs and utility functions, I provide a political economic analysis of the removal of immigration restrictions, in an open host country of immigrants, when there is a tendency toward FPE between two open economies. Thus, under certain price levels there exists a tendency toward equal factor prices between the countries by allowing some amount of labor to move from a labor abundant country to a capital abundant country. It is important to focus on cases where FPE is initially invalid, since only such cases allow the existence of immigration as an economic phenomenon. Put differently, if factor prices are the same, no individual will

[5] I examine the case of heterogeneous labor force in both countries in a separate paper, where I develop a short run specific model (with temporary immobile factors), where labor is assumed to be immobile in the short run but capital is assumed to be perfectly mobile within a country. The cases of two and then many groups of skilled workers are examined. I find that the more diverse in skills is the population of each country, or the more types of commodities each country (origin or/and host country of immigrants) produces, the more liberal toward immigration would be the host country of immigrants. For more, see Qirjo (2009).

have an economic incentive to move from one country to the other. In this framework, factor prices will be different for each country only in the cases of complete specialization for at least one country. Thus, using the basic Heckscher-Ohlin assumptions, I look at scenarios where K_i and L_i are very dissimilar between R_1 and R_2. A sufficient condition for this to hold is that the endowments of both countries lie outside the intersection of the cones of diversification of the country with the lowest, and the country with the highest, capital-labor ratio. For simplicity, let's assume that the host country of immigrants is producing both commodities, while the origin country of immigrants completely is specialized in the production of the labor intensive commodity. Consequently, the wage in the capital abundant country exceeds the wage in the labor abundant country. Thus, if some individuals move from the labor intensive country to the capital intensive country, then the factor endowments of both countries will change in order to ensure incomplete specialization in both countries. The more dissimilar the factor endowments between two countries, the higher the volume of immigrants needed in order to achieve incomplete specialization (and therefore FPE) in a theoretical world that consists of two countries.[6] I provide some graphical illustrations, and more details, on the tendency toward FPE in the subsection 5.1.

Since I am considering a passage of an immigration proposal in a direct democracy (i.e., all individuals in the host country will vote whether to allow a certain amount of labor movement from the origin country in their country), I focus on the changes of the indirect utility of each individual caused by immigration. I assume that all eligible voters of the host country of immigrants are rational agents. This implies that they will accept or reject the immigration proposal subject to the increase or decrease that the proposal will cause in their utility. The voters also are perfectly informed about the factor endowments of both countries. Therefore, before casting their vote, they are able to perfectly estimate the volume of immigrants coming into their country if the immigration proposal passes. All voters participate in the election regardless of their expectations about other voters. In other words, all voters of the host country of immigrants vote to maximize their expected utility when evaluating the immigration proposal.

Using the fact that the equilibrium prices are determined in the commodity market, they will remain the same before and after the immigration, even in the case of approval of the immigration proposal. Let's consider the price of the labor intensive commodity as numeraire ($P_Y = 1 \; and \; P_X = p$). Using the profit maximizing conditions, the indirect utility of each individual in the host country (V_{q_1}) is:

$$V_{q_1} = \mu^{\mu}(1-\mu)^{(1-\mu)}\left(\frac{1}{p}\right)^{\mu} I_{q_1} \qquad (5)$$

Then, if the immigration proposal were to pass, the indirect utility of each individual in the host country ($V_{q_1}^*$) would be:

$$V_{q_1}^* = \mu^{\mu}(1-\mu)^{(1-\mu)}\left(\frac{1}{p}\right)^{\mu} I_{q_1}^* \qquad (6)$$

[6] I also can add the assumption that there are no illegal immigrants in the host country. For simplicity, this assumption is used to assure the theoretical fact that if the immigration proposal passes, then the wages of immigrants in the host country will be equal to the wages of the natives. Nonetheless, the dynamic model introduced in the fourth section provides some intuition about the existence of the illegal immigrants in the host country. See pp. 29-30.

where $I_{q_1}^*$ denotes the new income that each individual obtains because of the approval of the immigration proposal.

Maximizing the median voter utility function subject to her income, I easily can obtain the median voter indirect utility function. Therefore, the median voter will approve the immigration proposal only if her indirect utility function after immigration will be higher than the one before immigration. So, if we denote V_m^* as the median voter indirect utility function after the immigration proposal is approved and V_κ as the median voter indirect utility function before the immigration proposal is presented to the voters in the host country, then the immigration proposal will pass only and only if: $\frac{V_m^*}{V_m} > 1$ or $\frac{I_m^*}{I_m} > 1$ or $\frac{(w_1^*+r_1^*\theta_m)}{(w_1+r_1\theta_m)} > 1$, where m indexes the median voter in the host country. Using the definition of capital and labor stocks shown in equation 2) then θ_m is the median capital to labor ratio that solves the following equation:

$$\frac{\int_0^{\theta_m} N(\theta_q)\, d\theta_q}{\int_0^{\theta_{L_1}} N(\theta_q)\, d\theta_q} = 0.5 \tag{7}$$

The solution of the above equation gives us θ_m, which represents the capital to labor ratio owned by the median voter[7]. Therefore, Proposition 1 can be established as:

> **Proposition 1.** *Immigration is beneficial to the median's voter utility and thus approved if and only if the positive effect on her capital (the increase of the product between rental rate of capital and capital stock owned by median voter) outweighs the negative effect on her labor (the decrease in median voter's wage).*

Therefore, the above proposition simply implies that in a perfectly competitive environment the approval of the immigration proposal depends on the change of the income of the median voter. Thus, under these circumstances, in general, a society that consists of more capital owners will be more open to immigration due to the income effect that the latter brings in the host country of immigrants. Then, corollary one can be written as:

> **Corollary 1.** *If the capital endowment of the median voter (θ_m) is higher than the critical level of the capital endowment ($\bar{\theta}$) then the immigration proposal will pass.*

Hence, if $\bar{\theta} \equiv \frac{w_1-w_1^*}{r_1^*-r_1}$, then corollary one is implying that the immigration proposal will pass only if $\theta_m > \bar{\theta}_m$.[8] Consequently, the above corollary shows that the liberalization of labor, in an open host country where there exists a tendency toward FPE, will take place only if a certain level of capital endowment is owned by the median voter. Thus, in this environment, it is reasonable for labor unions always to lobby against immigration, and for capital owners always to lobby pro immigration. But, are there developed countries, in the real world, where most of their median voters' income come from their capital ownership? In the modern world, maybe

[7] Note that the index of the country in the equation (7) is absent for simplicity purposes. It should be obvious that I am referring to the stock of labor and capital, and the median voter in the host county of immigrants, since the latter is of primary importance in evaluating the immigration proposal.

[8] This inequality comes from the derivation of the ratio of median voter's incomes if she is pro immigration. Thus: $\frac{I_m^*}{I_m} > 1 \; or \; \frac{w_1^*+r_1^*\theta_m}{w_1+r_1\theta_m} > 1 \; or \; (w_1^* + r_1^*\theta_m) > (w_1 + r_1\theta_m) \; or \; (r_1^* - r_1)\theta_m - (w_1 - w_1^*) > 0, \; or \; \theta_m > \frac{w_1-w_1^*}{r_1^*-r_1}$.

there exists few countries like this (one could mentioned Qatar). However, the median voters' income of most developed countries comes from their returns of their labor services (wages). As mentioned in the introduction, most economic, legal immigrants move from developing countries to developed countries. Assuming that most developed countries apply some degree of direct democracy rule, when evaluate an immigration proposal; their median voters must value something else, in addition to their income. This might be the individuals (societies) taste for variety. Therefore, assuming that different individuals have different tastes for varieties, their immigration policies also will be different. I will theoretically analyze this statement in the following section.

3. Immigration Proposal under Monopolistic Competition

In this section, I demonstrate that under a differentiated-commodity model, the immigration proposal is more likely to pass in societies that have more taste for varieties. I analyze an immigration proposal as described in section 3, but I relax the assumption of perfect competition, and instead assume that there are a lot of varieties of the capital intensive commodity X produced in a monopolistically competitive environment under increasing return to scale with a fixed cost of production. On the other hand, commodity Y (labor intensive commodity) again is produced under perfect competition. Thus, the new feature of this model is the existence of the varieties of the differentiated capital intensive variety, which, as I explain later in this section, goes up as the number of immigrants employed in producing the capital intensive commodity increases. The relative price of the capital intensive commodities decreases as the number of immigrants increases. This is the exact reason why, in this richer model, the median voter would more likely approve the immigration proposal as compared to the model described in the second section of this paper, where both commodities were produced in a perfectly competitive environment. In other words, all the assumptions of the previous section still stand in this section with the exception of the production function of the capital intensive commodities, which now are produced in a monopolistically competitive environment with increasing returns to scale under a love of variety approach.

Consequently, the reasonable assumption that consumers in both countries prefer more varieties than less is added in this section. In other words, each individual in each country has identical homothetic preferences where more varieties are preferred to less. However, as will be demonstrated later in this section, the cost of having more varieties because of immigration will be different for different individuals in the host country because of the difference in their capital levels. Put differently, the capital owners (the voters whose most of their income comes from the return to their capital ownership) will enjoy higher varieties and higher income because the number of varieties and the rental rate both will increase due to immigration. As a result, this portion of the society only will benefit and won't suffer any costs of having more varieties in the case of approval of the immigration proposal. On the other hand, the workers (the individuals whose income comes mostly from their wage) will suffer some cost of having more varieties because the wage will decrease due to immigration.

Again, just as in the second section, the endowments of both countries lie outside the intersection of the cones of diversification of the country with the lowest and the country with the highest capital over labor ratio. The capital abundant country is exporting the differentiated commodities and is importing the homogeneous, labor intensive commodity. The origin country of immigrants is importing the differentiated capital intensive commodity and is exporting the homogeneous labor intensive commodity. Consequently, the wages are lower in the labor intensive country and higher in the capital intensive country due to very dissimilar factor endowments. The latter is the reason why the origin country of immigrants is specialized in producing the homogeneous commodity and the host country of immigrants is producing both commodities. Thus, citizens of the labor intensive country will have an economic incentive to immigrate in the capital intensive country. The volume of immigrants will depend again in the magnitude of the factor endowments' difference between both countries. Using the love of variety approach with constant elasticity of substitution between a pair of varieties, it is possible that FPE also could be achieved (see subsection 5.2 of this paper for a discussion on the occurrence of FPE in this framework). Under these circumstances, in this love of variety framework, if the immigration proposal passes, then both countries will produce both commodities. The number of varieties produced in the host country of immigrants will increase. Thus, the host country still will import the labor intensive commodity and also be a net exporter of the capital intensive, differentiated commodities. On the other hand, the origin country of immigrants could export some differentiated commodities but will be a net importer of them and yet export the labor intensive commodity.

The production function of commodity Y is the same as in section 3. However, the commodities in the industry X are assumed to be differentiated products produced under increasing returns to scale with constant elasticity of substitution between each variety and with a fixed cost of production (a) measured in the unit of X. The inclusion of such a fixed cost is necessary in this particular production function in order to assure the existence of an optimal level of production for each differentiated commodity[9]. If I denote by x an individual variety, then its production function is:

$$x = A_x K_x^{\eta\gamma} L_x^{\eta(1-\gamma)} - a \tag{8}$$

I denote by n the number of varieties produced in the monopolistic industry, and by X the total output produced in this industry. So, x is produced under a monopolistic competitive model using a demand function similar to that described in Krugman (1979).[10] Before I give further details on such a demand function and the equilibrium conditions, it is important at this point to provide the reasons for the form of the production function of the differentiated commodities. The assumption of identical technologies that exhibit increasing returns to scale in the capital intensive industry is of particular importance in this set-up for four reasons. The first and most important reason is related to the presence of immigrants, or the increase of the labor endowments in the host country of immigrants. By construction of this model all immigrants will be employed in the capital intensive industry. This is related to the fact that the existence of increasing returns to scale enables the firms (operating in the capital intensive industry) that double their inputs to more than double their output. Second, consumers in both countries prefer more varieties to less. Thus, if the firms operating in the capital intensive industry exhibit technologies with constant returns to scale, then the number of varieties (firms) will eventually go to infinity and

[9] See Liu (2007) for more details in the inclusion of a fixed cost in a similar production function. Specifically, look for his correction in Levy's (1997 *pp.514*) result, when finding the optimal level of a variety. In few words if the fixed cost is not included in the production function of *x*, then the equilibrium is not well-defined, meaning that the free entry conditions (*P=AC*) and the profit maximizing conditions (*MC=MR*) do not yield optimal value for *x* in this type of production function.

[10] See Levy (1997) for an application of a similar model (with the model described in this section) in a political economy approach evaluating a proposition on trade liberalization. For a detailed description of such demand functions see also: {Norman (1976) or Krugman (1978); Dixit-Norman (1980 Ch .9); or Helpman and Krugman (1985 Ch. 6); or Wong (1995 Ch.14); or Feinstra (2004 Ch. 5)}.

therefore will be undetermined[11]. Third, from the supply point of view, under increasing returns to scale, the number of varieties is bounded from above implying that the output of each firm is not sufficiently low. Fourth, under identical technologies that exhibit increasing returns to scale, in equilibrium, no two firms will be able to produce the same variety.[12]

Let me briefly describe the general equilibrium in this model. The identical preferences of each individual in both countries can be represented by the following felicity function:

$$U_q = \left(\sum_{v=1}^{n} D_v^{\varepsilon}\right)^{\mu/\varepsilon} Y^{(1-\mu)} \tag{9}$$

Note that $(\sum_{v=1}^{n} C_v^{\varepsilon})^{\frac{1}{\varepsilon}} \equiv U_x$ indicates the SDS (Spence-Dixit-Stieglitz) subutility function, v denotes the index of varieties of the capital intensive commodity, D symbolizes the consumption of one individual variety and σ represents the cross-price elasticity of substitution between a pair of varieties ($0 < \varepsilon < 1 \; and \;\; \varepsilon = (1 - \frac{1}{\sigma}) \Rightarrow \sigma > 1$);

In this model, there are a certain number of firms (*n*) each producing, under monopolistic competition, the exact level of output (*x*) by simply equalizing marginal revenue with marginal cost, and the relative equilibrium price with the entry conditions.[13]

$$x = \frac{\eta a(\sigma - 1)}{\sigma - \eta(\sigma - 1)} \qquad or \qquad x = \frac{\eta\varepsilon a}{1 - \eta\varepsilon} \tag{10}$$

Note that the above optimal amount of each variety produced in the host country should be positive. It makes no sense to talk about a negative optimal amount of a variety. Hence, the sufficient condition for $x > 0$ is $\frac{\sigma}{\sigma-1} > \eta$ or $\varepsilon < \frac{1}{\eta}$. Then the aggregate amount of the capital intensive varieties is equal to the product of the number of firms with the optimal (and also constant) level of output (x) that each firm produces. Remember that from this model's structure, each firm produces the same optimal amount of the differentiated product because of the assumption of the constant cross price elasticity between varieties. Therefore, the aggregate level of the differentiated capital intensive commodities is represented by the following equation:

$$X = nx \tag{11}$$

Having all the above, where again, like in the second section of this paper, the price of the labor intensive commodity serves as a numeraire, it is easy to show that the identical preferences of each individual in the host country before immigration can be represented by the following indirect utility:

$$V_{q_i} = \left[\mu^{\mu}(1-\mu)^{(1-\mu)} \left(\frac{1}{p}\right)^{\mu} I_{q_i}\right] n^{\left(\frac{\mu}{\sigma-1}\right)} \tag{12}$$

[11] In such a case, differentiated commodities eventually will become homogeneous. This is uncommon in the real world. Thus, the assumption of increasing returns to scale assures that the differentiated products still will be different (as compared to each other) before and after the immigration.
[12] This is important because if two firms are producing the same variety, then one of them could decrease its average cost, because of the increasing returns to scale, by simply producing slightly more than the other firm. This allows the most productive firm to charge a lower price and drive the other firm out of the market.
[13] For more details, on finding the optimal level of production of each variety, see appendix 3A of the LVI-Appendix.

The above indirect utility is obtained by decomposing the utility maximization problem of the consumers into two stages. In the first stage, the consumer maximizes the SDS subutility function (U_c) subject to a given income ($\bar{I}$) and a given price for each variety (p). In the second stage, the consumer chooses to allocate the given income between the differentiated commodities and the homogeneous commodity.[14] If the immigration proposal were to pass, then the new indirect utility of an individual in the host country would look as follows:

$$V_{q_i}^* = \left[\mu^\mu (1-\mu)^{(1-\mu)} \left(\frac{1}{p^*}\right)^\mu I_{q_i}^*\right] \left(\frac{n^*}{n}\right)^{\left(\frac{\mu}{\sigma-1}\right)} \tag{13}$$

In this section, as in the previous one, the median voter requires the primary attention since she again will be in the majority of the host country's voters. The median voter in the host country of immigrants still will be identified as the voter with the median capital over labor ratio. This is related to the assumption that all voters in the host country of immigrants have identical and homothetic preferences, where more varieties are preferred to less. Hence, all voters will obtain identical benefits from the availability of more varieties in the host country due to the approval of the immigration proposal. Moreover, all voters also are equally affected from the decrease of the equilibrium price of each variety because of the creation of new varieties due to immigration. As a result, the only variable that provides different changes to different voters in the host country of immigrants because of the liberalization of labor is the voter's income. More specifically, because throughout this paper the wage within a country is considered homogeneous (recall that labor is perfectly mobile within each country), the capital ownership of host country's voters will play the key role on the immigration decision. Consequently, since different voters obtain different levels of capital, they will react differently when evaluating the immigration proposal. Thus, the new features of this richer model, as illustrated in this section, are the gains from varieties accompanied with lower equilibrium prices for each (symmetric) variety. Using equations (12) and (13), the ratio of the indirect utilities of the median voter before and after the immigration proposal is described by equation (14):

$$\frac{V_m^*}{V_m} = \left(\frac{I_m^*}{I_m}\right)\left(\frac{p^*}{p}\right)^{-\mu} \left(\frac{n^*}{n}\right)^{\left(\frac{\mu}{\sigma-1}\right)} \tag{14}$$

Thus, the median voter will approve the immigration proposal only if the new indirect utility (V_m^*) will go up as a result of immigration. In terms of equation (14), the immigration proposal will pass only if the ratio of indirect utility after the immigration to the ratio of the indirect utility before the immigration will be higher than unity. In order to evaluate this ratio and better understand the intuition (that this richer model provides) behind the approval or disapproval of the immigration proposal, I split the ratio of indirect utilities of equation 14 into two effects, the "*income effect*" and the "*real variety effect.*"

The income effect is that portion of the indirect utility that remains if the societies have no love for variety at all. In other words, it is the effect in the indirect utility of the voters that remains if there are no differentiated commodities in the world, or if both commodities are homogeneously produced as demonstrated in the second section of this paper. I showed in the previous section that in such a case the ratio of the indirect utilities of the median voter will be equal to the ratio of her new to her old income, and therefore, the immigration proposal will

[14] See Appendix 3B in the LVI-Appendix for a step by step demonstration on deriving the equation (12).

pass only if the income of the median voter will ameliorate because of immigration. This can be illustrated by the following equation 15:

$$\frac{I_m^*}{I_m} = \frac{w_1^* + r_1^*\theta_m}{w_1 + r_1\theta_m} \tag{15}$$

The remaining effect of the ratio of the indirect utilities (of the equation 14) in the case where the income effect of the median voter does not change due to immigration ($\frac{I_m^*}{I_m} = 1$) is called the real variety effect. This effect consists of two sub-effects, which I call the *"price effect"* and the *"variety effect."* It is important to evaluate these effects separately and then regroup them to give the intuition behind the notion of the *"real variety effect."*

The variety effect is defined as the portion of the indirect utility [of either indirect utility described in equation (13), or of that described in equation (14)] that represents the gain that each consumer, and therefore the median voter in the host country, enjoys because of the availability of more varieties in the economy caused by immigration. In our ratio of indirect utilities of (14), this gain is represented through the ratio of $\left(\frac{n^*}{n}\right)^{\left(\frac{\mu}{\sigma-1}\right)}$. This ratio shows the increase of the number of varieties caused by immigrants, which is indicated by $\frac{n^*}{n}$, where $n^* > n$. This ratio is raised to the power of $\frac{\mu}{\sigma-1}$, where μ is the utility weight on each capital intensive differentiated commodity and σ is the cross price elasticity of substitution between varieties. In order to express the variety effect in terms of the volume of immigrants and evaluate its sign and magnitude, it is important at this point to introduce some new notation. Thus, let's define λ as the percentage increase in the labor force of the host economy due to the approval of the immigration proposal. Recall from the definition of the median voter demonstrated in the equation (7) and equations shown in (2), that Λ represents the volume of immigrants arriving in the host country after the approval of the immigration proposal. Hence, $\lambda = \frac{L_1^* - L_1}{L_1} = \frac{\Lambda}{L_1}$. Then, the variety effect is shown to be expressed by the following equation[15]:

$$\left(\frac{n^*}{n}\right)^{\left(\frac{\mu}{\sigma-1}\right)} = [(1+\lambda)^{1-\gamma}]^{\left(\frac{\mu}{\sigma-1}\right)} \tag{16}$$

The above equation symbolizes the positive effect of the gains of each host country's voter from the existence of more varieties due to immigration. Let's evaluate the sign and magnitude of the right hand side of (16). Thus, $[(1+\lambda)^{1-\gamma}]^{\left(\frac{\mu}{\sigma-1}\right)} > 0$ because $\lambda > 0$ by definition. It makes no sense to talk about immigration when the latter does not exist. Hence, $(1+\lambda) > 1$. Let me denote with $\varphi \equiv (1-\gamma)^{\left(\frac{\mu}{\sigma-1}\right)}$, where $0 < \varphi < 1$, since $0 < \gamma < 1$, $0 < \mu < 1$ and $\sigma > 1$. Hence, $(1+\lambda) > 1$ and $0 < \varphi < 1$ implies that $(1+\lambda)^{\varphi} > 1$. This inequality shows that in this richer model, the variety effect will always be positive. So, the voters always will enjoy more varieties, and therefore, more gains in their indirect utility function because of the immigration proposal's approval. As a result, if the other two effects (the income effect and the price effect) cancel each other, then the liberalization of labor will be supported by all voters of the host country of immigrants because it will increase the welfare of all agents in the economy. I should add at this point that the positive gain of the

[15] See Appendix 3D of the LVI-Appendix for a step-by-step derivation of the variety effect.

variety effect relies in part on the assumption of increasing returns to scale that the technologies of the capital intensive industry need in order to produce the differentiated commodities. Thus, under increasing returns to scale, firms that double their inputs more than double their output. Consequently, since only the differentiated commodities are produced under increasing returns to scale, while the labor intensive commodities are produced under constant returns to scale, then all immigrants will work in the capital intensive industry. Since I am employing a of love of variety framework with symmetric varieties, more varieties will be created with the same optimal level of production for each variety. Moreover, the change of factor endowments between both countries due to labor movement from the labor abundant country to the capital abundant country will increase as briefly described above the number of varieties produced in the host country, but it also will increase the number of varieties produced in the origin country of immigrants. For more details on this, see subsection 5.2.

Finally, the effect that remains from the real variety effect after subtracting the variety effect is called the *"price effect."* This effect is the portion of the indirect utilities of (12) or/and (13) that represents the gain that each consumer enjoys because of the decrease of the equilibrium price of each differentiated commodity caused by immigration. In the ratio of the indirect utilities shown in equation 14, the price effect is represented by the ratio of $\left(\frac{p^*}{p}\right)^{-\mu}$, where p^* is the new equilibrium price, due to immigration, of each variety and p is the old equilibrium price of a symmetric variety before the approval of the immigration proposal. Recall that either p or p^* are relative prices where the price of the homogenous commodity is considered as numeraire. Now, $\left(\frac{p^*}{p}\right)^{-\mu}$ can be written as $\left(\frac{p}{p^*}\right)^{\mu}$. Since, $0 < \mu < 1$ then $\left(\frac{p}{p^*}\right)^{\mu} > 1$ only if $\frac{p}{p^*} > 1$. So, $p^* < p$ is necessary but not sufficient for the price effect to be higher than unity. In order to evaluate the price effect in terms of the volume of the immigrants and show its positive effect due to the decrease of the price of each variety, I can show that the price effect can be written as[16]:

$$\left(\frac{p^*}{p}\right)^{-\mu} = (1+\lambda)^{\gamma\mu+\beta(1-\mu)} \tag{17}$$

The above equation shows the positive effect on the indirect utility of each individual, and therefore of the median voter, due to immigration. As one can easily observe from equation 17, the right hand side (and by equality the left hand side) is always higher than unity. Using the same simple algebra derivation as in the variety effect, one can show that $(1+\lambda)^{\gamma\mu+\beta(1-\mu)} > 1$ since $(1+\lambda) > 1$ and $\psi \equiv \gamma\mu + \beta(1-\mu) > 0$. This implies that $(1+\lambda)^{\psi} > 1$.[17] This shows that in this type of love of variety framework, the price effect will always be positive. Thus, the agents of the host country will enjoy lower prices per variety caused by immigrants. Consequently, if the variety effect cancels the income effect, then the immigration proposal will find unanimous support in the host country of immigrants because it will improve the welfare of all individuals in the economy. I should add here that the decrease in price of each differentiated capital intensive commodities is the same for every variety due to the construction of the love of variety framework. In particular, this is due to the existence of symmetry between varieties and the constant elasticity of substitution between the varieties.

[16] See Appendix 3C of the LVI-Appendix for a step-by-step derivation of 17.
[17] An alternative way to show that $(1+\lambda)^{\psi} > 1$ is to take the logarithms of both sides of the inequality. Thus, $\psi \log\ (1+\lambda) > 0$ since $\psi > 0, \log\ (1+\lambda) > 0 \Rightarrow \psi \log\ (1+\lambda) > 0$.

So far I have shown that the variety effect always is positive and higher than unity for each voter. The same stands for the price effect. Therefore, the real variety effect, which is represented by the product of the variety effect and the price effect, also is higher than unity. This is related to the fact that the product of two positive numbers, where both numbers are higher than unity, always will be a positive number higher than unity. Consequently, the real variety effect shows the real gains that each consumer is enjoying from the availability of more varieties caused by the liberalization of labor. Thus, each voter in the host country of immigrants not only is enjoying more varieties, but also she is benefiting from a lower price for each of them. This statement comes directly from the construction of the model, where, due to the symmetry assumption of varieties (where each firm produces the same optimal amount, but a different variety) and the love of variety approach, there exists a negative relationship between the number of varieties and their equilibrium price.[18] In particular, $n = bK^{\gamma}L^{1-\gamma}.\ Hence, \frac{dn}{dL} > 0 \Rightarrow n^* > n$. This implies that more varieties are available because of immigration. Equation B3-5 can be written as: $pnx = \mu(wL + rK), or\ n = \frac{\mu(wL+rK)}{px}$. Now, since $(n^* > n)$ due to immigration, then $(p^* < p)$. Since we established the real gains from varieties that appear in the indirect utility of each voter, and therefore in the indirect utility of the median voter, and since the latter, as explained earlier, is of primary importance even in this sophisticated model with differentiated commodities, then proposition two follows.

> **Proposition 2.** *The critical level of the median voter's capital necessary for the approval of the immigration proposal in the monopolistic competitive case* $(\tilde{\theta})$ *is always lower than that of the perfect competitive case* $(\bar{\theta})$ *due to the real variety effect.*

As a result, the above proposition introduces the notion that in a monopolistic competitive environment, where the differentiated commodities are produced using increasing returns to scale technologies and the consumers have identical homothetic preferences forming a love of variety framework, the level of median voter's capital loses the previous exclusive power on the decision of the immigration proposal because of the variety effect. The latter effect pushes the median voter in the host country of immigrants toward the liberalization of labor in this theoretical world, which consist of two countries. This can be described by the following proposition.

> **Proposition 3.** *The higher the love of variety in a society, the more open to immigration is the host country of immigrants.*

This proposition is the focal point of this section because it provides the main result of this paper, which is related to the assumption of preferences of varieties that each individual obtains in each country. As one can easily observe from the variety effect described in equation (16), the gains from variety also is related with the cross-price elasticity of substitution (σ) and with the percentage increase of immigrants (λ). These two relations are included in the following corollary.

> **Corollary 2.** *The lower the constant cross-price elasticity of substitution between varieties* (σ) *before*

[18] This can be shown by incorporating the equation C3-13 (of appendix 3C of the LVI-Appendix) and the utility maximization condition of a differentiated commodity in the first stage budgeting shown by equation B3-5 (of Appendix 3B of the LVI-Appendix).

immigration, or/and the higher the volume of immigrants (Λ), the more intense is the variety effect, and therefore, the more liberal toward immigration is the host country.

The above corollary shows two important results that require caution in their interpretation. First, the positive relationship between the variety effect and the volume of immigrants stands only if the volume of immigrants is not a huge number. This is related to the structure of the SDS subutility function (U_x) and the assumption of increasing returns to scale of the production function for each differentiated capital intensive commodity. Thus, if the volume of immigrants is not bounded from above, then the number of firms, each producing a different variety, will go to infinity. But, throughout this paper, I assume constant elasticity of substitution between varieties, which means that the number of varieties does not affect their elasticity of substitution. This statement might be true for a certain increase of varieties. However, if the number of varieties goes to infinity, it might not be realistic to assume that their cross-price elasticity (σ) remains the same. Theoretically, if the number of varieties approaches infinity, then σ approaches infinity, which means that the capital intensive commodities now will be produced under perfect competition and each variety will not be considered different from each other. Thus, it is very important that the volume of immigrants must be bounded from above. Consequently, one must be very cautious when using this model especially in the case where the host country of immigrants is very small and the origin country of immigrants is very large, in terms of their population.

Referring back to proposition two, it seems interesting to analyze the approval of the immigration proposal in an extreme scenario, where the median voter of the host country owns zero capital. In other words, all of her income comes from her wage. The main result that I want to point out through the examination of this extreme scenario is the fact that (now, using a richer framework) it is theoretically possible that even the host country's labor union might favor the approval of the immigration proposal. The key factor that could make the workers, and therefore the median voter, to accept the immigration proposal is related to the real variety effect. As explained earlier, this effect consists of the existence of more varieties, each of them with a lower price caused by immigration. Therefore, the voter will vote pro immigration, only in the case that the positive effect of the real variety gains outweighs the negative effect of their lower wages due to immigration. This is expressed in the following corollary.

Corollary 3. *It is theoretically possible that the median voter, in the host country of immigrants, will be pro liberalization of labor, even in the extreme case when her entire income comes from her wage.*

It should be obvious that if the above corollary is true then the immigration proposal will find unanimous support in the host country, since it will increase the welfare of all the residents in this country. This is related to the fact that the rental rate of capital increases because of immigration. Thus, if the workers are pro labor liberalization, the capital owners will be more than happy to vote pro immigration since their welfare will increase by more. This is shown in the following corollary:

Corollary 4. *If corollary 3 is true, then the immigration proposal will face unanimous support in the host country of immigrants.*

Therefore, according to the above corollary, in a monopolistically competitive environment, with increasing returns to scale, it is theoretically possible that the liberalization of labor benefits both workers and the capital owners of the host country of immigrants unlike in a perfectly competitive environment. Thus, in this environment, it might be reasonable for both labor unions and capital owners to lobby pro immigration.

4. An Extension of the Models by Looking at Some Dynamic Implications

When the immigration proposal is approved, it seems reasonable to assume that the immigrants will earn the voting rights after providing their labor services in the host country for a certain period of time. [19] One can define this period of time equal to five years. Thus, one can assume that the immigration proposal is put to a vote every five years in the potential host country of immigrants. Also, once immigrants became citizens of the host country, they remain there forever. In order to consider the procedure of labor liberalization in two stages, I assume that there is a population growth in the origin country of immigrants in the second period. Consequently, the labor force at the end of the second period in the origin country of immigrants is $L_{2_2} = (\mathrm{g}\Lambda_1 - \Lambda) + \int_0^{\theta_{L_2}} N(\theta_{q_2}) d\theta_{q_2}$. Where $\mathrm{g} > 1, \Lambda_1 > 0, \Lambda \geq 0$. $\mathrm{g}\Lambda_1$denotes the population growth in the origin country of immigrants in the second period and Λ denotes the number of emigrants which moved in the rich country at the first period. The population growth must be strictly higher than the volume of immigrants ($\mathrm{g}\Lambda_1 > \Lambda$) for the existence of the wage inequality between the rich and the poor country in the second period. If the immigration proposal passes in the first period, the only thing that has changed in the second period, in the host country, is the total number of voters. Consequently, in the host country of immigrants, there will be a different median voter evaluating the immigration proposal. Since all immigrants bring only their labor service and no capital, when they move in the host country in the first period, the new median voter (of the second period) will be less rich than the old median voter (of the first period). Voters, in the first period, realize that if immigration proposal is approved, all immigrants will gain their voting rights in the second period. As a result, voters are fully aware that the approval of immigration in the first period not only will affect their income, but also it will affect the domestic politics in the host country. Consequently voters are not myopic, as they were in the previous section because of the static structure of the models, but they are considered forward looking. So to analyze the immigration proposal in this dynamic environment, I consider a simple two stage game. In the first stage, the immigration proposal is put to a vote. The median voter decides whether to accept it. In the case of failure, the game ends in the first stage. However, if the immigration proposal passes in the first period, it will be reevaluated in the second period by a new, poorer median voter. Since, the voters are considered forward looking, they are fully aware that they might lose their political influence in the second period. Consequently, I will show in the following analysis that when these considerations are taken into account, no matter what type of model is used (perfect competition or love of variety), voters' preferences over immigration depend on their initial capital

[19] In the real world, we see for instance, that in the US the legal immigrants earn their voting rights approximately four years after they obtained their Green Card. The individuals who have earned the privilege to immigrate to the US from other countries under the Visa-Diversity Lottery Program earn the voting rights in the US after approximately five years. In most of the countries of the European Union, i.e., legal immigrants earn their voting rights in approximately four to five years, depending on the source country of immigrants (if the immigrants come from an EU country or not).

ownership and on the volume of immigrants hypothetically accepted in the first period. To illustrate this, let's consider a host country of immigrants with the rich median voter. She fully acknowledges the fact that admitting immigrants will increase her income due to the positive effect of the rental rate. However, in the second period, this flow of immigrants will increase the political influence of the workers. This could lead to the failure of the immigration proposal, because the new median voter could never accept the immigration proposal due to the negative effect on her income. Thus, the old median voter votes to maximize her overall utility of both periods subject to her income level and her influence on the political power. I formalize the behavior of the voters toward the liberalization of labor in this dynamic setting under perfect competition and under monopolistic competition.

4.1. Dynamics under Perfect Competition

In the case where both commodities are produced under perfect competition, the forward looking voters are maximizing their utility function when evaluating the immigration proposal. Again, I focus on the median voter since the latter is in the majority of the voters and her support will enact the immigration proposal. Thus, the median voter in the host country solves the following problem:

$$\max_{X_t, Y_t} U_{mt} = \sum_{t=1}^{2} X_t^{\mu} Y_t^{(1-\mu)}$$

$$s.t. \ \{(pX_t + Y_t = I_m) \ and \ (\theta_{m2} > \bar{\theta})\}$$

The utility function takes this form due to the assumption that period one and period two (denoted by *t*) are close to each other in time, which is five years according to our discussion in the previous page. Consequently, for simplicity, one might ignore the discounting factor. It should be obvious that θ_{m2} represents the new median voter in the second period. Recall that $\bar{\theta} = \frac{w-w^*}{r^*-r}$ is the median voter's critical level of capital that makes her indifferent to the immigration proposal in the static game. Hence, the following conditions must be satisfied $\theta_{m1} > \bar{\theta}$ in order for the approval of the immigration proposal in the first period (see corollary one). Thus, $\theta_{m2} > \bar{\theta}$ represents the necessary condition for the political dominance of the (old) forward looking median voter in the second period. This assures that, even though the forward looking median voter will not going to be in the majority of the voters, the new median voter will accept the immigration proposal in the second period. Hence, the immigration proposal in the second period will pass if the constraint $\theta_{m2} > \bar{\theta}$ is not binding. This can be represented by the following inequality:

$$\frac{V_{mt}^*}{V_{mt}} = \frac{I_{m1}^* + I_{m2}^*}{I_{m1} + I_{m2}} > 1 \tag{18}$$

The income of the median voter consists of the homogeneous wage and the product of the homogeneous return to capital with her (heterogeneous for different voters) level of capital. Incorporating this with the percentage increase of the labor force (λ) in the host country caused by immigration in the first period, the above inequality can be written as:

$$\theta_{m1} > \frac{w_1 - w_2^*}{r_2^*(1+\lambda) - r_1} \tag{19}$$

In the above equation, the number index shows the respective period and should not be confused with the countries' index.[20] Consequently, proposition four follows:

Proposition 4. *In this dynamic setting the immigration proposal would more likely pass in the second period:*

1. *The lower is the hypothetical host country's population growth (λ), in the first period due to immigration (movement of individuals from R_2 to R_1).*
2. *The richer, in terms of the ownership of the capital, is the forward looking median voter (in the first period).*

4.2.Dynamics under Monopolistic Competition

In the case where capital intensive differentiated commodities are produced under monopolistic competition, with increasing returns to scale, while the labor intensive commodity is produced under perfect competition, the forward looking voters are maximizing their utility function when evaluating the immigration proposal. Again, the median voter is of focal importance, since the latter is in the majority of the voters and her reaction to immigration will decide the faith of the immigration proposal. Therefore, the median voter in the host country solves the following problem:

$$\max_{X_t,Y_t} U_{mt} = \sum_{t=1}^{2}\left(\sum_{v=1}^{n} C_v^{\varepsilon}\right)^{\frac{\mu}{\varepsilon}} Y_t^{(1-\mu)}$$

$$s.t.\ \{(pX_t + Y_t = I_m)\ and\ (\theta_{m2} > \tilde{\theta})\}$$

Every other assumption is exactly the same as in the previous subsection with an exception. This is related to the median voter's critical level of capital that makes her indifferent to the immigration proposal, which is $\tilde{\theta} = \frac{w_1-(1+\lambda)^{\zeta}w_1^*}{(1+\lambda)^{\zeta}r_1^*-r_1}$ in the static game. Again, $\theta_{m1} > \tilde{\theta}$ must be valid to assure the approval of the immigration proposal in the first period. Consequently, $\theta_{m2} > \tilde{\theta}$ portrays the necessary condition for the political dominance of the (old) forward looking median voter in the second period. Therefore, the following inequality must be valid:

$$\frac{V_{mt}^*}{V_{mt}} = \frac{I_{m1}^*+I_{m2}^*}{I_{m1}+I_{m2}}(1+\lambda)^{\zeta} > 1 \qquad (20)$$

Recall from section 3 that $(1+\lambda)^{\zeta}$ represents the real variety effect, which is positive and the same for all voters. Applying similar algebraic derivations as in the previous subsection, the above inequality is equivalent to[21]:

$$\theta_{m1} > \frac{r_2+r_2^*(1+\lambda)^{-1}-(1+\lambda)^{1-\zeta}(w_1+w_2+r_1+r_2)}{w_2+w_2^*} \qquad (21)$$

[20] I show the steps on deriving equation 19 from equation 18 in the Appendix 4A of the LVI-Appendix.
[21] See Appendix 4B of the LVI-Appendix for a step by step derivation of the inequality 21 from the inequality 20.

A careful reader can observe form the above equation that θ_{m1} is always higher than the left hand side of the above inequality if the numerator is negative. This illustrates the case when the real variety effect dominates the income effect. Hence, in this dynamic setting, proposition three of the static game still is valid. Moreover the following proposition follows:

Proposition 5. *In this dynamic game, it is theoretically possible for the immigration proposal always to pass if the real variety effect dominates the median voter's income effect.*

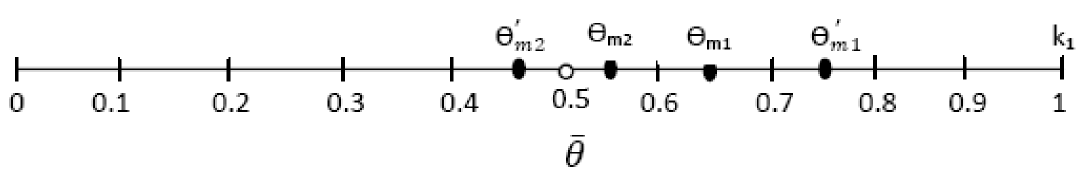
But what happens when the numerator of the inequality 21 is positive? I will show that the answer to this question depends on certain values of the parameter ζ. Consequently, proposition six follows:

Proposition 6. *In this dynamic setting, the first part of proposition four is true only for certain values of the parameter ζ, while the second part of proposition four is valid for any ζ.*

The above proposition is telling us that, in this dynamic game, there is symmetry (for certain levels of ζ) between the two models on the restriction of the volume of immigrants in the first period and level of capital owned by the median voter, unless the income effect dominates the real variety effect. In both models, the median voter will accept fewer immigrants in the first period, in order to be fully assured that she will not lose her political dominance in the second period, when the immigration proposal is re-voted. The richer the forward looking median voter, the less restricted will be the policy of the host country toward immigration in the first period. However, in the case that the real variety effect dominates the income effect, the host country will apply liberal policy toward immigration regardless of the status of the monopolistic competitive model (i.e., it is the same for static and dynamic approach).

I can illustrate both parts of proposition four with the help of *Fig. 1*, which portrays a one-dimension graph, where the host country's capital over labor ratio (k_1) is normalized to one. For simplicity, let's use this graph to demonstrate the dynamic model under perfect competition. We know that under certain values of the parameter ζ the results of proposition four stand for the dynamic framework under monopolistic competition.

Figure 1



Let's also assume that the median voter's critical level of capital is equal to 0.5 ($\bar{\theta} = 0.5$). Consequently, the immigration proposal will pass in the first period when $\theta_{m1} > 0.5$ and in the second period when $\theta_{m2} > 0.5$. The latter inequality also shows the necessary condition for the political dominance of the first period's median voter in the second period. As one can observe from *fig. 1*, θ_{m1} lies always to the right of $\bar{\theta}$. This indicates that in a static framework, the immigration proposal will pass. However, in this dynamic setting, the forward looking median voter is concerned for the weakening of her political influence in the second period if she is very liberal toward immigration policy in the first period. In other words, she is trying to maximize her utility by accepting fewer immigrants in the first period, in order to accept more immigrants in the next period. Hence, the heart of part one of proposition four lies in the fact that the rich median voter will accept more immigrants overall (in both periods) by being more restrictive in the first period in order to still have domestic political dominance in the second period, since, now, there is a less richer median voter evaluating the immigration proposal. Thus, in terms of *fig. 1*, if the forward looking median voter of period one is represented by θ_{m1} and the volume of immigrants willing to move in the host country is one decimal point, then all immigrants will be accepted in the first period. These immigrants will become citizens after one period and the immigration proposal will be re-voted again in the second period. Now, the new, less rich median voter accepts the new immigration proposal, regardless of the volume of the new immigrant flow. Recall that immigrants bring no capital with them when they immigrate to the host county and since there is no discounting, the stock of capital remains unchanged. However, in the case that the volume of immigrant flow in the first period is considered to be two decimal points, the forward looking median voter will accept only a portion of the immigrants. This portion in our line is equal to $\theta_{m1} - (\bar{\theta} + e)$ where e is a very small positive number. This is to fully assure the domestic dominance on the approval of immigration in the second period by the new median voter. It is obvious that the immigration proposal would not have passed in the second period if the first period's median voter was not forward looking. This is demonstrated by θ'_{m2} in *fig 1*.

The spirit of part two of proposition four (and also of proposition six) lies in the fact that the richer the forward looking median voter (of the first period), the less concerned for the weakening of her political influence in the second period due to her acceptance of the immigration proposal in the first period. Therefore, the higher the volume of immigrants accepted in the first period. This is illustrated by θ'_{m1} in *fig. 1*. It is obvious that the volume of immigrants accepted in period one by the forward looking median voter is higher, the further in the right is the level of capital owned by the median voter. This is true, since $\theta'_{m1} - (\bar{\theta} + e) > \theta_{m1} - (\bar{\theta} + e) \Rightarrow \theta'_{m1} > \theta_{m1}$, which is true only if θ'_{m1} lies to the right of θ_{m1} as indicated in *fig. 1*.

It should be obvious to the reader that in this dynamic game, both models quietly suggest that the capital owners always will be in favor of illegal immigration or be in favor of delaying, as long as they can, the required time for an immigrant to become a citizen in the host country. This is because, in such a scenario, the capital owners will not have to worry about losing their future political influence when lobbing for immigration. On the other hand, the workers of the host country of immigrants (represented by their labor unions or their political party) will not always lose from sending illegal immigrants back to their countries of origin. This is related to the future gain of more and more political influence that this scenario will garner when lobbing against immigration. Consequently, both models in their dynamic approach intuitively explain the reason why illegal immigrants are more likely to gain their legal status when the workers' representative party controls the government, in the host country. Nevertheless, more illegal immigrants are more likely to enter in the host country, when capital owners' representative party is in power. The same could be true for the guest workers program.

5. The Cases When FPE Does Not Hold and Immigration Seems Attractive

This section describes the scenarios where FPE is not valid by looking at the relaxation of the assumption of incomplete specialization for at least one country. In each scenario, I discuss certain conditions where there exist tendencies toward FPE, when the latter does not hold. I examine such cases in both markets (the prefect competitive and the monopolistic competitive one) in order to provide the intuition behind the existence of immigration as an economic phenomenon. In other words, such cases provide incentives for individuals of the labor intensive country to move in the capital intensive country due to the existence of the wage differentials.

5.1. Tendencies toward FPE in a Perfect Competitive Environment

In a classical Heckscher-Ohlin world (two countries, two commodities) with valid assumptions {such as pure competition in product and factor prices, full employment of both factors of production (K_i and L_i), similar tastes between countries, no restriction to trade in commodities for both countries, no transportation costs, perfect mobility of labor and capital within a country, and incomplete specialization in production of each commodity in both countries}, the Factor Price Equalization holds. This means that both relative and absolute factor prices are completely equalized across countries (for a rigorous proof of FPE, look at Samuelson 1953). If FPE holds, then there is nothing to be achieved (in terms of world efficiency) when allowing labor (or capital) to move from the origin to the host country. Moreover, since trade in commodities will eventually guarantee the same wages for both countries, then the individuals living in the origin country never will have an economic incentive to migrate in the host country. However, relaxing the assumption of incomplete specialization, it might be possible that the FPE would fail. The violation of the assumption of incomplete specialization in both countries, in this case, is due to the fact that the factor endowment ratios of two countries are very different from each other. Hence, assuming that K_i and L_i are very dissimilar between R_1 and R_2 (a sufficient condition for this to hold is that the endowments of both countries lie outside the intersection of the cones of diversification of the country with the lowest, and the country with the highest, capital over labor ratio), the following scenarios would take place:

i) The host country would completely specialize in the capital abundant commodity while the origin country would produce both commodities. Using our notation, this case would be described as the following: {$R_1 \rightarrow X_1 > 0$, $Y_1 = 0$; $R_2 \rightarrow X_2 > 0$, $Y_2 > 0$}.

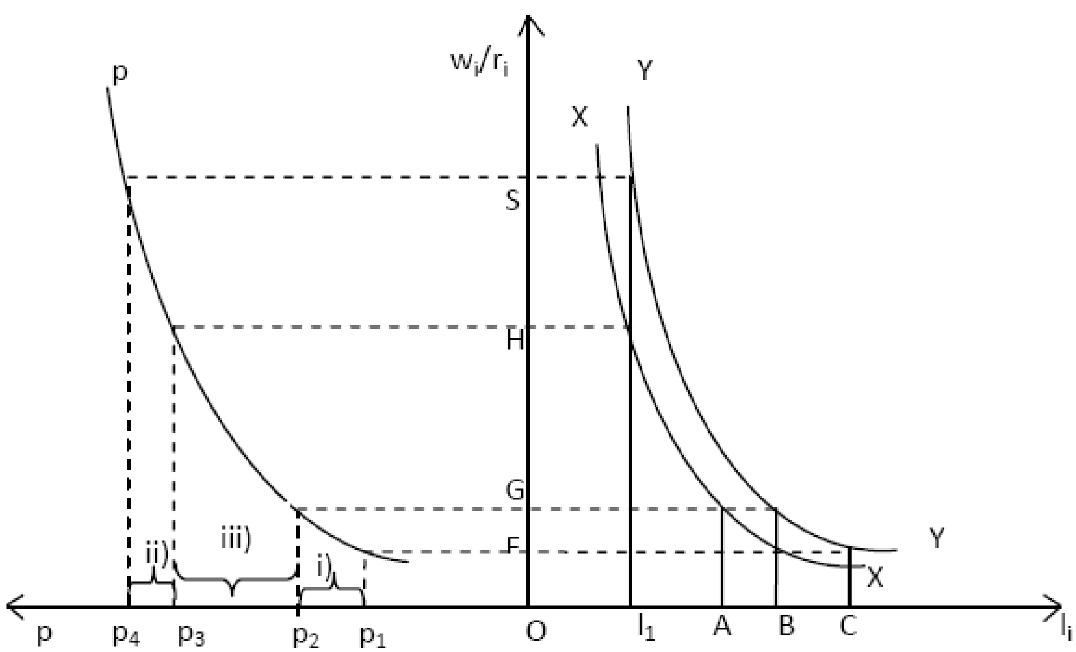
ii) The origin country would completely specialize in the labor abundant commodity while the host country would produce both commodities. Using our notation, this case would be described as the following: {$R_1 \rightarrow X_1 > 0$, $Y_1 > 0$; $R_2 \rightarrow X_2 = 0$, $Y_2 > 0$}.

iii) The origin country would completely specialize in the labor abundant commodity and the host country would completely specialize in the capital abundant commodity. Using our notation, this case would be described as the following: {$R_1 \rightarrow X_1 > 0$, $Y_1 = 0$; $R_2 \rightarrow X_2 = 0$, $Y_2 > 0$}.

I can demonstrate the situation described in the three cases above with the help of *fig. 2*. The first quadrant illustrates the relationship between factor prices ($\frac{w_i}{r_i}$) and relative factor endowment ratios ($\frac{L_j}{K_j} \equiv l_j$) on the assumption that commodity *X* is capital intensive relative to commodity *Y* for all the factor price ratios. The curve *XX* represents the relationship between $\frac{w_i}{r_i}$ and l_X. The curve *YY* represents the relationship between $\frac{w_i}{r_i}$ and l_Y. The curve *XX* intentionally lies completely to the left in order to demonstrate that commodity *X* is capital intensive relative to *Y* for all factor price ratios. In the second quadrant, relative commodities' price ratio $\frac{1}{p}$ is measured along the horizontal axes and in a negative direction. The curve *PP* shows the relationship between the factor price ratio and the relative price ratio. As shown in the first quadrant, the labor over capital ratios between the host and the origin country respectively are very dissimilar (a necessary condition for the FPE to fail).

Hence, when R_1's l_1 lies outside of the region *AC* and inside the region *OA*, then R_1 permitted range of variation of relative factor prices is *HS*, while the permitted range of $\frac{1}{p}$ in order to have incomplete specialization within R_1, is P_3P_4. When R_2's factor endowment is given by the distance *OB*, then R_2 permitted range of variation of relative factor prices is *FG*, while the permitted range of $\frac{1}{p}$ in order to have incomplete specialization within R_2 is P_1P_2. In other words, if $\frac{1}{p}$ is within the range P_1P_4 then all the cases described above will take place. Case i) occurs when $\frac{1}{p}$ lies in the region P_1P_2. Case ii) happens when $\frac{1}{p}$ lies in the region P_3P_4; Case iii) takes place when $\frac{1}{p}$ lies in the region P_2P_3.[22]

Figure 2



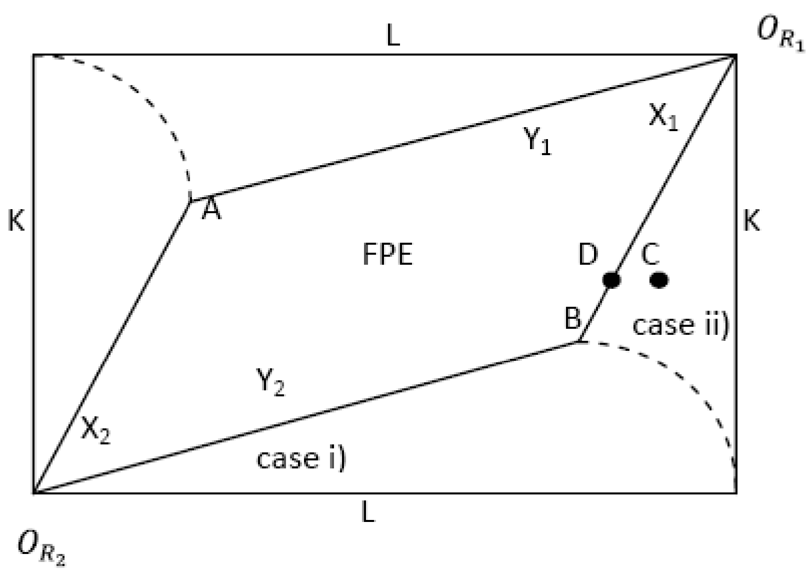
I can also demonstrate cases: i); ii); iii) by the use of an Edgeworth box tool, keeping in mind that we have

[22] Look at Chacholiades (ch.10 part C. pp. 266-271) for a detailed description of such a case and other cases where there exists a tendency toward FPE by allowing labor to move from one country to another.

assumed identical homothetic preferences. This is drawn in the *fig. 3*, where the dash lines are taken from *fig. 2*.[23] Inside the parallelogram $O_{R_1}AO_{R_2}B$ we have incomplete specialization for both countries and FPE holds. However, outside the parallelogram (but, inside the Edgeworth Box) FPE does not hold and the cases i) and ii) discussed above are shown.

Since, FPE does not hold, it is obvious that the capital over labor ratio necessarily continues to be higher in the host country than in the origin country. Therefore, the following inequality continues to hold after free trade: $w_1/r_1 > w_2/r_2$. Consequently, in all the above three cases, immigration seems attractive from the origin country to the host country. If we were to look at the point of view of the validity of the FPE, keeping capital internationally immobile while allowing labor to be internationally mobile, and for a brief moment assume that there are no immigration restrictions in the host country (R_1), then we would expect to see a (limited) movement of labor from the host to the origin country until the possibility of complete specialization is ruled out and FPE would be valid again.

Figure 3



When scenario i) occurs $\{R_1 \rightarrow X_1>0,\ Y_1=0;\ R_2 \rightarrow X_2>0,\ Y_2>0\}$ and the immigration proposal passes, then there would be a flow of immigrants (labor) from the origin country (R_2) to the host country (R_1) until the FPE is achieved and both countries are producing both commodities. Hence, in this particular case what is likely to happen is that the host country will produce less of the commodity *X* and start producing some amount of commodity *Y*. During the same time, the origin country will produce more of the commodity *X* and less of the commodity *Y*. However, the volume of immigrants is assumed to be such that the host country will continue to be capital abundant, and therefore, export commodity *X* and import commodity *Y*, and the origin country will continue to import commodity *X* and export commodity *Y*.

When scenario ii) takes place $\{R_1 \rightarrow X_1>0,\ Y_1>0;\ R_2 \rightarrow X_2=0,\ Y_2>0\}$ and the immigration proposal passes, as in

[23] Intuitively taken from *fig. 2*, specifically from the relationship of the relative commodities' price ratio and relative labor-capital ratios, for demonstration purposes only, in order to show where the scenarios, described in pages 5 and 6 of this paper, might approximately lie in the Edgeworth box.

the previous case, there would be a flow of immigrants (labor) from the origin country (R_2) to the host country (R_1) until the FPE is achieved and both countries are producing both commodities. Therefore, the case of incomplete specialization for at least one country is no longer valid. Hence, in this particular case what is likely to happen is that the origin country will produce less of the *Y* and start producing some amount of commodity *X*. During the same time the host country will produce more of the commodity *Y* and less of the commodity *X*. Again, the volume of immigrants is assumed not to be very larger in order to assure that the host country will continue to export commodity *X* and import commodity *Y*, and the origin country will continue to import commodity *X* and export commodity *Y*.

When scenario iii) happens $\{R_1 \rightarrow X_1>0,\ Y_1=0;\ R_2 \rightarrow X_2=0,\ Y_2>0\}$ and the immigration proposal passes then, then like in the previous two cases, there would be a flow of immigrants (labor) from the origin country (R_2) to the host country (R_1) until the FPE is achieved and both countries are producing both commodities. Hence, in this particular case what is likely to happen is that the host country will produce less of the commodity *X* and start producing some amount of commodity *Y*. During the same time the origin country will produce less of the commodity *Y* and start producing some amount of commodity *X*. Once again, the volume of immigrants is bounded from above in order to assure that the host country will continue to export commodity *X* and import commodity *Y*, and the origin country will continue to import commodity *X* and export commodity *Y*.

5.2. Tendencies toward FPE in a Monopolistic Competitive Environment

I am going to look only in case ii) of the above subsection, because the other cases should be obvious after reading the previous subsection. So, R_1 is producing the homogeneous labor intensive commodity and the differentiated capital intensive commodities, while R_2 is completely specialized in producing the homogeneous labor intensive commodity *Y*. Therefore, R_1 is exporting *X* to R_2 and importing *Y* from R_2, while R_2 is exporting *Y* to R_1 and importing *X* from R_1. So, if the relative commodities' price ($\frac{1}{p}$) is as described in *fig. 1* for case *ii)*, then there exists a tendency toward FPE by allowing labor to move from the origin country to the host country of immigrants. However, here I have to be careful when explaining the following two important problems in the existence of a tendency toward FPE:

First, since there are a lot of varieties of commodity *X* produced under free trade, then in equilibrium, before and after allowing labor to move internationally, the number of firms (where each firm is producing a fix amount *x*, and the number of firms is $n = \frac{X}{x}$), must be an integer, in order for equilibrium to exist and FPE to occur. Moreover, this fact also is required for the love of variety framework, employed in section 3, to be realistic. It doesn't make sense, for instance, to talk about the existence of seventy five and one-half firms (or seventy five and one-half varieties). There must either be seventy five firms, or seventy six firms, each of them producing a different variety. For an excellent discussion on the existence and the magnitude of the number of varieties, and the tendency toward FPE, see Dixit-Norman (1980. pp. 289-291).

Second, the volume of immigrants should be bounded from above. Otherwise, we might expect to see a huge increase on the cross price elasticity of demand such that each firm (with monopoly power) never will choose an optimal level of output (x) because its marginal revenue would be negative. This also is in contrast with the structure of the love of variety demand function, where the cross price elasticity is considered constant.

Therefore, the achievement of FPE should be achieved before such a phenomenon happens. In other words, the factor endowments between the two countries should be dissimilar enough in order to have different factor prices. On the other hand, the factor endowments should not be extremely dissimilar, otherwise the volume of immigrants needed to achieve FPE will be very large and the demand for the capital intensive commodity could become inelastic making the number of varieties (*n*) undetermined.

Next, let me describe the achievement of FPE in this case. Exactly like in the subsection 5.1, due to the very dissimilar factor endowments, the citizens of the labor intensive country will have an economic incentive to move in the capital intensive country because of the wage differentials between the countries. Thus, there would be a movement of labor in the direction of the capital intensive country until FPE is achieved. Under these circumstances, both countries will produce both commodities. The total number of varieties will increase, where the number of varieties produced in the host country of immigrants also will increase. Thus, the host country still will import the labor intensive commodity and also be a net exporter of the capital intensive, differentiated commodities. On the other hand, the origin country of immigrants could export some differentiated commodities but will be a net importer of them and yet export the labor intensive commodity because of the new factor endowments caused by the movement of labor. As discussed in section 3, all immigrants arriving in the capital intensive country will be employed in the capital intensive industry because of the assumptions of the production function for each capital intensive commodity.

I can describe this situation with the help of the Edgeworth box drawn in the *Figure 3* (of the subsection 5.1). Again, like in the previous subsection, inside the parallelogram $O_{R_1}AO_{R_2}B$ there is incomplete specialization for both countries and FPE holds. On the other hand, outside the parallelogram (but inside the Edgeworth Box), FPE does not hold. The labor intensive country is completely specialized in the production of the homogeneous commodity, while the capital intensive country produces the differentiated capital intensive commodities and the homogeneous labor intensive commodity, due to the dissimilarity of factors endowments. In the Edgeworth box, this is represented by the point C. Now, assuming that the immigration proposal passes in the host country of immigrants, labor will move in to the capital intensive country. The final equilibrium point is shown by the point D, which lies on the $O_{R_1}B$ line. At this point FPE is achieved. In this case the volume of immigrants is represented by the distance between points C and D.

6. Conclusions

In this paper, the political economy of immigration is studied where the median voter focuses on the economic effects of immigration on her returns on capital and labor ownership. I use a long run general equilibrium trade model, with two open economies that employ two factors in order to produce two commodities, and blend it with the median voter ala-Mayer (1984) framework, in which a majority of voters is required to pass a proposal. I examined the cases when there are tendencies toward FPE between two small open economies since only these cases allow the existence of immigration as an economic phenomenon, assuming that both countries use the same technologies in producing both commodities.

I have shown that in a perfect competitive environment, the liberalization of labor, and therefore, the achievement of FPE, depends on the level and distribution of capital in the host country of immigrants. The volume of immigrants depends on the magnitude of the difference between the capital to labor ratios of the capital abundant country and the labor abundant country. Thus, in this scenario, it is shown that the immigration proposal will pass only if the median voter's return to capital undermines her return to wage. Consequently, it is reasonable for labor unions always to lobby against immigration and for capital owners always to lobby pro immigration.

I have demonstrated that in a monopolistic competitive environment, with differentiated capital intensive commodities produced under increasing returns to scale, the immigration proposal is more likely to pass in the societies that have more taste for varieties. This is shown to be related to the fact that in this richer model, the liberalization of labor creates gains from the availability of more varieties accompanied with lower prices for each variety. Thus, in this framework, the median voter's capital level loses some of its exclusive power due the variety effect caused by immigrants. Moreover, it has been portrayed that it is theoretically possible for the liberalization of labor to take place independent of the stock and distribution of capital in the host country of immigrants. Therefore, it is shown, that in an extreme scenario when the real variety effect dominates the median voter income effect due to immigration, both labor unions and capital owners will lobby pro labor liberalization.

Finally, reexamining the immigration proposal in a two period dynamic model with forward looking voters, it is shown that the median voter is willing to accept fewer immigrants in the first period, in order to be fully assured that she will not lose her domestic political influence in the second period due to the naturalization of the immigrants accepted at the end of the first period. It has been shown that using this strategy, the median voter increases her gains from immigration by accepting more immigrants in total at the end of the second period. However, the richer the forward looking median voter, the less restricted will be the policy of the host country toward immigration in the first period. Moreover, in the case that the real variety effect dominates the income effect, it is illustrated that the host country always will be open to immigration regardless of the time period. It is argued that both dynamic frameworks quietly provide a political-economic intuition for the allowance of more illegal immigrants when a capital owners' representative political party controls the government. It also is argued that this dynamic framework intuitively explains the political-economic reason behind the fact that illegal immigrants are more likely to gain their legal status when a workers' representative party is in power.

Appendix

Proposition 1. *Immigration is beneficial to the median's voter utility and thus approved if and only if the positive effect on her capital (the increase of the product between rental rate of capital and capital stock owned by median voter) outweighs the negative effect on her labor (the decrease in median voter's wage).*

Proof:

Note that $\frac{I_m^*}{I_m} > 1$ if $\frac{dI_m}{dL_1}$>0. In this case $\frac{dI_m}{dL_1} > 0 \; iff \; \left|\frac{\partial w_1}{\partial L_1}\right| < \left|\frac{\partial r_1}{\partial L_1}\theta_m\right|$. Hence, the proof of the above proposition consists of three stages as indicated below:

Stage 1) Proof of the "if" part:

Combining the assumptions of full employment, free trade in commodities, and no savings with the zero profit conditions and the equation 3), then: $\frac{\partial w_1}{\partial L_1} < 0$ and $\frac{\partial r_1}{\partial L_1} > 0$. In other words, from the production functions w_1 and r_1 can be written as: $w_1 = (1-\beta)A_{Y_1}K_{Y_1}^{\beta}L_{Y_1}^{-\beta}$ and $r_1 = \beta A_{Y_1}K_{Y_1}^{(\beta-1)}L_{Y_1}^{(1-\beta)}$. Hence, $\frac{\partial w_1}{\partial L_1} = -\beta(1-\beta)A_{Y_1}K_{Y_1}^{\beta}L_{Y_1}^{-(\beta+1)} < 0$and $\frac{\partial r_1}{\partial L_1} = \beta(1-\beta)A_{Y_1}K_{Y_1}^{(\beta-1)}L_{Y_1}^{-\beta} > 0$ since $0 < \alpha, \beta < 1$. So, let $\left|\frac{\partial w_1}{\partial L_1}\right| < \left|\frac{\partial r_1}{\partial L_1}\theta_m\right|$ where $\frac{\partial w_1}{\partial L_1} < 0$ and $\frac{\partial r_1}{\partial L_1} > 0$. Then $\left[\frac{\partial w_1}{\partial L_1} + \frac{\partial r_1}{\partial L_1}\theta_m\right] > 0$.

Stage 2) Proof of the "iff" part:

$Let \; \left|\frac{\partial w_1}{\partial L_1}\right| \nless \left|\frac{\partial r_1}{\partial L_1}\theta_m\right|, then \left|\frac{\partial w_1}{\partial L_1}\right| \geq \left|\frac{\partial r_1}{\partial L_1}\theta_m\right| \; and \; \frac{\partial w_1}{\partial L_1} < 0; \frac{\partial r_1}{\partial L_1}\theta_m > 0 \Rightarrow$

$\Rightarrow \left[\frac{\partial w_1}{\partial L_1} + \frac{\partial r_1}{\partial L_1}\theta_m\right] \leq 0$, which is a contradiction with stage 1).

Stage 3) Proof that $\left[\frac{\partial w_1}{\partial L_1} + \frac{\partial r_1}{\partial L_1}\theta\right]$ is monotonically increasing in θ for any distribution $N(\theta)$

Let $f(\theta) \equiv \left[\frac{\partial w_1}{\partial L_1} + \frac{\partial r_1}{\partial L_1}\theta\right]$ then $\frac{df(\theta)}{d\theta} = \frac{\partial r_1}{\partial L_1} > 0$. Defining $N(\theta) \in (0, \theta_1, \cdots, \theta_m, \cdots \theta_{L_1}]$ where each element of this distribution is strictly increasing, then it is obvious that $f(\theta)$ is monotonically increasing in $\theta \; \forall \; N(\theta)$. ■

Proposition 2. *The critical level of the median voter's capital necessary for the approval of the immigration proposal in the monopolistic competitive case ($\tilde{\theta}$) is always lower than that of the perfect competitive case ($\bar{\theta}$) due to the real variety effect.*

Proof:

In order to prove the above proposition, I have to show that $\bar{\theta} > \tilde{\theta}$. Let's assume that the opposite is true. Hence, $\bar{\theta} < \tilde{\theta}$. Recall from Corollary 1 that $\bar{\theta} \equiv \frac{w_1 - w_1^*}{r_1^* - r_1}$. I can show that $\tilde{\theta} = \frac{w_1 - (1+\lambda)^{\zeta} w_1^*}{(1+\lambda)^{\zeta} r_1^* - r_1}$.[24] Thus, the following inequality must also be true:

$\frac{w_1 - w_1^*}{r_1^* - r_1} < \frac{w_1 - (1+\lambda)^{\zeta} w_1^*}{(1+\lambda)^{\zeta} r_1^* - r_1}$. This is true only if $(1+\lambda)^{\zeta} < 1$ {since $w_1 > w_1^*$ because $\frac{dw_1}{dL_1} < 0$, $r_1 < r_1^*$ because $\frac{dr_1}{dL_1} > 0$} and $w_1, w_1^*, r_1, r_1^* > 0$. But, $\lambda > 0$ because when immigration occurs, $\lambda = \frac{\Lambda}{L_1} > 0$ and $\zeta > 0$ because $\zeta = \frac{(\sigma-1)[\gamma\mu + \beta(1-\mu)] + \mu(1-\gamma)}{\sigma - 1}$ where $\sigma > 1$ and $\gamma, \mu, \beta \in (0,1)$ from the assumption of the production and demand function of the differentiated commodities. This implies that the following inequality always is true: $(1+\lambda)^{\zeta} > 1$. This is a contradiction. Therefore $\bar{\theta} > \tilde{\theta}$. ■

Proposition 3. *The higher the love of variety in a society, the more open to immigration is the host country of immigrants.*

Proof:

I showed in (16) that the variety effect can be represented by the following equality:

$$\left(\frac{n^*}{n}\right)^{\left(\frac{\mu}{\sigma-1}\right)} = [(1+\lambda)^{1-\gamma}]^{\left(\frac{\mu}{\sigma-1}\right)}$$

The love for varieties that the societies have, in this framework, is represented by the value of the parameter μ, which is the utility weight on capital intensive commodities. This is taken from the SDS subutility function (U_x). Let's denote the variety effect with $f(\mu)$. Then, I obtain: $f(\mu) = [(1+\lambda)^{1-\gamma}]^{\left(\frac{\mu}{\sigma-1}\right)} \Rightarrow \frac{df(\mu)}{d\mu} = \frac{1-\gamma}{\sigma-1}[(1+\lambda)^{1-\gamma}]^{\left(\frac{\mu}{\sigma-1}\right)} \ln(1+\lambda) > 0$ since $\lambda > 0, \sigma > 1$ and $0 < \gamma < 1$. ■

Corollary 2. *The lower the constant cross-price elasticity of substitution between varieties* (σ) *before immigration, or/and the higher the volume of immigrants* (Λ)*, the more intense is the variety effect, and therefore, the more liberal toward immigration is the host country.*

Proof:

First I provide the proof of the relationship between σ and the variety effect and then do the same for the relationship between Λ and the variety effect.

First, let's denote the variety effect with $f(\sigma)$. Then,

$f(\sigma) = [(1+\lambda)^{1-\gamma}]^{\left(\frac{\mu}{\sigma-1}\right)} \Rightarrow \frac{df(\sigma)}{d\sigma} = -\frac{(1-\gamma)\mu}{(\sigma-1)^2}[(1+\lambda)^{1-\gamma}]^{\left(\frac{\mu}{\sigma-1}\right)} \ln(1+\lambda) < 0$ since $\lambda > 0, \sigma > 1$ and $\gamma, \mu \in (0,1)$. This completes the proof for the first part of corollary 2.

[24] See Appendix 2A of the LVI-Appendix

In order to proof the second part of corollary 2, let's denote the variety effect with $f(\lambda)$. So, $f(\lambda) = [(1+\lambda)^{1-\gamma}]^{\left(\frac{\mu}{\sigma-1}\right)}$. Recall that $\lambda = \frac{\Lambda}{L_1}$. Thus, $\frac{df(\lambda)}{d\lambda} = \frac{(1-\gamma)\mu}{\sigma-1}(1+\lambda)^{\left[\frac{(1-\gamma)\mu}{\sigma-1}-1\right]} > 0$ since $\lambda > 0, \sigma > 1$ and $\gamma, \mu \in (0,1)$. ■

Corollary 2. *The lower the constant cross-price elasticity of substitution between varieties* (σ) *before immigration, or/and the higher the volume of immigrants* (Λ)*, the more intense is the variety effect, and therefore, the more liberal toward immigration is the host country.*

Proof:

First I provide the proof of the relationship between σ and the variety effect and then do the same for the relationship between Λ and the variety effect.

First, let's denote the variety effect with $f(\sigma)$. Then,

$f(\sigma) = [(1+\lambda)^{1-\gamma}]^{\left(\frac{\mu}{\sigma-1}\right)} \Rightarrow \frac{df(\sigma)}{d\sigma} = -\frac{(1-\gamma)\mu}{(\sigma-1)^2}[(1+\lambda)^{1-\gamma}]^{\left(\frac{\mu}{\sigma-1}\right)} \ln(1+\lambda) < 0$ since $\lambda > 0, \sigma > 1$ and $\gamma, \mu \in (0,1)$. This completes the proof for the first part of corollary 2.

In order to proof the second part of corollary 2, let's denote the variety effect with $f(\lambda)$. So, $f(\lambda) = [(1+\lambda)^{1-\gamma}]^{\left(\frac{\mu}{\sigma-1}\right)}$. Recall that $\lambda = \frac{\Lambda}{L_1}$. Thus, $\frac{df(\lambda)}{d\lambda} = \frac{(1-\gamma)\mu}{\sigma-1}(1+\lambda)^{\left[\frac{(1-\gamma)\mu}{\sigma-1}-1\right]} > 0$ since $\lambda > 0, \sigma > 1$ and $\gamma, \mu \in (0,1)$. ■

Corollary 4. *If corollary 3 is true, then the immigration proposal will face unanimous support in the host country of immigrants.*

Proof:

Since corollary 3 is assumed to be true, then $\{\zeta \log(1+\lambda) > \log w - \log w^*\}$ always is true. Hence, if an arbitrary individual q owns θ_q level of capital, her income will increase further because of immigration, since $\frac{dr_1}{dL} > 0$ (see stage 1 of the proof of proposition 1). Moreover, $\zeta \log(1+\lambda)$ is the same for all the individuals independent of their capital levels. Thus, $\{\zeta \log(1+\lambda) > \log(w - r\theta_q) -$ $\log w* - r*\theta q$ is also true since $r* > r$ *and* $\theta q > 0$. ■

Proposition 4. *In this dynamic setting the immigration proposal would more likely pass in the second period:*

3. *The lower is the hypothetical host country's population growth* (λ)*, in the first period due to immigration (movement of individuals from* R_2 *to* R_1*).*
4. *The richer, in terms of the ownership of the capital, is the forward looking median voter (in the first period).*

Proof:

The proof of the above proposition consists of two stages as indicated below:

Stage 1): Proof of the 1. part:

We show that in this dynamic setting, the immigration proposal will pass only if the inequality 19 is valid. Let's denote $\theta_F \equiv \frac{w_1 - w_2^*}{r_2^*(1+\lambda)-r_1}$. It is obvious that the lower the value of θ_F the higher the possibility that inequality 19 is true. Then, $\frac{d\theta_F}{d\lambda} = \frac{-r_2^*(w_1-w_2^*)}{[r_2^*(1+\lambda)-r_1]^2}$ .We also know that $\frac{dL}{dw} < 0 \Rightarrow (w_1 < w_1^* \; and \; w_2 < w2*$. But, $w2=w1* \Rightarrow w1<w2$.

Since, $w_1 < w_2 < w_2^* \Rightarrow w_1 < w_2^*$. For the same reason, $w_1 - w_2^* > 0 \Rightarrow \frac{d\theta_F}{d\lambda} < 0$.

Stage 2): Proof of the 2. part:

From the definition of the median voter, we know that $(1+\lambda) = \frac{\theta_{m1}}{\theta_{m2}}$. Hence, θ_F can now be written as: $\theta_F = \frac{\theta_{m2}(w_1-w_2^*)}{\theta_{m1}r_2^*-\theta_{m2}r_1}$. Thus, $\frac{d\theta_F}{d\theta_{m1}} = \frac{-\theta_{m2}(w_1-w_2^*)r_2^*}{(\theta_{m1}r_2^*-\theta_{m2}r_1)^2}$. Since, $\theta_{m2}, r_2^*, (w_1 - w_2^*) > 0 \Rightarrow\Rightarrow \frac{d\theta_F}{d\theta_{m1}} < 0$. ■

Proposition 5. *In this dynamic game, it is theoretically possible for the immigration proposal always to pass if the real variety effect dominates the median voter's income effect.*

<u>Proof</u>

Let's assume that the median voter owns some initial capital, $\Rightarrow \theta_{m1} > 0$. Then, inequality (21) is always valid as long as: $(1+\lambda)^{1-\zeta}(w_1+w_2+r_1+r_2) > r_2 + r_2^*(1+\lambda)^{-1}$. Taking logs of both sides and rearranging, I obtain: $\zeta < \frac{\log(w_1+w_2+r_1+r_2)-\log[r_2+r_2^*(1+\lambda)^{-1}]}{\log(1+\lambda)} - 1$. We know from the previous section that $\zeta > 0$. Hence, it is theoretically possible that, for certain values of the parameter ζ, proposition 5 is true. This occurs when $0 < \zeta < \left\{\frac{\log(w_1+w_2+r_1+r_2)-\log[r_2+r_2^*(1+\lambda)^{-1}]}{\log(1+\lambda)} - 1\right\}$. ■

Proposition 6. *In this dynamic setting, the first part of proposition four is true only for certain values of the parameter ζ, while the second part of proposition four is valid for any ζ.*

<u>Proof:</u>

The proof of this proposition consists of two stages, as indicated below:

Stage 1): The lower is the hypothetical host country's population growth (λ), in the first period due to immigration (movement of individuals from R_2 to R_1).

Let's denote with $\theta_v \equiv \frac{r_2+r_2^*(1+\lambda)^{-1}-(1+\lambda)^{1-\zeta}(w_1+w_2+r_1+r_2)}{w_2+w_2^*}$. Let's examine the sign of $\frac{d\theta_v}{d\lambda}$.

$\frac{d\theta_v}{d\lambda} = \frac{-(1+\lambda)^{-2}+(1-\zeta)(1+\lambda)^{-\zeta}(w_1+w_2+r_1+r_2)}{w_2+w_2^*}$. Hence, $\frac{d\theta_v}{d\lambda} < 0$ for $\zeta > 1$.

Stage 2): The richer, in terms of the ownership of the capital, is the forward looking median voter (in the first period).

From the definition of the median voter, one can obtain $(1+\lambda) = \frac{\theta_{m1}}{\theta_{m2}}$. Hence, θ_v can now be written as: $\theta_v = \frac{r_2 + \frac{\theta_{m2}}{\theta_{m1}} r_2^* - \left(\frac{\theta_{m1}}{\theta_{m2}}\right)^{1-\zeta} (w_1 + w_2 + r_1 + r_2)}{w_2 + w_2^*}$. Let's examine the sign of $\frac{d\theta_v}{d\theta_{m1}}$.

$\frac{d\theta_v}{d\theta_{m1}} = \frac{r_2 - \frac{\theta_{m2}}{\theta_{m1}^2} r_2^* - \left[\theta_{m2}^{\zeta-1} (w_1 + w_2 + r_1 + r_2)\right](1-\zeta)\theta_{m1}^{-\zeta}}{w_2 + w_2^*}$. $\frac{d\theta_v}{d\lambda} < 0$ for $\zeta < 0$. But, the parameter ζ is always positive. Hence, $\frac{d\theta_v}{d\lambda} > 0$. ■

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