

# Labor Tax Avoidance and its Determinants: The Case of Mafia Firms in Italy

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## Abstract

This paper develops two new measures of labor tax avoidance based on social contribution expenses reported in financial statements and tests them and their determinants within a sample of 224 Italian firms defined as legally registered Mafia firms due to having been confiscated at some point by judicial authorities, in relation to alleged connections with Italian organized crime. Overall, our results reveal that before confiscation legally registered Mafia firms engage more in labor tax avoidance than lawful firms do, whereas after confiscation there is no significant difference between both types of firm. Furthermore, we find that several factors have a significant influence on the probability of engaging in such a practice.

This study can enhance further research on the effectiveness of our measures and on the determinants of labor tax avoidance in other contexts and for other types of firm. Moreover, these measures can be added to the other direct and indirect methods commonly employed to measure and detect undeclared work representing a primary means of labor tax avoidance. Finally, our study allows inferring conclusions on the relation between corporate social responsibility and tax avoidance, suggesting that socially irresponsible firms, such as legally registered Mafia firms, are more likely to adopt this practice.

**Keywords:** corporate social responsibility; labor tax avoidance; legally registered Mafia firms; real activities manipulation; tax avoidance; tax evasion; undeclared work.

# 1 Introduction

Previous studies on tax avoidance (TAV) have concentrated mostly on income tax avoidance (ITAV). In this study we focus our attention on labor tax and develop two new measures of labor tax avoidance (LTAV) based on social contribution expenses (SOCs) reported in financial statements. Subsequently, we test them and their determinants on a sample of 224 Italian firms defined as legally registered Mafia firms (LMFs) due to having been confiscated at some point by judicial authorities, in relation to alleged connections with Italian organized crime. We additionally examine the effect that the confiscation of the firms and their assignment to legal administrators may have on LTAV. Hence, we identify two main time periods: the pre-confiscation period and the post-confiscation period within a time frame of 10 years from 2003 to 2012 for which financial statements are available on AIDA database.

Indeed, the Mafias, which are considered to be the most sophisticated form of criminal organization, also run businesses in the lawful economic sphere in which they usually invest proceeds from illicit trafficking (money laundering). LMFs, according to criminologists' terminology, can be defined as firms that are legally registered and apparently engage in lawful activities but are owned by a Mafia family (Champeyrache, 2004). LMFs differ from lawful firms (LWFs) in three main ways (Gambetta, 1993; Fantò, 1999): the owners are members of a criminal organization; funding partially or totally comes from illegal activities; and criminal methods involving violence, intimidation or corruption might be used while doing business. Legal and illegal activities are therefore closely intertwined within LMFs as the legal activities mostly serve to launder profits stemming from illegal ones (Fantò, 1999).

On the other hand, labor tax consists of social security contributions and other insurances computed on gross wages of all employees that the employers are legally required to withhold and pay to tax authorities. However, if employers underreport the real size of their labor force or the hours actually worked or the position covered to the social security authorities, they may then be able to avoid payment of the legally due social security contributions. In addition, we

expect underreporting of labor force and related expenses to be consistently reflected in the financial statements. Although the base of calculation of labor tax is different from that of income tax, their avoidance has similar negative effects on society by reducing tax revenue which is needed to finance public goods and services (Freedman, 2003; Slemrod, 2004; Landolf, 2006; Lanis and Richardson, 2012). Following Hanlon and Heitzman (2010) and Dyreng et al. (2008) we define TAV broadly as the reduction of firm's explicit income and labor tax liability through specific transactions. We do not distinguish between technically legal TAV and illegal evasion as in several cases the legality of a transaction, usually linked to its "economic substance" or a "business purpose", cannot be clearly determined. For example, LTAV may be legal if carried out through rearrangement of wages for hired employees with other forms of pay or compensation in order to avoid a portion of taxes (e.g. employee discount, fringe benefits, income from property leasing) (Feld and Schneider, 2010; Krumplyte and Samulevicius, 2010). Although our measures of LTAV can reflect both legal and illegal tax reductions we consider that, because of our research design, the illegal tax evasion related to the employment of undeclared work (UDW) may be the primary explanation of the results conveyed by our measures. Indeed, UDW is the primary illegal means commonly used to avoid labor tax payment (Feld and Larsen, 2005; Feld and Schneider 2010). Hence, our measures of LTAV can also be categorized as a new direct method to measure UDW based on financial statement information.

Overall, our results reveal that before confiscation LMFs engage more in LTAV by exhibiting lower abnormal social contribution expenses (ABSOCs) than LWFs, whereas after confiscation there is no significant difference between these two types of firm or this difference significantly decreases. These results may indicate a larger resort to UDW of LMFs before confiscation which is mitigated after confiscation due to the reinstatement of legality and the consequent regularization of all employees carried out by legal administrators. Furthermore, we find that before confiscation LMFs which are larger and exhibit abnormally higher material expenses are less likely to engage in LTAV, whereas LMFs with higher return on assets and a greater proportion of inventory are more likely to engage in such a practice and vice versa.

Prior research has focused on the examination of ITAV in varying types of firms in diverse contexts. For example, Rego (2003) finds that multinational corporations with more extensive foreign operations engage more in ITAV measured by effective tax rates (ETRs) than firms with less extensive foreign operations which have fewer opportunities to adopt such a practice. More recently, Wilson (2009) and Lisowsky (2010) document similar results in terms of likelihood of corporate tax shelter utilization. Other studies find that private companies are more tax aggressive than public companies especially in a few selected industries, such as banks and insurers (e.g., Cloyd et al., 1996; Beatty and Harris, 1999; Mills and Newberry, 2001). Moreover, although public family firms are similar to private firms in the concentration of ownership of selected individuals, Chen et al. (2010) find that the former are less tax aggressive than their non-family counterparts.

Some traits of LMFs can be identified in some studies on ITAV aforementioned. Nonetheless, to the best of our knowledge there are no previous studies in the literature that examine TAV in LMFs and more specifically LTAV using financial statement information and the factors that may influence its practice at firm level. In this paper we aim to bridge this gap. In addition, our study contributes to the business literature given that it adopts new LTAV measures that may enhance further research on their effectiveness and on the determinants of LTAV in other cultural, legal and institutional contexts and for other types of firm. Moreover, these measures can be added to the other direct and indirect methods commonly employed by practitioners and researchers for the difficult task of measuring UDW. Most important, their ability to infer the presence of UDW can contribute to protecting employees against illegal exploitation and to avoiding tax revenue loss and related issues of equity in the social security system. Furthermore, these measures can supplement current compliance risk-assessment models used by tax authorities. On the other hand, our study examines LMFs that may particularly interest the scientific community due to their singularities. Indeed, they are socially irresponsible by nature because of their illicit purposes. Moreover, they are private firms with incentives, *modus operandi* and legal financial statement formats (i.e. income statement by nature) that differ from those of public listed companies. Finally, it allows inferring conclusions

on the relation between corporate social responsibility (CSR) and LTAV, suggesting that socially irresponsible firms, such as LMFs, tend to engage more in such a practice.

The remainder of the paper proceeds as follows: section 2 introduces LMFs; section 3 reviews the literature and develops the hypotheses; section 4 describes the research design and sample data; section 5 presents empirical results and their discussion; section 6 includes concluding remarks.

## **2 Legally registered Mafia firms**

For the purpose of this study, we define “organized crime” according to the Italian legal provision of “associazione a delinquere di tipo mafioso” (article 416-bis of the Italian criminal code). In particular, art. 416-bis states that:

“A mafia-type association consists of three or more individuals and those who belong to it make use of the power of intimidation afforded by the associative bond and the state of subjugation and criminal silence (*omertà*) which derives from it to commit crimes, to acquire directly or indirectly the management or control of economic activities, concessions, authorizations or public contracts and services, either to gain unjust profits or advantages for themselves or for others, or to prevent or obstruct the free exercise of the vote, or to procure votes for themselves or to others at a time or electoral consultation”.

Ever since their appearance in the middle of the 19th century, Italian criminal organizations have infiltrated the social and economic life of many regions only in Southern Italy. The Sicilian Mafia, the most notorious of these organizations, would later expand into other foreign countries including the United States. There are several known mafia-like organizations in Italy: Cosa Nostra of Sicily and Ndrangheta of Calabria are considered among the biggest cocaine smugglers in Europe and, together with Camorra of Naples, began to develop between 1500

and 1800. More recently in the 1980s, two new organizations, Stidda and Sacra Corona Unita of Apulia, also appeared.

One of the main reasons for criminal organizations to take on new businesses is so as to be able to invest and launder significant financial resources coming from illegal activities, such as usury, extortion, drug, waste and arms trafficking and so on. This form of investment of illicit capital is a way to break into legal markets in order to obtain high profits and launder so-called "dirty" money. Another very important aspect is the need to achieve social consensus through activities that ensure employment and income for the population in the areas in which the criminal organization exercises control of the territory.

Several authors in Sociology have analyzed characteristics of LMFs. Fantò (1999) suggests that the main trait of LMFs is not the type of business run but the nature of the capital accumulation process that led to their formation as well as the strength of intimidation on which they are hinged. This force of intimidation, according to the same author, in addition to being the precondition that allows LMFs to take a dominant position in a territory, it is also a kind of surplus value that is added to what normally yields the legal capital invested in the same area and under the same conditions. The mafia-style intimidation is the point of greatest strength, the source of the competitive advantages of firms and economies of the Mafias over firms and the legal economy.

Arlacchi (1983) identifies the following competitive advantages of the LMFs over the LWFs: discouragement of competition (securing goods and raw materials at favorable prices, as well as orders, contracts and commercial outlets using criminal intimidation); wage compression (evasion of social security contributions and insurance, non-payment of overtime, denial of trade union rights); availability of financial resources (investment of huge proceeds coming from illegal activities (money laundering) without bearing the cost of credit).

In this study a firm is classified as LMF if, at some point during its existence, it has been confiscated by Italian authorities because of alleged connections to one of the Italian criminal organizations. After the first instance of court confiscation the LMF is entrusted to one or more legal administrators. The Legal Administration (LA) is an institution designed to protect and

manage confiscated assets and firms and to avoid their progressive impoverishment. The LA is based on strong principles of corporate social responsibility and public interest. The main objectives of legal administrators are: the reinstatement of legality in the management of the firm, the reorganization and turnaround of the firm according to sound management principles. However the administration of these firms is not always sufficiently dynamic and market-oriented and conservatism may prevail. Furthermore, it ought to be noted that the confiscation of first instance is a temporary measure that can be followed, even after several years, by the definitive confiscation as the last phase of the trial.

The body in charge of the administration and assignment of assets (including firms) definitively confiscated to organized crime is the Italian agency Agenzia Nazionale Beni Sequestrati e Confiscati (ANBSC) which was created through Decree Law on February 4th 2010. The main concern of ANBSC is to ensure the continuation of firms after confiscation, as most of them risk bankruptcy with the consequent loss of employment resulting in a hugely negative impact on their workforce and subsequently social stability. According to the most recent available data on the ANBSC official website

(<http://www.benisequestraticonfiscati.it>) the number of confiscated firms on January 7th 2013 was 1,708. After confiscation firms can be sold, leased or liquidated and although the efforts of ANBSC to ensure the continuation of the business, the most of the firms end up being liquidated or going bankrupt as they are unable to face the market competition after losing the support of organized crime and banks.

LMFs are mainly created as limited-liability companies (Società a responsabilità limitata (SRL)) with a reduced number of owners that exercise a close control on operations directly or indirectly through trusted managers that are often affiliates or surrogates of the same to criminal organization. One might then assume that the potential misalignment of interests and goals between them is reduced, with no significant agency problems. The minimum required starting equity for a SRL is € 10,000. Its capital is divided into shares which can be bought or sold just by notarial act. SRLs can issue corporate bonds but are subject to many limitations. Organized crime may prefer this corporate structure because the initial investment is lower

than alternative legal forms, audit committee is not required, and even from a fiscal point of view there are fewer charges.

### **3 Related research and hypothesis development**

There are two lines of research that are highly relevant for this paper. The first consists of studies on UDW typical of public economics or labor relations areas and the second consists of studies on ITAV mostly concentrated in the business and accounting areas.

#### **3.1 Undeclared work and its measure**

The phenomenon of UDW is known under a broad variety of different names. Terms such as “cash-in-hand”, “black work”, “informal economy”, “shadow economy”, “underground economy” and many others have been used to describe the phenomenon or parts of it. Indeed, there is no single comprehension on the concept of UDW in the scientific and applied literature. The choice of the research object definition is determined by research objectives and specifics of used research methods. The analysis of UDW in the light of tax non-compliance spotlights phenomena attributable to tax evasion and avoidance. In this regard, Feld and Larsen (2005) defines UDW as income from productive economic activities which are legal and taxable, but on which income tax, social security contributions, VAT, etc., are not paid, because they are not reported to the tax, social security or customs authorities. These activities are not only deliberately concealed from public authorities in order to save taxes, but also to avoid certain legal labor market standards, such as minimum wages, maximum working hours, safety standards, etc., and to avoid certain administrative obligations, such as completing statistical questionnaires or other administrative forms (Feld and Schneider, 2010). These are the only differences between undeclared and declared work. If there are other differences, then it is not



defined as UDW. If the goods and/or services are illegal (e.g. drug-trafficking), for example, then this is “criminal” activity. If the activity is not remunerated, similarly, it is part of the unpaid informal economy (Williams, 2010). Thus, UDW is the part of the shadow economy which only involves labor as a production factor and the related evasion of tax and social security contributions (Schneider and Enste, 2002). In addition, the term UDW does not describe a uniform type of employment. Indeed, it rather covers a variety of forms of work that constitute distinctly different types involving different degrees of social integration, as they are based on different motives of employees and strategies of employers or contractors, and their interplay (Pfau-Effinger, 2009). Pfau-Effinger (2009) distinguishes three main types of undeclared workers from a workers’ motivational perspective. The poverty escape type, in which, from a supply side perspective, UDW avoids extreme poverty and provides the main source of income. This type is common within populations that are restricted from entering regular employment. From a demand side perspective this type of UDW is linked to a cost-saving strategy of firms for tasks that require relatively low skills in private households (Pfau-Effinger, 2009). The second type of UDW is the moonlight type which covers mainly qualified craftsmen who are unregistered self-employed. Last but not least, the solidarity-orientated type is UDW in which the main motive is the mutual support within social networks, more than the monetary gain. With regard to LMFs the first type may be prevalent considering the traditionally high unemployment rate of regions in South of Italy where LMFs in our sample are more abundant. Recent studies find that UDW is still large and growing relative to declared work in nearly all-global regions (Schneider, 2008; Schneider and Bajada, 2005; Williams, 2009a; Williams, 2010). UDW creates considerable costs on several levels: tax authorities receive less revenue in the form of income tax or value added taxes; social security institutions do not get contributions and undeclared activities partly inhibit the creation of regular employment with full social protection. UDW in firms is found mostly in sectors characterized by high work intensity but with low levels of organizational rationalization and of production (Pfau-Effinger, 2009). This is linked to the character of UDW: there is relatively little commitment to the employing enterprise, and thus also relatively little enterprise-specific worker qualification and

relatively high worker fluctuation (turnover) levels. These features are not compatible with jobs in primary labor market sectors and high-production enterprises that use highly developed technologies (Williams and Windebank, 1998). In this regard, LMFs in our sample are particularly concentrated in sectors traditionally associated with higher UDW. For the development of adequate policy measures which deal with UDW, it is important to have sufficient and comparable information not only about the extent, but also about the structure of UDW (Schneider and Enste, 2000). Unfortunately, it is very difficult to get accurate information about shadow economy activities on the goods and labor market, because all individuals engaged in these activities do not wish to be identified (Schneider et al., 2010). Nonetheless, previous studies use several direct and indirect methods in order to approximately measure UDW. Indirect methods try to determine the size of the hidden economy (UDW) by measuring the “traces” it leaves in the official statistics. They are often called indicator approaches and use mainly macroeconomic data such as such national accounts, electricity consumption, cash transactions, employment figures, etc. (Schneider and Enste, 2000; Dell’Anno et al., 2007; Schneider et al., 2010). Such methods can be divided into six categories: (1) the discrepancy between national expenditure and income statistics; (2) the discrepancy between the official and real labor force statistics; (3) the transaction approach; (4) the currency demand (or cash deposit ratio) approach; (5) the physical input (e.g. electricity) method; and (6) the model approach or MIMIC method. The model or MIMIC approach understands the dimension of the hidden economy to be a “latent variable”, and therefore applies statistical modeling, namely structural equation modeling (SEM), commonly employed in social research (psychology, sociology, marketing, etc.) to explore unobservable variables such as attitudes, personality, beliefs, satisfaction, etc. Using this approach Schneider (2004) finds that Greece has the largest shadow economy in Europe, followed by Italy and Spain. Dell’Anno et al. (2007) also use the MIMIC method to estimate the size and the evolution of the shadow economy in three Mediterranean countries, namely France, Spain and Greece. They find that in the French case the shadow economy is declining whereas the submerged economy in Spain and Greece is on increase. Moreover, their results confirm that

unemployment, the fiscal burden and self-employment are the main causes of the shadow economy in these countries, and confirm that an inverse relationship exists between the official GDP growth rate and that of the unofficial economy. Finally, applying the same MIMIC method to the Spanish case, Alañón and Gómez-Antonio (2005) find a considerable shadow economy, measuring between 8 and 18.8% of GDP in the period 1976–2002, and demonstrate that the shadow economy is significantly influenced by the tax burden, the degree of regulation and unit labor costs. Some indirect methods have been criticized because of the questionable basic assumptions and the unreliable macroeconomic estimates on which they rely (Schneider and Enste, 2000; Ahumada et al., 2007; Feige and Urban, 2008).

On the other hand, direct methods to measure UDW are microeconomic approaches based on contacts with or observations of persons and/or firms to gather direct information about UDW (Dell'Anno et al., 2007). They employ either surveys based on voluntary replies or tax auditing and other compliance methods (Schneider and Enste, 2000; Feld and Larsen, 2005; Williams, 2006). The main advantage of the direct method of voluntary sample surveys lies in the detailed information that can be gained about the structure of the UDW although the results depend greatly on the respondents' willingness to cooperate (Schneider and Enste, 2000). In this regard, Williams (2006) analyses the results of a cross-national survey conducted across 27 EU member states in 2007 involving 26,659 face-to-face interviews. He unravels the heterogeneous nature of UDW across the European Union and the marked geographical variations in its configuration. Furthermore, he finds that most countries currently use only a relatively limited range of the potential policy measures at their disposal to tackle UDW. Using information on characteristics of artisan firms in Piedmont (Italy) in 2000 to 2005 and tax evasion observed directly from the audit exercise, Di Porto (2011) estimates UDW and finds that tax inspections could actually be counterproductive, decreasing both tax compliance and tax revenues. Williams (2009b) shows how the formal economy can be permeated by informal practice. He reports a 2007 survey in the 27 EU member states finding that some 5 percent of all formal employees receive from their formal employer two wages, one declared and the other an undeclared and cash-in-hand "envelope" wage. Nevertheless, such a practice is not

evenly distributed across all population groups, sectors and geographical areas. The economic sector where formal employees most commonly receive undeclared earnings, meanwhile, is construction. Construction is exactly the sector in which LMFs in our sample are more abundant.

Finally, it is worth mentioning that UDW in Italy is a substantial problem. Every year the Italian Statistical Institute (ISTAT) estimates the percentage of Italian undeclared employees, to provide an aggregate level of full-time employed (FTE) irregular workers per region and per year for the four main productive sectors (industry, constructions, agriculture, and services). For most of the years taken in our study, 2003-2009, the percentage of undeclared workers estimated by ISTAT is about 12 percent of the total amount FTE in the labor market, of which 19 percent is in the southern Italian regions (i.e., Calabria, Apulia, Sicily and Campania) where most of LMFs in our sample are located.

### **3.2 Income tax avoidance and hypothesis development**

Turning to the other line of research relevant for our paper, previous studies on ITAV can guide us to develop our hypotheses since we assume that the motivations and the incentives to engage in ITAV are similar to those to engage in LTAV. That said, some previous studies support our expectation on the higher probability of LMFs engaging in LTAV than LWFs.

In this regard, when managers perceive that government enforcement of tax rules is stronger, the higher expected probability of detection and potential for imposition of penalties may discourage TAV. That is, managers may decrease TAV when they believe tax authorities are more likely to detect the avoidance and impose additional taxes plus penalties (Crocker and Slemrod, 2005; Desai et al., 2007; Hoopes et al., 2012; Atwood et al., 2012). LMFs benefit from a lower level of scrutiny from outsiders since they can count on the protection granted by the criminal organization through bribery, intimidation and political infiltrations. Thus, for this first reason we expect LMFs to be more likely to engage in LTAV than LWFs.

On the other hand, Dyreng et al. (2010) track the movement of 908 CEOs, CFOs, and other executives across firms during the period 1992 to 2006 in order to examine whether individual executives have an effect on their firms' ITAV. By examining executives who switch firms, they attempt to control for firm fixed effects and identify executive-specific effects. Results indicate that individual executives play a significant role in determining the level of ITAV that firms undertake, incremental to characteristics of the firm. Moreover, Bertrand and Schoar (2003) investigate whether and how individual managers affect corporate behavior and performance. They find, among others, that the realizations of all investment, financing, and other organizational practices of firms appear to systematically depend on the specific executives in charge and some of the managerial differences in corporate practices are systematically related to differences in corporate performance. Although the two studies above are based on publicly traded U. S. firms, we consider that their results are even more so applicable to LMFs. Indeed, in LMFs mafia-member owners exercise a close control on operations directly or indirectly through trusted managers that are often affiliates or surrogates of the same criminal organization. We then expect a significant influence of mafia-member owners on possible illicit practices of their firms including TAV.

Considering LMFs as firms clearly socially irresponsible, we can also refer to some previous studies on the relation between CSR and ITAV in order to get some additional insight for the development of our hypotheses. In this regard, based on a sample of 408 publicly listed Australian corporations for the 2008/2009 financial year, Lanis and Richardson (2012) find that the higher the level of CSR disclosure of a corporation, the lower is the level of aggressive ITAV considered as a socially irresponsible and illegitimate activity. Furthermore, Huseynov and Klamm (2012) examine the effect of three measures of CSR (corporate governance, community and diversity) and tax management fees on ITAV measured by ETRs in firms that use auditor-provided tax services. They find that tax fees are associated with lower GAAP ETR regardless of a firm's strengths or concerns for corporate governance or diversity, but are associated with lower Cash ETR when a firm has corporate governance strengths or diversity concerns. However, tax fees are associated with higher GAAP ETR in a firm with a high

number of community concerns and with higher Cash ETR in a firm with any community concerns. Finally, other studies show how some firms that claim to be socially responsible are also engaged in TAV and evasion. Focusing on tax evasions, Preuss (2010, 2012)) finds that firms with headquarters in tax havens tend to make stronger claims of social responsibility than U.S. headquartered firms, and thus conclude that there is a conflict between claiming social responsibility and engaging in off-shore financial centers to reduce their tax liabilities. Similarly, Sikka (2010) provides examples to show how companies, including major accountancy firms, make promises of responsible conduct, but indulge in TAV and evasion. However, Sikka's conclusions are based on case examples, which provide anecdotal evidence, but the analysis lacks rigor (Huseynov and Klamm, 2012).

LMFs benefit from significant competitive advantages (Arlacchi, 1983) and do not need to claim to be socially responsible. Indeed, they mostly derive their gains from coercive market transactions through intimidation, illegal political connections ensured by their infiltrators in the public institutions and privileges granted by illegality and bribery.

Based on previous considerations our study thus empirically tests the following research hypotheses:

**H1: Ceteris paribus, before confiscation LMFs engage more in LTAV than LWFs do.**

As already discussed, after confiscation one of the tasks of legal administrators is the reinstatement of legality within the firm which may for example include the regularization of existing undeclared workers. Hence, the second hypothesis of our study is:

**H2: Ceteris paribus, there is no significant difference in level of LTAV between LMFs after confiscation and LWFs or this difference, although significant, is significantly lower than that between LMFs before confiscation and LWFs.**

## 4 Research design

### 4.1 Labor tax avoidance measures (dependent variables)

The dependent variables of our empirical tests are two new measures of LTAV represented by abnormal social contribution expenses (ABSOCs). Importantly, lower ABSOCs suggest higher probability of firm engagement in LTAV and vice versa. It is noteworthy that our analysis is allowed by legal structure of income statement in Italy that classifies costs by nature rather than by function. In order to compute our first measure, we estimate the normal level of SOCs (NSOCs) using the model adopted by prior studies (e.g., Roychowdhury, 2006; Cohen et al., 2008; Kim et al., 2012) for calculation of abnormal production costs:

$$\frac{SOC_t}{TA_{t-1}} = \beta_0 + \beta_1 \frac{1}{TA_{t-1}} + \beta_2 \frac{S_t}{TA_{t-1}} + \beta_3 \frac{\Delta S_t}{TA_{t-1}} + \beta_4 \frac{\Delta S_{t-1}}{TA_{t-1}} + \varepsilon_t \quad (1)$$

Where  $SOC_t$  is the social contribution expenses in year t that we assume mostly related to production;  $TA_{t-1}$  is the total assets in year t-1;  $S_t$  is the net sales in year t; and  $\Delta S_t$  is the change in net sales from year t-1 to t ( $S_t - S_{t-1}$ ). The firm subscript is suppressed for simplicity.

Parameters of Eq. (1) are estimated cross-sectionally for each industry-year with at least 15 observations in order to control for industry-wide changes under different economic conditions (Jeter and Shivakumar, 1999) that affect SOCs while allowing the coefficients to vary across time (e.g., Kasznik, 1999; DeFond and Jiambalvo, 1994). We use all active firms in AIDA (excluding LMFs) which are not listed on the stock exchange and with financial statements available for 10 years from 2003 to 2012. The total number of these firms at the moment of its retrieval from AIDA is 78,340. The level of ABSOCs ( $ABSOC1$ ) is measured as the estimated residual from Eq. (1).

UDW by reducing personnel expenses has the effect of increasing taxable income and income tax burden. LMFs may compensate this through a fraudulent understatement of sale revenues in order to reduce income tax as well as value added tax (VAT) payable. Hence, the ability of measure *ABSOC1* to reflect UDW and LTAV greatly depends on the doubtful reliability of reported sales.

Differently from sales, consumption of raw materials and trading goods is less likely to be under-reported for ITAV purposes although it may be over-reported. Indeed, raw material and trading goods expenses reduce taxable income and increase VAT receivable. We then compute a second measure of ABSOCs (*ABSOC2*) by replacing in Eq. (1) sales with material consumption (*CONSUM*) computed by adding raw materials and trading goods expenses to change in related inventories:

$$\frac{SOC_t}{TA_{t-1}} = \beta_0 + \beta_1 \frac{1}{TA_{t-1}} + \beta_2 \frac{CONSUM_t}{TA_{t-1}} + \beta_3 \frac{\Delta CONSUM_t}{TA_{t-1}} + \beta_4 \frac{\Delta CONSUM_{t-1}}{TA_{t-1}} \quad (2)$$

$$+ \varepsilon_t$$

*ABSOC2* is measured as the estimated residual from Eq. (2).

Additionally, in order to test the robustness of our results we perform our analysis both on the full sample and on the two subsamples including respectively firm-year observations with positive and negative values of each of the two measures of LTAV.

## 4.2 Control variables and base regression model

We explain LTAV measures expressing ABSOCs as depending on firm type (LMF or LWF), period (pre-confiscation and post-confiscation) and other control variables mostly used in previous research on ITAV. Indeed, we assume that engagement in LTAV is associated with



the opportunities to engage in ITAV given that UDW increases taxable income through personnel expenses underreporting as well as reducing SOCs. As already mentioned, we assume that lower ABSOCs imply higher probability of engaging in LTAV and vice versa.

As independent variables strictly related to our hypotheses we use binary variables *CRIME1* taking value of 1 for LMFs before confiscation, *CRIME2* taking value of 1 for LMFs after confiscation and *CRIME3* taking value of 1 for LWFs and excluded as a base variable from the final regression model.

Turning to control variables, previous studies on the association between ITAV and firm size (*SIZE*) produce conflicting results. Zimmerman (1983) finds a negative association between ITAV measured by ETRs and *SIZE* and justifies it under the political cost theory claiming that taxes are one part of the higher political costs borne by larger firms. Lower ITAV for larger firms is furthermore found by Rego (2003) and Atwood et al. (2012). On the other hand, Stickney and McGee (1982), Porcano (1986) and Richardson and Lanis (2007) document a positive association between ITAV and *SIZE*. Interestingly, based on empirical evidence, Gupta and Newberry (1997, p. 28) assert that the inconsistent results suggest that firm-size effects could be sample-specific and not likely to exist over time in firms with longer histories. Finally, a further indication on the likely effect of *SIZE* on LTAV may come from Perrini et al. (2007) that, within a sample of 3,680 Italian firms, find that large firms are more likely than small and medium ones to engage in formal CSR strategies also aiming to improve their employee conditions. Hence, we measure *SIZE* as natural logarithm of total assets and given the inconsistent evidence from previous research we do not make any prediction on its relation with LTAV.

Previous research finds a positive association between ITAV, proxied by ETRs, and long-term leverage (*LEVLONG*) given that, among other reasons, interest expenditure is tax deductible while dividends are not (Gupta and Newberry, 1997; Stickney and McGee, 1982; Richardson and Lanis, 2007; Dyreng et al. 2008; Lisowsky, 2010; Atwood et al., 2012). Nonetheless, other studies document a negative association between ITAV related to tax shelter transactions and long-term leverage consistent with the belief of tax shelters being a non-debt tax shield that

substitutes for the use of interest tax deductions (Graham and Tucker, 2006; Lisowsky, 2010). We include long-term leverage (*LEVLONG*) in our model and we expect a negative association between this variable and ABSOCs since firms in financial distress and possibly bearing high interest expenses may engage in an aggressive personnel and related SOC reduction with an associated higher probability of resorting to LTAV.

Previous studies show that firms with larger capital intensity (*CAPINT*), measured as the proportion of fixed assets both tangible and intangible, engage more in ITAV due to tax incentives that permit taxpayers to write-off the cost of depreciable assets over periods shorter than their economic lives (Stickney and McGee, 1982; Gupta and Newberry, 1997; Richardson and Lanis, 2007). On the other hand, firms with a greater proportion of inventory (*INVTA*), substitute for capital intensity, engage less in ITAV (Stickney and McGee, 1982; Gupta and Newberry, 1997; Richardson and Lanis, 2007; Lanis and Richardson, 2012). In contrast, we expect ABSOCs to be positively associated with *CAPINT* and thus negatively with *INVTA*. Indeed, the fact that firms with larger *CAPINT* usually require less but more qualified labor force may discourage the resort to LTAV. In this regard, Pfau-Effinger (2009) finds a higher presence of UDW especially in sectors with high work intensity and low technology.

To the extent that tax incentives (e.g., depreciation), causing book income to differ from taxable income, are not proportionately related to book income, ETRs can change simply due to changes in book income (Richardson and Lanis, 2007). Hence, we expect *ROA* (income before tax divided by total assets) to be positively associated with LTAV consistent with previous studies indicating that more profitable firms, which have the greatest incentive to reduce taxes, engage in more ITAV (Gupta and Newberry, 1997; Richardson and Lanis, 2007; Atwood et al., 2012; Wilson, 2009; Rego, 2003).

An additional control variable used in previous research on ITAV is sales growth (Atwood et al., 2012; Badertscher et al., 2010). We replace it with assets growth (*GROWTH*) that we consider more reliable and less likely to be significantly manipulated relative to sales growth in LMFs. We expect a positive association between *GROWTH* and ABSOCs contrasting with previous studies finding a positive association between ITAV and growth (Atwood et al., 2012;

Chen et al., 2010; Badertscher et al., 2010). Indeed, with regard to ITAV growing firms may make more investments in tax-favored assets that generate timing differences in the recognition of expenses (Chen et al., 2010). On the other hand, growing firms have available significant financial resources that may discourage the reduction of personnel costs through LTAV.

Similar to previous studies on ITAV (Desai and Dharmapala, 2006; Wilson 2009; Lisowsky 2010; Atwood et al., 2012) we furthermore examine the relation between LTAV and two specific accrual measures such as change in receivables (*CH\_REC*) and change in inventory (*CH\_INV*) both deflated by lagged total assets. We expect a positive relation between ABSOCs and these accruals given that firms may try to offset lower ABSOCs having an income-increasing effect with lower inventory and receivables change accruals having an income-decreasing effect. Previous studies find a positive relation between aggressive ITAV and discretionary or unadjusted accruals (Wilson 2009; Frank et al., 2009; Lisowsky 2010; Atwood et al., 2012) in public listed companies suggesting that some ITAV is achieved through accruals management. Nonetheless, we base our opposed expectation on particularities of firms in our study which are private with different incentives from public listed companies.

Besides accrual management we consider the possibility of a manipulation of real activities through transactions affecting the cash flow (e.g., Roychowdhury, 2006). In particular, we focus on material expenses including both raw materials and trading goods that may be increased even fraudulently through fictitious transactions in order to reduce taxable income. Hence, we estimate the abnormal level of material expenses (*ABMAT*) using the model adopted by prior studies (e.g., Roychowdhury, 2006; Cohen et al., 2008; Kim et al., 2012) for abnormal production costs and consisting of the residuals of the following regression:

$$\frac{MAT_t}{TA_{t-1}} = \beta_0 + \beta_1 \frac{1}{TA_{t-1}} + \beta_2 \frac{S_t}{TA_{t-1}} + \beta_3 \frac{\Delta S_t}{TA_{t-1}} + \beta_4 \frac{\Delta S_{t-1}}{TA_{t-1}} + \varepsilon_t \quad (3)$$

Where  $MAT_t$  are material expenses in year  $t$ . Parameters of Eq. (3) are estimated in the same way as those of Eq. (1). We expect a negative relation between ABSOCs and  $ABMAT$  since firms engaging more in LTAV may also over-report material expenses and/or under-report sales revenue in order to avoid income tax. This may result in higher  $ABMAT$ .

In order to test our assumption that LTAV and ITAV may be performed simultaneously, we additionally include in our model a measure of ITAV expecting a positive association with our measures of LTAV. Hanlon and Heitzman (2010) list 12 measures of ITAV commonly used in the literature including different ETRs measures, the most frequently used (Lanis and Richardson, 2012), and book-tax difference measures (Manzon and Plesko, 2002; Desai and Dharmapala, 2006). Among the different measures we adopt the current  $ETR$  (current tax expense divided by pre-tax book income) (Richardson, and Lanis, 2007; Hanlon and Heitzman, 2010; Lanis and Richardson, 2012). This measure is affected by tax deferral strategies but is not affected by changes in the tax accounting accruals (Hanlon and Heitzman, 2010).

Previous studies find that the level of economic development in a country is negatively associated with the level of tax evasion and corruption (Treisman, 2000; Tsakumis et al., 2007; Richardson, 2008). Furthermore, regional development inequalities in Italy especially between North and South of the country may influence the level of salaries, although in Italy collective agreements define employee salaries by category at national level rather than at regional level. Hence, we include the level of economic development, measured as the natural logarithm of regional GDP (Gross Domestic Product) per capita ( $LNGDP$ ) of the firm location, as a control variable in our base regression model. We expect a positive relation between  $LNGDP$  and ABSOCs across regions.

Moreover, similar to previous studies on ITAV (Lisowsky, 2010; Dyreng et al., 2010; Lanis and Richardson, 2012) we consider the particular situation of firms bearing losses. Thus, we add a control dummy variable  $LOSS$  that takes a value of 1 if the firm reports two or more consecutive years of negative income including the current and 0 otherwise. On the one hand, loss firms may engage more in LTAV in order to improve the profitability even though, on the

other hand, the income tax saving coming from losses may reduce the incentive to avoid labor tax. Hence, do not make any prediction on the sign of the variable *LOSS*.

Industry-sector dummy variables (*INDSEC*) defined at the two-digit SIC code level are also included as control variables in our study, given that it is possible for TAV intensity to fluctuate across different industry sectors (e.g. Omer et al., 1993; Derashid and Zhang, 2003; Richardson and Lanis, 2007; Lanis and Richardson, 2012). In particular for LTAV, firms in sectors with high work intensity and low levels of organizational rationalization and of production are expected to resort more to UDW (Pfau-Effinger, 2009). Nonetheless, we do not make any specific sign prediction for the *INDSEC* dummies.

Finally, year dummy variables (*YEAR*) are included in our regression model to control for differences in ABSOCs that could possibly exist over the sample period. Again, no sign predictions are made for the *YEAR* dummies.

In summary, to test our hypotheses we estimate the following base regression model for our LTAV measures:

$$\begin{aligned}
 LTAV\_PROXY_t = & \beta_0 + \beta_1 CRIME1_t + \beta_2 CRIME2_t + \beta_3 SIZE_t + \beta_4 LEVLONG_t + \\
 & \beta_5 CAPINT_t + \beta_6 INVTA_t + \beta_7 ROA_t + \beta_8 GROWTH_t + \beta_9 CH\_REC_t + \beta_{10} CH\_INV_t + \\
 & \beta_{11} ABMAT_t + \beta_{12} LNGDP_t + \beta_{13} LOSS_t + \beta_{14} ETR_t + \sum \phi_i INDSEC_{it} + \\
 & \sum \alpha_i YEAR_i + \varepsilon_t
 \end{aligned} \tag{4}$$

The variables, whose firm subscript is suppressed for simplicity, are defined in the Appendix.

### 4.3 Data and sample selection

LMFs sample consists of 224 firms confiscated to organized crime during the 1994 to 2013 period, some of them provided by ANBSC and others found in online newspapers and AIDA

database. The financial statements for all firms are obtained from AIDA, the Italian Bureau Van Dijk database. It contains comprehensive information on 1 million companies with a turnover above € 500,000 in Italy, including the indication for some of them of the confiscation status and date of confiscation. Firms provided by ANBSC have all been confiscated by final judgment but their small size or their liquidation means that only 54 out of 1663 have financial statements available on AIDA in 2013. In addition, we include firms confiscated in first instance and found on AIDA database (118) and online newspapers (52) until reaching a total of 224. For the 224 LMFs we obtain from AIDA available financial statement data for the year of confiscation and for the years prior to and following the confiscation within the period of 2003 to 2012. Hence, for some LMFs we only have available either financial data prior to confiscation or financial data after confiscation. We then estimate our base regression model of Eq. (4) including LMFs firm-years and AIDA population of active unlisted firm-years from 2003 to 2012 in LMFs industries. We initially avoid the matched sample procedure although in our base regression model we control for year, size and two-digit industry SIC code. Table 1 summarizes the sample selection procedure that yields the 224 LMFs and the 78,340 LWFs.

**(Insert Table 1 approximately here)**

Table 2 presents the industry distribution by two-digit SIC groups of LMFs in our sample and AIDA population of active unlisted firms with available financial data from 2003 to 2012 in the same industries as the LMFs.

**(Insert Table 2 approximately here)**

Compared to the population of active and unlisted firms on AIDA with available financial data from 2003 to 2012, the sample LMFs are especially more abundant in industry groups: building construction-general contractors and operative builders (18.30% of LMFs sample versus 7.00% of population), food stores (7.14% versus 2.22%) and Motor freight transportation and

warehousing (8.04% versus 3.69%). On the other hand, there is a lower proportion of LMFs mostly in wholesale trade, durable goods (10.27% versus 17.95%), business services (0.89% versus 6.38%) and fabricated metal products, except machinery and transportation equipment (0.89 versus 8.98%). It is noteworthy that Building construction-general contractors and operative builders is the sector with the higher percentage (18.30%) of LMFs in our sample. This sector presents most of the characteristics of sectors in which previous research finds a higher presence of UDW (Pfau-Effinger, 2009) such as high work intensity and low technology. Table 3 shows the distribution of LMFs by Italian region where they are legally registered and indicates the Mafia organization with major presence in that region based on a recent study of Transcrime (2013). Because of their different locations we can reasonably assume that LMFs in our sample represent a variety of Mafia organizations, although we do not have the information on the Mafia organization each LMF is exactly connected to. Therefore, the probability of a selection bias is mostly reduced and a possible concern may only be related to the predominance of Cosa Nostra. Indeed, 50.89% of LMFs are located in Sicily where Cosa Nostra is largely dominant. Moreover, each confiscation is individually and independently carried out by judicial authorities, being LMFs part of the assets belonging to any person accused of connections with any Mafia organization.

**(Insert Table 3 approximately here)**

Some features of our sample selection may affect our results and generate biases limiting the generalization to other settings. We just consider LMFs that have been confiscated and with available financial data on AIDA. This database only includes companies with a turnover above € 500,000. For some firms confiscation year is not available and we find it out through a Google search for articles in local online newspapers including details on confiscation and whose correctness is reasonable but cannot be corroborated. Several preventive confiscations may have been carried out for the same firm and subsequently cancelled by the court. Criminal connection is in these cases uncertain.

Finally, Table 4 includes number of LMFs by confiscation year. It can be seen that 2012 is the year with largest number of confiscated LMFs and more than 50% of LMFs have been confiscated from 2010 to 2013.

**(Insert Table 4 approximately here)**

## **5 Results and discussions**

### **5.1 Estimation of normal social contribution expenses**

Tables 5 and 6 respectively report the estimation results by two-digit SIC code of Eq. (1) and Eq. (2) used to determine NSOCs. Results are presented following the Fama and MacBeth (1973) procedure. More specifically, the reported coefficients and  $R^2$  are mean values by two-digit SIC code of cross-sectional estimations across 280 industry-years. Significance levels of coefficients are calculated using the standard errors of the coefficients across industry-years.

**(Insert Table 5 approximately here)**

**(Insert Table 6 approximately here)**

Initially, it should be noted that all the estimated regressions are significant at the 0.01 level according to the F tests, except for the singular case of SIC code 45 (Transportation by air) in Eq. (2) estimations. Significance of coefficients, their sign and  $R^2$  vary across the various two-digit SIC codes although in different degrees. Hence, the industry sector is a relevant aspect to consider in the interpretation of LTAV measures calculated based on the residuals of the estimations. Overall, the average  $R^2$  across the 280 industry-years is 0.29 for Eq. (1) and 0.19 for Eq. (2). For comparison, previous studies aiming to detect accrual-based earnings



management through abnormal accruals find values of  $R^2$  even below 0.19 in regressions estimating normal accruals (Dechow et al., 2010).

## 5.2 Descriptive statistics and univariate analysis

Table 7 and Figure 1 present median *ABSOC1* and *ABSOC2* for LMFs and for years -5 to +2 relative to the year 0 of confiscation. We report medians because they are less likely than means to be influenced by extreme observations. We find significantly negative *ABSOC1* and *ABSOC2* in all the years except in year +2 for *ABSOC1*. These results provide a first indication of LTAV which before confiscation and according to both measures does not exhibit a clear trend. Hence, we infer that LMFs before confiscation may engage in LTAV consistently so as not to show significant fluctuations to the authorities and raise any red flags. On the other hand, after confiscation and in particular in years 0 and 1 LTAV sharply decreases (*ABSOC1* and *ABSOC2* increase) as a consequence of the intervention of legal administrators. In confirmation of this, an untabulated two-tailed Mann–Whitney–Wilcoxon test indicates that median *ABSOC1* and *ABSOC2* for LMFs are significantly ( $p < 0.01$ ) higher after confiscation (-0.0052 and -0.0105, respectively) relative to before confiscation (-0.0117 and -0.0161, respectively). Finally, it is worth noting that *ABSOC1* shows higher percentage variations than *ABSOC2* in years -1, 0 and 1 most likely due to the higher fluctuations of net sales compared to material consumption around confiscation.

**(Insert Table 7 approximately here)**

**(Insert Figure 1 approximately here)**

The following Table 8 presents descriptive statistics for each variable considered in our base regression model comparing the LMFs firm-years before and after confiscation to the LWFs firm-years. Again, we report medians because they are less likely than means to be influenced

by extreme observations. All continuous variables, except *LNGDP*, are winsorized at the top and bottom 1 percent of their distributions to avoid the influence of outliers.

**(Insert Table 8 approximately here)**

Medians of our variables of interest *ABSOC1* and *ABSOC2* are both negative and significantly ( $p < 0.01$ ) lower for LMFs before confiscation relative to LWFs, providing a first indication in support of our hypothesis H1 on the higher LTAV in LMFs. Consistently, the same results are found for variables *N\_ABSOC1* and *N\_ABSOC2*, whereas there is no significant difference at conventional levels in variables *P\_ABSOC1* and *P\_ABSOC2*.

On the other hand, consistent with our hypothesis H2 there is no significant difference at conventional levels in variable *ABSOC1* between LMFs after confiscation and LWFs, whereas variable *ABSOC2* remains significantly ( $p < 0.01$ ) lower for LMFs even though the difference in medians decreases from -0.0094 to -0.0038. In addition, in LMFs unsigned values of variables *P\_ABSOC1* and *N\_ABSOC1* becomes significantly ( $p < 0.05$ ) lower than those of LWFs confirming the change of behavior relative to before confiscation as a consequence of the actions of legal administrators. In contrast, no significant difference at conventional levels is found in variables *P\_ABSOC2* and *N\_ABSOC2* between both types of firm. It is noteworthy that in LMFs before confiscation *N\_ABSOC1* observations represent 72.08% of total *ABSOC1* observations and *N\_ABSOC2* observations represent 75.16% of total *ABSOC2* observations. Furthermore, after confiscation the percentage decreases to 62.86% for *N\_ABSOC1* and to 67.35% for *N\_ABSOC2*. Overall, these percentages provide further evidence in support of our hypotheses H1 and H2.

As regards the rest of variables, before confiscation variable *LEVLONG* is not significantly different at conventional levels between the two types of firm. However, after confiscation LMFs appear significantly ( $p < 0.01$ ) more long term indebted than LWFs because of the likely loss of the criminal organization financial support. A consequent LMFs wider resort to bank financing

may additionally explain the significant increase in their long term indebtedness after confiscation.

Furthermore, LMFs are significantly ( $p < 0.01$ ) less profitable (*ROA*) than LWFs both before and after confiscation. An overinvestment of financial resources stemming from illegal activities (money laundering) and a downward earnings manipulation for ITAV purposes may explain this lower profitability of LMFs before confiscation. On the other hand, after confiscation the explanation may lie in the loss of business opportunities and competitive advantages (Arlacchi, 1983; Fantò, 1999) and in the cost of the reinstatement of legality including the regularization of UDW. A further consistent indication is the significantly ( $p < 0.01$ ) higher total assets growth rate (*GROWTH*) of LMFs before confiscation relative to LWFs, presumably financed with dirty money, which becomes significantly ( $p < 0.01$ ) lower after confiscation because of the likely suspension of any money laundering activity. Moreover, significantly ( $p < 0.01$ ) higher variables *CH\_REC* and *CH\_INV* for LMFs before confiscation relative to LWFs may suggest a wider engagement in accrual-based earnings management of the former firms. A higher real activities manipulation of LMFs through material expenses can also be inferred by significantly ( $p < 0.01$ ) higher variable *ABMAT* both before and after confiscation. Variable *LNGDP* is significantly ( $p < 0.01$ ) lower for LMFs relative to LWFs given that LMFs in our sample are mostly concentrated in southern Italian regions with a traditional lower economic development. Interestingly, significantly ( $p < 0.01$ ) lower variable *ETR* for LMFs both before and after confiscation provides evidence of a higher ITAV in these firms. This result supports our assumption on LTAV and ITAV being performed in parallel because of the similar underlying motivations and incentives. It is noteworthy that the percentage of firms with two or more consecutive years of negative income (*%LOSS*) is significantly ( $p < 0.01$ ) lower for LMFs before confiscation relative to LWFs. Nonetheless, after confiscation the situation is completely reversed consistently with the average decline of economic performance of LMFs.

Finally, an untabulated analysis shows that correlations among independent variables of our base regression model in Eq. (4) are low (below 0.43), thus providing a first indication that collinearity is unlikely to affect estimations.

### 5.3 Base regression results

We estimate our model in Eq. (4) through a linear regression with panel-corrected standard errors in order to consider heteroskedasticity and contemporaneous correlation across panels. Table 9 presents the results for our LTAV measures.

**(Insert Table 9 approximately here)**

Initially, it is noteworthy that all the estimated regressions are significant at the 0.01 level according to the chi-square tests. On the other hand, consistent with our hypothesis H1 coefficient on variable *CRIME1* is negative and significant at the 0.01 level in *ABSOC1*, *ABSOC2*, *N\_ABSOC1* and *N\_ABSOC2* regressions whereas in *P\_ABSOC1* and *P\_ABSOC2* regressions it is not significant at conventional levels. Overall, these results suggest that before confiscations LMFs engage more in LTAV than LWFs do. Indeed, the consistent results showed by both variables *ABSOC1* and *ABSOC2* in support of our hypothesis H1 provide the first insight into the ability of these measures to correctly reflect LTAV in the examined firms. In particular, computation of *ABSOC1* is based on reported sales whereas computation of *ABSOC2* is based on reported material consumption. Hence, the consistency of the results between both measures provides evidence of robustness in front of possible manipulations that may affect both material consumption and sales reported figures.

In addition, coefficient on *CRIME2* is not significant at conventional levels both in *ABSOC1* and in *ABSOC2* regression providing support for our hypothesis H2. In contrast, in *N\_ABSOC2* regression coefficient on *CRIME2* is negative and significant ( $p < 0.01$ ) and in *N\_ABSOC1* regression it is negative and only marginally significant ( $p < 0.10$ ). However, an untabulated test shows that in both regressions it is significantly ( $p < 0.01$  and  $p < 0.05$ , respectively) higher and

then closer to zero than coefficient on *CRIME1*. This suggests that the difference in level of LTAV significantly decreases after confiscation consistent with hypothesis H2. Finally, in *P\_ABSOC1* and *P\_ABSOC2* regressions coefficient on *CRIME2* is positive and significant ( $p < 0.01$  and  $p < 0.05$ , respectively). Overall, these results provide further evidence on the ability of our measures to actually reflect LTAV given that an action commonly taken by legal administrators after confiscation is the regularization of UDW which causes an increase in SOCs.

As regards the other variables, coefficient on *SIZE* is negative and significant ( $p < 0.01$ ) in *ABSOC1*, *P\_ABSOC1*, *ABSOC2* and *P\_ABSOC2* regressions, whereas it is positive and significant ( $p < 0.01$ ) in *N\_ABSOC1* and *N\_ABSOC2* regressions. These results indicate that within the subsample with negative ABSOCs smaller firms are more likely to engage in LTAV in contrast to the opposed indication that can be inferred from the results on the full sample. The coefficients on the rest of variables are significant ( $p < 0.01$ ) and have the expected sign with some exceptions. For example, coefficient on *INVTA* is significant ( $p < 0.01$ ) and negative, as expected, in *ABSOC2*, *P\_ABSOC1* and *P\_ABSOC2* regressions, whereas in *ABSOC1*, *N\_ABSOC1* and *N\_ABSOC2* regressions it is positive. Some conflicting results are also found for coefficient on *CAPINT* which is positive and significant ( $p < 0.01$ ), as expected, in *ABSOC1*, *N\_ABSOC1* and *N\_ABSOC2* regressions whereas it is negative and significant in *ABSOC2*, *P\_ABSOC1* and *P\_ABSOC2* regressions. Finally, coefficient on *LOSS* is significant ( $p < 0.01$ ) and positive in all regressions except in *N\_ABSOC2* regression.

In summary, the multiple regression analysis provides evidence that, consistent with hypothesis H1, before confiscation LMFs engage more in LTAV than LWFs do by exhibiting lower ABSOCs. Furthermore, consistent with hypothesis H2, there is no significant difference in level of ABSOCs and thus in LTAV between LMFs after confiscation and LWFs or this difference significantly decreases relative to before confiscation.

## 5.4 Additional analyses

### 5.4.1 Regression analysis with interactions

In order to empirically determine the effect of each control variable on LTAV in LMFs before confiscation we estimate additional regressions including the interactions of control variables with the binary variable *CRIME1*. Interestingly, there are mainly four variables that have a significant effect on LTAV in LMFs before confiscation. Specifically, coefficients on the interaction variables *SIZE\*CRIME1* and *ABMAT\*CRIME1* are positive and significant ( $p < 0.05$ ) indicating respectively that larger LMFs and with higher abnormal material expenses are less likely to engage in LTAV and vice versa. On the other hand, coefficients on interaction variables *ROA\*CRIME1* and *INVTA\*CRIME1* are negative and significant ( $p < 0.05$ ) suggesting respectively that LMFs with higher profitability and a greater proportion of inventory are more likely to engage in LTAV and vice versa.

### 5.4.2 Alternative model using unadjusted social contribution expenses

We estimate an alternative regression model by replacing in Eq. (4) dependent variables on ABSOCs with the unadjusted SOCs variable  $SOC_i/TA_{t-1}$  as well as adding the independent variables of Eq. (1). We omit variable *SIZE* whose effect is already reflected by highly correlated variable  $1/TA_{t-1}$  ( $r = -0.76$ ,  $p < 0.01$ ). Our purpose is to assess whether our results are confirmed through a more direct measure of paid SOCs such as  $SOC_i/TA_{t-1}$  which can be considered a low cost alternative to ABSOCs in terms of calculation efforts. Table 10 shows the results of our estimation. Because the residuals can be correlated across firm and/or over time, test statistics and reported significance levels are based on the standard errors adjusted by a two dimensional cluster at the firm and year levels (Gow et al., 2010; Colin et al., 2011).

**(Insert Table 10 approximately here)**

The unadjusted SOCs regression is significant at the 0.01 level according to the chi-square test. Its results mostly confirm previous findings based on ABSOCs regressions. Indeed, coefficient on variable *CRIME1* is negative and significant ( $p < 0.05$ ), supporting hypothesis H1, and coefficient on variable *CRIME2* is not significant at conventional levels, supporting hypothesis H2. Furthermore, the magnitude of coefficient on *CRIME1* (-0.0061) represents about 12% of the average  $SOC_i/TA_{t-1}$  (0.0508) for the full population of LWFs, providing a rough indication of the intensity of LTAV.

As regards the rest of control variables, results are similar to those of Eq. (1) and Eq. (4) in terms of sign and significance of variables.

In summary, the usage of unadjusted SOCs provides additional support to our results by spotting a different SOCs payment pattern between LMFs and LWFs as well as confirming significant associations with other variables that may influence LTAV. Nonetheless, the related variable  $SOC_i/TA_{t-1}$ , individually considered, says little about the LTAV pattern of a firm. Indeed, a basis for comparison and assessment is not immediately available as the official tax rate can be for those studies that try to measure ITAV through ETRs. Additionally, differences in industry sectors and annual economic conditions are not reflected in unadjusted SOCs. On the other hand, ABSOCs are calculated as the residuals of cross-sectional regressions for each industry-year and their sign (positive or negative) provides a first immediate indication of the likelihood of a firm engaging in LTAV practices.

### 5.4.3 Matching procedure

We perform a further robustness test of our results by estimating our base regression model within a matched sample. So as to define a control sample, researchers choose from a wide range of firm characteristics on which to match such as: cash flows, year, industry, net income, size proxied by sales or total assets, ROA, etc. (Defond and Jiambalvo, 1994; Perry and Williams, 1994; Defond and Subramanyam, 1998; Teoh et al., 1998; Kothari et al., 2005). We

match each LMF with three LWFs on year, industry, sign of profitability (ROA) and asset quintile. Indeed, we believe that matching on actual profitability or actual assets is problematic (e.g., by using propensity scores) because the profitability or assets of LMFs are likely to be far more manipulated and unreliable than those of LWFs. Hence, using something more generic, like sign of profitability or an asset group considers that there might be some marginal manipulation of income or assets by LMFs, but that the manipulation is not so massive as to cause a LMF to report a profit instead of a loss, or jump into another asset quintile. Matching is performed for both LMFs pre-confiscation firm-year observations and for LMFs post-confiscation firm-year observations. We add to the dummy variables *CRIME1* and *CRIME2* the new dummy variables *LAW1* and *LAW2*. *LAW1* takes value of 1 for LWFs observations matched to LMFs pre-confiscation firm-years and 0 otherwise, whereas *LAW2* takes value of 1 for LWFs observations matched to LMFs post-confiscation firm-years. For each LTAV measure we estimate two regressions excluding as base dummy variable *LAW1* or *LAW2*, alternatively. However, we present a result column for each dependent variable and only report values for variables *CRIME1* (versus base *LAW1*) and *CRIME2* (versus base *LAW2*). Indeed, switching base from *LAW1* to *LAW2* does not affect value and significance of the other independent variables except for the intercept whose values and significances are separately reported for each base. Table 11 shows the results of our estimations.

**(Insert Table 11 approximately here)**

Again, all the estimated regressions are significant at the 0.01 level according to the chi-square tests. Results of matched sample estimations are mostly consistent with those of the unmatched sample. Indeed, both in *ABSOC1* and *ABSOC2* regressions coefficient on variable *CRIME1* is negative and significant ( $p < 0.01$ ), providing further support for hypothesis H1, and coefficient on variable *CRIME2* is not significant at conventional levels, providing further



support for hypothesis H2. As regards the rest of control variables, results are similar to those of the unmatched sample estimations in terms of sign and significance of variables.

In summary, the documented robustness of our results to different estimation methods can relieve concerns that our findings are driven by uncontrolled factors.

## 6 Conclusions

In this study we analyze LTAV and its determinants within a sample of 224 Italian firms, defined as LMFs due to having been confiscated at some point by Italian judicial authorities, in relation to alleged connections with Italian organized crime. We build two new measures of LTAV based on SOCs reported by firms in their financial statements. Overall, our results reveal that before confiscation LMFs engage more in LTAV than LWFs do as suggested by their lower ABSOCs. After confiscation, following the reinstatement of legality performed by legal administrators, there is no significant difference in level of LTAV between both types of firm or this difference significantly decreases as indicated by results on difference in ABSOCs. Moreover, a further analysis shows that before confiscation LMFs which are larger and exhibit abnormally higher material expenses are less likely to engage in LTAV, whereas LMFs with higher return on assets and with a greater proportion of inventory are more likely to engage in such a practice and vice versa. Our results are robust to a variety of estimation methodologies. Our study contributes to the academic literature in several ways. First of all, it is the first to examine LTAV based on financial statement information and the factors that may influence its practice at firm level. In particular, it adopts two new LTAV measures that may enhance further research on its effectiveness in other contexts and for other types of firm. Moreover, these measures can be added to the other direct and indirect methods commonly employed to measure UDW. More importantly, their ability to infer the presence of UDW can contribute to protecting employees against illegal exploitation and to avoiding tax revenue loss and related issues of equity in the social security system. Furthermore, these measures can supplement

current compliance risk-assessment models used by tax authorities. On the other hand, our study examines LMFs that may particularly interest the scientific community due to their singularities. Indeed, they are socially irresponsible by nature and are private firms with incentives, *modus operandi* and legal financial statement formats that differ from those of public listed companies. Finally, our research allows inferring conclusions on the relation between CSR and LTAV, suggesting that socially irresponsible firms, such as LMFs, tend to engage more in such a practice.

These findings, however, are subject to several limitations. We cannot reject the possibility of a bias in the selection of our sample of LMFs considering that undetected LMFs are unobservable and smaller LMFs, unavailable on AIDA, are excluded. Furthermore, there could be selection biases in LMFs pursued and confiscated by Italian authorities. Our measures of LTAV, based on ABSOCs, greatly depend on the reliability of reported sales revenue and material consumption figures. The likely manipulation of these figures and the consequent endogeneity in the calculation models may affect the correct interpretation of our measures, although the consistent results of estimations within a matched sample may partially relieve this concern.

We propose several opportunities for future research. Our measures could be applied to other types of firm that are expected to engage in LTAV in order to gain further insight into their measurement ability. Furthermore, alternative models could be tested in order to improve the predictive power of normal SOCs regressions and produce more accurate LTAV measures. Finally, this study could be replicated in other countries, where organized crime is deeply rooted or UDW is a widespread practice, in order to determine whether its results are confirmed in a different cultural, legal and institutional context.

## 7 Appendix

### 7.1 Definition of variables of the base regression model (Eq. (4)):

$LTAV\_PROXY = ABSOC1, P\_ ABSOC1, N\_ ABSOC1, ABSOC2, P\_ ABSOC2$  or  $N\_ ABSOC2$ :

$ABSOC1$  = Abnormal SOCs equal to estimated residual from Eq. (1)

$P\_ ABSOC1$  = Positive  $ABSOC1$

$N\_ ABSOC1$  = Negative  $ABSOC1$

$ABSOC2$  = Abnormal SOCs equal to estimated residual from Eq. (2)

$P\_ ABSOC2$  = Positive  $ABSOC2$

$N\_ ABSOC2$  = Negative  $ABSOC2$

$CRIME1$  = Dummy variable taking value of 1 for LMFs before confiscation and 0 otherwise

$CRIME2$  = Dummy variable taking value of 1 for LMFs after confiscation and 0 otherwise

$SIZE$  = Natural logarithm of total assets in thousands

$LEVLONG$  = Long-term debts divided by total assets

$CAPINT$  = Net property, plant and equipment and net intangible fixed assets divided by total assets

$INVTA$  = Inventory divided by total assets

$ROA$  = Income before tax divided by total assets

$GROWTH$  = (Total assets – lagged total assets)/ lagged total assets

$CH\_REC$  = (Receivables - lagged receivables)/ lagged total assets

$CH\_INV$  = (Inventory - lagged inventory)/lagged total assets

$ABMAT$  = Abnormal material expenses equal to residuals from Eq. (3)

$LNGDP$  = Natural logarithm of regional GDP per capita (source ISTAT)

$LOSS$  = Dummy variable that takes a value of 1 if the firm had two or more consecutive years of negative income including the current and 0 otherwise

$ETR$  = Current tax expense divided by income before tax

*INDSEC* = Dummy variables representing industry defined by the two-digit SIC code

*YEAR* = Dummy variables representing the fiscal year

## 7.2 List of abbreviations:

ABSOCs: abnormal social contribution expenses

ANBSC: Agenzia Nazionale Beni Sequestrati e Confiscati

CFO: cash flow from operations

CSR: corporate social responsibility

ETR: effective tax rate

FTE: full-time employed

ISTAT: Italian Statistical Institute

ITAV: income tax avoidance

LA: legal administration

LMF: legally registered Mafia firm

LTAV: labor tax avoidance

LWF: lawful firm

NSOCs: normal social contribution expenses

SRL: Società a responsabilità limitata

SOCs: social contribution expenses

TAV: tax avoidance

UDW: undeclared work

VAT: value added tax

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**Table 1: Sample selection**

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	<b>Number of firms</b>
<b>LMFs sample</b>	
LMFs definitively confiscated at November 5th 2012 provided by ANBSC	1,663
Less: LMFs provided by ANBSC with data unavailable on AIDA database	-1,609
Add: LMFs found on AIDA database with status confiscated	118
Add: confiscated LMFs found in online newspapers with data available in AIDA	52
<b>Final LMFs sample</b>	<b>224</b>
<b>LMFs year observations in base regression model (ABSOC1)</b>	<b>1,046</b>
<b>LWFs control sample</b>	
Aida population of active and unlisted firms with available financial data from 2003 to 2012 in the same two-digit SIC industries as LMFs	<b>78,340</b>
<b>LWFs year observations in base regression model (ABSOC1)</b>	<b>587,555</b>

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Source: ANBSC and AIDA database, 2013.

**Table 2: Industry distribution of LMFs and AIDA population of active unlisted firms with available financial data from 2003 to 2012 restricted to LMFs industries (LWFs)**

Sic code	Industry description	AIDA population		LMFs	
		Freq.	Percent	Freq.	Percent
01	Agricultural production-crops	644	0.82%	4	1.79%
14	Mining and quarrying of nonmetallic minerals, except fuels	463	0.59%	9	4.02%
15	Building construction-general contractors and operative builders	5,486	7.00%	41	18.30%
16	Heavy construction other than building construction-contractors	524	0.67%	3	1.34%
17	Construction-special trade contractors	4,032	5.15%	8	3.57%
20	Food and kindred products	3,224	4.12%	6	2.68%
25	Furniture and fixtures manufacturing	829	1.06%	3	1.34%
28	Chemicals and allied products manufacturing	1,598	2.04%	1	0.45%
29	Petroleum refining and related industries	158	0.20%	2	0.89%
32	Stone, clay, glass and concrete products manufacturing	1,960	2.50%	13	5.80%
34	Fabricated metal products, except machinery and transportation equipment	7,038	8.98%	2	0.89%
42	Motor freight transportation and warehousing	2,894	3.69%	18	8.04%
44	Water transportation	586	0.75%	1	0.45%
45	Transportation by air	95	0.12%	1	0.45%
47	Transportation services	1,884	2.40%	3	1.34%
49	Electric, gas and sanitary services	1,419	1.81%	7	3.13%
50	Wholesale trade, durable goods	14,064	17.95%	23	10.27%
51	Wholesale trade, nondurable goods wholesale dealing in	7,821	9.98%	19	8.48%
52	Building materials, hardware, garden supply, and mobile home dealers wholesale dealing in	1,018	1.30%	1	0.45%
53	General merchandise stores	324	0.41%	1	0.45%
54	Food stores	1,737	2.22%	16	7.14%
55	Automotive dealers and gasoline service stations	536	0.68%	4	1.79%
56	Apparel and accessory stores	1,920	2.45%	3	1.34%
57	Home furniture, furnishings, and equipment stores	872	1.11%	1	0.45%
58	Eating and drinking places	1,007	1.29%	2	0.89%
59	Miscellaneous retail	1,475	1.88%	1	0.45%
65	Real estate	2,239	2.86%	7	3.13%
70	Hotels, rooming houses, camps, and other lodging places	1,600	2.04%	3	1.34%
72	Personal services	327	0.42%	1	0.45%
73	Business services	5,001	6.38%	2	0.89%
75	Automotive repair, services, and parking	882	1.13%	1	0.45%
79	Amusement and recreation services	744	0.95%	5	2.23%
80	Health services	1,165	1.49%	9	4.02%
81	Legal services	19	0.02%	1	0.45%
87	Engineering, accounting, research, management, and related services	2,755	3.52%	2	0.89%
<b>Total</b>		<b>78,340</b>	<b>100.00%</b>	<b>224</b>	<b>100.00%</b>

Source: AIDA database, 2013.

**Table 3: LMFs by Italian region and Mafia organization**

<b>Italian Region</b>	<b>Number of LMFs</b>	<b>Percentage of LMFs</b>	<b>Mafia organization with major presence in the region*</b>
<b>Sicily</b>	114	50.89%	Cosa Nostra
<b>Calabria</b>	61	27.23%	Ndrangheta
<b>Campania</b>	20	8.93%	Camorra
<b>Lazio</b>	13	5.80%	Camorra
<b>Apulia</b>	6	2.68%	Sacra Corona Unita
<b>Lombardy</b>	4	1.79%	Ndrangheta
<b>Abruzzo</b>	3	1.34%	Camorra
<b>Piedmont</b>	2	0.89%	Ndrangheta
<b>Emilia-Romagna</b>	1	0.45%	Ndrangheta
<b>Total</b>	<b>224</b>	<b>100.00%</b>	

\*Source: Transcrime (2013)

**Table 4: LMFs by confiscation year**

<b>Confiscation year</b>	<b>Number of confiscated LMFs</b>	<b>Percentage</b>
1994	3	1.33%
1995	1	0.44%
1996	1	0.44%
1997	1	0.44%
1998	2	0.89%
1999	1	0.44%
2000	2	0.89%
2001	3	1.33%
2002	2	0.89%
2004	10	4.45%
2005	1	0.45%
2006	9	4.01%
2007	18	8.03%
2008	24	10.71%
2009	19	8.48%
2010	24	10.72%
2011	35	15.64%
2012	37	16.54%
2013	31	13.87%
<b>Total</b>	<b>224</b>	<b>100.00%</b>

Source: ANBSC and AIDA database, 2013.

**Table 5: Estimation of normal contribution expenses based on net sales (Eq. (1))**

SIC code	$1/TA_{t-1}$	$S_t/TA_{t-1}$	$\Delta S_t / TA_{t-1}$	$\Delta S_{t-1}/TA_{t-1}$	Intercept	Mean obs.	Mean R <sup>2</sup>	F
01	8.418 ***	0.005 ***	0.000	0.001	0.011 ***	607	0.148	85.98 ***
14	25.943 ***	0.046 ***	-0.020 ***	-0.008 **	0.001	433	0.411	6,633.16 ***
15	19.421 ***	0.042 ***	-0.020 ***	-0.008 ***	0.000	5,126	0.514	515.56 ***
16	26.731 ***	0.036 ***	-0.018 ***	-0.009 ***	0.013 ***	493	0.407	205.29 ***
17	20.167 ***	0.031 ***	-0.015 ***	-0.006 ***	0.016 ***	3,831	0.309	857.85 ***
20	17.820 ***	0.014 ***	-0.008 **	-0.004	0.008 ***	3,044	0.252	698.80 ***
25	18.197 ***	0.023 ***	-0.013 ***	-0.003	0.016 ***	792	0.266	264.00 ***
28	13.535 ***	0.019 ***	-0.006 **	-0.008 **	0.013 ***	1,530	0.208	504.91 ***
29	10.271 ***	0.002 *	-0.002	-0.005	0.024 ***	146	0.110	62.23 ***
32	19.707 ***	0.033 ***	-0.019 ***	-0.009 ***	0.007 ***	1,854	0.327	289.15 ***
34	25.501 ***	0.033 ***	-0.017 ***	-0.011 ***	0.013 ***	6,764	0.320	1,725.95 ***
42	20.410 ***	0.010 ***	0.006 *	0.005	0.037 ***	2,521	0.133	307.93 ***
44	17.561 ***	0.055 ***	-0.032 **	0.012	0.039 ***	547	0.362	192.15 ***
45	-10.381	0.029 ***	-0.011	-0.027	0.043 ***	87	0.194	25.38 ***
47	9.587 ***	0.004 ***	0.002 ***	-0.001	0.036 ***	1,788	0.091	445.47 ***
49	29.173 ***	0.011 ***	-0.005	-0.007	0.023 ***	1,335	0.166	74.50 ***
50	9.816 ***	0.003 ***	0.000	-0.003 ***	0.020 ***	13,326	0.070	78.37 ***
51	6.568 ***	0.005 ***	-0.002 *	-0.002 **	0.014 ***	7,380	0.101	454.47 ***
52	0.585	0.016 ***	-0.008 ***	-0.007 ***	0.007 ***	958	0.219	454.13 ***
53	5.399 ***	0.011 ***	0.004 **	0.002	0.014 ***	304	0.250	219.45 ***
54	3.473 ***	0.018 ***	-0.001	-0.006 **	0.008 ***	1,627	0.414	1,020.19 ***
55	2.863 ***	0.008 ***	-0.002	-0.003 ***	0.005 ***	493	0.292	909.01 ***
56	-1.758 **	0.026 ***	-0.010 ***	-0.012 ***	0.002 **	1,493	0.458	967.60 ***
57	-1.305 ***	0.015 ***	-0.007 **	-0.005 **	0.013 ***	825	0.239	500.01 ***
58	13.618 ***	0.038 ***	-0.011 **	-0.002	0.027 ***	951	0.540	2,183.82 ***
59	2.721 ***	0.013 ***	-0.003	-0.004 **	0.019 ***	1,389	0.175	489.44 ***
65	1.483 ***	0.027 ***	-0.011 ***	-0.003 *	0.001 ***	2,100	0.358	308.92 ***
70	7.743 ***	0.051 ***	-0.023 ***	-0.016 ***	0.007 ***	1,510	0.747	885.82 ***
72	4.468 *	0.049 ***	-0.012	0.007	0.021 ***	307	0.383	351.60 ***
73	6.547 ***	0.032 ***	-0.005 **	0.006	0.043 ***	4,721	0.145	764.51 ***
75	28.460 ***	0.003 ***	0.004 *	0.002	0.029 ***	835	0.236	103.60 ***
79	21.286 ***	0.011 ***	0.004	0.000	0.034 ***	702	0.175	99.62 ***
80	-11.218 ***	0.048 ***	-0.016 **	-0.014 **	0.020 ***	1,084	0.357	2,397.74 ***
81	26.109 ***	0.030 ***	0.006	-0.003	0.009 *	18	0.654	174.87 ***
87	15.451 ***	0.017 ***	-0.003	0.000	0.039 ***	2,598	0.122	89.81 ***

Notes: \*, \*\* and \*\*\* denote significance levels at 10%, 5% and 1%, respectively, based on a two-tailed test. The coefficients and R<sup>2</sup>, reported by two-digit SIC code, are the mean values of coefficients and R<sup>2</sup> of cross-sectional estimations across 280 industry-years.



**Table 6: Estimation of normal contribution expenses based on material consumption (Eq. (2))**

SIC code	1/TA <sub>t-1</sub>	CONSUM <sub>t</sub> /TA <sub>t-1</sub>	ΔCONSUM <sub>t</sub> /TA <sub>t-1</sub>	ΔCONSUM <sub>t-1</sub> /TA <sub>t-1</sub>	Intercept	Mean obs.	Mean R <sup>2</sup>	F
01	14.932 ***	-0.002 **	0.002	0.001	0.014 ***	608	0.123	182.74 ***
14	53.923 ***	0.011 ***	0.003	0.003	0.023 ***	433	0.232	330.67 ***
15	45.565 ***	0.023 ***	-0.012 ***	-0.002	0.016 ***	5,124	0.327	350.79 ***
16	44.324 ***	0.018 ***	0.007	-0.001	0.035 ***	493	0.264	88.11 ***
17	38.200 ***	-0.009 ***	0.021 ***	0.005 *	0.047 ***	3,831	0.214	155.48 ***
20	26.727 ***	0.001 *	0.001	0.001	0.021 ***	3,043	0.165	86.21 ***
25	29.625 ***	0.000	0.006	0.002	0.039 ***	792	0.178	137.19 ***
28	20.501 ***	-0.001	0.011 ***	-0.003	0.033 ***	1,530	0.100	219.33 ***
29	11.299 ***	-0.002 **	0.002	-0.002	0.027 ***	146	0.103	19.76 ***
32	39.203 ***	-0.007 ***	0.011 **	0.001	0.035 ***	1,854	0.196	147.16 ***
34	40.858 ***	-0.017 ***	0.026 ***	0.004	0.051 ***	6,764	0.233	229.02 ***
42	27.222 ***	-0.005 ***	0.030 ***	0.019 ***	0.050 ***	2,521	0.108	465.43 ***
44	63.382 ***	-0.042 ***	0.020	0.043 **	0.101 ***	547	0.191	146.65 ***
45	8.922	-0.002	0.032	-0.002	0.068 ***	87	0.063	2.06
47	13.334 ***	-0.003 ***	0.006 *	0.002	0.043 ***	1,787	0.080	306.63 ***
49	36.262 ***	-0.009 ***	0.013 ***	0.004 *	0.036 ***	1,334	0.145	423.82 ***
50	11.609 ***	-0.002 ***	0.003 ***	-0.002 **	0.027 ***	13,325	0.067	147.22 ***
51	9.717 ***	0.000 ***	0.000	-0.003 *	0.021 ***	7,379	0.075	347.29 ***
52	5.749 ***	0.008 ***	-0.004 *	-0.006 ***	0.018 ***	957	0.086	74.21 ***
53	8.534 ***	0.007 ***	0.008 **	0.003	0.022 ***	304	0.151	356.49 ***
54	6.703 ***	0.018 ***	-0.001	-0.006 *	0.016 ***	1,628	0.325	373.81 ***
55	5.053 ***	0.007 ***	-0.001	-0.003 ***	0.008 ***	493	0.241	330.06 ***
56	3.781 **	0.024 ***	-0.010 ***	-0.012 ***	0.013 ***	1,493	0.258	246.01 ***
57	2.561 ***	0.011 ***	-0.006 *	-0.006 *	0.022 ***	825	0.104	68.02 ***
58	37.917 ***	0.012 ***	0.007	0.008	0.062 ***	951	0.326	700.32 ***
59	10.826 ***	0.002 **	0.003	-0.003	0.032 ***	1,388	0.074	81.81 ***
65	23.431 ***	0.012 ***	-0.009 **	0.002	0.007 ***	2,099	0.175	142.26 ***
70	51.250 ***	0.047 ***	-0.017	-0.006	0.020 ***	1,510	0.541	216.69 ***
72	39.838 ***	-0.019 ***	0.027 **	0.009	0.068 ***	307	0.208	74.26 ***
73	26.983 ***	-0.029 ***	0.032 ***	0.015 ***	0.082 ***	4,719	0.076	1,877.84 ***
75	30.539 ***	-0.005 ***	0.007 ***	0.002	0.038 ***	835	0.243	152.77 ***
79	32.457 ***	-0.010 **	0.028 ***	0.022 **	0.042 ***	702	0.153	412.59 ***
80	22.959 ***	0.026 ***	0.020	0.001	0.050 ***	1,085	0.139	120.60 ***
81	25.773 ***	1.841 ***	-0.632	-0.012	0.045 ***	18	0.487	92.84 ***
87	28.266 ***	-0.022 ***	0.024 ***	0.005	0.057 ***	2,596	0.107	339.34 ***

Notes: \*, \*\* and \*\*\* denote significance levels at 10%, 5% and 1%, respectively, based on a two-tailed test. The coefficients and R<sup>2</sup>, reported by two-digit SIC code, are the mean values of coefficients and R<sup>2</sup> of cross-sectional estimations across 280 industry-years.

**Table 7: Time series of LTAV measures in LMFs around confiscation year = 0**

Year	ABSOC1			ABSOC2		
	Median	Test	$\Delta\%$ Median	Median	Test	$\Delta\%$ Median
-5	-0,0135	**		-0,0189	***	
-4	-0,0117	***	13,21%	-0,0177	***	6,31%
-3	-0,0113	***	3,90%	-0,0154	***	12,56%
-2	-0,0109	***	3,04%	-0,0166	***	-7,19%
-1	-0,0128	***	-17,15%	-0,0161	***	2,89%
0	-0,0094	***	26,35%	-0,0132	***	17,78%
1	-0,0050	***	46,97%	-0,0107	***	19,35%
2	-0,0051		-1,55%	-0,0105	***	1,14%

Notes: \*, \*\* and \*\*\* denote significance levels at 10%, 5% and 1%, respectively, based on a two-tailed Wilcoxon signed-rank test for the difference of median from zero.  $\Delta\%$ Median represents the percentage change of median relative to previous period.

**Table 8: Descriptive statistics and variable comparison between LMFs and LWFs**

Variable	LMFs before confisc.		LMFs after confisc.		LWFs		LMFs before confisc. - LWFs		LMFs after confisc. - LWFs	
	N	Median	N	Median	N	Median	Difference	Test	Difference	Test
<b>ABSOC1</b>	616	-0.0117	490	-0.0052	659,094	-0.0047	-0.0070	***	-0.0005	
<b>P_ABSOC1</b>	172	0.0196	182	0.0130	267,636	0.0182	0.0014		-0.0052	**
<b>N_ABSOC1</b>	444	-0.0180	308	-0.0141	391,458	-0.0155	-0.0025	***	0.0015	**
<b>ABSOC2</b>	616	-0.0161	490	-0.0105	659,016	-0.0067	-0.0094	***	-0.0038	***
<b>P_ABSOC2</b>	153	0.0205	160	0.0165	259,845	0.0206	-0.0002		-0.0041	
<b>N_ABSOC2</b>	463	-0.0231	330	-0.0178	399,171	-0.0176	-0.0055	***	-0.0003	
<b>SIZE</b>	967	7.9444	553	8.2300	753,484	7.8023	0.1421		0.4277	***
<b>LEVLONG</b>	967	0.0238	553	0.0643	753,480	0.0296	-0.0058		0.0347	***
<b>CAPINT</b>	967	0.1621	553	0.1874	753,400	0.1514	0.0107		0.0360	*
<b>INVTA</b>	967	0.0540	553	0.0885	753,457	0.1157	-0.0617	***	-0.0272	
<b>ROA</b>	967	0.0220	553	0.0113	753,371	0.0276	-0.0055	***	-0.0163	***
<b>GROWTH</b>	750	0.1089	517	0.0043	671,352	0.0371	0.0718	***	-0.0328	***
<b>CH_REC</b>	698	0.0261	490	0.0048	599,106	0.0028	0.0233	***	0.0019	
<b>CH_INV</b>	750	0.0002	517	0.0000	671,298	0.0000	0.0002	***	0.0000	
<b>ABMAT</b>	622	0.0599	490	0.0529	661,717	-0.0037	0.0636	***	0.0567	***
<b>LNGDP</b>	1436	9.7159	804	9.7307	777,380	10.2886	-0.5728	***	-0.5580	***
<b>ETR</b>	966	0.4229	553	0.3340	751,630	0.5153	-0.0924	***	-0.1813	***
<b>%LOSS</b>	3.90%		15.05%		6.34%		-2.44%	***	8.71%	***

Notes: The sample full period spans 2003–2012. \*, \*\* and \*\*\* denote significance levels at 10%, 5% and 1%, respectively, based on a two-tailed Mann–Whitney–Wilcoxon test for the differences in medians of continuous variables. Pearson chi-squared test of independence for categorical variable %LOSS = % of firms with two or more consecutive years of negative income. See Appendix for variable definition.

**Table 9: Heteroskedastic panels corrected standard errors linear regression of LTAV measures**

Variable	Exp. Sign	ABSOC1		P_ABSOC1		N_ABSOC1		ABSOC2		P_ABSOC2		N_ABSOC2	
		Coef.	p-value	Coef.	p-value	Coef.	p-value	Coef.	p-value	Coef.	p-value	Coef.	p-value
<b>CRIME1 (Hypothesis H1)</b>	–	-0.0045	0.0040	0.0009	0.7440	-0.0043	0.0000	-0.0081	0.0000	-0.0024	0.4060	-0.0074	0.0000
<b>CRIME2 (Hypothesis H2)</b>	?	0.0010	0.5490	0.0070	0.0030	-0.0017	0.0850	0.0011	0.5790	0.0079	0.0110	-0.0036	0.0000
<b>SIZE</b>	?	-0.0012	0.0000	-0.0054	0.0000	0.0036	0.0000	-0.0007	0.0000	-0.0050	0.0000	0.0037	0.0000
<b>LEVLONG</b>	–	-0.0138	0.0000	-0.0150	0.0000	0.0027	0.0000	-0.0264	0.0000	-0.0201	0.0000	-0.0046	0.0000
<b>CAPINT</b>	+	0.0076	0.0000	-0.0131	0.0000	0.0154	0.0000	-0.0077	0.0000	-0.0151	0.0000	0.0043	0.0000
<b>INVTA</b>	–	0.0018	0.0000	-0.0139	0.0000	0.0123	0.0000	-0.0067	0.0000	-0.0141	0.0000	0.0050	0.0000
<b>ROA</b>	–	-0.0236	0.0000	-0.0247	0.0000	-0.0046	0.0000	-0.0082	0.0000	-0.0172	0.0000	0.0013	0.0070
<b>GROWTH</b>	+	0.0010	0.0000	0.0142	0.0000	-0.0100	0.0000	0.0087	0.0000	0.0180	0.0000	-0.0067	0.0000
<b>CH_REC</b>	+	0.0028	0.0000	0.0029	0.0000	-0.0004	0.0550	0.0043	0.0000	0.0030	0.0000	0.0009	0.0000
<b>CH_INV</b>	+	0.0439	0.0000	0.0382	0.0000	0.0112	0.0000	0.0309	0.0000	0.0358	0.0000	0.0015	0.0000
<b>ABMAT</b>	–	-0.0494	0.0000	-0.0498	0.0000	-0.0105	0.0000	-0.0457	0.0000	-0.0453	0.0000	-0.0051	0.0000
<b>LNGDP</b>	+	-0.0007	0.0010	-0.0013	0.0000	-0.0017	0.0000	0.0046	0.0000	-0.0007	0.0730	0.0011	0.0000
<b>LOSS</b>	?	0.0047	0.0000	0.0036	0.0000	0.0004	0.0000	0.0037	0.0000	0.0045	0.0000	-0.0008	0.0000
<b>ETR</b>	+	0.0012	0.0000	0.0006	0.0000	0.0002	0.0000	0.0014	0.0000	0.0008	0.0000	0.0004	0.0000
<b>INDSEC dummies</b>	?	Yes		Yes		Yes		Yes		Yes		Yes	
<b>YEAR dummies</b>	?	Yes		Yes		Yes		Yes		Yes		Yes	
<b>Intercept</b>	?	0.0146	0.0000	0.0907	0.0000	-0.0411	0.0000	-0.0361	0.0000	0.0880	0.0000	-0.0693	0.0000
<b>Number of observations</b>		588,601		238,731		349,870		588,547		232,429		356,118	
<b>R-squared</b>		0.1397		0.3601		0.3880		0.1283		0.3388		0.3882	
<b>Wald chi2</b>		53,736	0.0000	74,381	0.0000	133,577	0.0000	50,992	0.0000	70,125	0.0000	137,146	0.0000

Notes: The p-values are two-tailed. See Appendix for variable definition.

**Table 10: Two dimensional cluster corrected standard errors regression of unadjusted social contribution expenses**

<b>Variable</b>	<b>Exp. Sign</b>	<b>Coef.</b>	<b>p-value</b>
<b>CRIME1 (Hypothesis H1)</b>	–	-0.0061	0.0340
<b>CRIME2 (Hypothesis H2)</b>	?	-0.0004	0.9050
<b>1/TA<sub>t-1</sub></b>	?	13.9642	0.0000
<b>S<sub>t</sub>/TA<sub>t-1</sub></b>	+	0.0111	0.0000
<b>ΔS<sub>t</sub> /TA<sub>t-1</sub></b>	?	-0.0029	0.0130
<b>ΔS<sub>t-1</sub>/TA<sub>t-1</sub></b>	?	-0.0011	0.2880
<b>LEVLONG</b>	–	-0.0239	0.0000
<b>CAPINT</b>	+	-0.0023	0.0840
<b>INVTA</b>	–	-0.0085	0.0000
<b>ROA</b>	–	-0.0149	0.0100
<b>GROWTH</b>	+	0.0042	0.0000
<b>CH_REC</b>	+	0.0025	0.0000
<b>CH_INV</b>	+	0.0389	0.0000
<b>ABMAT</b>	–	-0.0516	0.0000
<b>LNGDP</b>	+	0.0023	0.0010
<b>LOSS</b>	?	0.0043	0.0000
<b>ETR</b>	+	0.0015	0.0000
<b>INDSEC dummies</b>	?	Yes	
<b>YEAR dummies</b>	?	Yes	
<b>Intercept</b>	?	0.0082	0.2400
<b>Number of observations</b>		535,820	
<b>R-squared</b>		0.4131	
<b>Wald chi2</b>		13,925	0.0000

Notes: The p-values are two-tailed. See Appendix for variable definition.

**Table 11: Heteroskedastic panels corrected standard errors linear regression of LTAV measures within a matched sample**

Variable	Exp. Sign	ABSOC1		ABSOC2	
		Coef.	p-value	Coef.	p-value
<b>CRIME1 (Hypothesis H1)</b> <i>(base LAW1)</i>	–	-0.0054	0.0070	-0.0074	0.0010
<b>CRIME2 (Hypothesis H2)</b> <i>(base LAW2)</i>	?	0.0013	0.5390	0.0021	0.3800
<b>SIZE</b>	?	-0.0015	0.0050	-0.0017	0.0020
<b>LEVLONG</b>	–	-0.0091	0.0020	-0.0184	0.0000
<b>CAPINT</b>	+	0.0044	0.1160	-0.0080	0.0070
<b>INVTA</b>	–	0.0007	0.8090	-0.0128	0.0000
<b>ROA</b>	–	-0.0412	0.0000	-0.0176	0.1030
<b>GROWTH</b>	+	0.0009	0.7840	0.0051	0.1280
<b>CH_REC</b>	+	0.0068	0.0990	0.0090	0.0410
<b>CH_INV</b>	+	0.0394	0.0000	0.0269	0.0010
<b>ABMAT</b>	–	-0.0388	0.0000	-0.0387	0.0000
<b>LNGDP</b>	+	0.0002	0.9260	0.0072	0.0090
<b>LOSS</b>	?	0.0019	0.2740	0.0014	0.4740
<b>ETR</b>	+	0.0004	0.4990	0.0009	0.0970
<b>INDSEC dummies</b>	?	Yes		Yes	
<b>YEAR dummies</b>	?	Yes		Yes	
<b>Intercept</b> <i>(base LAW1)</i>	?	0.0086	0.7520	-0.0539	0.0660
<b>Intercept</b> <i>(base LAW2)</i>	?	0.0101	0.7130	-0.0522	0.0770
<b>Number of observations</b>		4,044		4,044	
<b>R-squared</b>		0.1382		0.1448	
<b>Wald chi2</b>		364.61	0.0000	416.92	0.0000

Notes: The p-values are two-tailed. LAW1: dummy variable taking value of 1 for LWFs observations matched to LMFs pre-confiscation firm-years and 0 otherwise; LAW2: dummy variable taking value of 1 for LWFs observations matched to LMFs post-confiscation firm-years and 0 otherwise. See Appendix for the other variable definition.

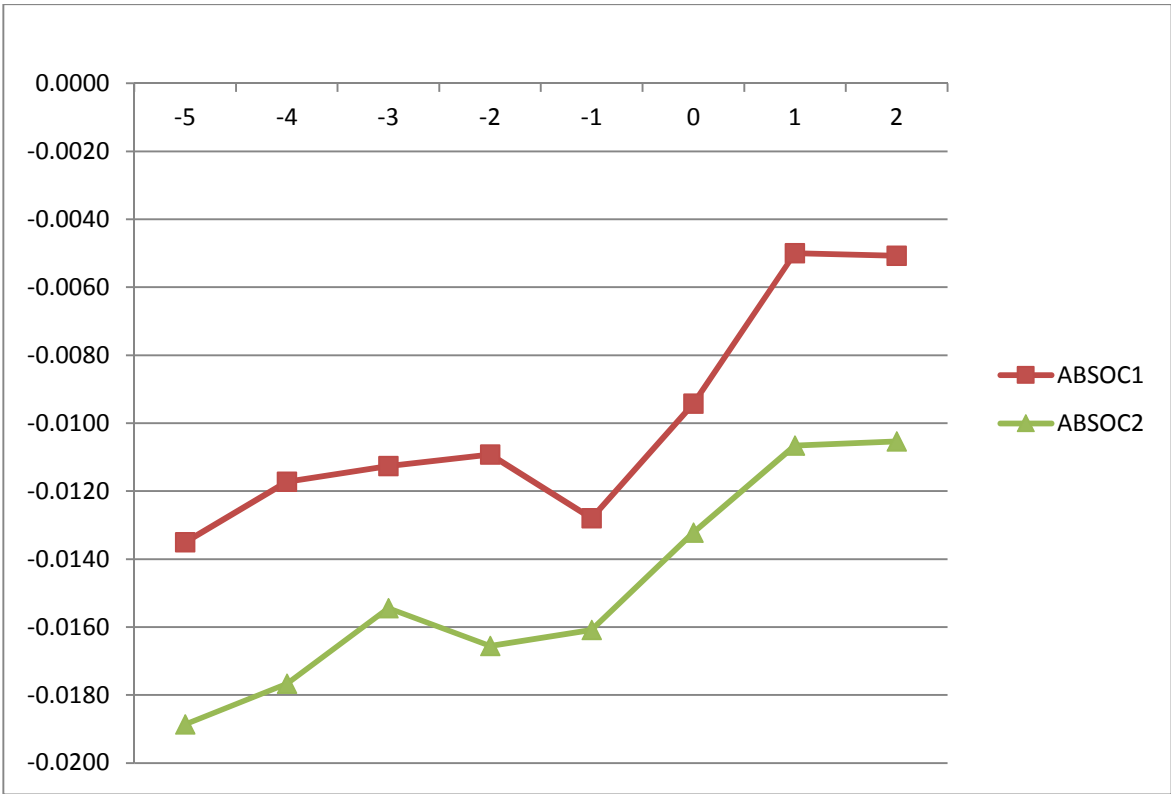


Fig.1 Time series of LTAV measures in LMFs around confiscation year = 0