



Department of Economics and Management

DEM Working Paper Series

Organized Crime and Human Capital

Mustafa Caglayan
(Heriot-Watt University)

Alessandro Flamini
(Università di Pavia)

Babak Jahanshahi
(Università di Pavia)

143 (10-17)

Via San Felice, 5
I-27100 Pavia

<http://epmq.unipv.eu/site/home.html>

October 2017

Organized crime and Human Capital

Comments welcome.

Mustafa Caglayan* Alessandro Flamini[†] Babak Jahanshahi[‡]

First draft: February 15 2017. Current version: October 13, 2017

Abstract

Since 1980s, organized crime rooted in northern Italy with a new modality in its relation with the society: less violence and more illegal business. We study to what extent, if any, this social adaptation, dubbed *silent mafia*, to the highest productive area of the country, is interfering with human capital accumulation. We provide empirical evidence that in northern Italy provinces, the larger the presence of organized crime, the less human capital accumulation. This is due on the one hand to the relation between organized crime and entrepreneurs that reduces entrepreneurs' incentives to innovate, and thus leads to a fall in their demand for high-skilled labor. On the other hand to mafia's control of the territory that provides young people with examples of social elevator which reduce their incentives to acquire human capital.

*Heriot Watt University

[†]University of Pavia, alessandro.flamini@unipv.it. Part of this paper was written while Alessandro Flamini was visiting the Department of Economics at Harvard University, whose kind hospitality is gratefully acknowledged. We are indebted to Alberto Alesina for support and useful discussions. We also benefited from useful discussions with Philippe Aghion, May Chiabrera, Giuseppe De Feo, Lorenzo Frigerio, Claudia Goldin, Lawrence Katz, Luigi Zingales and seminar participants at the 2017 EEA Congress.

[‡]University of Pavia

1 Introduction

A distinctive feature of any society is its ability to accumulate human capital. A distinctive feature of organized crime is its ability to develop structural relations with the society. Can organized crime adversely affect human capital via its interaction with the society? This is an important issue, as researchers have shown that both the initial level and the changes in human capital are instrumental in economic growth and societal welfare.¹

We address this question looking at northern Italy, the most developed part of the country. In particular, we study empirically with the IV method the relation between human capital (university graduates) and mafia captured by the [Caglayan et al. \(2017\)](#) index, which is in line with the investigation approach of specialized antimafia prosecutors in Italy.

The main contribution of this work lies in finding empirical evidence that the presence of organized crime depressed human capital accumulation in northern Italy. Such a finding is both economically and politically important. Indeed, it suggests that a region or a country which is initially wealthy, innovative and prosperous, can experience a fall in human capital once organized crime groups are allowed to spread their roots changing the structure of the industry and worming the fabric of the society.

A study which is closely related to ours is that of [Coniglio et al. \(2010\)](#), which has examined data from Calabria, a south Italy region. This study has focused on the question whether *'ndrangheta* along with Sicilian mafia had any effects on individuals' economic incentives to invest in their own education to increase their future income. [Coniglio et al. \(2010\)](#) show that in areas where organized crime is present there is a negative incentive to acquiring education and those who can migrate will do. There are certain differences between our examination and theirs. Their study draws conclusions based on an area with little industrial development to start with. In contrast, we examine the wealthiest and most developed part of the country. This helps to disentangle the causal relation from organized crime to human capital from its reverse. Indeed, one often invoked argument to explain the presence of organized crime in south Italy is the fact that it is less developed than the north and therefore endowed with less human capital. Also, several researchers have shown that there are regional differences in trust between the South and the North in Italy². Furthermore, recent judicial investigations and sentences in northern Italy like *Infinito* in Lombardy, *Minotauro* and *Albachiara* in Piedmont *Maglio* in Liguria and *Aemilia* in Emilia-Romagna have shown that organized crime in the northern provinces adapted to the more developed society of the north using little or no violence. This led to the definition in 2006 of a new

¹See for instance [Sunde and Vischer \(2015\)](#) and the references therein.

²See among others [Guiso et al. \(2004\)](#) and [Bigoni et al. \(2016\)](#).

type of Mafia by merit judges in Milan running the investigations, i.e. *silent mafia*. This is a structural difference with southern areas where organized crime groups operate with vicious tactics.

It should also be noted that the migration channel which could help explain why human capital falls in presence of organized crime in the south may be less relevant in the north. Here, in fact, except for moving out of the country, migration for someone who has the potential to acquire high-skills is not really an option.³

Regarding the methodology, our identification strategy is based on the Instrumental Variables method. In particular, by exploiting a natural experiment occurred in Italy known as forced resettlement, we instrument mafia with high-ranking bosses that were sent to northern provinces by judicial authorities during the 1956-1990 period.

To estimate our model, we adopt two different approaches while we consider for both exogeneity and endogeneity of our explanatory variables. We start our investigation using the ordinary least squares method (OLS). Given our dependent variable is a ratio, we then resort to using the fractional probit model and employ the generalized linear model method (GLM), as suggested in [Papke and Wooldridge \(2008\)](#). Both OLS based and GLM based estimates show that organized crime has a negative effect on university graduates. The inclusion of control variables does not affect the result that organized crime adversely affects human capital confirming its robustness.

But why does mafia hamper human capital? We claim that two important channels through which this happens are the mafia's control of the territory and its adverse impact on technology.

As to the first, the control of the territory, mafia provides, particularly to young people, examples of social elevator that abstracts from advanced education. Thus, trying to team up with mafia can be interpreted as a shortcut to success. Instead, acquiring human capital can be a long and costly process that does not guarantee an adequate payoff.

The second channel works via the adverse impact of organized crime on technology ([Caglayan et al., 2017](#)). This occurs both at the inter-sector and the intra-sector level. As to the former, mafia alters the efficient allocation of resources by diverting scarce resources away from where they are more productive. As a result low productive industrial sectors expand relatively to high productive sectors and this adversely affects technological progress. As a consequence, an industrial fabric less intense in technology requires less human capital leading to a decline in societal incentive to accumulate human capital as the likelihood to

³While migrations from south to north did occur, migrations from north to elsewhere in Italy did not occur, and migrating from north out of the country requires more adaptation costs including learning different languages.

find a proper job after having invested in education is smaller.

Turning to the intra-sector level, the presence of mafia in a sector allows entrepreneurs to buy illegal goods, services and workforce which allow skipping the competition of the other entrepreneurs that do not relate with mafia. Less intra-sector competition leads to a lower need to innovate, which in turn causes a fall in the demand of high-skilled labor.

The rest of the paper is organized as follows. In section 2 we describe the transmission channels through which mafia hampers human capital. In section 3 we provide information on the data and the choice of the index used to capture the presence of organized crime in the northern area. Section 4 discusses the empirical model and identification strategy. Section 5 first presents the correlation between organized crime and human capital in the northern provinces, also offering a spatial visualization of this correlation at the individual province level. Then, it discusses the results of the OLS and GLM in the main estimates and the robustness analysis. Section 6 concludes.

2 Transmission channels from mafia to human capital

In this investigation, we conjecture that in environments where organized crime expands, an increasing part of the labor force will be diverted towards low-skill jobs as high-tech jobs will tend to be scarce and less promising in terms of expected payoff/effort ratio. To understand this conjecture it is worth looking at the supply side of the economy considering both workers and entrepreneurs.

Starting with the former, we can notice that today's workers are yesterday's students. And the students' decision to invest in education also depends on their assessment of the expected effort and payoff associated with education. Now, a leading activity run by mafia consists of controlling the territory. This activity provides, particularly to young people, examples of social elevator that do not require advanced education. Thus, trying to team up with mafia can be interpreted as a shortcut to success, while acquiring human capital can be a long and costly process that does not guarantee an adequate payoff.

Turning to entrepreneurs, it is useful to have both an intra-sector and an inter-sectors perspective.

At the intra-sector level, when mafia establishes in an area, entrepreneurs have the option to buy illegal services, goods and workforce from mafia to skip competition. This in turn slows down the entrepreneurs' need of innovations to survive and prosper. As a result, the demand for labor will tend to shift away from high-skill workers, key for the development of innovations, towards low-skill workers.

At the inter-sectors level, organized crime affects the sectors' availability of funding and

therefore the likelihood of entrepreneurial success associated with entering in each sector. For instance, commercial centres, restaurants or construction enterprises, which are low-tech and among the main activities controlled by or making business with organized crime ([Transcrime, 2013](#)), can easily grow due to easy access to illegal profits that need to be laundered. Growth of their sectors, as a consequence, would lead to an increased demand for low skill labor. Whereas, in environments where criminal organizations have spread their roots deeply in the fabric of the society and where trust is elusive, high-tech startups would not find it easy to survive rendering the demand for high-skill/high-quality labor to decline.⁴ To that end, [Meier et al. \(2016\)](#) provide evidence that mistrust and in-group favouritism can be sustained by informal institutions such as organized crime.⁵

These transmission channels thus motivate our conjecture that organized crime affects the fabric of the society reducing both the demand and supply for high-skill/high-quality labor and therefore human capital accumulation.

Accordingly, to test our conjecture, we focus on northern Italy. This area is the richest, the most productive area of the country (south Italy GDP is slightly larger than half of the North west GDP in per capita terms), and ranks highly above the median in the European Union. However, it turns out that there is a massive silent presence of organized crime in North Italy and, yet, public has realized this long after organized crime groups have spread their roots in this part of the country.

In fact, the establishment of organized crime in the North had been inadvertently facilitated by an interesting natural experiment known as forced resettlement that dates back to two laws issued in 1954 and 1965. Due to these laws, southern Italy courts exiled convicted high-ranking bosses suspected of belonging to a clans to the northern provinces⁶.

Surprisingly, this special legal arrangement of forced resettlement remained in force until 1990. Hence, for decades high-ranking bosses who de facto belonged to organized crime were sent to the northern provinces. We exploit this natural experiment to draw our identification strategy. Specifically, we instrument organized crime with the number of high-ranking bosses per capita exiled to northern provinces.

⁴Trust plays a critical role in achieving economic development and prosperity, [Algan and Cahuc \(2013\)](#).

⁵See for instance [Putnam et al. \(1994\)](#), [Knack and Keefer \(1997\)](#) and [Greif and Tabellini \(2010\)](#) who discuss the consequence of in-group favouritism on development.

⁶It is worth noting that the crime of 'mafia association' has been introduced in the Italian Penal code in 1982 with Article 416 bis

3 Data and organized crime index

To carry out our investigation, we assembled an annual dataset covering information from 46 provinces in the northern Italy.⁷ The choice to use data at the province level rather than at smaller type of municipality level is dictated by the necessity to gather sufficient information to characterize the presence of organized crime. Our dataset covers the period between 2005 and 2012 and contains three sets of variables. The first provides a proxy for the evolution of human capital in a province, specifically the university graduates per capita. The second set of variables captures the presence of organised crime. It includes a group of special crimes extracted from ISTAT⁸ which we use to build a mafia index as in [Caglayan et al. \(2017\)](#), exiled criminals data made available by Ministry of Interior, and specific arsons data provided by the National Fire Brigade (Corpo Nazionale dei Vigili del Fuoco). The third group contains the control variables made available by Istituto Tagliacarne (Infrastructure) and by Unioncamere (Value Added).

Before moving to the analysis, two remarks on the choice of the mafia index and the use of instrumental variables are in order. Regarding the first, the results of several mafia trials recently held in the north area have shown that organized crime adopted different modalities in the north to adapt to a different society. These modalities have been described with the name *silent mafia* and feature a particular expression of the intimidation method characterising mafia-type organisations, which avoids striking offences like murders and/or slaughters.⁹ Being a mutation of mafia borne to root and expand in the high-income and very productive north area, silent mafia skips the previous mafia indexes based on violent crimes traditionally committed by organized crime in the southern areas. For this reason, we decided to adopt the new mafia index in [Caglayan et al. \(2017\)](#) which tackles the problem by following the investigation standpoint of the National Anti-mafia Directorate, (DNA), and the District Anti-mafia Directorates, (DDAs), the judicial authorities that, respectively, coordinates and carry out anti-mafia investigations in Italy.¹⁰

4 Empirical Model and identification strategy

To examine the impact of organized crime on human capital accumulation, we estimate some variants of the following model:

⁷Provinces with a special administrative status along with provinces which did not exist yet when mafia criminals were exiled to the north are not in the dataset.

⁸They are crimes reported by the security force to judicial authorities.

⁹See sentence n. 436/2015 delivered by [Court of Cassation \(2015\)](#).

¹⁰For details of this index, see [Caglayan et al. \(2017\)](#).

$$H = \alpha + \beta_1 M + \beta_2 C + \epsilon \quad (1)$$

Here we focus on β_1 which measures the impact of the mafia index (M) on human capital (H).¹¹ The variable that proxies human capital is the university graduates per capita. In this model we expect to find that the coefficient associated with organized crime index, β_1 , will take a negative sign, as an increase in the activities of organized crime will shift the demand from high-skilled labor to low-skilled labor. This shift will ultimately reduce total human capital available to the nation.

As to the use of instrumental variables, we think that this approach is important in the current work where the endogeneity problem may affect the results due to the potential correlation between the explanatory variables and the disturbance term. Our identification strategy to describe the causal impact of organized crime on human capital is based on the episode of forced exile occurred since 1954 to 1990. During this period, courts in southern Italy convicted criminals suspected to belong to clans to forced internal exile mostly in the northern provinces. As a result, hundreds of high-profile members of mafia-type organizations were sent to the northern provinces. This natural experiment proved to be useful to instrument the organized crime variable. As in [Buonanno and Pazzona \(2014\)](#) and [Scognamiglio \(2015\)](#), we employ information on the *concentration* of exiled convicted criminals in each province. Specifically, we use as an instrument the number of convicted criminals per province population.

5 Results

We start the analysis by computing the correlation between organized crime and human capital. In line with the expectation, the correlation coefficient turns out to be negative and significant, its value equal to -0.29. We thus rely on visual inspection to obtain a general view on the correlation at the province level and on its heterogeneity. Figures 1-2 report a spatial visualization of our OC and human capital indexes. Figure 1 and 2 show that north west and north east tend to differ, specifically the north west area features higher organized crime presence and less per capita graduates than the north east one. Knowing that the north west is the part of the country with the highest GDP per capita, this finding comes to surprise as normally one expects that organized crime spreads more in areas which are less developed. Put it differently, the argument that organized crime is strong in southern Italy because it is a low-income area is inconsistent with what we observe here as to northern

¹¹The mafia index is a synthesis of several variables which are used by DNA (National Anti-mafia Directorate) in anti-mafia investigations.

Italy. It is also instructive to look at the Imperia province, in the north Liguria. This is an interesting case as it stands out as the province in which the inverse correlation between organized crime and human capital is the most severe reaching the value of -0.7.

We next move to estimating the relation at issue, assuming first that the explanatory variables are exogenous. For brevity, we focus on the coefficients of the organized crime index. Since the dependent variable of our model is a fraction, we estimate our relation mainly with the Fractional Probit Model. According to [Papke and Wooldridge \(2008\)](#) and to the best of our knowledge this is the most reliable estimation method when the dependent variable is a fraction. Nevertheless, we also estimate the relation using Ordinary Least Square (OLS), which is the most common method and provides a benchmark for our study. In each method we consider the possibility that organized crime index could be endogenous and we instrument the organized crime variable with the number of high-ranking bosses belonging to clans who faced forced exile to northern Italy provinces.

Table 2 presents the OLS parameters estimations with the robust standard errors for the exogenous and the endogenous cases. The coefficients of organized crime on total university graduates are negatively significant across all the specifications and this suggests that organized crime affects upper-tail education negatively. With the inclusion of control variables the coefficients remain negatively significant suggesting that our findings are robust. In addition, the first stage results are positive and significant which is in line with our expectation. The facts that first stage estimates deliver similar coefficients with and without control variables, and that first stage F-statistics are well above 10 ¹² suggest that our instrument is valid.

Moving to Table 3, we depart from OLS and adopt the Fractional Probit model. Table 2 also confirms that organized crime negatively impacts upper-tail education. When the control variables are included in the model, the coefficient estimates are very similar confirming the robustness of the claim. As to the first stage, the coefficient estimate is still significant and takes the expected sign.

We also report the coefficient on \hat{v}_2 to obtain the [Hausman \(1978\)](#) test for endogeneity and its robust standard errors (3 and 1.7 in endogenous regressions with and without control variables) provide a first evidence that the mafia index is endogenous.

It is worth noting that in tables 2-3 the coefficient estimation of the mafia index is always negative and significant, and that the values of the estimates are significantly different from each other when one compares the exogenous and endogenous cases. Along with the result of the Hausman test, all this is pointing at the presence of endogeneity. Thus, taking

¹²[Staiger and Stock \(1994\)](#) suggest that the F-statistic should be at least 10 so that the weak identification problem would not be a concern in a specification.

endogeneity into account matters to pin down the precise impact of organized crime on the accumulation of human capital.

In order to test the validity of our findings we undertake some robustness checks in the next section.

5.1 Robustness analysis

Tables 4 to 6 show the results of other experiments which assess the validity of our previous findings. First, in tables 4 and 5 we duplicate the same experiments undertaken in tables 2 and 3 after elimination of the synthetic provinces from the data set.¹³ The findings remain very similar to the previous experiments with the exception that the first stage t-statistics decrease slightly due to the decrease in the number of observations. Second, following some other scholars (e.g. Angrist and Lavy (1999), Angrist and Krueger (2001), Levitt (1996), Murray (2006), Acemoglu et al. (2001)) we provided some evidences in supporting the credibility of our instrument variable in table 6. According to Murray (2006) the reduced form regressions with the instrumental variables as the independent variable and the dependent variable of interest provide valuable information to check the intuition of the validity of the instrument. Table 6 provides the findings of such kind of reduced form regressions in which we regress the instrument variable on the dependent variable -i.e. per capita graduations in each province. Columns 1 and 2 indicate the specification with and without control variables and, panel A and B show the findings across model with and without synthetic provinces. All the coefficients are negatively significant suggesting that in line with our story the increase in the presence of organized crime contributes to the deterioration of human capital.

6 Conclusions

Several researchers have examined the determinants, costs and avoidance of organized crime. Several other researchers have shown that there are regional differences in terms of societal welfare between the South and North in Italy, where South suffered from organized crime since the 19th century. In this paper, differently from the previous literature, we examine whether organized crime affects the accumulation of human capital in a high-income

¹³Some nowadays provinces did not exist when south Italy courts adopted the institute of forced resettlement to exile mafia bosses to the north. In fact, the provinces of Lecco, Lodi, Rimini, Biella, Verbano-Cusio-Ossola were born in 1992, while the province of Monza e Brianza in 2004. The fact that these provinces did not exist during that period, however, does not mean that convicted bosses were not sent there. In other words, some leading gangsters were sent to municipalities that later on in 1992 or 2004 passed to new provinces. For this reason, we introduced synthetic provinces for the six provinces above that have the exact number of exiled high-ranking bosses that were sent there

area, north Italy. This is a key question as human capital stands out as one of the main drivers in achieving and maintaining high societal welfare levels. We conjecture that when organized crime becomes pervasive in an area, scarce resources will be diverted towards sectors that employ low-skill jobs. This shift ultimately will lead to a decline in human capital resulting in societal welfare losses in the long-run.

To investigate our conjecture, we examine data from the Northern provinces in Italy. There are two main reasons for this choice. Firstly, the Northern provinces are the richest, the most productive area of the country, and rank highly above the median in the European Union. Secondly, different from that in Southern provinces, organized crime in the North has been *silent*, as little or no violence was observed in the public domain. Hence, over a period of 30-40 years, organized crime groups were able to expand their roots in the North without much resistance from the wider public. In fact, the public realized what has happened long after the pervasive integration of organized crime into the fabric of the society and its industry.

The main result of this paper is that the presence of organized crime affects the human capital adversely. We explain this finding with two main transmission channels: the mafia's control of territory providing examples of social elevator that abstract from advanced education and the shift in scarce resources towards industrial sectors that do not require high levels of human capital.

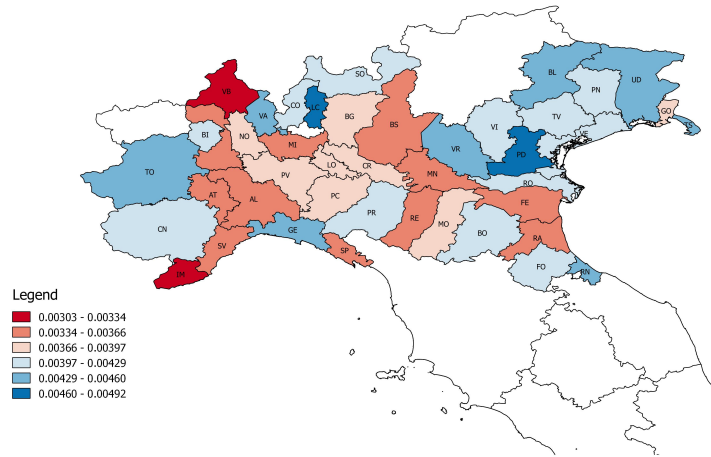
This result is important to both public and policy makers because it suggests that a region which was initially wealthy, innovative and prosperous, could experience a decline once organized crime finds an opportunity to expand there its roots. Although the decline may not be visible in the beginning, the changes will ultimately affect the long-run development and welfare the society.

References

- Acemoglu, D., S. Johnson, and J. A. Robinson (2001). The colonial origins of comparative development: An empirical investigation. *The American economic review* 91(5), 1369–1401.
- Algan, Y. and P. Cahuc (2013). Trust and growth. *Annu. Rev. Econ.* 5(1), 521–549.
- Angrist, J. and A. B. Krueger (2001). Instrumental variables and the search for identification: From supply and demand to natural experiments. *The journal of Economic Perspectives* 15(4), 69–85.
- Angrist, J. D. and V. Lavy (1999). Using maimonides’ rule to estimate the effect of class size on scholastic achievement. *The Quarterly Journal of Economics* 114(2), 533–575.
- Bigoni, M., S. Bortolotti, M. Casari, D. Gambetta, and F. Pancotto (2016). Amoral familism, social capital, or trust? the behavioural foundations of the italian north–south divide. *The Economic Journal* 126(594), 1318–1341.
- Buonanno, P. and M. Pazzona (2014). Migrating mafias. *Regional Sciences and Urban Economics* 44.
- Caglayan, M., A. Flamini, and B. Jahanshahi (2017). Organized crime and technology. Technical report, University of Pavia, Department of Economics and Management, DEM WP 136.
- Coniglio, N. D., G. Celi, C. Scagliusi, et al. (2010). Organized crime, migration and human capital formation: Evidence from the south of italy. *Dipartimento di Scienze Economiche e Metodi Matematici-Universitadi Bari*.
- Court of Cassation (2015). Sentence n. 436. *Sez. 2*.
- Greif, A. and G. Tabellini (2010). Cultural and institutional bifurcation: China and europe compared. *The American economic review* 100(2), 135–140.
- Guiso, L., P. Sapienza, and L. Zingales (2004). The role of social capital in financial development. *The American Economic Review* 94(3), 526–556.
- Hausman, J. A. (1978). Specification tests in econometrics. *Econometrica: Journal of the Econometric Society*, 1251–1271.

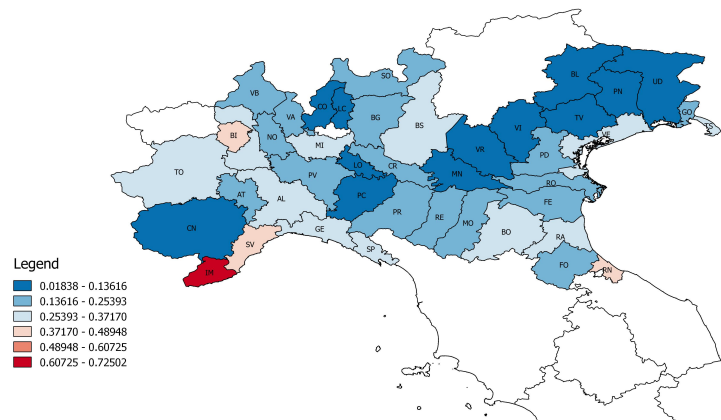
- Knack, S. and P. Keefer (1997). Does social capital have an economic payoff? a cross-country investigation. *The Quarterly journal of economics* 112(4), 1251–1288.
- Levitt, S. D. (1996). The effect of prison population size on crime rates: Evidence from prison overcrowding litigation. *The quarterly journal of economics* 111(2), 319–351.
- Meier, S., L. Pierce, A. Vaccaro, and B. La Cara (2016). Trust and in-group favoritism in a culture of crime. *Journal of Economic Behavior & Organization* 132, 78–92.
- Murray, M. P. (2006). The bad, the weak, and the ugly: Avoiding the pitfalls of instrumental variables estimation.
- Papke, L. E. and J. M. Wooldridge (2008). Panel data methods for fractional response variables with an application to test pass rates. *Journal of Econometrics* 145(1), 121–133.
- Putnam, R. D., R. Leonardi, and R. Y. Nanetti (1994). *Making democracy work: Civic traditions in modern Italy*. Princeton university press.
- Scognamiglio, A. (2015). When the mafia comes to town. *CSEF working paper 404*.
- Staiger, D. O. and J. H. Stock (1994). Instrumental variables regression with weak instruments. *National Bureau of Economic Research Cambridge, Mass., USA*.
- Sunde, U. and T. Vischer (2015). Human capital and growth: specification matters. *Economica* 82(326), 368–390.
- Transcrime (2013). *Progetto PON Sicurezza 2007-2013: Gli investimenti delle mafie. Rapporto Linea 1*. Milano: Ministero dell'Interno. www.investmentioc.it.

Figure 1: Per capita graduates in 2010



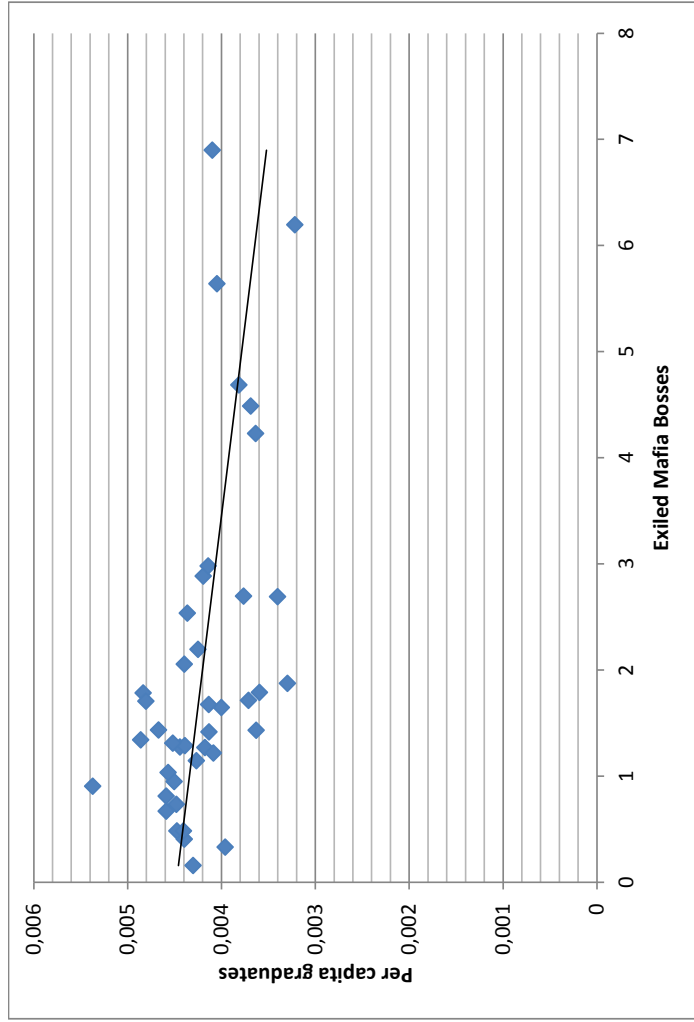
Note:...

Figure 2: Organized crime index in 2010



Note:...

Figure 3: Reduced-form relationship



7 Tables

Table 1: Descriptive Statistics

	N.obs	Mean	Stad. Dev.	Median	Min	Max
Mafia index	45	0.24	0.14	0.22	0.0298	0.87
University graduates per capita	45	0.004	0.0005	0.004	0.0025	0.0054
Standardized exiled bosses	45	1.83	1.63	1.42	0	6.88
Value added	45	26166	3420	25898	19603	40175
Population	45	582468	613944	391811	138752	3774801
Activity rate	45	69	1.88	69	66	73
Infrastructure	45	0.97	1.1	0.66	0.22	6.7

Table 2: Organized crime and university graduates - OLS and IV

	Exogenous	Exogenous	1 st stage	2 nd stage	1 st stage	2 nd stage
	(1)	(2)	(3)	(4)	(5)	(6)
Mafia_index	-0.0013*** (0.0003)	-0.0016*** (0.0002)		-0.0039** (0.001)		-0.0023*** (0.0007)
\hat{v}_2				0.003*** (0.001)		0.0013 (0.0008)
Exiled Bosses			0.035* (0.02)		0.05** (0.02)	
First stage F-stat			23		22	
Controls		yes			yes	yes
N.obs	45	45	45	45	45	45

Notes. Robust standard errors in parenthesis. Significance levels: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. We control for autonomous provinces (i.e. dummy equal to one if provinces are Bolzano or Trento) in all the specifications as it is explained in the text. Other controls include value added, infrastructure investment, activity rate, and, the size of the provinces (i.e. dummy is equal to one if the provinces are a capital of the region).

Table 3: Organized crime and university graduates - Fractional Probit

	Exogenous	Exogenous	1 st stage	2 nd stage	1 st stage	2 nd stage
	(1)	(2)	(3)	(4)	(5)	(6)
Mafia_index	-0.1*** (0.03)	-0.12*** (0.02)		-0.35*** (0.08)		-0.26*** (0.06)
APE Mafia index	-0.0005*** (0.0001)	-0.001*** (0.0003)		-0.004*** (0.0005)		-0.003*** (0.0001)
\hat{v}_2				0.3*** (0.088)		0.2*** (0.065)
Exiled Bosses			0.037* (0.02)		0.05** (0.02)	
First stage F-stat			21		15	
Controls		yes			yes	yes
N.obs	45	45	45	45	45	45

Notes. Robust standard errors in parenthesis. Significance levels: *** p<0.01, ** p<0.05, * p<0.1. We control for autonomous provinces (i.e. dummy equal to one if provinces are Bolzano or Trento) in all the specifications as it is explained in the text. Other controls include value added, infrastructure investment, activity rate, and, the size of the provinces (i.e. dummy is equal to one if the provinces are a capital of the region).

Table 4: Organized crime and university graduates old provinces - OLS and IV

	Exogenous	Exogenous	1 st stage	2 nd stage	1 st stage	2 nd stage
	(1)	(2)	(3)	(4)	(5)	(6)
Mafia_index	-0.0013*** (0.0003)	-0.0016*** (0.0002)		-0.0039** (0.001)		-0.0026*** (0.0006)
Exiled Bosses			0.037* (0.021)		0.05** (0.02)	
\hat{v}_2				0.003*** (0.001)		0.002* (0.001)
First stage F-stat			21		17	
Controls		yes			yes	yes
N.obs	40	40	40	40	40	40

Notes. Robust standard errors in parenthesis. Significance levels: *** p<0.01, ** p<0.05, * p<0.1. We control for autonomous provinces (i.e. dummy equal to one if provinces are Bolzano or Trento) in all the specifications as it is explained in the text. Other controls include value added, infrastructure investment, activity rate, and, the size of the provinces (i.e. dummy is equal to one if the provinces are a capital of the region).

Table 5: Organized crime and university graduates old provinces - Fractional Probit

	Exogenous	Exogenous	1 st stage	2 nd stage	1 st stage	2 nd stage
	(1)	(2)	(3)	(4)	(5)	(6)
Mafia_index	-0.1*** (0.027)	-0.14*** (0.015)		-0.32*** (0.07)		-0.24*** (0.05)
APE Mafia index	-0.0005*** (0.0002)	-0.002*** (0.0004)		-0.004*** (0.0005)		-0.003*** (0.0001)
\hat{v}_2				0.28*** (0.08)		0.16** (0.07)
Exiled Bosses			0.04* (0.02)		0.05** (0.023)	
First stage F-stat			21		17	
Controls		yes			yes	yes
N.obs	40	40	40	40	40	40

Notes. Robust standard errors in parenthesis. Significance levels: *** p<0.01, ** p<0.05, * p<0.1. We control for autonomous provinces (i.e. dummy equal to one if provinces are Bolzano or Trento) in all the specifications as it is explained in the text. Other controls include value added, infrastructure investment, activity rate, and, the size of the provinces (i.e. dummy is equal to one if the provinces are a capital of the region).

Table 6: Reduced form regression: evidences on credibility of instrument

	(1)	(2)
<i>A: All Provinces</i>		
<i>Exiled bosses</i>	-0.01** (0.004)	-0.009** (0.0037)
N.obs	45	45
<i>B: Old Provinces</i>		
<i>Exiled bosses</i>	-0.008*** (0.0038)	-0.009** (0.0037)
N.obs	40	40
Controls		yes

Notes. Robust standard errors in parenthesis. Significance levels: *** p<0.01, ** p<0.05, * p<0.1.