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## Organized crime, the quality of local institutions and FDI in Italy: A panel data analysis

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## ABSTRACT

This paper examines the impact of crime on foreign direct investment (FDI) inflows in the Italian provinces. The incidence of organized crime is measured by the number of complaints regarding criminal offences of different kinds traditionally related to the *mafia* organizations. The results show how the correlation between organized crime and FDI is both negative and significant, even when an indicator of financial incentives for investment is included in the regressions. Our analysis shows that crime represents a deterrent for foreign investors, suggesting that high levels of (certain) crimes may be perceived as a signal of a local socio-institutional environment unfavourable for FDI.

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## 1. Introduction

Numerous studies show that the “quality” of the legal, political and institutional environment (“institutions” in a broad sense) tends to influence the amount of FDI received by a country. For instance, an institutional environment favourable for FDI includes: the ease with which a company can be set up, government effectiveness, security of property rights, the efficiency of judicial systems (Globerman and Shapiro, 2002; Altomonte, 2000; Bénassy-Quéré et al., 2007; Daude and Stein, 2007) and the lack of violence and corruption (Wei, 2000; Habib and Zurawicki, 2001; Broadman and Recanatini, 2000).

This paper aims to verify whether the quality of a socio-institutional environment also influences FDI at the regional level. The case considered is that of Italy, a country that is interesting for various reasons. In Italy there are major differences in the FDI amounts received by different regions: in the period 2005–2006, the eight Southern regions (the Mezzogiorno area), where 35% of the Italian population lives, received about 1% of total FDI inflow. Different socioeconomic conditions exist in the North and South of Italy. One major concern is the incidence of crime. It is well known that in the South there is a historically rooted presence of organized crime of the *mafia* type. This presence can be considered an additional risk (or an additional cost) for business. Crime, especially the *mafia*, may condition business activities in various ways: racketeering; retail market limitations; market distortions (Centorrino et al., 1999; Dawid et al., 2002). A high presence of organized crime should therefore be considered an aspect of an unfavourable business climate and, consequently, a disincentive for foreign and national investments.

Using data for different kinds of crime and a panel data analysis, this study examines the impact of crime on FDI inflow in 103 Italian provinces during the period 2002–2006. The results show that organized crime is negatively and strongly correlated with FDI inflow. This correlation is robust even when an indicator for financial incentives to investments is included in the regressions. Our analysis suggests that organized crime is a disincentive to investment and the possibility is not excluded that crime may be perceived by foreign investors as a signal of a socio-institutional system unfavourable for FDI.

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**Table 1**

FDI inflows in the Italian regions in percentage of Italy, 2005 and 2006.

Source: Italian Exchange Office (UIC).

Regions	2005	2006
Abruzzo	0.1	0.1
Basilicata	0.2	0.2
Calabria	0.0	0.0
Campania	0.3	0.2
Emilia Romagna	2.5	3.7
Friuli	0.1	0.1
Lazio	6.2	7.8
Liguria	0.5	0.7
Lombardy	69.7	68.2
Marche	0.1	0.0
Molise	0.1	0.0
Piedmont	15.5	11.4
Puglia	0.1	0.2
Sardinia	0.0	0.1
Sicily	0.0	0.0
Tuscany	3.6	1.9
Trentino A. A.	0.2	0.5
Umbria	1.0	0.8
Valle d'Aosta	0.0	0.0
Veneto	4.3	4.2
Centre-North	99.2	99.3
Mezzogiorno	0.8	0.7

Data refer to FDI gross flows IDE and do not include trade credits and transactions in the banking sector.

The remainder of the paper is as follows: [Section 2](#) illustrates the regional distributions of FDI inflows in Italy and its determinants; [Section 3](#) offers a brief review of the economic effects of crime; [Section 4](#) describes the data and the results of the empirical analysis. Finally, [Section 5](#) contains some conclusive remarks.

## 2. FDI in Italy

### 2.1. Regional distribution

FDI tends to be concentrated in certain areas in all countries. In Spain, Madrid and Cataluña are the main destinations of FDI; also in France, Greece and the UK there are clear differences between the regions.<sup>1</sup> In Italy, FDI is highly concentrated. As shown in [Table 1](#), Lombardy received 69% of the FDI inflows in the two-year period 2005–2006, followed by Piedmont (13%), and Lazio (7%). Other regional shares are far lower. Overall, the Centre-North of Italy received almost all the FDI inflows. The share of the Mezzogiorno area is residual, amounting to less than 1% of the national total. Equally high regional differences exist considering the FDI ratio of GDP. In the period 2000–2005, net FDI inflows represented 1.6% of GDP in the Northwest, 0.6% in the Central regions and just 0.1% in the South.

At provincial level, FDI concentration is even greater. [Table 2](#) shows the first and last ten provinces, ranked on the basis of FDI inflows in the period 2004–2006. Notably, the province of Milan alone absorbs over 66% of total FDI and the top three provinces are large urban areas. Moreover, the data show that nine of the last ten provinces are in the Mezzogiorno area.

The presence of FDI in Italian regions may be examined more in depth using data on the number of firms with foreign participation located in Italy. Of over 7100 firms with foreign participation operating in Italy in 2006, only 318 (4.5% of the total) had headquarters in Southern Italy ([Table 3](#)). By comparison, in Lombardy the number of firms with foreign participation was ten times higher than in the entire Mezzogiorno. As observed for FDI flows, the case of Lombardy is striking: half of all the Italian firms with foreign capital, generating over 45% of employment and sales of all such firms, are based there. Piedmont, Lazio and Emilia follow. Over 95% of sales and employment generated by multinationals headquartered in Italy in 2006 were in the Centre-North. Consequently, the Southern regions, with less than 5% of sales and employment generated by multinational enterprises, play a marginal role in the passive internationalisation of Italy.

### 2.2. Determinants of FDI inflows

The empirical literature on FDI determinants is extensive ([Barba Navaretti and Venables, 2004](#)). With particular reference to the European Union, some of the principle studies show how the location of foreign firms is guided mainly by the firms' specific

<sup>1</sup> For France, cfr. [Mayer \(2004\)](#); for Spain, [Hermosilla and Ortega \(2001\)](#) and [Pelegrín and Bolancé \(2008\)](#); for Britain, [Devereux et al. \(2007\)](#); for Greece, [Kokkinou and Psycharis \(2004\)](#). The regional distribution of FDI in Italy is examined, among others, by [Basile \(2001, 2004\)](#), [Basile et al. \(2004\)](#), [Daniele \(2005\)](#) and [Basile and Giunta \(2005\)](#).

**Table 2**

Top and bottom provinces ranked for FDI inflows in Italy in the years 2004–2006, in %.  
Source: Calculations on Italian Exchange Office data.

Rank	Provinces	FDI
1	Milan	66.46
2	Turin	9.25
3	Rome	6.33
4	Florence	3.06
5	Verona	2.86
6	Bologna	2.63
7	Cuneo	2.03
8	Terni	0.99
9	Alessandria	0.75
10	Vicenza	0.56
94	Foggia	0.001
95	Ragusa	0.001
96	Reggio Cal.	0.001
97	Gorizia	0.001
98	Agrigento	0.001
99	Catanzaro	0.001
100	Caltanissetta	0.001
101	Enna	0.000
102	Vibo Valentia	0.000
103	Oristano	0.000

characteristics and, to a lesser extent, by observable national or regional factors. Although these factors are diverse depending on the Countries considered, the empirical literature on FDI determinants indicates some fundamental characteristics common to the Countries or regions in which foreign investors tend to invest (Crozet et al., 2004; Artige and Nicolini, 2005; Barrios et al., 2006; Devereux et al., 2007; Barry et al., 2007). In the European Union, FDI tends to locate in regions with: 1) a large potential internal and external market; 2) high population density; 3) the presence of other foreign investors (signal effect); 4) good infrastructure and accessibility; 4) a highly educated workforce and a high level of R&D expenditure; and 5) the presence of agglomeration economies, determined by numerous competitors, clients and suppliers within the firm's industry (Alegría, 2006; European Commission, 2006).

Some recent literature has been devoted to investigating how FDI is influenced by diverse national political, institutional and legal systems (Globerman and Shapiro, 2002; Bénassy-Quéré et al., 2007). The quality of institutions may be important for FDI for several reasons. Firstly—according to studies on long-term growth determinants—efficient institutions improve productivity prospects and this attracts investors. Secondly, a poor institutional environment means additional costs for firms: often the case with crime and corruption (Broadman and Recanatini, 2000; Wei, 2000; United Nations, 2007). Furthermore, due to high sunk costs—FDI is highly exposed to uncertainty, including that stemming from poor government efficiency, graft or the weak enforcement of property rights and of the legal system. Studies generally confirm that a “good” institutional environment is an important determinant for FDI inflows. This institutional environment—or “governing infrastructures”—includes, for instance, the ease with which a company can be set up, government effectiveness, security of property rights, the efficiency of the judicial systems and the lack of corruption (Habib and Zurawicki, 2001; Bénassy-Quéré et al., 2007; Daude and Stein, 2007). The World Bank (2001) and some case-studies (United Nations, 2007; Broadman and Recanatini, 2001) suggest that the attraction of investments is greater in areas with low levels of crime and corruption. From the international literature it emerges clearly, therefore, how the quality of the institutional system and the business climate influence decisions regarding foreign companies' choice of location. Such an effect could also be relevant at regional level when, as in Italy, notable differences exist in the quality of the local socio-institutional environments.

### 3. Crime as an economic disincentive

The effects of organized crime on economic development in Italy have been widely examined from the sociological and historical points of view, but far less so from the economic viewpoint. Economists, in fact, have often concentrated more on the

**Table 3**

Number, employees and sales of Italian firms with foreign participation.  
Source: Elaborations of the Reprint data base, ICE-Milan Polytechnic.

Years	Firms		Employees		Sales	
	Centre-North	South	Centre-North	South	Centre-North	South
2001	6359	329	850,698	62,136	315,290	18,611
2004	6739	347	867,294	60,071	346,353	18,031
2006	6776	318	811,144	46,895	378,597	15,481

For the region where the firm is headquartered; data refer to total participation and to January 1st in each of the years considered.

determinants of criminality than on the effects that it produces on the economy (Marselli and Vannini, 1997; Buonanno, 2006). Some recent studies show, however, how organized crime can influence both economic growth and the quality of local institutional systems (Centorrino and Ofria, 2008; Peri, 2004). Crime conditions business activities in many ways. Generally, it increases the risks for (and the costs of) investment because of possible attacks, intimidation and the destruction of property. One typical criminal activity—particular of the *mafia*—is the extortion racket. It ensures a fixed income, generally directed to financing other illegal activities, and allows criminal organizations to exercise widespread territorial control where a clan exercises its power. *Mafia* organizations also control the local economy in other ways. Clans often force legal companies to purchase raw materials from specific suppliers, hire personnel that are linked to the organizations and respect obligations or limits to sales markets. Extortion and the control of a part of the legal economy have been well documented in judiciary inquests and are the subjects of much research (La Spina and Lo Forte, 2006; CPI, 2008).<sup>2</sup> Numerous inquests testify how organized crime even manages to condition the activities of large companies involved in public works in Southern regions (Confesercenti, 2007). Furthermore, through violence or corruption, it imposes monopolies, conditioning the functioning of the markets and local institutions, distorting the allocation of resources and pocketing a part of public expenditure, including European funds for regional development (CPI, 2008). The functional capabilities of the market and the institutions are therefore compromised and, as a result, the development of the same local economies is negatively affected (Centorrino and Signorino, 1993).

The presence of organized crime imposes notable economic (and social) costs in many areas of Southern Italy. One such cost, which is rarely considered, derives from the fact that the criminal presence tends to discourage both domestic and foreign investment. Confirmation of this comes from some surveys directed at potential investors, both Italian and foreign. One survey conducted of a panel of businessmen from North-Eastern Italy, shows how almost all those interviewed (92.6%) believed the presence of criminality to be the principal block to investment in the Mezzogiorno area (Marini and Turato, 2002). An enquiry conducted on behalf of the Ministry of the Economy in 11 Countries confirmed that, in businessmen's perception, Mezzogiorno appears to be an area lacking conditions of security (Gpf-Ispo, 2005).<sup>3</sup> The deterrent effect of crime on foreign investors has been highlighted for years by economists. Over twenty years ago, Sylos Labini (1985) and Olson (1984) observed how the presence of organized crime in the South forces companies to transfer elsewhere, discouraging those who intend to invest. Although rich with implications, the observations of Paolo Sylos Labini and Mancur Olson have received little attention. Only recently have some studies on FDI determinants considered the crime rate among the explicative variables used in the analysis, showing how, in Italy, high crime rates tend to be negatively correlated with the regional capacity to attract foreign investors (Basile, 2001; Paziienza et al., 2005; Daniele, 2005, 2007; Daniele and Marani, 2008).

With respect to these studies our analysis differs in method and content. We used panel data for a disaggregated level of territory (103 provinces) and different estimation procedures; furthermore, we considered different crimes, focussing in particular on those of the *mafia* type. As far as we are aware, our research constitutes the first attempt aimed explicitly at estimating the impact of crime on FDI in Italy.

### 3.1. Measuring organized crime

It is not easy to quantify the territorial spread of organized crime (in particular the *mafia*). Data are often lacking and, for certain crimes, the number of complaints tends to under-report the effective dimension of the phenomenon. Notwithstanding these limitations, we based our calculations on official data in order to estimate the incidence of different crimes. It should be made clear that not all offences are typical of organized crime: some, such as theft, corruption or sexual violence are not, generally, typical of criminal organizations, above all the *mafia*. For these reasons, and on the basis of studies on the subject, we constructed an *index of organized crime* based only on certain crimes: extortion, bomb attacks, arson and criminal associations.

As already mentioned, extortion represents a crime typical of the *mafia*. As judiciary inquests testify, all clans exercise their power in a territory through extortion, however official data notably under-report the numbers of crimes committed, particularly in Southern regions. Whenever extortion is imposed by *mafiosi*, only a small number of victims actually denounce the crime. Estimates and inquiries into victimisation show how, in many Southern provinces, the phenomenon is much greater than in fact indicated by the data based only on complaints. According to some estimates provided by the Confederation of commercial activities, in 2007, the 'racket of kick-backs' touched 70% of Sicilian entrepreneurs, 50% of those in Calabria, 40% of those in Campania, and 30% of those in Apulia, for a total of over 120,000 in all (Confesercenti, 2007).<sup>4</sup> In Sicily, the estimated costs of extortion represent 1.3% of the overall regional GDP (Asmundo, and Lisciandra, 2008).

<sup>2</sup> According to the data contained within the Annual Report of the Parliamentary Commission of Inquest on criminal organisations (Commissione parlamentare, 2008), in the area of the judicial district of Catanzaro, in Calabria, companies which resist the pressures from organized crime are practically non-existent; furthermore, the report carries the denouncements made by the representative of a large Tour Operator, Parmatour, who declared that tourist resort villages in Calabria were systematically subject to extortion.

<sup>3</sup> The issue of security and its importance for internal and external investments in the *Mezzogiorno* has long been part of the political and economic debate in Italy. Recently, a series of events has made this issue one of the most urgent for development in Southern Italy. The Federation of Antiracket and Anti-usury Associations (FAI) has proposed the establishment of a "security tutor" for foreign firms interested in investing in the *Mezzogiorno* (FAI, *Antiracket tutoring, Experimental three-year project*, Naples, 12 December 2007). One of the reasons behind the above project was the declaration made by the President of the Italian Council of Ministers at the Anti-mafia summit, on November 17th 2006, according to which organized crime represents a significant deterrent for foreign firms interested in investing in Southern Italian regions.

<sup>4</sup> Such estimates must be considered very prudently because of the lack of a controllable methodology in collecting and processing the data.

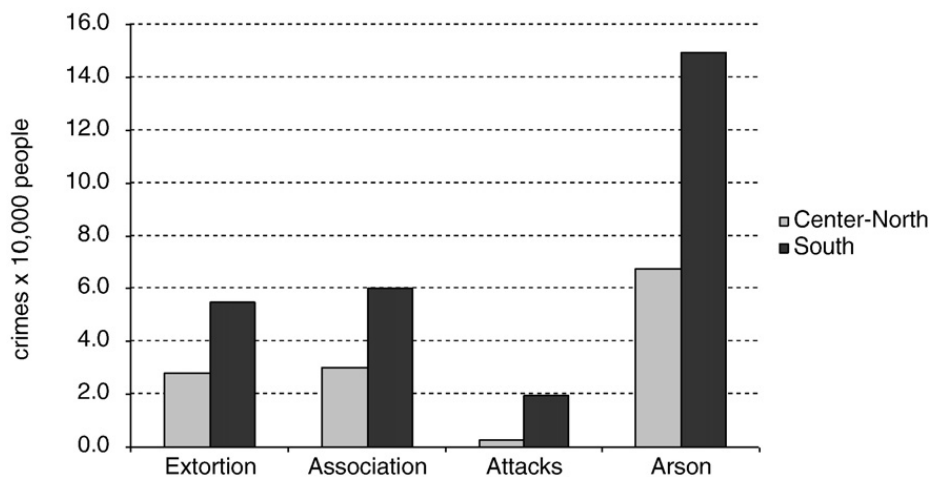


Fig. 1. Crime incidence per 10,000 inhabitants, 2000–2005. Cumulated values.  
Source: Calculations on Istat data “Territorial information system on justice”.

Since the number of complaints only partially represents the effective extent of the racket, it is necessary to consider other crimes which are symptomatic indicators of the activities of organized crime such as bomb attacks and arson. These crimes, used to threaten and intimidate the economic operators or politicians, obviously cannot be concealed by the victims, as often happens in the case of extortion (La Spina and Lo Forte, 2006). Finally, we considered the number of people denounced for criminal association, including *mafia*-type association; crimes which are foreseen by Italian Penal Code. To summarize, with the calculation of the incidence of organized crime being given by the sum of the four crimes (extortion, bomb attacks, arson, and criminal association) per 10,000 inhabitants, in the period 2001–2005 these crimes represented approximately 1% of the cumulative total of all crimes denounced in Italy.

Fig. 1 shows the incidence of the four considered crimes. On average, the incidence of these crimes is far higher in the *Mezzogiorno* with respect to the rest of Italy. Significant differences exist between Southern regions; crime is, in fact, extremely high in Calabria, Campania, Sicily and Apulia, regions where the *mafia* organizations, *Cosa nostra*, *Ndrangheta*, *Camorra* and the *Sacra corona unita*, are historically based. Fig. 2 illustrates the “geography of crime” through our index of organized crime. Not only does Fig. 2 indicate the clear existence of significant differences between the North and South, but it also seems to faithfully reproduce the “map” of the *mafia families* that emerges from judicial enquiries and reports compiled by those Institutions that deal with criminal phenomena (CPI, 2008). On the basis of these indices we shall examine the impact of crime on FDI in the following paragraph, seeking to verify through the data whether, as the entrepreneurs interviewed in the surveys and numerous economic analysts and politicians maintain, crime is an effective block for potential foreign investors.

#### 4. The empirical analysis

##### 4.1. Data description

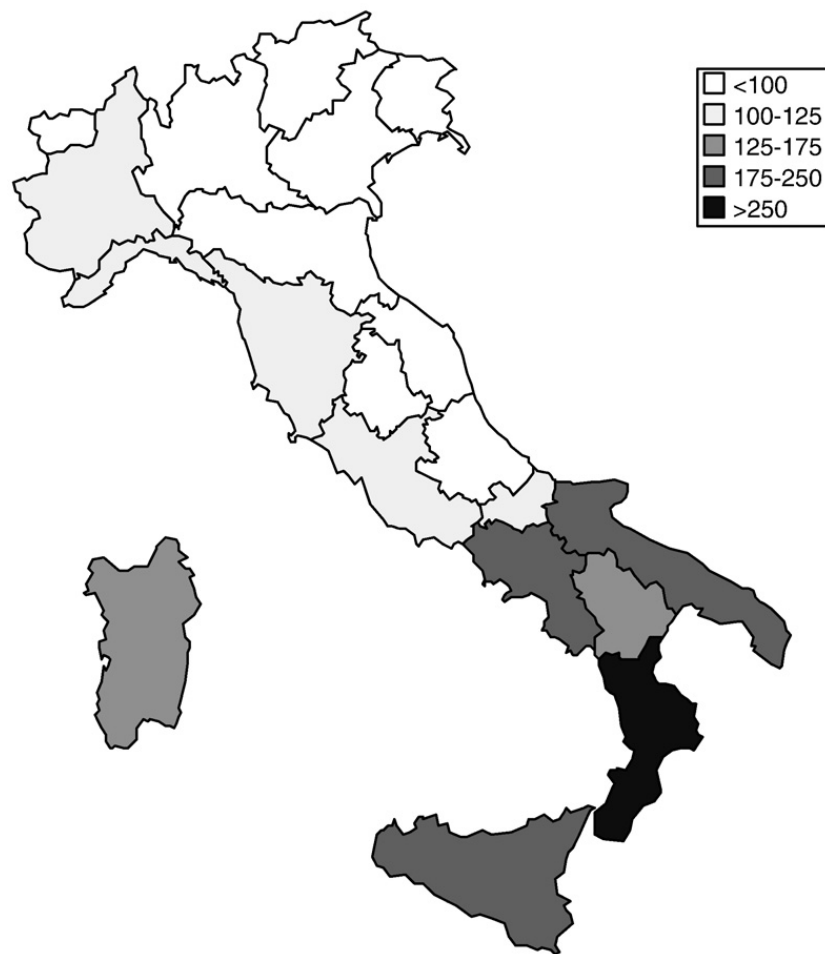
To estimate the impact of crime on FDI we constructed a dataset comprising observations for 103 Italian provinces for the period 2002–2006. Our empirical exercise uses a log-linear equation that is consistent with the theoretical background on the determinants of FDI inflows. The basic equation takes the following form:

$$FDI_{i,t} = \alpha + \beta_1 X_{i,t-1} + \beta_2 Crime_{i,t-1} + w_{it} \quad (1)$$

where  $i$  represents province,  $t$  time and  $w_{i,t} = e_i + u_{i,t}$  is the error term. The dependent variable is the log of FDI inflow in the provinces,  $X_{i,t-1}$  is a set of lagged control variables, while  $Crime$  is a measure of the incidence of crime.

*Dependent variable.* The data on FDI inflow in the Italian provinces is gathered by UIC (the Italian Office of Exchange) in order to compile the balance of payments. In conformity with international definitions, the FDI establish a long-term interest between a company headquartered abroad and one headquartered in Italy. Hence the definition comprises fusions with Italian companies and acquisitions, even partial, by foreign firms and the greenfield investments, although UIC data do not allow us to distinguish between the two types of direct investment.<sup>5</sup> Because of the way in which they are collected, the data on FDI present some

<sup>5</sup> According to the official definitions, a direct investment enterprise is an incorporated enterprise in which a foreign investor owns 10% or more of the ordinary shares or voting power for an incorporated enterprise, or an unincorporated enterprise in which a foreign investor has equivalent ownership (IMF-OECD, 2000).



**Fig. 2.** Organized crime index, 2001–2005. Cumulated values per 10,000 inhabitants (Italy = 100). Source: Elaborated from Istat data, “Territorial information system on justice”.

limitations, the most important of which is the fact that when investment flows transit via one or more intermediaries, the methods of reception (immediate beneficiary) do not permit control over the final geographical destination (Mariotti and Mutinelli, 2009). For this reason, the comparison between data on flows and those relative to the number of multinational companies should be made with great care. Notwithstanding limitations, the regional distribution of foreign firms that results from data on FDI and data based on the number of plants, presents many similarities; furthermore, empirical research on FDI determinants, conducted using the two data-sources, generally leads to similar conclusions. The FDI data have the advantage of provincial (and sectoral) disaggregation and of a wide temporal coverage, permitting comparison to analogous data furnished by international institutions. Furthermore, these data are used both in empirical analyses on the determinants of FDI (Bronzini, 2004) and in descriptive research to quantify Italy's attractiveness to investors.

*Crime measures.* The incidence of organized crime is measured by the index described in Section 3.1, constructed as the sum of extortion, bomb attacks, arson and crimes of criminal association per 10,000 inhabitants. Other kinds of crimes have been considered as control variables: the number of crimes against property (with the exception of that included in the “organized crime index”), and thefts and robberies, per 10,000 inhabitants. All data on crime is collected by the Italian national institute of statistics (Istat) in the *Informative System on Italian Justice*.

*Control variables.* On the basis of studies on FDI determinants, we have included some control variables in the regression which are related both to the dimension and to the structure of the provinces in economic terms. Market size, which as studies show is the principal determinant of FDI, is approximated by two variables: one is the log of the resident population (*Population*) in each province, while the other is the share of provincial GDP of that of the region (*Size*). Since there are strong regional differences in the level of development between Northern and Southern Italy, we have considered GDP per capita (in log) as a control variable. We have also included a measure of the degree of openness of the provincial economy, calculated by exports of GDP (*Export*) and a proxy of R&D activities, given by the number of patents presented to the European Patent Office (*Patents*). Furthermore, some variables related to the economic and productive structure have been considered. These are the share of medium and large firms (with more than 50 employees) of the total number, and the number of firms in non-agricultural sectors per 1000 people (*Firms*). Since the location of companies also tends to be influenced by an area's

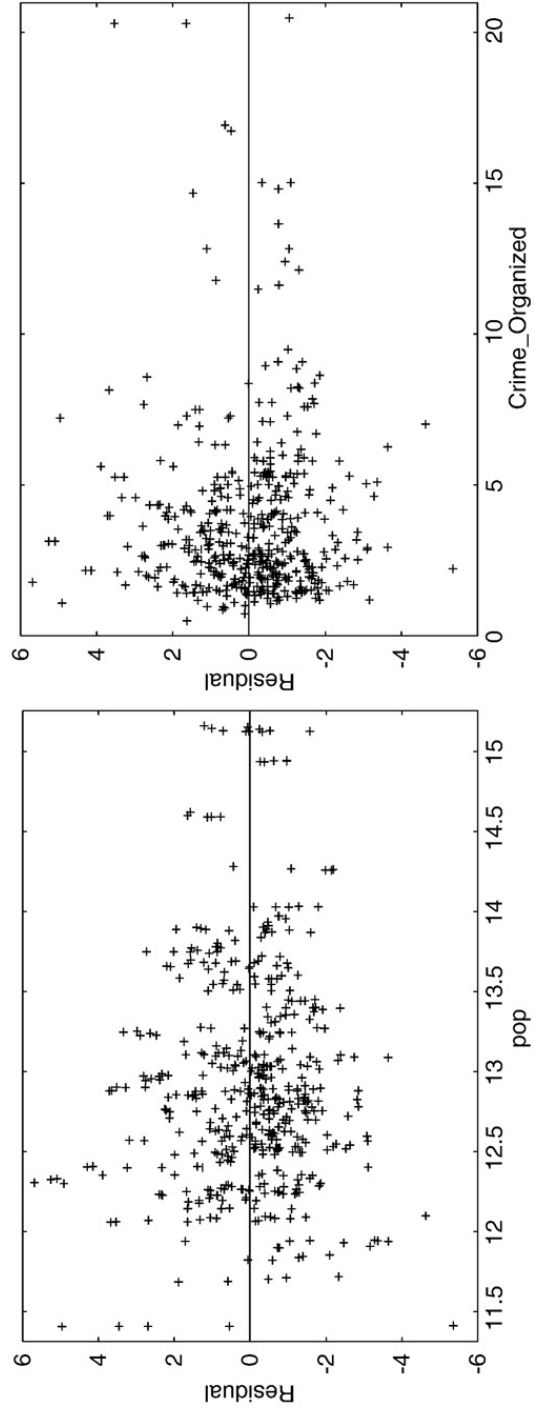


Fig. 3. Regression residuals.



**Table 4**  
Diagnostic for the basic model.

Test	Results
White	LM = 40.48; $p$ -value = $P(\text{Chi}^2(9) > 40.48) = 0.000$
Wald <sup>a</sup>	$\text{Chi}^2 103 8049.87$ ; $p$ -value = 0
Joint significance $F$	$F(102.4) = 4.40$ ; $p$ -value 0.000
Breusch–Pagan <sup>b</sup>	LM = 160.7; $p$ -value = prob. ( $\text{Chi}^2(1) > 160.7$ ) = 0.000
Hausman test <sup>c</sup>	$H = 5.34$ ; $p$ -value = prob. ( $\text{Chi}^2(3) > 5.34$ ) = 0.14

FDI is regressed on GDP per capita, population and organized crime index.

<sup>a</sup> Based on FGLS residuals.

<sup>b</sup> A low  $p$ -value counts against the null hypothesis that the pooled OLS model is adequate, in favour of the fixed effect alternative.

<sup>c</sup> A low  $p$ -value counts against the null hypothesis that the random effects model is consistent, in favour of the fixed effects model.

accessibility, we considered an index of total infrastructural endowment (*Infrastructure*). We then inserted, among the regressors, a proxy of the financial incentives to companies conceded under Law no. 488/92 (*Incentives*) which, in the period under examination, was the principal instrument of incentives for investment in Italy. This variable was considered in order to evaluate whether financial incentives and subsidies, conceded particularly to companies investing in Southern Italy, are capable of attracting foreign companies to areas where disincentives tied to the social and institutional context exist. Table 1 in the appendix describes the data and their sources.

#### 4.2. Estimations results

The standard assumption of homoskedasticity in the regression disturbances seems too restrictive for panel data where the cross-sectional units have different sizes and, consequently, different variations (Baltagi, 2008). In this case, problems such as group-wise heteroskedasticity are likely to arise, producing consistent but non-efficient estimates. To choose the most appropriate estimator, we start by considering the basic specification of Eq. (1), with GDP per capita, population and crime index as explanatory variables. The plot of the residuals, illustrated in Fig. 3, and the results of the standard tests for heteroskedasticity—White's and Wald's tests—clearly reject the hypothesis of homoskedastic disturbances. Table 4 reports the results of the diagnostic

**Table 5**  
Organized crime index and FDI inflows.

	[1]	[2]	[3]	[4]	[5]	[6]
Const	−72.37** (−35.74)	−62.00** (−22.18)	−61.71** (−19.67)	−61.65** (−19.57)	−62.75** (−19.26)	−61.54** (−17.88)
Organized crime	−0.039** (−2.39)	−0.046** (−2.71)	−0.046** (−2.69)	−0.047** (−2.69)	−0.047** (−2.75)	−0.042** (−2.41)
GDP pc	5.831** (29.87)	4.918** (19.12)	4.901** (18.20)	4.902** (18.17)	5.029** (17.56)	4.954** (15.38)
Population	1.952** (33.97)	1.757** (24.55)	1.745** (18.94)	1.741** (18.81)	1.757** (18.86)	1.706** (16.67)
BigFirms		0.463* (1.95)	0.4845* (1.95)	0.457 (1.32)	0.359 (1.01)	0.552 (1.52)
Firms		0.0082** (3.08)	0.0082** (3.07)	0.0081** (3.00)	0.0064** (2.13)	0.0068** (2.26)
Patents		0.0029** (4.85)	0.0029** (4.80)	0.0029** (4.76)	0.0030** (4.89)	0.0031** (4.85)
Size			0.0006 (0.21)	0.0008 (0.26)	0.0003 (0.11)	0.0011 (0.34)
Export				0.052 (0.11)	0.053 (0.11)	−0.102 (−0.22)
Infrastr					−0.001 (−1.29)	−0.001 (−1.09)
Incentives						0.0001 (0.103)
$n$	515	515	515	515	515	492
$R^2$ adj.	0.86	0.87	0.87	0.87	0.87	0.88
$\ln L$	−728.3	−724.6	−724.3	−724.3	−723.8	−690.5

Method: Group-wise WLS.  $T$ -statistics in parentheses.

\* Indicates significance at the 10% level.

\*\* Indicates significance at the 5% level.

Table 6

Effects of different crimes on FDI inflows.

	[1]	[2]	[3]
Const	−67.67** (−24.37)	−66.50** (−24.81)	−64.88** (−22.66)
GDPpc	5.369** (19.77)	5.189** (19.29)	5.033** (17.68)
Population	1.856** (24.82)	1.891** (20.91)	1.856** (24.42)
BigFirms	0.4386* (1.72)	0.5667** (2.36)	0.7801** (2.86)
Firms	0.0089** (3.09)	0.0088** (3.04)	0.0115** (3.65)
Patents	0.0026** (4.50)	0.0024** (4.02)	0.0023** (3.73)
Infrastr	−0.0011 (−1.06)	−0.0010 (−0.97)	−0.0011 (−0.99)
Theft	−0.0007 (−1.57)		
Robberies		−0.0091 (−1.23)	
Prop. crime			−0.0002 (−0.70)
<i>n</i>	515	515	442
<i>R</i> <sup>2</sup> adj.	0.87	0.87	0.87
lnL	−725.5	−726.8	−622.3

Method: Group-wise WLS. *T*-statistics in parentheses.

\* Indicates significance at the 10% level.

\*\* Indicates significance at the 5% level.

for panel data—*F* statistic, Breusch–Pagan's test and Hausman's test—that suggest that the fixed effect model is not adequate for the nature of the data. Based on this, in our analysis we used a group-wise weighted least square (WLS) estimator for panel data, a specific case of Feasible GLS estimators. The FGLS estimator is consistent under the basic random effects assumptions, and is advisably used when dealing with simple forms of autocorrelation or group-wise heteroskedasticity (Wooldridge, 2002: 257–264).

Table 5 reports the results of estimations. The model is sufficiently robust and with a high explicative power. The results confirm how the provincial distribution of FDI inflows is primarily influenced by the level of development and by the dimension of the local market, as measured by resident population. Nevertheless, the number of firms, the proxy of R&D activities (*patents*) and the share of large firms result among the determinants of FDI. In all specifications, the organized crime index is significant and negatively correlated with FDI. Furthermore, it is possible to observe how financial incentives to investment do not seem to influence the distribution of FDI, probably because such incentives are granted in greater measure to those firms that invest in the less developed areas of the country, and therefore this variable also tends to reflect some regional characteristics. To analyse the effects of crime in further depth, we have taken into consideration other specifications that include the incidence of theft and robberies and the rate of crimes against property (*Prop. crime*) as control variables. The results of estimations, reported in Table 6, show an absence of correlation between these crimes and FDI, while the other explanatory variables are significant and with the expected sign. This is not a surprising result: in fact, research shows that the incidence of crime (excluding *mafia* type) is generally higher in those areas with greater economic activity (Cracolici and Uberti, 2009). In our analysis, this would suggest that not all crimes, but only some linked to the presence of a *mafia*-type organization, tend to discourage potential investors.

## 5. Conclusive remarks

Using data for 103 Italian provinces, we have examined the impact of organized crime on FDI. The main results obtained can be summarized as follows:

- a significant, negative correlation between the index of organized crime and FDI was found;
- such a correlation results as being significant even when a proxy of the financial incentives to investment is included among the explanatory variables.

The results obtained are coherent with those surveys that contain the opinions of potential foreign investors, regarding opportunities for investing in Southern Italy. In other words, our analysis confirms how organized crime is a factor capable of greatly reducing the degree of regional attractiveness. It is possible to observe how, in some areas, crime is only one aspect—

certainly the most evident and dramatic—of a social and institutional context characterised by other forms of illegality that include corruption and, even more widespread, the violation of regulations that are non-penal but important for the correct functioning of the economy (Del Monte and Papagni, 2001, 2007; La Spina and Lo Forte, 2006). Overall, forms of illegality determine a socio-institutional context that lacks some fundamental public goods, such as legality and security.

Numerous studies have shown how the national institutional environment is an important determinant of FDI (Globerman and Shapiro, 2002; Bénassy-Quéré et al., 2007; Busse and Hefeker, 2007). In the case of Italy, ample economic and sociological literature attests the existence of significant differences in the “quality” and functioning of the regional socio-institutional systems, in particular between the North and the South of the country: these are historical differences, capable of influencing long-term economic development (Putnam, 1993; Peri, 2004). Since the presence of organized crime in Italy also shows marked regional differences, we cannot exclude that particularly high crime levels, in addition to discouraging investment, are also perceived as signalling an unfavourable business climate, particularly by potential foreign investors, who generally have less access to available information. In other words, in a situation where perceptions and expectations play an important role, a high presence of organized crime could determine a negative image of the local socio-institutional environment and discourage FDI. In general terms, our analysis suggests that the quality of the local institutional system can influence decisions regarding the location of foreign firms. The policy implications that can be derived are obvious. In the case of Italy, the improvement of conditions of security (and, possibly, of the quality of the local socioeconomic context) is a fundamental prerequisite for increasing the regional attractiveness for FDI and, presumably, the effectiveness of policies devoted to attracting foreign investors in the less developed area of the country.

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## Appendix A

**Table 1**

Description of variables and sources.

Variables	Description	Sources
FDI	Logarithm of the average FDI inflow in the provinces in the period 2004–2006. The data refers to the investment flows and does not include commercial credits and banking sector transactions.	Italian Exchange Office (UIC)
Population	Natural logarithm of the resident population in each Italian province. Proxy of the size of the local market.	Elaborated from ISTAT Census data.
GDPpc	Natural logarithm of pro capita GDP. Proxy of the level of development.	Elaborated from ISTAT data.
Size	Provincial GDP on the GDP of Italy. Proxy of the size of the local market.	Elaborated from ISTAT data.
Incentives	Variable of proxy of the financial incentives granted to firms, given to the investment projects granted under the Law 488/92. Data refers to the projects for creating new production plants in the industrial sector (excluding “special industry” calls for proposals).	Ministry for Economic Development—Ipi-Print databank
Firms	Number of firms in non-agricultural sectors, per 1000 inhabitants.	Elaborated from ISTAT data.
Export	Total export on GDP.	Elaborated from ISTAT data.
Patents	Number of European patents presented to the European Patent Office (EPO).	European Patent Office—Unioncamere
Bigfirm	Share of firms with more than 50 employees out of the total number of firms.	Elaborated from ISTAT data.
Infrastructures	Synthetic index of infrastructure endowment (excluding ports) in percentage terms compared nationwide.	G. Tagliacarne Institute
Extortion	The number of crimes of extortion denounced per 10,000 inhabitants.	Elaborated from Istat data, “Territorial Informative System on Justice” (online databank).
Association	The number of crimes of criminal association denounced, including ‘mafia’ association, per 10,000 inhabitants.	Elaborated from Istat data, “Territorial Informative System on Justice” (online databank).
Attacks	Number of (bomb) attacks, per 10,000 inhabitants.	Elaborated from Istat data, “Territorial Informative System on Justice” (online databank).
Arson	Number of cases of arson, per 10,000 inhabitants.	Elaborated from Istat data, “Territorial Informative System on Justice” (online databank).
Theft	Number of thefts, per 10,000 inhabitants.	Elaborated from Istat data, “Territorial Informative System on Justice” (online databank).
Robberies	Number of robberies, per 10,000 inhabitants.	Elaborated from Istat data, “Territorial Informative System on Justice” (online databank).
Organized crime	Sum of extortion, attacks arson, association (as above defined) per 10,000 inhabitants.	Elaborated from Istat data, “Territorial Informative System on Justice” (online databank).
Property crime	Total number of crime against property (with the exception of that included in the “organized crime index”).	Elaborated from Istat data, “Territorial Informative System on Justice” (online databank).

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