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**INFORMAL SOCIAL NETWORKS, ORGANISED CRIME AND
LOCAL LABOUR MARKET**

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Informal social networks, organised crime and local labour market

Antonella Mennella[*]

Abstract

This paper's purpose is to show a new informal social networks interpretation, according to which social networks change their nature if they are located in social contexts where organised crime is relevant. Here the perusal of a social network is just a necessary condition to enter the labour market rather than a deliberate choice. Moreover this labour market is the ground where favouritisms and social and electoral consensus policies take place.

Abstract

Lo scopo di questo studio è dimostrare come si possa attribuire un'interpretazione alternativa, rispetto a quella offerta dalla letteratura economica, dei reticoli sociali nel mercato del lavoro se osservati in contesti in cui è forte la presenza del crimine organizzato. In tal caso il ricorso alla rete per fini occupazionali non è frutto di una libera scelta ma diventa condizione necessaria per poter accedere al mercato del lavoro: un mercato che diventa così il campo sul quale vengono giocate le politiche clientelari e quelle del consenso sociale ed elettorale.

Key words: social networks, organised crime, labour market

Jel code: D85, J64, K00

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1. Introduction

Further to the recent and increasing attention on the ways and related issues through which workers/employers are looking for a job/an appropriate application, labour force and employer surveys are starting including questions about channels used to find a job or to hire a worker. In the last case, concerns arise about the screening selection process (approach). Surveys often use multiple response questionnaires listing the different search channels, and, among those, appear also informal social networks. These ones in most cases, turn out to be the preferred channel used by labour market players.

The economic literature on the issue consists of studies focussing on the effects of the use of this kind of channel on unemployment tenure, wages, productivity and so on. The main difference among them entails the network: some studies analyse its structure, size and density whereas others focus only on the choice of this channel by the labour market players but do not investigate on its characteristics. However, they do not analyse the nature of the network. Up to now, the literature proposes a sterile/positive interpretation of social networks, referring to them predominantly as relations providing information on job opportunities. My point of view is that behind the networks there could be a degenerative phenomenon for which social networks become a barrier for free labour market access. This wall is built by a "business-bureaucratic-political and criminal network" where organised crime often plays the main role.

The literature on organised crime too assumes a generic position about its effects on network's dynamics associated with the labour market. Therefore we are entering an unexplored dimension that links labour market, organised crime and informal social networks.

The purpose of this work is to present an alternative interpretation of the network assuming that this sterility does not exist. I introduce two possible interpretations of the informal social network's nature: a positive one and a negative one. The latter represents what I call the *black side* of the network: my objective is to prove that the use of informal social networks by jobseekers is higher in contexts where organised crime is dominant.

Using and opportunely changing the Calvò-Armengol and Zenou (2003) model, I consider two types of crime (micro and organised) and I relate them to the informal network use.

The estimation of this relationship is carried out using an organised crime index (regressor), calculated using statistics from the *Home Office* and *National Statistics Office*, and a dummy variable capturing the use of informal social networks (dependent variable), drawn out from the Survey on Household Income and Wealth - SHIW of the Bank of Italy (that provides information about job search methods: informal social networks, PES and so on). It is hypothesized that there is a positive but decreasing relationship between micro and organised crime. This relationship is tested introducing an innovative crime equation in comparison to the ones usually employed in literature. Therefore there are two econometric estimates: one refers to the crime equation and the second one to the social network equation. Both are based on cross section analysis for the year 2004: in the former estimate I run an OLS regression on the Italian provinces[1], in the latter estimate I run a Probit regression on the Italian regions.

The paper is organised as follows. Section 2 presents a short review of the literature on informal social networks in labour market, Section 3 focuses on Italian economic literature on organised crime. The subsequent section highlights the new concept of informal social networks and explains the introduction of organised crime in the relationship between informal channels and labour market. The theoretical model, with the new three hypothesis, is developed in Section 5. Section 6 presents the econometric estimates and Section 7 closes the paper.

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[1] Provinces are local authorities and represent a territorial partition of Italy. It is divided into 20 regions and each regions is divided, in turn, into provinces. The number of these last ones vary among regions. For example the region Lazio is divided into 5 provinces (Roma, Viterbo, Latina, Frosinone, Rieti) whereas region Umbria into 2 provinces (Terni and Perugia). Finally, the provinces comprise municipalities. For example the province of Rome is composed by 121 municipalities and Roma is one of these.

2. The role of social networks on labour market

Informal social networks play an important role in the labour market and this fact is well known by economists. The literature on social networks highlights the positive network's effects resulting in a shorter unemployment period, due to higher break-even levels of labour supply and demand, and to the fluctuations of wage premiums. Bentolila and others (2004), Holzer (1987), Calvò – Armengol (2004), Lindeboom and others (1994), Linda Datcher Loury (2006) and Marmaros – Sacerdote (2002), for example, confirm the positive relationship between social contacts and probability to be employed. Some of these papers point out that the positive effects are often mitigated by the negative ones which arise from the mismatching problem and productivity reduction.

This positive relationship has been confirmed by Datcher Loury but at the same time she found that network efficiency depends either on network composition or source of information. Marmaros and Sacerdote (2002), utilizing a survey carried out by *Darmouth College*, in 2001, highlighted the possible causality between job opportunities and inclusion in students' lobbies. Positive relationship between social networks' use and probability to find a job is criticised in few papers. Cahuc – Fontaine (2002) and Fontaine (2004), for example, show that active labour market policies that tend to encourage social capital produce an increase of unemployment rate and a decrease of jobseekers' wealth, whereas positive effects associated to the labour demand side persist[2]. Calvò – Armengol and Zenou (2003a, 2003b), prove the existence of a network's size critical value over which there is a decreasing matching relation. This value affects the equilibrium unemployment rate, which decreases when the network's size is lower than the critical value and increases when the network's size exceeds that value.

There are different positions on social contacts and wages. Some papers assert that jobs found trough informal social networks lead to higher wages (Kugler 2003, Calvò-Armangol and Jackson 2007, Holzer 1988, Santamaria Garcia 2004). Moreover, Santamaria Garcia finds that this channel is privileged by unskilled workers. An important contribution for the understanding of informal social networks in the labour market has been given by Montgomery (1991, 1992, 1994). In alternative to Bridge-Villemez's (1986) position, he highlighted that Granovetter's (1995, 1998) hypothesis of the "strength of weak ties" is corroborated in terms of unemployment tenure but not definitely in term of wages. In fact, while Lin (1982) supports the idea that there are higher wages associated with weak ties, Granovetter demonstrates that weak ties lead, on average, to lower wages.

Bentolila and others (2004) show that jobs found through social networks require a low professional profile and provide lower wages than jobs found through formal channels. Similar results are found in Italy by Pistaferri (1999) and Pellizzari (2004a, 2004b). Cingano and Rosolia (2006), instead, conclude that there exists an inverse relationship between network quality and unemployment tenure.

Some authors argue that in order to understand the labour market outcomes of a jobseeker using informal networks it is necessary to take into account the network structure (Calvò-Armengol 2004, Calvò – Armengol – Jackson 2004)[3]. These papers use Social Network Analysis – SNA that studies informal social network architecture[4]. Finally, there is a branch of literature that studies how

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[2] Positive effects refer to information asimmetry and reduction of hiring costs.

[3] Calvò-Armengol (2004) argue that "… *the information inflow to any player is shaped by the network structure of his direct and two-links-away contacts. Direct contacts are beneficial whereas two-links-away contacts are detrimental. The net balance of these two effects is very much dependent on the details of the network structure. In particular, two networks with the same total number of links but different geometry may induce different aggregate unemployment levels…*". Calvò-Armengol – Jackson (2004) argue that the probability to found a job is related on the informal network composition: it decreases if networks are composed by unemployed.

[4] Scott J. (2003), Analisi delle reti sociali, Carocci. In *Network Analisis* there are two academic schools: the Manchester school and the Harvard school. The former has an anthropologic focus and focuses on the individual and its history (or story), the latter focuses on social network structure. This last methodology has become the dominant theory, although

networks and their structures can encourage criminal behaviours (Gleaser – Sacerdote – Scheinkman 1996, Sah 1991, Calvò Armengol – Zenou (2004), Calvò Armengol - Patacchini - Zenou (2005), Patacchini - Zenou (2008)).

Based on the literature examined, it is possible to stress that the social networks have a sterile/positive profile. This profile seems unrealistic especially in the case of Italy, where social networks might even take the form of organized crime.

3. A short review of Italian literature on organised crime

The Italian literature on the economic effects of organised crime highlights that the criminal phenomenon has a negative impact on regional growth and development opportunities (Sylos Labini 1965, 1985; Olson 1984, Centorrino-Signorino 1993, 1997; Boltho 2006, Daniele-Marani 2008). Some works have concluded that a strong presence of the public sector and massive public resource flows can encourage the diffusion and the reinforcement of organised crime in a local economy (D'Antonio – Scarlato 1993, Felli – Tria 2000, Caruso 2008). An economic structure primarily oriented towards small or medium firms, active in traditional economic sectors, such as construction and agriculture, is more sensitive to organised crime; these are further elements which should help understanding why Italian regions (particularly in the southern part of Italy) are victims of this criminal system (Lavezzi 2008). Other researches point out how associated crime phenomena can interfere on the level of confidence among market agents (Zamagni 1993, Campiglio 1993), whereas other papers review how organised crime has been considered in the economic field (Masciandaro 2000b), investigate associated crime in firms and also compromise as factor in legal productive activity (Masciandaro 2000a).

Literature on crime and employment is primarily based on *crime as work* model that is the microeconomic choice between committing or not committing an offence deriving from associated opportunity cost or social-cultural factors and it is expressed by a crime equation (Becker 1968, Marselli – Vannini 1996a, 1996b, 1997; Bonanno – Pastore 2003, Sah 1991, Gleaser et al.1996). From a macroeconomic point of view, the causal relationships between crime and unemployment rates (Masciandaro 1999, Marselli – Vannini 2000, Calvò-Armengol Zenou 2003) and that between crime and labour productivity (Centorrino – Ofria 2001, 2008; Felli – Tria 2000) have been investigated. Costabile – Giannola (1996), instead, include corruption into the analysis of southern labour market. They use two labour market models: the first one take into account PA sector, assuming that the hiring process is based on a very high discretional use, the second one refer to the industrial sector that should be representative of sectors where a market selection criteria is used. Both models present a labour supply surplus. Workers maximize the utility function that is positive related respect the expected income and negative related respect the payoff if it is paid in favour of Public Official in order to obtain a job and violating social rules.

Workers or Public Official, pay or accept, the payoff if the expected utility of corruption strategy is higher than that one of alternative strategy. This is called "infraction condition" of both agents and determines the maximum or minimum value of the payoff. This value is positive related to current and expected wages of agents. The equilibrium is where "infraction condition" functions crossing. So the short term labour market equilibrium determines the number of illegal exchanges and the equilibrium payoff. The corrupted Public Official will apply a different payoff for each workers, for the same product (the job).

The size of illegal market of job depend on the probability to be discovered and in turn depend from the controllers of the Public Official. The controllers of Public Official can be corrupted too and so there is a self-increase of this kind of system. In this case the Public Official's controller is the politician that, usually, give the administrative charge. In this case the political

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in recent years there is a hot debate about its excessive deterministic rigour. The academic world is trying to reconcile these two schools highlighting the importance of both aspects. www.insna.org is the non-profit association website. This association, founded by Barr Wellman in 1978, is the *trait d'union* of these schools.

payoff is the electoral consensus. The political control of jobs is intermediate by the public official who, in such a case, take the payoff from the politician.

So there are two types of interactions: the relation between unemployed and public official and the other one between unemployed and politician. In this last case the payoff is paid from the politician to the public official because unemployed will pay politician by the electoral consensus. This last type of corruption is more dangerous because the unemployed do not pay the payoff and the consequence is that the predisposition to violate social rules is higher in the politician corruption system than in the administrative corruption. So in the long time period the number of persons that violate social rules can increase if there are strong economic incentives (like unemployment, low probability to be discovered etc.). According to what say above and considering the negative correlation between unemployment rate and the survival of code of conduct, the authors conclude that only reducing unemployment there will be possible to obviate to "wrong" behaviours.

With exception of the work by Costabile – Giannola (1996)[5], no work has dealt with the barrier that the Mafia imposes on labour market access. Therefore, it is important to investigate the impact of the organised crime on the labour market, trying to sort out what social networks really mean in contexts where organised crime is relevant.

4. Informal social networks, organised crime and labour market relationships

The examination of the informal social networks is indispensable for a correct interpretation of the behaviours and choices of agents in the labour market. In this way we might produce a more realistic interpretation of labour market functioning.

Informal networks are generally thought of as an inherited (through relatives) or 'made-up' (through friends or acquaintances) relationship systems that incorporates weak or strong ties: *"Each individual has tight and permanent relationships with close friends and relatives (strong ties) as well as random and transitory interactions within the community (weak ties)"* (Calvò Armengol – Zenou 2003a).

The literature on the subject does not seem to consider the particular nature that this network can assume in some contexts. My point of view is that behind the networks there could be a degenerative phenomenon in which social networks become a barrier for free labour market access. This wall is built by a "business- bureaucratic-political and criminal network" [6].

The literature on organised crime, too, assumes a generic position about its effects on network dynamics associated with the labour market. So, we enter an unexplored area of studies, which links the labour market, organised crime and informal social networks[7].We attempt to provide an answer to the following questions: 1) what is the nature of the social networks? 2) what do we mean when we say that social networks "provide information about job opportunities"?.

First, I consider also a network's black side. In this case, there are two aspects of the nature of social networks: a positive and a negative one.

We have a positive social network if social interactions are not based on opportunistic purposes and the opposite for the negative network (social interactions based on opportunistic purposes).

Furthermore, we perceive the relevance of social networks in the labour market because they are one of the most important channels by which there is a job (opportunities) information flow.

I assume, as in the literature, that social networks are composed by strong and weak social interactions. Strong ties are represented by parents, friends, and tend to create positive networks

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[5] Tullio – Quarella (1999) just mention on the distort effects of organised crime on labour market.
[6] La Spina A. *Mafia, legalità debole e sviluppo del Mezzogiorno*, Il Mulino 2005. This circuit also operates on businessmen who can undertake economic activities.
[7] Felli e Tria (2000) only refer to access barriers on labour and commodity markets by criminal cartels. Costabile and Giannola (1996), instead, explicity take into account the corruption problem on labour market focusing on microeconomic behaviours according to social rules.

(because I presume that social interactions aren't based on opportunistic purposes). Weak ties are acquaintances (random meetings) and they can lead to positive or negative networks. When we talk about negative social networks we refer to weak ties.

Second, I distinguish between *neutral* and *influent or non-neutral* information about job opportunities. The former does not lead necessary to fill the vacancy, the latter is decisive in filling it. I assume in my model that positive social networks can provide either neutral or not neutral job information and negative social networks provide non-neutral job information. Finally, I assume that jobseekers are non-negative social network members (weak ties).

If we look at negative social network members, such as corrupted politicians and mafiosos: why should negative social networks pay attention to an external agent request? The first members (politicians) might be interested in electoral consensus and second ones (mafiosos) in social consensus and territorial control. Social consensus is fundamental for this kind of system[8]. The Italian context is characterized by a strong compromise between mafia, politics and the economy and a controlled labour market. In this case the dependence on informal social networks is very strong, and sometimes it is the only way to gain access to the labour market. In the light of these facts, the quantitative analysis intends to verify whether there is a positive relationship between the use of social networks and the presence of organised crime[9] in an area or territory.

5. The model

We employ the Calvò-Armengol and Zenou (2003)'s model, according to which:

- Job opportunities are vehiculated by social networks,
- Network composition is: weak and strong ties, as argued by Granovetter,
- The strength of ties depends on the frequency of meetings (strong ties are parents and friends, weak ties are acquaintances),
- Only the labour force (employed and unemployed looking for a job) can provide or receive job opportunities information,
- Criminals do not constitute labour force and cannot provide information on job opportunities.

The authors show that an increase in the number of criminals in the society reduces the network's size, because it increases the probability of meeting a criminal, reduces information flows about jobs and so reduces the probability to have job information.

While Calvò-Armengol and Zenou talk about *tout-court* crime, I argue that it is necessary to clarify which kind of crime we refer to. I consider two kinds of crime: micro and organised crime. I assume different effects on the probability to use network-related job search methods: producing a positive effect for organised crime and a negative for micro-crime (as in the previous cases).

On the basis of this difference in crime networks and in the light of some perplexity about Calvò-Armengol and Zenou's algebric formulation model, I introduce new hypotheses:

1. there are two kinds of crime (ρ): organised (ρ_2) and micro (ρ_1);
2. crime nature produces positive and negative effects on the dimension of the network (s);
3. organised crime is one of the crime equation regressors and is positively correlated to micro-crime with decreasing marginal increase.

I assume, like Calvò-Armengol and Zenou, that there exists a collective of n persons, that the group size of a group built on strong ties is f and is the same for each agent, and, furthermore, that groups are mutually exclusive. If there are only strong ties, the society will be composed of n/f groups. Weak ties are represented by social interactions between agents of different groups.

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[8] See Costabile – Giannola (1996).
[9] Organised crime is an expression of itself and a proxy of corruption.

The formulation model is:

n   people composing the society
f   friends and parents of *strong ties* group
m = (n – f) weak ties group
n$_{WSI}$ persons through which we have Weak Social Interaction (WSI)
n$_{SSI}$ persons through which we have Strong Social Interaction (SSI)

ω$_D$ proportion of weak ties $\dfrac{n_{WSI}}{m}$ $(0 \leq \omega_D \leq 1)$

ω$_F$ proportion of strong ties $\dfrac{n_{SSI}}{f}$ $(0 \leq \omega_F \leq 1)$

s   useful job information network size
m$_{CR}$ criminals in the society m
m$_{NCR}$ no criminals in the society m

ρ   proportion of criminals *tout court* in the society m $\dfrac{m_{CR}}{m}$

(1 – ρ)   proportion of no criminal weak ties and, consequently, useful job information
              $\dfrac{m_{NCR}}{m} = 1 - \dfrac{m_{CR}}{m}$

ρ$_2$ proportion of criminal membership in organised crime $\dfrac{m_{CRORG}}{m_{CR}}$

ρ$_1$ proportion of criminal membership in micro crime $\dfrac{m_{CRDIF}}{m_{CR}}$

$\omega_D \neq \omega_F$ and both are included between 0 and 1

(1 – ω$_D$)   are all possible weak ties that not occur. The same is for **(1 - ω$_F$)**

Now we reformulate the three new hypotheses:

1. $\rho = \rho_1 + \rho_2$
2. $\partial s / \partial \rho_1 < 0$ and $\partial s / \partial \rho_2 > 0$
3. $\rho_1 = A\rho_2^\alpha \prod_{j=1}^{k} Z_j^{\beta_j}$ and so: $\partial \rho_1 / \partial \rho_2 > 0$ e $\partial^2 \rho_1 / \partial \rho_2 < 0$

The average number of contacts for each agent (considering both strong and weak ties interactions) is:

$$(\omega_F \cdot f) + (\omega_D \cdot m)$$

The number of social interactions that could provide job information (s) will be lower or equal than this average number. Therefore, if some f members are in the labour force (like Calvò-Armengol and Zenou, 2003a) and if in the weak society there are some criminals which do not provide job information:

$$(\omega_F \cdot f) + (\omega_D \cdot m) = (\omega_F \cdot f) + \omega_D(1 - \rho)m + \omega_D \rho m$$

Instead if I assume that micro crime does not have this kind of function (providing job information) I could write what follows:

$$\underbrace{(\omega_F \cdot f) + (\omega_D \cdot m)}_{\text{Total contacts}} = \underbrace{(\omega_F \cdot f) + \omega_D(1-\rho)m + \omega_D\rho_2 m}_{\substack{\text{Criminal and no criminal} \\ \text{contacts useful to job} \\ \text{information}}} + \underbrace{\omega_D\rho_1 m}_{\substack{\text{Criminal interactions not} \\ \text{useful for job information} \\ \text{(micro crime)}}}$$

Therefore, the useful social network size to job information is:

$$s = (\omega_F \cdot f) + \omega_D(1-\rho)m + \omega_D\rho_2 m \quad (4)$$

deriving network size in respect to weak ties I obtain:

$$\partial s/\partial \omega_D > 0 \quad \text{if} \quad (1-\rho)m + \rho_2 m > 0 \quad \text{that is } m > \rho_1 m^{\,10}$$

The positive effects of weak ties on network size depend on the composition of the society: it is necessary that the community is not entirely composed by micro criminals.

Assuming $\partial s/\partial \rho_1 < 0$, I hypothesize a direct relationship, with decreasing marginal increase, between organised and micro crime (point 3). The nature and size of micro crime depend on the presence of organised crime in the regions: in regions where organised crime is present and relevant there will be a negligible micro crime size[11].

Why is there a direct but decreasing relationship between micro and organised crime? Micro crime assumes different size and meaning in function of a society's permeability to the mafia: generally, the more pervasive organised crime is, the lesser is micro crime. Just a low level of micro crime is compatible with and tolerated by associated crime (for example Crotone is the province where the organised crime index is the highest after Imperia and has one of the lowest micro crime indexes). It is also true that a higher level of micro crime is possible if there is an organised crime 'clan' structure (for example Naples in Campania).

So, the crime equation form is:

$$\rho_1 = A\rho_2^{\alpha} \prod_{j=1}^{k} Z_j^{\beta_j}$$

where:

ρ_1 e ρ_2 represent micro and organised crime respectively, both positive variables;

A   is the constant: micro crime not influenced by independent variables;

α e β_j are the partial elasticities: they represent micro crime sensibility to independent variables increase;

Z_j collects k control variables that can contribute to explain the micro crime phenomenon.

We assume: $0 < \alpha < 1$, $-1 < \beta_j < 1$

Focussing on the meaning regressor, the crime equation becomes:

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[10] If $\rho_2 = (\rho - \rho_1)$ we can write the derivative results in this way $(1-\rho)m + (\rho - \rho_1)m$ and then it becomes m - ρ_1m

[11] This is not always true, micro crime is functional to organised crime. So, the presence of micro crime phenomena depends either on the mafia's choices or can derive from the organised crime structure.

$$\rho_1 = A\rho_2^{\alpha} \qquad (5)$$

The first and second derivative show the expected sign: the first one is positive and the second one is negative[12]. Using the crime equation in logarithmic form we have:

$$\hat{\rho}_1 = a + \alpha\hat{\rho}_2$$

where $\qquad\qquad \ln\rho_1 = \hat{\rho}_1$, $\ln A = a$ e $\ln\rho_2 = \hat{\rho}_2$.

Rewriting $\quad \hat{\rho}_2 = \dfrac{1}{\alpha}\hat{\rho}_1 - \dfrac{1}{\alpha}a$ (7) and $\hat{\rho} = \hat{\rho}_1 + \hat{\rho}_2 = \hat{\rho}_1 + \dfrac{1}{\alpha}\hat{\rho}_1 - \dfrac{1}{\alpha}a = \hat{\rho}_1\left(1 + \dfrac{1}{\alpha}\right) - \dfrac{1}{\alpha}a$

we have

$$\hat{s} = \omega_F f + \omega_D\left\{1 - \left[\left(1 + \frac{1}{\alpha}\right)\hat{\rho}_1 - \frac{1}{\alpha}a\right]\right\}m + \omega_D\hat{\rho}_2 m$$

and

$$\frac{\partial\hat{s}}{\partial\hat{\rho}_1} = -\omega_D m\left(1 + \frac{1}{\alpha}\right) < 0 \ ; \ \ \frac{\partial\hat{s}}{\partial\hat{\rho}_2} = \omega_D m > 0 \qquad\qquad \text{point 2}$$

6. The empirical results

There are two econometric estimates: the first one refers to the crime equation and the second one to the social network equation. Both are based on cross sectional analysis for 2004: in the former estimate I used cross-sectional data for the Italian provinces and for each province the estimated model is:

$$\hat{\rho}_{1i} = a + \alpha\hat{\rho}_{2i} + \sum_{j=1}^{k}\beta_j\hat{z}_{ij} + \varepsilon_i$$

where i is the province and j is the k regressor; and the general model is:

$$\hat{\rho}_1 = a + \hat{\rho}_2\alpha + \hat{Z}\beta + \varepsilon$$

Micro and organised crime indexes have been elaborated using, at a provincial level, the Istat (Italian Institute for Statistics) crime statistics and, at a regional level, the *Ministero dell'Interno* (Home Office) statistics. When it has been possible we have used Home office statistics because they permit to take into account more crimes respect to Istat crime statistics (see Variables list at the end of the paper).

The latter estimate is a probit regression: the probabilistic relationship between the use of social networks and crime (micro and organised) is:

$$F(x_i'\beta) = \Phi(x_i'\beta) = \int_{-\infty}^{x_i'\beta}\frac{1}{\sqrt{2\pi}}\exp\left(-\frac{1}{2}z^2\right)dz = \int_{-\infty}^{x_i'\beta}\varphi(z)dz$$

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[12] $\dfrac{\partial\rho_1}{\partial\rho_2} = \alpha A\rho_2^{\alpha-1} = \alpha\left(\dfrac{\rho_1}{\rho_2}\right) > 0$ and $\dfrac{\partial^2\rho_1}{\partial\rho_2} = -\alpha\rho_1\rho_2^{-2} = -\alpha\dfrac{\rho_1}{\rho_2^2} < 0$

In this case, regressors x, collected in a X_i matrix, are represented by micro and macro variables. The first ones are drawn from the Survey on Household Income and Wealth (SHIW) of the Bank of Italy and provide informations about job search methods (informal social networks, PES and so on) and individual characteristics. The second ones have been carried out by the Istat and the *Ministero dell'Interno* (Home Office) and include socio-economic variables (education dispersion rate, unemployment rate, per capita GDP etc.). The main macro regressors are micro and organised crime. These estimates, related to the crime equation, are at regional level. The sample is formed by 1312 observations, composed of employed workers in the private sector that answered questions about job search channels. In this case, the social networks dummy is one.

The crime variables used in these estimates have different compositions deriving from territorial distribution. See Appendix variables.

The first estimates concern crime equation. Results seem to confirm a positive but marginal decreasing relationship between micro and organised crime. There are three sets of estimates: the first one regresses criminal statistical variables (control on territory, police investigation skills, etc.) on micro crime; the second one takes into account socio-economic variables (per capita GDP, education dispersion rate, etc.); and the last regression combines all variables (table 1). For each step we have statistically significant results. The organised crime variable has a positive and significant effect. In the full model, relationships with other variables are corroborated except for *lnffoo* (mod. 6 and 7). Police investigation skills (*lnineffpol*) are positively related to micro crime. This finding is not contradictory. The variable *lnineffpol* represents unknown reported micro crime on total reported micro crime, so this is a possible measure of police investigation errors in skill: an increase in this variable is very likely to determine an increase in unknown micro crime. A police investigation decrease in skills can induce larger micro crime levels. Another variable is police territory control (*lnffoo*), which is negatively correlated to micro crime because an increase in territorial control can reduce the phenomenon of micro crime. The effect of *lnprob* is not significant: this indicates that it is not a relevant determinant.[13] The socio-economic variables are statistically significant, too. I take out of the model the unemployment rate due to a multicollinearity problem.[14] A positive relationship between regressors and micro crime emerges. An education dispersion rate increase seems to encourage the micro crime phenomenon. This can be explained by the fact that high rates of dispersion can indicate difficult social contexts, where micro crime activities can emerge more easily. Moreover, education dispersion contributes to produce unskilled or low-profile workers. These kind of workers while having difficulties in gaining access to the labour market, might have better opportunities in micro and organised crime.

What about the positive relationship with added value (*a.v.*) *per capita*? This finding is of more difficult explanation. Intuitively, we would expect a negative relationship since in poor regions, micro crime is higher than in rich regions. But if we link *a.v. per capita* to population's composition, the positive relationship can be explained as follows: generally, high a.v. *per capita* are associated to stronger urban population provinces compared to low a.v. provinces and, in urban provinces, micro crime is higher than in rural provinces. Figure 1 shows the provinces' distribution related to micro crime and a.v. *per capita* in 2004 (see provinces' code list in appendix). The 35 southern Italian provinces are all under the a.v. *per capita* national average and, except for 9

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[13] Marselli and Vannini (2000) remove this variable to prevent simultaneity problems with the crime dependent variable. In place of this variable, the authors use police regional distribution. Moreover, they remove my lnineffpol too, called Unknown, because it incorporates a mesurement error problem that is due to the denominator composed by reported crimes (they use four kinds of Unknown variables: murder, robbery, theft and fraud) and so do not take in account the non reported crime. I have however used this variable because I build it only in respect of a composite variable, micro crime, that includes all the above mentioned crimes except murder, and in these crimes Robbery is the one more bias sensitive. Moreover, their research uses the paradigm of Total crime, while at regional level I only analyse a subsample of crime that can or cannot be subject to some bias problems (for example pickpocketing or car theft and burglary).

[14] Unemploymet rate VIF is higher than 5.

provinces, are under the national micro crime average too. Crotone's province has the lowest micro crime index whereas Agrigento has the lowest a.v. *per capita*. Among provinces gathered in the first quadrant (a.v. and micro crime higher than national average) Rimini has the highest micro crime index, followed by Bologna, Milan, Rome, Turin and Genoa. Milan is the province with the highest a.v. *per capita*. At this point we need to consider a.v. in terms of urban and rural province population: an high a.v. is associated to a larger urban population which can be linked to a higher level of micro crime. The opposite works for rural population. Therefore, a higher a.v. can encourage the micro crime phenomenon, following a process of population urbanization. Finally, the empirical evidence, deriving from a different estimation, shows a positive, but with decreasing rate, relationship between micro and organised crime. Nevertheless, this estimation procedure required a further wide elaboration because, in this case, it's a cross section at regional level (there are only 20 observations).

The second empirical results verified concern the relationship between recurring to the informal social network and crime variables. The dummy dependent variable of the *probit model* used is 1 when the survey respondent declared to use the informal social network channel (friends, parents, acquaintances) to look for a job, and 0 otherwise. Main regressors are crime variables at regional level. The micro crime index includes *No violent robbery* (for example no armed robbery), *Micro theft* (snatch) and *Fraud and informatic fraud* (see Variable list in Appendix). The organised crime variable, instead, derives from a principal component analysis (PCA) based on a correlation matrix of the following *per capita* crimes: *attacks, slaughter, mafia murder and attempted mafia murder, extortion, crime association (art. 416 penal code), mafia crime association (art. 416 bis penal code), money laundering, fires, contraband, drugs dealing, prostitution, falsification, mafioso and politician electoral exchange*.

I consider the first three components (tables 2 and 3): organised crime is very well represented by factor one (F1) which takes into account murder and attempted mafia murder, extortion, art. 416 *bis* p.c., fires. They have a positive sign, so a positive F1 should indicate the presence of organised crime in a region and its increase should imply an upsurge of the crime phenomenon. F2 considers two specific crimes: drugs dealing and prostitution. Their relationship with organised crime is obvious but they represent a particular form of this phenomenon. In fact, especially in the case of *narcotraffico*, large-scale drug selling, it is one of the most important and typical economic activities of organised crime. At the same time, they represent business relations with other foreign organizations. Therefore, if F2 represents typical associated crime economic activities, F1 could be considered an expression of control and repression activity and, moreover, a mean of organised crime justice sentence execution. In other words, it is the mafia's armed branch.

Finally, F3 reports a larger rate of falsification and contraband, economic activities which imply the legal commodity object of an illegal market. The correlation matrix between crimes and the principal factors (F1, F2, F3) seems to confirm the above relations. Figure 2 also seems to confirm this interpretation. In fact, 7 Italian regions are in F1 positive area (Calabria, Liguria, Campania, Puglia, Sicilia, Molise and Umbria) and, with the exception of Umbria, are the same regions in which the *per capita* crimes, related to F1 factor, are the highest in respect to the national average (figure 3). The same conclusions can be drawn about F2: there are 9 F2 positive Italian regions (Liguria, Umbria, Campania, Piemonte, Lazio, Toscana, Marche, Emilia-Romagna and Friuli Venezia Giulia) and the regional distribution of these two kinds of crime (figure 4) is very similar to F2 positive regions.

Using these crime indexes, I have run two probabilistic regressions. The results of the two *probit models* seem to provide empirical evidence of my hypothesis: an increase in the presence of the organised crime (F1) produces a more likely recourse to informal social networks (application to the networks in order to find a job, versus normal job employment), whereas the opposite occurs if there is an increase in micro crime (*cridif*) (table 4). This positive and negative relationship remains significant also in the other models with control variables. Compared to these models, the control variables have significant results: the positive relationship between *sntw dummy* and education level

(*edu1*) and the negative one with blue collar variable imply that it is more likely that unskilled people and with a low level of education will recur to *sntw* to find a job. The structural characteristic of systems usually recurring to informal social networks is being a little or medium size firm (*size1*), active in traditional economic sectors and more tightly linked to the region. This kind of profile is the one more permeable to organised crime, which traditionally works in economic sectors such as agriculture and construction. These sectors are still subject to "caporalato" (an illegal pyramid of submerged unpaid work) and to the "cosche" control that is very strong.

What about macroeconomic variables that contribute to understand the economic condition of a country? The probit model shows a persistence of micro and organised crime hypothesis. The bivariate regressions are all statistically significant and some of them are of the expected sign (table 5). The joint estimates, instead, produce, for some regressors, different results, that can be explained theorising a multicollinearity problem. Nevertheless, crime variables preserve their own significance. Furthermore, this result is strongly reinforced by the results obtained when the F1 estimate is combined with F2 and F3 factors[15].

The direct relationship between social network and unemployment rate is obvious: restrictions in the labour market can induce people to turn to the social network as preferred job search channel. This relationship can also be explained in a different way: a decrease in the unemployment rate can derive from an increase in the number of 'discouraged' people. In this case, the unemployment rate decreases because who was looking for a job stopped doing it and, as a consequence, does not ask for it anymore to his friends, parents, and acquaintances. The positive relation between education dispersion rate (*absc*) and social networks (table 5) can be associated to the one in the micro variable estimate but in this case the variable represents an aspect of the social-economic context. As it can be seen in figure 5, in 2004 the higher rates were found in the southern regions. These are the same regions where unemployment and young unemployment rates, poverty index and the incapability to offer regular jobs are higher than the national average, whereas employment regular rate and FDIs attraction are below national average (figures in appendix).

In particular, in Italy FDIs are affected by the presence of criminal organizations (Daniele – Marani, 2008). In fact, it is unlikely that foreign investors could be interested in investing in "underworld economies" where the use of social networks instead of normal job opportunities is high. Only Lombardy is capable of attracting foreign investment. Southern Italy is an area which does not attract capital's investments. In this case, organised crime plays a crucial role because it jeopardizes the potential development of the regions, affecting investment options. So, the inverse relationship between social network and FDI is probably due to the fact that FDIs in the south of Italy depend on the slow rate of development of the area and, even more, on the presence of organised crime.[16]

About regular employment variables: irregular employment implies an irregular selection and hiring procedures. That is, there will be no advertisements in the newspapers or on the Public Employment Service. Information on job opportunities will pass through *word of mouth* communication. If irregular employment increases there will be a higher probability to use informal social networks.

Finally, some words on regional *per capita* added value: low added value is associated with a larger use of informal social networks and this happens for two possible reasons: a) low added value regions tend to suffer from a lack of structures and it could be difficult to offer employment services; b) in these regions there are high organised crime indexes. In these same regions, there are also micro crime indexes that are below the Italian average (except Campania). This is probably due

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[15] The negative relation of F3 depends on the criminal composition. Contraband, in particular, can be considered also a micro crime. In this case there can be a negative relation with the social network.

[16] In Southern Italy, lack of development is not in itself the only cause of no investment. In fact, disadvantaged areas could receive always foreign investment, if there were good development and growth opportunities, as there are in the italian south. But the presence of organised crime, associated with a system of corruption which involves local and national politics, continues to be a strong deterrent.

to the presence of a strong territorial control of organised crime in these regions. Looking at southern regions more involved in the phenomenon of organised crime, all of them present a.v. and micro crime index below national average (except Campania) and organised crime index above the national average (except Sicilia).

So, in these contexts it is not the scarce incidence of micro crime which encourages a larger use of social networks but, instead, the presence of organised crime.

7. Conclusions

The aim of this analysis is to show a new interpretation of the informal social network's nature. The literature on the subject assumes a generic position about the phenomenon. In fact it takes into account network's structure, size and composition and explains how these characteristics can influence jobseekers' job opportunities, but it has not undertaken the necessary steps to discover the informal social network black side. This aspect cannot be ignored if social network analysis is localised in deeper organised crime areas. In these cases, associated crime pollutes economic tissue because crime has the availability of huge amount of money deriving from illicit activities (in particular, large scale drugs dealing, in Italian *narcotraffico*) and, so, can compromise the economic development of an area (for example Southern Italy).

If it is true that organised crime penetrates legal markets, its influence on the labour market is unavoidable. This situation is degenerated by the presence of "criminal, political and business networks" that, pursuing their own interest, such as social or electoral consensus, become important referents for job opportunities. In this study, organised crime is a variable that represents itself and is also a proxy of corruption. In fact *"In areas where organised crime is very pervasive, It controls the corruption market too."* (Davigo – Mannozzi, 2007, page. 81).

In these cases, the relationship between unemployment and criminal and/or institutional contacts derive from the coexistence of the agents on the same context: both unemployment and contact.

In this study, we have highlighted the lack of this aspect in social network and criminal economic literature and linked labour market and organised crime through a special *trait d'union* such as informal social networks.

Using Calvò-Armengol and Zenou's model (2003) I have introduced new different hypothesis: the first one is about the distinction between micro and organised crime, although there is a grey area where both crimes overlap. In the Calvò-Armengol and Zenou model, the authors use a *tout-court* criminal basis. They do not take into account the different role that criminals can assume in respect to jobseekers. As results (second hypothesis) I assume that only a special kind of criminal can provide information about job opportunities. Micro criminals are not able to provide job information because they are not part of the labour force but criminals affiliated with organised crime play a very important different role on labour market access. So, while there exists an inverse relationship between social network and micro crime, there is not a similar one between social network and organised crime. In the new model there are two conditions: the first one is the negative relationship between micro crime and social network's use, the second one is the positive relationship between organised crime and social network. Finally, the preliminary hypothesis is to demonstrate the inverse relationship between network's size and micro crime and the positive decreasing rate between organised and micro crime. Empirical results seem to confirm the proposed hypothesis.

So, I have formalized the organised crime interference on labour market. Results show that in these contexts it is not the scarce weight of micro crime that encourages the use of social networks but the presence of the organised one. This 'crowding out effect' has been verified by the crime equation between micro and organised crime and other regressors.

Another new feature of this study is the crime index composition. In fact, the organised and micro crime index are made using Home Office crime statistics. These allow us to use a larger

number and selection of crimes compared to the Justice Department statistics which are prevalently used in organised crime economic literature but are less detailed.

Finally, micro and organised crime produce different effects on the choice of informal social networks' use. A larger use of networks can derive from the lack of appropriate structures and services for unemployed, and from the presence of organised crime (both proxy of corruption and expression of itself). In this situation, the role of micro crime should be replaced with organised crime that can provide *non-neutral information* useful to reach an employment status. In "free" organised crime contexts, micro crime reconquers its role of 'brake' to social network because it increases the probability to meet persons not able to provide job information.

The agenda for future research in these topics should include a broading organised crime index taking into account *white collar crime* and corruption phenomena. Moreover the estimated crime equation give us the possibility to understand the relationship between organised and micro-crime but we are not sure about the direction of causality between these two variables and it could be useful to verify the potential endogeneity problem. Finally it could have been interesting to use a panel methodology to take into account also of cycle effects and confirm evidence and information, however at the time of the research the relative panel data were not available

Appendix

Table 1

Variable	mod1	mod2	mod3	mod4	mod5	mod6	mod7	mod8
lncrorg	.2717	.28728	.37574	.47534	.28326	.44049	.44782	.45481
	.1239	.06592	.1655	.09399	.1263	.0483	.04747	.03874
	0.031	0.000	0.035	0.000	0.027	0.000	0.000	0.000
lnineffpol		15.727				13.198	13.018	12.872
		1.868				1.169	1.12	1.111
		0.000				0.000	0.000	0.000
lnffoo			-.45432				-.053388	-.058433
			.1585				.0915	.09577
			0.010				0.566	0.549
lnvaab				1.0423		.94806	.9327	.9263
				.1198		.08305	.07546	.07291
				0.000		0.000	0.000	0.000
lnabsc					-.031955	.081546	.086277	.082208
					.07053	.03776	.04093	.03982
					0.651	0.033	0.049	0.053
lnprob								.063916
								.1371
								0.646
_cons	6.3012	7.0602	8.5752	-4.9905	6.2549	-3.2144	-2.7827	-2.969
	.594	.3061	1.109	1.356	.5992	.9536	.8834	.8442
	0.000	0.000	0.000	0.000	0.000	0.001	0.005	0.002
N	102	102	102	102	102	102	102	102

dependent variable: lncrdif1
robust s.e.
mod3, mod7 e mod8 cluster and robust variance (lnffoo and lnprob are regional variables)

legend: b/se/p

Figure 1
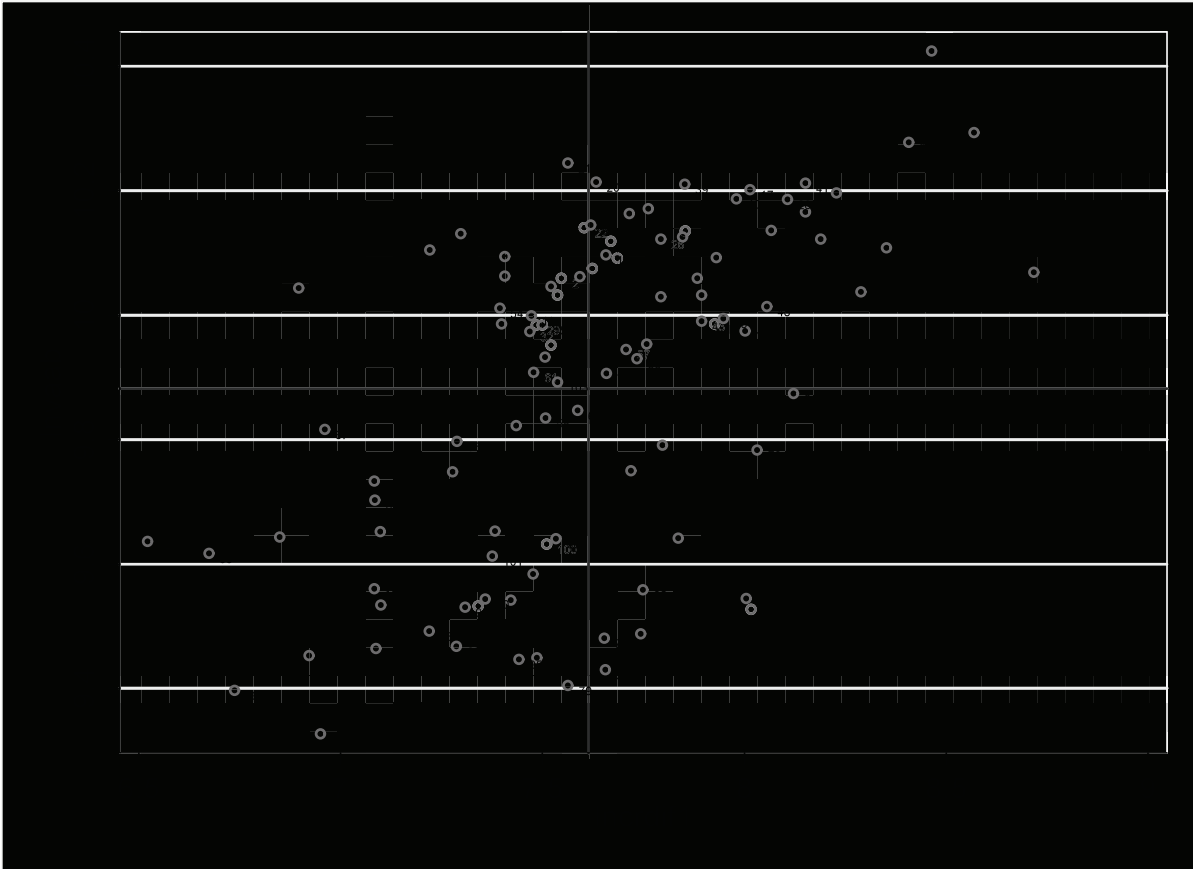
Source: ISTAT data processing

```
                              Table 2
----------------------------------------------------------------
          (principal components; 5 components retained)
Component    Eigenvalue     Difference    Proportion    Cumulative
----------------------------------------------------------------
    1         5.41049        2.37911        0.3382        0.3382
    2         3.03137        1.33015        0.1895        0.5276
    3         1.70122        0.12489        0.1063        0.6339
    4         1.57633        0.36240        0.0985        0.7325
    5         1.21393        0.42209        0.0759        0.8083
    6         0.79184        0.09416        0.0495        0.8578
    7         0.69767        0.07723        0.0436        0.9014
    8         0.62045        0.27600        0.0388        0.9402
    9         0.34444        0.13229        0.0215        0.9617
   10         0.21215        0.07375        0.0133        0.9750
   11         0.13840        0.04262        0.0087        0.9836
   12         0.09578        0.01095        0.0060        0.9896
   13         0.08483        0.02930        0.0053        0.9949
   14         0.05553        0.03296        0.0035        0.9984
   15         0.02257        0.01958        0.0014        0.9998
   16         0.00299          .            0.0002        1.0000
```

```
                              Table 3
        -----------------------------------------------------------------
                    Eigenvectors
          Variable |     1          2          3          4          5
        -------------+---------------------------------------------------
        attentatixab |  0.28707    0.12379   -0.38906    0.01120   -0.32269
           stragexab |  0.24438    0.16179   -0.33948    0.06383    0.01329
            ommafxab |  0.31940   -0.02753    0.20724   -0.21989   -0.38825
          tentomfxab |  0.38822   -0.09593   -0.07511   -0.15652   -0.10073
            ricetxab |  0.20138    0.43981    0.23425   -0.07730    0.04221
            estorxab |  0.39431   -0.06933   -0.01275    0.04486    0.09315
            usuraxab |  0.12763   -0.28533    0.08085    0.45146   -0.03660
             _416xab |  0.20574   -0.15493    0.00411    0.53965    0.19541
          _416bisxab |  0.35536   -0.18161   -0.07660   -0.21954    0.23828
          ricicloxab |  0.23330    0.29739    0.24904    0.10635    0.23211
          incendixab |  0.34027   -0.08478   -0.12491    0.18766   -0.07859
            cntrbxab |  0.18544    0.35458    0.40910   -0.15045   -0.03605
            drogaxab | -0.03660    0.41260   -0.20453    0.27453    0.12215
           cntrffxab |  0.05462   -0.08221    0.50129    0.28592    0.11402
            prostxab | -0.07209    0.44652   -0.25059    0.19144    0.11381
            sepmxab  |  0.10037   -0.11902   -0.12819   -0.32985    0.72514
```
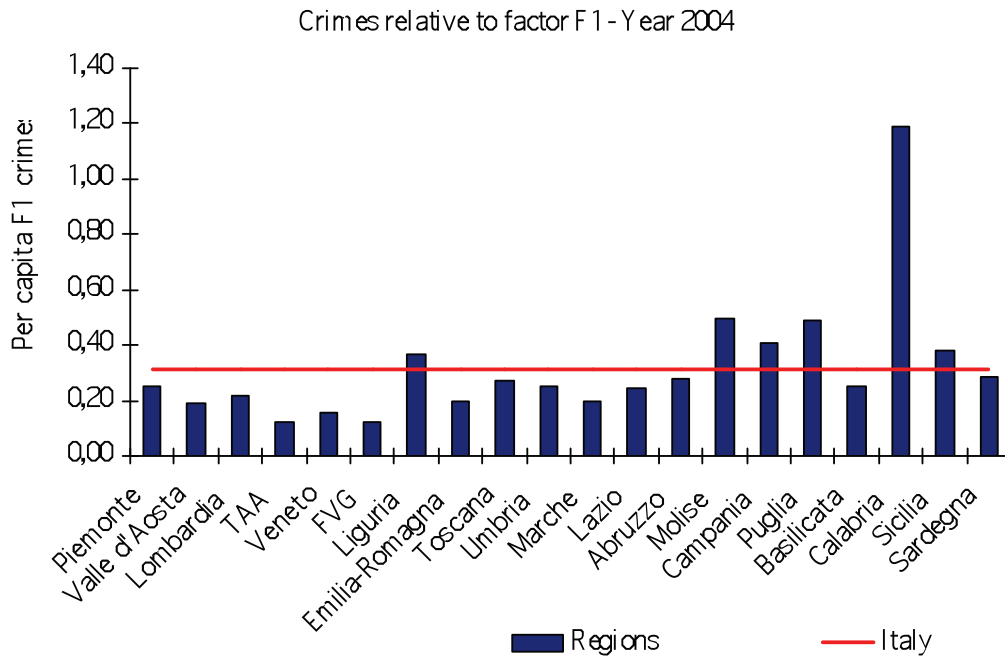
Figure 2
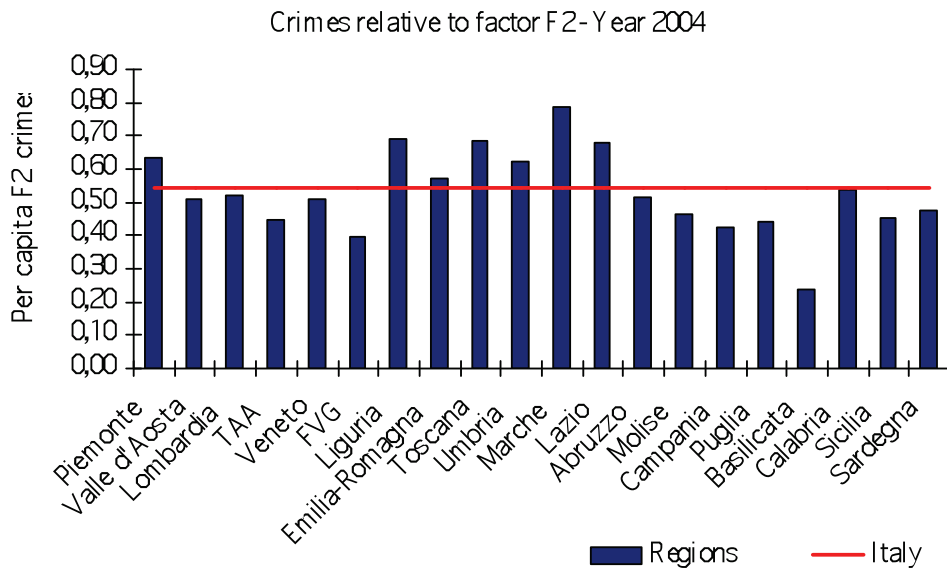

Source: ISTAT data processing

17

Figure 3

Crimes relative to factor F 1 - Year 2004
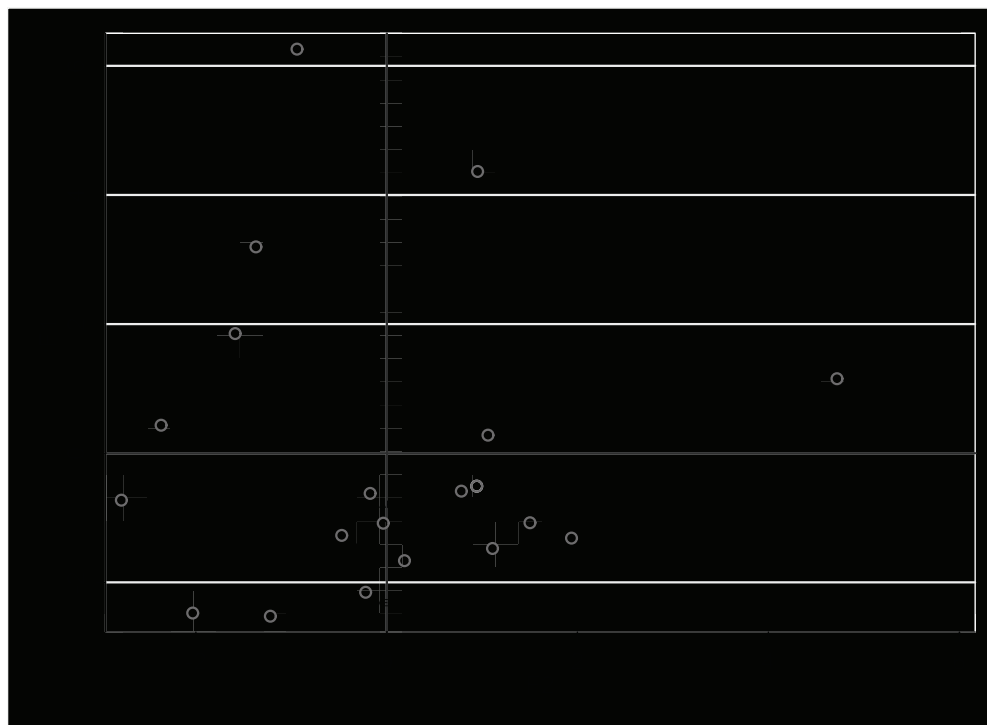
Figure 4

Crimes relative to factor F 2 - Year 2004

Table 4

Variable	mod1	mod2	mod3	mod4	mod5	mod6	mod7	mod8
F1	.098215	.078234	.078051	.072979	.070995	.13459	.13618	.16408
	.02194	.02102	.02149	.02172	.0221	.05575	.0575	.06907
	0.000	0.000	0.000	0.001	0.001	0.016	0.018	0.018
crdif	-.074279	-.07018	-.067143	-.065721	-.065604	-.083443	-.084021	
	.01946	.01881	.01888	.01905	.01946	.02026	.01962	
	0.000	0.000	0.000	0.001	0.001	0.000	0.000	
edu1	.43046	.37761	.20784	.20081	.18811	.21108	.21111	
	.06761	.06631	.06963	.06762	.06618	.0605	.0604	
	0.000	0.000	0.003	0.003	0.004	0.000	0.000	
size1		.54021	.5142	.51098	.49372	.49191	.49235	.50757
		.07342	.07814	.07931	.08354	.08306	.08245	.07823
		0.000	0.000	0.000	0.000	0.000	0.000	0.000
bcollar			.3791	.37103	.35257	.33847	.33921	.38883
			.05656	.05863	.05893	.05847	.05514	.0576
			0.000	0.000	0.000	0.000	0.000	0.000
agricoltura				.22426	.2752	.30629	.30664	.33212
				.177	.1713	.1649	.165	.1591
				0.205	0.108	0.063	0.063	0.037
costruzioni					.30537	.33061	.33127	.28547
					.1588	.1635	.164	.1515
					0.055	0.043	0.043	0.059
SUD						-.37641	-.37229	-.23974
						.2978	.3063	.2909
						0.206	0.224	0.410
NORD							.016367	-.14469
							.1222	.2713
							0.893	0.594
_cons	.85388	.53692	.34033	.31465	.30144	.65817	.65643	-.64455
	.3207	.3036	.2994	.3008	.3066	.3537	.3593	.2362
	0.008	0.077	0.256	0.296	0.326	0.063	0.068	0.006
N	1312	1312	1312	1312	1312	1312	1312	1312
r2_p	.07536	.1052	.1147	.116	.1198	.1228	.1228	.098

dependent variable: sntw (regions)

robust and clusterized s.e.

legend: b/se/p

Table 5

Variable	mod1	mod2	mod3	mod4	mod5	mod6	mod7	mod8	mod9	mod10	mod11	mod12
disoc	.0554										.277	.489
	.0126										.121	.101
	0.0000										0.0219	0.0000
disocgiov		.0191									-.0277	-.0884
		.00692									.0315	.026
		0.0059									0.3791	0.0007
absc			.0452								-.0119	.00735
			.0167								.0193	.0142
			0.0069								0.5379	0.6035
offlavreg				.0529							-.0497	-.0662
				.0111							-.0536	-.0366
				0.0000							0.3532	0.0705
occreg					-.0221						-.0167	-.00954
					.00565						-.0522	-.0223
					0.0001						0.7489	0.6688
atzfdi						-.00141					-.0000989	-.000274
						.000497					.000606	.000355
						0.0045					0.8705	0.4408
lnvaab							-1.2				.365	7.44
							.222				1.38	1.07
							0.0000				0.7906	0.0000
poor_idx								.0282			-.0758	-.0556
								.00607			-.0419	.0328
								0.0000			0.0703	0.0902
F1									.0985		.213	.257
									.0357		.063	.0524
									0.0058		0.0007	0.0000
crdif										-.0716	-.111	-.211
										.0179	-.0275	.0267
										0.0001	0.0001	0.0000
F2												.359
												.0591
												0.0000
F3												-.151
												-.0303
												0.0000
_cons	-.378	-.363	-.931	-.582	1.33	.0941	12	-.273	.0583	1.02	-3.32	-72.6
	.148	.17	.404	.166	.307	.12	2.22	.119	.0959	.283	11.4	10.5
	0.0104	0.0325	0.0212	0.0004	0.0000	0.4309	0.0000	0.0221	0.5432	0.0003	0.7712	0.0000
N	1312	1312	1312	1312	1312	1312	1312	1312	1312	1312	1312	1312

dependent variable: sntw

robust and clusterized s.e. (regions)

legend: b/se/p

Figure 5
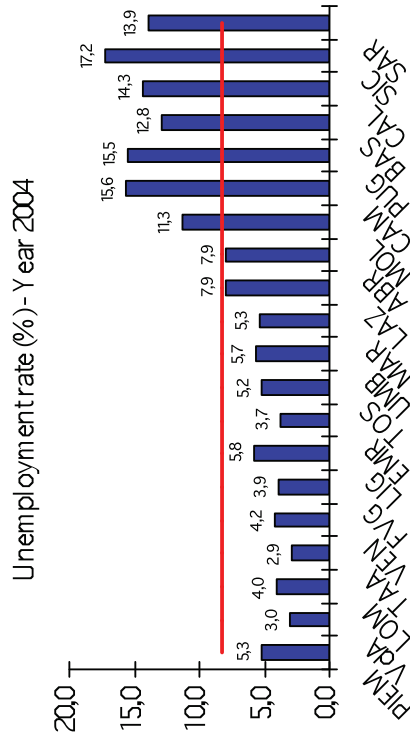
School dispersion rate (%) - Year 2004

PIEM	VdA	LOM	TAA	VEN	FVG	LIG	EMR	TOS	UMB	MAR	LAZ	ABR	MOL	CAM	PUG	BAS	CAL	SIC	SAR
22,3	22,3	21,8	21,6	18,2	13,7	16,3	20,0	21,0	13,3	16,7	15,6	16,6	15,2	28,6	30,3	17,0	21,9	30,7	30,1
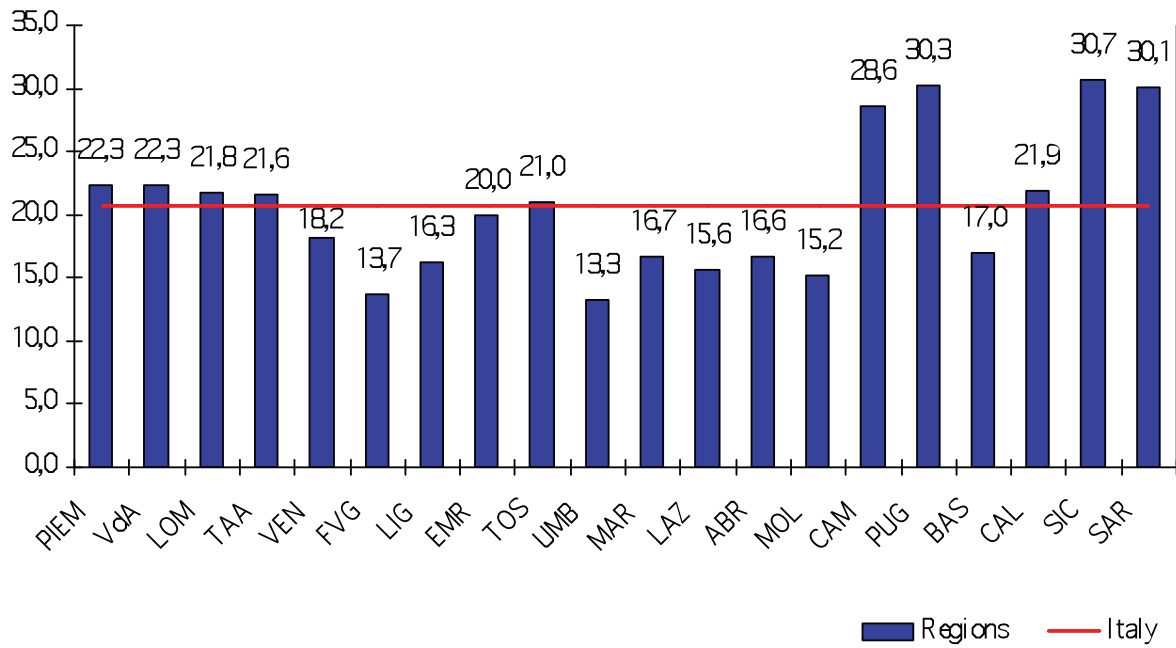
■ Regions —— Italy

Source: ISTAT data processing

Appendix B

Figures referred to macro economic variable (Probit model)

(Source ISTAT)

Figure 6

Unemployment rate (%) - Year 2004

Regions — Italy

Figure 7

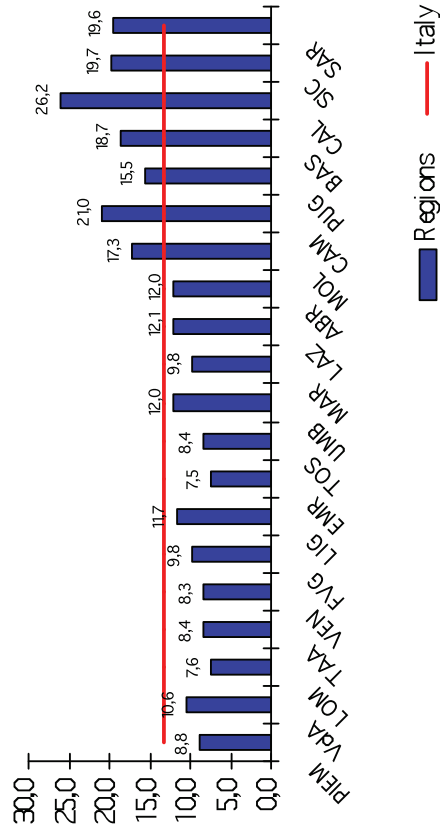Young unemployment rate (%) - Year 2004
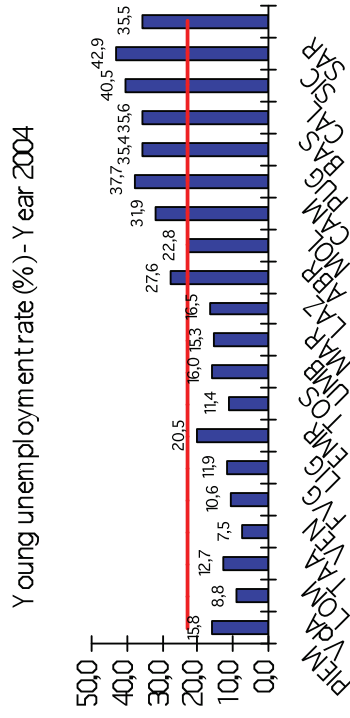
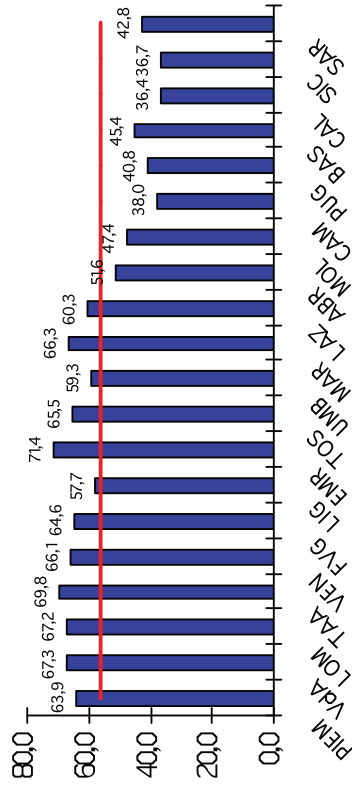Regions — Italy

Figure 8

School dispersion rate (%) - Year 2004
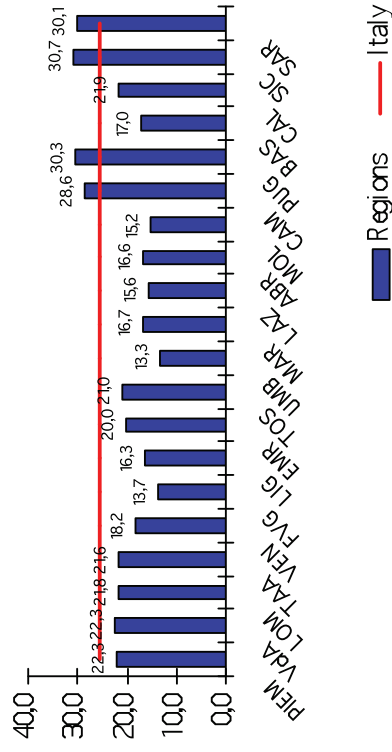
Regions — Italy

Figure 9

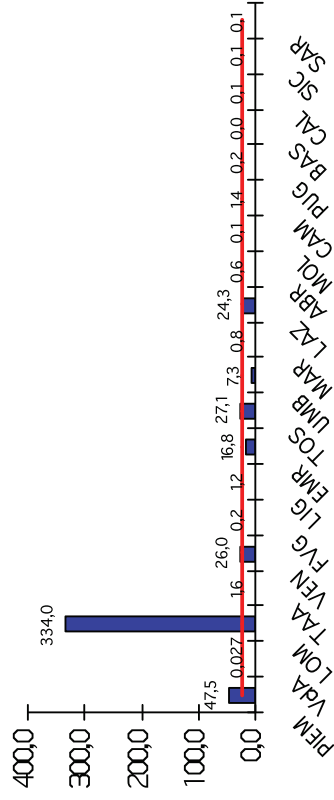Irregular job opportunities rate (%) - Year 2004

Regions — Italy
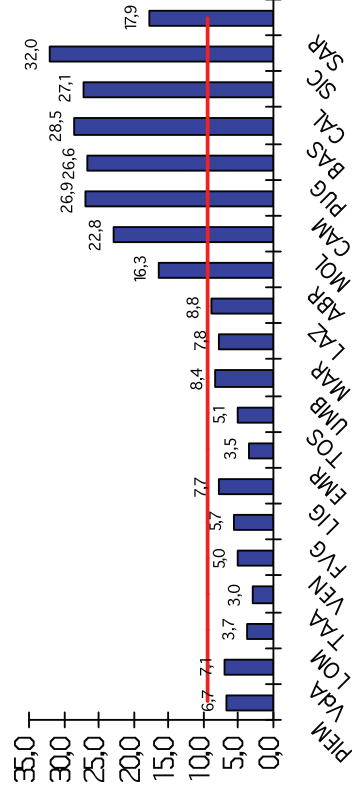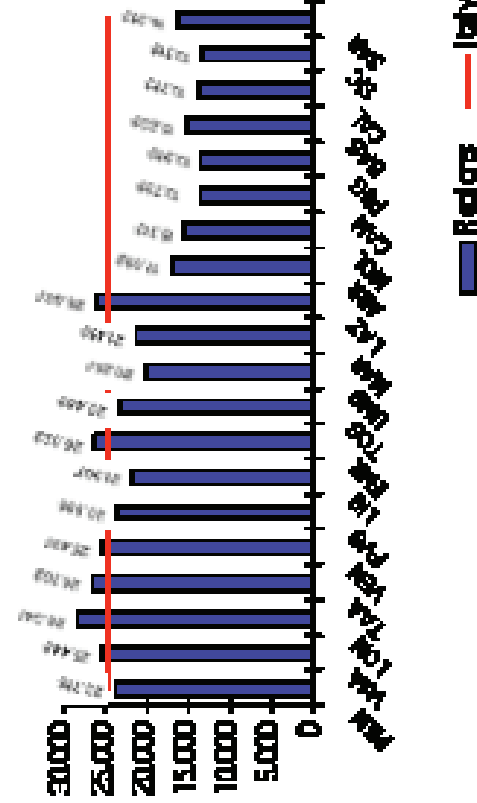
Figure 10

Regular employment rate (%) - Year 2004

63,9 67,3 67,2 69,8 66,1 64,6 57,7 71,4 65,5 59,3 66,3 60,3 51,6 47,4 38,0 40,8 45,4 36,4 36,7 42,8

PIEM VdA LOM TAA VEN FVG LIG EMR TOS UMB MAR LAZ ABR MOL CAM PUG BAS CAL SIC SAR

■ Regions — Italy

Figure 12

Poverty index (%) - Year 2004

6,7 7,1 3,7 3,0 5,0 5,7 7,7 3,5 5,1 8,4 7,8 8,8 16,3 22,8 26,9 26,6 28,5 27,1 32,0 17,9

PIEM VdA LOM TAA VEN FVG LIG EMR TOS UMB MAR LAZ ABR MOL CAM PUG BAS CAL SIC SAR

■ Regions — Italy

Figure 11

FDI attraction rate (%) - Year 2004

47,5 0,022 334,0 16 26,0 0,2 12 16,8 27,1 7,3 24,3 0,6 0,8 0,1 14 0,0 0,2 0,1 0,1 0,1

PIEM VdA LOM TAA VEN FVG LIG EMR TOS UMB MAR LAZ ABR MOL CAM PUG BAS CAL SIC SAR

■ Regions — Italy

Figure 13

Per capita added value on base price index in Euros for 2004

■ Regions — Italy

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Variables list

This list is based on territorial disaggregation of data (regional and provincial) and on observation size that is micro or macro unit.

Regional data:

1. **Micro crime index (crdif)**: sum of particular kinds of Theft, Robbery and Total Fraud on regional population. Theft crimes considered are: *purse snatching*, *theft sleight of hand*, *theft in public office, burglary, shoplifting, theft on parked car, of objets d'art and archaeological material, of trucks trasporting goods* (up to 2003 it was called theft of goods on trucks), *of moped and car.* Robbery crimes are: *at home, in a shop or in a public street* (Source: Public Security Department – DPS – Home Office)

2. **Organised crime index (F1)**: derives from a principal component analysis (PCA) based on a correlation matrix of the following *per capita* crimes: *attacks, slaughter, mafia murder and attempted mafia murder, extortion, crime association (art. 416 penal code), mafia crime association (art. 416 bis penal code), money laundering, fires, contraband, drugs dealing, prostitution, falsification, mafioso and politician electoral exchange*.

3. **Police territory control (lnffoo)**: number of policemen in a region (Carabinieri, Polizia di Stato e Guardia di Finanza) on regional population (%). Data referred to 2003 (Source: Compendio Statistico degli Eventi Criminosi 2003 del Ministero dell'Interno).

4. **Police investigations skills respect micro crime phenomenon**: unknown reported crimes on reported crimes (crimes refer to micro crime) (Source: Public Security Department – Home Office)

5. **Unemployment rate 15 – 64 years (disoc)**: people looking for a job on labour force (%) (Source Istat)

6. **Young unemployment rate (disocgiov):** people looking for a job 15-24 years on labour force of the same age (%) (Source Istat)

7. **Regular jobs supply ability (offlavreg):** irregular work unit on total work unit (%). Irregular work unit takes in account: irregular permanent workers; occasional 'works' carried out by inactive subjects such as students, housewifes or pensioners; illegal immigrants; others irregular activities (Source Istat).

8. **Regular employment rate (occreg)**: regular employment on population 15-64 years (%) (Source Istat)

9. **School dispersion (absc):** young people (18-24 years), attending at most a secondary school (first degree) and that did not attend others school courses or training activities over 2 years (%) (Source Istat)

10. **Regional poor index (poor_idx): people living in families below poverty line (%)**. It includes families whose monthly average consumption expenditure is even or under national average *per capita* spending. (Source Istat)

11. **Foreign investments draw ability (atzfdi):** Foreign gross direct investments in Italy on net direct investments in EU15 (0/00) (Source Istat)

12. **Added value (lnvaab):** euro added value *per capita* measured by base prices (Source Istat). The logarithmic form has been used.

Provincial data

(They are all logarithmic variables)

1. **Micro crime index (lncrdif1)**: sum of total thefts, frauds and micro robberies (that is, we have used the variable *other robberies* that incorporate theft in a shop, in a house etc.) reported to justice. This sum is based on the provincial population (1.000 people). (Source Istat)

2. **Organised crime index (lncrorg)**: the index composition is similar to the one on micro crime. Crimes considered are: *crime association (art. 416 penal code), mafia crime association (art. 416 bis penal code)*, *mafia murder, attacks, slaughter, extorsion*, *fires (arson)*, *contraband, usury, drogs, prostitution*. (Source Istat)

3. **Police investigation skills (lnineffpol):** unknown reported crimes on reported crimes (crimes refer to micro crime). (Source Istat)

4. **Certezza della pena (lnprob):** prisoners on reported crimes upon which the Judicial Authority undertook penal action (Source Istat)

5. **Added value (lnvaab):** euro added value *per capita* mesured by base prices – year 2004. (Source Istat).

6. **School dispersion (lnabsc):** students who abandoned Secondary school (II degree) (%). Academic year 2006/2007.

7. **Unemployment rate (lndisoc):** is the percentage of unemployment rate (average 2004) (Source Istat)

8. **Rural population (lnpoprur04):** rural population in 2004 at provincial level (Source Istat)

9. **Urban population (lnpopalturb04):** urban population in 2004 at provincial level(Source Istat)

Microeconomic data (SHIW – Banca d'Italia)

1. **Edu1:** dummy variable equal to 1 if the respondent's highest education level is compulsory school or nothing and 0 otherwise

2. **Size1:** dummy variable equal to 1 if firm size is under 20 employees and 0 otherwise

3. **bcollar:** dummy variable equal to 1 if respondent is a blue collar and 0 otherwise

4. **agricolture:** dummy variable equal to 1 if respondent works in the agricultural sector and 0 otherwise

5. **costruzioni:** dummy variable equal to 1 if respondent works in the construction sector and 0 otherwise

6. **SUD:** dummy variable equal to 1 if respondent's residence is in the southern of Italy and 0 otherwise

7. **NORD:** is the opposite of Sud variable

Provinces code list

1 Torino	36 Genova	71 Chieti
2 Vercelli	37 La Spezia	72 Isernia
3 Novara	38 Piacenza	73 Campobasso
4 Verbano-Cusio-Ossola	39 Parma	74 Caserta
5 Cuneo	40 Reggio nell'Emilia	75 Benevento
6 Biella	41 Modena	76 Napoli
7 Asti	42 Bologna	77 Avellino
8 Alessandria	43 Ferrara	78 Salerno
9 Aosta	44 Ravenna	79 Foggia
10 Varese	45 Forlì-Cesena	80 Bari
11 Como	46 Rimini	81 Taranto
12 Lecco	47 Massa-Carrara	82 Brindisi
13 Sondrio	48 Lucca	83 Lecce
14 Milano	49 Pistoia	84 Potenza
15 Lodi	50 Firenze	85 Matera
16 Bergamo	51 Prato	86 Cosenza
17 Brescia	52 Livorno	87 Crotone
18 Pavia	53 Pisa	88 Catanzaro
19 Cremona	54 Arezzo	89 Vibo Valentia
20 Mantova	55 Siena	90 Reggio di Calabria
21 Bolzano	56 Grosseto	91 Trapani
22 Trento	57 Perugia	92 Palermo
23 Verona	58 Terni	93 Messina
24 Vicenza	59 Pesaro e Urbino	94 Agrigento
25 Belluno	60 Ancona	95 Caltanissetta
26 Treviso	61 Macerata	96 Enna
27 Venezia	62 Ascoli Piceno	97 Catania
28 Padova	63 Viterbo	98 Ragusa
29 Rovigo	64 Rieti	99 Siracusa
30 Pordenone	65 Roma	100 Sassari
31 Udine	66 Latina	101 Nuoro
32 Gorizia	67 Frosinone	102 Oristano
33 Trieste	68 L'Aquila	103 Cagliari
34 Imperia	69 Teramo	
35 Savona	70 Pescara	

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