Department of Economics

"Mafia, Institutions and GDP: An Econometric Estimation of the

Effects of Organized Crime in Italy"

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Acknowledgments:

Abstract:

This research examines the economic costs of Mafia type organizations using a panel data fixed effects technique for the twenty Italian regions from 1980 to 2007. The results show a strong significant negative correlation of 0.018% between regional GDP per capita and the organised crime index. The theoretical framework surrounding the effects of mafia activity on GDP explores the mechanisms by which a society is damaged by organised crime: these go beyond directly quantifiable economic costs of lowered GDP, and spread to all areas of the social and political spheres. Social capital is reduced, human capital severely suffers, and an underlying setting of distrust and retaliation against the community pervades. In conclusion, policy recommendations are put forth: the necessity to invest more resources into fighting criminal organisations is exposed, since this constitutes the basis for economic prosperity and growth.

Contents

Introduction:

Organized crime afflicts societies from both economic and non-economic fronts. The resulting misallocation of economic resources, the reduction in private investment and the deterioration of talent and human capital are just few of the ways in which Mafia inhibits a country's economic development.

Many researchers have analysed the consequences of crime on an economy, but few focused on the specific effects of the most dangerous, richest and violent criminal organization in the world, the Italian Mafia. It is today considered the biggest business in the country, producing an annual turnover of approximately £116 billion, about 7% of Italy's GDP (Squires, 2012). While the Northern part experiences high levels of development and efficient legal institutions, the South's economic activity is severely obstructed by Mafia organizations, which limit the country's possibility to grow.

This paper has two objectives: first, to analyse the effects of such associations on Italy's economic output in order to bring a brighter understanding of what actions to carry out to eradicate it. Second, it seeks to go beyond that, by developing a logical explanation as to why Italy's Northern part has become the most industrially advanced region of Europe, while the South struggles having GDP levels comparable to those of underdeveloped nations.

This research empirically evaluates the effects of organized crime on the Italian economy using a panel data fixed effects technique for the twenty Italian regions from 1980 to 2007. The method of data selection follows the one employed by Pinotti (2014). The methodology follows the econometric analysis adopted by Daniele and Marani (2011) but uses different variables and selecting a larger time period updates their time-series by twenty years. To evaluate the incidence of Mafia activities, an organised crime index (OC index) was created incorporating annual data on typical mafia crimes.

The results reveal a strong negative correlation between the index for Mafia crime and GDP per capita: a one-unit increase in organized crime leads to a loss in GDP of 0.018%. The deteriorating effects of Mafia crimes are also significant on the investment rate, human capital and shares of value added in the three economic sectors. The outcome demonstrates a significant negative effect also when GDP is regressed on individual crimes such as extortions and mafia murders.

This paper then shifts its focus on a more qualitative approach, aimed at analysing the mechanism by which Mafia affects an economy. Reasons are extensively presented as to possible explanations to such outcome.

The concept of social capital is introduced as one reason why Mafias are detrimental to society and in turn to the economy. Mafia causes a loss in private investors' confidence destroying business innovation and competitiveness, which are the driving forces of economic growth. The decline in private investments is replaced by large and inefficient public contracts that Mafia can easily obtain with its violent methods and its extremely large availability of funds. Last, Mafia activities lead to destruction in human capital and talents. As found by Coniglio et al. (2010), it discourages individuals from investing in their own future and education. Other examples show that money laundering damages competitiveness of the market (UNODC, 2011), organized corruption reduces private investment rates, hence decreasing economic growth (Mauro, 1995). Moreover, an increase in Mafia murders is found to decrease GDP growth by 0.041% (Peri, 2004).

The underlying rationale as to why organised crime is such a threat to society goes well beyond the monetary welfare loss due to the diversion of resources towards the illicit market. Mafias create a macro-level dysfunction of the political and legal institution, feeding a complex vicious circle of civic disengagement, low social capital and faith in the community. The reason why this loop is detrimental to long-term growth is centred on the concept of social capital, defined as the abidance of civic norms and the relying

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on implicit agreements by the citizens of the community. According to Arrow any market transaction requires implicit trust to take place, so that "economic backwardness entails lack of mutual confidence" (1972:357). So criminal organisations diminish social capital and create a "patronage network" (Fukuyama, 2000:88) based on favouritism and corruption; these are the antithesis of civic norms and trust in the community. In turn, this failed state results in a failed economy by impeding investment and market transactions, which require a healthy environment of defined property rights and a working legal system.

This research supports the theory that the differences in legal and political institutions within the country led to the gap in the economic development between the North and the South. A lack in transparency, a less guaranteed rule of law and poor governance in the local municipalities created a stream of illegality in the "Mezzogiorno"[1] that could help the spread of the Mafia phenomenon.

The paper is structured as follows. Section 1 provides a historical background of mafia presence in Italy. In addition, it presents a detailed description of the various types of mafia, analysing the various legal and non-legal activities they carry out. Section 2 outlines the effects of organized crime on economic development with a review of the relevant literature. Section 3 is a detailed description of the organised crime index, and describes the distribution of mafia activities in relation to GDP in the Italian regions. Section 4 describes the method used, and presents the results obtained from the regression analysis. Finally, the last section puts forth suggestions on possible policy actions and conclusive remarks.

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[1] "Mezzogiorno" transl.: South Italy

Chapter 1. Organised crime in Italy

A. Historical background

The origin of this complex and obscure phenomenon is hard to trace. Both because the "Mafiosi" tend to be silent on their illicit activities and also because fear deters the victims from public disclosure. Mafia as a structured organization originated in Sicily and Calabria before Turin was declared the capital of the unified state in 1861. Originally, it was characterized by small acts of violence practiced by brigands. The violent methods used, their ability to control the territory, the solid pyramidal architecture in the organization and the inefficiency of the new-born Italian government to supervise the Southern regions are the reasons why Mafia could rapidly evolve from a small group of criminals committing modest crimes to a strong reality with powerful connections with politicians and authorities. By the end of the 19th century the potent Sicilian lords embraced the Mafiosi as the main instrument to protect their lands from robberies and to reinforce their power. Moreover, the authorities from Piedmont, which were unable to directly control the Southern territory in the new-born State, could suppress any form of insurrections by exploiting mafia power in many of the Southern municipalities, in return for compensations and political protection. This program of mutual assistance between Northern politicians and the Mafiosi could help the diffusion of the phenomenon in South Italy and, most importantly, created in the minds of Southern local people the idea that the new-born State was inefficient and unable to offer them satisfactory living conditions and social assistance. On the other hand, Mafia swiftly declared itself as the main source of protection from all kinds of abuses. (De Victor, 2013:47-60)

B. Types of mafia

Mafia type organizations in Italy are divided into four associations: Cosa Nostra, Camorra, 'Ndrangheta and Sacra Corona Unita. Since the latter has a less considerable impact on the Italian economy, this section will mainly focus on the first three groups. They all have common features, but at the same time they present individual and distinctive characteristics, both in the structure and in the illicit activities they conduct.

Cosa Nostra is considered to be the oldest form of mafia organizations in Italy. The name "Cosa Nostra" (Our thing) depicts the way this organization operates. Every activity is conducted in complete silence. The members must take part in a ritual of initiation, where they swear total devotion to the organization. Cosa Nostra originated in Sicily at the end of the 19th century and has been conditioning the social, economic and political life of the island ever since. It moved after to North America during 1930s, but compared to other Mafias its capacity of expansion and to settle outside Sicily is limited. The structure of the organization is highly hierarchical, with a single boss ruling for the entire association (Salvatore Riina and Bernando Provenzano are the most famous ones. Both were arrested after being on the run for years). Racketing, extortion, money-laundering, drug trafficking and a total control of commercial activities in the territory have always been its identifying business activities. (Europol Report on Organised Crime, 2013). It is sadly known to the public for the brutal homicides perpetuated against the judges and public officials who were fighting to uproot the organized crime between 1980s and 1990s. Among others, notable cases were the assassination of judges Falcone and Borsellino, lawyer Giorgio Ambrosoli and general Dalla Chiesa.

'Ndrangheta is the richest and most influent criminal organization in Italy and in the world. According to Coniglio et al. (2010:8) it has almost six thousand members and headquarters spread all over the globe, with an annual turnover of approximately 55 billion Euros (3.4 % of the country's GDP). It originated in Calabria, the poorest region in Italy, as a result of a fragile industrial and entrepreneurial system and a weak political class, incapable of limiting the spread of the delinquency. Subsequently, it consolidated its presence in Northern Italy (Piedmont and Lombardy) and also abroad (Germany, Russia, Spain, Switzerland among others). This organization has a remarkably modern, flexible and aggressive investment strategy (Coniglio et al. 2010). It is always open to engage in new business activities, if these become disadvantageous. This modern approach is combined with an ancient scheme of "blood ties", which makes almost impossible for the police to find informers since families build strong relationships that ensure obedience and solidarity among the members (2010:7). Differently from Cosa Nostra, the 'Ndrangheta has a horizontal structure. Every family has the total control over the territory supervised, with a strong monopoly power on all illicit and licit activities. One of the largest illegal business for the 'Ndrangheta is arms trafficking. Authorities discovered a colossal circulation of heavy weapons in Calabria. Arms like Surface-to-air missiles and MPG rocket launchers have also been found in a secret warehouse in Modena, Northern Italy (Sergi, 1991:62). The other considerable activities are international drug trafficking and extortions. Moreover, according to the journalist Pantaleone Sergi almost every business activity in Reggio Calabria pays the "black tax" to the Mafiosi (1992).

Finally, Camorra was born in Naples and extended its control on the entire Campania region. The structure is similar to the one applied by 'Ndrangheta: a horizontal group of families, frequently combined in cartels and coalitions in order to increase their economic power. However, they often breach these agreements, therefore mafia wars

are very common among Camorrists. These internal contrasts make the association weaker and less dangerous if compared to the two mentioned above. On the other hand, since Camorra lacks in a clear business strategy, illicit activities are hard to trace. Camorra is well-known for its brutal use of violence. Any method is justified for the profits of the clan. The main activities of Camorra are extortion, cocaine trafficking, money laundering, corruption and infiltrations in institutions to access public contracts. Though being still a potent and rich organization, the Camorra is losing its power due to the numerous internal conflicts and various arrests conducted by the authorities in the past years. A mafia war is currently happening is Naples between two of the biggest families in the area, the Di Lauro and the opposing gangs, the "Secessionists" (Europol Report on Organised Crime, 2013).

C. Structure and modus operandi

Until the 1950s economists blamed criminal behaviour on mental disease or social injustice. Thanks to the study of Becker (1968), scientists began to interpret criminal conducts rather as a result of reason. Becker outlined that criminals choose to engage in such activities after contrasting monetary (and non-monetary) compensations from criminal activities in comparison to legal ones. In addition, social factors such as unemployment, weak rule of law and legal institutions, poor human capital and income inequality have been found to be factors that increase criminality in a region. Calabria is a good example. Indeed, low levels of legal control, weak political institutions and an inadequate quality of education contributed to the spread of 'Ndrangheta and made this region the most backward, underdeveloped and poor economic area in Europe (Coniglio *et al*, 2010).

Mafia-type organizations have peculiar characteristics: the production and distribution of illegal goods and a strong identity, identified by well-defined rules and a robust structure. These criminal associations have many common features with normal legal companies. Their main objective is to maximize profits and they do so by investing in human and physical capital, by expanding the activities in different countries and by changing the qualities of products that they sell (Coniglio et al., 2010). Nevertheless, unlike legal companies, products and activities controlled by Mafia are in the great majority illegal. The methods used to make profits, in addition, are against any social ethical standard.

The modus operandi of Mafias is based on a combination of different factors. As explained by Pinotti (2014) the protracted use of *violence* allows the Mafiosi to obtain a solid monopoly power in both legal and illegal markets. The intimidations addressed against public officials, especially in Southern Italy, granted mafia with substantial public contracts during the past decades. Furthermore, thanks to a tremendous capacity to *control the territory*, the Mafia is able to undertake various complex criminal activities like extortions, smuggling, racketing and drug-trafficking. But differently from other forms of criminal organizations that might also have control over the territory, mafia tends to impose itself as an alternative to the State, by controlling political authorities and business activities of the area supervised. In addition, all mafia activities work efficiently because everything is based on a code of behaviour that prohibits members of a clan "from even mentioning it", the so-called *omertà*[2] (Pinotti, 2014:4). This code of silence has limited judicial activities for many years, until the former Cosa Nostra criminal and first police informer Tommaso Buscetta started to release precious information about mafia's operations during the 90s.

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[2] Omertà, trans. "silence"

All these peculiar features of mafia type-organizations were, until the 1980s, not recognized by the Italian penal code. As a matter of fact, only in 1982 law 646/82 introduced Article 416-bis in the Italian judicial system (Pinotti, 4:2014).. This regulation finally distinguished general organized crime behaviour like small bank robberies ("associazione a delinquere"), from a mafia-type crime ("associazione a delinquere di stampo Mafioso"). This constituted a decisive step in the fight against mafia. The above distinction could target networks of criminals that "exploit the power of intimidation granted by the membership in the organization, and the condition of subjugation and omertà that descends from it, to commit crimes and acquire the control of economic activities, concessions, authorizations and public contracts", namely the Mafiosi (Pinotti, 4:2014).

D. "White Mafia"

The empirical research of this paper focuses mainly on mafia crimes that can be reported by the authorities, such as murders, extortions, bomb attacks and smuggling. These activities grant big amounts of revenues for the organizations. However, since the end of the 80s, mafia activities switched to legal and transparent businesses, which grant extremely high revenues and are more difficult to track. This paper introduces the term "White Mafia" to denote those activities and criminals that do not have the usual mafia connotations.

'Ndrangheta in recent years has profoundly changed its business strategy. The organization is investing more funds in real estates, public contracts, business loans and all kind of legal and semi-legal activities. By doing so mafia organizations can move their hands towards the richest part of Italy, penetrating into the social and legal system of the North. According to a report conducted by Unioncamere (the Italian

Chamber for Commerce, Industry, Agriculture and Craftsmanship) criminal organizations have now entered the legal economy by investing consistent amount of revenues in activities such as public contracts and infrastructures[3], forgery (estimated at 6.9 billion euros annually), waste disposal (3 billion Euros annually), real estates (1.7 billion), renewable energies and financial investments (140 million confiscated and 900 people arrested for money-laundering only in 2012) (Unioncamere, 2013:28-40).

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[3] Mafia infiltrations increased costs by 40%, by causing delays and inefficiencies in the realization of the projects (2013:29)

Chapter 2. Mafia and institutions

A. Economic growth and the role of institutions in Italy

Figure 1: GDP per capita distribution in Italy (rank 1 to 20)

Rank	Region	GDP per capita
1	Valle d'Aosta	12474,70237
2	Lombardy	11320,11039
3	Emilia Romagna	10923,36086
4	Trentino Alto Adige	10675,99302
5	Piedmont	10309,06984
6	Liguria	10254,2596
7	Friuli Venezia Giulia	9951,65807
8	Veneto	9919,503719
9	Lazio	9896,936877
10	Toscana	9550,849842
11	Marche	9134,052702
13	Abruzzo	7414,576158
14	Sardinia	6790,937526
15	Molise	6443,331807
16	Puglia	6302,900526
17	Campania	6079,405789
18	Sicilia	5954,774123
19	Basilicata	5853,96814
20	Calabria	5367,182421

Notes: the table reports the average value of GDP per capita for the Italian regions from 1980 to 2007, All figures accounts for PPP. Created using data from ISTAT

Wealth in Italy is highly condensed in the industrial regions, such as Lombardy, Emilia Romagna, Piedmont and Veneto. As illustrated by Figure 1, GDP per capita in the Northern regions is more than twice that of the Southern regions. These regions act as a slowdown to Italian economic growth. The Northern part is a highly developed, industrial and flourishing region, with GDP levels that are among the highest in Europe, while the South brings the GDP level down by a relevant amount due to its backwardness and underdevelopment. Mafia organisations have grown due to a series of factors surrounding the weakness of the institutional framework.

This extreme gap between North and South Italy is mainly due to the differences in the social, legal and cultural systems of the two regions. As outlined by Acemoglu and Robinson in "Why nations fail" (Acemoglu, Robinson, 2012), developed countries (and regions) are wealthy mainly because political and economic institutions are inclusive. Inclusive institutions, such those that "enforce property rights, create a level playing field, and encourage investments in new technology and skills are more conducive to economic growth than extractive economic institutions that are structured to extract resources from the many by the few" (2012: 429-30). They stimulate creativity, power and vitality of the entire society, the key to innovation and progress. Rather, Southern institutions in Italy are remarkably extractive. Interestingly enough, the last seven regions of the rank are also those with the highest incidence of mafia crimes. This economic backwardness feeds on a failed state of unreliable property rights, weak rule of law, corrupted police system and absence of social capital. This concept refers to an underlying environment of trust in society, whereby citizens comply to civic norms and implicit agreements. This defines the basis of a well-functioning society as it boosts investment and creates a fertile field for business development and innovation, driving economic prosperity.

This environment of weak rule of law has allowed Mafia organisations to strengthen and infiltrate into every realm of political and legal activity. The exemplification of this underlying corruption and illegality is exemplified by the work of Acconcia et al. (2014:2191). Their research explores how council dismissals due to mafia infiltrations, which underpin the pervasive power of criminal activity in society, have been persistent in Southern provinces such as Naples, Palermo, Reggio Calabria and Caserta between 1991 and 2012.

And the way in which mafia societies damage a country is evident on all fronts. They damage tourism, FDI, private entrepreneurial activities (replaced by inefficient and

wasteful investment in public infrastructures) and eventually demolished any possibility of economic development explaining the exceptionally low GDP levels.

Figure 2 below shows the distribution of mafia crimes in the Italian regions. The poorest regions are those with the highest incidence of organized crime (Calabria, Campania, Sicily, Basilicata and Puglia).

Figure 2: regional distribution of Mafia crimes – average values from 1980 to 2007

Region	Extortion	Mafia Crime	Mafia Murder	Arsons	Smuggling
Abruzzo	3,546092	0,09924629	0,0212885	13,01354	5,074057
Basilicata	6,622704	0,35464038	0,069914147	11,3003	11,20662
Calabria	9,340032	1,81075889	1,960037602	42,31097	3,32883
Campania	9,05635	0,94448476	1,529513271	8,013208	251,1997
Emilia Romagna	3,528483	0,06822401	0,020348264	8,852778	5,860922
Friuli Venezia Giulia	3,10593	0,07335087	0,006687742	10,05939	21,04019
Lazio	3,049813	0,04809558	0,007614395	5,522043	1,223873
Liguria	4,117063	0,12875929	0,03645125	11,57167	26,69657
Lombardia	3,404874	0,07443569	0,039974035	5,376945	29,90277
Marche	3,537648	0,05525305	0,010553009	7,464102	3,499151
Molise	5,101587	0,14498133	0,018013072	7,512051	4,55215
Piemonte	4,796235	0,0396585	0,059436645	6,015718	10,86752
Puglia	8,768764	0,35707497	0,206567908	21,13475	120,7162
Sardegna	3,992402	0,0562611	0,111739087	39,11198	2,402783
Sicilia	8,383352	1,09755458	1,039854662	30,72141	12,69387
Trentino Alto Adige	2,759262	0,03987643	0	13,35639	5,579757
Toscana	4,324803	0,15506477	0,029387141	7,38878	16,89956
Umbria	4,996983	0,06960301	0,004914729	7,45373	2,219671
Valle d'Aosta	4,029149	0,13709121	0,104811606	4,763237	7,481901
Veneto	2,889051	0,07769937	0,012746009	7,018237	2,615803

Data gathered from ISTAT

B. The effects on the economy

The repercussions of mafia activities on society are numerous and detrimental. According to a report published by the UN Office on Drugs and Crime (2011), organized crime has a devastating effect on global economies. Nevertheless, it could bring some positive effects in the short term. Mafia usually need to launder money gathered from illicit activities. For this reason, it invests funds in small enterprises, hence creating more jobs. Moreover, money saved in banks ease credit flows and increase liquidity. However, in the long-term money laundering damages

competitiveness of the market and destroy business innovation, which are the driving forces of economic growth. Indeed, money is invested in companies that, thanks to the great amount of "dirty capital" owned, can sell goods below market price driving firms out of business and destroying fair business competition.

In regards to the positive effects, Van Dijk (2007) outlines that the production and trafficking of illegal goods might generate large profits, which are then reinvested in all sectors of the economy. The total sales of illicit substances in the world are evaluated at $322 billion. This huge amount of money will be in a way or the other reinvested in the official economy, stimulating the overall activity. In Mexico 6% of the country's GDP is estimated to come from illicit drug trafficking, approximately $25 billion a year (Gonzalez, Ruiz. 2001:19). Moreover, estimated revenues from drug trafficking lies from 30% to 60% of Afghanistan's GDP (Van Dijk, 2007:50 cited UNODC, World Drug Report 2004).

Although organized crime activities might bring positive effects, these are usually typical in undeveloped countries, which have a less assured rule of law and weak legal institutions (for example Mexico, Afghanistan, Albania and Tajikistan).

Generally, organised crime has an extremely negative impact on society and economic growth. Mauro (1995) finds that organized corruption significantly reduces private investment rates, therefore affecting the overall economic activity. Organised crime, in addition, significantly decreases foreign direct investment, since crime may be perceived as a signal of socio-institutional instability by foreign firms. In addition, as outlined by Wei (2000), an increase in the level of crime from the level of Singapore to that of Mexico would be equivalent to a rise in taxation for FDI by fifty percentage points. In the case of Italy, Daniele and Marani (2011) identifies a strong negative correlation between crime and FDI on Italian regions. The regions with the highest

presence of mafia receive approximately 0% of total national FDI. Furthermore, Peri (2004) finds that Italian provinces with the highest murder rate (Calabria and Sicily with more than 7 homicides per 100.000 inhabitants yearly) have a GDP growth rate 0.41% lower than the other regions.

The main channels through which mafia distorts economic efficiency are various. As outlined by Bonaccorsi di Patti (2009), mafia activities have a significant negative impact on the costs of bank loans. Organized crime diminishes access to credit and, often, banks need more collateral in regions where mafia is more widespread.

Then, as found by Coniglio et al. (2010:6) organized crime can distort the allocation of talent and human capital towards unproductive or destructive activities. Eventually, this will lead to a reduction in the incentive to accumulate skills and develop productive talent. Mafia, then, acts like a "tax" on productive activities, which increases the costs of investments and reduces firms' returns. By applying dynamic panel data with a sample of 20 regions, Del Monte and Papagni (2001) find that organized crime decreases significantly the efficiency of public expenditure. In fact, according to the authors, when mafia colludes with political institutions, the government needs to fight this increased corruption through excessive monitoring of public purchases (2:2001). Moreover, corrupted politicians will likely invest public capital in unproductive, massive projects that will grant them consistent revenues from bribes (2:2001)

Furthermore, a study conducted by Pinotti (2014:15) explores the overall costs of mafia activities on two Italian regions (Basilicata and Apulia) that, before 1975, were exempt from the presence of organised crime. Using a synthetic control method to calculate their counterfactual economic growth in the absence of mafia, Pinotti finds that the aggregate loss brought by a rise in organize crime amounts to 16% of GDP per capita and it acts primarily through a "reallocation of from private economic activity to (less productive) public investment" (2014:15). Public contracts constitute a great business

opportunity for the Mafia, which oblige companies to acquire low-quality products at extremely high prices. This boosts production costs and decrease efficiency in the market.

Finally, a study conducted by Van Dijk explores the impact of organized crime on economic growth. He identifies a strong negative correlation (-0.76) between the OC index[4] used and GDP growth. Mafia activities decrease growth by negatively impacting the maintenance of the rule of law and policy decisions. In his analysis, Italy is ranked among the lowest OECD countries in terms of corruption, efficiency of legal institutions and Organised crime vs. GDP rank (2007:51).

The long-term effects of crime, then, act as a tax on the economy discouraging private investors, lowering FDI and increasing the cost of legal monitoring. All the above mentioned factors then boost public expenditure and eventually reduce GDP growth.

C. Measurement: The Organized Crime Index

Measuring organized crime activities is not a simple task. Data is often missing and judicial-based measures of crime can be subject to under-reporting, as described by Pinotti (2014)[5] and Macdonald (2002). This is particularly the case for mafia-related crime. Indeed, the "omertà" code of silence limits judges' investigations especially where mafia power is more consolidated. Following the approach adopted by various researchers[6], this paper will use a composite index of organized crime in order to

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[4] The OC index used was constructed using data on homicides, corruption, money-laundering and the extent of the black economy (Van Diijk, 2007:14). His dataset includes all countries worldwide.
[5] I want to thank Prof. Pinotti for providing me the original dataset used in his analysis, gathered from ISTAT.
[6] See e.g. Daniele, Mariani (2011:135), , Rana (2012:10) and Van Dijk (2007:42)

estimate the effects of mafia on economic growth. For this reason, only mafia-specific crimes will be considered.

The first crime selected is *mafia murders,* which can be hardly subject to under-reporting. Homicide is the main instrument of intimidation and violence used by Mafia against the State. Northern regions experience a low number of homicides (between 1 and 3 murder every 100.000 people), while this crime is extremely intense in regions like Calabria, Sicily and Campania (between 4 and 6) (Pinotti, 2014:5).

Among all mafia activities, the "pizzo" (i.e. Italian for black tax, *extortion*) is surely the most distinctive and it will be included in the organised crime index used in this paper. It allows mafia families to re-enforce their power over the territory by controlling business activities. Extortion allows families to assist prisoners, it grants more prestige to the gangs and it helps to measure the level of omertà in a given area (Neanidis, Rana, 2012:12).In 2009 almost 160.000 commercial activities based in Sicily, Calabria and Campania were subject to the "pizzo", with total revenues of almost nine billion Euros[7] (Neanidis, Rana, 2012:12 cited Confesercenti, 2009:14)[8].

Due to issues of under-reporting related to extortions, the OC index includes also other crimes that are indicative of Mafia. The first one is arsons, which is another method used by the Mafiosi to intimidate politicians who do not collude and local businesses that do not disburse the "black tax". Like homicides, arsons can be easily identified and they can be used as an alternative method to evaluate the presence of extortions. The other mafia crimes included are mafia-type criminal organization (Art. 416-bis), criminal organization (Art. 416) and smuggling.

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[7] Sicily: 70% of activities pay the pizzo, with prices ranging from 200 Euros (small businesses) to 3000 Euros for supermarkets and luxurious shops with revenues of more than 1 billion Euros. Calabria: 50% of shops pay the black tax. Campania: 40% of all activities. (Confesercenti, 2009:14)

Figure 3: Crime incidence per 100.000 people. Created using data from ISTAT
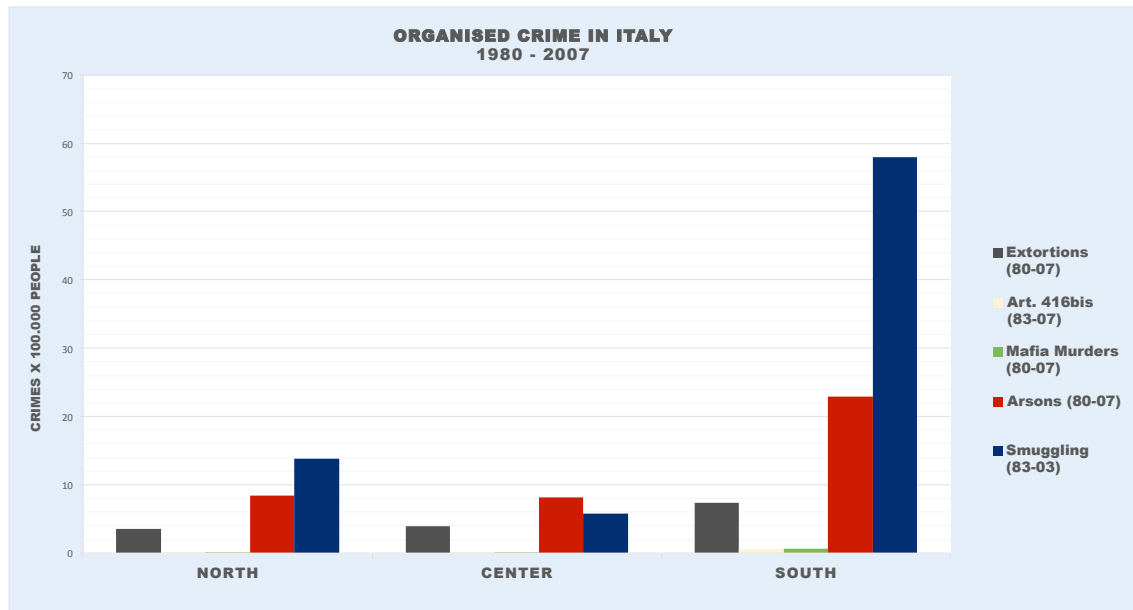

Figure 1 shows the proportions of the above mentioned mafia crimes on the Italian regions. As shown by the graph, the incidence is extremely high in the Southern regions. Extortions, Art.416 bis and mafia murders are almost double the size than that of Northern and Central regions. Arsons are approximately three times greater (9 compared to 23) and the incidence of smuggling is four times higher[9] (59 compared to 14 and 16). There are also regional differences in the Southern regions. These crimes are much more prevalent in those regions controlled by mafias. Calabria, Sicily and Campania experience the highest levels of OC index crimes when compared to the other regions, since 'Ndrangheta, Cosa Nostra and Camorra built roots in these areas.

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[5] Smuggling is higher especially in Calabria and Sicily, where the port of Gioia Tauro is used as the main channel for overseas operations. Mafia then opened new gates by using the ports of Apulia to open the "Tyrrenian route" (Pinotti, 2014:7)

Figure 4: OC Index average. Created using data from ISTAT
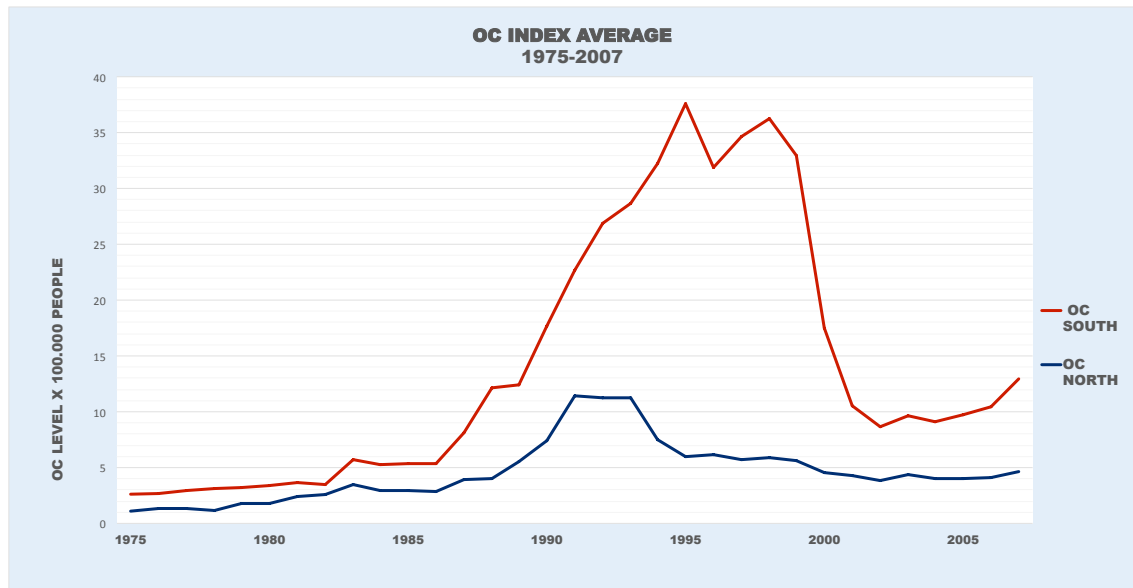
The line chart graph above shows how organized crime has evolved from 1975 to 2007 in the Italian regions. From 1975 to 1986 the trend is stable and at relatively low levels for both North and South. However, after 1986 the line chart depicts an acute rise in the amount of crimes carried out by the mafia. The most terrible homicides and criminal acts were committed in this period, characterized by the killings of several judges, journalists and police officers. The sharp increase is also due to the outburst of the "fourth and fifth mafia wars" (Pinotti, 2014:7), which led to the expansion of Cosa Nostra and 'Ndrangheta in Apulia and Basilicata. These two regions were used as new channels for drug trafficking with Eastern Europe.

This increase is explainable also with a rise in Mafia infiltrations of public administration at the end of the eighties. The reaction of the State consisted in new laws allowing the central government to dismiss politicians suspected of having connections with the Mafia (Acconcia et al, 2014:2191). The decline in OC crimes is probably the result of the so-called "Trattativa Stato-Mafia", a hypothesized negotiation between the highest Italian authorities and Cosa Nostra's bosses to end the period of massacres.

Figure 5: Total Crime rate x 100.000 people. Created using data from ISTAT
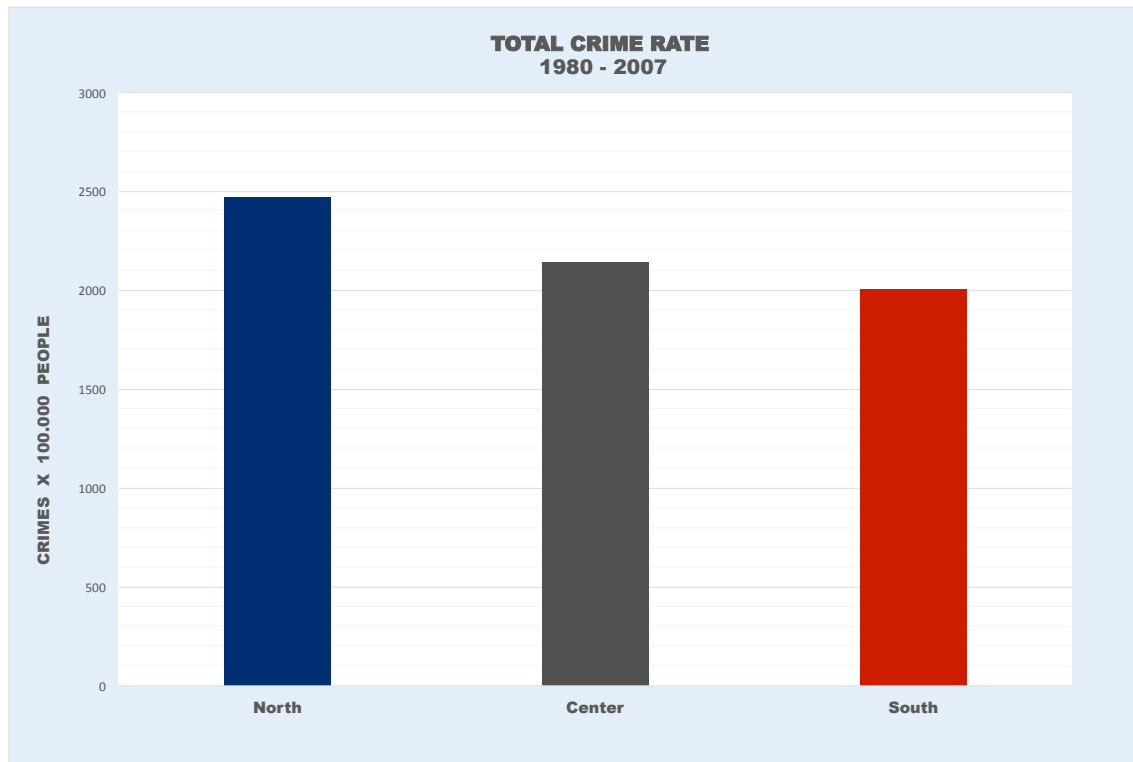
The graph above shows the incidence of total crime rate for the Italian regions. This variable is the sum of all crimes registered annually in the twenty Italian provinces (Source: ISTAT). In Northern regions the total crime rate is much higher. This outcome is not unexpected: regions with a greater economic activity like Piedmont, Lombardy and Veneto tend to attract more crime (Cracolici and Uberti, 2009). In these regions bank robberies, thefts and drug-related offences are at the highest level. On the contrary, the poorest regions in Italy (i.e. Calabria, Campania and Sicily), where rule of law and legal institutions are weaker, have the highest incidence of mafia-type criminality.

Figure 6: Art. 416-bis for Italian regions. Created using data from ISTAT [10]

Presence of mafia-type criminal organisations across Italian regions
1983 - 2007
Art. 416 bis. per 100k inhabitants
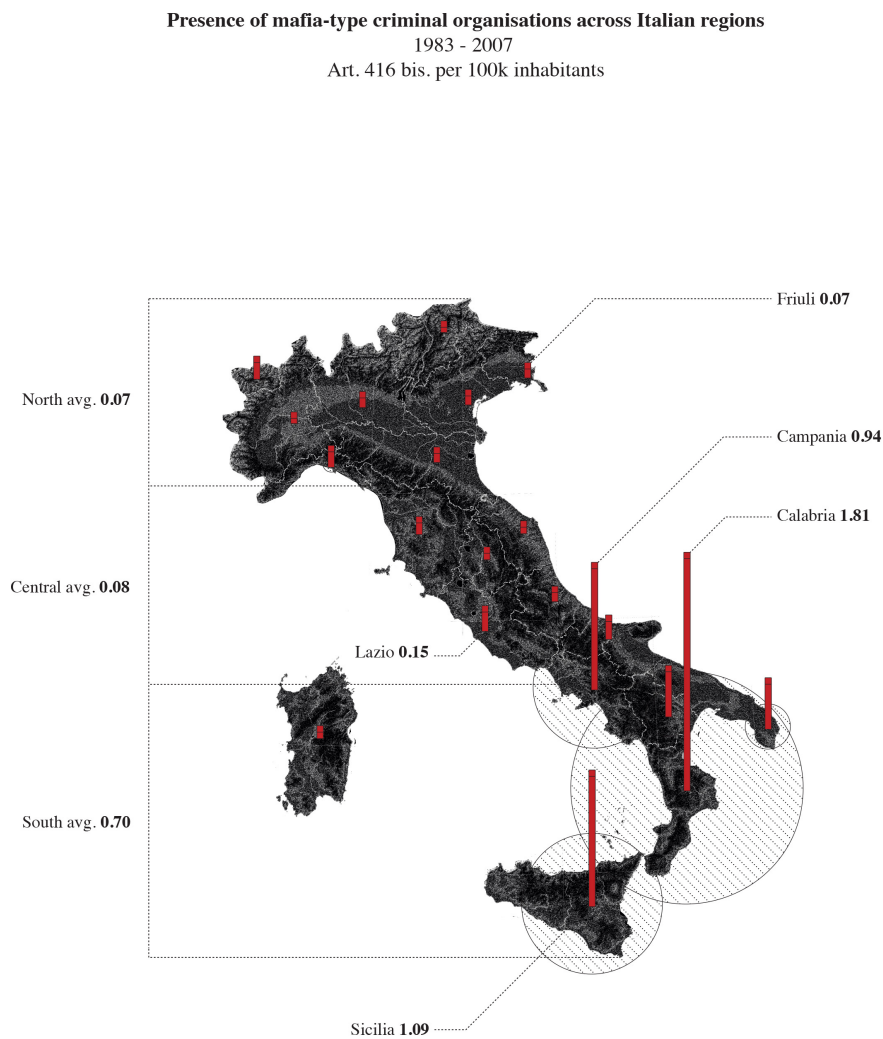
The graph above displays the incidence of mafia-type crimes recorded by ISTAT from 1983 to 2007. As illustrated by the height of the red bars, almost all mafia crimes occurred in South Italy. Calabria has the highest value, with 1.81 mafia crimes per 100.000 inhabitants, Sicily is second with 1.09 and then Campania with a score of 0.94. The average for all Southern regions is approximately ten times greater than that of the other regions (0.70 compared to 0.07 and 0.08).

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[10] Graph created with Rhyno software and Photoshop, after having grouped data with Excel.

The above graphs support the evidence that the most significant negative effect on economic growth is caused by organized criminality, as poorest regions have the highest presence of mafia-type crimes.

Chapter 3. Empirical study

A. **The econometric model**

The regression model adopted is the following:

$$lnGDPpc = \alpha + \beta_1 X_{i,t} + \beta_2 OCindex_{i,t} + u_{it}$$

Where i is the region, t is time, u_{it} is the error term (assumed to be normally distributed). $X_{i,t}$ is a vector that includes the control variables, while $OCindex_{i,t}$ represents the measure for organised crime. The methodology used follows the approach adopted by Daniele and Marani (2011) but uses a different dependent variable and updates their panel dataset with a larger time period from 1980 to 2007. Thus, a time-series cross-sectional panel dataset including annual observations for the 20 Italian regions is created.

The dependent variable is the natural log of GDP per capita for all the Italian regions. The independent one is organised crime, captured by the variable OC index. This index is the sum of mafia-related crimes: extortions, mafia murders, mafia organization crime (art. 416 bis) smuggling and arsons per 100.000 inhabitants. Other crimes selected for the regressions are included in the total crime rate (drug related offences, murder rate and robberies per 100.000 inhabitants). I will estimate the effects of each crime included in the OC index with additional models.

B. Data description

All data was gathered from the National Institute of Statistics (ISTAT). Every year, it releases a report containing information on mafia-related crimes: this is the most common source for data used by the literature as it is considered the most reliable source on organised crime data in Italy, together with the annual Parliamentary Antimafia Commission (PAC) (Pinotti, 2014:5).

When regressing GDP per capita on the organised crime index, the maximum sample size reaches a strongly balanced panel of 221 observations. Nonetheless, the sample is reduced to an unbalanced panel of 161 observations when the dependent variable is regressed on the variables Art416 bis and smuggling individually. There are gaps in data availability for some of the variables, especially those concerned with mafia activity. For example, Art. 416 bis (mafia crime) data starts from 1983 (the time it was introduced as a crime in the Italian penal code), as well as smuggling (available from 1983). For the control variables, data is missing from 1997 to 2007 for both investment rate and school enrolment rate. For the shares in value added in agriculture, industry and tertiary data is missing from 2005 to 2007. To solve for these missing gaps in the data sample, a dummy was created for each variable with missing observations, and put to 0 when data is missing.

Following the approach adopted by Neanidis and Rana (2012) and Daniele and Mariani (2011), the model includes a set of control variables that are related to the economic dimensions of the regions analysed. The variables selected, which are related to GDP per capita and are typically included in growth regression analysis (see Levine and Renelt, 1992), are the share of population with a high school degree, the regional

investment rate, the share of value added in agriculture, the share of value added in industry, and the share of value added in tertiary. Figure 7 below shows the summary statistics for the variables.

Figure 7: Summary statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
lnGDPpc	560	9.336241	0.2917276	8.644663	9.802598
Agriculture	500	0.0488069	0.0220275	0.0156632	0.1099827
Industry	500	0.2817843	0.0650362	0.1565075	0.4330457
Tertiary	500	0.5040966	0.0481269	0.386786	0.6203178
School enr.	221	0.571142	0.0907826	0.0576697	0.8307235
Investment	320	0.2267762	0.0630447	0.1372299	0.7259708
OCindex	560	2.346285	1.394485	0.2105742	6.839655

Regressions with both fixed and random effects were conducted, and a Hausman test was subsequently performed to choose the most appropriate method for the panel data analysis. This test selects the most efficient technique between fixed effects, ordinary least squares with dummies and random effects. The null hypothesis is that the favourite method is random effects, while the alternative sets fixed effects as the best one (Torres – Reyna, 2007:9). Since the p-value for the test is lower than 0.05, the H_0 hypothesis is rejected, in favour of fixed effect as the most appropriate approach for the regression (See Appendix fig. 10 for the Hausman test). This also makes theoretical sense, as the fixed effects method allows to control for omitted variable bias, which may lead to a biased estimation of the variables. The effects of these omitted variables will be "fixed" over the time period of the analysis (Williams, 2015:1).

Figure 8 shows the correlation matrix for the variables. As illustrated, all crimes are negatively correlated with GDP per capita, supporting the hypothesis that organised crime acts as a slowdown for economic growth and development. Among all crimes, Mafia crimes (art. 416-bis) and extortions have the biggest impact on GDP. Moreover,

crimes strongly reduce school enrolment rates and industry value added, since talents and efficient firms tend to relocate away from areas influenced by mafia.

Figure 8: correlation matrix

	LnGDPpc	School Enrol.	Inv. Rate	Agriculture	Industry	Tertiary	OCindex	Smuggling	Mafia Crime	Arsons	Extortions	Mafia Murder
LnGDPpc	1											
School Enrol.	0.2671	1										
Inv Rate.	0.4296	0.2542	1									
Agriculture	0.7882	0.2905	0.3799	1								
Industry	0.592	0.084	0.3227	0.4232	1							
Tertiary	0.4778	0.1451	0.2595	0.5946	-0.3364	1						
OCindex	-0.6349	-0.2678	0.1778	0.3572	-0.6022	0.0733	1					
Smuggling	-0.0888	-0.0388	-0.1332	-0.0798	-0.1533	0.2284	0.3292	1				
Mafia Crime	-0.5457	-0.2371	0.1726	0.3015	-0.4787	0.032	0.78	0.2007	1			
Arsons	-0.4236	-0.0356	0.133	0.3124	-0.4428	-0.0404	0.4993	0.0134	0.3457	1		
Extortions	-0.4952	-0.1488	0.1485	0.2593	-0.4374	0.0465	0.8512	0.382	0.5605	0.355	1	
Mafia Murder	-0.4701	-0.126	0.1233	0.248	-0.4365	0.0645	0.7675	0.263	0.6821	0.531	0.4927	1

Scatter plot 1 and scatter plot 2 (see Appendix fig. 11 and fig. 12) confirm the notion expressed before. As shown by the fitted lines, there is a strong negative relationship both between the organised crime index and GDP per capita and between organised crime index and industry value added for the Italian regions.

In order to check for multicollinearity between the variables, a VIF test was performed (computing the variance inflation factors), following the approach used by Daniele and Marani (2011). Since the values obtained are below 10, the test excludes multicollinearity from the model (see Appendix. Fig. 13).

Furthermore, since the Breusch – Pagan test confirmed the presence of heteroskedastic errors, which could affect the statistical significance of the results, the regression included robust standard errors in order to control for this problem. Heteroskedasticity does not affect the consistency or the unbiasedness of the model, but it could affect the efficiency, since the variance of the errors is not constant (i.e. the variance depends on the value of the independent variable X).

C. Results

The natural log of GDP per capita is regressed on all the independent variables with the fixed effects technique. The panel includes a balanced set of 221 observations and twenty groups, corresponding to the Italian regions. The F-test confirms that the coefficients are different from zero (Prob > F = 0), which means that overall the model is efficient. A crucial assumption of regression analysis requires that u and X are independent, therefore $cov(X_{ji}, u_i) = E(X_{ij}u_i) = 0$. If this requirement fails, the coefficients will be biased[11]. The outcome shows that the correlation between the errors u_{it} and the regressors is almost zero (-0.09), meaning that the probability that the model is endogenous is minimised[12].

In the initial model, the set comprised different control variables, such as population density, log of capital and log of value added. But since adding those variables resulted in a high correlation between the errors and the regressors (almost -0.8), a new baseline group of controls has been created in order to avoid any problem of endogeneity. In addition, the time period originally started in 1970. In the final models it is reduced by ten years, i.e. from 1980 to 2007.

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[11] Unbiasedness means that $E(\hat{\beta}) = \beta$

[12] Endogeneity would make all the coefficients biased, since the model does not control for "endogenous" variable contained in the error

Figure 9: Fixed effects outcome. Dependent variable: natural log of GDP per capita.

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
Agriculture value added	4.162***	4.854***	4.428***	4.378***	4.956***	4.748***	4.378***
	(-0.51)	(-0.617)	(-0.54)	(-0.546)	(-0.61)	(-0.541)	(-0.546)
Industry value added	4.593***	5.068***	4.686***	4.491***	4.784***	4.547***	4.156***
	(-0.345)	(-0.452)	(-0.369)	(-0.369)	(-0.458)	(-0.37)	(-0.403)
Tertiary value added	6.281***	6.433***	6.545***	6.287***	6.268***	6.317***	5.947***
	(-0.363)	(-0.44)	(-0.389)	(-0.388)	(-0.447)	(-0.391)	(-0.426)
School enrolment rate	0.256***	0.218***	0.293***	0.306***	0.231***	0.295***	0.290***
	(-0.044)	(-0.047)	(-0.046)	(-0.045)	(-0.046)	(-0.046)	(-0.046)
Investment rate	0.163	0.178	0.166	0.218*	0.217	0.193	0.155
	(-0.119)	(-0.138)	(-0.127)	(-0.127)	(-0.136)	(-0.127)	(-0.128)
Ocindex	-0.018***						
	(-0.003)						
Mafia crime (416-bis)		-0.017*					
		(-0.009)					
Extortions			-0.004***				
			(-0.002)				
Mafia murders				-0.005**			
				(-0.002)			
Smuggling					-0.00040		
Arsons and bomb attacks						-0.0010	
Total crime rate							-0.0080
Constant	4.477***	4.225***	4.264***	4.424***	4.355***	4.370***	4.677***
	-0.28	-0.344	-0.296	-0.299	-0.349	-0.299	-0.328
N	221	161	221	221	161	221	221
R^2	0.84	0.803	0.82	0.819	0.805	0.816	0.819
Adj. R^2	0.819	0.766	0.797	0.795	0.769	0.792	0.795
F	170.613	91.561	147.789	146.688	93.099	144.188	146.611

Notes: Values in brackets represent t-stat. * means significance at 10%, ** at 5% and *** at 1%.

The focus will now turn to the interpretation of the coefficients. The R^2 and the Adjusted R^2 show that the models have a high explanatory power (almost 0.8 in all outcomes).

The elements included in the set of control variables are positively related to the natural log of regional GDP per capita, as expected. The strongest correlations are given by the share in value added in tertiary services (6.280), in industry (4.592) and in agriculture (4.161). All coefficients are significant through the five model specifications at 90%, 95% and 99%. The school enrolment rate is significant and positive (0.256), which is logically intuitive as more human capital leads to an increase in GDP.

Investment rate is, as well, positively correlated with the dependent variable (0.163), though insignificant.

The variable related to organised crime in Italy (OCindex) is negatively correlated with GDP per capita (significant at all levels). When the OCindex increases by one unit, lnGDP decreases by 0.018%. All the variables included in the index negatively affect the dependent variable, even if arsons and smuggling are weakly correlated and insignificant (-0.001 and -0.0004). Extortions, mafia crimes and mafia murders have the strongest negative correlations with GDPpc (-0.004, -0.017 and -0.005 with significance at 99%, 90% and 95% respectively), supporting the evidence that specific mafia crime behaviour has the strongest negative impact on GDP.

These results are consistent with the theoretical analysis conducted above on the effects of mafia activity on economic development. The regression outcome confirms how severe the Mafia effect is on GDP. The loss is GDP is explained by a multitude of factors: diversion in efficient resources into illicit activities, a decrease in private and foreign direct investment, and a severe destruction of human capital.

Conclusion

The current financial recession requires to find solutions to stimulate industrial activity and re-enforce growth. In particular, Italy is struggling to recover from the consequences of the financial distress of recent times. Among the plagues that affect this country, organized crime has to be given priority. As indicated by this research, the effects of organized crime on an economy are vast and have long-term devastating consequences. Mafia activities impact private investments, discourage FDI, impair total factor productivity, diminish talent and human capital, enlarge public spending and, most notably, destroy social capital. Numerous studies have analysed the relationship between criminal activities and the economy, but only a few focused on the specific case of Italian Mafia. Due to its unique modus operandi, its extremely solid structure and the colossal amount of funds owned, the three Mafias in Italy have become the most dangerous and influent criminal associations in the world. For this reason, economists should devote more attention to the understanding of this unique phenomenon, which could allow more informed policy recommendations to tackle the issue.

This research attempted to do so by examining the social and economic consequences of Mafias on the Italian economy. Employing a panel data fixed effects technique, it analysed the effects of specific mafia-type crimes on Italy's regional GDP per capita. The results suggest a strong negative relationship between the index for mafia crime and all the variables related to the Italian economic activity. The outcome shows that a rise of one unit in Mafia crime leads to a deterioration in regional GDP of 0.018% (significant at all confidence levels). The effect is also significant on the shares of value added, investment rate and school enrolment rates.

The effects of the mafia phenomenon go far beyond the economic sphere of societies. However, not all of the effects are directly quantifiable with econometric instruments. The loss of social capital, the underlying demoralisation and hopelessness cannot be estimated, and yet are amongst the most severe consequences of mafia-dominated societies. Nonetheless, the quantification of the effect on GDP of mafia is evident by the quantitative analysis. As a result of this econometric outcome, important policy implications can be drawn. Serious effort is required in fighting political corruption, which is the main channel through which mafia groups can access the legal economy and public contracts. A zero tolerance policy on organized crime implies more power to the local governments with an increased investments in legal structures, so that authorities can tackle mafia at its roots. As a suggestion for successful policy stories in combating organised crime, examples refer to those of Hong Kong, New York (US) and Singapore. By implementing a policy of no tolerance against corruption and mafia activities, they in fact experienced booming levels of development. By ensuring that legal and political institutions are re-established – meaning that the rule of law is enforced -, social capital and obedience to the civic norms will gradually follow, so that a fertile environment for growth is ensured.

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Appendix

Figure 10: Hausman Test

$$Chi^2(11) = (b - B)'[(V_b - V_B)^{-1}](b - B) = 33.33$$

$$ProbChi^2 > 0.0005$$

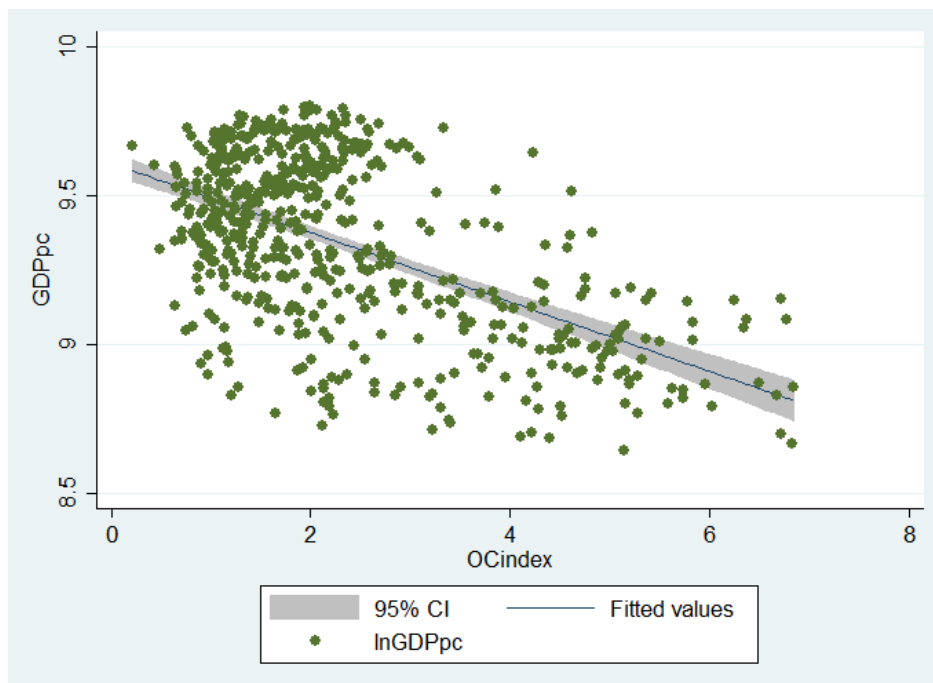**Figure 11: scatter plot with correlation between GDPpc and OCindex**

Figure 12: scatter plot with correlation between industry value added and OCindex
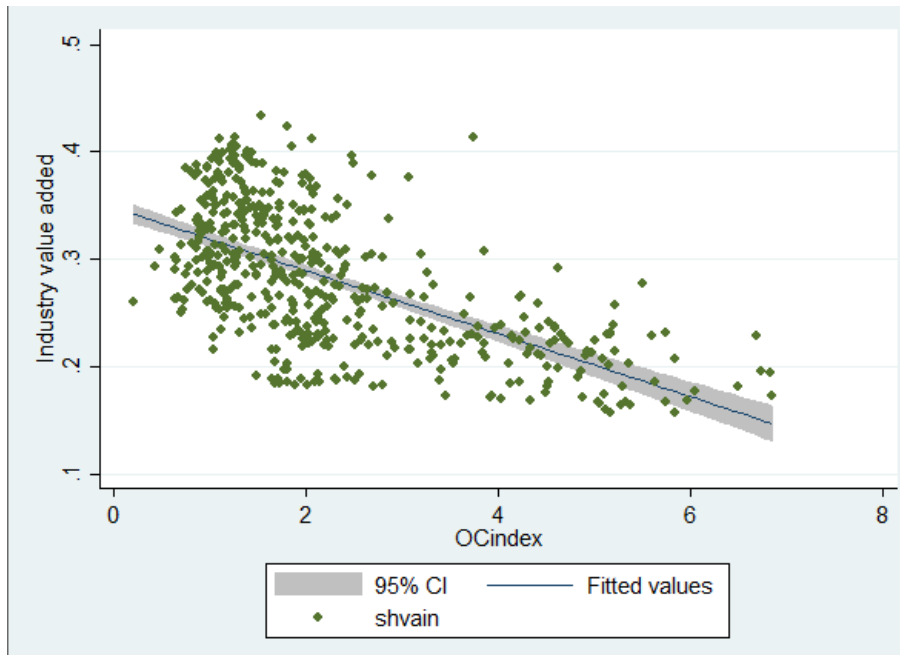

Figure 13: VIF test for multicollinearity (STATA)

Variable	VIF	1/VIF
Tertiary	5.6	0.178639
Industry	5.43	0.184003
Agriculture	5.29	0.189142
OCindex	1.75	0.570676
Inv.rate	1.58	0.632816
School	1.38	0.722519
Mean VIF	3.51	