BANCA D'ITALIA
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Questioni di Economia e Finanza

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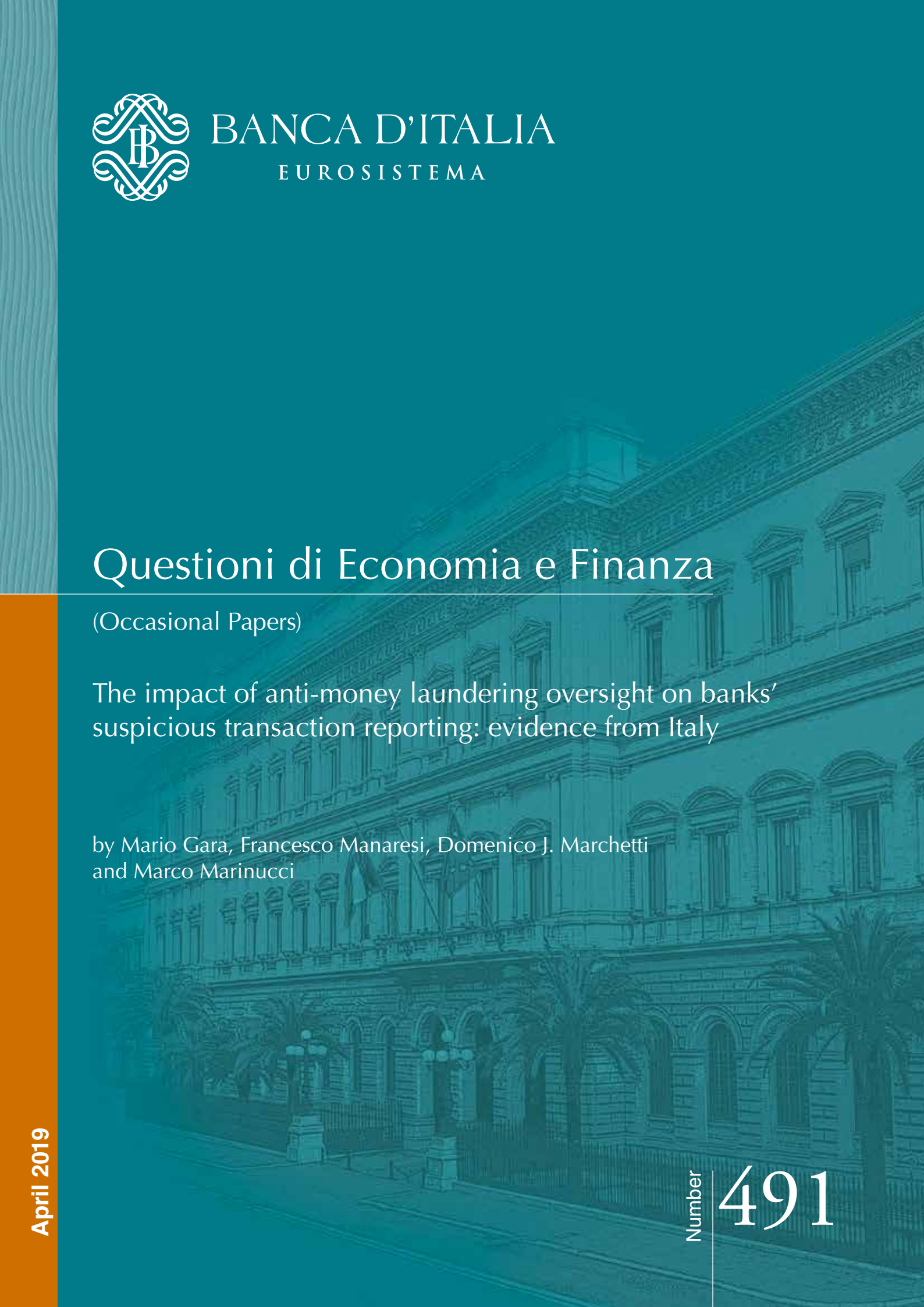
by Mario Gara, Francesco Manaresi, Domenico J. Marchetti and Marco Marinucci



April 2019

Number 491

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The series is available online at www.bancaditalia.it .

ISSN 1972-6627 (print)
ISSN 1972-6643 (online)

Printed by the Printing and Publishing Division of the Bank of Italy

THE IMPACT OF ANTI-MONEY LAUNDERING OVERSIGHT ON BANKS' SUSPICIOUS TRANSACTION REPORTING: EVIDENCE FROM ITALY

by Mario Gara♯, Francesco Manaresi*, Domenico J. Marchetti♯, and Marco Marinucci*

Abstract

We provide the first thorough investigation of the effect of anti-money laundering inspections on banks' reporting of suspicious transactions. We do so by using highly detailed data from the Bank of Italy and the UIF (the Italian anti-money laundering authority), which include information on i) on-site inspections by authorities and follow-up actions, and ii) the quantity and quality of suspicious transactions reports being filed by banks before and after inspections. Through a difference-in-differences econometric analysis we find that inspections (notably when followed by some type of intervention by the authority) lead to, other things being equal, an increase in the suspicious transaction reports filed by banks. Crucially, the effect is not limited to low-quality reports, as feared in the literature ('crying wolf' effect) but has spread to high-quality reports too. Authorities' oversight is thus shown to increase the quantity of information shared by banks without reducing its quality.

JEL Classification: G28, K23, L51, M21.
Keywords: money laundering, financial regulation, economic crime, banking.

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1 Introduction

Money laundering has increasingly become one of the most dangerous threats to the proper functioning of modern economic and financial systems over the last twenty years.[1] Most recently, the financing of terrorism has added a further dramatic dimension to the implications (and relevance) of money laundering for economic and national security. As a consequence, fighting money laundering has quickly reached the top of policy makers' agendas world-wide.[2]

In spite of its relevance, the effectiveness and efficiency of anti-money laundering and counter terrorist financing (AML/CTF henceforth) regulations and systems have received almost no attention from the economic literature.[3]

The core of any AML/CTF system is the requirement for banks to identify and report suspicious transactions made by their customers, thus triggering investigative action when appropriate. Banks are threatened with fines and sanctions if they fail to do so. In this regard, the AML/CTF international standard setter, the Financial Action Task Force (or FATF), explicitly lists in its Recommendations the powers that should ensure an effective oversight: *"the authority to conduct inspections, [...] to compel production of any information from financial institutions, and [...] to impose a range of disciplinary and financial sanctions"* the latter having to be *"effective, proportionate and dissuasive"* (Recommendation 35; Financial Action Task Force [2012]).

In other words, the FATF suggests that sanctions and the bodies administering them should enhance intermediaries' performance and compliance in reporting suspicious activities. However, to the best of our knowledge, there is no contribution in the economic literature that attempts to verify whether this is the case. In this paper we try to answer this question: does the action of AML/CTF supervisory authorities affect the conduct of supervised entities? if so, with what results? Our work studies the impact of the activity of Italy's AML/CTF supervisory authorities (i.e., the Central Bank and the Financial Intelligence Unit, which is the central AML/CTF authority, typically known as FIU) on the compliance of obliged entities with respect to their obligation to report suspicious transactions. In particular, we develop an empirical strategy to identify the effect of regulators' on-site inspections

[1] According to the UNODC (United Nations Organization for Drug and Crime), the yearly amount of money laundering world-wide is estimated at 2-5 per cent of global GDP, or $800 billion - 2$ trillion in current US dollars. To this estimate one should add the (huge) cost for the economy associated with the crowding out of sane enterprises by illegal ones (through unfair competitive advantages).

[2] For example, "Combating terrorism financing and money laundering" was listed among the priorities of the G20 meeting held in Hamburg in July 2017.

[3] The most notable exception is Dalla Pellegrina and Masciandaro [2009] and Takats [2011].

on the number and quality of suspicious transaction reports (STRs) filed by obliged entities. We focus on the period 2012-2013, and we compare all the inspected intermediaries with those not inspected in the period of analysis (or immediately before).

Due account is given to the outcome of each inspection, whether it resulted in any measure being taken by the supervisors or none. Accordingly, it is possible to detect whether the mere circumstance of being inspected by the authorities triggered any adjustment in banks' compliance strategy or whether it only emerged following a disciplinary action.

The most salient outcomes of our work confirm that an inspection by supervisors has a positive effect both in extensive (the number of STRs filed by a bank) and intensive (the probability that an STR is filed) terms; such an effect is found to be driven by a disciplinary action of some sort taken pursuant to the inspection, so as to correct cases of non-compliance. Crucially, the increasing effect on STRs is not limited to low-quality reports (the "crying wolf" effect identified by the literature) but spreads to high-risk ones.

The paper is structured as follows. Section 2 provides an outline of the institutional setting of AML/CTF regulation, with a particular focus on Italy. In Section 3 we review the main literature in order to better define the research question as well as to point out our main contribution with respect to the previous work on this topic. Section 4 describes the datasets used, with the following section providing some descriptive statistics thereof. The work's empirical strategy is set out in Section 6 while Section 7 describes the main results obtained. In Section 8 some robustness checks are then developed, before Section 9's concluding remarks.

2 Institutional Setting

The scope of application of AML-CTF spans across different sectors and types of operators. Most importantly, the request to identify and report suspicious transactions concerns banks and all other financial intermediaries; however, it concerns also various types of professionals (e.g., lawyers, accountants, notaries) and non-financial operators (e.g., gaming undertakings of all kind, auction houses, dealers in antiquities and precious items). As a result the function of checking compliance of such a fragmented and inhomogeneous bunch of operators is entrusted to a wide array of bodies and institutions, more often than not even within the same financial sector.

Italy's AML-CTF regulatory framework fits in this picture. If only compliance checks on banks are taken into account (which is the realm of our analysis), there are two AML-CTF supervisory authorities in charge of carrying them out. The regulation assigns to the Bank of Italy the task of implementing AML-CTF compliance checks on all financial intermediaries

which it also oversees for prudential supervision purposes. Bank of Italy's power of oversight concerns the intermediaries' overall adherence to most AML-CTF obligations, including customers due diligence, the monitoring of transactions and the recording thereof, staff training and the overall internal system of anti-money laundering checks. As far as the reporting of suspicious transactions is concerned, it is the Unità di Informazione Finanziaria (or UIF, which is Italy's FIU) which is in charge of supervising the compliance of all reporting agents, including financial intermediaries of all species.

The supervisory action of the two authorities also differs in terms of level of the supervised entities it is targeted to. The Bank of Italy systematically carries out on-site inspections and off-site checks at both centralized and decentralized level, since banks' headquarters are subject to checks by the Bank's central supervisory department, whilst its regional offices perform oversight controls on the intermediaries' local branches. On the other hand, in its on-site inspections the UIF does occasionally target specific banks' branches, but its supervisory action mainly takes place at a centralized level.

Regardless of their respective scope of action, both supervisory authorities are mandatorily required by law to cooperate with each other, thus one systematically informs the other of findings emerging from its controls that may fall in the scope of action of the other.

Similarly to most other countries the Italian legislation ensures supervisors have the widest spectrum of instruments to discharge their functions, in the AML-CTF realm as in other respects. In its evaluation of Italy's AML-CTF system (FATF [2016]), the FATF describes all the possible tools that the Bank of Italy can make use of so as to ensure compliance by the financial intermediaries subject to its oversight. Such tools include the request of remedial actions (which can be variably formalized by letters, ad hoc meetings and follow-up inspections), pecuniary sanctions - graduated according to the banks' size and the seriousness of the violations - and the imposition of prudential measures (additional capital buffer, prohibition of certain type of transactions, restrictions on operations or branches). As for measures that may be adopted in case of breaches to AML-CTF obligations, with particular regard to the obligation to report suspicious transactions, any intermediary failing to report to the UIF a transaction that should have been reported can be issued a fine whose amount varies depending on the seriousness of the breach and whom it is put down to (the bank, its management or the employees), but it may also face criminal charges.

Pursuant to an on-site inspection, typically supervisors formally require the bank to justify any controversial issue emerging from the checks. On the basis of the results of this adversarial-like procedure, the process leading to the application of a penalty or the requirement of a remedial action is started. Referring in particular to a breach to the reporting obligation, should the inspectors detect any suspicious transaction that the bank failed

to report; at a first stage the bank is required to explain why a STR was not filed in the first place. Should the reasons provided to this end be deemed inadequate, the supervisory authorities propose that a penalty be applied – the final decision being taken by the authorities themselves or by other bodies (i.e., the Ministry of Finance and the Economy). In the context of this paper, we do not make distinction between the different actions taken by either supervisory authorities as a result of their checks, but only record if the inspection resulted in some action (varying from reprimand letters to the request of fully-fledged pecuniary sanctions), irrespective of the actual result thereof. We do so since we do not have enough data to test the effect of each type of action; however, our approach is consistent with the rationale that any formal initiative taken by supervisors is liable to trigger some kind of adjustment in the behaviour of the supervised banks.

3 Literature Review

Among the scholars interested in the financial sector supervisory architecture and in the management of the different tools available to authorities for discharging their functions, the question of what lever supervisory bodies should pull, and when, has long been the object of a debate also at a theoretical level. In this framework, with specific reference to AML-CTF obligation (and the reporting requirement in particular) our work attempts at measuring empirically the impact of supervisors' action on banks' level of compliance, both in quantitative and in qualitative terms.

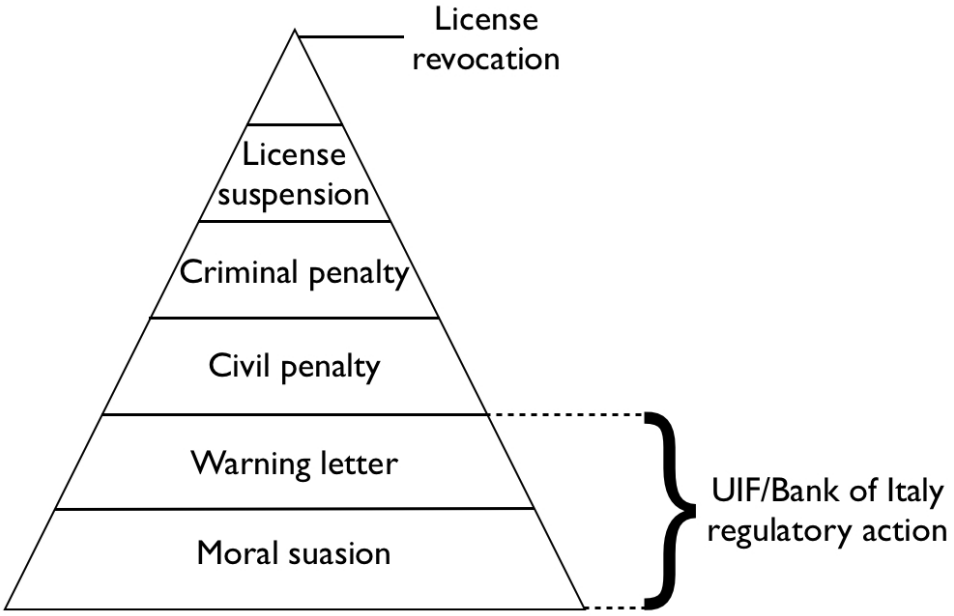
With reference to banks' prudential regulation, Ayres and Braithwaite [1992] introduce the diagram in Figure 1, to describe the multi-layered enforcement strategies authorities can adopt.[4]

At one extreme lies the case of *soft sanctions* and *moral suasion* (the bottom layer of the pyramid that Ayres and Braithwaite label "persuasion"), which are more consistent with a *risk-based approach*, whereby the stringency of rules and obligations is appropriately adjusted on account of the risk of money laundering and terrorism financing faced by each reporting agent. Moreover, in instances in which regulatory capture hazard is relevant, "*soft sanctions may be the only powers used to enforce compliance*" (Al-Rashdan [2012], p.489).

The oversight approaches placed at the top of the pyramid rely on a tougher stance on the side of regulators, who make extensive use of harsh sanctions. While this approach may be more consistent with a regulatory system which is built on a systematic cost-benefit analysis, enabling authorities to evaluate ex ante the implication of their actions, it also poses the

[4] Al-Rashdan [2012] applies this theoretical framework to the case of AML/CFT activities.

Figure 1: Possible enforcement strategies of a financial supervisory authority (adapted from Ayres and Braithwaite [1992]



risk that reporting agents only comply passively to AML-CTF obligations instead of providing a fully-fledged active cooperation, which is what AML-CTF regulation actually requires of them.[5] In the same strand of literature, some contributions analyse the impact of different enforcement strategies in different countries. Unger and van Waarden [2009] make a comparative analysis of the response observed in the Netherlands and the US pursuant to the introduction of a risk-based regulatory approach in place of the rule-based one previously in force. The improvement in the informative content of STRs that could be expected as a result of such shift was actually observed only in the Netherlands, whose supervisory authorities relies on "education of potential transgressors in enforcement compliance" as opposed to US's knack for "harsh sanctions over persuasion", which resulted only in an increase in the number of STRs filed by reporting agents. The econometric

[5]Eventually, the author advocates a regulatory stance that should be tailored on a case-by-case approach, the underlying rationale being that "the reporting entities differ in size, history, type of work and culture": as regulators of financial entities, AML-CTF compliance supervisors cannot shy away from taking into account the systemic implications of their actions, such as those, for instance, emerging from the revocation of the license of seriously non-compliant systemically-relevant intermediaries, which, conversely, may be appropriate for small-sized offenders. Our work tries to provide some insight in this respect, by gauging whether different intermediaries (in terms of size and market quota) react in different fashion to the same supervisors' regulatory action.

model we estimate attempts to account for such a diverse impact of oversight, by measuring it in both quantitative (number of STRs filed to the UIF) and qualitative (relevance of the STRs filed) terms.

This leads us to those studies trying to develop a theoretical framework demonstrating the differential implications of various enforcement strategies, the foremost of which is Takàts' [2011] seminal work. The work's set up is a principal-agent framework with two players, i.e. the government and a reporting bank. An excessively high level of fines established by the former to punish an inadequate amount of effort by the latter could result in the so called 'crying wolf syndrome', producing a report overload, in turn diluting the informational significance of all STRs. In this framework, it may be desirable that banks are required to pay a fee for reporting, so as to force them to internalise the cost of creating additional noise in the system.

A similar extended framework is presented in Dalla Pellegrina and Masciandaro [2009], who introduce an additional player, a supervisory authority, which both assesses banks' reporting effort and gauges the level of complexity of money laundering schemes. Thus, asymmetric information distortions are mitigated and, as a result, the optimal level of fines are lower. Far from replicating the extremely detailed setting of both studies, our work may provide answers to the issues either raises. On the one hand, should our model envisage that the enforcement action of supervisory authorities result merely in an increase in the number of low-quality STRs, then Takàts's scenario would be empirically validated. On the other hand, should an improvement in STRs' informative content be observed in our estimates alongside the mere rise of their number (or even in the absence thereof), then the picture would fit more closely that of Dalla Pellegrina and Masciandaro. Yet, fines and penalties are far from being the main tools in the hand of supervisors.

A cooperative approach (typically referred to as "moral suasion") is by some held to be the best stance authorities could adopt so as to enhance compliance. Indeed, Pok, Omar and Sathye [2014] show that, with reference to the Malaysian AML-CTF system, programs of awareness-raising or the mere provision of evidence on the effectiveness of the reporting system can actually do the trick. As a matter of fact, this is what banks themselves seem to require most in their struggle to make ends meet , that is, to render their AML-CTF monitoring system cost-compatible, as shown in KPMG [2014]: most reporting agents would welcome a stronger relationship with their regulators, in the form, for instance, of additional guidance. In their turns, though, it is acknowledged that "financial institutions need to adopt a more pro-active approach to avoid being subject to regulatory fines and sanctions".

The area that banks indicate as the least cost-effective is the one associated to transaction monitoring, which is essential for an adequate level of compliance in terms of suspicious transaction reporting. Nonetheless, in the face of ever-increasing costs, no proper assessment of the potential yields

the investment in AML-CTF checks could produce is actually done even by senior management, so that the best pressure regulators could exert on board members is through pecuniary penalties. As claimed by Stellin [2016], that would require primarily a change of attitude on the side of banks and intermediaries, that should strive to view their AML-CTF assignments more as a risk-management tool than as a burdensome regulatory requirement. In conclusion, as long as reporting agents fail to grow a deeper awareness in this regard and kick old habits, supervisors may be forced to use their stick-wielding arm rather than handing out carrots so as to induce a higher reporting effort by banks.

In this respect, the regulatory framework clearly plays a fundamental role, since the sanctions it envisages for each different type of infringement need be "effective, proportionate and dissuasive" (in FATF's Recommendation 35 own words) and, we would add, trigger the right incentives. The debate over this issue is widespread and dates back several years.[6]

Our work, far from providing insight with respect to all the issues that have been described, attempts at estimating the impact of regulators' enforcement tools on the effort banks exert in complying with the suspicious transaction reporting obligation with reference to the Italian context. As the brief literature review that has preceeded should have clearly borne out, this is a highly relevant issue for all stakeholders, spanning from policy-makers (who need to outline the appropriate legal framework for sanctions) and supervisory authorities (who have to apply it appropriately) to reporting agents (who have to strike the right balance between risks and costs).

The current literature on the matter seems to offer little beyond the compilation of pros and cons of single country's regulation or the comparative analysis of different national regulatory frameworks. By setting up an empirical analytical framework widely used for policy evaluation purposes, to the best of our knowledge, this study is the first that applies quantitative methods of analysis in order to assess to what extent banks' AML-CTF policies are sensitive to supervisors' action and, in case they are, whether the latter drives intermediaries' behaviour towards desirable outcomes.

The next section provides a more detailed account of the data being used in the analysis and some descriptive statistics thereof.

4 Data description

Our analysis is based on a unique dataset which collects detailed monthly information, for each bank operating in Italy, on the number of i) all transactions carried out and ii) STRs reported; these data are merged with in-

[6]See, among others, Costa[2008] for a clue over the Italian AML-CTF regulation in this respect.

formation on the occurrance and outcome of inspections made by the Bank of Italy and UIF. Data cover the period January 2012-December 2013. Information is merged from three distinct databases, which are detailed in the remainder of the Section.

The first source of information concerns STRs. In line with internationally shared standards (Financial Action Task Force [2012]), the Italian AML law[7] requires that banks, other financial intermediaries (fiduciary and assets management companies, securities firms and insurers) and some designated non-financial businesses and professions (e.g. lawyers) file to the FIU information concerning all the financial operations that they suspect to be revenues of a criminal activity. These STRs are then analysed by the FIU which informs law enforcement agencies on potential money laundering cases, thus triggering investigative action if appropriate.

In our paper, out of all STRs contained in the UIF's database, we focus on those filed by banks, which are, by and large, the most important reporting category in Italy. In the years 2012-2013, banks filed to the FIU 112.674 STRs (about 86% of all STRs received by the FIU in the same period) of which 58.929 in 2012 and 53.745 in 2013.[8] From the STR database we take several variables used in our analysis. Notably, we compute, for each quarter, the number of reports that each bank files to the FIU to provide a quantitative measure of banks' reporting activity.

This data is coupled with two qualitative information. The first one relies on banks' assessment of the risk that an STR may be related to a criminal activity. When filing one, banks are required to mark each STR (on a 1 to 5 scale) according to the underlying level of *risk* assigned to it (being 1 the level of minimum risk and 5 that of highest risk). STRs signalled between 0 and 2 are then considered as low risk, while the opposite occur for the reports with values 3 or higher.

The second variable is the FIU's own risk *rating* of each STR, which is set by complementing an IT algorithm with the FIU analysts' evaluation. The FIU *rating* takes integer values from 0 (no risk) to 5 (maximum risk). Likewise the risk scale, we differentiate STRs between the ones evaluated in the 0-2 rangeand the others.
To sum up, for each bank, we are able to assess the number of STRs and its risk level, perceived by both the intermediary and the FIU.

The second source of data we use is the Aggregate Anti-Money Laundering Reports[9] database. The Italian AML law requires all financial intermediaries to report to the UIF monthly anonymous reports concerning all

[7]Legislative Decree 231/2007 as modified by Legislative Decree 90/2017)

[8]Data source: UIF's Annual Report 2013 `http://uif.bancaditalia.it/pubblicazioni/rapporto-annuale/index.html`

[9]SARA, from the Italian acronym.

transactions worth 15,000 euros and more, aggregated by transaction type, customer's economic sector and bank branch. From this database we extract banks' reports: in the period of our analysis (2012 and 2013), banks reported 196,4 million aggregate records, corresponding to 591,4 million underlying individual transactions worth 44,4 trillion Euro[10]. In our analysis, we pay particular attention to cash transactions and wire transfers. Cash is traditionally considered to be criminals' favourite means of payment, due to its inherent opacity (i.e. lack of traceability and anonymity).[11] Wire transfers are another payment instrument quite relevant in money laundering activities. More in particular, we look at the number as well as the amount of cash transactions and wire transfers reported by banks. These informations are then used to calculate the share of cash transactions and wire transfers (over total financial transactions) for both the number and the amount of transactions.

The third data used in our analysis includes data on AML oversight activity carried out by both the Bank of Italy's prudential supervision department of the banking sector and UIF. We collect information on all inspections related to the reporting of suspicious transactions performed by both authorities during the period 2012-2013, and identify among them those that ended with a disciplinary action of some kind being taken by the supervisors. As we will see in Section 7.2, the underlying rationale here is that such distinction could help us detect whether any change in an intermediary's reporting policy was triggered as a consequence of it being merely inspected by the supervising authorities or whether there need be a formal disciplinary procedure in place for that effect to be observed.

Of all 736 banks included in the final sample, 325 were subject to an onsite inspection in the two years considered, 25 of which were aimed primarily at monitoring compliance with STRs. 192 inspections triggered some sort of disciplinary action, 77 of which because of deficiencies related to STRs.[12]

Finally, for each bank in our sample, we have an index of its level of compliance with the STR obligation computed by the FIU (Gara and Pauselli [2015]). The index is the result of a negative binomial model, which relates the number of STRs on a set of covariates.[13] Crucially for our analysis, the indicator was computed using data from year 2011, and during the period 2012-2013 it was neither publicly available nor used by the UIF and the

[10]Data source: FIU's Annual Report 2012 and 2013 available at `http://uif.bancaditalia.it/pubblicazioni/rapporto-annuale/index.html`

[11]E.g., *Why cash is still king*, Europol (2015).

[12]Deficiencies related to STRs may emerge also from inspections not focused on STR compliance.

[13]They include (i) indicators of banks' operational activities; (ii) measures of money laundering risk and (iii) proxies of economic activity.

Bank of Italy to select the banks to be inspected. Thus, it can be used as a relevant control variable for our identification strategy.

In the next section we provide some descriptive statistics on banks' main features and reporting activity.

5 Descriptive Analysis

The whole dataset is given by 5,603 quarterly observations related to 736 banks with reference to the period from January 2012 to December 2013. As it can be seen in the first section of Table 1, the number and the value of cash transactions and wire transfers represent respectively almost half of the total sample. For many variables, the strong difference between the mean and the median value shows the presence of skewness in the data: for example, the amount of transactions is on average 1 billion euros, while the median is around 121 million; the same can be observed for the total number of STRs. A first look at the number of STRs evaluated as "high-risk" by the UIF shows that it is lower than those labelled as such by the banks; a finding that may suggest a propensity of banks to over-rate, on average, the relevance of STRs.

The same statistics are reported for the subsamples of inspected and non-inspected banks. The main (if not the only) difference which emerges is that inspected banks appear to send on average more STRs as confirmed also by Kolmogorov-Smirnov and Kruskal-Wallis tests (available upon request); whether this is the cause or the effect of inspections themselves (and whether there is any causal link altogether) is left of course to the econometric analysis. The ratio of high vs low rating STRs is roughly similar in the two sub-samples, as it is the case for most other statistics being reported. There is some evidence that inspected banks tend to be somewhat larger than non-inspected ones (this is signaled by the Kruskal-Wallis test, but it is not confirmed by the Kolmogorov one).

Looking at Table 2, around 40 per cent of the observations are related to local banks operating in the Northern part of Italy, almost 15 per cent in the Centre and roughly 20 per cent refers to the South and the Islands (Sicily and Sardinia). Major banks, typically operating nation-wide, account for about 4 per cent of observations; interestingly, only 9 per cent of the observations are related to foreign banks, suggesting the (still) absolute predominance of domestic banks in the Italian financial system. The number of provinces where banks operate emphasizes their small size: roughly 10 per cent of banks operate in more than 15 provinces (out of 95), whilst half operate only in a single province. Reassuringly for our results, observations

Table 1: Main statistics

All banks					
variable	**mean**	**std dev**	**min**	**med**	**max**
Number of STRs	19.96	126.3	0	2	3900
No. of Low Rating STRs (FIU Evaluation)	9.967	81.14	0	0	2908
No. of High Rating STRs (FIU Evaluation)	9.994	50.86	0	1	1047
No. of Low Risk STRs (Bank Evaluation)	7.047	49.71	0	0	2076
No. of High Risk STRs (Bank Evaluation)	12.91	85.73	0	1	3234
Total Amount Transacted (Euros)	7.6e+09	5.4e+10	1822	3.8e+08	1.3e+12
Cash and Wire Transfers (Share of Total No. of Operations)	.4732	.1754	0	.4529	1
Cash and Wire Transfers (Share of Amount Transferred)	.434	.1731	0	.4104	1
ANSCOMBE (Gara and Pauselli 2015)	-.3732	1.52	-3.283	-.5665	14.49
No. of Provinces in Which the Bank Operates	7.107	18.24	1	1	110
Not inspected					
variable	**mean**	**sd**	**min**	**med**	**max**
Number of STRs	9.68	50.75	0	1	1549
No. of Low Rating STRs (FIU Evaluation)	4.687	27.77	0	0	935
No. of High Rating STRs (FIU Evaluation)	4.993	24.04	0	0	614
No. of Low Risk STRs (Bank Evaluation)	4.029	25.54	0	0	526
No. of High Risk STRs (Bank Evaluation)	5.651	27.85	0	1	1023
Total Amount Transacted (Euros)	6.7e+09	5.8e+10	1822	4.2e+08	1.3e+12
Cash and Wire Transfers (Share of Total No. of Operations)	.4812	.2053	0	.4583	1
Cash and Wire Transfers (Share of Amount Transferred)	.4427	.2063	0	.4168	1
ANSCOMBE (Gara and Pauselli 2015)	-.3859	1.519	-3.283	-.559	14.49
No. of Provinces in Which the Bank Operates	6.481	17.58	1	1	110
Inspected					
Number of STRs	32.1	177.5	0	2	3900
No. of Low Rating STRs (FIU Evaluation)	16.2	115.7	0	1	2908
No. of High Rating STRs (FIU Evaluation)	15.9	69.98	0	1	1047
No. of Low Risk STRs (Bank Evaluation)	10.61	67.79	0	0	2076
No. of High Risk STRs (Bank Evaluation)	21.49	122.4	0	1	3234
Total Amount Transacted (Euros)	8.7e+09	4.9e+10	1.1e+06	3.6e+08	7.9e+11
Cash and Wire Transfers (Share of Total No. of Operations)	.4637	.1311	.0424	.4486	1
Cash and Wire Transfers (Share of Amount Transferred)	.4238	.1219	.0577	.4047	1
ANSCOMBE (Gara and Pauselli 2015)	-.3586	1.521	-2.61	-.5965	9.96
No. of Provinces in Which the Bank Operates	7.846	18.97	1	2	110

are nearly equally split between inspected and uninspected banks.

Table 2: Distribution of banks and observations by type of bank, area and market dimension

Supervisory Classification	**Banks**	**Obs.**
Major	4.08	3.96
Special Purpose	9.24	9.42
Foreign	9.38	9.35
Local		
North-West	13.04	12.39
North-East	28.94	29.41
Centre	16.30	16.24
South /Islands	19.02	19.22
Market dimension		
1	50.14	50.06
2	19.57	19.20
3-5	12.50	13.58
6-15	8.15	7.76
> 15	9.65	9.39
Inspected		
Yes	44.16	45.85
No	55.84	54.15
N	**736**	**5603**

While the number of STR observations has a distribution similar to that of reporting banks, there are significant differences in the size of the STR flow according to the area, the type, and the dimension of the banks considered. First, as shown in Table 3, major banks file on average significantly more STRs than other banks; this is unsurprising, and is related to several factors, from economies of scale in banks' reporting organization and effort, to the bigger reputation risk faced by major banks. Also the market dimension, measured by the number of provinces in which each bank operates, confirms a similar feature: the average number of STRs from banks operating in more than 15 provinces is around 162, more than six times the number reported by banks operating in 6 to 15 provinces. Banks that underwent an inspection in the two years of analysis filed roughly four times as many STRs as those that were not inspected.

The latter finding — i.e., the existence of an apparent positive relationship between the occurrence of an inspection and the number of STRs being filed — is further explored in Table 4, which reports statistics for inspected banks, respectively before and after inspection. On average, after having

Table 3: Main statistics of number of STRs by type of bank, area and market dimension

	mean	**sd**	**min**	**p50**	**max**	**N**
Supervisory Classification						
Major	344.7	534.6	3	142	3900	222
Special Purpose	9.491	21.52	0	2	189	528
Foreign	4.147	30.51	0	0	379	524
Local						
North-West	8.48	19.383	0	3	177	694
North-East	4.351	11.218	0	1	216	1648
Centre	5.504	8.803	0	3	75	910
South /Islands	9.343	23.555	0	2	282	1077
Market dimension						
1	2.445	8.379	0	0	189	2805
2	3.733	5.712	0	2	54	1076
3-5	5.683	10.63	0	3	177	761
6-15	25.69	32.96	0	13	282	435
> 15	162.5	382.1	0	42.5	3900	526
Inspected						
No	9.68	50.75	0	1	1549	3034
Yes	32.1	177.5	0	2	3900	2569

been 'visited' by authorities, banks filed twice as many STRs as they did before. This increase did not affect the financial relevance of the STRs filed, since the reports remained equally split between high and low risk, as they were pre-inspection. These findings, although very preliminary and just based on descriptive statistics, are quite interesting. Needless to say, they need a rigorous econometric scrutiny until any conclusion can be reached, to which the rest of this paper is devoted.

Table 4: Main statistics of inspected banks

Before inspection					
variable	**mean**	**sd**	**min**	**med**	**max**
Number of STRs	22	95.2	0	2	1,361
No. of Low Rating STRs (FIU Evaluation)	9.91	48.8	0	1	1,055
No. of High Rating STRs (FIU Evaluation)	12	51.5	0	1	668
No. of Low Risk STRs (Bank Evaluation)	7.35	42.7	0	0	567
No. of High Risk STRs (Bank Evaluation)	14.6	64.8	0	1	1,139
Total Amount Transacted (Euros)	6,831	43,704	1.07	335	773,076
Cash and Wire Transfers (Share of Total No. of Operations)	.453	.132	.0424	.442	1
Cash and Wire Transfers (Share of Amount Transferred)	.419	.127	.0577	.399	1
ANSCOMBE (Gara and Pauselli 2015)	-.294	1.61	-2.61	-.588	9.96
No. of Provinces in Which the Bank Operates	6.68	16.2	1	2	110
After inspection					
Number of STRs	40.1	222	0	2	3,900
No. of Low Rating STRs (Bank Evaluation)	21.2	149	0	1	2,908
No. of High Rating STRs (Bank Evaluation)	19	81.6	0	1	1,047
No. of Low Risk STRs (FIU Evaluation)	13.2	82.3	0	0	2,076
No. of High Risk STRs (FIU Evaluation)	27	153	0	1	3,234
Total Amount Transacted (Euros)	10,115	52,402	5.73	386	791,490
Cash and Wire Transfers (Share of Total No. of Operations)	.472	.13	.0432	.453	1
Cash and Wire Transfers (Share of Amount Transferred)	.428	.117	.0635	.408	1
ANSCOMBE (Gara and Pauselli 2015)	-.41	1.44	-2.61	-.604	9.96
No. of Provinces in Which the Bank Operates	8.77	20.9	1	2	110

6 Empirical Strategy

Our goal is to identify the causal effect of inspections on suspicious transaction reporting by banks. Consider the simple linear model for a dependent variable DV measured for bank b on quarter q:

$$DV_{bq} = \beta_0 + \beta_1 Inspection_{bq} + \varepsilon_{bq} \quad (1)$$

DV can either be the number of reports sent by the bank in the quarter, or its average quality, as measured by the bank itself or by the FIU. $Inspection$ is a dummy = 1 if the bank has been inspected in quarter q or before. Several problems affect the correct estimation of the effect of inspections on DV in

this model. First, supervisory authorities may be induced to inspect the banks on the basis of omitted variables, which may also be correlated with STRs compliance. Indeed, Table 3 shows that larger banks send more STRs, and they may also be more likely to be inspected because of their size and systemic relevance.

Second, reverse causality may also be a concern, if too intense or too scarce STR activity by banks may induce supervisors to inspect them.

Because of lack of "random" inspection activities by the oversight bodies, and the impossibility to identify a plausible instrumental variable for it, we are left with identification based on the so-called Conditional Independence Assumption (CIA). That is, we assume that inspections are orthogonal to the error term ε in (1) conditional on a suitable vector of controls X.

In particular, we estimate treatment effects of inspections using three models: panel fixed-effects, difference-in-differences, and propensity-score matched difference-in-differences model.
In the panel fixed-effects model, vector X is composed by bank and quarter fixed effects and by some covariates:

$$DV_{bq} = \beta_0^P + \beta_1^P Inspection_{bq} + \gamma_b + \delta_q + Z_{b,q-1}\theta^P + \varepsilon_{bq}^P \qquad (2)$$

$\tilde{\beta}_1^P$ identifies the effect of an inspection on DV inasmuch any omitted factor affecting the supervisors' choice of doing an inspection is either bank-specific and time-invariant (γ_b), or time-varying but common to all banks (δ_q), or captured by lagged time-varying, bank-specific controls $Z_{b,q-1}$, which include the log of the amount of cash operations and wire tranfers carried out by each bank as well as the log of all operations.The error-term ε_{bq}^P is allowed to display heteroskedasticity and serial correlation at the bank level.

For the difference-in-differences model, we first distinguish between banks that have been audited at least once over the period of observation, and those that have never been so. Let T_b be a dummy equal to 1 for ever-audited banks, and zero otherwise. Assume there are N_T audited and N_{NT} non-audited banks in our sample. For simplicity, let us focus on the effect of the first audit received by the bank.
For each treated bank, we measure the average DV in the quarter before the inspection (PRE_{bq}) and in the quarter after it ($POST_{bq}$).
We compare each bank audited with the entire sample of non-audited banks NT_b. For them also, we measure average DV in both quarters. The resulting dataset is composed of N_T banks audited (treated group), and $N_{NT} \times N_T$ non-audited banks (control group). We then estimate:

$$DV_{bq} = \beta_0^D + \beta_1^D T_b * POST_{bq} + \beta_2^D T_b + \beta_3^D POST_{bq} + Z_{bq-1}\theta^D + \delta_q + \varepsilon_{bq}^D \quad (3)$$

where $POST_{bq}$ is a dummy = 1 for both bank b and all its N_{NT} controls in the quarter in which b is inspected. Z is the same vector of covariates of (2), and δ_q controls for any time-specific and bank-invariant factors affecting DV. The coefficient of interest is the interaction term β_1^D, measuring the differential change in DV with respect to both previous period and other not-inspected banks. In the following we denote $T_b * POST_{bq}$ as *postinsp* for the sake of clarity. Notice that in this setting it is once more crucial to allow for serial correlation at bank level in the error term ε_{bq}^D (as we do). Indeed, in the dataset there are N_T replications of observations from banks in the control group: if not properly controlled for, this would mechanically induce positive serial correlation, likely biasing standard errors downward.

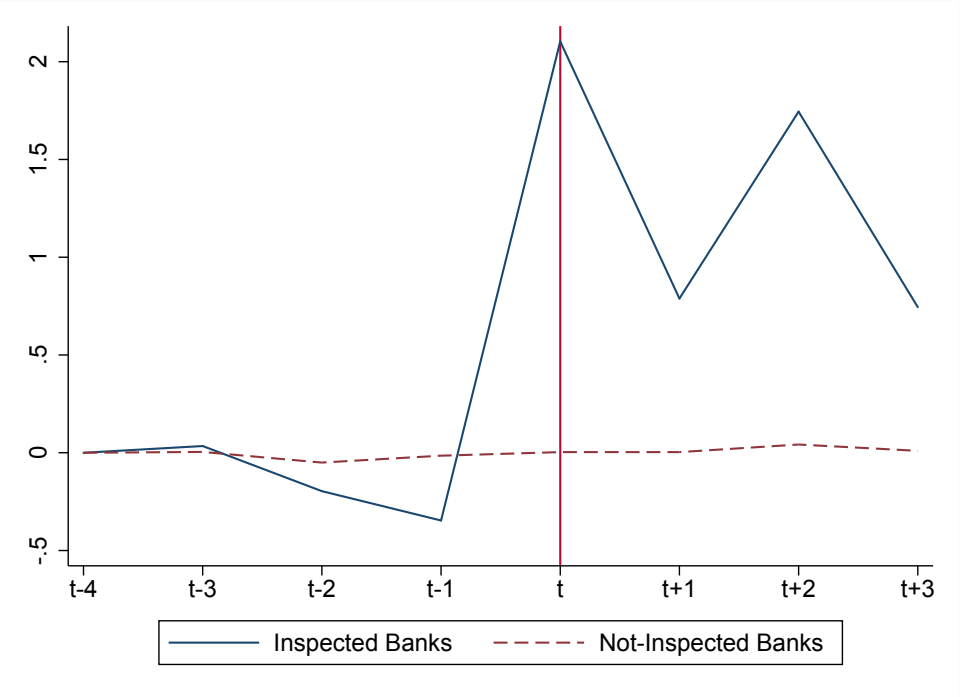
A standard test to evaluate the validity of a difference-in-differences model is to plot the dependent variable overtime for treated and non-treated observations, to show that before treatment the two groups shared a common trend. Figure 2 provides such evidence. It plots the average yearly number of reports sent from inspected and not-inspected banks (after partialling out the set of covariates and fixed effects included into (3), from the fourth quarter before inspection to the third one after it.

Finally, we improve on the difference-in-difference model by first creating for each of the N_T treated banks a specific control via propensity score-matching. In particular, we first compute for each bank a propensity score $e(X)$ on the basis of a vector of pre-inspection covariates X. This includes supervisory classification, market dimension, geographical area, amount of transactions processed, number of STRs reported and the measure of STR compliance computed by the FIU (*anscombe*). Results, available upon request, show that all available covariates are balanced across inspected and non-inspected banks, once matched using the propensity score.

We then estimate model (3) weighting each observation by $e(X)$, as suggested by Imbens and Wooldridge [2009]. As a result, the control group is weighted so as to mimic the distribution of covariates among inspected banks, and the estimate of β_1 is robust to non-linear differences in these pre-inspection characteristics. This model yield the most robust estimates under the CIA and with the information in our hands.

The use of propensity score matching has been recently criticized by Gary King and Richard Nielsen (2016) on the grounds of efficiency and, most importantly, possible bias from model misspecification. We address this issue by estimating the causal effect of inspection via a minimum-distance matching algorithm (Jann 2017): results, available upon request, confirm quantitatively and qualitatively those obtained from the propensity-score matched difference-in-differences model.

Figure 2: Graphical analysis of the common trend assumption



7 Evidence

7.1 Main results

In order to meet our goal of estimating the impact of regulators' action on the effort that banks exert in complying with the suspicious transaction reporting obligation and given the empirical strategy as outlined in the previous section, we have devised different dependent variable in Equation 3 so as to measure two possible different effects oversight activity can give rise to.

The most obvious and straight-forward way in which banks' response can be measured is by focusing on the sheer number of STRs they file to the FIU and whether any change in their pattern is brought about by authorities' on-site checks. Such effect, thanks to the extremely high level of detail of our data, can be also split according to STRs' level of risk, as assessed by the UIF or perceived by the reporting parties, so as to account also for any change in the quality and informational content of the STRs actually filed. So much for the extensive impact of oversight. Should one wish to take also into account the intensive outcome of authorities' action, then one way to look at this issue may be that of estimating the probability that an intermediary actually files an STR.

Additionally, estimates are provided for treatment effects of inspections on the number of STRs filed only by those banks featuring a positive probability of reporting, thus combining somehow the extensive and the intensive margins.

Results of the estimates are shown with reference to all three different approaches as described in the previous section, that is panel fixed-effects (Equation 2), difference-in-differences (DID) and propensity-score matched difference-in-differences model (Equation 3), referring to the latter as our benchmark specification.

Regardless of the approach, inspections are shown to produce a positive and statistically significant effect in all respects (see Table 5). According to our benchmark, banks are liable to file an additional 18% STRs pursuant to an inspection (which rise to 24% for those banks with a positive probability of reporting) with an increased 8% probability of filing at least one STR. So far, so good, then: supervisors' oversight activity does produce an adjustment of some kind in banks' reporting strategy, at least in quantitative terms.

If the overall effect is estimated differentiating for the type of banks (Table 6), it comes out that bigger banks are more sensitive to the impact of inspections (since, for instance, they may be more aware of the reputation implications of any infringement to the AML-CTF obligation). This appears to be true regardless of how bank size is measured, whether based on the amount or number of all transactions carried out (respectively, first and second column of results), the amount of cash transactions and wire transfers (third column), or the number of provinces each bank operates in (fourth column; the new variable Big Bank reported in Table 6 is a dummy equal to 1 if the bank's value of the corresponding variable is larger than the corresponding sample median, 0 otherwise.)

Some of the most interesting results emerge if one looks at the quality of STRs filed, that is to say, at the actual relevance from a AML-CTF perspective of the financial transactions being reported, as gauged by the UIF (see Table 7). Across all specifications the treatment effect of inspections is the same on the number of STRs regardless of their relevance; that is, after an ispection we observe an increase of both low-risk and high-risk STRs, to a broadly similar extent. This is confirmed by looking at the effect of inspections on the share of the most relevant (riskiest) STRs, which is estimated to be negligible and not statistically significant.

Perhaps not surprisingly, a somewhat different picture emerges from considering STR relevance as assessed by reporting banks (Table 8). In this case, the treatment effect on the most relevant STRs is significantly higher than that on lower risk class reports: our benchmark shows that following an inspection banks file an additional 17% of high risk STRs against a mere 7%

Table 5: Inspection Effect (P-values in brackets)

Number of STR	**Panel**	**DiD**	**DiD + Matching**
Postinsp	4.738**	3.957***	3.562***
	(.019)	(0.005)	(.000)
Cash and Wire Transfers (log, lagged)	.5166	.1698	-.848*
	(.291)	(.380)	(.055)
Total Amount Transacted (log, lagged)	.0771	-.0373	.205
	(.953)	(.777)	(.657)
Observations	4780	2834	2656
Adj. R-squared	.965	.0112	.0279
Prob. of STR	**Panel**	**DiD**	**DiD + Matching**
Postinsp	.0196	.1226***	.0839***
	(.558)	(.000)	(.001)
Cash and Wire Transfers (log, lagged)	-.0313	.0142	.0090
	(.323)	(.682)	(.626)
Total Amount Transacted (log, lagged)	.0122	.0638*	.0797***
	(.736)	(.083)	(.000)
Observations	4780	2834	2656
Adj. R-squared	.554	.1229	.1246
Number of STR | Pr(STR.)>0	**Panel**	**DiD**	**DiD + Matching**
Postinsp	7.433**	5.282**	4.741***
	(.025)	(.007)	(.000)
Cash and Wire Transfers (log, lagged)	4.668	.6511	-2.353**
	(.143)	(.409)	(.030)
Total Amount Transacted (log, lagged)	-.0715	-.5124	1.239
	(.989)	(.455)	(.277)
Observations	2972	1726	1563
Adj. R-squared	.960	.0137	.0436

Significance levels : $*$: 10% $**$: 5% $***$: 1%

Table 6: Inspection Effect by Bank Size (P-values in brackets)

Size Variable →	Total Amount	No. of Transactions	Cash & Wire Transf. Amnt	No. of Provinces
Postinsp	2.007**	1.620	2.024**	1.352**
	(.015)	(.025)	(.013)	(.013)
Postinsp * Big Bank	5.815**	6.087**	5.860**	9.989*
	(.042)	(.037)	(.049)	(.069)
Big Bank	-1.745*	-1.656	-1.653*	-.543
	(.074)	(.135)	(.052)	(.814)
Cash and Wire	.455	.530	.516	.642
Transfers (log, lagged)	(.338)	(.259)	(.275)	(.179)
Total Amount	.1055	.102	.0429	.0629
Transacted (log, lagged)	(.935)	(.937)	(.974)	(.961)
Observations	4780	4780	4780	4780
Adj. R-squared	.9653	.9655	.9655	.9656

Significance levels : $*$: 10% $**$: 5% $***$: 1%

more of low risk STRs. Accordingly, the share of the former on the overall number of STRs rises by nearly 7%. How can these results be reconciled with those emerging from the estimates concerning STRs relevance from the FIU's perspective?

Two tentative opposite interpretations can be provided. Banks do their best to improve their level of compliance after an inspection and to identify risky transactions, by investing on internal checks and their own AML procedures and activities. They end up assigning a higher level of relevance to financial transactions they report to the UIF since they genuinely believe that these transactions feature a higher risk than those detected in the past. Another way of seeing the results is that there has not been any major change in banks' reporting effort and ability, but intermediaries aim at providing the perception that that is the case.

7.2 The mechanism behind the effect

Taking into account the debate on the optimal supervisory strategy that was illustrated above in Section 3, it is worth checking whether in order to trigger an adjustment in the banks' reporting strategy it suffices that supervisors perform an on-site inspection (i.e. the *postinsp* variable we have seen so far) or that adjustment only materializes if and when authorities take some disciplinary action (*postaction*). Results (see Table 9) show that the implementation of some type of action by authorities is key in driving the effect we have observed: in the benchmark specification, both the

Table 7: Inspection Effect by STR Rating (FIU evaluation) (P-values in brackets)

Num. STR Rating 0-2	**Panel**	**DiD**	**DiD + Matching**
Postinsp	1.737*	1.5197*	1.5797***
	(.093)	(.081)	(.000)
Cash and Wire Transfers (log, lagged)	.4849	.0651	-.1515
	(.041)**	(.561)	(.466)
Total Amount Transacted (log, lagged)	-.5099	-.0956	.0038
	(.187)	(.218)	(.986)
Observations	4780	2834	2656
Adj. R-squared	.952	.0038	.0229
Num. STR Rating 3-5	**Panel**	**DiD**	**DiD + Matching**
Postinsp	2.221***	1.893***	1.698***
	(.007)	(.001)	(.000)
Cash and Wire Transfers (log, lagged)	.0491	.0781	-.256
	(.874)	(.283)	(.321)
Total Amount Transacted (log, lagged)	.3952	.0688	.227
	(.655)	(.332)	(.402)
Observations	4780	2834	2396
Adj. R-squared	.959	.0143	.0175
Share STR 3-5 su tot	**Panel**	**DiD**	**DiD + Matching**
Postinsp	.0287	.0151	.0326
	(.378)	(.575)	(.261)
Cash and Wire Transfers (log, lagged)	-.0387	-.0333	-.0533
	(.658)	(.299)	(.207)
Total Amount Transacted (log, lagged)	-.0267	.0311	.0426
	(.800)	(.361)	(.339)
Observations	2972	1415	1259
Adj. R-squared	.3340	-.0001	.0075

Significance levels : $*$: 10% $**$: 5% $***$: 1%

Table 8: Inspection Effect by STR Risk (Bank evaluation) (P-values in brackets)

Num. STR Risk 0-2	**Panel**	**DiD**	**DiD + Matching**
Postinsp	.95**	.91	.46**
	(.042)	(.12)	(.02)
Cash and Wire Transfers (log, lagged)	.16	.31	-.028
	(.51)	(.34)	(.88)
Total Amount Transacted (log, lagged)	-.34	-.28	-.036
	(.14)	(.36)	(.86)
Observations	4412	2586	2396
Adj. R-squared	.949	.0071	.0049
Num. STR Risk 3-5	**Panel**	**DiD**	**DiD + Matching**
Postinsp	1.5***	1.2***	2.2***
	(.0056)	(.0071)	(1.3e-16)
Cash and Wire Transfers (log, lagged)	.36	.086	.1
	(.22)	(.67)	(.69)
Total Amount Transacted (log, lagged)	-.2	-.12	.015
	(.54)	(.54)	(.95)
Observations	4412	2586	2396
Adj. R-squared	.945	.0106	.0325
Share STR Risk 3-5 su tot	**Panel**	**DiD**	**DiD + Matching**
Postinsp	.057**	.049*	.073***
	(.014)	(.092)	(.0098)
Cash and Wire Transfers (log, lagged)	-.016	-.018	-.03
	(.31)	(.15)	(.42)
Total Amount Transacted (log, lagged)	.024**	.018	.028
	(.047)	(.19)	(.45)
Observations	2676	1256	1105
Adj. R-squared	.537	.0074	.0137

Significance levels : $*$: 10% $**$: 5% $***$: 1%

increase in the number of STRs and the probability to file an STR rises to nearly 20%. These results appear sensible: banks do not have a clear rational to react to an inspection bereft of consequences for them, since that would broadly signal that supervisors hold as adequate their level of compliance with the AML-CTF obligations and thus implicitly require no adjustment of them. Conversely, the size of the impact of the disciplinary action can be interpreted that authorities are able to detect precisely the cases of non-compliance in which corrective measures on banks' side give rise to significant adjustment both from the extensive (number of STRs) and the intensive (probability of filing an STR) viewpoint.

Table 9: Action Effect (P-values in brackets)

Number of STR	**Panel**	**DiD**	**DiD + Matching**
Postinsp	2.28	1.25	1.17
	(.463)	(.512)	(.175)
Postaction	4.48	4.97*	4.05***
	(.294)	(.0794)	(.000179)
Cash and Wire Transfers (log, lagged)	.546	.193	-.782*
	(.271)	(.325)	.0758)
Total Amount Transacted (log, lagged)	.0199	-.0809	.111
	(.988)	(.573)	(.81)
Observations	4780	2834	2656
Adj. R-squared	.976	.0188	.0363
Prob. of STR	**Panel**	**DiD**	**DiD + Matching**
Postinsp	-.0334	.0153	-.0338
	(.465)	(.72)	(.349)
Postaction	.0965*	.197***	.199***
	(.0817)	(.0000566)	(.0000108)
Cash and Wire Transfers (log, lagged)	-.0307	.0152	.0122
	(.333)	(.66)	(.507)
Total Amount Transacted (log, lagged)	.011	.0621*	.0751***
	(.762)	(.0901)	(.00011)
Observations	4780	2834	2656
Adj. R-squared	.687	.13	.134
Number of STR | Pr(STR.)>0	**Panel**	**DiD**	**DiD + Matching**
Postinsp	4.8	2.17	2.29*
	(.394)	(.485)	(.0993)
Postaction	4.23	4.94	3.64**
	(.53)	(.21)	(.0264)
Cash and Wire Transfers (log, lagged)	4.7	.757	-2.17**
	(.142)	(.349)	(.0455)
Total Amount Transacted (log, lagged)	-.168	-.629	1.05
	(.975)	(.385)	(.36)
Observations	2972	1726	1563
Adj. R-squared	.975	.022	.0521

Significance levels : $*$: 10% $**$: 5% $***$: 1%

We also replicated regressions documented in Table 7 by adding *postaction*. Results are reported in Table 10. They confirm that the effect of inspections is channelled through authorities' action. They also confirm that there is a positive effect on both low-risk and high-risk STRs, and that these effects are broadly of the same order of magnitude, thus leaving the share of high-risk STRs on the total number of STRs unchanged (i.e., the effect on the share is not statistically significant).

Table 10: Action Effect by STR Rating (FIU evaluation) (P-values in brackets)

Num. STR Rating 0-2	**Panel**	**DiD**	**DiD + Matching**
Postinsp	.115	-.0335	.518
	(.894)	(.973)	(.202)
Postaction	.629	2.85*	1.8***
	(.645)	(.097)	(.000428)
Cash and Wire Transfers (log, lagged)	.633**	.0786	-.122
	(.0222)	(.495)	(.556)
Total Amount Transacted (log, lagged)	-.382	-.121	-.0381
	(.219)	(.158)	(.862)
Observations	4780	2834	2656
Adj. R-squared	.949	.0113	.0308
Num. STR Rating 3-5	**Panel**	**DiD**	**DiD + Matching**
Postinsp	.024	.0968	.203
	(.951)	(.823)	(.687)
Postaction	2.64***	3.3***	2.53***
	(.00206)	(.00239)	(.0000642)
Cash and Wire Transfers (log, lagged)	-.142	.0938	-.215
	(.638)	(.212)	(.404)
Total Amount Transacted (log, lagged)	.849	.04	.169
	(.311)	(.579)	(.534)
Observations	4780	2834	2656
Adj. R-squared	.961	.0238	.0206
Share STR Rating 3-5 su tot	**Panel**	**DiD**	**DiD + Matching**
Postinsp	.0348	.00516	.015
	(.239)	(.916)	(.757)
Postaction	.0373	.0156	.0257
	(.32)	(.783)	(.65)
Cash and Wire Transfers (log, lagged)	-.0835	-.0328	-.0517
	(.128)	(.309)	(.223)
Total Amount Transacted (log, lagged)	.0175	.0306	.041
	(.783)	(.371)	(.36)
Observations	2972	1415	1259
Adj. R-squared	.413	.0063	.0147

Significance levels : $*$: 10% $**$: 5% $***$: 1%

8 Concluding remarks

Fighting money laundering has become one of the major challenges of modern economic and financial systems worldwide in recent years. Lately, the surge in the terroristic threat has further increased the urgency of making the AML-CTF systems as effective as possible. In this context, it becomes highly important to ensure that the appropriate enforcement mechanisms for the AML-CTF regulatory framework are in place, and that the tools for oversight authorities are used effectively, prompting reporting agents to improve, and correct if necessary, their AML conduct and strategies.

Our work tries to verify whether the actions adopted by Italy's AML/CTF supervisors cause Italian banks, the most important sector subject to AML/CTF regulation, to adjust their suspicious transaction reporting strategy and whether such adjustments actually point in the right direction.

To this end we use detailed data from the Bank of Italy's databases (the Italian banking supervisory authority) and the UIF (the Italian FIU, or central AML/CTF authority), including i) data on on-site inspections of both authorities and the outcome thereof, and ii) data measuring the quarterly flow of STRs that banks filed in 2012 and 2013, with indicators of the relevance (for AML-CTF purposes) of each report, so as to account for any adjustment that may have taken place following the inspections both in quantitative and also qualitative terms.

Our empirical strategy relies on estimating the treatment effects of inspections on the flow of STRs and their relevance/importance using three models: panel fixed-effects, difference-in-differences, and propensity-score matching difference-in-differences.

Our results show that following an inspection, banks are likely to increase the number of STRs they file to the FIU by some 18 per cent; also the probability that they file one report increases accordingly, larger banks being more sensitive to supervisors' checks. Crucially, we find that the increase in STRs caused by inspections is not limited to low-quality reports, which would be the case if banks' responses in increasing the reporting effort were only apparent, but spreads to high-quality reports, thus showing that the authorities' on-site controls actually spurred an increase in banks' propensity to identify and report risky transactions. Further analysis has documented that such a positive effect is mainly produced by actual intervention by the authorities following the inspection, in the form of reprimand letters or stronger action, i.e. sanctions.

Our findings represent, to our knowledge, the first thorough empirical analysis of the effect of anti-money laundering oversight on banks' reporting behaviour and effort. According to our evidence, supervisors appear capable, on average, of pushing banks to make positive adjustments as a result of their action. This is encouraging, given the known concerns in the literature about the "crying wolf effect", i.e. the concern that excessive fines and sanctions may induce excessively defensive reporting by the banking sector, thus diluting the information value of new reports, and ultimately making the fight against money laundering and terrorism financing less effective.

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