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Migrants, Ethnicity and Strategic Assimilation

by

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Abstract

Ethnic networks are a way of overcoming informal barriers to trade such as information costs, risk, and uncertainty by building trust and by substituting for the difficulty of enforcing contracts internationally. We study networks which emerge from the interaction (i) between migrants and natives in the host country and (ii) between migrants and natives in their home country. The degree of assimilation and the strength of the networks do not “just happen”, but are the outcomes of strategic choices of subsets of the migrant population.

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Abstract

Ethnic networks are a way of overcoming informal barriers to trade such as information costs, risk, and uncertainty by building trust and by substituting for the difficulty of enforcing contracts internationally. We study networks which emerge from the interaction (i) between migrants and natives in the host country and (ii) between migrants and natives in their home country. The degree of assimilation and the strength of the networks do not “just happen”, but are the outcomes of strategic choices of subsets of the migrant population.

Introduction

Immigrant participation in labor markets is quite complex and in many ways different from that of the local population. Studies of recent migrants around the world show, with few exceptions, that they tend to earn wages substantially below those of the comparable local population. Partly, this reflects a failure on the part of immigrants to undertake the effort to assimilate with the local population. The “lack of effort” can arise from the desire to maintain a cultural heritage or separate identity which would be lost or reduced if the group assimilated. The failure to take active steps to assimilate can also arise in the face of high adjustment costs, such as inadequate language skills, intergenerational familial conflicts, and, in the case of immigrants, lack of knowledge about the host country labor market.

Various indicators are used to measure the degree to which immigrants have assimilated. The most common measures in the economics literature are wages and earnings, and there is an extremely large literature that examines the rate and degree of decline in wage and earnings differences among groups. Recently employed indicators also include labor force participation, poverty, and education, more frequently now being looked at over several generations. Moreover, for immigrants and their descendants, as length of time in the host country increases, assimilation intensifies and immigrant earnings tend to approach those of the comparable local population. On occasion, migrant workers outperform local population workers.

Efforts undertaken to assimilate, and time, are two elements that work to bring migrants into line with the local population. A third element, the degree to which the local population welcomes the migrants, also plays a role. Often, the local population

is less than welcoming, blaming the migrants for depressing wages and displacing local workers – i.e., causing unemployment among the local. This presumption has very strong policy implications and is implicit in the calls for increased regulation of immigration heard worldwide. Yet, there is mixed evidence on the impact of migrants on local population wages and employment – it depends on whether they are substitutes or complements for the non-immigrant population (Gang and Rivera-Batiz 1994). The perception exists that migrants lower wages and increase employment, whether or not they actually do so. Because of this perception the local population may take active steps to discourage migrants’ assimilation – discrimination, isolation, and so on. We refer to these local population activities as harassment.

We are interested in why migrants are so often at a disadvantage relative to the local population, and the circumstances under which their status changes or stagnates over time. Assimilation efforts, harassment and time are the three elements that determine how well the migrant is doing compared to the local population. We proceed by constructing a model in which there are four actors: the members of the local population and the organization that represents them, and members of the migrants and the organization that represents them. These organizations (or political entities) are institutions that are able to overcome the free-rider problem individual members of each group have in moving from the actions they desire to take, to actually taking the actions. The organizations could be, for example, political parties, trade organizations, unions, or thugs. While the organizations may represent the members of the group, the interests’ of the organization and that of its members do not always coincide.

We examine the consequences for assimilation and harassment of increases in the number migrants, time, and the role of the political entity. Over time, the migrants and the political entity representing them exhibit different interests in assimilating and in maintaining cultural identity. We discuss how this affects the migrants’ position over time. Our work adds to the blossoming literature on local population – migrants’ conflict and resolution, assimilation, and the reestablishment of cultural identity (see, for example, Alesina and La Ferrara, 2000, Anas, 2002, Bisin and Verdier, 2000, Dustmann, Fabbri and Preston, 2004, Kahanec, 2004, and Lazear, 1999).

The model

Consider a firm that has two factors of production: workers who are part of the local population (natives), L_n , and workers who are migrants, L_m . For simplicity, we assume that there is only one migrant group. We normalize the efficiency level of local population workers to unity; the migrants' productive/efficiency level equals $g(.)Pr(.)$. The two functions $g(.)$ and $Pr(.)$ play important roles in the determination of production and wages; aside from these, labor is homogeneous.

$Pr(.)$, where $0 \leq Pr(.) \leq 1$, is a function of two elements: (1) the effort invested by the local population in order to prevent the migrants from assimilating into the local population. These activities include harassing migrants, not cooperating with them, discriminating against them, and so on (hereafter, "harassment"). Such activities decrease migrants' productivity and thus their efficiency.¹ Denote the harassment level by h . (2) The effort invested by migrants in assimilating. These activities affect migrants' efficiency levels positively. The more migrants assimilate, their productivity increases, as cooperation increases between the local population and migrants. Denote assimilation activity by a .²

We further assume that over time, in a natural way, migrants assimilate or the local population gets used to them and views them more as equals (Chiswick, 1978, Duleep and Regets, 2002). We therefore introduce an element of time into migrants' productivity. Productivity increases with time, though it cannot be higher than the local population's. Thus $g(.)$ is such that for $t \geq 1$, $0 < g(t) \leq 1$.³ An example of such a

function is $g(t) = e^{-\frac{1}{\tau}t}$, with $\tau > 0$. In this example, over a long period of interaction between the migrants and the local population, $t = \infty$, the time weight equals one unit, $g(t) = 1$. For all other levels of t , $t < \infty$, the weight is less than one, $g(t) < 1$.

¹ This is similar to the cooperation and harassment activities described in insider-outsider theory (Lindbeck and Snower, 1998).

² Assimilation is not always beneficial for migrants; see Epstein (2003) for a discussion of migrant assimilation. For now, we ignore such possibilities; we return to discuss them later in this paper.

³ If we allow the migrants to be more productive/efficient than the local population, corresponding to the popular opinion about Asians and other groups in America, our results below will be more extreme.

The productivity weight that migrants receive equals $g(.)\Pr(.)$. This proportion reflects the productivity and efficiency of migrants relative to the local population, with the local population investing in harassment activities and migrants investing in assimilation activities (a and h are positive). We focus on the unique interior Nash equilibria. The function $\Pr(.)$ has the following properties:

$$(1) \quad \frac{\partial \Pr(h, a)}{\partial h} < 0 \text{ and } \frac{\partial \Pr(h, a)}{\partial a} > 0 .$$

The representative firm's production function at time t ($t \geq 1$) is given by

$$(2) \quad Q_t(L) = f(L_n + g(t)\Pr(h, a)L_m),$$

such that

$$\frac{\partial f(L)}{\partial L} > 0, \frac{\partial^2 f(L)}{\partial L^2} < 0, \frac{\partial^3 f(L)}{\partial L^3} = 0, \frac{\partial g(t)}{\partial t} > 0 \text{ and } \frac{\partial^2 g(t)}{\partial t^2} < 0 .$$

We assume decreasing returns to scale for labor. Moreover, we assume that the third derivative of the production function with respect to labor equals zero, $\frac{\partial^3 f(L)}{\partial L^3} = 0$.

This assumption simplifies our calculations. Below we show where this assumption is used and that it is not critical for our results.

Let W_n be the local worker wage and W_m be the migrant wage. We assume that the wages the local population and migrants receive equals their marginal product values. We could assume that local workers have market power over their employers; this would not change our results.

Normalizing the price of the product to unity, the profits of the firm are given by

$$(3) \quad \pi(.) = f(L_n + g(t)\Pr(h, a)L_m) - (W_n L_n + W_m L_m) .$$

The first order conditions for maximization are

$$(4) \quad \frac{\partial \pi(\cdot)}{\partial L_n} = f' - W_n = 0 \Rightarrow f' = W_n,$$

and,

$$(5) \quad \frac{\partial \pi(\cdot)}{\partial L_m} = g(t)\Pr(h, a)f' - W_m = 0 \Rightarrow g(t)\Pr(h, a)f' = W_m.$$

Equation (4) represents the wage condition for local workers and (5) represents the wage condition for migrants.

Harassment and local population utility

We specify the local population's utility simply as

$$(6) \quad u_n(\cdot) = C_n,$$

where C_n is the local population's consumption level. We assume that each worker consumes his entire income in each period; this means that the consumption level equals the local population's wage level (the price level is normalized to unity). Therefore,

$$(7) \quad u_n(\cdot) = C_n = f'(L_n + g(t)\Pr(h, a)L_m).$$

Utility is a positive function of harassment activities by the local population and a negative function of the assimilation activities by migrants. Each local individual would want to invest in harassment activities; however, as a result of free riding it is not rational for each individual separately to do so.

Now assume that there exists a political entity that represents the local population. The utility of this entity is a positive function of workers' utility, $u_n(\cdot)$. The total quantity of harassment activity set by this political entity equals h . Denote the utility of the political entity representing the local population by $U_N(\cdot)$. The political entity is able to overcome the free rider problem.

The political entity representing the local population determines the level of harassment so as to maximize utility. From (4) it is clear that increasing the level of harassment decreases the productivity level of migrants. This is similar to decreasing

the labor force available to the firm, thus increasing the wage level of the local population.⁴

The local population can benefit from harassing migrants, as these activities will increase their own wages. On the other hand, there is a cost to harassment that decreases the utility of the local population.

One could also think of local utility as increasing in the harassment level, as the local population may have positive utility just from harassment. This may be the case for some in the local population; however, overall we assume that it costs the local population to participate in harassment activities. These activities take time and effort and thus decrease the utility of the local population. The utility of the political entity representing the local population is thus a function of the local's representative agent and the level of harassment activities: $U_N(u_n, h)$. To simplify we assume, using (4), (6) and (7), that the utility of the political entity representing the local population is written as⁵

$$(8) \quad U_N(\cdot) = f'(L_n + \Pr(h, a)g(t)L_m) - h,$$

$$\text{where } f'(L_n + \Pr(h, a)g(t)L_m) = \frac{\partial f(L_n + \Pr(h, a)g(t)L_m)}{\partial L}.$$

The local population's objective is to maximize its utility by determining its optimal harassment level. The first order condition determining the optimal harassment level is given by $\frac{\partial U_N(\cdot)}{\partial h} = 0$, thus

$$(9) \quad \Delta_N = \frac{\partial \Pr(h, a)}{\partial h} g(t) f''(L_n + g(t)\Pr(h, a)L_m)L_m L_n - 1 = 0,$$

⁴ We can also model the behavior of a second political entity, one that represents the interests of capital owners (the firm) in the local population. The capital owners would react as the migrants (since immigrants decrease the firm's marginal costs), so the results do not change.

⁵ Assuming a general function such as $U_N(f'(L_n + \Pr(h, a)g(t)L_m) - h)$ does not change the results.

where $f''(L_n + \Pr(h, a)g(t)L_m) = \frac{\partial^2 f(L_n + g(t)\Pr(h, a)L_m)}{\partial L^2}$.

The first order condition therefore satisfies,

$$(10) \quad \frac{\partial \Pr(h, a)}{\partial h} = \frac{1}{f''(L_n + g(t)\Pr(h, a)L_m)g(t)L_nL_m}.$$

Remember that both $\frac{\partial \Pr(h, a)}{\partial h}$ and $f''(L_n + \Pr(h, a)g(t)L_m)$ are negative.

In order for the harassment level determined in (9) to maximize the local population's utility, the second order condition must hold. The second order condition for maximization is given by $\frac{\partial^2 U_N(\cdot)}{\partial h^2} < 0$. Thus,

$$(11) \quad \frac{\partial^2 \Pr(h, a)}{\partial h^2} f''(L_n + g(t)\Pr(h, a)L_m)g(t)L_nL_m + \left(\frac{\partial \Pr(h, a)}{\partial h}\right)^2 f'''(L_n + g(t)\Pr(h, a)L_m)g(t)^2L_n^2L_m^2 < 0.$$

Under the assumptions made above, see (2), the third derivative of the production function with respect to the labor equals zero, $\frac{\partial^3 f(L)}{\partial L^3} = 0$. This assumption

simplifies matters; alternatively, it can be assumed that $\left(\frac{\partial \Pr(h, a)}{\partial h}\right)^2 f'''(L_n + g(t)\Pr(h, a)L_m)g(t)^2L_n^2L_m^2$ is very small or equals zero. The

second order condition can thus be written as

$$(12) \quad \frac{\partial^2 \Pr(h, a)}{\partial h^2} f''(L_n + g(t)\Pr(h, a)L_m)g(t)L_nL_m < 0.$$

From (2) we know that $f''(L_n + g(t)\Pr(h, a)L_m) < 0$, so in order for the second order conditions to hold it must be that

$$(13) \quad \frac{\partial^2 \Pr(h, a)}{\partial h^2} > 0 \text{ or } \frac{\partial^2 (1 - \Pr(h, a))}{\partial h^2} < 0 .$$

Namely, the proportion of migrants that do not assimilate, $(1 - \Pr(h, a))$, face decreasing returns to harassment, h .⁶

Assimilation and migrants' utility

The utility of migrants is of the same form of that of the local population. We specify the migrants' utility function simply as

$$(14) \quad u_m(\cdot) = C_m ,$$

where C_m is the migrants' consumption level. We assume that each worker consumes his entire income in each period. Therefore,

$$(15) \quad u_m(\cdot) = W_m = g(t) \Pr(h, a) f'(L_n + g(t) \Pr(h, a) L_m) .$$

Utility is a negative function of harassment and a positive function of assimilation activities. Each migrant would want to invest in assimilation; however, while it is rational for all together to invest, as a result of free riding it is not rational for each individual separately to do so.⁷

Now assume that there exists a political entity that represents the migrants and is able to overcome the free rider problem. The political entity might be a group representing migrants rights, interests, and so on. The utility of this entity is a positive function of the number of assimilated migrants. Assimilation has many benefits for migrants: first, it increases their wages; second, if some migrants assimilate, the benefits of their assimilation will provide the rest of the migrants with

⁶ The proportion of migrants that have assimilated affects both the wages of the migrants and local population.

⁷ It has been frequently noted that while people may hold prejudices about a group, often they do not hold these views about individuals from the group whom they know. The costly assimilation we refer to here is in terms of how the local population thinks of the migrants as a group. Individuals in the migrants may benefit from, for example, learning the language and will be willing to invest.

benefits – this arises because migrants can act as a network (Rauch, 2001); and third, for international traders such connections help in importing and exporting products at lower costs. In this last example, as immigrants assimilate into the host country, network externalities increase, enabling increased profits and increased imports, thus increasing the utility of the international importer (exporter) migrants (in other words, there is an extra externality, see Epstein and Gang, 2005). In general, the utility of the political entity representing the migrants will be a function of the degree to which the migrants population has assimilated into the local population, $g(t)\Pr(h, a)L_m$.

Denote the utility of the political entity representing migrants by $U_M(g(t)\Pr(h, a)L_m, a)$ such that,

$$(16) \quad U(.)_M = R(g(t)\Pr(h, a)L_m) - a.$$

$R(.)$ is the rent associated with the assimilation of the migrants. This level of assimilation is represented by the term $g(t)\Pr(h, a)L_m$. We assume that as the level of assimilation increases, $g(t)\Pr(h, a)L_m$ increases, that is, the rent also increases. Some migrants participate in assimilation activities and thus have a cost of a for each a unit of effort for the purpose of assimilating. To simplify, we assume for now that the rent equals $R(g(t)\Pr(h, a)L_m) = r g(t)\Pr(h, a)L_m$. Therefore, the utility of the political entity representing the migrants becomes

$$(17) \quad U(.)_M = r \Pr(h, a) g(t)L_m - a.$$

As assumed above, as assimilation activities increase $\Pr(h, a)$ increases. The first order condition for maximization of migrants' utility is given by $\frac{\partial U(.)_M}{\partial a} = 0$, namely,

$$(18) \quad \Delta_M = \frac{\partial \Pr(h, a)}{\partial a} g(t)L_m r - 1 = 0.$$

The first order condition is satisfied if

$$(19) \quad \frac{\partial \Pr(h, a)}{\partial a} = \frac{1}{g(t)L_m r}.$$

Remember we assumed that $\frac{\partial \Pr(h, a)}{\partial a} > 0$, see (1). In order to insure that the solution is the level that maximizes migrants' utility it must hold that $\frac{\partial^2 U(.)_M}{\partial a^2} < 0$.

Therefore, it must also hold that

$$(20) \quad \frac{\partial^2 \Pr(h, a)}{\partial a^2} < 0.$$

In other words, (20) assumes that there are decreasing returns to investing in assimilation. From (19) we can conclude that,

Increasing the number of migrants, or the rent associated with assimilation, r , will, given the level of harassment, increase the level of assimilation. Moreover, over time, migrants will invest more effort in assimilating.

The political entity representing migrants seeks aggregate rents as described above, not rents per capita. Thus for this political entity, growth of the migrant population wanting to assimilate is the same as increasing rents. Rising rents increase the benefits for the migrants' political entity and thus increase the entity's returns to investing in assimilation. With time, the migrants naturally integrate into the local population; increasing assimilation efforts speeds up the process.

Equilibrium

The local population invests in harassment and migrants invest in assimilation (a and h are positive). We focus on the unique interior Nash equilibria. We now wish to consider the effects changes in the number of migrants (rents to the migrants' political entity) have on the equilibrium levels of harassment and assimilation efforts.

By differentiation of the first order conditions (see (8) and (18)), the Nash equilibrium effort levels satisfy the following conditions for $L=L_F$,

$$(21) \quad \frac{\partial h^*}{\partial L} = \frac{\frac{\partial \Delta_N}{\partial a} \frac{\partial \Delta_M}{\partial L} - \frac{\partial \Delta_M}{\partial a} \frac{\partial \Delta_N}{\partial L}}{\frac{\partial \Delta_N}{\partial h} \frac{\partial \Delta_M}{\partial a} - \frac{\partial \Delta_N}{\partial a} \frac{\partial \Delta_M}{\partial h}},$$

and,

$$(22) \quad \frac{\partial a^*}{\partial L} = \frac{\frac{\partial \Delta_M}{\partial h} \frac{\partial \Delta_N}{\partial L} - \frac{\partial \Delta_N}{\partial h} \frac{\partial \Delta_M}{\partial L}}{\frac{\partial \Delta_M}{\partial a} \frac{\partial \Delta_N}{\partial h} - \frac{\partial \Delta_M}{\partial h} \frac{\partial \Delta_N}{\partial a}}.$$

From (8) and (18) we obtain

$$\begin{aligned} \frac{\partial \Delta_N}{\partial a} &= \frac{\partial^2 \Pr}{\partial h \partial a} g(t) f'' L_n L_m; & \frac{\partial \Delta_N}{\partial h} &= \frac{\partial^2 \Pr}{\partial h^2} g(t) f'' L_m L_n^2; \\ & & \frac{\partial \Delta_N}{\partial L_F} &= \frac{\partial \Pr}{\partial h} g(t) f'' L_n; \end{aligned}$$

(23) and,

$$\frac{\partial \Delta_M}{\partial a} = \frac{\partial^2 \Pr}{\partial a^2} g(t) L_m r; \quad \frac{\partial \Delta_M}{\partial h} = \frac{\partial^2 \Pr}{\partial a \partial h} g(t) L_m L_n r; \quad \frac{\partial \Delta_M}{\partial L_m} = \frac{\partial \Pr}{\partial a} g(t) r.$$

Substituting (23) into (21) and (22) and using the first order conditions (9) and (19) we obtain

$$(24) \quad \frac{\partial h^*}{\partial L_m} = \frac{g(t)^2}{H} \left(\frac{\partial^2 \Pr}{\partial h \partial a} f'' L_n - \frac{\partial^2 \Pr}{\partial a^2} r \right),$$

and,

$$\frac{\partial a^*}{\partial L_m} = \frac{L_n}{H} g(t)^2 \left(\frac{\partial^2 \Pr}{\partial a \partial h} r - \frac{\partial^2 \Pr}{\partial h^2} f'' L_n \right),$$

where, $H = g(t)^2 L_n^2 L_m^2 r f'' \left(\frac{\partial^2 \Pr}{\partial a^2} \frac{\partial^2 \Pr}{\partial h^2} - \left(\frac{\partial^2 \Pr}{\partial h \partial a} \right)^2 \right)$.

Since $f'' < 0$; $\left(\frac{\partial^2 \text{Pr}}{\partial h \partial a}\right)^2 > 0$ and $\text{Sign}\left(\frac{\partial^2 \text{Pr}}{\partial a^2}\right) = -\text{Sign}\left(\frac{\partial^2 \text{Pr}}{\partial h^2}\right)$, $H > 0$.

The ability of migrants to convert assimilation efforts into productivity and efficiency can be represented by the marginal effect of a change in migrants' assimilation effort on the marginal productivity effect, $\frac{\partial \text{Pr}(\cdot)}{\partial a}$ (where $0 \leq \text{Pr}(\cdot) \leq 1$).

By assumption, this marginal productivity effect is declining with migrants' own assimilation efforts. Changes in assimilation efforts also affect, however, the local population's marginal productivity level. Migrants have an advantage in terms of ability if a change in local population's effort positively affects migrants' marginal productivity level. In other words, a positive (negative) sign of the cross second-order

partial derivative of $\text{Pr}(h, a)$, $\frac{\partial^2 \text{Pr}}{\partial a \partial h}$, implies that migrants have an advantage

(disadvantage) when local population's efforts to harass migrants change. For a given combination of efforts (h, a) , the ratio between the effect of a change in migrants' efforts on the marginal productivity level and the effect of a change in local

population's effort, $\frac{\partial^2 \text{Pr}}{\partial a \partial h} \left/ \left(\frac{\partial^2 \text{Pr}}{\partial a^2} \right) \right.$, is a measure of the asymmetry between the

abilities of both groups to affect the migrants' productivity level.⁸ In the same way one can calculate the measure of asymmetry in terms of the other group.

From (24) we obtain

Lemma 1

(a) For $\frac{\partial^2 \text{Pr}}{\partial h \partial a} = 0$, $\frac{\partial h^*}{\partial L_m} > 0$ and $\frac{\partial a^*}{\partial L_m} > 0$.

(b) For $\frac{\partial^2 \text{Pr}}{\partial h \partial a} < 0$, $\frac{\partial h^*}{\partial L_m} > 0$ and $\frac{\partial a^*}{\partial L_m} > 0$ if $\frac{\partial a^*}{\partial L_m} < 0$ if $\frac{\frac{\partial^2 \text{Pr}}{\partial a \partial h}}{\left(\frac{\partial^2 \text{Pr}}{\partial h^2}\right)} > \frac{f'' L_n}{r}$.

⁸ For a general discussion on how effort activities are transferred from effort to performance see Epstein and Nitzan (2005).

$$(c) \text{ For } \frac{\partial^2 \text{Pr}}{\partial h \partial a} > 0, \quad \frac{\partial a^*}{\partial L_m} > 0 \quad \text{and} \quad \frac{\partial h^*}{\partial L_m} = 0 \text{ if } \frac{\frac{\partial^2 \text{Pr}}{\partial h \partial a}}{\left(\frac{\partial^2 \text{Pr}}{\partial a^2} \right)} = \frac{r}{f'' L_n}.$$

By Lemma 1 (a), if the contestants are symmetric in equilibrium in terms of their abilities, then growth in the immigrant population will increase both harassment and assimilation efforts.

By Lemma 1 (b), if the local population group has an advantage, as defined above, over the migrants population, then growth in the migrants' population will increase harassment; however it is not clear what will happen to the level of assimilation activities. This ambiguity depends on the measure of asymmetry

between the two groups, $\frac{\frac{\partial^2 \text{Pr}}{\partial a \partial h}}{\left(\frac{\partial^2 \text{Pr}}{\partial h^2} \right)}$, growth in the U.S., and the ratio between the

effects of the marginal efficiency of their investment, $\frac{f'' L_n}{r}$. The main idea here is that even though harassment activities increase, the local population is so strong that it may not be worthwhile for the migrants to try to fight the local population. Therefore, the migrants may well decrease their efforts to assimilate. This depends on what each group can gain from such activities.

By Lemma 1 (c), if the migrants have an advantage over the local population, then an increase in the migrants population will increase assimilation activities, however it is not clear what will happen to the level of harassment activities. This

ambiguity depends on the measure of asymmetry between the two groups, $\frac{\frac{\partial^2 \text{Pr}}{\partial a \partial h}}{\left(\frac{\partial^2 \text{Pr}}{\partial a^2} \right)}$,

and the ratio between the effects of the marginal efficiency of their investment, $\frac{r}{f'' L_n}$. Recall our assumption $f'''=0$, so when increasing L_n , f'' doesn't change and thus the ratio decreases. Thus the relative advantage of migrants decreases, while it increases for the local population.

Assuming the local population has the advantage over migrants, it holds that

$$\frac{\partial^2 \text{Pr}}{\partial h \partial a} < 0 . \text{ We conclude,}$$

$$\textbf{Proposition 1: } \frac{\partial h^*}{\partial L_m} > 0 \quad \textbf{and} \quad \frac{\partial a^*}{\partial L_m} = 0 \text{ if } \frac{\frac{\partial^2 \text{Pr}}{\partial a \partial h}}{\left(\frac{\partial^2 \text{Pr}}{\partial h^2} \right)} > \frac{f'' L_n}{r} .$$

Growth in the migrant population, given that the local population group is relatively stronger, increases the local population's harassment of the migrants. As the migrant population grows, efforts to assimilate on the part of migrants will increase if the measure of the asymmetry between the abilities of both groups to affect the migrants' productivity exceeds the ratio between the effects of the marginal efficiency of their investments on their rents. Here it "pays" for migrants not to give up in the face of greater harassment, but to fight instead and further their assimilation. Similarly, if the measure of the asymmetry between the abilities of both groups to affect migrants productivity is less than the ratio between the effects of the marginal efficiency of their investments on their rents, migrants will not find it worthwhile to fight the local population and will reduce their assimilation efforts as their population increases. As the migrant population grows, assimilation efforts by the migrants will decrease if the local population is so strong that it is worthwhile for migrants to try to fight the local population. Therefore, the migrants may well decrease their efforts to assimilate. This will depend on what each group can gain from such activities.

Let us now consider how a change in the rent received by the political entity representing the migrants population, r , affects the level of harassment against migrants and their assimilation efforts. As presented above in (21) and (22), differentiating of the first order conditions (see (8) and (18)), the Nash equilibrium effort levels satisfy the following conditions,

$$(25) \quad \frac{\partial h^*}{\partial r} = \frac{\frac{\partial \Delta_N}{\partial a} \frac{\partial \Delta_M}{\partial r} - \frac{\partial \Delta_M}{\partial a} \frac{\partial \Delta_N}{\partial r}}{\frac{\partial \Delta_N}{\partial h} \frac{\partial \Delta_M}{\partial a} - \frac{\partial \Delta_N}{\partial a} \frac{\partial \Delta_M}{\partial h}} \quad \textbf{and} \quad \frac{\partial a^*}{\partial r} = \frac{\frac{\partial \Delta_F}{\partial h_1} \frac{\partial \Delta_N}{\partial r} - \frac{\partial \Delta_N}{\partial h_1} \frac{\partial \Delta_F}{\partial r}}{\frac{\partial \Delta_F}{\partial a} \frac{\partial \Delta_N}{\partial h_1} - \frac{\partial \Delta_F}{\partial h_1} \frac{\partial \Delta_N}{\partial a}} .$$

The calculations described in (23) hold. We, however, calculate two additional components:

$$(26) \quad \frac{\partial \Delta_N}{\partial r} = 0 \quad \text{and} \quad \frac{\partial \Delta_M}{\partial r} = \frac{\partial \text{Pr}}{\partial a} g(t) L_F.$$

Using (26) together with (23), (25) and (26) we obtain

$$(27) \quad \frac{\partial h_1^*}{\partial r} = \frac{g(t)^2}{H} \frac{\partial^2 \text{Pr}}{\partial h \partial a} f'' \frac{\partial \text{Pr}}{\partial a} L_m^2 L_n$$

and,

$$\frac{\partial a^*}{\partial r} = \frac{g(t)^2}{H} \left(- \frac{\partial^2 \text{Pr}}{\partial h^2} f'' L_m^2 L_n^2 \frac{\partial \text{Pr}}{\partial a} \right),$$

where H is defined in equation (23).

Lemma 2:
$$\text{Sign} \left(\frac{\partial h_1^*}{\partial r} \right) = - \text{Sign} \left(\frac{\partial^2 \text{Pr}}{\partial h \partial a} \right) \quad \text{and} \quad \frac{\partial a^*}{\partial r} > 0.$$

Increasing the rent associated with assimilation efforts increases assimilation activities by migrants. However, it is not clear what will happen to harassment activities. If migrants have an advantage over the local population in turning effort into ability, $\frac{\partial^2 \text{Pr}}{\partial h \partial a} > 0$, then increasing rents associated with assimilation decreases harassment.⁹ The idea here is that migrants have a lot more to gain from their assimilation activities relative to what the local population can obtain and, at the same time, they can have an advantage in turning effort into efficiency. These two elements will cause migrants to increase their assimilation activities, while they will decrease the local population's harassment efforts.

⁹ Effort refers to activities such as assimilation and harassment, while ability tells us how effort translates into outcomes – does one unit of effort give us one percent or ten percent of the desired outcome

With the local population as the strong population we obtain

Proposition 2: *Increasing the rent associated with assimilation activities will increase both harassment and assimilation efforts by both groups ($\frac{\partial h^*}{\partial r} > 0$ and $\frac{\partial a^*}{\partial r} > 0$).*

Let us now consider how time affects assimilation activities. Will we see greater or fewer assimilation and harassment efforts over time? As $g(t)$ is increasing in t , we look at the effect of changes in $g(t)$ on the levels of harassment and assimilation activities. Use (21) and (22) for $L=g(t)$ and the fact that (recall $f'''=0$),

$$(28) \quad \frac{\partial \Delta_N}{\partial g(t)} = \frac{\partial \text{Pr}}{\partial h} f'' L_m L_n \quad \text{and} \quad \frac{\partial \Delta_{IT}}{\partial g(t)} = \frac{\partial \text{Pr}}{\partial a} L_n r .$$

By substituting (28) and (2) into (21) and (22) and using the first order conditions (9) and (19) we obtain

$$(29) \quad \frac{\partial h^*}{\partial g(t)} = \frac{L_m}{H} \left(\frac{\partial^2 \text{Pr}}{\partial h \partial a} f'' L_N - \frac{\partial^2 \text{Pr}}{\partial a^2} r \right)$$

and

$$\frac{\partial a^*}{\partial g(t)} = \frac{L_n L_m}{H} \left(\frac{\partial^2 \text{Pr}}{\partial a \partial h} r - \frac{\partial^2 \text{Pr}}{\partial h^2} f'' L_n \right) .$$

From (29) we have,

Lemma 3

(a) For $\frac{\partial^2 \text{Pr}}{\partial h \partial a} = 0$, $\frac{\partial h^*}{\partial t} > 0$ and $\frac{\partial a^*}{\partial t} > 0$.

(b) For $\frac{\partial^2 \text{Pr}}{\partial h \partial a} < 0$, $\frac{\partial h^*}{\partial t} > 0$ and $\frac{\partial a^*}{\partial t} > 0$ if $\frac{\frac{\partial^2 \text{Pr}}{\partial a \partial h}}{\left(\frac{\partial^2 \text{Pr}}{\partial h^2} \right)} > \frac{f'' L_n}{r}$.

$$(c) \text{ For } \frac{\partial^2 \text{Pr}}{\partial h \partial a} > 0, \quad \frac{\partial a^*}{\partial t} > 0 \quad \text{and} \quad \frac{\partial h_l^*}{\partial t} = 0 \text{ if } \frac{\frac{\partial^2 \text{Pr}}{\partial h \partial a}}{\left(\frac{\partial^2 \text{Pr}}{\partial a^2}\right)} = \frac{r}{f''L_n}.$$

By Lemma 3(a), if the contestants are symmetric in equilibrium in terms of their abilities then over time the local population increases its harassment activities and migrants increases their assimilation activities. By Lemma 3(b) if the local population has an advantage over the migrants, then over time harassment activities increase, however, it is not clear what happens to assimilation efforts. By Lemma 3(c) if migrants have an advantage (in turning effort into performance) over the local population, then over time assimilation activities increase, however, it is not clear what happens to the level of harassment efforts. The reason for these results is the same type of reasons presented after Lemma 1.

Given that the local population is the stronger group we obtain:

Proposition 3: *Harassment will increase over time while assimilation efforts may*

$$\text{increase or decrease } \left(\frac{\partial a^*}{\partial t} = 0 \text{ if } \frac{\frac{\partial^2 \text{Pr}}{\partial a \partial h}}{\left(\frac{\partial^2 \text{Pr}}{\partial h^2}\right)} = \frac{f''L_n}{r} \right).$$

A general model of assimilation

Now let us return to the political entity representing the migrant population. Assume that assimilation has two different types of effects on the utility of an individual: (1) it increases the wages of the individual and, (2) it decreases the utility of the individual as he is losing his identity and uniqueness.¹⁰ Therefore, we rewrite the utility of the entity in the following way:

$$(30) \quad U(.)_M = R(\Pr(h,a)g(t)L_m, (1-\Pr(h,a))g(t)L_m) - a.$$

The first component is the number of assimilated migrants, while the second component is the number of non-assimilated migrants. Increasing any of these components increases the utility of the political entity:

$$(31)$$

$$\frac{\partial R(\Pr(h,a)g(t)L_m, (1-\Pr(h,a))g(t)L_m)}{\partial(\Pr(h,a)g(t)L_m)} > 0 \text{ and } \frac{\partial R(\Pr(h,a)g(t)L_m, (1-\Pr(h,a))g(t)L_m)}{\partial((1-\Pr(h,a))g(t)L_m)} > 0.$$

The objective of the political entity is to maximize its utility by determining the level of assimilation activities. The first order condition is:

$$(32) \quad \frac{dU(.)_M}{da} = \left(\frac{\partial R(.)}{\partial(\Pr(h,a)g(t)L_m)} - \frac{\partial R(.)}{\partial((1-\Pr(h,a))g(t)L_m)} \right) \frac{\partial(\Pr(h,a)g(t)L_m)}{\partial a}.$$

In the case we described above it is clear that we were only talking about the first component of (32).

Under this more generalized case, it is clear that if $\Pr(h,a)=1$ then the benefit for an individual will be low (and for the political entity it will be zero and it will not

¹⁰ Another way of thinking about this is from the political entity's view: this group's existence is a function of harassment and the migrants' failure to undertake effective assimilation activities. In order for the political entity to survive it needs to help those it represents and at the same time ensure that they still need its services. If all migrants fully assimilate then there will be no place for this political entity to exist.

have any reason for existence). Therefore, if the level of assimilation is sufficiently high then the assimilated individuals will want to invest in resisting assimilation so as to differ from the local population, thus holding on to their heritage and traditions.

Assume for $t=t^*$ the assimilation activity that maximizes (32) equals a_t^* . Over time, as the assumed level of assimilation increases, if the level of harassment in time $t=t^*+1$ equals the level of harassment activities at time $t=t^*$, then it is clear that the level of assimilation activities of those who have already assimilated will decrease from time period $t=t^*$ to period $t=t^*+1$. Namely, $a_t^* > a_{t+1}^*$. In other words it may well be the case that after a certain period of time the level of assimilation activities will decrease. Let us now return to migrant workers. Given (5), migrant workers who have a low level of assimilation will always want to invest effort in assimilation activities while it is not clear that the political entity that represents all the migrants will always want to do so. Moreover, if the level of assimilation is sufficiently high, it may well be the case that migrant workers will continue investing in assimilation activities while the political entity will invest in anti-assimilation activities, for example, preserving the heritage of the migrants group, etc. These activities are aimed at preserving home country traditions and emphasizing the differences between the local population and the migrants.

We conclude therefore that,

Proposition 4

There exists an inverse U-shaped relationship between the rent obtained from assimilation activities and time for the political entity representing migrants. With time the local population will continue to invest in harassment activities against migrants, whereas migrants who have low levels of assimilation will invest in assimilation activities while those with a high level assimilation will invest in anti-assimilation activities. The political entity representing the migrants will increase its assimilation activities until a certain point in time, \bar{t} , and beyond this time will decrease assimilation activities and may even invest in anti-assimilating activities ($a_1 < 0$).

This proposition states that migrants benefit from assimilation and will invest (as much as they can given free rider problems, etc.) in assimilation activities. Denote migrants' assimilation activities by $a_2 > 0$. At the beginning, the political entity representing the migrants will benefit from assimilation and thus will increase their investment in assimilation activities. Over time, after \bar{t} , the political entity benefits less from assimilation as its members are becoming more and more assimilated. As a result, after period \bar{t} assimilation activities by political entity decrease and may even become negative. Negative assimilation activities can be thought of as anti-assimilation activities (these activities of the political entity are denoted by $a_1 < 0$), and include activities aimed at preserving home country traditions and emphasizing the differences between the local population and the migrants. At the same time the local population will continue harassing migrants, while individual migrants continue to invest in assimilation activities.

It may well be the case that as migrants continue in their assimilation activities after a level of a_2^* (see figure) and the political entity invests effort in anti-assimilation activities, that a_1 becomes negative (see figure). Thus the political entity is fighting to prevent assimilation or at least full assimilation while individual migrants who have low levels of assimilation fight to increase assimilation. Both the local population and the political entity will be fighting assimilation while recent immigrants who have barely assimilated will be fighting to increase assimilation. Over time, therefore, we may well see that the political entity raises assimilation efforts and fights harassment, but after a certain point they go against their fellow country-men and decrease assimilation activities, even engaging in anti-assimilation activities to hold on to their rent and not let the migrants fully assimilate into the host country.

Concluding remarks

We posit that the degree of assimilation is a matter of local population attitudes and migrant desires. There is a conflict, or at least a potential conflict, between the local population and the migrants over the position of the migrants in the economy and society. This potential conflict is acute between both the local population and the migrants, and within the migrant community (see Gradstein and Schiff, 2005 and Gradstein and Justman, 2005). The local population's attitudes towards migrants (are

they welcoming? do they attempt to integrate migrants?), the migrants desire to integrate and the will of migrant representatives determine the degree of integration, as represented in our model by the relative productivity of the two groups.

We explicitly model the actors involved in assimilation, in developing desires to maintain ethnic identity, and in trying to isolate and distinguish migrants. We examine how these actors interact, affecting the assimilation path.

Our picture of assimilation is highly simplified – with time and effort migrants assimilate into local population culture until they cannot be differentiated in terms of consumption preferences or wages. The local population group harasses migrants to forestall and prevent this, or at least to keep the gains from the process out of the hands of migrants. In the latter part of the paper, we examine the case where the representatives of the migrants, facing a loss of their own positions, reject assimilation. Over time it is assumed that, in a natural way, the migrants assimilate or the local population gets used to them and sees them more as equals. While highly simplified, the model allows us to obtain insights that are useful for understanding richer assimilation stories (Bun and Kiong, 1993, Gang and Zimmermann, 2000, Gradstein and Schiff, 2005, Gradstein and Justman, 2005, Rapoport and Weiss, 2001).

The intensity of assimilation activities by migrants and harassment activities by the local population group generally depends on how symmetric the migrants and local population are in terms of their abilities, and their relative marginal efficiency of investment in these activities. Over time, the migrants' representatives and some of the members of the migrants exhibit different interests in assimilation and in maintaining their cultural identity, and the interplay of their conflict with the actions of the local population over time provides further insights.

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Figure
Assimilation activities of political entity and employed migrants

