DOCUMENT DE TRAVAIL DT/2019-14

# Immigration and crime: the role of self-selection and institutions

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# Immigration and crime: the role of self-selection and institutions*

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December 30, 2019

**Abstract**

Contrarily to popular perception, empirical evidence suggests that immigrants do not commit more crimes than natives, in spite of having lower legitimate earning opportunities. To make sense of this, we propose a novel theoretical framework based on a predator/prey model of crime, where endogenous migration decisions and career choices (between licit and illicit activities) are jointly determined. In this setting, we show that the involvement of migrants in crime crucially depends on self-selection into migration, as well as productivity and institutional quality in the host economy. We also find that stricter immigration policies may induce an adverse selection of migrants, and eventually attract more foreign-born criminals. Finally, a dynamic extension of our model can account for the higher crime rates of second-generation immigrants and, based on the interplay between crime and institutions, highlights the critical role of immigration and assimilation for the long-run evolution of crime and the rule-of-law in host countries.

*JEL classification:* F22; K42; O17.
*Keywords:* Migration; Crime.

## 1 Introduction

The concern about the propensity of immigrants to be involved in criminal activities is widespread and long-standing. Abbott (1931) and Van Vechten (1941) document that, already in the 19$^{\text{th}}$ and early 20$^{\text{th}}$-century United States, immigration was regarded as a massive inflow of potential criminals. More recent research, based on survey data, also highlights how frequent is the belief, in today's destination countries, that immigrants commit more crimes than natives and thus trigger

*We are thankful to Giuseppe De Arcangelis, Frédéric Docquier, Thierry Verdier, as well as seminar participants at Clemson University, LUISS and UCLouvain for useful comments and discussion. We also acknowledge the financial support of the Belgian French-Speaking Community (ARC Project 15/19-063). All errors are, of course, under our own responsibility.

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an overall increase in crime (Bauer, Lofstrom, and Zimmermann, 2000; Mayda, 2006). This idea is indeed consistent with the implications of the traditional economic theory of crime (Becker, 1968; Ehrlich, 1973), which suggests that immigrants are more likely than natives to engage in illicit activities because they typically expect lower relative net returns from legitimate activities, as a consequence of their socio-demographic characteristics and possible discrimination on legal labor markets. Assessing whether these popular perceptions and theoretical predictions correspond to reality has been the objective of a large and still growing body of empirical literature. As we will document below, this literature strongly rejects the idea that immigration is crime-enhancing, by finding that immigration has either negligible or negative effects on the prevalence of criminal activities.

In this paper, we propose a novel theoretical framework to reconcile economic intuition with the data. Namely, we aim at understanding why immigrants may even commit less crime than natives, in spite of economic conditions that are more conducive to criminal behavior. Different from the existing literature, we analyze endogenous migration decisions and career choices (i.e. the decision to engage in legal *vs* illegal activities) within a single theoretical framework. Putting the spotlight on the decision to migrate – so far neglected by the theoretical literature – allows us to explore the consequences of self-selection (of honest *vs* criminal workers) into migration on the composition of emigration flows, and better understand the determinants of migrants' involvement in crime. In particular, if the career choice precedes the migration decision, better institutional conditions in the destination countries are key to explain why honest rather than criminal individuals are more likely to self-select into emigration. Our theory also allows to show that stricter immigration policies may induce adverse selection and eventually attract more immigrant criminals, while allowing migrants to update their career choice after migration generates a possible substitution effect with formerly honest immigrants replacing natives in illegal activities. Last, by taking into account the dynamic interplay between crime and institutions, we highlight the crucial role of immigration, assimilation and redistributive policies for crime reduction.

### 1.1 Literature review

Let us start by summarizing the results of the vast empirical literature on migration and crime, which typically aims at detecting a difference in criminal behaviors between migrants and natives,

or an effect of immigration intensity on the prevalence of crime. The findings of this literature are somehow difficult to reconcile with existing theories of crime, and thus provide the main motivation for our paper.

The results of a first set of studies, relying on administrative or survey data at the individual level (such as Borowski and Derrick (1994), Albrecht (1997), Butcher and Piehl (1998) and Hagan and Palloni (1999)), either point to no difference in criminal behavior between native and foreign-born individuals, or even to a lower participation of migrants into criminal activities, especially once socio-demographic characteristics are accounted for.[1] In particular, by taking advantage of a nationally representative survey of the UK, Papadopoulos (2014) shows how, after controlling for the underreporting of criminal behaviors and for basic demographics characteristics, immigrants are significantly less involved in property crime than natives.

Also at odds with the crime-enhancing view of immigration, another set of studies in criminology emphasizes a negative relationship between immigration and crime prevalence across US localities. For instance, Reid et al. (2005) observe a negative correlation between immigration and homicide rate in 150 US localities in 2000, and no significant relationship with robbery, burglary and larceny. MacDonald, Hipp, and Gill (2013) and Lyons, Vélez, and Santoro (2013) both find a negative association between immigration in 2000 and the subsequent change in crime, respectively in the neighborhoods of Los Angeles and of 87 large US cities. Other researches (Ferraro, 2016; Ousey and Kubrin, 2009; Stowell et al., 2009; Martinez, Stowell, and Lee, 2010; Wadsworth, 2010) exploit panel data to detect a negative link between within-city or within-neighbourhood changes in immigration and in the prevalence of various types of crimes. In a meta-analysis of 51 papers published between 1994 and 2014, Ousey and Kubrin (2018) further show that the immigration – crime correlation in the US is overall small in size, but significantly negative.

Finally, a recent strand of empirical research exploits exogenous sources of variation in the intensity of migration to identify a causal effect of immigration on crime. Relying on shocks in the country of origin, Chalfin (2014) observes no impact of Mexican immigration on US criminality (with the exception of a modest increase in robberies in the case of Los Angeles), and Nunziata (2015) shows that immigration does not affect criminality in Europe. Exploiting emigration trends from the same countries of origin toward alternative destinations, Bianchi, Buonanno, and Pinotti

[1] Other studies emphasize the relatively low levels of incarceration of immigrants as compared to natives. See for instance Rumbaut et al. (2006), for a description of the US case.

(2012) find no effect of immigration on crime in Italian provinces, except a small positive effect on robberies. Other papers use instruments *à la* Card (2001), based on the locational choice of previous migrants, and mostly report a null impact of immigration on crime for the US (Spenkuch, 2013), Germany (Maghularia and Übelmesser, 2019) and the UK (Jaitman and Machin, 2013; Bell and Machin, 2013; Bell, Fasani, and Machin, 2013).[2] Last, combining a Card-type instrument with the demographic conditions at origin, Ozden, Testaverde, and Wagner (2017) report a negative impact of immigration to Malaysia on violent crime, and no effect on property crime.

On the theoretical side, the most widely used framework to look at the immigration–crime nexus and interpret the available evidence is the standard economic theory of crime inspired by Becker (1968) and Ehrlich (1973). In this setting, agents decide whether to engage in crime by looking at the relative returns to illegal (as opposed to legal) activities. As hinted at above, since migrants are on average younger and less educated than natives, and more likely to suffer from skill depreciation and labor-market discrimination, they usually expect lower legal earning opportunities, which should make them more prone to engage in illegal activities.

This line of reasoning is at odds with the empirical evidence, unless one additionally assumes that migrants have a higher expected cost of crime, as they face a higher risk of being arrested (Sharp and Budd, 2005), punished and eventually deported (Smith, 1997; Butcher and Piehl, 2007). This could significantly reduce, from the migrants' viewpoint, the expected relative returns to crime and explain why they tend to shy away from criminal activities. In this perspective, Dai, Liu, and Xie (2013) obtain that immigration can have a crime-reducing effect in the short run if immigrants face higher costs of participation into criminal activities.[3] To the best of our knowledge, this is the only existing model that attempts to reconcile theory and evidence – but still overlooks the importance of endogenous migration decisions.

### 1.2 What we do

We propose an alternative model to explain why migrants may turn out to be less criminal than natives. Rather than just evaluating the differential costs and returns to legal *vs* criminal activities

[2] Bell, Fasani, and Machin (2013) show that the economic migration inflow triggered by the EU enlargement in 2004 had no causal impact on crime in the UK. On the other hand, using the exogenous geographical allocation of asylum-seekers who arrived in the late 1990s/early 2000s, they find that the effect of this specific category of immigrants was null on violent crime, but slightly positive on property crime.

[3] Dai, Liu, and Xie (2013) show that, in the long run, crime rates can be further reduced through an additional mechanism related to endogenous skill-upgrading by natives.

for migrants and natives, we explore the role of self-selection in determining the crime rate of migrants. To do so, we depart from the existing literature by analyzing both the migration and the career decisions, within a single theoretical framework. We assume that the career choice precedes, rather than follows, the migration choice: if career choices are not easily reversible, accounting for self-selection into migration becomes central to understand migrants' involvement in crime. The imperfect reversibility of career choices is all the more plausible in our context as success in criminal activities has been shown to crucially depend upon the accumulation of specialized skills, i.e. the so-called criminal capital (McCarthy and Hagan, 1995).[4] In particular, there is extensive evidence that income earned out of illegal activities is significantly enhanced by experience, specialization, criminal social capital and tutelage.[5]

In a two-country setting, we combine migration decisions and a predator/prey model of crime, in which agents make a career choice between legal and criminal activities. Criminal rents derive from the predation of honestly-produced income, and the equilibrium crime rate results from equating the expected revenues of workers and criminals. Migration might then be attractive for both criminals, who can find "better" preys in a richer country, and workers, who expect to find in the destination country higher wages and more effective protection from crime. In this setting, along with individual characteristics driving self-selection into migration, aggregate factors such as institutional differences between countries (notably in terms of productivity or crime protection) concur to shape the criminal behavior of migrants.

In the benchmark model, where we assume that career choices are irreversible, we are able to identify conditions under which the share of criminals among immigrants in the destination country is higher or lower than among natives, and discuss the role of immigration policies. In particular, we show that stricter border enforcement may induce an adverse selection of immigrants and eventually attract more immigrant criminals. This result is consistent with the empirical evidence pointing to a positive correlation between the restrictiveness of immigration policy and the involvement of migrants in illegal activities (Lynch and Simon, 1999; Melossi, 2012), and cannot be explained by simply adding migration to Beckerian models of crime, i.e. without considering the process of self-selection into migration.

[4]Several scholars also suggest that crime-specific capital contributes to productivity in illegal activities more than education and physical capital (Grogger, 1998; Tremblay and Morselli, 2000).

[5]See for instance Matsueda et al. (1992), Viscusi (1986), Loughran et al. (2013), Uggen and Thompson (2003), McCarthy and Hagan (2001), Tremblay and Morselli (2000), Fagan (1994), Pezzin (1995), Morselli, Tremblay, and McCarthy (2006), Nguyen and Bouchard (2013).

We then develop two extensions of our model. First, we relax the irreversibility assumption and allow for career crossovers after migration. Some formerly honest immigrants may then take up criminal jobs and replace natives in illegal activities.[6] Second, we analyze the behavior of second-generation migrants and the joint long-run dynamics of crime and institutions. Consistent with the empirical findings of Albrecht (1997) for Germany and Morenoff and Astor (2006), Hagan, Levi, and Dinovitzer (2008) and Bucerius (2011) for the US, we show that second-generation migrants are more likely to become criminals than their parents. We also highlight that, if the current prevalence of crime affects future institutional quality, a migration-induced "crime trap" may emerge over time. These last results underline the critical importance of assimilation and redistribution policies to reduce crime and build up better institutions, in a dynamic perspective.

The rest of the paper is organized as follows. Section 2 presents and solves the benchmark model, compares the crime rates of immigrants and natives, and analyzes the individual and institutional determinants of migrants' criminality. Section 3 discusses immigration policies and their consequences on crime. The possibility of career crossovers is analyzed in Section 4. Section 5 explores the behavior of second-generation immigrants and presents the dynamic extension of the model. Section 6 concludes.

## 2 The basic model

We consider two countries, denoted by $D$ (destination) and $S$ (sending, or source). In each country, agents make a career choice: they can either engage in a honest activity or become criminals, whose income derives from "predation" of honest workers. The two resulting types of agents – workers and criminals – are denoted by $w$ and $c$, respectively. Within countries, individuals are assumed to be identical *ex ante*, i.e. before the career choice is made. This assumption is chiefly made for simplicity, although heterogeneous earning abilities and different personal attitudes (toward risk, for instance) certainly play an important role in determining career choices.

[6] The possibility of such a "substitution effect" is supported by Ruggiero (1996), and suggested by Bianchi, Buonanno, and Pinotti (2012) in their analysis of immigration and crime in Italy.

### 2.1 Endogenous career choices

Consider country $j = D, S$ in autarky, so that migration, for the moment, is not allowed. When deciding about their future career, agents evaluate their expected income from alternative occupations.

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 interpreted as human capital), $\lambda_j$ represents an economy-wide externality, while $q_j$ denotes the fraction of income that is stolen away from honest workers by criminals. Both $h$ and $\lambda$, as well as $q$, are assumed to be country-specific and, for the time being, exogenous. The parameter $q$ can be related to institutions, as it depends – in each country – on factors such as the effectiveness of law enforcement and the culture of legality.

Prospective rents from crime are

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

where $x_j$ is the proportion of agents involved in crime in the total population, which we normalize to 1. $\Pi_j^c$ is a negative function of $x_j$, thus implying that criminal activities are subject to a crowding-in effect: at the limit, if $x_j = 1$ criminal rents are reduced to zero, as there are no honest workers left and therefore no production to be stolen.

Our description of the interaction between workers and criminals is a simplified, reduced-form version of predator/prey models *à la* Acemoglu (1995).[7] The stable equilibrium distribution of agents between criminal and honest activities $(x_j^*, 1 - x_j^*)$ can be determined by equating prospective revenues from alternative occupation, i.e. solving $\Pi_j^w = \Pi_j^c(x_j)$, as depicted in Figure 1.[8] In

[7] As far as criminal rents are concerned, we choose a linearly decreasing function of $x$ for simplicity. Using $(1 - x_j)^\delta$ (with $\delta > 0$), instead of $(1 - x_j)$, would leave our main results qualitatively unchanged. Alternatively, one could have written $\Pi_j^c = q_j \lambda_j h_j (1 - x_j)/x_j$, thereby modeling the predator/prey interaction as a matching process, as in Mariani (2007). Here, we use a reduced-form representation of the interaction between criminals and honest workers, in order to keep the benchmark model as simple as possible, while preserving the fundamental feature that earning opportunities in illicit activities are subject to crowding-in.

[8] In principle, $\Pi_j^w$ could also be a decreasing function of $x_j$, so that a larger share of criminals translates into a smaller prospective revenue for honest workers. In such a setting, having $\Pi_j^w(x_j)$ flatter than $\Pi_j^c(x_j)$ would be enough to ensure the existence of a stable equilibrium.

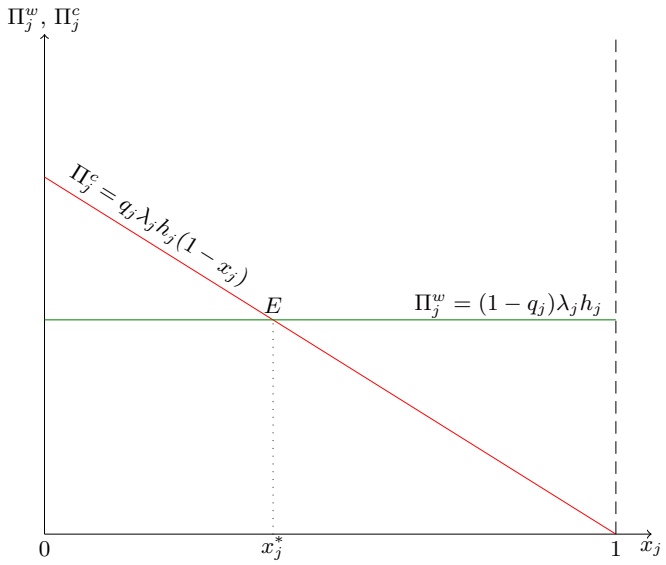



Figure 1: Endogenous career choice

particular, we obtain

$$x_j^* = 2 - \frac{1}{q_j}. \tag{3}$$

Note that for $x_j^*$ to be strictly positive but smaller than 1 (so as to exclude the existence of completely crime-free economies, while ensuring that there is a positive amount of production), we need to have $q_j \in (1/2, 1)$.[9]

## 2.2 Introducing migration

We assume that (i) migration takes place after individual productivity is set up and the career choice is made, and (ii) career crossovers are not possible so that, for instance, honest workers cannot become criminals after arriving in the destination country, even if they have the economic incentive to do so. The assumption of irreversible career choices will be relaxed in Section 4.

In this framework, migration is driven by cross-country differences in income, which are in turn affected by the fundamental parameters of the model. We assume that $\lambda_D = \lambda > 1 = \lambda_S$, so that honest workers are *ceteris paribus* more productive in the destination country. In particular, their gross productivity is $\lambda$ times higher in country $D$, thus meaning that even in the absence of crime, honest workers have an incentive to migrate from $S$ to $D$. We also consider that $h_D = h$

[9] Although not uncommon in the literature (see Mariani (2007), for instance), this assumption may look unrealistic. It might be mitigated by adding further structure to the model. One could assume, for instance, that within a matching framework, each criminal steals from several honest workers at the same time. We prefer, however, to preserve as much as possible the analytical parsimony of our framework.

and $h_S = \eta h$ (with $\eta, h > 0$), so as to allow for human-capital differentials across countries. As far as institutions are concerned, we have that $q_S = q$ and $q_D = \rho q$, with $q > 0$ and $\rho \in (0, 1)$, thus implying that country $D$ is better at enforcing the rule of law and protecting licit activities from predation.

In our setting, only an exogenously fixed fraction $m \in (0, 1)$ of the population of country $S$ is allowed to migrate to country $D$. Furthermore, workers and criminals are assumed to have different migration costs, with $c^w < c^c$: this reflects the idea that honest workers are more welcome in destination countries, which try to make the access of criminals more costly. In particular, we define $c^c = c$ and $c^w = c - \gamma$, with $\gamma \in (0, c)$.

Honest workers and criminals may have differential incentives to emigrate from country $S$, and we want to determine the composition of the emigration flow from $S$ to $D$. We then denote by $\hat{x}_M$ the equilibrium share of criminals among migrants, i.e. the crime rate that equalizes the incentive to migrate of honest workers and criminals born in $S$.[10]

### 2.2.1 Workers

For honest individuals residing in country $S$, the incentive to migrate $\Omega^w$ can be computed as the difference between the income they could obtain abroad, net of migration costs, and the one they would earn if they stay in their home country:

$$\Omega^w = ((1 - \rho q)\lambda - (1 - q))\eta h - (c - \gamma). \tag{4}$$

Note that, given the specific structure of our model, $\Omega^w$ does not depend on the behavior of other agents, be they honest or criminals, natives or immigrants.

### 2.2.2 Criminals

When computing the prospective income of criminals, we must take into account how they contribute – as migrants – to the crowding-in of the criminal market in the destination country. After migration, the total population of the $D$ economy becomes $1 + m$, but the number of criminals grows up to $x_D^* + m x_M$. In addition, the expected rents from crime in country $D$ are modified

[10] For what concerns notation, we use $\hat{x}_M$ instead of $x_M^*$ to underline the difference between the equilibrium *migration* choice and the equilibrium *career* choice of agents. Given our assumptions, the career choice is made before migration, by agents born in country $S$ who do not internalize the possibility of future migration to $D$.

by the arrival of immigrants engaging in licit activities, who are also subject to predation but are characterized by a different productivity. The prospective income of criminals who migrate from $S$ to $D$ can be thus written as

$$\rho q \frac{[(1+m)-(x_D^*+mx_M)]}{(1+m)} \frac{[(1-x_D^*)\lambda h + m(1-x_M)\lambda\eta h]}{[(1-x_D^*)+m(1-x_M)]}, \tag{5}$$

where the first fraction accounts for the crowding-in effect, while the second one is the after-migration average productivity of honest workers. Equation (5) can be simplified into

$$\frac{(1-x_D^*+m\eta(1-x_M))\rho q\lambda h}{1+m}. \tag{6}$$

The expected income of criminals who migrate is thus decreasing in $x_M$ and, for sufficiently low values of $\eta$, depends negatively on $m$. In fact, all other things being equal, more immigration will dilute average productivity and strengthen the crowding-in effect.

If a criminal based in country $S$ decides not to migrate, he will instead earn

$$\frac{(1-x_S^*-m(1-x_M))q\eta h}{1-m}. \tag{7}$$

The above expression is always increasing in $x_M$, and also increasing in $m$ if $x_M > x_S^*$: 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 $S$.

Given Equations (6) and (7), and after replacing $x_S^*$ and $x_D^*$ with the expressions implied by Equation (3), the incentive to migrate for criminals writes as

$$\Omega^c(x_M) = \frac{(1-\rho q(1-\eta m(1-x_M)))\lambda h}{1+m} - \frac{(1-q(1+m(1-x_M)))\eta h}{1-m} - c, \tag{8}$$

which is decreasing in $x_M$, thus reflecting the crowding-in effect of criminal migrants.

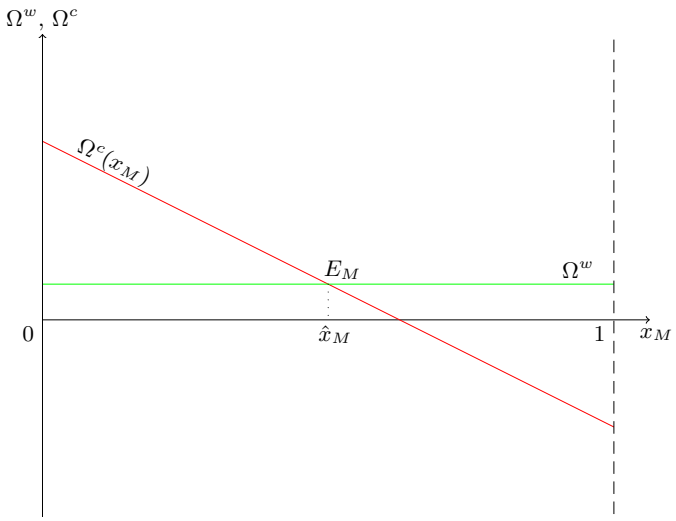



Figure 2: Composition of the migration outflow

## 2.3 Composition of the migration outflow

Equating $\Omega^w$ and $\Omega^c(x_M)$ and solving for $x_M$, we obtain

$$\hat{x}_M = \frac{((1-\eta)(1-\rho q)\lambda - (\eta+\lambda-2q\eta-(1+\eta)\lambda\rho q)m - (1-\lambda-2q(1-\lambda\rho))\eta m^2)h - \gamma(1-m^2)}{(1+m+(1-m)\lambda\rho)q\eta hm}, \tag{9}$$

which describes the equilibrium composition of the migration flow from country $S$ to country $D$, as represented in Figure 2.

We can now assess the role of (relative) human capital in determining the self-selection of migrants.

**Proposition 1** *The proportion of criminals among migrants is decreasing in $\eta$ and $h$. Moreover, the crime rate of immigrants may be lower than that of natives, even if the human capital of migrants is lower.*

**Proof.** The first part of the proposition follows directly from the inspection of the partial derivatives of $\hat{x}_M$ with respect to $\eta$ and $h$. As far as the second one is concerned, we need to find the value of $\eta$, which we denote $\overline{\eta}$, such that $\hat{x}_M = x_D^*$. We obtain

$$\overline{\eta} = \frac{(1-m)\rho((1+m)\gamma-(1-\rho q)\lambda h)}{(m(1+m)-(m(1+m)+(1-m)\lambda)\rho+(1-m)\lambda\rho^2 q)h},$$

which can be lower than 1. It can be shown, in particular, that $\overline{\eta} < 1$ if $\lambda > (1+m)\gamma/((1-\rho q)h)$.

■

The above Proposition reproduces a standard implication of Beckerian models of crime, namely that *ceteris paribus* higher returns to human capital (in productive activities) discourage criminal behavior. In particular, both a generalized increase in education (higher $h$) and convergence between countries (higher $\eta$) may contribute to reducing the participation of migrants into illegal activities.

Proposition 1 also establishes a new result that seems particularly relevant in light of the stylized facts discussed in the Introduction. The fact that immigrants are characterized by a lower earning ability (than natives) does not necessarily imply that they will be more involved in criminal activities, as conjectured by traditional models. This does not depend on migrants having an intrinsically different structure of incentives (as shaped, for instance, by the cost of crime), but rather on self-selection into emigration. If, for instance, the destination country has sufficiently better institutions ($\rho < 1$) or higher productivity ($\lambda > 1$) than the sending economy, this can make migration more attractive for honest workers and compensate for lower human capital ($\eta < 1$). As a consequence, the prevalence of crime among immigrants may be lower than the before-migration crime rate in the destination country, even if migrants have lower human capital than natives.

In order to derive additional results, we now introduce a simplifying assumption on the parameters of our model.

**Assumption 1** *We assume that* $\eta = 1 = h$.

The above assumption allows us to deal away with the role of human capital, which has already been highlighted by Proposition 1, and concentrate on the other parameters. Otherwise said, by setting $\eta = 1$, we want to understand how the various characteristics of the source and destination economies affect the crime rate of migrants, once we control for human capital. Further assuming $h = 1$ allows us to save on notation.

Under Assumption 1, the equilibrium crime rate of migrants can be rewritten as

$$\hat{x}_M = 2 - \frac{(1 + m + (1 - m)\lambda - \gamma m)m + \gamma}{(1 + m + (1 - m)\lambda\rho)qm}. \tag{10}$$

We can then claim the following Proposition, which summarizes the comparative statics of the model.

**Proposition 2** *Among migrants, the crime rate decreases with $\gamma$, and increases with $\rho$, $q$ and $m$. If $\rho$ is sufficiently small, $\hat{x}_M$ is also decreasing in $\lambda$.*

**Proof.** The results of the above Proposition follow from the inspection of the partial derivatives of $\hat{x}_M$. In particular, it can be checked that $\partial\hat{x}_M/\gamma < 0$, $\partial\hat{x}_M/\rho > 0$, $\partial\hat{x}_M/q > 0$ and $\partial\hat{x}_M/m > 0$. Moreover, $\partial\hat{x}_M/\lambda < 0$ if $\rho < m/(m + \gamma(1 - m))$. ■

Proposition 2 reveals that better institutions in country $D$ (in the absolute, or relative to country $S$, i.e. lower values of $q$ and $\rho$, respectively) or a better ability of the destination country to screen "good" migrants (higher $\gamma$) translate into lower crime rates among immigrants.[11] Moreover, in the presence of a sufficiently low predation rate in the destination country, a higher productivity results into a lower migrants' crime rate, by inducing a more favorable self-selection of migrants. Conversely, if $\rho$ is large enough, a higher $\lambda$, from the viewpoint of prospective migrants, raises criminal rents more than honest income at destination (since criminal rents, unlike honest income, depend also on the productivity of natives). As far as $m$ is concerned, an increase in total immigration worsens the composition of the immigrant group – all other things being equal.

# 3 The role of immigration policy

Until now we have considered $m$ as exogenous. In reality, managing immigration implies important policy tradeoffs, which may in particular affect the incentives to pursue a criminal career in the destination country.

## 3.1 Border *vs* law enforcement

Let us now build a simple extension of our model, in order to discuss a specific policy tradeoff: in the presence of a binding government budget constraint, a stricter border enforcement may weaken the destination country's capacity to contrast criminal activities.

We introduce a parameter $s \in (0, 1)$, accounting for the degree of restrictiveness of immigration policy. Intensifying border controls has a two-fold effect: on the one hand it can reduce $m$, the number of immigrants who reach the destination country; on the other hand, it requires to spend

[11] Therefore, it can be claimed that the receiving country is also partly responsible for the inflow of criminals, as bad institutions tend to attract foreign-born individuals specialized in illicit activities. Moreover, if native criminal organizations are pretty effective and well organized, they are also susceptible of hiring foreign criminals.

more in border patrolling, thus draining resources out of law enforcement, so that $\rho$ is likely to increase.

For simplicity, we choose a linear formulation, so that

$$m = (1 - s)M \tag{11}$$

and

$$\rho = \theta s, \tag{12}$$

where $M$ is the potential supply of migrants to country $D$, while $\theta \in (0, 1)$ accounts for the opportunity cost of a stricter immigration policy in terms of law enforcement.

From the viewpoint of the destination country, one may be interested 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 variables might be relevant for social welfare in country $D$.

For ease of presentation, we keep working under Assumption 1 and further set $\gamma = 0$.[12] Our main variable of interest thus becomes

$$\hat{x}_M = 2 - \frac{1 + \lambda + (1 - \lambda)(1 - s)M}{(1 + \theta\lambda s + (1 - s)(1 - \theta\lambda s)M)q}, \tag{13}$$

and the consequences of immigration policy for the criminal behavior of immigrants can be summarized as follows.

**Proposition 3** *There exist two threshold values $\theta_1$ and $\theta_2$, with $\theta_1 < \theta_2$, such that, for $s \in (0, 1)$:*

- *if $\theta < \theta_1$, $\hat{x}_M$ is decreasing with $s$,*
- *if $\theta_1 < \theta < \theta_2$, $\hat{x}_M$ is U-shaped in $s$,*
- *if $\theta > \theta_2$, $\hat{x}_M$ is increasing with $s$.*

*There also exists $\theta_1'$ such that if $\theta_1' < \theta < \theta_2$, then $N_M$ is also U-shaped in $s$. Furthermore, if we denote by $\check{s}$ and $\check{\check{s}}$ the values of $s$ which minimize $\hat{x}_M$ and $N_M$, respectively, we have that $\check{s} < \check{\check{s}}$, i.e. the minimum of $N_M$ is reached for a higher value of $s$ than the minimum of $\hat{x}_M$.*

[12] We will discuss the link between immigration policy and differential migration costs in Section 3.2.

**Proof.** See Appendix A. ■

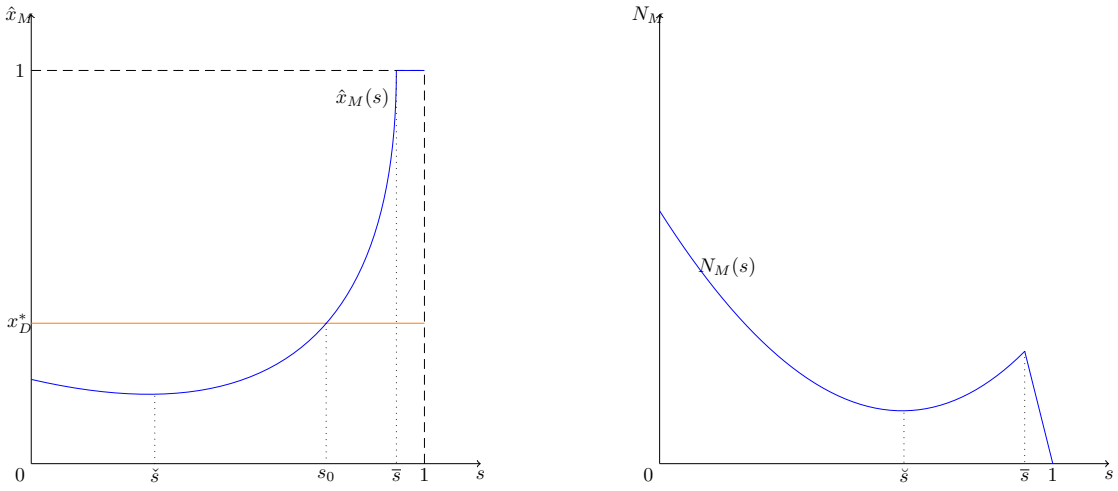
The above Proposition establishes that, unsurprisingly, when $\theta$ is very small, the opportunity cost of border enforcement is so low that any increase in $s$ will result into a lower crime rate of immigrants, given that – as stated in Proposition 2 – $\hat{x}_M$ is increasing in $m$. On the opposite, when $\theta$ is large, increasing $s$ will entrain a big increase in $q$, thus bringing about a more adverse self-selection of migrants. More interestingly, for intermediate values of $\theta$, both the crime rate of immigrants and the total number of "imported" criminals first decrease with $s$, but eventually increase if the immigration policy becomes too restrictive.

Therefore, as can be seen in Figure 3, restricting immigration is not always a good option if the policy-maker wants to achieve a reduction in crime rates. In particular, starting from low values of $s$, a tightening of immigration policy is effective in reducing immigrant crime, but a too restrictive policy (i.e. $s > \check{s}$) may induce an adverse selection of immigrants driven by worse institutions, i.e. a higher $\rho$. However, the policy-maker may choose to accept the increase in $\hat{x}_M$ (i.e. a worse composition of the migration inflow) associated with tougher border enforcement, if the corresponding decrease in $m$ brings about a reduction in the total number of foreign-born criminals – as would happen for $\check{s} < s < \check{s}$. In Figure 3, we also identify two more threshold values of $s$, denoted by $s_0$ and $\overline{s}$, respectively. As soon as $s > s_0$ immigrants necessarily have higher crime rates than natives, because of the increase in $\rho$ brought about by the toughening of immigration policies. If $s$ grows further and eventually reaches $\overline{s}$, all migrants are criminals.

### 3.2 Border enforcement and migration costs

There may be other consequences of a more restrictive immigration policy. Rather than increasing $\rho$, a higher $s$ may bring about a reduction in $\gamma$, the migration-cost differential between criminals and honest workers. As a matter of fact, as soon as migration is restricted, illegal immigration may account for a larger share of $m$, and it is quite reasonable to assume that illegal emigration is relatively cheaper for individuals who are already involved in illicit activities.[13] At the limit, when $s$ tends to 1, one would expect migration-cost differential to vanish ($\gamma = 0$), since migration

[13] On the link between immigration policies and the choice between illegal and legal emigration, see Djajić (1999) and Djajić and Vinogradova (2019). Camacho, Mariani, and Pensieroso (2017) also study the possible consequences of border enforcement for illegal immigration. As far as crime is concerned, the legal status of migrants may also become a key determinant of their likelihood to engage in illicit activities, once they have reached the destination country. In this respect, papers such as Mastrobuoni and Pinotti (2015), Pinotti (2017) and Fasani (2018) provide convincing causal evidence of a crime-reducing effect of legalization.




(a) (b)

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

would be completely illegal and honest workers and criminals are treated equally at the border.

Although we do not develop a formal analysis of this case, its implications are qualitatively the same as those presented in Proposition 3 and illustrated by Figure 3. In particular, beyond a certain threshold value of $s$, a stricter immigration policy may induce a negative self-selection of immigrants by raising the relative returns to migration for criminals.[14] The existence of an upward-sloping part in the relation linking immigration policy tightness and migrants' involvement in crime is also consistent with the empirical evidence provided by Lynch and Simon (1999), who find a positive correlation between immigrants' crime rate and the restrictiveness of immigration policies.[15]

# 4 Reversible career choices

Throughout Sections 2 and 3, we have considered career choices as irreversible: migrants who leave the sending economy as criminals or honest workers stick to their specific sector of activity

[14] Results are available upon request.

[15] In particular, Lynch and Simon (1999) contrast the so-called "immigrant nations", characterized by large inflows and low barriers to entry and naturalization, to "non-immigrant nations" where the volume of immigration and possibilities of entry, settlement and naturalization are restricted. They observe that "immigrant nations" have, on average, lower ratios of immigrant-to-native crime than nations with less liberal policies. The welfare effects of policies dealing with undocumented immigrants (namely, amnesties and deportations) are also studied by Machado (2017), which is however is not specifically concerned with the issue of crime.

in the destination country. In this Section, we remove this assumption and allow for occupation-switching after migration. 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 must be available to natives, who are consequently free to revise their career choice if economic incentives change (following, for instance, the arrival of immigrants).

Although we do not have empirical evidence in favor of or against the hypothesis of career crossovers, it is reasonable to believe that changing one's sector of specialization is costly, but still possible for some individuals.[16] Therefore, rather than determining the new after-migration equilibrium allocation of people between honest and criminal activities, we limit ourselves to checking whether immigrants and/or natives have an economic incentive to change their sector of occupation.

For immigrants, the difference between criminal and honest revenues can be obtained by subtracting $(1-\rho q)\lambda\eta h$, the revenue from honest activities in country $D$, from the returns to crime in $D$, as expressed by Equation (5). After replacing $x_D$ with $x_D^*$ and $x_M$ with $\hat{x}_M$, the net incentive of honest immigrants to join the criminal sector, under Assumption 1, can be written as

$$I^M = \frac{\lambda((\gamma + (1-\gamma)m)\rho - m)}{1 + m + (1-m)\lambda\rho}. \tag{14}$$

The arrival of immigrants also alters the structure of relative returns for natives. In the presence of immigration, it can be shown that the difference between criminal and honest earnings for natives (call it $I$) is also given by the expression in Equation (14), so that immigrants' and natives' incentives are aligned ($I = I^M$). We can then claim the following.

**Proposition 4** *Under Assumption 1, if institutions are sufficiently weak in the destination country, i.e. $\rho > m/(m + (1-m)\gamma)$, and career crossovers are possible, some formerly honest immigrants and/or natives take up criminal jobs.*

**Proof.** The condition on $\rho$ derives directly from $I^M > 0$, where $I^M$ is given by Equation (14). ■

The situation, from the viewpoint of immigrants, is illustrated by Figure 4. The equilibrium composition of the immigration flow $\hat{x}_M$ is obtained by equating incentives to migrate for different

[16] As discussed in the Introduction, 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 be costly. Although in the model we do not have any within-sector heterogeneity, one could also argue that in the real world, the cost of joining the legal or illegal sectors depends on the specific type of (criminal) job.

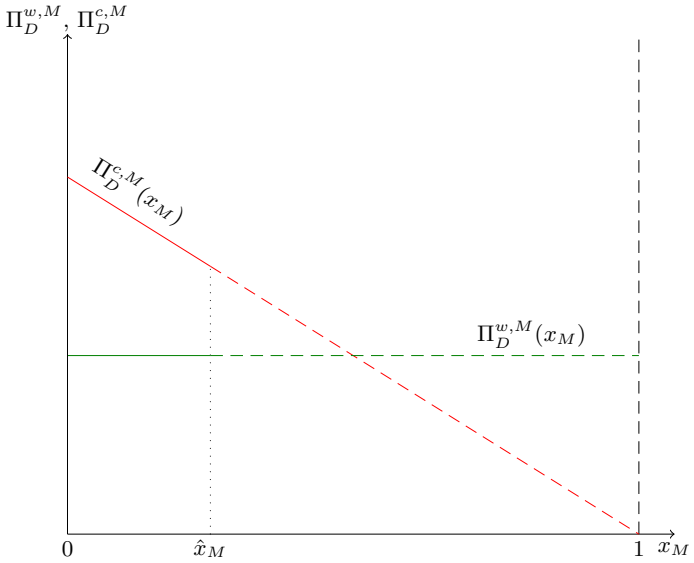



Figure 4: Career crossovers: migrants

types of agents born in country $S$ (as in Figure 2), and is given by Equation (10). It does not ensure, however, that honest and criminal revenues are equal in country $D$, after migration takes place. In particular, if $\rho$ is sufficiently large, prospective rents from crime are higher than actual honest earnings, for migrants (and natives).

The above results are obtained under Assumption 1, i.e. by imposing that $\eta = h = 1$. One may wonder, however, what happens if natives and migrants are characterized by differential abilities in honest jobs, i.e. $\eta \neq 1$. We thus relax our assumption on the parameter $\eta$, but still use $h = 1$ to save on notation.

In such a case, migrants' and natives' incentives are different ($I \neq I^M$). In fact, it can be shown that $I^M > 0$ if $\eta < \eta_1$, where

$$\eta_1 = \frac{1 - \rho q + (1 - m)\gamma\rho}{1 - \rho q + m(1 - \rho)}, \tag{15}$$

while $I < 0$ if $\eta < \eta_2$, where

$$\eta_2 = \frac{m + (\lambda + m(\gamma - q - \lambda) - (1 - m)\lambda\rho q - \gamma)\rho}{(\lambda + m(1 - q - \lambda) - (1 - m)\lambda\rho q)\rho}. \tag{16}$$

We can therefore claim the following.

**Proposition 5** *For sufficiently low values of $\eta$, namely $\eta < \min(\eta_1, \eta_2)$, immigration induces*

*a substitution effect, with (some) migrants replacing natives in criminal activities and (some) natives switching from illicit to honest jobs.*

It is thus possible that, after migration, and provided that immigrants are sufficiently less productive (educated) than natives, some native criminals leave their place to formerly honest immigrants. This result is consistent with the hypothesis of a substitution effect in illegal activities, supported in particular by Ruggiero (1996). Bianchi, Buonanno, and Pinotti (2012) also suggest that such a substitution effect may lie behind the absence of impact of the size of the immigrant population on crime rate that they observe across Italian provinces.

# 5 Dynamics

In Section 4, we have seen how our model economy may behave after the arrival of a wave of migrants. We have restricted our attention, however, to one single generation (of migrants and natives). In this Section, we extend the analysis to further generations.

## 5.1 Second-generation migrants

We start by the analysis of the criminal behavior of second-generation immigrants. This is potentially important, since some existing research on crime and immigration (e.g. Albrecht (1997) and Rumbaut et al. (2006), among others) has found a strikingly high involvement in criminal activities of the children of foreign-born people.

Our benchmark model can be slightly modified to address this issue. In particular, we focus on one migration wave only, and suppose that there are $i$ second-generation immigrants (children of foreign-born parents) and $(1-i)$ agents born from native parents, with $i \in (0,1)$. Assuming no population growth among both natives and migrants, we would have that: $i = m/(1+m)$.

Second-generation immigrants have to chose whether to become criminals or honest workers. The key assumption is that their ability to set up productive capital is lower than that of the children of natives. Although not modeled explicitly, this may be due to the relatively low skill level of their parents (through the inter-generational transmission of human capital) or related to some discrimination on the credit and/or the labor market. We set the productivity of second-generation immigrants equal to $\sigma h$, with $\sigma \in (0,1)$, whereas that of the children of natives is $h$. The parameter $\sigma$ lends itself to a straightforward interpretation: it could be seen, in fact, as a measure

of the degree of assimilation of immigrants, which might in turn depend on several variables not modeled here, ranging from cultural factors to any policy aimed at reducing discrimination and inequality (through redistribution, public schooling, etc.). For simplicity, here we also drop country indexes and parameters $\rho$ and $\lambda$, since our analysis is now focused exclusively on the destination country.

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

$$\Pi^w = (1-q)h \tag{17}$$

and

$$\Pi^w_I = (1-q)\sigma h, \tag{18}$$

respectively.

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

$$\Pi^c = \Pi^c_I = q[(1-x)(1-i)h + (1-x_I)i\sigma h], \tag{19}$$

and depends on the average productivity of honest workers.

It follows that the prospective income of criminals does not depend on their own origin, while working honestly pays better for natives.

The endogenous career choice is made in the usual fashion, by comparing prospective incomes from alternative occupations. For instance, solving $\Pi^w_I = \Pi^c_I$ for $x_I$ yields the equilibrium share of criminals among second-generation immigrants ($x^*_I$), while $\Pi^w = \Pi^c$ can be used to find the equilibrium value of $x$. Note, however, that $\Pi^c$ and $\Pi^c_I$ depend on both $x$ and $x_I$, so that $x^*_I$ and $x^*$ must be determined simultaneously, as a solution of the following system:

$$\begin{cases} \Pi^w = \Pi^c(x, x_I) \\ \Pi^w_I = \Pi^c_I(x, x_I) \end{cases}. \tag{20}$$

Since $\Pi^w > \Pi^w_I$, it is not possible to have, at the same time, $0 < x^* < 1$ and $0 < x^*_I < 1$. In

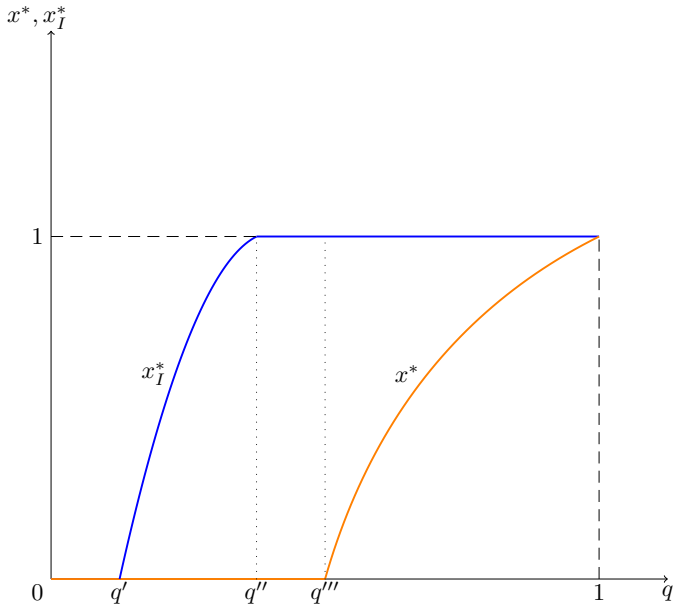



Figure 5: Second-generation immigrants and natives: differential involvement in crime

fact, the equilibrium shares of criminals in the two groups are given by

$$x^* = \max\left[0, \frac{(1-i)q - (1-q)}{(1-i)q}\right] \tag{21}$$

and

$$x_I^* = \min\left[\max\left[0, 1 - \frac{\sigma(1-q) - (1-i)q}{\sigma i q}\right], 1\right], \tag{22}$$

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 $x_I^* = 1$. The role of $q$ is illustrated by Figure 5, where $q' = \sigma/[(1-i)+\sigma(1+i)]$, $q'' = \sigma/(1-i+\sigma)$ and $q''' = 1/(2-i)$.[17]

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

[17] In particular, $q'$, $q''$ and $q'''$ respectively solve $\left(1 - \frac{\sigma(1-q)-(1-i)q}{\sigma i q}\right) = 0$, $\left(1 - \frac{\sigma(1-q)-(1-i)q}{\sigma i q}\right) = 1$ and $\left(\frac{(1-i)q-(1-q)}{(1-i)q}\right) = 0$.

### 5.2 Long-run dynamics

Let us now go beyond the second generation. We assume that the dynamic evolution of our economy – over a discrete-time, infinite horizon - is driven by an intergenerational externality, linking the current prevalence of crime in the total population, as determined by $x_t^*$ and $x_{I,t}^*$, to the future quality of institutions, i.e. the extortion rate $q_{t+1}$. In particular, we consider the following dynamic equation:

$$q_{t+1} = \min[a + \zeta[(1-i)x_t^*(q_t) + ix_{I,t}^*(q_t)], 1], \tag{23}$$

with $a, \zeta \in (0,1)$, while $x_t^*$ and $x_{I,t}^*$ are given by the time-indexed version of Equations (21) and (22), respectively. Here, we are also implicitly assuming that (i) different generations do not overlap with each other on legal and illegal labor markets, (ii) reproduction occurs asexually, and (iii) each agent's fertility is constant and equal to 1.

The transition function in Equation (23), which we can summarize as $q_{t+1} = f(q_t)$, is piecewise due to the shape of $x_t^*$ and $x_{I,t}^*$, represented in Figure 5. As further depicted in Figure 6, the transition function $f(q_t)$ may give rise to multiple equilibria.

Multiple equilibria are in turn associated with the existence of a crime trap, based on the two-way relationship between the quality of institutions and the criminal behavior of immigrants. In particular, if first- or second-generation migrants have higher crime rates than natives (because of self-selection or discrimination, respectively), immigration can potentially drive the destination economy towards an inferior equilibrium, namely $q^{**}$ in Figure 6, characterized by a high crime rate and bad institutions.

This is, however, only a possibility, and the trap can be circumvented or eliminated, through a number of different policies. For instance, institutional reforms aimed at lowering $q_0$ may, by changing initial conditions, allow the economy to reach the equilibrium characterized by $q^*$ instead of $q^{**}$, in the long-run (without affecting the shape of the transition function in Figure 6). Alternatively, if initial conditions cannot be altered, the trap may be eliminated altogether by restricting immigration (lower $m$) or reducing discrimination and fostering assimilation (higher $\sigma$), as can be seen from the example in Figure 7. There, the transition function has been redrawn for a higher value of $\sigma$ than in Figure 6. As a consequence, there is a unique, stable steady-state

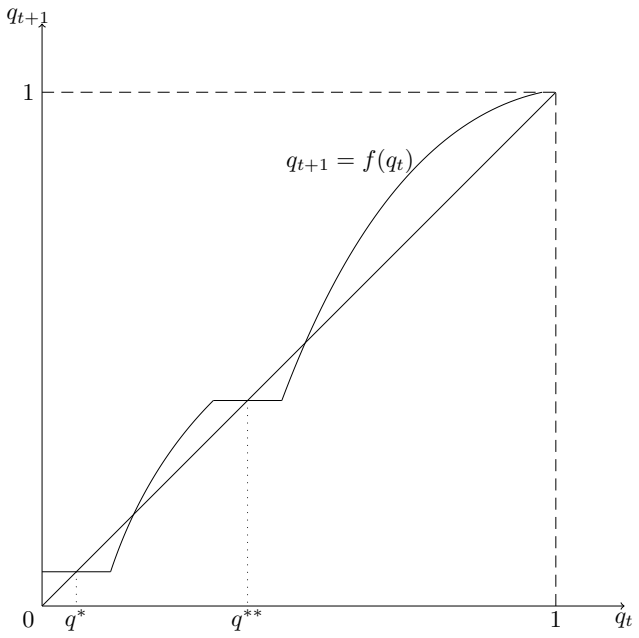



Figure 6: Dynamics of $q$

displaying good institutions ($q = q^*$) and a moderate crime rate.

# 6 Conclusions

In this paper, we have proposed a two-country model of immigration and crime. In the benchmark version of our theory, migration occurs after agents have decided whether to become criminals or to work honestly. In this setting, we discuss how individual and institutional factors, in both the sending and the destination economies, affect the composition of the migration inflow, i.e. the crime rate among migrants. We show that the proportion of criminals is not necessarily higher among migrants than among natives, even if the former are less educated. We also derive conditions under which a more restrictive immigration policy can drive an increase in the proportion of immigrant criminals. If we allow agents to revise their career choice after migration, our model can further generate the so-called "substitution effect" in the crime sector, with some formerly honest immigrants replacing natives in illicit activities. Finally, a dynamic extension of our model can also explain the higher crime rates of second-generation immigrants, and lends itself to the analysis of the long-run consequences of immigration for the prevalence of crime in the destination

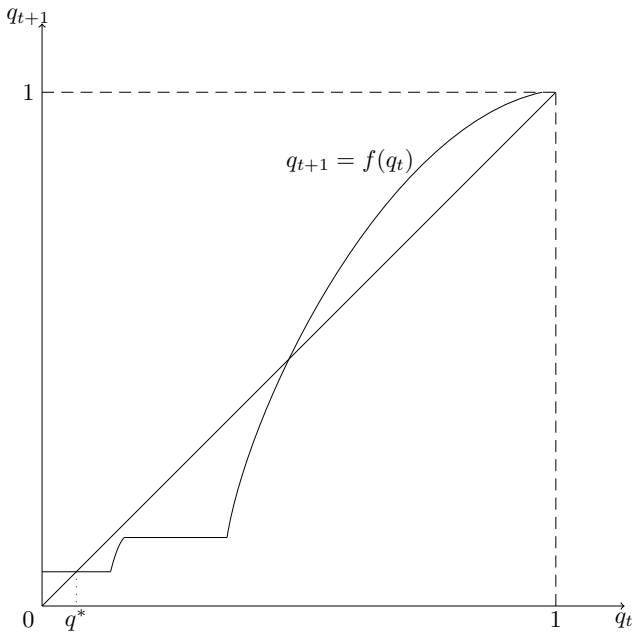



Figure 7: Dynamics: the role of policy

country, when crime and institutions interplay with each other. From the normative point of view, our dynamic analysis puts the spotlight on the long-run effects of immigration policies and other forms of public intervention that can affect the assimilation of migrants and the enforcement of the rule of law in destination countries.

Our theory must be regarded as a first attempt to go beyond the traditional Beckerian framework, by highlighting the role of self-selection into migration to better understand the interaction between immigration and crime. The model, which we have kept as simple as possible, could be extended along at least two directions. First, it would be instructive to see what happens if individuals fully internalize migration prospects when making their initial career choice. This could generate a number of additional findings, especially from the point of view of the sending economy, which may use its emigration policy as an instrument to reduce crime. The mechanism would be similar to that of the brain gain literature, according to which higher chances of emigration may induce a better skill composition of the workforce in the sending country – as put forward, for instance, by Beine, Docquier, and Rapoport (2001) and Docquier and Rapoport (2012). In a similar vein, Mariani, Mercier, and Verdier (2018) show that emigration may also benefit an

economy riddled with civil war, by strengthening the incentives of the groups in conflict to seek a peaceful agreement. Second, it would be interesting to allow agents to trade-off between setting up productive capacity (by investing in human capital) and protection (thus defending themselves against criminals). By considering private protection as a possible substitute to the institutional protection provided by the government, one could gain additional insight on the immigration – crime nexus, and check the robustness of the main theoretical results presented in this paper.

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# A Proof of Proposition 3

Consider $\hat{x}_M$ as given by Equation (13). By solving $\partial \hat{x}_M / \partial s = 0$, we find two roots, one of which is always negative. The other root is given by

$$\check{s} = 1 - \frac{\lambda + 1}{(\lambda - 1)M} + \frac{\sqrt{2\theta((\lambda + 1)\theta + (\lambda - 1)(1 - \theta)M)}}{(\lambda - 1)\theta M}.$$

It follows that $\hat{x}_M$ reaches a minimum when $s = \check{s}$, if $\lim_{s \to 1} \partial \hat{x}_M / \partial s > 0$ and $\lim_{s \to 0} \partial \hat{x}_M / \partial s < 0$. The first inequality is verified if

$$\theta > \theta_1 \equiv \frac{2M}{1 + \lambda + 2M},$$

while the second one holds if

$$\theta < \theta_2 \equiv \frac{2M}{1 + (\lambda - 1)M^2 + \lambda(1 - 2M)}.$$

Therefore, if $\theta_1 < \theta < \theta_2$, $\hat{x}_M$ is U-shaped in $s$, and $\check{s} \in (0, 1)$. If $\theta < \theta_1$, $\hat{x}_M$ is decreasing with $s$ when $s \in (0, 1)$. If instead $\theta > \theta_2$, $\hat{x}_M$ is increasing with $s$ when $s \in (0, 1)$.

Let us now restrict our attention to $\theta \in (\theta_1, \theta_2)$. Given that $N_M = m\hat{x}_M$ and $m = (1 - s)M$, it automatically follows that the minimum of $N_M$ will be reached for a higher value of $s$, denoted by $\check{s}$, which falls in the $(0, 1)$ interval if $\lim_{s \to 1} \partial N_M / \partial s > 0$. Such inequality is satisfied if

$$\theta > \theta_1' \equiv \frac{1 - 2q + \lambda}{2q\lambda}.$$