Migration and crime*

- PRELIMINARY DRAFT -

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Abstract

Contrarily to popular perception, empirical evidence says that crime rates are not necessarily higher among immigrants than among natives; however, in most cases, second-generations immigrants are more involved in criminal activities than natives. These stylized facts can be explained in the framework of a two-country, endogenous "career choice" model. Agents may choose between working honestly and engaging in criminal activities. Depending on whether career crossovers are possible after migration (to a richer economy) takes place, we may have different consequences in terms of immigrants' crime rates. The main factors affecting our results range from socio-economic and institutional differences between countries, to immigration policies; in particular, if the latter become too restrictive, they might favor illegal immigration, thus inducing an adverse selection of immigrants. In addition, our benchmark model can also be used to explain why immigrants often replace natives in criminal activities (the so-called "substitution" effect) and analyze the long-run consequences of immigration for crime.

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1 Introduction

The concern about the propensity of immigrants to become involved in criminal activities is almost as old as migration itself. Abbott (1931) and Van Vechten (1941) report many examples of how, in the 19th century United States, immigration was regarded as a potential inflow of criminals. Much more recently, Bauer et al. (2000) show that the the common belief in OECD countries is that immigrants commit more crimes than natives, thus determining an overall increase in crime. Moreover, throughout the 20th century, criminal organizations are more than often represented, in popular culture and in public opinion, as being of foreign origin (Italian mafia in the US, Russian mob in today's Western Europe, etc.).

Not surprisingly, a huge number of studies have tried to assess whether this kind of (popular) perception corresponds to reality. Earlier contributions found that crime rates were clearly higher among immigrants, but suffered from severe scientific limitations: for instance they did not control for factors like sex, age and income, which made immigrants more likely to engage in criminal activities. Some more recent (and accurate) research delivers us a much more mixed evidence: in particular, the relative likelihood to commit crimes of natives and immigrants seems to be highly variable, across countries and over time.[1]

Just to give a few examples, Bianchi et al. (2008), Plecas (2002), Butcher and Morrison Piehl (1998, 2005), Albrecht (1997) and Francis (1981) find that immigrants are less involved than natives in criminal activities, in Italy, Canada, US, Germany, and Australia, respectively. However, Barbagli (2008) and Killias (1997) show that, in Italy and Switzerland, immigrants display higher crime rates.

While it cannot be established whether immigrants are more likely than natives to become involved in illegal activities, there is instead wide consensus on some further stylized facts. First, as pointed out, for instance, by Barbagli (2008) and Albrecht (1997), second-generation immigrants have higher crime rates than natives.[2] Second, more recent immigrants participate in criminal activities much more than earlier immigration waves. Third, to some extent, foreign born individuals tend to replace natives in criminal activities: this

[1] In the US, the awareness that immigrants could have lower crime rates than natives dates back to 1931, when the final report of the Wickersham Commission was made public.

[2] This was observed in the US since the beginning of the 20th century, but also applies to the cases of Australia (Francis, 1981), and everywhere in Western Europe, with only one notable exception: Sweden (see Martens, 1997).

is the so-called "substitution effect", well known in the sociology of crime and documented by Barbagli (2008). Finally, as put forward by Lynch and Simon (1999), there seems to be a general pattern in which "immigrant" countries have lower ratios of immigrant to native crime than nations with less liberal policies.[3]

Surprisingly enough, the relationship between immigration and crime has been rather neglected by economists. If Bianchi et al. (2008) and Butcher and Morrison Piehl (2005) are among the few who have employed econometric techniques to explore this issue, there is no theoretical model on the subject. This is particularly striking, since there exists a well developed economic literature on both crime and international migration.

In some cases, standard economic theories of crime, inspired by Becker (1968) and Ehrlich (1973) have been used to draw conclusions about the criminal behavior of immigrants. Basically, migrants are assumed to decide whether to engage in illegal activities once they arrive in destination countries. Since immigrants are characterized, for instance, by lower legitimate earning opportunities than native, this approach would predict that immigrants necessarily have a larger propensity to commit crime than natives. Such a result is somewhat at odds with empirical evidence. Moreover, such an analysis relies on an unsatisfactory hypothesis, since it implicitly assumes that all migrants leave as honest workers and eventually turn themselves to illegal activities, thus implying that illegal activities don't require any specific skill and missing the fact that many immigrants already had a criminal record in their home country and poorer countries may actually export criminals to richer countries. Instead, McCarthy and Hagan (1995, 2001) show that criminal success strongly depends on some specific competence, that they call "criminal capital".[4]

The objective of this paper is to propose a theoretical framework of analysis, through which we are able to account for most of the stylized fact mentioned above, and namely that: (i) immigrants might have (but do not have necessarily) higher crime rates than natives, (ii) second-generation immigrants commit more crime than natives, (iii) successive migration waves are characterized by growing crime rates, (iv) there can be a substitution effect between native and foreign-born criminals, and (v) more restrictive immigration policies might induce an adverse selection of immigrants. With respect to this results, we suggest possible causes of variations across countries and over time. Moreover, we build a

[3]Barbagli (2008) suggests that, after the early 70's, immigration policies became much more restrictive in Western Europe, and the propensity of immigrants to commit crimes has consequently increased.

[4]Also Abbott (1931a) reports many examples ...

very simple dynamic extension of the model, in order to understand the consequences of migration for the receiving country in the long-run (i.e. beyond second-generation immigrants).

To do that we add the possibility of migration to a predator/prey model in the fashion of Acemoglu (1997): agents make a career choice between working honestly and becoming criminals. Criminal rents derive basically from predation of income produced by honest workers. Equating workers' income and revenues from crime will determine the equilibrium fraction of agents involving in crime. Migration might be attractive for both criminals (who will find richer prey in a richer country) and workers (who expect to find higher wages, less crime and better institutions abroad). In first approximation we assume that career choices are irreversible (a honest worker cannot become a criminal after migration, and *vice versa*), and agents do no take the possibility of migration into account when deciding about their occupation. In this framework, we are able to identify the composition of the migration outflow, and find conditions under which the crime rate is higher among immigrants than among natives in the destination country. We will also see how immigrations policies can play a decisive role; in particular, restricting migration might determine a different composition of the migration inflow, leading to an adverse selection of immigrants.

If agents are able to internalize the migration prospect into their career choices, results might be different, thus explaining the different behavior of successive migration waves (that are better informed about migration chances). If instead career crossovers are possible, we show that some honest immigrants will have an incentive to become criminals and replace natives in illegal activities (as it happens in the real world).

Moreover, we slightly modify the model to analyze the behavior of second-generation immigrants. These agents are born in the foreign country but, since their parents are characterized by lower human capital than native parents, are more likely than their native peers to become criminals. Obviously, in this framework assimilation policies and redistribution are of crucial importance in reducing the social danger represented by the criminal involvement of second-generation immigrants. Finally, if we extend the analysis to further generations and consider that the current crime rate may affect the future quality of institutions (the extortion rate, for instance), we find an immigration-induced "crime" (poverty) trap may arise; however, such a trap might be circumvented relying on different policies (assimilation, immigration quotas, etc.).

The paper is then organized as follows. Section 2 presents and solves the basic model, compares the crime rates of immigrants and natives, and analyzes how different factors may affect the composition of immigration (with special attention to the role of immigration policy). The possibility of career crossovers and differences between successive migration waves is analyzed in Section 3. Section 4 explains the behavior of second-generation immigrants and its long-run implications. Finally, Section 5 concludes.

2 The basic model

We consider two countries, denoted by F and H. Migration, for reasons that will become clear very soon, takes place from H to F. In each country, agents (that we suppose to be all identical) make an endogenous career choice: they can either engage in a honest activity or become criminals; agents of the two types will be denoted by w and c, respectively.[5] Income from criminal activities comes from "predation" of honest workers.

2.1 Endogenous career choices

Consider country $j = H, F$, in autarky: migration, for the moment, is not allowed. When deciding about their future career, agents compare alternative occupations in terms of prospective income.

The prospective revenue of honest workers is given by:

$$\Pi_j^w = (1 - q_j)\lambda_j h_j, \tag{1}$$

where h_j is a parameter accounting for individual productivity (which can be assimilated to human capital, for instance), λ_j represent an economy wide kind of externality (i.e. the level of technology), while q_j is the fraction of income that is stolen away from honest workers by criminals (call it "extortion rate"). Both h and λ, as well as q, are country-specific and are assumed, for the time being, to be exogenous. The parameter q can be related to *institutional* factors: in fact, the extortion rate can be explained by the overall quality of institution, the effectiveness of police, etc.[6]

[5] Of course, heterogeneous earning abilities and different personal attitudes toward risky behaviors would play an important role, in determining career choices.

[6] Indeed, q can be endogenized. For instance, honest workers might invest some of their resources in private "protection", or pay taxes that can be devoted to finance public "protection" (police, etc.).

Prospective rents from crime are:

$$\Pi_j^c = b_j q_j \lambda_j h_j (1 - x_j), \tag{2}$$

where x_j is the share of agents involved in crime in the total population, which we normalize to 1. Notice that Π_j^c is a negative function of x_j: this formulation captures the idea that criminal activities are limited by a "crowding-in" effect; at the limit, if $x_j = 1$, criminal rents will be eroded down to zero, because there will not be any honest workers left and therefore no production to be stolen.[7] The parameter b_j accounts for all those variables like, for instance, the degree of organization of crime, which are susceptible of weakening the "crowding-in" effect.[8]

The (stable) equilibrium distribution of agents between criminal and honest activities $(x_j^*, 1 - x_j^*)$ can be determined solving $\Pi_j^w = \Pi_j^c(x_j)$. In particular, we obtain:

$$x_j^* = 1 - \frac{1 - q_j}{b_j q_j}, \tag{3}$$

and the situation is depicted in Figure 1.

This is a stark simplification of predator/prey models *à la* Acemoglu (1997).[9] In principle, Π_j^w should also be a decreasing function of x_j; however, to ensure the existence of a stable equilibrium, $\Pi_j^w(x_j)$ should be less steep than $\Pi_j^c(x_j)$, so that assuming an horizontal profile for the income of honest workers looks like a somewhat "cheap" assumption. Notice also that, for x_j^* to be strictly positive (so as to exclude the existence of completely "crime-free" economies), we need simply:

$$q_j > \frac{1}{1 + b_j}; \tag{4}$$

the above condition implies that the extortion rate and/or the degree of organization of crime are sufficiently high to motivate at least some criminal activity.

[7] It is important to underline that, if instead of $(1 - x_j)$ inside (2), we take $(1 - x_j)^\delta$ (with $\delta > 0$), our results would hold qualitatively unchanged. However, it would be not be possible to obtain as many analytical solutions as in the case of a linear functions. Results are available upon request.

[8] An easy and straightforward interpretation of b would be the number of honest workers that a criminal can handle at the same time. In this sense, it might depend on the quality of criminal organization in the destination country. Of course, it would also possible to believe that criminal organization is to some extent inherent to immigrant groups. Alternatively, b can be regarded as a measure of "ferocity" of criminals. In both cases, b would be also "importable", since it depends on the origin country of predators instead of depending on the country where predation takes place.

[9] See also Mehlum et al. (2003), or Mariani (2007).

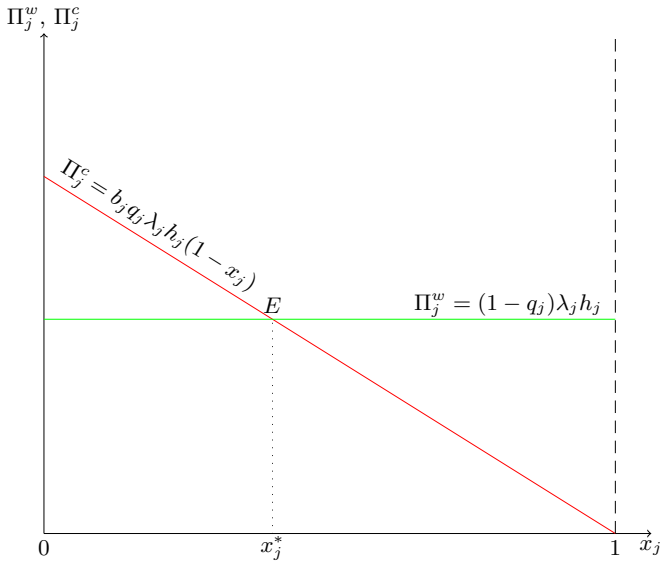


Figure 1: Endogenous career choice

2.2 Introducing migration

We assume that migration takes place after the career choice is made. For the moment, we also rule out the possibility of career-crossovers: for instance, honest workers cannot become criminals, even if a changing system of economic incentives would justify such a choice. We will remove this assumption later, to take into account the fact that honest migrants might be pushed to become criminals by economic convenience.

In this framework, migration can be motivated by cross-country differences in income, which are affected by the fundamental parameters we have introduced in the model. An important assumption we make is that $\lambda_F = \lambda > 1 = \lambda_H$, so that honest workers might be, *ceteris paribus*, more productive abroad. Abstracting from institutional parameters (like q) that affect net income, their gross productivity will be λ times higher in country F. This means that, even in absence of crime, honest workers would have some incentive to migrate from H to F.

Workers and criminals may also have different (fixed) migration costs, c^w and c^c.

Let us assume the following: $h_H = \eta h_F$, $h_F = 1$ and $c^w = c^c - \gamma = c - \gamma$, where $\eta > 0$ and $0 \leq \gamma \leq c$.

Clearly enough, the incentive to migrate for workers and criminal in country H might be quite different. Assuming that only an exogenously fixed fraction m of the population

of country H is allowed to emigrate, what we are interested in determining is the composition of the emigration flow from H to F, and namely $\hat{x}_M$ (that is the equilibrium share of criminals among migrants). Notice that we use $\hat{x}_M$ instead of x_M^* to underline the conceptual difference between the equilibrium *career* choice and the equilibrium *migration* choice of agents. Recall that, given our assumptions, the career choice comes first and do not take into account the possibility of migration.

In addition, for the sake of simplicity, we make the parsimonious assumption that $m < x_H$.

2.2.1 Workers

For honest workers residing in country H, the incentive to migrate (Ω^w) can be computed as the difference between the "after-predation" income they could obtain abroad, net of migration costs, and the one they would earn if they stay in their home country:

$$(1 - q_F)\lambda h_H - c^w - (1 - q_H)h_H, \tag{5}$$

that is

$$\Omega^w \equiv \eta(\lambda - 1)[1 - (q_F - q_H)] - (c - \gamma). \tag{6}$$

It should be noticed that Ω^w does not depend on the behaviour of other agents, be they honest or criminal, natives or immigrants.

2.2.2 Criminals

The prospective income of criminals, if they migrate, writes as:

$$b_F q_F \frac{[(1+m) - (x_F^* + m x_M)]}{(1+m)} \frac{[(1 - x_F^*)\lambda h_F + m(1 - x_M)\lambda h_H]}{[(1 - x_F^*) + m(1 - x_M)]}. \tag{7}$$

The first fraction in the above expression accounts for the crowding-in effect, once immigration is considered: the total population becomes $1 + m$, but the number of criminals grows up to $x_F^* + m x_M$. The second fraction is simply the *after-migration* average productivity of honest workers, thus allowing for the possibility that also immigrant workers are subject to predation.[10]

[10] In fact, data show that quite often, an important number of criminal acts performed by immigrants are directed towards other immigrants.

Expression (7) can be rewritten as:

$$b_F q_F \lambda \frac{[(1-x_F^*)+m\eta(1-x_M)]}{(1+m)}; \tag{8}$$

notice that, if $\eta < 1$, it depends negatively on m since, all other things being equal, more immigration will dilute average productivity and strengthen the crowding-in effect (that also explains why the income of criminal immigrants is decreasing in x_M).

If a criminal in country H decides not to migrate, he will earn:

$$b_H q_H h_H \frac{[(1-x_H^*)-m(1-x_M)]}{(1-m)}, \tag{9}$$

that is:

$$b_H q_H \eta \frac{[(1-x_H^*)-m(1-x_M)]}{(1-m)}. \tag{10}$$

The above expression is always increasing in x_M, and increasing in m if $x_M > x_H^*$: emigration leaves unaffected the income that is available for predation, but the crowding-in effect is weaker if relatively more criminals leave the country, thus raising criminal rents in H.

Given (8) and (10), the incentive to migrate for criminals is:

$$b_F q_F \lambda \frac{[(1-x_F^*)+m\eta(1-x_M)]}{(1+m)} - b_H q_H \eta \frac{[(1-x_H^*)-m(1-x_M)]}{(1-m)} - c, \tag{11}$$

that is, once we replace x_F^* and x_H^*:

$$\Omega^c(x_M) \equiv -c + \frac{\lambda(1-m)-\eta(1+m)}{(1-m^2)} - \frac{\lambda[1-mb_F\eta(1-x_M)]q_F}{(1+m)} + \frac{\eta[1+mb_H(1-x_M)]q_H}{(1-m)}; \tag{12}$$

it is important to notice that the coefficient of x_M is always negative, being equal to:

$$-\left(\frac{\lambda b_F q_F}{1+m} + \frac{b_H q_H}{1-m}\right)\eta m.$$

2.2.3 Composition of the migration outflow

Equating Ω^w and $\Omega^c(x_M)$, we obtain:

$$\hat{x}_M = \frac{m(1+m)(1+b_H)q_H\eta - (1-m)\{1-[1+m(1+b_F)]\eta\}q_F\lambda + (1-m)\lambda - m(1+m)\eta - (1-m^2)(\eta\lambda+\gamma)}{m[(1-m)b_F q_F\lambda + (1+m)b_H q_H]\eta} \tag{13}$$

which describes the equilibrium composition of the migration flow from country H to country F, as it can be seen from Figure 2.

It can be shown (see Appendix) that: $\partial\hat{x}_M/\partial\gamma < 0$, $\partial\hat{x}_M/\partial q_F > 0$, $\partial\hat{x}_M/\partial b_F > 0$, $\partial\hat{x}_M/\partial q_H > 0$ and $\partial\hat{x}_M/\partial b_H > 0$.

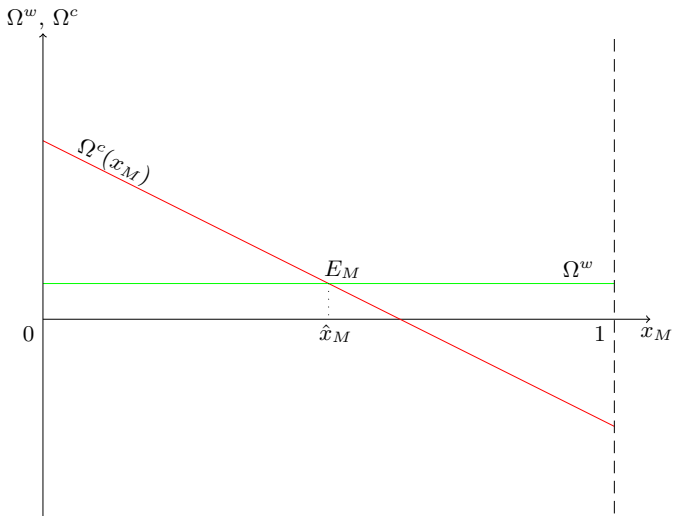


Figure 2: Composition of the migration outflow

Quite trivially, $\hat{x}_M$ depends positively on γ because of the increasing migration cost for criminals. Moreover, it is positively affected by q_H and b_H since these two parameters increase the share of criminals in the sending country, thus expanding the total supply of criminal emigrants. Similarly, it increases in b_F and q_F because these two parameters describe the attractiveness of a criminal career in the foreign country.[11]

Moreover, $\partial\hat{x}_M/\partial\eta < 0$ if $\lambda > \overline{\lambda} \equiv (1+m)\gamma/(1-q_F)$, while $\partial\hat{x}_M/\partial\lambda < 0$ if $\eta > \overline{\eta}$, where

$$\overline{\eta} \equiv \frac{(1-q_F)b_H q_H + (1-m)\gamma b_F q_F}{(1+m)(1-q_F)b_H q_H - m(1-q_H)b_F q_F}.$$

The share of criminals in the migration outflow ($\hat{x}_M$) depends negatively on η, because if honest workers are characterized by a higher individual productivity, their incentive to migrate is consequently stronger (unless λ is very low). Symmetrically, $\hat{x}_M$ can be an increasing function of λ only if η is small enough: in such a case a higher λ, from the viewpoint of prospective migrants, raises criminal rents more than honest income (since criminal rents, unlike honest income, depend also on the productivity of natives).[12].

[11]Therefore, it can be claimed that the responsibility for importing criminals bears also on the shoulders of the receiving country: bad institutions or insufficient protection attract foreign-born criminals. Moreover, if native criminal organizations are pretty effective and well organized, they are also susceptible of "hiring" foreign criminals, in a sense.

[12]Otherwise said, if the human capital of migrants is relatively small (large), an increase in foreign productivity will raise (decrease) the relative returns of criminals, because criminal income depends also on native

Finally, let us define $\overline{\lambda'} \equiv \gamma/[(1-q)(1-\eta)]$; for $\lambda < \overline{\lambda'}$ the relation between m and $\hat{x}_M$ is positive while, for $\lambda > \overline{\lambda}$, it becomes non-monotonic: in this case, $\hat{x}_M$ would first decrease in m, and then increase.

Whether $\hat{x}_M$ is larger than x_F^* (i.e. if the crime rate is higher among immigrants than among natives) depends also on the values of the relevant parameters. For instance, it is possible to find threshold values $\tilde{\eta}$, $\tilde{\lambda}$, $\tilde{\gamma}$, $\tilde{b_F}$, $\tilde{q_F}$, $\tilde{b_H}$, $\tilde{q_H}$ and $\tilde{m}$, such that $\hat{x}_M = x_F^*$. Given that, we will have that $\hat{x}_M < x_F^*$ if $\gamma > \tilde{\gamma}$, $b_F < \tilde{b_F}$, $q_F < \tilde{q_F}$, etc.

In particular, we have:

$$\tilde{\gamma} = \frac{m(1+m)\eta[(1-q_F)b_H q_H - (1-q_H)b_F q_F] + (1-m)(1-\eta)\lambda(1-q_F)b_F q_F}{(1-m^2)b_F q_F}, \tag{14}$$

$$\tilde{\lambda} = \frac{(1+m)\{[(1-m)\gamma + m\eta(1-q_H)]b_F q_F - m\eta(1-q_F)b_H\}}{(1-m)(1-\eta)(1-q_F)b_F q_F}, \tag{15}$$

$$\tilde{\eta} = \frac{(1-m)[(1+m)\gamma - \lambda(1-q_F)]b_F q_F}{m(1+m)(1-q_F)b_H q_H - [m(1+m)(1-q_H) + (1-m)\lambda(1-q_F)]b_F q_F}, \tag{16}$$

and

$$\tilde{b_F} = \frac{m(1+m)\eta(1-q_F)b_H q_H}{q_F\{(1+m)[(1-m)\gamma + m\eta(1-q_F)] - (1-m)(1-\eta)\lambda(1-q_F)\}}. \tag{17}$$

It is worth underlining that, in this framework, the fact that immigrants are characterized by a lower earning ability (than natives) does not imply that they will be more involved in criminal activities, as conjectured by Beckerian models of criminal behaviour. In fact, here a larger λ (or a smaller q_F, a higher γ, etc.) can compensate for a low η. This is due to the fact that we assume the existence of crime-specific skills and accordingly consider migrants as being self-selected, on the basis of their career choice.

Finally, notice that having $\gamma > 0$ implies that workers pay a lower migration cost than criminals, while, of course, if $\gamma = 0$ migration is equally costly for the two types of migrants. The first case describes a situation where migration is mostly legal (or controlled by the receiving country), like it was in Western Europe before the early 70's, according to Barbagli's (2008) description. The latter fits better the case of illegal migration: if both honest and "bad" people are discouraged to enter the foreign country, at borders honest workers are basically treated as if they were criminal. In such a case, we may even think that the cost of migration becomes relatively lower for criminals, that are more used to exploit illegal emigration networks, etc.

productivity.

2.3 The role of immigration policy

Until now we have considered γ and m as being completely exogenous. Indeed, both these parameters might depend on the way the destination country manages its immigration policy. Let us, for instance, introduce a parameter, s, accounting for the degree of restrictiveness of immigration policy. A more restrictive immigration policy will have a double effect: (i) it will reduce m, i.e. the number of immigrants who reach the destination country, and (ii) it will reduce γ, i.e. the migration-cost differential between criminals and honest workers. As a matter of fact, as soon as migration is restricted, illegal immigration becomes more important (it accounts for a larger share in m), and it is quite reasonable that illegal emigration is relatively less costly for criminals. Both these effects are supported by existing papers, like Orrenius and Zavodny (2005), or Djajic (1999).

Therefore, we can write:

$$m = (1 - s)M, \tag{18}$$

and

$$\gamma = (1 - s)c, \tag{19}$$

where M is the potential supply of migrants, while c is the maximum cost differential between criminals and honest migrants. Clearly enough, for $m = 0$, we should have $\gamma = 0$, since migration would be completely illegal, so that honest workers and criminal would be treated as equal at the border (i.e. they face the same migration cost).

We could be interested - from the viewpoint of the destination country - in determining how s affects two different variables: $\hat{x}_M$ (the composition of the migration inflow) and $N_M \equiv \hat{x}_M(1 - s)M$ (the total number of foreign-born criminals). Both these variable might be related to an hypothetical social welfare function in country F.

To this purpose, and for ease of presentation, we set $b_F = b_H = b$, $q_F = q_H = q$ and $\eta = 1$, so that migration dynamics are driven only by $\lambda > 1$ and $\gamma > 0$.[13]

We obtain that:

$$\frac{\partial \hat{x}_M(s)}{\partial s} = \frac{c\{(\lambda - 1) + M(1 - s)[M(1 - s)(\lambda - 1) - 2(\lambda + 1)]\}}{[1 - M(1 - s)(\lambda - 1) + \lambda]^2 bq} \tag{20}$$

[13]However, it should be noticed that, under these parametric restrictions, we would have $\overline{\lambda'} = +\infty$ and therefore $\partial \hat{x}_M / \partial m > 0$.

and

$$\frac{\partial N_M(s)}{\partial s} = \frac{M[1-q_F(1+b_F)][1-M(1-s)(\lambda-1)+\lambda]^2 - c[(\lambda+1)+M^2(1-s)^2](2M-3)}{[1-M(1-s)(\lambda-1)+\lambda]^2 bq}, \tag{21}$$

respectively.

In particular, we can identify the following values of s:

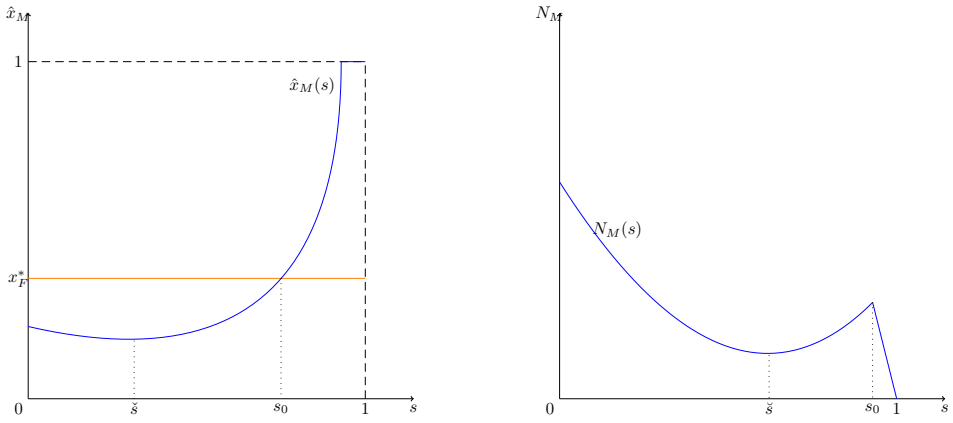
$$\check{s} = 1 - \frac{1}{M} - \frac{2}{M(\sqrt{\lambda}-1)} \tag{22}$$

and

$$\check{s} = ... \tag{23}$$

such that $\partial \hat{x}_M(s)/\partial s < 0$ (> 0) for $s < \check{s}$ $(> \check{s})$, and $\partial N_M(s)/\partial s < 0$ (> 0) for $s < \check{s}$ $(> \check{s})$. It can be also shown that $\check{s} < \check{s}$.

As it can be seen in Figure 3, restricting immigration policy is not always a good policy option if the objective is a reduction of crime. In particular, starting from $s = 0$, a tightening of immigration policy will be effective in reducing immigrant crime. However, a too restrictive policy might induce an adverse selection of immigrants (through larger illegal immigration).



(a) (b)

Figure 3: Effect of the immigration policy on $\hat{x}_M$, N_M

The underlying mechanism is supported by some empirical papers, which show how the incidence of illegal immigration is indeed positively related to the restrictiveness of quantitative immigration policies (Djajic, 1999), and that illegal immigration is adversely selected (Orrenius and Zavodny, 2005). Interestingly enough, the existence of an upward-sloping part in the relation linking immigration policy and foreign criminality is consistent with some empirical evidence: in fact, Lynch and Simon (1999), who consider a cross-section of OECD countries, find clues a positive relation between immigrants' involvement in crime and tightness of immigration policies.

Finally, it is worth noticing that we could have considered the more general formulation $m = (1 - s^{\phi})M$ (with $\phi > 0$), instead of the linear formulation in (19). Depending on the value of ϕ, our main results can somewhat change. However, we would always have an upward sloping portion in both $\hat{x}_M(s)$ and $N_M(s)$.[14]

3 Career crossovers (the "substitution" effect)

In this Section, we remove the assumption that the career choice is irreversible after migration. Of course, as soon as immigrants are allowed to change their sector of employment (from the legal to the illegal one, or vice versa), the same option should be made available to natives, who are consequently left free to re-formulate their career choice so as to react to changing economic conditions (determined by the arrival of immigrants).

We do not have empirical evidence in favor or against the hypothesis of career-crossovers. It is reasonable to believe that changing specialization is costly, but still possible for some individuals.[15] Therefore, it is not particularly interesting to determine the new after-migration equilibrium allocation of people between honest and criminal activities. It seems then preferable to check whether immigrants and/or natives have an economic incentive to change their activity.

For immigrants, the difference between criminal income and honest income can be obtained subtracting $(1 - q_F)\lambda\eta$ from (8). After replacing x_F with x_F^* and x_M with $\hat{x}_M$, we get:

$$\frac{\lambda\{[(1-m)\gamma + m\eta(1-q_H)]b_F q_F + [1-\eta(1+m)](1-q_F)b_H q_H\}}{(1-m)\lambda b_F q_F + (1+m)b_H q_H}. \tag{24}$$

[14] Results are available upon request.

[15] Just like legal activities, crime requires specialization and specific skills, that McCarthy and Hagan (1995, 2001) define as "criminal capital". Therefore, moving from one sector to the other might imply some costs.

A sufficient condition for the above expression to be positive is that $\eta < 1/(1+m)$. In such a case, if career crossovers are possible, there will exist an incentive, for some immigrants, to give up their honest activity and engage in a criminal career.

Conversely, the arrival of immigrants alters the structure of relative returns for natives. In presence of immigration, the difference between honest and criminal earnings is given by $(1-q_F)\lambda$ minus (8), i.e.:

$$\frac{\lambda\{[(1-m)\gamma + m\eta(1-q_H) - (1-m)(1-\eta)\lambda(1-q_F)]b_F q_F - m(1-q_F)b_H q_H\}}{(1-m)\lambda b_F q_F + (1+m)b_H q_H}. \quad (25)$$

This expression can be positive, provided that $\eta < \breve{\eta}$, with

$$\breve{\eta} = \frac{(1-m)[\lambda(1-q_F) - \gamma]b_F q_F + m(1-q_F)b_H q_H}{[(1-m)\lambda(1-q_F) + m(1-q_H)]b_F q_F},$$

thus implying that, among native criminals, there would exist an incentive to turn to an honest income-earning activity.

This result is consistent with the hypothesis (well-known in the sociology of crime) of a "substitution effect" in illegal activities: as soon as immigration to a developed country takes place, and provided that immigrants are sufficiently less productive (educated) than natives, some native criminals will leave their place to formerly honest immigrants.

4 Further generations

The analysis of the criminal behavior of second-generation immigrants turns out to be very important, since - as we put forward in the Introduction - one of the few empirical regularities, which have been found in existing research on crime and immigration, concerns the strikingly high involvement of the children of foreign-born people in criminal activities. Among second generation immigrants, crime rates are higher than among natives, and much higher than they are among their parents.

4.1 Second generation ...

Our benchmark model can be slightly modified to address this issue. Suppose, in fact, that there are now i second-generation immigrants (children of foreign-born parents) and $(1-i)$ agents born from native parents. With respect to the basic model, and assuming that there is zero population growth (in both ethnic groups), we would have that: $i = m/(1+m)$. Our

second-generation immigrants will have to chose whether to become criminals or honest workers. The key assumption is that their ability to set up productive capital (be it human or physical) is lower than the that of natives. This might be due, for instance, to the relatively low skill level of their parents, through an inter-generational mechanism of human capital transmission. Alternatively, one could make the hypothesis that immigrants are discriminated on the credit market, so that for them borrowing money and setting up productive capital becomes more difficult. Whatever the case, their productivity would therefore be equal to σh, with $\sigma < 1$, whereas the prospective before-predation income of honest natives is h. The parameter σ lends itself to a straightforward interpretation: it could be seen, in fact, as a measure of the degree of assimilation of immigrants. Assimilation might in turn depend on several variables, ranging from cultural factors to any policy aimed at reducing inequality (through redistribution, public schooling, etc.). Notice also that here we drop country indexes, since our analysis is now focused exclusively on the destination country.

To sum up, the expected income of workers, of native and foreign origin, is given by:

$$\Pi^w \equiv (1-q)h \tag{26}$$

and

$$\Pi_I^w \equiv (1-q)\sigma h, \tag{27}$$

respectively.

The prospective income of a criminal, of native or foreign origin, is given by:

$$\Pi^c = \Pi_I^c \equiv bq[(1-x)(1-i)h + (1-x_I)i\sigma h]; \tag{28}$$

and, as it be easily seen, it depends on the average productivity of honest workers.

It is then clear that the prospective income of criminals does not depend on their ethnic origin, while working honestly pays better for natives (since $\sigma < 1$).

The endogenous career choice will be made in the usual way, comparing prospective incomes from alternative occupations. For instance, solving $\Pi_I^w = \Pi_I^c$ for x_I will give us the equilibrium share of criminals among second-generation immigrants, while $\Pi^w = \Pi^c$ can be used to find the equilibrium value of x. However, it should be noticed that now Π^c and Π_I^c depend both on both x and x_I, so that x_I^* and x^* should be in principle determined simultaneously, as a solution of the following system:

$$\begin{cases} \Pi^w = \Pi^c(x, x_I) \\ \Pi_I^w = \Pi_I^c(x, x_I) \end{cases}. \tag{29}$$

However, since it is clear that $\Pi^w \neq \Pi_I^w$, and namely $\Pi^w > \Pi_I^w$ since $\sigma < 1$, it is not possible to have, at the same time, $0 < x^* < 1$ and $0 < x_I^* < 1$. In fact, the equilibrium shares of criminals in the two ethnic groups are given by:

$$x^* = \max\left[0, \frac{(1-i)bq - (1-q)}{(1-i)bq}\right] \tag{30}$$

and

$$x_I^* = \min\left[\max\left[0, 1 - \frac{1-[1+(1-i)b]q}{ibq\sigma}\right], 1\right], \tag{31}$$

respectively.

Depending on the configuration of the parameters, four different situations may arise: (i) $x^* = 0$ and $x_I^* = 0$, (ii) $x^* = 0$ and $0 < x_I^* < 1$, (iii) $x^* = 0$ and $x_I^* = 1$, or (iv) $0 < x^* < 1$ and $x_I^* = 1$. In particular the role of the parameter q is illustrated by Figure 4, where $q' = \sigma/[(1-i)b + \sigma(1+bi)]$, $q'' = \sigma/[(1-i)b + \sigma]$ and $q''' = 1/[(1-i)b + 1]$.

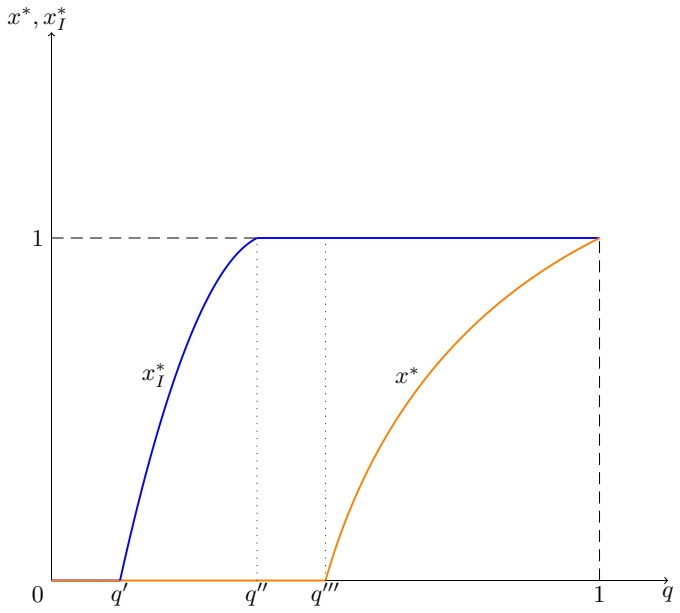


Figure 4: Second-generation immigrants and natives: involvement in crime

In any case, however, the crime rate among second-generation immigrants cannot be lower than among natives, consistent with empirical evidence.

4.2 ... and beyond

Let us now consider a dynamic extension of this model. Everything is based on the assumption that an intergenerational externality exists, linking the current prevalence of crime in the total population to the future quality of institutions (the extortion rate q_t), so that:

$$q_{t+1} = \min[a + \zeta[(1-i)x_t^* + i^x *_{I,t}], 1], \tag{32}$$

with $0 < a < 1$ and $0 < \zeta < 1$. Of course, here we are also assuming that immigrant do not mix with natives and the fertility is constant and equal to 1.

Given the above equation, we are able to derive a transition function $q_{t+1} = f(q_t)$, such that multiple equilibria may arise, as depicted in Figure 5.

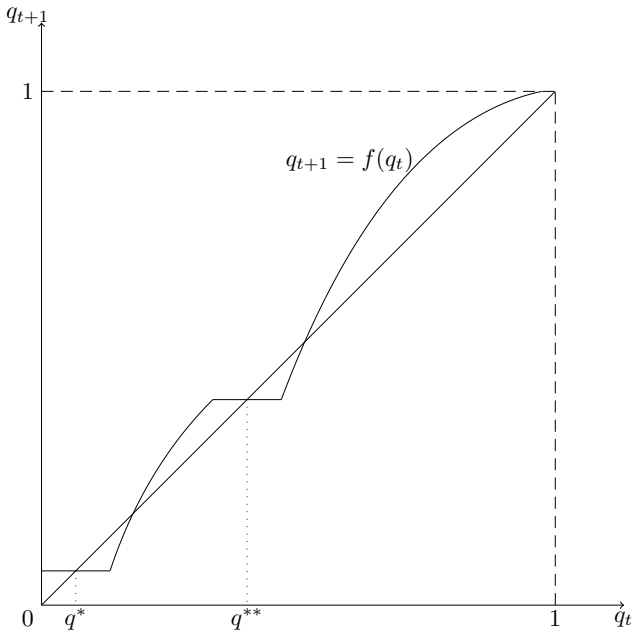


Figure 5: Dynamics of q

Once again, assimilation plays a crucial role. Even if there exists a second-generation problem, in the long-run migration does not affect q, unless a trap arises; however, this trap might be circumvented through a better assimilation policy ...

5 Conclusions

In this paper we have proposed a two-country model of immigration and crime. In the basic version of our model, migration occurs after that agents have already decided whether to become criminals or work honestly. Consequently, we have identified many factor that affect the composition of the migration flow. In particular, we have shown that the proportion of criminals needs not to be higher among migrants than among natives. In this framework, we have also derived conditions under which a more restrictive migration policy can lead to an increase in immigrant crime in the destination country. Allowing career crossovers after migration explains the so-called "substitution effect" in the crime sector, with immigrants replacing natives in predatory activities. Finally, a slightly modified version of our model can account for the particularly high crime rates of second-generation immigrants (which calls for careful assimilation policies by the governments of host countries), and lends itself to the analysis of the long-run consequences of immigration for the prevalence of crime in the destination country.

Our model could be profitably extended at least along two main directions. First, parameters like the extortion rated might be made endogenous. In particular, we may think that agents face a trade-off between setting up productive capacity (investing in human and/or physical capital) and defending themselves against criminal (such protection might be pursued privately or publicly provided). Such an extension would also have interesting dynamic implications. Second, since the model puts special emphasis on immigration policies, it would be particularly interesting to see, for instance, how the government in receiving countries could allocate resources between border enforcement and internal police activity, in order to reduce crime.

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A Effects of the parameters on $\hat{x}_M$.

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