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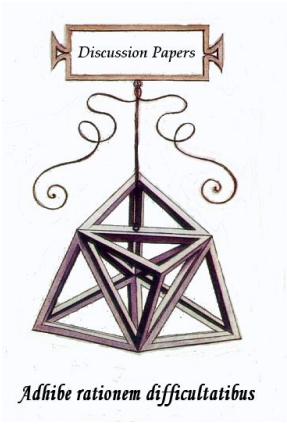

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Resisting the Extortion Racket: an Empirical Analysis

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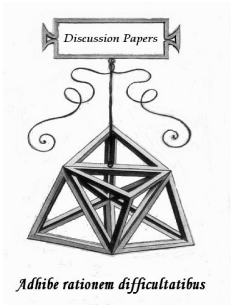

Michele Battisti - Andrea Mario Lavezzi - Lucio Masserini - Monica Pratesi

Resisting the Extortion Racket: an Empirical Analysis

Abstract

In this paper we study the decision of firms operating in areas where organised crime is pervasive to resist the extortion racket. To this purpose we design a case-control study starting from the unique experience of *Addiopizzo* (AP), an NGO operating in Palermo (Sicily) which, from 2004, invites firms to resist to the racketeers and join a public list aimed at eliciting critical consumption in favour of firms in the list. We study the determinants of the decision to join AP by estimating a two-level logistic regression model. We find that firm's total assets and firm's age have a negative effect on the probability of joining AP, while a higher level of human capital embodied in the firm and a higher number of employees increases such probability. Among the district-level variables, we find that the share of district population reduces the probability to join, while a higher level of socio-economic development, including education levels, increase the probability. We posit that these results support the hypothesis that the decision to join AP is based on a cost-benefit analysis and discuss policy implications of our results.

Classificazione JEL: O17, K42, R11, C41
Keywords: Organised Crime, Extortion, Social Mobilisation, Multilevel regression models

Contents

I. Introduction

Organised crime poses a serious threat in a conspicuous number of countries (Van Dijk , 2007), being Italy a relevant case in the context of Europe. A typical activity of criminal organizations such as the Sicilian Mafia is extortion, consisting in the forced extraction of resources from firms, under the threat of punishment (see e.g. Paoli , 2003). According to recent estimates in cities like Palermo, Sicily, more than 80% of firms and stores pay the extortion racket (Confesercenti , 2010). The impact of extortion on firms' activity and on the aggregate economy can be sizeable. For example, Balletta and Lavezzi (2014) estimate that the incidence of extortionary payments may reach 40% of gross profits for Sicilian firms, while Asmundo and Lisciandra (2008) find that the resources subtracted to the Sicilian economy by organised crime through extortion amount to 1.4% of regional GDP.

Criminal organisations, therefore, can severely interfere with firms' activity and hinder economic growth (Pinotti , 2015). This makes the contrast to organised crime of paramount importance for economic policy in regions or countries where the phenomenon is widespread. A primary actor in the contrast of criminal organizations is obviously the State, but the civil society may also mobilise (see La Spina , 2008 and Lavezzi , 2014). In the case of extortion, in particular, firms may resist the racketeers and refuse to pay.

The literature on extortion is abundant (see Varese , 2014, for discussion and references), and includes theoretical and empirical contributions in economics such as Alexander (1997), Konrad and Skaperdas (1998), Bueno de Mesquita and Hafer (2007), Asmundo and Lisciandra (2008) and Balletta and Lavezzi (2014). Much less work, however, has been conducted so far on the decision of firms that resist extortion. To study this issue, in this paper we focus on the unique experience of the firms of Palermo (Sicily) that joined *Addiopizzo* (AP), an NGO that, from 2004, invites firms to refuse extortionary requests from the local Mafia and join a public list of "non-payers". AP originated from the idea of stimulating civic-

minded consumers to buy products and services from AP-firms, providing in this way incentives to firms to join the list.

The aim of this paper is to understand the determinants of the decision to resist the extortion racket and join AP. To this purpose, we design a case-control study (Keogh and Cox , 2014) based on a unique dataset of AP-joiners and non-joiners, which includes data on firms (e.g. their sector, size, level of profits), and on the socio-economic characteristics of the districts where the firms are located. In fact, we see the decision to join AP as based on a cost-benefit analysis in which both types of information are relevant. For example, a large firm's capital stock can reduce the probability to join, as a larger capital may imply larger expected losses if racketeers punish non-complying firms. In addition, the probability to join is likely to be higher the higher is the expected diffusion of "critical consumption", a behaviour which may depend on the socio-economic conditions of the district. By adopting a multilevel logistic regression approach (Goldstein, 2011, Raudenbush and Bryk, 2002, Sneijder and Bosker, 2011) we can identify the effect on the decision to join of firm-specific characteristics (first-level variables), and of the districts' characteristics (second-level variables).

Our research question has been previously addressed by scholars from other disciplines. For example, Vaccaro (2012) and Vaccaro and Palazzo (2014), from the perspective of management science, highlight the capacity of AP to attract firms by investing in credibility as an organization, and by strategically promoting values such as dignity and legality. From a sociological perspective, Gunnarson (2014) instead stresses the role played by AP-members' previously existing networks and by trust in explaining the decision to join.[1] Yet, no contribution so far provided a rigorous statistical analysis of firms' decision to resist the extortion racket and join AP such as the one we propose in this paper.[2]

[1] The experience of AP has been also studied as a specific example of "critical consumption" by Forno and Gunnarson (2010) and Partridge (2012).

[2] Gunnarson (2014) provides an econometric analysis of firms' decision to join. The sample and the methodology are, however, very different from ours: the sample is represented by the respondents to a survey, and does not include a control group of non-joiners and second-level

Our main results are the following. We find that the probability to join AP decreases with the level of firm's total assets and firm's age, and increases with the level of human capital embodied in the firm and with the number of employees. We also find that second-level variables have a significant effect. In particular, the probability to join decreases with the district's population share, and increases with socio-economic development, measured by the share of small families (a proxy for the demographic structure), the share of self-employed (a proxy for the labour market conditions) and districts' human capital level. We argue that, overall, these results support the hypothesis that firms' decision to resist the extortion racket is based on a cost-benefit analysis, and provide a discussion of the policy implications.

The paper is organised as follows: in Section II. we describe the activity AP; in Section III. we discuss our theoretical assumptions on firms' decision to join; in Section IV. we introduce the research design, the data sources used in the study and the ways to recruit the firms. Section V. contains the empirical analysis: in particular Sections V.A. and V.B. present the descriptive statistics, while Section V.C. contains the results of the econometric analysis; Section VI. concludes and discusses some directions for further research.

II. The Case of Addiopizzo

Addiopizzo means "farewell to *pizzo*", where *pizzo* is the Sicilian definition of the money extorted by the local Mafia, *Cosa Nostra*.[3] AP activity begun from an idea of few young activists who, in the night of June 29th, 2004, flooded the walls of Palermo with thousands of stickers carrying the slogan: *"A whole people who pays the pizzo is a people without dignity"*, with the aim of provoking a reaction of the civil society against the Mafia. This was a shocking message in a city where organised crime is historically rampant.

variables. This limits the analysis to a study of the determinants of the different *timings* of the decision to join.

[3]Thorough accounts of the Sicilian mafia are given, among others, by Gambetta (1993) and Paoli (2003).

In 2005 the founders of AP launched a campaign to spread this message of resistance to the racket which brought, in May 2006, to the creation of a list of more than 100 businesses available to publicly denounce the *pizzo*, claiming their refusal to pay. The list was published in a local newspaper and diffusion on national media followed. From 2004, more than 1000 firms have been members of AP and at the time we collected the data (May 2012), the number of joiners was around 820.[4] The list can be consulted in the AP website (`http://www.addiopizzo.org/`). Occasionally, AP runs campaigns targeted to specific neighborhoods of Palermo and organizes meetings in schools. Also, it holds a regular event in May, *"Fiera del consumo critico"*, in which AP firms present their products and various activities, from debates to live performances, take place.[5]

The idea of making public the list of joiners follows an economic insight. Consumers, in fact, are invited to shop at AP stores if they wish to: "pay those who do not pay".[6] In other words, AP tries to elicit "critical consumption" by civic-minded citizens who, in this way, can express their opposition to organised crime. AP stores clearly signal their membership by displaying an AP sticker at the entrance of their premises.

A caveat of our hypothesis is that so far we considered joining AP as signalling the non compliance with paying the Mafia. However, while joining AP is observable, not paying the Mafia is not. To join AP, firms must sign a declaration of non compliance with extortionary requests but we are not able to control for the firms' truthful disclosure of information. As discussed by Vaccaro (2012, p. 7), firms can be "double-game" players and choose to join an

[4]These numbers include different branches of the same firm. The number may fluctuate as new firms join and old firms are deleted from the list. Deletion from the AP list can occur for various reasons, for example: if the firm goes out of business, if it changes ownership and the new owners ask to be cancelled, if interactions with organised crime are detected (see below).

[5]AP also supplies legal support in trials against the racketeers, mainly in collaboration with the business association *Libero Futuro*, or psychological support to entrepreneurs wishing to stop paying the Mafia. For more details on AP activity, see Forno and Gunnarson (2010, pp. 109-111) and Gunnarson (2014, pp. 42-44).

[6]This is another slogan diffused by AP.

anti-racket organization to hide their actual connections with organised crime.[7] AP, however, closely monitors the joiners and has already expelled some "double-game" players.[8] Therefore, in this paper we posit that joining AP implies refusing to pay the *pizzo*.

III. On the Decision to Join AP

Our assumption in this paper is that the decision of a firm to join AP is based on a cost-benefit analysis. Cost and benefits of such decision can be identified as follows.

Among the costs, we assume that a major role is played by risk: refusing to pay the Mafia may expose the firm to risk of retaliation.[9] An increase in the perceived risk of firms' activity may imply other costs, for example restricted access to banks' credit.[10] In addition, given the pervasive penetration of organised crime in the local economic activity, refusal to pay may cause abandoning the network of economic transaction overseen by the Mafia, implying higher costs or lower revenues.[11] Finally, joining AP can imply social stigma which can also have economic consequences: for example MNews (2015) mentions the case of the boycotting of a bakery from the local consumers after it joined AP.

Among the benefits we can consider first of all the elimination of outlays taking the form of *pizzo*. In addition, if "critical consump-

[7]Indeed, recent evidence shows that some Mafia bosses suggested to strategically join anti-mafia organizations to this purpose. See Vaccaro (2012, p. 7).

[8]The number of cases seems however very limited, as confirmed by personal communication.

[9]Firms joining AP should declare if they were paying the *pizzo* and commit themselves to stop paying, or if they never paid. This piece of sensitive information is, however, not released by AP. There exists recent evidence of intimidation to AP firms, reported in the local news (see, e.g., Fiasconaro , 2007, Ziniti , 2015 and MNews , 2015). There is, however, also evidence contrary to this assumption, according to which *mafiosi* are unwilling to retaliate AP-firms, because this would attract attention by the police (see, e.g, the declaration of M. Pasta in the news section of `http://www.addiopizzo.org/`). Clearly, a precise assessment of the risk implied by joining AP would require an analysis of intimidation against non-AP firms, which is prevented by lack of data and can represent a topic for further research.

[10]We were informed of this possibility by personal communication from AP.

[11]For example the Mafia often favour "protected" firms in the adjudication of public contracts, or guarantees privileged access to local markets (see Gambetta and Reuter , 1995 and Varese , 2009)

tion" is actually stimulated, firms may obtain higher revenues and profits from joining AP.[12]

A factor that may impact on the overall result of the cost-benefit analysis is the (unobservable) attitude of firms' owners with respect to the Mafia. For example, we can conjecture that if among the owner(s)' values there exist a strong anti-mafia attitude, this will increase the probability of joining AP.[13] Possessing anti-Mafia values is likely to be correlated with education: as discussed for example by Schneider and Schneider (2003, p. 264), activities aiming at spreading of the "culture of legality" often take place in schools. Moreover, as Putnam et al. (1994, p. 110) find in a study of civic attitudes in Italian regions, education is negatively correlated with citizens' "powerlessness", i.e. the perception of being exploited and unable to significantly affect the society. According to this result, education could act as a factor that stimulate citizens' initiatives against the Mafia.

From this discussion, it emerges that to understand the decision to join AP both firm-specific characteristics and the characteristics of the environment in which the firm operates should be taken into account. To capture the elements that, according to our hypotheses, are relevant to answer our research question, we considered several firms' and districts' characteristics.

Among the firm's characteristics, we selected: i) measures of firm's size (total assets, number of employees, revenues); ii) indicators of firm's economic performance (net and gross profits, debts/revenue ratio); iii) a proxy for the human capital embodied in the firm (personnel costs); iv) firm's age v) firm's sector.

Size can have an ambiguous impact on the decision to join: bigger firms, for example, may have a lower probability to join if they have a high capital stock and therefore fear the risk of damages, for

[12]In this paper we only consider the observable decision to join or not to join AP, and can therefore only speculate on firms' expectations on the consequences of such decision before joining, while in a companion paper (Battisti et al. , 2014) we study the actual economic consequences for firms that join AP by adopting a propensity score matching technique.

[13]See Lavezzi (2014, pp. 177-78) for discussion and references on anti-Mafia values in a society.

example arsons. Balletta and Lavezzi (2014) show that the average *pizzo* decreases with firm's size which implies that, on the contrary, smaller firms should have a higher probability to join as they are more heavily "taxed" by the Mafia. In addition, larger firms, having more collateral, may not fear credit rationing. Similarly, firm's economic performance can have a positive effect on the probability to join if "healthier" firms can afford to take more risks, or a negative effect if firms in difficult economic conditions are more prone to join in order to give up paying the Mafia.

We consider the human capital embodied in the firm as a proxy for the unobservable human capital of owners which, as remarked, can correlate with possessing anti-Mafia values.

Firm's age can be informative as a measure of the length of time in which the firm has operated in a Mafia-infested environment. It is reasonable to assume that the longer the period, the stronger the relationship it may have developed with the racketeers, the harder is breaking these relationships. In addition, firm's age can be a proxy for the unobservable owners' age which is likely to be negatively correlated with risk-taking (see, e.g. Vroom and Pahl , 1971). For these reasons, we expect that firm's age has a negative impact on the probability to join AP.

Firms in different sectors, finally, can have a different probability to join because of a different degree of penetration of Mafia in the sector: for example the Construction sector is typically heavily controlled by organised crime (see e.g. Lavezzi , 2008).

Among the district's characteristics, we selected indicators of socio-economic development, such as the demographic structure, the education level of the resident population, the labour market conditions, the housing conditions (see Section IV. for details). As remarked, we expect that the probability to join is higher for firms operating in districts where the (expected) level of anti-Mafia critical consumption is higher, a behaviour likely to be correlated to the spread of anti-Mafia values. However, we cannot directly measure the cross-district variation in the spread of anti-Mafia values in the population, but assuming that they are positively correlated to

the level of socio-economic development, in particular to education, we can expect that district's level of development (or the education level of its residents) positively affects the probability to join. In addition, it is likely that in districts where anti-Mafia values are widespread, the decision to join AP does not imply social stigma, and therefore the probability to join is higher.

IV. The Dataset

We designed an unmatched case-control study where information is collected in a retrospective, observational way. The "cases" are 150 joint-stock companies of Palermo, listed in the archive of subscribers of AP.[14]

A stratified random sample of 483 "control" cases, i.e. firms not belonging to AP, was selected from the CERVED archive. The stratification criteria (confounding factors) were the age of the firm since the beginning of its activity. The distribution of controls by age reflected the distribution of firms' age in the cases group: 72% existed before December 31st, 2005, and 28% were created afterwards.[15] We classified firms in this way to distinguish those who

[14]The original dataset obtained from AP has 839 entries, and refers to firms that joined by May 2012. The same firm can appear in more entries if it has branches. Of the original 839 entries, 72% refer to firms located in the municipality of Palermo. In this article we only consider joint-stock companies because balance sheets, a relevant source of information for our analysis, are available for this type of firm only. In addition, we excluded firms' branches, as the balance sheet data only refer to the firm's headquarter. Finally, we excluded observations on 54 firms outside Palermo, as they are located in small towns, where the district characteristics' variation cannot be observed as in Palermo. By this procedure, we identified 190 joint-stock companies located within the municipality of Palermo. We matched information in this list with information on balance sheet data in the database of CERVED, who collects data from the Italian Chambers of Commerce (CCIAA). For all firms studied in this paper (cases and controls), we extracted data on balance sheets for the period 2002-2011, to have approximately 5 years of data before and after the creation of AP. Finally, we reached the number of 150 cases by deleting firms for which we did not find any data, or for which there were inconsistencies, for example between the registered initial year of activity and the available balance sheets. In addition, since we will carry out a cross-section analysis on averaged data, we deleted firms that had less than three years of observations available. The AP list also included 201 firms of a legal form different from joint stock, (152 in the city of Palermo, 49 from the Palermo province) and 112 firms that we were unable to correctly identify.

[15]We originally selected a random sample of 573 joint-stock firms to obtain a ratio controls-cases of 3:1 (see, e.g. Grimes and Schulz , 2005 and Dicker , 2008). As for the cases, we cancelled

were existing before AP was created and acquired some visibility, to those who were not, in other words those who were exposed to the existence of AP for a fraction of their life, from those who were exposed to AP since their creation. The controls, therefore, have been selected from the exposure population and are comparable with the cases.

We enriched the list of AP joiners (our cases group) by auxiliary information from Census data on the 25 Palermo districts where the firms are located. The linkage between the two sources has been done by geographical matching of the address of each joiner with the database from the 2001 Census, containing data on the socio-economic conditions of each district.[16] The choice of this Census year should ensure about the exogeneity of these characteristics with respect to the decision to join AP, which appeared only in 2004.

Finally, we built a dataset consisting of two types of data for each firm: firm-specific or individual data, and district-specific data on the socio-economic characteristics of the district were the firm is located. Our final dataset, as mentioned, includes a study group (AP-joiners) of 150 firms and a control group (non AP-Joiners) of 483 firms.[17] The dataset contains the following data:

1. Firm-level data: sector, age, date of joining AP, total assets (which includes physical capital), personnel costs, revenues, gross profits, net profits, debts/revenues ratio, number of employees.[18] For each firm with at least three available observations, we averaged the yearly values over the period 2001-2012

firms with inconsistent data (see footnote 14) or few observations, and firms that ceased before 2004, i.e. the year in which AP appeared.

[16]Census data are collected by ISTAT, the Italian National Institute of Statistics. Originally, the Census dataset contains data on 3021 Census Cells, from which we computed values for 25 districts, after matching each cell to a district.

[17]Overall, we are considering a sample of 633 firms that have been operative in the period 2002-2011. The average number of joint-stock firms operating in the same period, from the CERVED dataset, is around 9400, including both "active" and "inactive" firms (i.e. firms that have not yet started their activity or failed to communicate to the CCIAA the beginning of activities). Our sample, therefore, covers approximately a range of 7-8% of the population.

[18]Nominal data were converted into real terms dividing by the values of the Consumption Price Index (CPI) of the capitals of regions (Istat- System of Territorial Indicators -SITIS). All data are expressed at constant 2000 prices.

for each balance sheet variable to reduce the impact of cyclical components, obtaining a cross-sectional database. The firm age is computed between the initial year of firm's activity and October 2012.

2. District-level data from the 2001 Census. In particular we selected indicators of socio-economic development such as:

   (a) Demographic characteristics: district's population share, dependency ratio (share of population above 64 on share of population under 15), share of small families (with 1-3 components), share of large families (with 5-6 components).

   (b) Human capital levels: share of population with tertiary, secondary (high school), primary (including junior high), elementary education; share of literate population,[19] share of illiterate population.[20]

   (c) Labour market conditions: employment and unemployment rates, employment share in agriculture, manufacturing, construction, services; shares of self-employed and employees on total labour force.

   (d) Housing conditions: share of houses in good/perfect conditions, share of houses with no running water.

Our prediction, as mentioned above, is that a higher level of socio-economic development could increase the probability of joining AP for because it can be correlated with a higher propensity to exert "critical consumption". A high level of socio-economic development can be proxied, for example, by the share of families of small size, by the level of human capital (see, e.g., Becker et al. , 1990), by low unemployment or by high employment in skilled occupations (e.g.

[19]This category includes people with no schooling, but able to read and write.

[20]The population considered to compute these shares includes individuals aged more than 6 years.

the share of self-employed or those employed in the Services sector). The next section contains the results of our empirical analysis.

V. Empirical Analysis

In this section we present the empirical analysis. First of all we provide descriptive statistics of the firms in the sample (Section V.A.) and of the districts' characteristics (Section V.B.). Then we present the results of the econometric analysis of the firms' choice to join AP (Section V.C.).

V.A. Comparing Cases and Controls

In this section we describe our sample by comparing the characteristics of cases and controls. Table 1 contains average values and standard deviations of the firm-specific variables from the balance sheets, along with the p-values of t-test for the mean difference.

	AP		Control		
	mean	std.dev	mean	std.dev	p.value
Total assets	748,178.32	4,709,943.16	615,897.62	3,380,364.93	0.75
Personnel costs	346,859.69	1,549,325.66	122,998.12	404,548.88	0.08
Number of employees	15.32	60.23	6.06	17.39	0.07
Debts	463,637.72	2,652,589.76	428,064.21	2,149,966.68	0.88
Revenues	1,477,937.55	5,086,066.25	909,457.68	3,643,809.14	0.21
Debts/Revenues	0.39	2.1	1.81	13.10	0.03
Gross profits	41,947.74	178,315.01	9,915.70	169,033.71	0.05
Net profits	-2,812.01	81,004.82	-20,138.31	232,021.24	0.16
Firm's age (years)	11.90	12.60	15.00	11.22	0.01

Table 1: Firm-specific variables in cases and control groups

Table 1 shows that AP firms have significantly higher levels of gross profits and significantly lower debt/revenue ratio and firms' age.[21] At first sight, the AP firms appear on average larger and "healthier" than the control firms.

[21]Personnel costs and number of employees are significant just at 10%. The value of the debt/revenues is obtained after cancelling few extremes observations. This variable is very sensitive to this problem, that we will take into account in the econometric analysis.

Table 2 contains the distribution of cases and controls across sectors. In our sample, some sectors feature small numbers of firms. For this reason, we considered an aggregation of observations in 10 sectors, which corresponds to a higher level of aggregation than the 1-digit level, and a even higher aggregation in three sectors: Manufacturing, Construction and Services (both are presented in Table 2). These different criteria will be taken into account in the econometric analysis.[22]

	AP # firms	Control # firms	Sector Tot.	AP %	Control %
Manufacturing, Energy	13	42	55	8.67	8.75
Construction	13	82	95	8.67	17.08
Wholesale and Retail, Motor repair	53	115	168	35.33	23.96
Transport and Logistics	7	19	26	4.67	3.96
Hotels and Restaurants	12.	21	33	8.00	4.38
Rentals, Business Services	10	38	48	6.67	7.92
Education, Health	7	36	43	4.67	7.50
Culture and Sport	10	7	17	6.67	1.46
Hi-skill Services	23	78	101	15.33	16.25
Real Estate Services	2	42	46	1.33	8.75
Total Services	124	356	480	82.67	74.17
Total	150	480	630	100	100

Table 2: Distribution of firms across sectors

Table 2 shows that AP and control firms have similar shares in the Manufacturing sector, while the share in the Construction sectors is much higher in the control group. Among the services, AP firms' share is notably higher for Wholesale and Retail, Hotels and Restaurants, Culture and Sport, and notably lower in Real Estate Services. The numbers of firms in each sector is, however, quite small. When aggregating all Service sectors, the share in AP appears higher.

[22]The sector was unspecified for three firms of the control group.

V.B. Palermo Districts' Characteristics

In this section we provide a description of the 25 Palermo districts in terms of the distribution of the AP firms and of districts' socio-economic characteristics.[23] In the maps that follow, the darkness of the color indicates a higher intensity of the represented phenomenon. The levels are defined on the basis of the quantiles of the respective distributions.

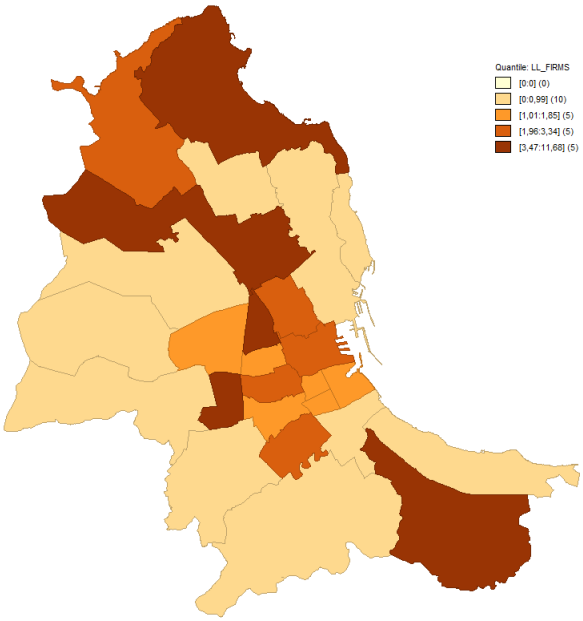

Figure 1: Shares of AP firms in the 25 Palermo districts

Figure 1 highlights the distribution of AP firms across the districts. To take into account the overall spread of economic activity, we report the shares of AP-firms over the number of limited-liability firms in each district.[24] It shows that the spatial distribution of AP firms is not homogeneous. The districts with the relatively higher shares of AP firms are located in the central-eastern part of the city,[25] but there is a vast area including many peripheral districts

[23] Appendix B contains the list of Palermo districts and their location on the map.

[24] This number is the average number of limited-liability firms in the period 2004-2012. Data from CERVED at a zip level were converted through the common census cells in data at district level.

[25] The districts with the highest numbers of AP-firms are, starting from the East, Partanna-

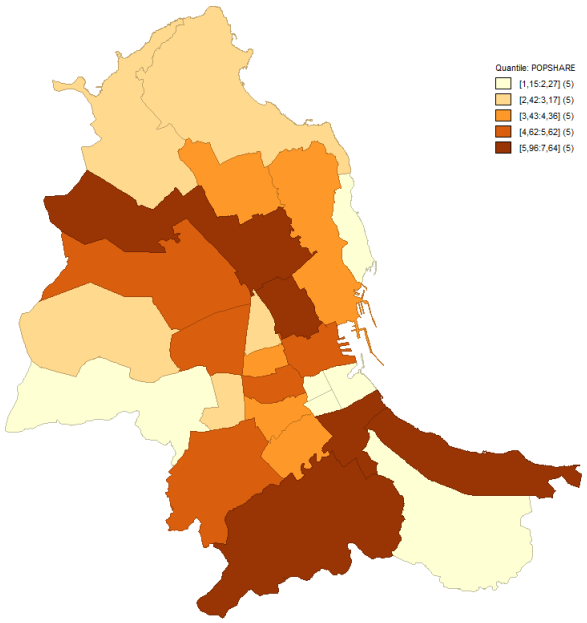

Figure 2: Shares of population in the 25 Palermo districts

in which no AP firms are present.[26]

Figures 2, 3 and 4 refer to a representative measure of demography, human capital and labour market conditions in the districts.[27] Figure 2, in particular, displays the population shares across districts, that could represent a proxy for the potential market for a firm located in a particular district. Here no evidence of clear spatial correlation appears: populous districts are present in both the central and peripheral areas of Palermo.

Interestingly, a strongly divergent pattern is found when we observe human capital. Figure 3 shows that the spatial pattern of human capital, measured by the share of population with tertiary

Mondello (9), Resuttana-San Lorenzo (17), Politeama (43), Liberta' (25), and Malaspina-Palagonia (11). The western district of Brancaccio appears in the map similar to the former districts, but this is due to the very low number of AP-firms (2), combined with a very low number of registered firms in the district.

[26]We refer in particular to the contiguous disticts of: Cruillas CEP, Borgo Nuovo, Boccadifalco, Mezzomonreale, Villagrazia-Falsomiele, Oreto and the district of Arenella - Vergine Maria.

[27]Tables 8, 9 and 10 in Appendix B report other districts' statistics, while Tables 9 and 10 report their correlations. No interesting pattern was found in the descriptive and econometric analyses for our measures of the quality of living conditions, that are therefore discarded from now on.

education, is similar to the one characterizing the presence of AP firms. This share can vary from approximately 20% in the some of the latter districts (e.g Resuttana-San Lorenzo), to 2% in districts where no AP-firms are present (e.g. Arenella-Vergine Maria). Table 7 shows that in the latter districts a large majority of citizens has primary education only, approximately 60%, while in districts with higher presence of AP-firms this percentage drops to approximately 30%.[28] These measures of human capital are strongly correlated with demographic indicators such as the shares of small and large families (see Table 9): high (low) human capital is correlated with low (high) family size, in line with the predictions of the child quality/quantity trade-off of the model of Becker et al. (1990).

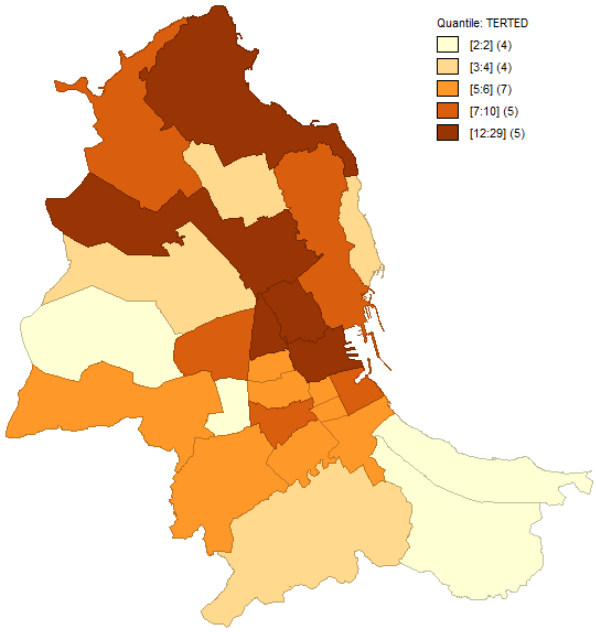

Figure 3: Shares of population with tertiary education in the 25 Palermo districts

[28]These averages are computed considering the groups of districts listed in Footnotes 25 and 26. Table 6 also shows that the dependency ratios, i.e. the ratio of the share of population over 64 on the population under 14, is generally largely lower than 1 in the former and higher than 1 in the latter districts.

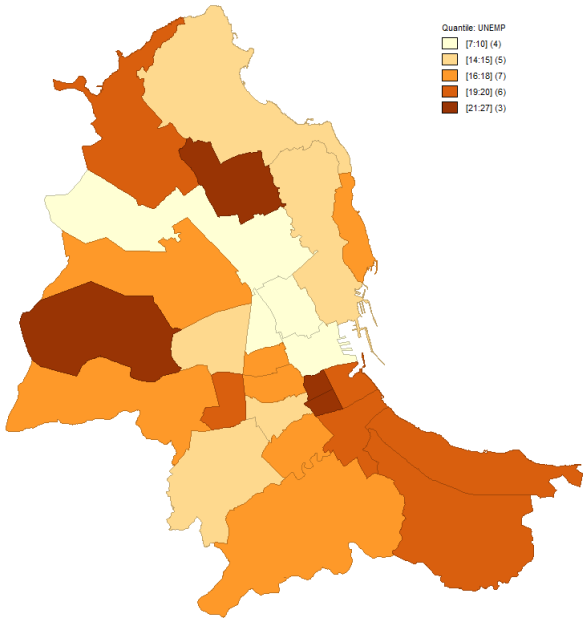

Figure 4: Unemployment rates in the 25 Palermo districts

A similar pattern is found in Figure 4. Unemployment rates are, respectively in the "high-AP" and "low-AP" districts, around 10% and 17%, a pattern reflected by the employment rates (see Table 8) which amount to, approximately, 85% and 70%.

Overall, the picture of Palermo is the one of a city in which two different socio-economic contexts co-exist: one in which population is on average educated, generally employed and lives in families of small size, and one in which population has on average little or no education, lives in large families, and is characterized by high unemployment rates. In the following section we describe our strategy for the econometric analysis.

V.C. Econometric Analysis: Modelling the Participation to AP

In this section we describe the methodology we adopted to identify the determinants of the decision to join AP (that is declare to refuse to pay the extortion racket), and then present the results in the next section.

Hierarchical or multilevel data are common in the social and behavioral sciences. In this paper, analysed data show a typical hierarchical structure (Raudenbush and Bryk, 2002; Snijders and Bosker, 2011) where lower-level units (individuals) are nested within higher-level units (clusters). Here, firms are clustered in districts and define a two-level hierarchical data structure. Because of this we can expect that firms located within each district, sharing the same unobserved factors, due to the exposure to common environmental or contextual effects, have correlated values of the response variable. When this occurs, analysing lower-level units as if they were independent can produce biased standard errors of the regression coefficients, thus resulting in erroneous inferences (Hox, 2010) and possible substantive mistakes when interpreting the effects of predictor variables. Furthermore, in the analysis of such data, it is usually informative to take into account the sources of variability in the responses associated with each level of nesting, in this case the variance between firms and between districts, respectively.

Multilevel regression models (Goldstein, 2011, Raudenbush and Bryk, 2002, Sneijder and Bosker, 2011) are suitable for handling dependence among the responses resulting from a hierarchical data structure, also analysing the complex pattern of variability. In multilevel models, the total variance of the response variable is partitioned into its different components of variation, due to the various cluster levels in the data. The effect of clustering is modelled by introducing random effects (Laird and Ware, 1982), that is a continuous latent variable following a known parametric distribution, whose values are constant within clusters but vary across clusters. Independence across observations is assumed at cluster-level (district) whereas at individual-level (firms) it is assumed only among units belonging to different clusters (independence conditional on cluster membership). As a consequence, cluster-level random effects can be interpreted as the effects of district-levels unmeasured covariates that induce dependence among firms in the same neighborhood whereas indivudual-level random effects represent residuals specific to each firm after taking into account cluster effects. To explain

at least some of the cluster-level variability, district-level covariates can also be introduced.

In this research, the response variable, indicated with y, is binary and distinguishes the firms that decided to join *Addiopizzo* by May, 2012 ($y = 1$) from the others ($y = 0$). The analysis is performed by using a two-level random intercepts logistic regression model (Goldstein, 2011; Rabe-Hesketh, Skrondal and Pickles, 2004). Given a binary outcome y_{ij} [0,1] observed on firm i, with $i = 1, 2, ..., N_j$, located in neighborhood j, with $j = 1, 2, ..., G$, and being $P_{ij} = Pr(y_{ij} = 1)$ the probability that y_{ij} takes on the value of 1 (i.e. the firm is associated with *Addiopizzo*), the model is defined in terms of the natural logarithm of the odds ratio (logit), indicated as $ln(P_{ij}/1 - P_{ij})$.

Hence, the two-level random intercepts logistic regression model can be expressed as a linear function of the explanatory variables using the single equation mixed model formulation (Rabe-Hesketh, Skrondal and Pickles, 2004):

$$ln\left(\frac{P_{ij}}{1 - P_{ij}}\right) = \beta_0 + \beta_1 x_{ij} + \gamma w_j + u_j \qquad (1)$$

where x_{ij} is a vector of predictors for firm i placed in district j and w_j is a vector of predictors characterizing district j.

The random effects are given by the level-2 residuals, $u_j \sim N(0, \sigma_u)$, which define the effect of being in district j on the log-odds. This parameter represents a continuous and unobservable quantity shared by the firms within a particular neighbourhood that captures all the relevant factors not accounted for by the observed covariates. The magnitude of the standard deviation, σ_u, indicates the strength of the influence of the specific district j on the log-odds.

The fixed parameters to be estimated are β_0, β_1 and γ. More specifically, β_0 represents the population average log-odds when x_{ij} $= 0$ and $u_j = 0$; β_1 is the vector of the regression coefficients quantifying the effect on log-odds of a 1-unit increase in x for all the firms in the same neighbourhood, thus having the same value of u; γ is the vector of the regression coefficients for the predictors character-

izing the neighbourhood j. The probability of joining AP for firm i in neighbourhood j is calculated as follows, for given values of the predictors x_{ij}, w_j and u_j, the specific term:

$$P_{ij} = \frac{exp^{(\beta_0+\beta_1 x_{ij}+\gamma w_j+u_j)}}{1+exp^{(\beta_0+\beta_1 x_{ij}+\gamma w_j+u_j)}} \tag{2}$$

From the previous formula it is also possible to make predictions for "ideal" or "typical" firms having particular values for the vector of covariates, given the value of the random effect. The measurement of the extent to which the observations in a cluster are correlated is often of interest and can be expressed by the intraclass correlation coefficient (ICC), indicated with ρ. This quantity can be obtained as the ratio of the variance of the random effects u_j to the total variance and can be interpreted as the proportion of variance explained by clustering. Since the logistic distribution for the level-one residual implies a variance of $\pi^2/3$, the intraclass correlation in a two-level logistic random intercept model is defined as follows:

$$\rho = \frac{\sigma_u^2}{\sigma_u^2 + \pi^2/3} \tag{3}$$

This formulation can be used also to express the residual intraclass correlation coefficient, that is the intraclass correlation after controlling for the effects of the explanatory variables. Methods for estimating hierarchical or multilevel logistic models are based on maximum likelihood (ML) (Demidenko, 2004; Skrondal and Rabe-Hesketh, 2004; Tuerlincks et al. 2006) or, alternatively, on Bayesian methods (Browne and Draper, 2000; Condgon, 2006; Draper, 2008).

When the second level effects are treated as random and the model parameters as fixed, inference is usually based on the marginal likelihood, that is the likelihood of data given the random effects, integrated over the random effects distribution. In this case, except for multilevel linear models, parameter estimation involves inevitably numerical methods and some kinds of approximation because the integrals do not have a closed-form solution (Pinheiro and Bates, 1995; Skrondal and Rabe-Hesketh, 2004). Currently the most used algo-

rithms for approximating the integral employed in the calculation of the log likelihood are the Laplace approximation and adaptive numerical quadrature. In contrast, when both the random effects and the model parameters are treated as random variables, a Bayesian approach is applied and inference is based on the posterior distribution, given the observed data. Bayesian methods use Markov chain Monte Carlo (MCMC) simulation methods for sampling from the posterior distribution and estimating parameters by their posteriors means (Gelfand and Smith 1990; Clayton, 1996).

In this paper, ML approach is employed and estimation of the model parameters is performed using the *melogit* procedure, implemented in the software Stata 13.0. The integral required to calculate the log-likelihood is approximated by using the mean-variance adaptive Gauss-Hermite quadrature (Skrondal and Rabe-Hesketh, 2004) with 20 points of integration (with 20-point adaptive quadrature). Following this approach, the quadrature locations and weights for individual clusters are updated during the optimization process by using the posterior mean and the posterior standard deviation.

Prediction of random effects and expected responses is also often required. An extensive treatment of this topic is addressed by Skrondal and Rabe-Hesketh (2004; 2009). For assigning values to random effects, empirical Bayes prediction (Efron and Morris, 1973 and 1975; Morris, 1983; Maritz and Lwin, 1989; Carlin and Louis, 2000a and 2000b) is employed. For this method, Skrondal and Rabe-Hesketh (2009) also discuss three different kinds of standard errors (the posterior standard deviation, the marginal prediction error standard deviation and the marginal sampling standard deviation).

V.D. Econometric Analysis: Results

In this section we report the results obtained by using a two level logistic regression model, when we model a second level linked to

the district characteristics.[29] The analysis is carried out by using a two-level logistic regression model, estimated on 588 firms nested within 25 districts, the average number of firms for each district is 23.5, with a minimum of 2 and a maximum of 148.

Our modelling strategy consists in comparing the estimates of different specifications (Table 3), moving from a model with the first-level covariates only (column 1), estimated in order to select the firm-level variables that better explain the probability of joining *Addiopizzo*, to the alternatives ones which include also the second-level (or district-level) covariates (columns 2-7), introduced for taking the possible effects of contextual or environmental predictors into account.[30] Table 3 contains the results.[31]

[29]Tables 4, 9 and 10 in Appendices A and B contain the correlations among, respectively, firm-level and district-level variables.

[30]Quantitative variables having different magnitude (Total assets, Personnel costs, Debts, Revenues, Gross and Net Profits, Debt/Revenues ratio) were preventively standardized in order to make the effects more easily comparable. Furthermore, the variable "Number of employees" was transformed into categorical with three levels ("No employees"; "1-9 employees" and "more than 9 employees"), whereas the classification of economic sectors was considered at the most aggregate level, as described in Table 2, by distinguishing firms into three levels ("Manufacturing/Energy", "Construction" and "Services"). Finally, a dummy variable indicating the exposure to the promotional campaign of *Addiopizzo* was introduced ("AP Campaign"). We do not use the absolute values of employees as the pure number declared by the firms is often not precise due to the diffusion of illegal labour. In addition, this number is not attached to the yearly balance sheets, but it is recorded in a given year and not regularly updated.

[31]We present only representative specifications in which significant results are obtained, and mention other specifications where other significant effects or non-significant results are found. Results not presented in 3 are available upon request.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Constant	-1.565***	-1.549***	-1.399***	-1.650***	-1.634***	-1.438***	-1.436***
	(0.517)	(0.490)	(0.486)	(0.486)	(0.480)	(0.473)	(0.473)
Total Assets	-0.937*	-1.008**	-1.056**	-1.032**	-1.024**	-1.081**	-1.074**
	(0.495)	(0.466)	(0.468)	(0.469)	(0.463)	(0.467)	(0.467)
Personnel Costs	0.931**	1.000**	1.044***	1.026**	1.012**	1.072***	1.066***
	(0.442)	(0.397)	(0.400)	(0.399)	(0.393)	(0.399)	(0.399)
Revenues	-0.212						
	(0.244)						
Gross Profits	0.391						
	(0.392)						
Net Profits	-0.0513						
	(0.438)						
Debts/Revenues	0.0347						
	(0.0299)						
Firm age	-0.0276**	-0.0327***	-0.0324***	-0.0322***	-0.0327***	-0.0317***	-0.0321***
	(0.0117)	(0.0112)	(0.0111)	(0.0111)	(0.0111)	(0.0111)	(0.0110)
# Employees Class I	1.026***	1.120***	1.116***	1.125***	1.109***	1.109***	1.104***
	(0.308)	(0.303)	(0.302)	(0.302)	(0.301)	(0.300)	(0.300)
# Employees Class II	1.813***	1.837***	1.828***	1.851***	1.846***	1.799***	1.821***
	(0.372)	(0.358)	(0.359)	(0.358)	(0.356)	(0.352)	(0.353)
Construction Sect. Dummy	-1.085**	-1.132**	-1.162**	-1.179**	-1.173**	-1.227**	-1.257**
	(0.526)	(0.511)	(0.509)	(0.510)	(0.509)	(0.504)	(0.506)
Services Sect. Dummy	-0.299	-0.317	-0.322	-0.375	-0.367	-0.367	-0.397
	(0.415)	(0.396)	(0.396)	(0.395)	(0.393)	(0.387)	(0.388)
AP Campaign dummy	-0.811						
	(0.615)						
Population Share			-0.359**			-0.459***	-0.463***
			(0.164)			(0.138)	(0.136)
Share of small families				0.332*			
				(0.170)			
Share of self-employed					0.298**		
					(0.139)		
Share of pop. with primary ed.						-0.257**	
						(0.111)	
Share of pop. with tertiary ed.							0.257**
							(0.100)
Second level variables	NO	NO	YES	YES	YES	YES	YES
Residual District St. Dev.	0.593**	0.523**	.367	0.421	0.313	0	0
N	558	588	588	588	588	588	588
aic	572.4	592.3	589.4	590.0	589.8	586.8	585.6
bic	632.9	631.7	633.1	633.7	633.6	635.0	633.7

Table 3: Mixed effect Logistic Regression. Dependent variable: probability to join AP. Standard errors in parentheses. * p<0.10, ** p<0.05, *** p<0.01

Model 1 includes all the first-level variables only, and a dummy

to control for the effects of AP campaigns in specific districts.[32] The model estimates indicate that the variables proxing for firms' performance (Revenues, Gross and Net Profits, Debt/Revenues ratio) are not significant. The dummy for the AP-campaign is also non-significant. Total assets have a negative and significant effect, as well as firms' age. Personnel costs and the dummies for employment level have a positive and significant effect, while the dummy variable for the Construction sector has a negative and significant effect.

The results also show a considerable random-intercept standard deviation ($\sigma_u = 0.593$; p-value < 0.05),[33] and indicate the presence of unobserved between-districts heterogeneity, which means that the probability of joining *Addiopizzo* is significantly different across the districts of Palermo, after taking into account for the model's covariates. More specifically, the random intercept parameter can be thought of as the combined effect of omitted firm-specific covariates that cause the firms within the same district to be more or less prone to join *Addiopizzo* (Rabe-Hesketh and Skrondal, 2008). The within-district dependence among the dichotomous responses can be quantified by the conditional intraclass correlation (or residual intraclass correlation), indicated with ρ. The estimated value is $\rho = 0.091$, and indicates the presence of a substantial association in the probability of joining *Addiopizzo* among the firms within each district. These preliminary results confirm that a two-level approach is suitable for analysing such data and then alternative specifications of Model 1 are proposed by introducing contextual or environmental predictors in order to account some of the second-level variance.

Model 2 contains only the significant first-level variables,[34] and

[32]This dummy assigns 1 to firms (joiners and non-joiners) belonging to districts where AP campaign took place before the decision of the AP-firm to join.

[33]The reported p-value is based on the likelihood-ratio (LR) test but it should be noted that the null hypothesis for this test is on the boundary of the parameter space because it refers to a variance component. As a consequence, the LR test does not have the usual central chi-square distribution with one degree of freedom but it is better approximated as a 50:50 mixture of central chi-squares with zero and one degree of freedom (Snijders and Bosker, 2011).

[34]Model 2 is obtained by sequentially deleting the non-significant variables from Model 1, starting from the least significant. We controlled the robustness of the results by deleting

represents our benchmark model for the introduction of the second-level variables. It still shows the presence of a significant district-level effect.

Models 3 and 4 feature the introduction of variables on the demographic characteristics of the districts. The population share has a negative and significant effect, while the share of small families has a positive and significant effect.[35] Model 5 adds to first-level variables a measure of the labour market characteristics. It shows that the share of self-employed has a positive and significant effect.[36]

In Models 6 and 7 we introduce measures of districts' human capital levels, controlling for the district population share. When we introduce the human capital variables alone, we find the expected signs (positive for high education, negative for low education levels), although the coefficients are not significant. Controlling for the population share, we find that the share of population with tertiary education has a positive effect, while the share of population with primary education has a negative effect.[37]

In Models 3-7, where second-level variables are significant, the district-level random effect significance vanishes, indicating that our measures are able to capture the district-level variance.

V.E. Interpretation of Results

These results allow for the identification of which firm-level characteristics significantly affect the decision to resist the extortion racket and join AP. In addition, they demonstrate that the characteristics of the district where the firm is located have significant explanatory power. Overall, we argue that results in Table 3 support our working hypothesis according to which firms decide to join

outliers. The coefficient for the Debt/Revenues values proved to be the most sensitive to extreme values, although it remained largely non-significant.

[35]We also found that the share of large families has a negative and significant effect, while the coefficient of the dependency ratio is positive but not significant.

[36]We also found that the share of employees has a negative and significant effect, while the other labour market variables have non-significant effects.

[37]We also found that the share of population with elementary education has a negative and significant effect.

AP following a cost-benefit analysis.

In particular, the negative effect of the total assets is consistent with a risk-minimizing behaviour on the part of the firm, as the installed capital is an easy target for organised crime.[38] The size of personnel costs, on the contrary, has a positive effect. As remarked, we consider this variable as a proxy for the human capital embodied in the firm, correlated with the human capital of owners.[39] The positive effect shown in Table 3, suggests that a firm embodying a higher level of human capital has a higher probability to join AP, as this reflects the presence of anti-mafia values in the firm. We interpret the positive effect of the number of employees as suggesting that the perceived risk is lower if more individuals are involved, assuming that firms with larger personnel share the risk of retaliation among a larger pool of possible targets.[40] Finally, the negative effect of firm's age follows our conjecture according to which younger firms have weaker connections with the Mafia, or are run by young, risk-prone, owners.

We may try to give a quantitative economic assessment of the results in addition to these qualitative interpretation by computing the odds ratios.[41]

For a standard deviation change in Total Assets (3.898.049€),

[38] In the cases described in Fiasconaro (2007) and MNews (2015), for example, the premises of the two firms were damaged by, respectively, arson and shots in the windows.

[39] A more suitable measure of human capital would be represented by the average personnel cost. However, given the partial reliability of the numbers of employees (see Footnote 30), we do not utilize such measure.

[40] An alternative useful measure would be the number of owners, assuming that they could be considered as responsible for the choice of joining AP, but this number is not observable.

[41] Since the research design is based on a retrospective unmatched case-control study, sampling of firms is performed conditional on the outcome variable with the consequence that the probabilities of joining AP are determined by the sample design. Accordingly, the baseline probability in the population is different from the corresponding proportion in the sample and interpreting the effect of independent variables in terms of the effects on the probability of being a case versus being a control has no substantive meaning. In such situations, odds ratios may provide the best alternative for interpretation since their values are invariant under study design (Agresti, 2002; Hosmer, Lemeshow and Sturdivant, 2013; Keogh and Cox, 2014). Odds ratio are obtained by taking the exponent of the regression coefficient, $\mathrm{OR} = \exp(\beta)$, and represents the factor of expected change in the odds of joining AP, holding all other variables constant. The relevant null hypothesis for odds ratios usually is H_0: $\mathrm{OR} = 1$, and this corresponds directly to the null hypothesis that the corresponding regression coefficient is zero, H_0: $\beta = 0$.

the odds of joining AP are expected to vary by a factor of 0.342, holding all other variables constant; instead, by taking a change of 100.000€ as a more typical value, the corresponding variation in odds is 0.973, which means that it reduces by 2.7%. Regarding Personnel costs, a standard deviation change (888.085.9€) translates to an increase of odds by a factor of 2.904, whereas a change of 100.000€ implies a factor of 1.128, equal to an increase of 12.8%. Moreover, for firms in the Construction sector, the odds decrease by a factor of 0.285 compared with firms in Manufacturing/Energy, resulting in a reduction of 71.5%. Also, for each additional year of firms' activity, the odds reduce of about 3.2%. Finally, odds tend to increase with the number of employees: indeed, firms with 1-9 employees are more likely to join AP than firms with no employees, with the odds increasing by 3.02%, whereas for firms with more than 9 employees the odds increase even more, by 6.18%. Regarding the district-level variables, for a change of 0.01 in the districts' population share, the odds of joining AP are expected to vary by a factor of 0.743, corresponding to a reduction of 25.7%, whereas the same change in the share of population with tertiary education produces a variation of odds by a factor of 1.029, which reflects an increase of 2.9%.

The results on the second-level variables suggest that the the sheer number of inhabitants is not a good proxy for the propensity of practising critical consumption. Indicators of socio-economic development, such as the presence of a large share of small families, or of self-employed (e.g. professionals), can be a good proxy for this propensity. Human capital seems to proxy well for this propensity, or for a lower propensity to express social stigma against AP-firms, when we control for population size. An important policy implication of this result is that promoting human capital accumulation can by part of an anti-Mafia strategy. In this case, the channel at work is the possibility of acquiring, through education, anti-Mafia values, which implies a higher propensity to support AP-firms, whose behaviour reduces the resource accumulated by the criminal organisations.

VI. Conclusions

In this paper we studied the decision of firms operating in areas where organised crime is pervasive to resist to the extortion racket. Starting from the unique experience of *Addiopizzo* we built a database of firm and social district characteristics for the city of Palermo in the period 2002-2012. We identified firms' characteristics and districts' characteristics that explain the decision to join AP. For instance we show how every additional year a firm spent in the market reduces the probability to adopt a public anti-racket behaviour of 3%, suggesting that in the long run acquiescence to racket is the usual behaviour. We argued that these results support the hypothesis that firms' decision is based on a cost-benefit analysis. Finally, we suggested that promoting human capital accumulation is an important policy implication to stimulate civic mobilization against the Mafia, as it may increase support to firms that choose to resist the extortion racket through joining NGO such as AP.

An important aspect that we did not address in this article is the interaction of firms' decisions. It is likely that the decision to join AP is influenced by the number of firms that took the same decision before or, alternatively, that the presence of an organization such as AP acts as a coordinating device to make such choices. This issue is tackled in Battisti et al. (2015), where the tools of the social interaction econometrics are employed.

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A Firm-level variables

Table 4 contains the values of the correlation coefficients among the firm-level variables (standardized values) used in the econometric analysis of Section V.D. (p-values of tests for significance in parenthesis).

	Total Assets	Personnel Costs	Revenues	Gross Profits	Net Profits	Debts/Revenues
Total Assets	1					
Personnel Costs	0.67 (0)	1				
Revenues	0.51 (0.17)	0.72 (0.17)	1			
Gross Profits	0.62 (0.92)	0.47 (0.92)	0.39 (0)			
Net Profits	-0.05 (0.56)	-0.07 (0.56)	-0.11 (0)	0.36 (0)	1	
Debts/Revenues	0.06 (0.25)	0 (0.25)	0	0.04 (0)	-0.04 (0)	1

Table 4: Correlations among firm-level variables

B District variables

In this appendix we present the statistics relative to the second-level variables. Figure 5 and Table 5 contain the map of the Palermo districts.

Tables 6, 7 and 8 report the statistics on the demographic characteristics of the districts, of the levels of human capital and on labour market indicators, while Tables 9 and 10 contain the correlations among these variables (p-values of tests for significance in parenthesis).

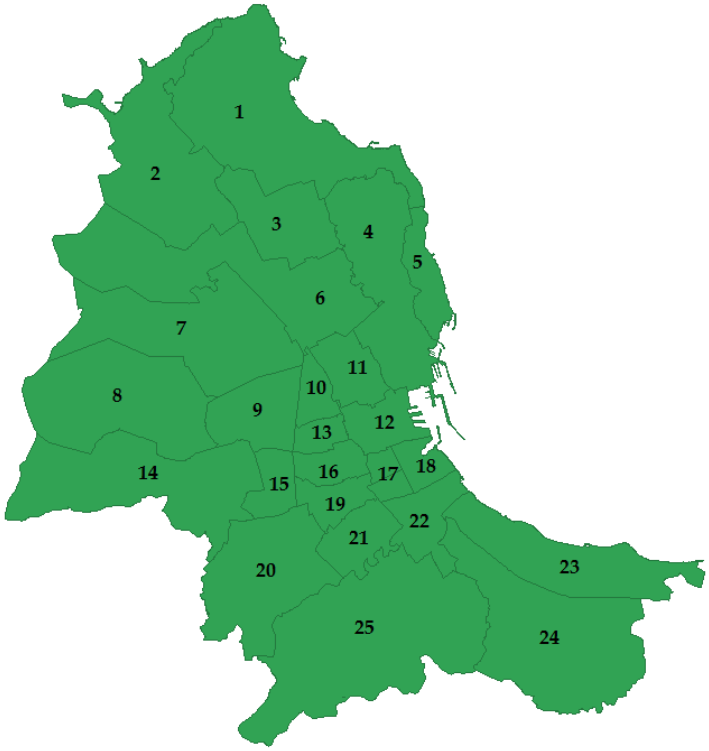

Figure 5: Palermo districts: map

ID	District name
1	Partanna Mondello
2	Tommaso Natale
3	Pallavicino
4	Monte Pellegrino
5	Arenella Vergine Maria
6	Resuttana San Lorenzo
7	Cruillas CEP
8	Borgo Nuovo
9	Uditore - Passo di Rigano
10	Malaspina-Palagonia
11	Liberta'
12	Politeama
13	Noce
14	Boccadifalco
15	Altarello
16	Zisa
17	Palazzo Reale - Monte di Pieta'
18	Tribunali-Castellammare
19	Cuba-Calatafimi
20	Mezzomonreale
21	Santa Rosalia
22	Oreto
23	Settecannoli
24	Brancaccio-Ciaculli
25	Villagrazia-Falsomiele

Table 5: Palermo districts: names

	Council	Tot. Pop.	Pop. share	Dep. Ratio	Family 123	Family 56
Palazzo Reale-Monte di Pieta'	I	11352	0.02	0.69	0.71	0.12
Tribunali-Castellammare	I	10137	0.01	0.86	0.73	0.12
Brancaccio-Ciaculli	II	15618	0.02	0.45	0.54	0.18
Settecannoli	II	52481	0.08	0.56	0.54	0.18
Oreto-Stazione	III	42504	0.06	0.89	0.64	0.13
Villagrazia-Falsomiele	III	40915	0.06	0.62	0.56	0.17
Altarello	IV	16944	0.02	0.53	0.57	0.15
Boccadifalco	IV	7909	0.01	0.47	0.59	0.16
Cuba	IV	23587	0.03	0.91	0.63	0.12
Mezzomonreale	IV	38567	0.06	0.7	0.58	0.14
Santa Rosalia	IV	25678	0.04	1.03	0.64	0.13
Borgo Nuovo	V	21085	0.03	0.74	0.56	0.2
Noce	V	29940	0.04	0.95	0.67	0.11
Uditore-Passo di Rigano	V	33331	0.05	0.88	0.63	0.12
Zisa	V	36260	0.05	0.89	0.63	0.13
Cruillas-S. Giov. Ap. (ex C.E.P.)	VI	32998	0.05	0.54	0.55	0.15
Resuttana-San Lorenzo	VI	45376	0.07	1.34	0.7	0.07
Arenella-Vergine Maria	VII	9299	0.01	0.64	0.59	0.15
Pallavicino	VII	27428	0.04	0.48	0.55	0.19
Partanna Mondello	VII	16652	0.02	0.77	0.68	0.09
Tommaso Natale	VII	21125	0.03	0.54	0.59	0.14
Liberta'	VIII	45002	0.07	1.6	0.75	0.06
Malaspina-Palagonia	VIII	21793	0.03	1.88	0.74	0.06
Monte Pellegrino	VIII	29011	0.04	0.86	0.65	0.12
Politeama	VIII	31730	0.05	1.18	0.73	0.08

Table 6: Demographic variables (districts). Tot.Pop.: total population; Pop. Share: population share; Dep. Ratio: dependency ratio; Family 123: share of families with 1-3 components; Family 56: share of families with 5-6 components or more

	Council	Primm. Ed.	Prim. Ed.	Sec. Ed.	Tert. Ed.	Pop. Lit.	Pop. Illit.
Palazzo Reale-Monte di Pieta'	I	0.32	0.61	0.11	0.05	0.17	0.06
Tribunali-Castellammare	I	0.27	0.54	0.16	0.1	0.16	0.05
Brancaccio-Ciaculli	II	0.31	0.65	0.15	0.02	0.15	0.03
Settecannoli	II	0.3	0.65	0.16	0.02	0.14	0.03
Oreto-Stazione	III	0.29	0.61	0.2	0.05	0.12	0.03
Villagrazia-Falsomiele	III	0.28	0.62	0.21	0.03	0.12	0.02
Altarello	IV	0.29	0.66	0.16	0.02	0.13	0.02
Boccadifalco	IV	0.23	0.58	0.21	0.06	0.12	0.02
Cuba	IV	0.24	0.55	0.26	0.07	0.1	0.02
Mezzomonreale	IV	0.22	0.56	0.28	0.06	0.09	0.01
Santa Rosalia	IV	0.28	0.61	0.2	0.05	0.11	0.03
Borgo Nuovo	V	0.31	0.67	0.13	0.02	0.13	0.04
Noce	V	0.27	0.59	0.21	0.06	0.11	0.02
Uditore-Passo di Rigano	V	0.21	0.51	0.29	0.1	0.09	0.01
Zisa	V	0.27	0.6	0.2	0.06	0.11	0.02
Cruillas-S. Giov. Ap. (ex C.E.P.)	VI	0.24	0.57	0.25	0.04	0.11	0.03
Resuttana-San Lorenzo	VI	0.13	0.34	0.39	0.2	0.06	0.01
Arenella-Vergine Maria	VII	0.29	0.64	0.19	0.03	0.12	0.01
Pallavicino	VII	0.31	0.63	0.15	0.04	0.14	0.03
Partanna Mondello	VII	0.2	0.47	0.3	0.12	0.09	0.01
Tommaso Natale	VII	0.22	0.56	0.25	0.07	0.11	0.02
Liberta'	VIII	0.11	0.3	0.35	0.29	0.06	0
Malaspina-Palagonia	VIII	0.14	0.34	0.37	0.23	0.06	0
Monte Pellegrino	VIII	0.24	0.53	0.27	0.08	0.1	0.02
Politeama	VIII	0.18	0.41	0.26	0.21	0.1	0.02

Table 7: Human Capital (districts). Primm. Ed.: share of population (age >6) with primary (elementary) education; Prim. Ed.: share of population (age >6) with primary (elementary and intermediate) education; Sec. Ed.: share of population (age >6) with secondary education; Tert. Ed.: share of population (age >6) with tertiary education; Pop. Lit.: share of population (age >6) with no education, literate; Pop. Illit.: share of population (age >6) with no education, illiterate

	Council	Empl.	Unempl.	Empl. Agr.	Empl. Manuf	Empl. Constr.	Empl. Serv.	Empl. Dep.	Empl. Indep.
Palazzo Reale-Monte di Pieta'	I	0.54	0.27	0.02	0.09	0.07	0.82	0.83	0.16
Tribunali-Castellammare	I	0.68	0.19	0.03	0.1	0.05	0.81	0.76	0.23
Brancaccio-Ciaculli	II	0.6	0.2	0.06	0.15	0.07	0.71	0.83	0.15
Settecannoli	II	0.6	0.2	0.03	0.13	0.06	0.76	0.83	0.16
Oreto-Stazione	III	0.65	0.19	0.02	0.12	0.06	0.79	0.83	0.15
Villagrazia-Falsomiele	III	0.66	0.17	0.03	0.11	0.06	0.78	0.82	0.17
Altarello	IV	0.62	0.2	0.02	0.13	0.08	0.75	0.84	0.15
Boccadifalco	IV	0.65	0.16	0.01	0.1	0.09	0.78	0.81	0.17
Cuba	IV	0.72	0.15	0.02	0.09	0.04	0.83	0.83	0.16
Mezzomonreale	IV	0.72	0.14	0.02	0.09	0.05	0.83	0.82	0.17
Santa Rosalia	IV	0.64	0.18	0.02	0.09	0.05	0.83	0.85	0.14
Borgo Nuovo	V	0.59	0.21	0.02	0.13	0.08	0.75	0.85	0.13
Noce	V	0.67	0.17	0.02	0.1	0.06	0.81	0.82	0.17
Uditore-Passo di Rigano	V	0.74	0.14	0.01	0.08	0.05	0.84	0.81	0.18
Zisa	V	0.64	0.17	0.01	0.09	0.06	0.83	0.82	0.17
Cruillas-S. Giov. Ap. (ex C.E.P.)	VI	0.68	0.18	0.02	0.11	0.07	0.79	0.83	0.16
Resuttana-San Lorenzo	VI	0.86	0.08	0.01	0.07	0.04	0.86	0.78	0.22
Arenella-Vergine Maria	VII	0.67	0.16	0.03	0.15	0.06	0.74	0.8	0.18
Pallavicino	VII	0.59	0.21	0.02	0.12	0.07	0.77	0.82	0.17
Partanna Mondello	VII	0.77	0.14	0.02	0.08	0.06	0.82	0.7	0.29
Tommaso Natale	VII	0.7	0.17	0.03	0.14	0.07	0.75	0.77	0.22
Liberta'	VIII	0.87	0.07	0.01	0.05	0.03	0.89	0.75	0.25
Malaspina-Palagonia	VIII	0.86	0.07	0.01	0.05	0.03	0.9	0.77	0.22
Monte Pellegrino	VIII	0.73	0.15	0.01	0.12	0.05	0.8	0.81	0.18
Politeama	VIII	0.82	0.1	0.02	0.07	0.04	0.87	0.73	0.26

Table 8: Labour Market indicators (districts). Empl.: employment rate; Unempl.: employment rate; Empl. Agr.: share of empl. in Agriculture; Empl. Manuf.: share of empl. in Manufacture; Empl. Constr.: share of empl. in Construction; Empl. Dep.: share of employees; Empl. Indep.: share of self-employed

	Total Pop.	Pop. Sh.	Dep. ratio	Fam. 123	Fam. 56	Tert. Ed.	Sec. Ed.	Primm. Ed.	Prim. Ed.	Pop. lit.	Pop. Illit.
Total Pop.	1 (0)										
Pop. Sh.	1 (0)	1 (0)									
Dep. ratio	0.29 (0.167)	0.29 (0.167)	1 (0)								
Fam. 123	-0.02 (0.917)	-0.02 (0.917)	0.8 (0)	1 (0)							
Fam. 56	-0.12 (0.56)	-0.12 (0.56)	-0.82 (0)	-0.89 (0)	1 (0)						
Tert. Ed.	0.24 (0.25)	0.24 (0.25)	0.86 (0)	0.8 (0)	-0.86 (0)	1 (0)					
Sec. Ed.	0.36 (0.077)	0.36 (0.077)	0.7 (0)	0.48 (0.015)	-0.77 (0)	0.79 (0)	1 (0)				
Primm. Ed.	-0.26 (0.207)	-0.26 (0.207)	-0.84 (0)	-0.76 (0)	0.88 (0)	-0.98 (0)	-0.88 (0)	1 (0)			
Prim. Ed.	-0.27 (0.195)	-0.27 (0.195)	-0.74 (0)	-0.61 (0.001)	0.82 (0)	-0.91 (0)	-0.95 (0)	0.96 (0)	1 (0)		
Pop. lit.	-0.42 (0.035)	-0.42 (0.035)	-0.73 (0)	-0.42 (0.037)	0.73 (0)	-0.74 (0)	-0.96 (0)	0.81 (0)	0.89 (0)	1 (0)	
Pop. Illit.	-0.34 (0.097)	-0.34 (0.097)	-0.47 (0.017)	-0.15 (0.479)	0.52 (0.008)	-0.56 (0.004)	-0.85 (0)	0.62 (0.001)	0.75 (0)	0.89 (0)	1 (0)
Empl.	0.29 (0.163)	0.29 (0.163)	0.77 (0)	0.62 (0.001)	-0.84 (0)	0.9 (0)	0.95 (0)	-0.94 (0)	-0.96 (0)	-0.91 (0)	-0.8 (0)
Unempl.	-0.34 (0.102)	-0.34 (0.102)	-0.75 (0)	-0.5 (0.011)	0.74 (0)	-0.84 (0)	-0.93 (0)	0.87 (0)	0.92 (0)	0.93 (0)	0.88 (0)
Empl. Agr.	-0.13 (0.532)	-0.13 (0.532)	-0.48 (0.016)	-0.43 (0.03)	0.52 (0.008)	-0.41 (0.043)	-0.5 (0.01)	0.45 (0.023)	0.5 (0.01)	0.54 (0.005)	0.29 (0.15)
Empl. Manuf.	-0.25 (0.223)	-0.25 (0.223)	-0.79 (0)	-0.76 (0)	0.8 (0)	-0.8 (0)	-0.69 (0)	0.82 (0)	0.77 (0)	0.66 (0)	0.38 (0.05)
Empl. Constr.	-0.46 (0.021)	-0.46 (0.021)	-0.86 (0)	-0.7 (0)	0.76 (0)	-0.76 (0)	-0.68 (0)	0.76 (0)	0.66 (0)	0.68 (0)	0.46 (0.021)
Empl. Serv.	0.32 (0.119)	0.32 (0.119)	0.86 (0)	0.81 (0)	-0.86 (0)	0.83 (0)	0.73 (0)	-0.84 (0)	-0.78 (0)	-0.71 (0)	-0.41 (0.041)
Empl. Dep.	-0.03 (0.901)	-0.03 (0.901)	0.47 (0.018)	0.66 (0)	-0.7 (0)	0.77 (0)	0.6 (0.002)	-0.76 (0)	-0.72 (0)	-0.5 (0.012)	-0.43 (0.031)
Empl. Indep.	0.05 (0.803)	0.05 (0.803)	-0.43 (0.031)	-0.63 (0.001)	0.66 (0)	-0.74 (0)	-0.57 (0.003)	0.73 (0)	0.69 (0)	0.48 (0.016)	0.43 (0.033)
H. No Wat.	-0.28 (0.18)	-0.28 (0.18)	-0.19 (0.372)	0.03 (0.876)	-0.03 (0.892)	0 (0.998)	-0.17 (0.418)	0.06 (0.784)	0.07 (0.75)	0.17 (0.415)	0.12 (0.568)
H. Good	0.24 (0.253)	0.24 (0.253)	0.08 (0.72)	-0.24 (0.246)	-0.04 (0.852)	0.25 (0.227)	0.5 (0.012)	-0.28 (0.176)	-0.44 (0.027)	-0.57 (0.003)	-0.71 (0)

Table 9: Correlations among census indicators. Tot.Pop.: total population; Pop. Share: population share; Dep. Ratio: dependency ratio;Family 123: share of families with 1-3 components; Family 56: share of families with 5-6 components or more. Primm. Ed.: share of population (age >6) with primary (elementary) education; Prim. Ed.: share of population (age >6) with primary (elementary and intermediate) education; Sec. Ed.: share of population (age >6) with secondary education; Tert. Ed.: share of population (age >6) with tertiary education; Pop. Lit.: share of population (age >6) with no education, literate; Pop. Illit.: share of population (age >6) with no education, illiterate. Empl.: employment rate; Unempl.: employment rate; Empl. Agr.: share of empl. in Agriculture; Empl. Manuf.: share of empl. in Manufacture; Empl. Constr.: share of empl. in Construction; Empl. Dep.: share of employees; Empl. Indep.: share of self-employed; H. No Wat.: share of houses with no running water; H. Good: share of buildings in good/excellent conditions.

	Empl.	Unempl.	Empl. Agr.	Empl. Manuf	Empl. Constr.	Empl. Serv.	Empl. Dep.	Empl. Indep.	H. No Wat.	H. Good
Empl.	1 (0)									
Unempl.	-0.97 (0)	1 (0)								
Empl. Agr.	-0.41 (0.043)	0.4 (0.047)	1 (0)							
Empl. Manuf.	-0.71 (0)	0.67 (0)	0.66 (0)	1 (0)						
Empl. Constr.	-0.76 (0)	0.73 (0)	0.29 (0.161)	0.71 (0)	1 (0)					
Empl. Serv.	0.76 (0)	-0.71 (0)	-0.69 (0)	-0.97 (0)	-0.82 (0)	1 (0)				
Empl. Indep.	0.73 (0)	-0.63 (0.001)	-0.15 (0.47)	-0.53 (0.006)	-0.44 (0.028)	0.51 (0.008)	1 (0)			
Empl. Dep.	-0.71 (0)	0.61 (0.001)	0.12 (0.577)	0.48 (0.014)	0.4 (0.049)	-0.46 (0.02)	-1 (0)	1 (0)		
H. No Wat.	-0.07 (0.754)	0.15 (0.487)	0.13 (0.532)	0.28 (0.173)	0.18 (0.395)	-0.22 (0.298)	0.23 (0.274)	-0.24 (0.242)	1 (0)	
H. Good	0.43 (0.031)	-0.52 (0.007)	-0.07 (0.725)	-0.09 (0.654)	0.01 (0.98)	0.03 (0.869)	0.33 (0.11)	-0.35 (0.084)	-0.1 (0.65)	1 (0)

Table 10: Correlations among census indicators (continued). Empl.: employment rate; Unempl.: employment rate; Empl. Agr.: share of empl. in Agriculture; Empl. Manuf.: share of empl. in Manufacture; Empl. Constr.: share of empl. in Construction; Empl. Dep.: share of employees; Empl. Indep.: share of self-employed; H. No Wat.: share of houses with no running water; H. Good: share of buildings in good/excellent conditions.

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