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**Is It Worth Having the Sopranos on Board?
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Is It Worth Having the Sopranos on Board?

Corporate Governance Pollution and Organized Crime: The Case of Italy

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ABSTRACT: We examine the corporate consequences of having board directors connected with the organized crime. Given that in principle such as connections can trigger both pros and cons, the question is genuinely empirical: using an original data base of Italian corporations (108,332 observations for the period 2006-2013) we offer two results. On the one side, we find that firms with at least one director, whose criminal record displays potential involvement with criminal organizations (i.e., *tainted director*), show lower levels of cash holdings and lower profitability. Two alternative explanations can be offered: the firms are likely to use financial policies to lower cash holdings, thereby reducing the risk of being expropriated by tainted directors; the firms are completely captured by such as directors, that use the corporations for money laundering purposes, and therefore manage the cash holdings in order to minimize the risk of detection. On the other side, the firm profitability is inversely associated with the presence of tainted directors, suggesting that the tainted directors can use firm resources for their own private benefits, which harms the firm profitability. Results from this study are informative to regulators, policy makers and politicians, interested in preventing the pollution of criminal organizations in the legal economy.

Keywords: Corporate Governance, Organized Crime, Firm Performance
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1. Introduction

“The management genius displayed by the likes of the Camorra is directed towards the creative side of creative destruction.” The Economist (August 27, 2016)

We examine the corporate consequences of having board directors connected with the organized crime. Since the seminal work of Becker (1968), literature in economics and finance has examined the economic consequences of crime. The bulk of this literature has focused primarily on the activity of individual offenders, ignoring the emerging relevance of organized crime. The economic consequences of organized crime go beyond the obvious social implications, menacing the global economy. A meta-analysis conducted by UNODC (2011) shows that all criminal proceeds represented 3.6% of global GDP in 2009. The presence of criminal organizations increases the riskiness and uncertainty of the business environment which ultimately lowers the growth potential of the economy (Pinotti 2015a). The private sector is at risk. Firms expect a business environment with fair, clear and transparent tax and trade policies; yet, they have strong incentives to engage in illegal behavior when they believe their competitors are receiving unfair advantages (World Bank, 2016). Hence, a natural question to ask is whether, and to what extent, the private sector is polluted by organized crime? And, more importantly, does the presence of criminal organizations generate economic consequences on firm operations and firm value?

In this work, we contribute to existing literature on both corporate governance and organized crime by assessing the economic consequences when firms are tainted in the “board room”. Specifically, we test the influence of directors whose criminal records display potential involvement with criminal organizations, i.e., *tainted with organized crime*, on firm operations and firm value. Organized crime is a complex and multi-faceted phenomenon, which is usually defined as any group of individuals who commit systematically serious crimes in order to pursue

an economic target. These groups of individuals are organized in business organization, where activities are managed with an entrepreneurial approach.

Notwithstanding the undeniable relevance of the issue, the empirical literature on crime has widely neglected the economic consequences imposed by the presence of criminal organizations at the micro level. Among the exceptions, a few studies (Bandiera, 2003, Dimico, Isopi, and Olsson, 2012, Buonanno, Durante, Prarolo, and Vanin, 2015) examine the historical origins of the Sicilian Mafia. Moreover, Mastrobuoni (2015) examines the importance of criminal connections inside an Italian-American criminal organization (i.e., Cosa Nostra). Dell (2015) estimates the effects of law enforcement on trafficking networks in Mexico. Pinotti (2015b) estimates the economic cost of organized crime in two regions of southern Italy. Finally, Pinotti (2015a) examines the cross-country correlation between organized crime and measures of institutional quality.

Surprisingly, prior literature in finance and economics is silent about the “ways” through which criminal organizations taint corporations to pursue their illegal goals. The literature on crime has explored the relationships between organized crime, finance and the legal sector shedding light on the money laundering phenomena. Only in recent times the economic analysis has been focused on the financial aspects of illegal activities, a topic which has been thus far completely absent in the academic literature. The attention to the study of money laundering has progressively increased, recognizing the importance of such as crime in the development of any law violation that generates revenues information (Masciandaro, 1999; Argentiero et al., 2008; Dalla Pellegrina and Masciandaro, 2009; Ferwenda, 2009; Levi and Reuter, 2009; Walker and Unger, 2009; Schneider, 2010; Barone and Masciandaro, 2011; Ardizzi et al., 2014; Chong and Lopez De Silanes, 2015).

Empirically, our approach takes its cue from recent finance literature (Fisman and Miguel, 2007; Davidson, Dey, and Smith, 2015; Mironov, 2015) that examines the consequences of top executives *off-the-job* behavior on firm performance. We also extend prior studies (e.g., Smith, 2016; Caprio, Faccio, and McConnell, 2013) on corruption that find that firms in more corrupt areas (or countries) hold less cash than firms in less corrupt areas (or countries), which suggests that firms respond to the threat of rent-seeking of public officials by shielding firm assets.

Such as threat represents an external risk for firms, whereas the presence of board members tainted with organized crime represents an internal risk which can affect firm financial policies differently. The corporate performances can be triggered by both downside and upside risks. On the one hand, when the corporation is used as a money laundering device, firms can benefit from the presence of tainted directors if they can trade proceeds from illegal activities for business opportunities. More generally, the presence of tainted directors makes a firm more profitable due to the illegal advantages the criminal organization affiliated with the director is able to generate. At the same time the need to reduce the probability of detection can influence the financial policy of the firm.

On the other hand, the presence of tainted directors actually worsens firm profitability due to the illegal behavior which can potentially harm the firm. Further from the financial standpoint firms can act to lower the risk of being a potential target of criminal organizations by managing cash holdings downward. The trade-off between the costs and benefits of the presence of tainted directors on board suggests that it is an empirical question whether tainted directors enhance or diminish firm performances.

In this paper, we examine a large sample of Italian private companies to examine the effect of tainted directors on firm operations and firm value. Italy provides a unique environment

to study organized crime-related issues. First, Italy is arguably the cradle of the first criminal organizations (Paoli, 2004). Second, the Italian legislator was the first to target mafia organizations with a specific legislative intervention (Law 646/82). Third, a unique feature of our work is the access to a unique, and strictly confidential, database which reports the results of the investigations of police and military forces (“*System of Investigation*”, or “SoI”). This database is managed by the Italian “Internal Intelligence and Security Agency” (AISI) which shared these data with us. The corporation headquarters are in Lombardy, the richest Italian region, where a strong presence of criminal organizations is reported - see recent studies (e.g., Varese, 2006; Savona, 2015), as well as anecdotal evidence from the national press and criminal courts’ judgements. Finally, all Italian private companies are required to file their financial statements to the local Chamber of Commerce which is also repository of corporate governance data, and this information is publicly available. Our final sample is made of 16,382 unique firms (108,332 firm-year observations) for the period 2006-2013¹.

To create a measure of the costs and benefits of the presence of tainted directors on board, we use the information contained in the SoI database and define a director as tainted if she is under investigation by the police authorities for a potential crime following under the umbrella of an organized crime type of offense.² Therefore, we define as *tainted* those firms where at least a board member is tainted with organized crime, under the assumption that such members are able to influence from the inside firm’s activities. An unquestionable advantage of our approach is the fact the individuals are “under investigation” making this more than an ex-post analysis an “on-going” analysis, when the individuals do not know they are on the spotlight. We follow the literature on finance to operationalize firm operation and firm value with cash holdings and firm profitability, respectively.

¹ Please notice this is the latest available year we got access to from AISI.

² Please notice a detailed clarification of our measure for tainted firms is provided in the data section.

In our sample, about seven percent of the firms have at least one tainted director on board, which suggests that the pollution of criminal organization into the private sector is dramatically and economically meaningful. Moreover, these firms show on average lower levels of cash holdings and worse profitability relative to firms without tainted directors on board. Our results suggest that firms use financial policies to lower cash holdings, thereby reducing the risk of being expropriated by tainted directors. Moreover, our findings also suggest that tainted directors use firm resources for their own private benefits, or for those of the criminal organization to which they belong, thereby reducing firm profitability. Our findings are robust to controls of other determinants of cash holdings and firm profitability, including firm financial and corporate governance characteristics.

A potential concern is that a company's decision to hire a director who has displayed a criminal behavior is endogenous because a selection occurs when observations are non-randomly sorted into discrete groups, resulting in the potential for coefficient bias in estimation procedures such as OLS. We propose two alternative approaches to alleviate this potential threat. First, we adopt a propensity score matching (Lawrence, Minutti-Meza, and Zhang, 2011; Shipman, Swanquist, and Whited, 2017). Second, we adopt a treatment effect model (Larcker and Rusticus, 2010; Lennox, Francis, and Wang, 2012). Results from these analyses corroborate our main findings.

Our paper contributes to the emerging literature in economics and finance that examine the economic consequences of organized crime in several ways. To the best of our knowledge, this is the first study providing empirical evidence about the existence of organized crime in the private sector. Further, we contribute to the literature on white-collar crimes by examining directors tainted with organized crimes. We also contribute to the emerging literature in finance that examines the consequences of top executives off-the-job behavior on firm performance.

Finally, our work is largely informative for regulators who might find our results of interest in addressing policy issues related to prevent the presence of criminal organizations in the legal economy.

The remaining of the paper is organized as follows: the next section provides the background of literature and develops the hypotheses. Section 3 explains the institutional setting and describes the sample. Section 4 presents the research design. Section 5 reports the descriptive statistics and the multivariate results. Section 6 provides some conclusions.

2. Corporate Governance and Organized Crime: The Missing Link

To properly understand the object of our investigation and, its relevance, it is first necessary to define what crime is. This is not an easy task itself, as a generally accepted definition does not exist yet. In fact, “crime” and “criminal behavior” closely reflect social, political, economic and cultural factors driving the environment – broadly speaking – in which individuals live and operate (Lilly, Cullen, and Ball, 2007).

Becker (1968, 1974) provides the background for what is known as the economic theory of crime, which theorizes that if the rationally expected utility of the action clearly outweighs the expected disadvantages resulting from the action thus leaving some net material advantage, then every person will commit the offence in question. More recently, instead, the development of a market economy and the emphasis on scientific knowledge led to much more rational explanations of crime (Walters, 2015).³ Together with the definition of crime, the criminal law has evolved alongside the socio-political features of each historical period (Bantekas and Nash, 2009), and this may help explain why so many theories – sometimes in contrast one to the other – have been proposed over time.

³ If we can possibly think of “crime” as a rational behavior.

Regardless of their evolving nature, crimes have been largely analyzed with reference to: (a) crimes committed by individuals, and (b) crimes committed by criminal organizations. In the next section, we briefly describe the common crime as far from our core investigation, while more attention is devoted to give an overview of white-collar crime literature.

2.1 Individual Crimes

Crimes committed by individuals are usually clustered under one of the following two broad categories (Piquero, Schoepfer, and Langton, 2010): (i) *common (or street) crime* (e.g., assault, murder, robbery, theft); and (ii) *white-collar crime* (e.g., bribery, embezzlement, fraud, money laundering). With the former being investigated since past centuries and the latter being only recently under spotlights after it became of common knowledge the relevant effect on the economy of such types of crime.

Common crimes. It refers to any type of crime that originates in a public place, and mostly includes crimes against persons and property, as well as drug crimes (Benson and Moore, 1992). Over time, many theories have been developed to investigate, understand and possibly prevent and detect common crime. This led to three main theories proposed to explain crime and its dynamics. These theories are mainly rooted in disciplines other than economics, and this could explain why “crime” has not been originally considered as a research topic in the economics, finance and management fields.

Hopkins Burke (2009) classifies the most relevant theories on crime and criminal behavior under one of these three broad models: **(i)** the *rational actor model* (or *classical criminology*), where individuals are fully rational and possess free-will, hence, they decide to engage in criminal activities in essentially the same way they choose to get involved in any other activity. **(ii)** the *predestined actor model* (or *positivism*), where the main cornerstone is that human behavior is determined by several factors internal or external to individuals (Lilly et al.,

2007). **(iii)** the *victimized actor model*, where the main ground is the symbolic interactionism, according to which “a person’s self-identity is continuously constructed and reconstructed in interaction with ‘significant others’ [...] and human behavior can only be understood by reference to this process” (p. 160, Hopkins Burke, 2009). Finally, some researchers attempted to combine some of these perspectives by developing *integrated* paradigms which are assumed to be superior to each theory separately considered (Farnsworth, 1989).

White-collar crimes. These crimes are mainly associated with corporate activities and are defined as “a crime committed by a person of respectability and high social status in the course of her occupation” (p.9, Sutherland, 1949). Although the offences may be extremely serious, the literature has overlooked white-collar crime for a long time (*e.g.*, Kramer, 1984; Croall, 1992). Specifically, the interest in corporate offending has widespread only after realizing that the economic losses induced by white-collar crime are considerably greater than those of ordinary crime (Conklin, 1977), and that corporate crime has longer lasting consequences compared to common offences (Croall, 2001).

As mentioned above, corporate crime represents a research area which has been overlooked for a long time. An exception is represented by the seminal work of Sutherland (1949) who examines criminal actions committed by the 70 largest U.S. corporations. Moving from this work, few further steps towards a deeper understanding of corporate crime and its dynamics are detectable in the study of embezzlers conducted by Cressey (1953), in that of violations in price regulations of Clinard (1952) and in Hartung’s (1950) attempt to shed light on regulatory violations in the meat industry in Detroit.

However, the situation completely reversed in the mid of the seventies, when the interest in corporate crime exploded. This might have happened for two reasons. On the one hand, scholars became more and more interested in challenging the knowledge of crime and criminal

behavior, pushing it beyond the disciplines investigated up to that time (Paternoster and Simpsom, 1996). On the other hand, the non-scientific community (*e.g.*, journalists) placed an increasing emphasis on corporate events, such as egregious cases of corporate misconduct and illegal actions (Clinard and Yeager, 1980). This translated into a growing body of work on corporate crime. Among others, Cullen, Maakestad, and Cavender (1987), Hagan, Nagel, and Albonetti (1980), and Wheeler, Weisburd, and Bode (1982) developed case studies and quantitative analyses of striking corporate criminal events. Moreover, scholars started applying the criminological theories developed to explain common crime, to white-collar crime as well. The seminal work is the sociological theory of white-collar crime (Coleman, 1987) which postulates that managers who commit economic offences live in a social setting, *i.e.* culture, in which a very high value is placed on material success and individual wealth. Other theoretical approaches have been developed over time. For example, Makkai and Braithwaite (1991), and Braithwaite (1992) describe corporate offending in light of the opportunity theory, while Passas (1990), and Waring, Weisburd, and Chayet (1995) in light of the anomie theory, and Swigert and Farrell (1988) in light of the labelling theory. In addition, Lasley (1988), and Makkai and Braithwaite (1991) relate corporate misbehavior to the control theory. Paternoster and Simpson (1996), instead, propose the rational choice theory as the best to explain corporate crime, given that businessmen are “sensitive to variations in the perceived costs and benefits of their actions and in other, more normative influences” (p. 551).

In this paper, we follow Song and Han (2015) and define an individual’s white-collar crime as an illegal act committed through deceit, concealment, or a violation of trust without physical violence. Whereas, we define an individual’s street crime as a traditional criminal act (*e.g.*, assault, theft, murder) committed for personal gain that are non-white collar and may involve violence towards an individual or a group of individuals.

2.2 Organized Crime

The original concept of organized crime is quite opposite of the imagery of “mafia” that dominates the current understanding of the organized crime. The term “organized crime” first came into regular use among the members of the Chicago Crime Commission, a civic organization that was created in 1919 by businessmen, bankers, and lawyers to foster changes in the justice system to better cope crime problems and pollution (Von Lampe, 2001).

Nowadays, although the concept of organized crime and criminal organizations pervades common language, a unique accepted definition lacks and it can vary in different legislative systems (Pinotti, 2015b). In fact, in different areas (country or regions), over time, and from different bodies (e.g. regulators, justice departments, historians and academic researchers) more than 190 definitions of organized crime have been catalogued.⁴ In this work, we draw from such definitions, in order to briefly clarify what we mean by “criminal organizations” without the intention of considering this the best way to define them but simply to give a common feeling on the overall meaning in this manuscript of a criminal organization.

Organized crime is a complex and multi-faceted phenomenon, which can be difficult to measure through a single indicator. It is usually considered as any group of people committing systematically serious crimes having an economic target backed by a sort of a business organization, where costs, profits, money launderings, investments and reinvestments are programmed with an entrepreneurial approach (Turone, 2007, 48-49). This form of illegal activity usually implies that tasks are collectively planned, the proceeds shared and further activities collectively attempted (Ruggiero 1996, 121). Organized crime, in turn, entails a vertical structure, and planning and execution are here strictly separated (Ruggiero 1996, 121).

⁴ This information can be retrieved at www.organized-crime.de/organizedcrimedefinitions.htm

The economic consequences of organized crime go beyond the obvious social implications, menacing the global economy. In fact, organized crime is considered as having major negative effects on economic development. Large evidence exists on the costs of organized crime arising from the decrease in the quality of the political class (Pinotti 2013; Daniele and Geys, 2015), the reduction of electoral competition (De Feo and De Luca, 2013), the increase in corruption accompanied by a decrease in government efficiency (Godson and Williamns, 1998; Allum and Siebert 2003), the replacement of public investments with private investments and the miss-allocation of public funds (Barone and Narciso, 2015; Pinotti, 2015), and the restriction to access credit (Bonaccorsi di Patti, 2009). The main idea underlying existing research focusing on the economic consequences of organized crime is that it worsens the institutional environment, thereby imposing economic costs on society.

Most of these studies have examined the public sector (political class, governments, electoral competition, miss-allocation of public funds). Surprisingly, the consequences of organized crime on business activities, as well as the way through which criminal organizations penetrate legal businesses, have been largely overlooked. A meta-analysis conducted by UNODC (2011) shows that all criminal proceeds represented 3.6% of global GDP in 2009. The presence of criminal organizations increases the riskiness and uncertainty of the business environment which ultimately lower the growth potential of the economy (Pinotti 2015a). Moreover, the World Bank (2016) states that firms expect a business environment with fair, clear and transparent tax and trade policies; yet, they have strong incentives to engage in illegal behavior when they believe their competitors are receiving unfair advantages.

3. Bridging the Gap: Tainted Directors and Corporate Performances. The Case of Italy

In this paper, we examine the consequences of directors with criminal records suggesting involvement with criminal organizations (i.e., tainted with organized crime) on firm operations. We build on the criminology literature which argues that individuals with greater propensity to commit crimes are likely to have low self-control and are less likely to conform to social norms and laws (Gottfredson and Hirschi, 1990). Furthermore, Jones and Kavanagh (1996) show that individuals, who lack conventional morality, show more unethical behavioral tendencies than others. Blicke, Schlegel, Fassbebder, and Klein (2006) state that low self-control and high hedonism are positively associated to the probability of committing white-collar crime. Moreover, we also contribute to those studies that examine the consequences of top executives off-the-job behavior on firm performance. Gendreau, Little, and Goggin (1996) argue that individuals displaying unethical tendencies, such as past criminal behavior, tend to persist in this type of behavior by justifying it through moral disengagement and by exhibiting motivated forgetting of information that might otherwise limit their dishonesty. Relatedly, Davidson, Dey, and Smith (2015) show that top executives with a legal record are more likely to perpetrate fraud than others, while Mironov (2015) shows that individual propensity to corrupt can be inferred from recorded traffic violations. Finally, Fisman and Miguel (2007) find that United Nations diplomats from high-corruption countries accumulated more unpaid parking violations, which suggests that even minor legal violations can capture differential behavioral norms.

We first examine whether the presence of directors tainted with organized crime affects firm financial policies. In the finance literature, Smith (2016) finds that firms in more corrupt areas hold less cash than firms in less corrupt areas, which suggests that firms respond to the threat of rent-seeking of public officials by shielding firm assets. Relatedly, Caprio, Faccio, and McConnell (2013) use an international sample and find that corporate holdings of liquid assets

are negatively correlated with measures of political corruption at the country level, which suggest that the threat of political extraction may reduce economic development not only through the direct costs of political payoffs but also for the potential of asset extraction moves firms away from their otherwise optimal asset holding. In these papers, corruption represents an external indicator of risk that can affect firm financial policies, whereas the presence of tainted directors on board represents an internal indicator of risk, whose consequence are difficult to predict ex ante. On the one hand, firms can benefit from the presence of tainted directors if they can trade proceeds from illegal activities, which can be generated by the criminal organization affiliated with the tainted director, for business opportunities. On the other hand, firms can act to lower the risk of being a potential target of criminal organizations. Given that moving firms operations can be costly (Smith, 2016), firms can seek an alternative channel to lower the risk of being a target of criminal organizations. Prior research on corruption (Klasa, Maxwell, and Ortiz-Molina, 2009; Matsa, 2010; Smith, 2016) suggests that firms can manage cash holdings downward to deter rent-seeking. We postulate that, when a tainted director seats on board, firms can use financial policies to lower liquidity, thereby reducing the risk of being expropriated by criminal organizations.

At the same time the relationship can go in the other way around: the firms are completely captured by such as directors, that use the corporations for money laundering purposes, and therefore manage the cash holdings in order to minimize the risk of detection.

Given that there exists arguments suggesting opposite results, and irrespective of which are the drivers in motion, it is an empirical question whether firms with tainted directors on board show higher or lower cash holdings relative to other firms without tainted directors. Therefore, we leave our first hypothesis in the null form, as follows:

HP1: Firms with tainted directors on board show levels of cash holdings that are not different from those firms without tainted directors on board, else being equal.

Next, we examine whether the presence of tainted directors makes a firm more profitable due to the “illegal advantages” the criminal organization is able to generate, or it actually worsens firm profitability due to the illegal behavior which can potentially harm the firm. On the one hand, prior studies on corruption (Leff, 1964; Huntington, 1968; Lui, 1985; Mironov, 2015) suggest that corrupt managers can create value for shareholders. In a similar fashion, directors tainted with organized crime can share their criminal knowledge about tax evasion, extortion, and bribery. Moreover, they can help to maneuver around bad laws and institutions to boost firm performance. Therefore, firms with tainted directors on board can show higher levels of profitability relative to firms without tainted directors on board. However, prior studies (Desai, Dyck, and Zingales, 2007; Mironov, 2013) suggest that corrupt managers destroy shareholder value when they pursue their own private benefits. Similarly, tainted directors can use firm resources for their own private benefits, or for those of the criminal organization to which they belong, thereby reducing firm profitability. Also for our second hypothesis, it is an empirical question whether the profitability of firms with tainted directors on board differs from the profitability of those without tainted directors. Therefore, we leave our second hypothesis in the null form, as follows:

HP2: Firms with tainted directors on board show levels of profitability that are not different from those firms without tainted directors on board, else being equal.

3.1 Why Italy?

Italy provides a unique environment in which to study organized crime-related issues. First, Italy is the cradle of the first criminal organizations. Paoli (2004) argues that antecedents of the contemporary mafia associations existed in Southern Italy already in the 1880s. The Italian legislator introduced in 1982 (Law 646/82) a specific article into the Penal Code (article 416-bis) to target mafia organizations, defined as those groups that “exploit the power of intimidation granted by the membership in the organization to commit crimes and acquire the control of economic activities, concessions, and public contracts”. Contrary to the common wisdom that organized crime exists only in Southern Italy, recent studies (e.g., Varese, 2006; Savona, 2015) report a strong presence of criminal organizations also in Piedmont and Lombardy, especially in their capitals Turin and Milan, respectively. Moreover, anecdotal evidence from the national press and Criminal Courts’ judgements highlight that a leading criminal organization, i.e., ‘Ndrangheta, has moved its criminal operations outside its region of origin (i.e., Calabria) to Milan which is the heart of the Italian economy.

Second, the very few literature on criminal organizations is largely concentrated in Italy, giving us the opportunity to trace a new path by exploring still unanswered research questions. In fact, a few studies (Bandiera, 2003, Dimico, Isopi, and Olsson, 2012, Buonanno, Durante, Prarolo, and Vanin, 2015) examine the historical origins of the Sicilian Mafia. Moreover, Mastrobuoni (2015) examines the importance of criminal connections inside an Italian-American criminal organization (i.e., Cosa Nostra). Pinotti (2015b) estimates the economic cost of organized crime in two regions of southern Italy. Outside Italy, Dell (2015) estimates the effects of law enforcement on trafficking networks in Mexico, while Pinotti (2015a) examines the cross-country correlation between organized crime and measures of institutional quality.

Third, proprietary data availability is another important factor that makes Italy a unique case. The Italian Internal Intelligence and Security Agency (Agenzia Informazioni e Sicurezza

Interna, or “AISI”) manages a database which reports the results of the investigations of police and military forces (“*System of Investigation*”, or “SOI”). In this paper, we obtained access to this database only for corporate crimes investigation cases under a confidentiality agreement. Furthermore, all Italian private companies are required to file their financial statements to the local Chamber of Commerce which is also repository of corporate governance data (board of directors, executive directors, shareholders and auditors).

3.2. The original data source

Italy has various law enforcement agencies, each with a different status and structure; the most important law enforcement agencies are the State Police (“*Polizia di Stato*”), the “*Arma dei Carabinieri*” and the Financial Police (“*Guardia di Finanza*”). For specific crimes, there are inter-force agencies, like *DIA Direzione Investigativa Antimafia* (literally Anti-Mafia Investigation Department), i.e. the Italian multi-force agency dedicated to solving and preventing mafia-related crimes. Special departments against economic and organized crimes are also operating within *AISI – Agenzia informazioni e sicurezza interna* (“Internal Intelligence and Security Agency”)⁵ that is responsible for safeguarding national security from threats originating within Italy’s borders, and for protecting Italy’s political, military, economic, scientific and industrial interests. Moreover, any member of any law enforcement agency can also be given the task of carrying out investigations into a criminal offence by the public prosecutor and in this case, they come under the term of “*polizia giudiziaria*” (judicial police), a term used to indicate a function rather than a specific law enforcement agency

The findings of the investigations and intelligence activities are recorded in a central database called “*SDI - Sistema di Indagine*” (SoI, System of Investigations), established to collect information from law enforcement agencies regarding investigation and victim reports.

⁵ Please keep in mind this authority as it is the one from which we got the proprietary data used in our analysis.

Police Forces use the database to analyze the evolution of a criminal phenomenon or to profile offenders (actual and potential).

In Figure 1, we report general overview of the investigation and criminal process in Italy, which starts from Police forces investigations (Stage 1) and can end with a case dismissal (Stage 6) or a final trial (Stage 7). In our work, because of the well-known inefficiencies and long timing of the Italian justice, we decided to focus our attention on the results of the police forces' investigations (Stage 3). Hence, our extraction from the SoI database only includes data of reported crimes that were recorded at the end of police forces' investigation (Stage 3) and notified to public prosecutors (Stage 4). This allows us to exclude any possible limitation and problem caused by the public prosecutors' activity (delay in supplemental investigations, lack of resources, decision to postpone investigations in order to evaluate the existence of additional crimes, and/or networks, decision to exclude some criminal charges because of insufficient evidence or statute of limitations etc...).

Insert Figure 1 about here

Crimes, in order to be relevant for our investigation, must be organized crime ("mafia" broadly speaking) related types. Therefore, we need to identify in the SoI dataset which crimes are of interest. To that end, starting from the SoI dataset revealing 422 analytical description for reported crimes, we did the following. We identified 14 categories of reported crimes which are frequently associated with Mafia-like criminal behaviors (i.e., organized type of crime) according to the half-yearly reports issued by the DIA (Direzione Investigativa Antimafia) for the years from 2006 to 2016.⁶ In these official documents, DIA reports on semi-annual basis the number of detected crimes for the following categories: "associazione mafiosa" ("Mafia

⁶ Publicly available at: http://direzioneinvestigativaantimafia.interno.gov.it/page/relazioni_semestrali.html

association”), usury, money laundering, criminal association, extortion, robbery, murder, drug trafficking, smuggling and counterfeiting. Furthermore, these reports also provide information about the main investigation outcomes, related arrests, and confiscations for the four Italian criminal associations (i.e., Mafia from Sicily, Camorra from Campania, ‘Ndrangheta from Calabria and Sacra Corona Unita from Puglia). Thanks to this evidence, it was possible to identify a significant and continued criminal activity in the fields of immigration and waste disposal, as well as the frequent use of false invoices to perpetrate many crimes, in connection with carousal frauds, money laundering, tax evasion, undue government grants and more. Finally, DIA reports in a specific chapter the results of monitoring and investigations in the field of public tender and public procurement.

Based on DIA’s reports, we utilize the 14 categories of crimes that are frequently associated with “Mafia” (and similar organizations) activities in order to identify directors who displayed a criminal behavior relevant for our analyses. This selection was then corroborated by the organized crime specialists of AISI. In Figure 2, we list all these crime categories and a frequency analysis for the directors of our Lombardy-based companies’ sample. We find 1,485 reported crimes for the directors in our sample. There are 14 against the course of Justice, 155 against the Public Administration (corruption and misappropriation), 111 against the Public Administration (other crimes), 20 for counterfeiting and illegal export of currency, 2 for drug trafficking, 851 for false invoice, 4 for immigration, 3 for Mafia and political, 50 for money laundering and receiving, 94 for public tenders, 40 for smuggling and counterfeiting, 15 for theft, extortion, weapons, 8 for usury, and 118 for waste disposal.

3.3. Data

In this study, starting from the SoI proprietary dataset mentioned in the previous

paragraph, we examine private companies from the region of Lombardy. In 2013, Lombardy had a population of 9.8 million, and a GDP of about 330 billion euro which is roughly the 25 percent of the total GDP of Italy. We choose Lombardy because recent studies (e.g., Varese, 2006; Savona, 2015) and anecdotal evidence from the national press and Criminal Courts' judgements state that a leading criminal organization, i.e., 'Ndrangheta, has moved its criminal operations outside its region of origin (i.e., Calabria) to Lombardy which is the heart of the Italian economy. Therefore, it is important to study the population of companies in Lombardy to understand how companies tainted with criminal organizations behave relative to the others in the legal economy.

We obtained data from different sources. We used AIDA database of Bureau Van Dijk for financial data. CERVED provided information about the composition of the board of directors. SDI provided information about the criminal record of all individuals in our sample. In Table 1, we provide information about the sample selection. From the 2006-2013 period, we identify from AIDA database an initial sample of 17,608 firms (133,789 firm-year observations). We eliminate 124 firms (3,825 firm-year observations) because of missing information about the board composition. We also eliminate 1,102 firms (21,632 firm year observations) for missing data on the variables included in the model. We obtain a final sample of 16,382 unique firms (108,332 firm-year observations).

4. Research Design

Cash Holding Model

We estimate the following model to examine the determinants of cash holdings:

$$\begin{aligned}
CASH_RATIO_{i,t} = & \beta_0 + \beta_1 TAINTE_{i,t} + \beta_2 CFO_{i,t} + \beta_3 WORKING_CAPITAL_{i,t} + \beta_4 \\
& PPE_{i,t} + \beta_5 INTANGIBLES_{i,t} + \beta_6 SIZE_{i,t} + \beta_7 INVENTORY_{i,t} \\
& + \beta_8 LEVERAGE_{i,t} + \beta_9 DIVIDEND_{i,t} + \beta_{10} NEWDEBT_{i,t} \\
& + \beta_{11} NEWSHARES_{i,t} + \beta_{12} BOARD_SIZE_{i,t} + \beta_{13} LAGE_{i,t} \quad (1) \\
& + \beta_{14} EXT_AUDITOR_{i,t} + \beta_{15} BSA_{i,t} + \beta_{16} DUAL_{i,t} \\
& + \beta_{17} FAMILY_FIRM_{i,t} + \beta_{18} ACCRUALS_QUALITY_{i,t} \\
& + \beta_{19} CFSIGMA_{i,t} + \beta_{20} LOSS_{i,t} + \varepsilon_{i,t}
\end{aligned}$$

Our dependent variable is $CASH_RATIO_{i,t}$ which is cash and cash equivalents divided by total assets in year t (Smith 2016). Our test variable is $TAINTE_{i,t}$ which is a dichotomous variable equal to one if any director of firm i has displayed a criminal behavior at any point in time which resulted in an investigation recorded by the police and military forces in the SoI database, and zero otherwise. Similar to prior studies (e.g., Gendreau, Little, and Goggin, 1996; Fisman and Miguel, 2007; Davidson, Dey, and Smith, 2015; Mironov, 2015), we argue that individuals displaying unethical tendencies, such as past criminal behavior, tend to persist in this type of behavior over time by justifying it through moral disengagement and by exhibiting motivated forgetting of information that might otherwise limit their dishonesty. Therefore, we consider the presence of an investigation record as a proxy for criminal behavior which we consider as time invariant characteristic of directors in our sample.⁷ According to our hypothesis 1, we have no prediction for $TAINTE_{i,t}$.

We draw our controls from previous research on the determinants of cash holdings (e.g., Li, Meng, Wang, and Zhou, 2008; Smith, 2016). The variable $CFO_{i,t}$ measures the annual cash flow from operations divided by total assets. $WORKING_CAPITAL_{i,t}$ controls for net working capital net of cash scaled by total assets. $PPE_{i,t}$ measures net property, plant, and equipment

⁷ For example, if Mr. X is a director of company Alfa in year 2010, and he displayed a criminal behavior (e.g., money laundering) which resulted in an investigation in year 2000, company Alfa in 2010 is a *TAINTE* company.

divided by total assets. *INTANGIBLES_{i,t}* measures net intangibles scaled by total assets. We control for firm size which is which is the natural logarithm of total assets. We also control for *INVENTORY_{i,t}* which measures total inventory scaled by total assets. *LEVERAGE_{i,t}* measures leverage as the total long-term debt plus debt in current liabilities divided by total assets. *DIVIDEND_{i,t}* is a dichotomous variable equal to one if dividends were paid during the year, and zero otherwise. *NEWDEBT_{i,t}* measures the change in total debt *t-1* to *t* scaled by total assets. While, *NEWSHARES_{i,t}* measures the change in share capital from *t-1* to *t* scaled by total assets. *ACCRUALS_QUALITY_{i,t}* is a proxy for financial reporting quality and is measured with abnormal working capital accruals (e.g., DeFond and Park, 2001; Marra, Mazzola, and Prencipe, 2011). *CFSIGMA_{i,t}* captures the industry standard deviation of cash flows for a three years window (from *t-3* through *t*), where industries are defined using the Fama and French 30 industry classification. Furthermore, we control for firm performance by adding *LOSS_{i,t}* which a dichotomous variable equal to one if earnings are negative, and zero otherwise.

Furthermore, we control for the quality of corporate governance. *BOARD_SIZE_{i,t}* represents the number of director on board. *EXT_AUDITOR_{i,t}* is a dichotomous variable equal to one if an external auditor audits the financial statements of company *i*. *BSA_{i,t}* is a dichotomous variable equal to one if there is a Board of Statutory Auditors, and zero otherwise. Prencipe and Bar-Yosef (2011) report that most Italian nonfinancial companies are family controlled and that family firms have different corporate governance systems and different reporting quality incentives than nonfamily firms. Hence, we control for family ownership by including *FAMILY_FIRM_{i,t}* which is equal to one if a family owns more than 25% of the outstanding shares, and zero otherwise (Lins Volpin, and Wagner, 2013; Amore, Garofalo, and Minichilli, 2014). Furthermore, we control for company age (*LAGE_{i,t}*), calculated as the natural logarithm of the number of years since incorporation, because older companies might have

different reporting incentives and strategies (Chiu, Teoh, and Tian, 2013).

In Equation 1, we include year and industry fixed effects and we cluster robust standard errors by firm to correct for serial dependence (Petersen, 2009). All variables definitions are summarized in Appendix A.

Firm Profitability Model

We estimate the following model to examine the determinants of profitability:

$$\begin{aligned}
 ROA_{i,t} = & \beta_0 + \beta_1 TAINTE_{i,t} + \beta_2 CFO_{i,t} + \beta_3 WORKING_CAPITAL_{i,t} + \beta_4 \\
 & PPE_{i,t} + \beta_5 INTANGIBLES_{i,t} + \beta_6 SIZE_{i,t} + \beta_7 INVENTORY_{i,t} \\
 & + \beta_8 LEVERAGE_{i,t} + \beta_9 DIVIDEND_{i,t} + \beta_{10} NEWDEBT_{i,t} \\
 & + \beta_{11} NEWSHARES_{i,t} + \beta_{12} BOARD_SIZE_{i,t} + \beta_{13} LAGE_{i,t} \\
 & + \beta_{14} EXT_AUDITOR_{i,t} + \beta_{15} BSA_{i,t} + \beta_{16} DUAL_{i,t} \\
 & + \beta_{17} FAMILY_FIRM_{i,t} + \beta_{18} ACCRUALS_QUALITY_{i,t} \\
 & + \beta_{19} CFSIGMA_{i,t} + \beta_{20} LOSS_{i,t} + \varepsilon_{i,t}
 \end{aligned} \tag{2}$$

Our proxy for profitability is $ROA_{i,t}$ which is net earnings divided by total assets in year t (Li, Meng, Wang, and Zhou, 2008). The test variable and all the controls are the same of those in Equation (1) and are described before. According to our hypothesis 2, we have no predictions for $TAINTE_{i,t}$. In Equation 2, we include year and industry fixed effects and we cluster robust standard errors by firm to correct for serial dependence (Petersen, 2009). All variables definitions are summarized in Appendix A.

5. Descriptive Statistics, Empirical findings and Robustness Checks

5.1 Descriptives

Table 1, Panel A reports descriptive statistics of the final sample. $CASH_RATIO_{i,t}$ is

0.068, while $ROA_{i,t}$ is 0.009. The 6.7 percent of companies in our sample has at least one director with a criminal record. $CFO_{i,t}$ has a mean of 0.031, $WORKING_CAPITAL_{i,t}$ has a mean of 0.224, $PPE_{i,t}$ is 0.268, $INTANGIBLES_{i,t}$ are 0.033, and $INVENTORY_{i,t}$ is 0.168. The average company size is 28.8 million Euro in total assets. $LEVERAGE_{i,t}$ is 0.238, $NEWDEBT_{i,t}$ is 0.001, and $NEWSHARES_{i,t}$ is -0.001. On average, about 36 percent of the companies pay dividends. $ACCRUALS_QUALITY_{i,t}$ has an average of zero, $CFSIGMA_{i,t}$ is 0.005, and 30.5 percent of the companies have negative earnings.

With respect to the governance controls, the average $BOARD_SIZE_{i,t}$ is 3 directors, and in 20.9 percent of the companies the CEO is also the Chair of the board. Moreover, 15.6 percent of the companies have an external auditor, while 88.1 percent have a BSA. On average, 49.5 percent are family firms, which conforms with prior research using Italian data (e.g., Prencipe and Bar-Yosef 2011). Furthermore, companies are 26 years old since incorporation.

Table 1, Panel B, reports differences in means between firms tainted with criminal organizations and non-tainted. There are significant differences between both groups. Tainted firms have lower cash holdings (0.057 versus 0.069) and show lower profitability (0.004 versus 0.010). They also show lower cash flows from operations (0.028 versus 0.031), lower investments in property plant and equipment (0.233 versus 0.270), pay less dividends (0.346 versus 0.360), they are younger (2.964 versus 3.066), and are less family firms. Nevertheless, tainted firms are bigger (9.579 versus 9.197), have larger boards (3.662 versus 3.106), have more inventory (0.183 versus 0.167), show higher levels of leverage (0.277 versus 0.235). They also have more external auditors (0.192 versus 0.153), have more BSAs (0.908 versus 0.879), and show higher CEO/Chair duality.

Table 1, Panel C shows the breakdown by industry of the distribution of tainted versus non-tainted firms. The communication, oil and recreation industries show the highest presence

of tainted companies.

Insert Table 1 about here

Table 2 shows the Pearson correlation coefficients. $CASH_RATIO_{i,t}$ is positively correlated with $ROA_{i,t}$, $CFO_{i,t}$, $BOARD_SIZE_{i,t}$, and $CFSIGMA_{i,t}$, while it is negatively correlated with $TAINTED_{i,t}$, $WORKING_CAPITAL_{i,t}$, $PPE_{i,t}$, $SIZE_{i,t}$, $INTANGIBLES_{i,t}$, $SIZE_{i,t}$, $INVENTORY_{i,t}$, $LEVERAGE_{i,t}$, $DIVIDEND_{i,t}$, $NEWDEBT_{i,t}$, $NEWSHARES_{i,t}$, $EXT_AUDITOR_{i,t}$, $DUAL_{i,t}$, $ACCRUALS_QUALITY_{i,t}$, and $LOSS_{i,t}$. Moreover, $ROA_{i,t}$ is positively correlated with $CFO_{i,t}$, $WORKING_CAPITAL_{i,t}$, $SIZE_{i,t}$, $NEWSHARES_{i,t}$, $BOARD_SIZE_{i,t}$, $LAGE_{i,t}$, $BSA_{i,t}$, $DUAL_{i,t}$, $FAMILY_FIRM_{i,t}$, and $ACCRUALS_QUALITY_{i,t}$. While $ROA_{i,t}$ is negatively correlated with $TAINTED_{i,t}$, $PPE_{i,t}$, $INTANGIBLES_{i,t}$, $INVENTORY_{i,t}$, $LEVERAGE_{i,t}$, $DIVIDEND_{i,t}$, $EXT_AUDITOR_{i,t}$, $CFSIGMA_{i,t}$ and $LOSS_{i,t}$. We find that $TAINTED_{i,t}$ is negatively correlated with $PPE_{i,t}$, $DIVIDEND_{i,t}$, $LAGE_{i,t}$, $FAMILY_FIRM_{i,t}$, and $ACCRUALS_QUALITY_{i,t}$, while it is positively correlated with $INTANGIBLES_{i,t}$, $SIZE_{i,t}$, $INVENTORY_{i,t}$, $LEVERAGE_{i,t}$, $NEWSHARES_{i,t}$, $BOARD_SIZE_{i,t}$, $EXT_AUDITOR_{i,t}$, $BSA_{i,t}$, and $DUAL_{i,t}$. Overall, univariate analysis shows that tainted firms show lower levels of cash holdings and worse profitability.

Insert Table 2 about here

5.2 Empirical Findings

Table 3 reports the main results for the cash holdings model. We find a significant negative coefficient on $TAINTED_{i,t}$ (t-statistic = -3.40), which provides evidence that tainted companies show lower levels of cash holdings (H1). This effect has a sizeable economic magnitude. Holding the control variables constant at their mean values, we find that cash holdings of tainted companies are on average 10.5 percent lower than those of non-tainted

companies. Consistent with prior studies (Gao, Harford, Li 2013; Smith 2016), we find a negative significant coefficient on $WORKING_CAPITAL_{i,t}$, $PPE_{i,t}$, $INVENTORY_{i,t}$, $SIZE_{i,t}$, $LEVERAGE_{i,t}$, and $DIVIDEND_{i,t}$, while we find a positive significant coefficient on $NEWDEBT_{i,t}$, $LAGE_{i,t}$, and $CFSIGMA_{i,t}$. We also find a positive significant coefficient on $BOARD_SIZE_{i,t}$, $BSA_{i,t}$, and $FAMILY_FIRM_{i,t}$, while we find a negative significant coefficient on $CFO_{i,t}$, $INTANGIBLES_{i,t}$, $EXT_AUDITOR_{i,t}$, $DUAL_{i,t}$, $ACCRUALS_QUALITY_{i,t}$ and $LOSS_{i,t}$.

Insert Table 3 about here

Table 4 reports the main results for the profitability model. We find a significant negative coefficient on $TAINTED_{i,t}$ (t-statistic = -2.97), which provides evidence that tainted companies show worse profitability relative to non-tainted. This effect is economically meaningful. Holding the control variables constant at their mean values, we find that ROA of tainted companies is on average 32.9 percent lower than those of non-tainted companies. With respect to the control variables, we find a positive coefficient on $CFO_{i,t}$, $WORKING_CAPITAL_{i,t}$, $PPE_{i,t}$, $SIZE_{i,t}$, $NEWSHARES_{i,t}$, $FAMILY_FIRM_{i,t}$, and $ACCRUALS_QUALITY_{i,t}$. Whereas, we find a negative coefficient on $INTANGIBLES_{i,t}$, $INVENTORY_{i,t}$, $LEVERAGE_{i,t}$, $DIVIDEND_{i,t}$, $NEWDEBT_{i,t}$, $BOARD_SIZE_{i,t}$, $EXT_AUDITOR_{i,t}$, $BSA_{i,t}$, $DUAL_{i,t}$, and $LOSS_{i,t}$.

We examine the variance inflation factors (VIFs) to determine whether multicollinearity problems exist, and we find that VIFs are less than five for all variables, indicating that multicollinearity does not appear to be an issue.

Insert Table 4 about here

5.3 Robustness Checks

A potential concern is that a company's decision to hire a director who has displayed a

criminal behavior is endogenous because a selection occurs when observations are non-randomly sorted into discrete groups, resulting in the potential for coefficient bias in estimation procedures such as OLS in Equation (1) and (2). In this section, we propose two alternative approaches to alleviate this potential threat. First, we adopt a propensity score matching (Lawrence, Minutti-Meza, and Zhang, 2011; Shipman, Swanquist, and Whited, 2017). Second, we adopt a treatment effect model (Larcker and Rusticus, 2010; Lennox, Francis, and Wang, 2012).

First, we conduct analyses using matched propensity scores to ensure that observed firm characteristics are similar between tainted and non-tainted firms. Shipman, Swanquist, and Whited (2017) state that propensity score matching creates a sample of treated (*tainted*) and untreated (*non-tainted*) observations that are similar across all independent variables minimizing the correlation between $TAINTED_{it}$ and independent variables, thus reducing concerns about “functional form misspecification” bias.

We model the likelihood of being a tainted as follows:

$$\begin{aligned}
TAINTED_{i,t} = & \beta_0 + \beta_1 CFO_{i,t} + \beta_2 WORKING_CAPITAL_{i,t} + \beta_3 PPE_{i,t} \\
& + \beta_4 INTANGIBLES_{i,t} + \beta_5 SIZE_{i,t} + \beta_6 INVENTORY_{i,t} \\
& + \beta_7 LEVERAGE_{i,t} + \beta_8 DIVIDEND_{i,t} + \beta_9 NEWDEBT_{i,t} \\
& + \beta_{10} NEWSHARES_{i,t} + \beta_{11} BOARD_SIZE_{i,t} + \beta_{12} LAGE_{i,t} \\
& + \beta_{13} EXT_AUDITOR_{i,t} + \beta_{14} BSA_{i,t} + \beta_{15} DUAL_{i,t} \\
& + \beta_{16} FAMILY_FIRM_{i,t} + \beta_{17} ACCRUALS_QUALITY_{i,t} \\
& + \beta_{18} CFSIGMA_{i,t} + \beta_{19} LOSS_{i,t} + \varepsilon_{i,t}
\end{aligned} \tag{3}$$

where the dependent variable ($TAINTED_{i,t}$) equals one if any director of firm i has displayed a criminal behavior at any point in time which resulted in an investigation recorded

by the police and military forces in the SOI (“*System of Investigation*”) national database, and zero otherwise. Equation (3) includes all the independent variables from Equation (1), given that prior literature on organized crime does not provide guidance as to how to identify a model of the determinants of $TAINTED_{i,t}$.

Table 5, Panel A, shows the results of Equation (3). We find a significant negative coefficient on $WORKING_CAPITAL_{i,t}$ (z-statistic = -3.52), $PPE_{i,t}$ (z-statistic = -5.07), $DIVIDEND_{i,t}$ (z-statistic = -2.10), $NEWDEBT_{i,t}$ (z-statistic = -2.13), $LAGE_{i,t}$ (z-statistic = -2.88), $ACCRUALS_QUALITY_{i,t}$ (z-statistic = -2.33), and $LOSS_{i,t}$ (z-statistic = -2.33). We also find a significant positive coefficient on $SIZE_{i,t}$ (z-statistic = 6.70), $LEVERAGE_{i,t}$ (z-statistic = 7.83), $NEWSHARES_{i,t}$ (z-statistic = 1.96), $BOARD_SIZE_{i,t}$ (z-statistic = 8.19), $SIZE_{i,t}$ (z-statistic = 6.70). These results are consistent with our preliminary evidence shown in Table 1, Panel B.

Next, we use the results from Equation (3) to match, without replacement, each observation in the tainted sample to its closest match in the non-tainted sample within a maximum distance of three percent (Lawrence, Minutti-Meza, and Zhang, 2011). We obtain a sample of 14,574 observations in the tainted sample, and 14,574 observations in the matched non-tainted sample. Table 5, Panel B reports the mean values for all the variables in the two samples. The differences are generally insignificant, indicating that the propensity score matching procedure has achieved adequate covariate balance between the treatment and control groups, allowing us to better control for potential confounds (Armstrong, Jagolinzer, and Larcker, 2010).

Next, we reestimate the model for $CASH_RATIO_{i,t}$ and $ROA_{i,t}$ using the matched sample. Table 5, Panel C, Column (1), shows the results for $CASH_RATIO_{i,t}$. We find a negative significant coefficient on $TAINTED_{it}$ (t-statistic = -3.58), which corroborates our main results in Table 3. Table 5, Panel C, Column (2), shows the results for $ROA_{i,t}$. We find a

significant negative coefficient on $TAINTED_{it}$ (t-statistic = -2.25), which provides supporting evidence to our main findings.

Insert Table 5 about here

Another approach to address the threat of endogeneity would be to model the presence of director who displays a criminal behavior in the first stage and control for endogeneity bias using the inverse Mills ratio in the second-stage models. Larcker and Rusticus (2010) state that the choice of the instrumental variables is critical and challenging. Unfortunately, prior literature on organized crime does not provide guidance as to how to find good instruments to predict the presence on board of a director who displays a criminal behavior. Becker, Cronqvist, and Fahlenbrach (2011) propose a geographic instrument to separate selection from treatment effects of large shareholders. Similarly, Bianchi (2017) explores the place of birth of an individual auditor as an instrument to predict the early formation of auditor professional networks. Pinotti (2015) states that the presence of Mafia organization in Italy is concentrated into five southern regions: Calabria, Sicily, Campania, Apulia and Basilicata. We theorize that individuals who are born in these five regions are more likely to be exposed to criminal organizations relative to those who are born in the North. Therefore, we introduce as an instrument the percentage of directors who were born in one of those five regions ($BOARD_SOUTH_{i,t}$).⁸

Our instrument to be valid needs to significantly predict the presence of tainted directors on board (Becker, Cronqvist, and Fahlenbrach, 2011). Table 6, Panel A, reports the results of the first stage regression of $TAINTED_{it}$. We find a significant positive coefficient for

⁸ In Italy, individuals at birth are given a unique identifier (“Codice Fiscale”) which provides information about the date and the place of birth. These information was provided by CERVED.

$BOARD_SOUTH_{i,t}$ (t-statistic = 3.43), which shows a strong association between the instrument and the presence of tainted directors on board.

Next, we follow the Heckman (1979) procedure to estimate the inverse Mills' ratio ($MILLS_{it}$) which we add to Equation (1) and (2). Table 6, Panel B, Column (1), shows the results of the second-stage regression of Equation (1). We find a negative significant coefficient on $TAINTED_{it}$ (t-statistic = -3.37) and a positive insignificant coefficient on $MILLS_{it}$ (t-statistic = 1.55), thus confirming our main results. Table 6, Panel B, Column (2), shows the results of the second-stage regression of Equation (2). We find a negative significant coefficient on $TAINTED_{it}$ (t-statistic = -2.95) and a positive insignificant coefficient on $MILLS_{it}$ (t-statistic = 1.06), thus corroborating our main results.

Notwithstanding that we have tried to address the endogeneity issue using the two approaches shown in Table 5 and 6, we concede that it is impossible to completely rule out concerns about the selection which occurs when observations are non-randomly sorted into discrete groups. Therefore, we do not claim to have completely resolved the endogeneity issue.

Insert Table 6 about here

6. Conclusions

The existing economic literature on both corporate governance and crime ignore which are the effects when directors connected with the organized crime sit on board. In this paper, we fill this gap using a novel data base. We assess the economic consequences of the presence of organized crime on private firms (working on financial policies and performance), and we do so by shedding light on the effect of tainted board members. We examine a large sample of private companies from the Italy, by using a proprietary and confidential dataset provided to us by

Italian Internal Intelligence and Security Agency (AISI) which reports the results of the investigations of police and military forces.

Our analysis, robust to sensitivity tests to alleviate endogeneity concerns, show that firms with at least one tainted director on the board have - on average - lower levels of cash holdings, and are less profitable relative to non-tainted firms. Two interpretations can be offered. One possibility is that firms use financial policies to reduce expropriation risk potentially fostered by tainted directors. Another possibility is that the firms are completely captured by such as directors, that use the corporations for money laundering purposes, and therefore manage the cash holdings in order to minimize the risk of detection. On top of that our findings also suggest that tainted directors' presence worsens firm profitability.

Our paper makes several contributions. First, and in general it begins to bridge the gap between the corporate governance literature and the emerging field that examine the economic and financial consequences of organized crime. Second, and consequently we contribute to the literature on white-collar crimes analyzing organized crime tainting the boardroom and the consequences of top executives' off-the-job behavior on firm performance. Third, we are first in providing empirical evidence about the existence of organized crime tainted firms in the private sector. Finally, our work is likely to deserve attention of both politicians and regulators in their tireless attempt in preventing the proliferation of criminal organizations in the legal economy.

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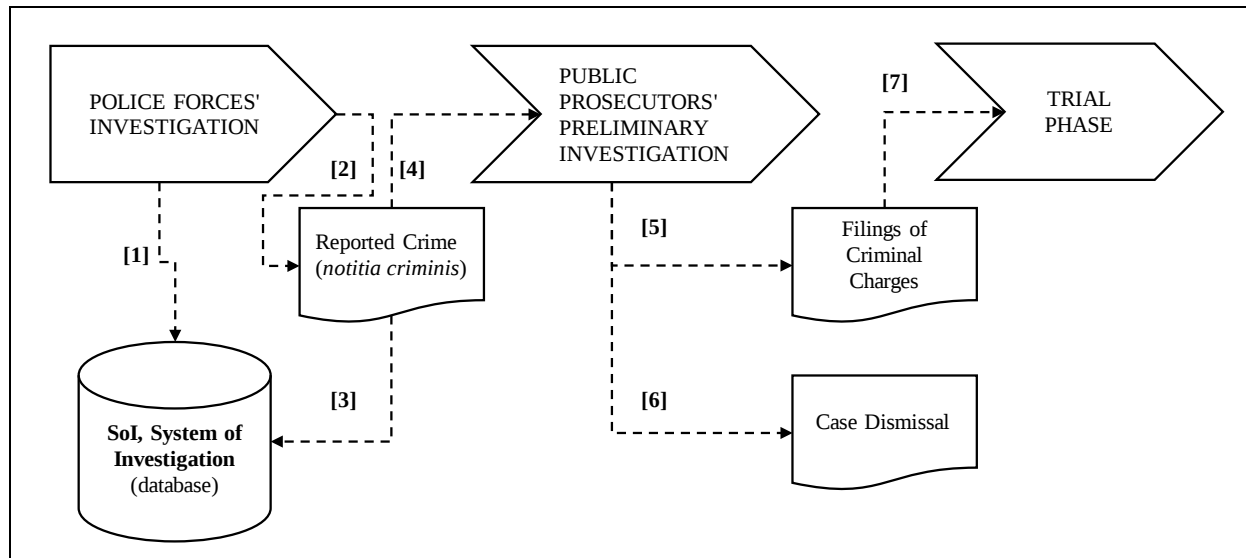
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Figure 1
Overview of the investigation and criminal process in Italy



Legend: [1] Investigation of Police Forces with the support of DIA and AISI. Conclusion of Investigations [2]: a crime is reported into the SoI database [3] and notified to public prosecutors [4]. After supplemental preliminary investigations, the public prosecutors may either file criminal charges [5] or dismiss the case [6]. The trial phase [7] follows the filing of criminal charges.

Figure 2

Breakdown of crimes committed by Organized Crime groups according to DIA's Reports.

Crimes' Categories (Italian Penal Code and other relevant laws)	N.	Freq.
Against the Course of Justice	14	0,94%
Against the Public Administration: corruption and misappropriation	155	10,44%
Against the Public Administration: other crimes	111	7,47%
Counterfeiting and Illegal Export of Currency	20	1,35%
Drug Trafficking	2	0,13%
False Invoice	851	57,31%
Immigration	4	0,27%
Mafia and Political	3	0,20%
Money Laundering and Receiving	50	3,37%
Public Tenders	94	6,33%
Smuggling and Counterfeiting	40	2,69%
Theft, Extortion, Weapons	15	1,01%
Usury	8	0,54%
Waste Disposal	118	7,95%
Total	1,485	100%

This figure presents the number of directors' criminal records showing behavior tainted with organized crime.

APPENDIX A –Variable Definitions

$CASH_RATIO_{i,t}$	=	Cash and cash equivalents divided by total assets in year t .
$ROA_{i,t}$	=	Net income/ lagged total assets in year t .
$TAINTED_{i,t}$	=	indicator variable equal to one if any board member of company i in year t is known to police authority for any crime related to organized crime, and zero otherwise.
$CFO_{i,t}$	=	cash from operations ratio [(earnings + depreciation + change current liabilities-change current assets)/average total assets] of company i in year t .
$WORKING_CAPITAL_{i,t}$	=	[(short-term asset – cash and cash equivalents) - (short-term liabilities –short-term debt)].
$PPE_{i,t}$	=	net property, plant, and equipment divided by total assets.
$INTANGIBLES_{i,t}$	=	intangible assets divided by total assets.
$SIZE_{i,t}$	=	natural logarithm of total assets in year t .
$INVENTORY_{i,t}$	=	inventory divided by total assets.
$LEVERAGE_{i,t}$	=	((short-term debt + long-term debt)/ average total assets) of company i in year t .
$DIVIDEND_{i,t}$	=	indicator variable equal to 1 if the firm pays dividends in year t , 0 otherwise.
$NEWDEBT_{i,t}$	=	net change in total debt divided by total assets in year t .
$NEWSHARES_{i,t}$	=	net change in share capital divided by total assets in year t .
$BOARD_SIZE_{i,t}$	=	number of board members in year t .
$LAGE_{i,t}$	=	natural logarithm of years since incorporation in year t .
$EXT_AUDITOR_{i,t}$	=	indicator variable equal to one if company i has an external auditor in year t .
$BSA_{i,t}$	=	indicator variable equal to one if company i has a BSA in year t .
$DUAL_{i,t}$	=	indicator variable equal to one if the CEO of company i is also the Chair of the Board of Directors in year t .
$FAMILY_FIRM_{i,t}$	=	indicator variable equal to one if firm i in year t has a family controlling more than 25% of the share capital, and zero otherwise.
$ACCRUALS_QUALITY_{i,t}$	=	[WC - (lagged WC / lagged sales) * sales] / [(total assets + lagged total assets)/2].
$CFSIGMA_{i,t}$	=	Industry standard deviation of cash flow for three years prior, where industry is defined by Fam and French 30 industries.
$LOSS_{i,t}$	=	indicator variable equal to 1 if year earnings are negative in year t , 0 otherwise.
$BOARD_SOUTH_{i,t}$	=	Percentage of board members who were born in Sicily, Calabria, Campania and Puglia.

Table 1*Panel A: Descriptive Statistics*

variable	n	mean	median	min	max	sd
CASH_RATIO	108,332	0.068	0.020	0.000	0.549	0.108
ROA	108,332	0.009	0.006	-0.379	0.294	0.085
TAINTED	108,332	0.067	0.000	0.000	1.000	0.250
CFO	108,332	0.031	0.026	-0.552	0.520	0.137
WORKING_CAPITAL	108,332	0.244	0.237	-0.426	0.884	0.255
PPE	108,332	0.268	0.153	0.000	1.231	0.297
INTANGIBLES	108,332	0.033	0.004	-0.021	1.000	0.085
SIZE	108,332	9.222	9.167	6.200	12.743	1.228
INVENTORY	108,332	0.168	0.110	0.000	0.888	0.195
LEVERAGE	108,332	0.238	0.197	0.000	0.868	0.226
DIVIDEND	108,332	0.359	0.000	0.000	1.000	0.480
NEWDEBT	108,332	0.001	0.000	-0.452	0.357	0.105
NEWSHARES	108,332	-0.001	0.000	-0.203	0.125	0.029
BOARD_SIZE	108,332	3.143	3.000	1.000	9.000	1.791
LAGE	108,332	3.059	3.219	1.099	4.431	0.725
EXT_AUDITOR	108,332	0.156	0.000	0.000	1.000	0.362
BSA	108,332	0.881	1.000	0.000	1.000	0.323
DUAL	108,332	0.209	0.000	0.000	1.000	0.406
FAMILY_FIRM	108,332	0.495	0.000	0.000	1.000	0.500
ACCRUALS_QUALITY	108,332	0.000	0.006	-1.074	0.688	0.205
CFSIGMA	108,332	0.005	0.004	0.000	0.026	0.003
LOSS	108,332	0.305	0.000	0.000	1.000	0.460
BOARD_SOUTH	108,332	0.045	0.000	0.000	1.000	0.160

Panel B: Differences in means: Non-Tainted vs Tainted

Variable	Not Tainted	Tainted	Difference	t-stat	p value	
CASH_RATIO	0.069	0.057	0.012	9.330	0.000	***
ROA	0.010	0.004	0.005	5.251	0.000	***
CFO	0.031	0.028	0.003	1.807	0.071	*
WORKING_CAPITAL	0.244	0.247	-0.003	-0.893	0.372	
PPE	0.270	0.233	0.037	10.364	0.000	***
INTANGIBLES	0.033	0.037	-0.004	-4.252	0.000	***
SIZE	9.197	9.579	-0.382	-25.725	0.000	***
INVENTORY	0.167	0.183	-0.016	-6.638	0.000	***
LEVERAGE	0.235	0.277	-0.042	-15.325	0.000	***
DIVIDEND	0.360	0.346	0.013	2.283	0.022	**
NEWDEBT	0.000	0.001	-0.001	-0.774	0.439	
NEWSHARES	-0.001	0.001	-0.002	-4.983	0.000	***
BOARD_SIZE	3.106	3.662	-0.556	-25.673	0.000	***
LAGE	3.066	2.964	0.101	11.514	0.000	***
EXT_AUDITOR	0.153	0.192	-0.039	-8.941	0.000	***
BSA	0.879	0.908	-0.029	-7.363	0.000	***
DUAL	0.206	0.239	-0.033	-6.644	0.000	***
FAMILY_FIRM	0.499	0.436	0.063	10.454	0.000	***
ACCRUALS_QUALITY	0.001	-0.008	0.009	3.624	0.000	***
CFSIGMA	0.005	0.005	0.000	-1.874	0.061	*
LOSS	0.305	0.296	0.010	1.717	0.086	*
Observations	101,045	7,287				

(continued on next page)

Panel C: Breakdown of Tainted Firms by Industry

Description	Industry	Total	Non-tainted	Tainted
Food	1	3,381	93%	7%
Beverage	2	184	96%	4%
Recreation	4	1,281	90%	10%
Printing	5	1,709	96%	4%
Consumer	6	2,148	97%	3%
Apparel	7	1,069	95%	5%
Healthcare	8	1,717	93%	7%
Chemicals	9	2,520	95%	5%
Textiles	10	3,798	94%	6%
Construction	11	13,465	91%	9%
Steel	12	2,832	93%	7%
Fabricated	13	9,758	94%	6%
Electrical	14	1,193	97%	3%
Autos	15	1,431	95%	5%
Carry	16	158	91%	9%
Mines	17	392	91%	9%
Oil	19	262	90%	10%
Utilities	20	1,505	91%	9%
Communication	21	528	87%	13%
Services	22	9,627	94%	6%
Business equipment	23	1,940	93%	7%
Paper	24	1,631	97%	3%
Transportation	25	3,348	91%	9%
Wholesale	26	19,401	93%	7%
Retail	27	3,759	94%	6%
Meals	28	1,102	92%	8%
Financials	29	17,170	94%	6%
Other	30	1,023	87%	13%

This table presents descriptive statistics for the variables used in the main analyses. Panel A shows descriptive for the whole sample. Panel B shows differences in means between suspect and non-suspect firms. Panel C shows the breakdown of suspect firms by industry.

Table 2 - Correlation Matrix (108,332 observations)

Variables	1	2	3	4	5	6	7
1 CASH_RATIO	1						
2 ROA	0.2113*	1					
3 TAINTED	-0.0283*	-0.0160*	1				
4 CFO	0.0379*	0.3539*	-0.0055	1			
5 WORKING_CAPITAL	-0.2149*	0.1008*	0.0027	-0.1166*	1		
6 PPE	-0.1828*	-0.0356*	-0.0315*	0.0707*	-0.4242*	1	
7 INTANGIBLES	-0.0443*	-0.1314*	0.0129*	0.0228*	-0.1749*	-0.1346*	1
8 SIZE	-0.1218*	0.0921*	0.0779*	0.0390*	0.0074*	-0.0453*	0.0232*
9 INVENTORY	-0.1451*	-0.0596*	0.0202*	-0.0920*	0.4828*	-0.3190*	-0.0922*
10 LEVERAGE	-0.3356*	-0.2480*	0.0465*	-0.0978*	0.2289*	0.1507*	0.0252*
11 DIVIDEND	-0.1288*	-0.5004*	-0.0069*	-0.1719*	-0.0399*	0.0558*	0.0707*
12 NEWDEBT	-0.0314*	-0.0039	0.0024	0.0203*	0.0686*	0.0774*	-0.0004
13 NEWSHARES	-0.0059	0.0613*	0.0151*	-0.0386*	0.0161*	0.0116*	0.0049
14 BOARD_SIZE	0.0318*	0.0189*	0.0778*	0.0323*	-0.0171*	-0.0912*	0.0669*
15 LAGE	0.0005	0.0598*	-0.0350*	0.0466*	0.0772*	0.1379*	-0.2118*
16 EXT_AUDITOR	-0.0242*	-0.0115*	0.0272*	0.0124*	-0.0432*	-0.1104*	0.1144*
17 BSA	0.0016	0.0402*	0.0224*	0.0208*	0.0275*	-0.0089*	-0.0133*
18 DUAL	-0.0122*	0.0098*	0.0202*	0.0140*	0.0419*	-0.0390*	-0.0068*
19 FAMILY_FIRM	-0.0054	0.0191*	-0.0317*	-0.0037	0.0630*	0.1194*	-0.1291*
20 ACCRUALS_QUALITY	-0.0724*	0.0666*	-0.0110*	-0.2498*	0.1784*	-0.0132*	-0.0103*
21 CFSIGMA	0.0197*	-0.0183*	0.0057	0.0229*	-0.0378*	0.0131*	0.0694*
22 LOSS	-0.1333*	-0.3785*	-0.0052	-0.1770*	-0.0819*	0.0847*	0.0966*
23 BOARD_SOUTH	0.0002	-0.0201*	0.0261*	-0.0117*	-0.0333*	-0.0187*	0.0488*

	8	9	10	11	12	13	14
8 SIZE	1						
9 INVENTORY	0.0583*	1					
10 LEVERAGE	0.0505*	0.2154*	1				
11 DIVIDEND	-0.0643*	0.0369*	0.1392*	1			
12 NEWDEBT	0.0511*	0.0171*	0.1801*	-0.0025	1		
13 NEWSHARES	0.1017*	0.0004	-0.0015	-0.0680*	0.0388*	1	
14 BOARD_SIZE	0.2751*	-0.0660*	-0.1081*	-0.0163*	0.0057	0.0411*	1
15 LAGE	0.0234*	0.0461*	-0.0604*	-0.0279*	-0.0249*	-0.0260*	0.0038
16 EXT_AUDITOR	0.3516*	-0.0756*	-0.1299*	0.0282*	-0.0279*	0.0095*	0.2266*
17 BSA	0.2768*	-0.0275*	-0.0544*	-0.0391*	0.0026	0.1456*	0.1756*
18 DUAL	0.0983*	0.0358*	0.0091*	-0.0247*	0.0046	0.0093*	0.1822*
19 FAMILY_FIRM	-0.2477*	0.1201*	0.1693*	-0.0386*	0.0296*	-0.0100*	-0.2528*
20 ACCRUALS_QUALITY	0.0025	0.0235*	0.0212*	0.0206*	0.2596*	0.0295*	-0.0017
21 CFSIGMA	0.0500*	-0.0208*	-0.0219*	0.0259*	-0.0018	0.0066*	0.0677*
22 LOSS	-0.0772*	0.0202*	0.1557*	0.2805*	-0.0595*	-0.0735*	-0.0076*
23 BOARD_SOUTH	-0.0101*	-0.0269*	0.0140*	0.0046	0.0012	-0.0036	-0.0285*

	15	16	17	18	19	20	21	22
15 LAGE	1							
16 EXT_AUDITOR	-0.0929*	1						
17 BSA	0.0996*	0.1001*	1					
18 DUAL	0.0574*	0.0066*	0.0791*	1				
19 FAMILY_FIRM	0.2206*	-0.3224*	-0.1124*	0.0041	1			
20 ACCRUALS_QUALITY	-0.002	-0.0006	0.0075*	0.0009	-0.0007	1		
21 CFSIGMA	0.0116*	0.0239*	0.0509*	0.0217*	-0.0312*	0.0042	1	
22 LOSS	-0.0398*	0.0377*	-0.0475*	-0.0200*	-0.0563*	-0.0549*	0.0286*	1
23 BOARD_SOUTH	-0.0935*	0.0130*	-0.0219*	-0.0389*	-0.0320*	-0.0017	0.001	0.0041

This table shows results of correlation matrix. In panel D, a star indicates that the correlation is significant at the 0.05 level or better. Variable definitions are included in Appendix A.

Table 3
Determinants of *Cash Holdings*

	CASH_RATIO (1)
TAINTED	-0.007*** [-3.40]
CFO	-0.026*** [-7.28]
WORKING_CAPITAL	-0.134*** [-35.43]
PPE	-0.126*** [-40.85]
INTANGIBLES	-0.156*** [-24.37]
SIZE	-0.011*** [-17.04]
INVENTORY	-0.042*** [-13.13]
LEVERAGE	-0.086*** [-32.02]
DIVIDEND	-0.017*** [-23.61]
NEWDEBT	0.066*** [20.62]
NEWSHARES	0.004 [0.42]
BOARD_SIZE	0.002*** [4.33]
LAGE	0.003*** [3.38]
EXT_AUDITOR	-0.010*** [-5.48]
BSA	0.008*** [4.37]
DUAL	-0.002* [-1.68]
FAMILY_FIRM	0.006*** [4.42]
ACCRUALS_QUALITY	-0.023*** [-13.15]
CFSIGMA	0.360*** [3.30]
LOSS	-0.019*** [-22.97]
INTERCEPT	0.251*** [35.48]
Observations	108,332
R-squared	0.248

This Table examines the association between *Cash Holdings (Cash Ratio)* and Tainted Firms. Variable definitions are included in Appendix A. ***, **, and * indicate significance at the 0.01, 0.05, and 0.10 levels, respectively. The models include year-specific and industry-specific intercepts, but for brevity these are not reported. All *t*-statistics (in brackets) and *p*-values are calculated using clustered standard errors by firm.

Table 4Determinants of *Performance*

	ROA (1)
TAINTED	-0.003*** [-2.97]
CFO	0.176*** [48.05]
WORKING_CAPITAL	0.058*** [30.57]
PPE	0.013*** [8.82]
INTANGIBLES	-0.054*** [-10.65]
SIZE	0.006*** [20.23]
INVENTORY	-0.026*** [-14.51]
LEVERAGE	-0.071*** [-42.58]
DIVIDEND	-0.063*** [-117.66]
NEWDEBT	-0.036*** [-12.45]
NEWSHARES	0.069*** [6.86]
BOARD_SIZE	-0.001*** [-4.03]
LAGE	-0.001* [-1.73]
EXT_AUDITOR	-0.005*** [-5.07]
BSA	-0.007*** [-7.81]
DUAL	-0.002** [-2.35]
FAMILY_FIRM	0.004*** [6.31]
ACCRUALS_QUALITY	0.051*** [27.14]
CFSIGMA	0.103 [1.10]
LOSS	-0.030*** [-54.33]
INTERCEPT	0.001 [0.39]
Observations	108,332
R-squared	0.443

This Table examines the association between *Firm Performance (ROA)* and Tainted Firms. The models include year-specific and industry-specific intercepts, but for brevity these are not reported. Variable definitions are included in Appendix A. ***, **, and * indicate significance at the 0.01, 0.05, and 0.10 levels, respectively. All *t*-statistics (in brackets) and *p*-values are calculated using clustered standard errors by firm.

Table 5 - Matched Propensity Score Analysis

Panel A: First Stage Model

	TAINTED (1)
CFO	-0.07 [-1.51]
WORKING_CAPITAL	-0.238*** [-3.52]
PPE	-0.316*** [-5.07]
INTANGIBLES	-0.185 [-1.19]
SIZE	0.090*** [6.70]
INVENTORY	0.12 [1.39]
LEVERAGE	0.525*** [7.83]
DIVIDEND	-0.034** [-2.10]
NEWDEBT	-0.131** [-2.13]
NEWSHARES	0.461** [1.96]
BOARD_SIZE	0.067*** [8.19]
LAGE	-0.060*** [-2.88]
EXT_AUDITOR	-0.033 [-0.81]
BSA	0.015 [0.38]
DUAL	0.04 [1.18]
FAMILY_FIRM	-0.012 [-0.35]
ACCRUALS_QUALITY	-0.065** [-2.33]
CFSIGMA	-0.072 [-0.04]
LOSS	-0.034* [-1.73]
INTERCEPT	-2.278*** [-14.07]
Observations	108,332
Pseudo R-squared	0.0388

(continued on next page)

Table 5 - Matched Propensity Score Analysis (continued)

Panel B: Tests of Differences Between the Treatment Sample and the Matched Control

Variable	Not Tainted	Tainted	Difference	t-stat	p value	
CASH_RATIO	0.0651	0.0568	0.0082	4.9557	0.0000	***
ROA	0.0084	0.0041	0.0042	3.1008	0.0019	***
CFO	0.0319	0.0283	0.0036	1.5608	0.1186	
WORKING_CAPITAL	0.2463	0.2470	-0.0007	-0.1556	0.8763	
PPE	0.2378	0.2328	0.0050	1.0885	0.2764	
INTANGIBLES	0.0368	0.0370	-0.0002	-0.1055	0.9160	
SIZE	9.5771	9.5788	-0.0017	-0.0818	0.9348	
INVENTORY	0.1807	0.1827	-0.0019	-0.5619	0.5742	
LEVERAGE	0.2770	0.2773	-0.0003	-0.0759	0.9395	
DIVIDEND	0.3428	0.3464	-0.0036	-0.4532	0.6504	
NEWDEBT	0.0024	0.0014	0.0009	0.4727	0.6364	
NEWSHARES	0.0013	0.0009	0.0004	0.8406	0.4006	
BOARD_SIZE	3.6874	3.6617	0.0257	0.7794	0.4357	
LAGE	2.9773	2.9643	0.0130	1.0483	0.2945	
EXT_AUDITOR	0.1876	0.1923	-0.0047	-0.7180	0.4728	
BSA	0.9082	0.9083	-0.0001	-0.0287	0.9771	
DUAL	0.2348	0.2391	-0.0043	-0.6039	0.5459	
FAMILY_FIRM	0.4423	0.4360	0.0063	0.7677	0.4426	
ACCRUALS_QUALITY	-0.0086	-0.0083	-0.0002	-0.0658	0.9476	
CFSIGMA	0.0051	0.0051	-0.0001	-1.0549	0.2915	
LOSS	0.2861	0.2959	-0.0097	-1.2948	0.1954	
Observations	7,287	7,287				

(continued on next page)

Table 5 - Matched Propensity Score Analysis (continued)

Panel C: Second-Stage Model

	CASH_RATIO (1)	ROA (2)
TAINTED	-0.008*** [-3.58]	-0.003** [-2.25]
CFO	-0.031*** [-4.51]	0.148*** [18.93]
WORKING_CAPITAL	-0.115*** [-16.23]	0.063*** [14.37]
PPE	-0.103*** [-18.47]	0.022*** [5.89]
INTANGIBLES	-0.136*** [-12.00]	-0.050*** [-5.09]
SIZE	-0.010*** [-7.98]	0.006*** [8.21]
INVENTORY	-0.035*** [-5.95]	-0.016*** [-4.31]
LEVERAGE	-0.069*** [-12.83]	-0.081*** [-18.98]
DIVIDEND	-0.014*** [-8.48]	-0.062*** [-47.87]
NEWDEBT	0.044*** [5.91]	-0.038*** [-5.69]
NEWSHARES	0.037 [1.33]	0.011 [0.38]
BOARD_SIZE	0.002*** [2.87]	0.000 [-1.42]
LAGE	0.000 [-0.01]	-0.003*** [-2.78]
EXT_AUDITOR	-0.007** [-2.01]	-0.001 [-0.54]
BSA	0.004 [1.04]	-0.006*** [-2.58]
DUAL	-0.003 [-1.10]	-0.001 [-0.58]
FAMILY_FIRM	0.005* [1.78]	0.005*** [3.78]
ACCRUALS_QUALITY	-0.029*** [-6.91]	0.045*** [10.58]
CFSIGMA	0.256 [0.89]	-0.306 [-1.20]
LOSS	-0.016*** [-8.74]	-0.029*** [-19.76]
INTERCEPT	0.242*** [17.55]	0.007 [0.89]
Observations	14,574	14,574
R-squared	0.229	0.427

This table presents results from a matched propensity scores analysis. Panel A reports the first stage of the determinants of *TAINTED*. Panel B reports differences-in-means between the non-tainted sample and the tainted sample. Panel C reports the second-stage model of *Cash Holdings* (Column 1) and *ROA* (Column 2). The models in Panel A and Panel C include year-specific and industry-specific intercepts, but for brevity these are not reported. Variable definitions are included in Appendix A. ***, **, and * indicate significance at the 0.01, 0.05, and 0.10 levels, respectively. All *t*-statistics (in brackets) and *p*-values are calculated using clustered standard errors by firm.

Table 6 - Treatment Effect Model
Panel A: First Stage

	TAINTED (1)
CFO	-0.068 [-1.47]
WORKING_CAPITAL	-0.233*** [-3.45]
PPE	-0.310*** [-4.98]
INTANGIBLES	-0.194 [-1.25]
SIZE	0.089*** [6.68]
INVENTORY	0.121 [1.40]
LEVERAGE	0.519*** [7.73]
DIVIDEND	-0.033** [-2.07]
NEWDEBT	-0.130** [-2.12]
NEWSHARES	0.464** [1.99]
BOARD_SIZE	0.068*** [8.32]
LAGE	-0.056*** [-2.70]
EXT_AUDITOR	-0.034 [-0.84]
BSA	0.018 [0.43]
DUAL	0.043 [1.26]
FAMILY_FIRM	-0.011 [-0.32]
ACCRUALS_QUALITY	-0.066** [-2.36]
CFSIGMA	-0.085 [-0.05]
LOSS	-0.033* [-1.70]
BOARD_SOUTH	0.275*** [3.43]
INTERCEPT	-2.301*** [-14.20]
Observations	108,332
Pseudo R-squared	0.040

(continued on next page)

Table 6 - Treatment Effect Model (continued)

Panel B: Second Stage

	CASH_RATIO (1)	ROA (2)
TAINTED	-0.007*** [-3.37]	-0.003*** [-2.95]
CFO	-0.027*** [-7.45]	0.176*** [47.52]
WORKING_CAPITAL	-0.138*** [-28.02]	0.056*** [22.08]
PPE	-0.132*** [-25.67]	0.010*** [3.85]
INTANGIBLES	-0.159*** [-23.39]	-0.056*** [-10.60]
SIZE	-0.009*** [-6.94]	0.007*** [10.06]
INVENTORY	-0.039*** [-11.15]	-0.025*** [-12.55]
LEVERAGE	-0.076*** [-10.37]	-0.067*** [-16.51]
DIVIDEND	-0.018*** [-20.64]	-0.064*** [-106.93]
NEWDEBT	0.064*** [17.60]	-0.036*** [-12.12]
NEWSHARES	0.014 [1.10]	0.073*** [6.85]
BOARD_SIZE	0.003*** [3.23]	0.000 [-0.45]
LAGE	0.002 [1.63]	-0.001** [-2.03]
EXT_AUDITOR	-0.011*** [-5.70]	-0.006*** [-5.14]
BSA	0.008*** [4.55]	-0.007*** [-7.55]
DUAL	-0.002 [-1.04]	-0.001* [-1.74]
FAMILY_FIRM	0.006*** [4.23]	0.004*** [6.10]
ACCRUALS_QUALITY	-0.024*** [-12.69]	0.050*** [26.23]
CFSIGMA	0.359*** [3.28]	0.103 [1.10]
LOSS	-0.019*** [-20.60]	-0.031*** [-50.04]
LAMBDA	0.023 [1.55]	0.009 [1.06]
INTERCEPT	0.190*** [4.76]	-0.022 [-0.97]
Observations	108,332	108,332
R-squared	0.248	0.443

This table presents results from a treatment effect model. Panel A reports the first stage of the determinants of *TAINTED*. Panel B reports the second-stage model of *Cash Holdings* (Column 1) and *ROA* (Column 2). The models in Panel A and Panel B include year-specific and industry-specific intercepts, but for brevity these are not reported. Variable definitions are included in Appendix A. ***, **, and * indicate significance at the 0.01, 0.05, and 0.10 levels, respectively.

0.05, and 0.10 levels, respectively. All t -statistics (in brackets) and p -values are calculated using clustered standard errors by firm.