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Strategies to avoid blacklisting: The case of statistics on money laundering

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Abstract

Financial and legal entities (e.g. banks, casinos, notaries etc.) have to report money laundering suspicions. Countries' enga in fighting money laundering is evaluated–among others–with statistics on how often these suspicions are reported. Lack o compliance can result in economically harmful blacklisting. Nevertheless, these blacklists repeatedly become empty–in wha known as the emptying blacklist paradox. We develop a principal-agent model with intermediate agents and show that non harmonized statistics can lead to strategic reporting to avoid blacklisting, and explain the emptying blacklist paradox. We recommend the harmonization of the standards to report suspicion of money laundering.

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Introduction

The Financial Action Task Force (FATF) was founded by the G-7 in 1989 and was mandated to set international standards coordinate the global effort to combat money laundering. To this end the FATF evaluates countries' anti-money laundering (policies and their effectiveness [1]. Countries that receive a negative evaluation from the FATF face the risk of being blackli Blacklisting carries a large reputational cost and may even lead to an economic embargo [2,3]. Nevertheless, the success strategy is heavily contested [2,4]. Soon after the FATF published a new blacklist, countries removed themselves from it by providing the FATF with evidence that they are meeting the necessary standards. Paradoxically, a world with no blacklisted countries is still a world rifle with large scale money laundering schemes, as field experiments [5] and whistleblowers (e.g. I Papers, WikiLeaks, Luxembourg Papers) show.

This paper adheres to the growing body of literature that questions the effectiveness of the global AML strategy [5–12] and literature questioning the reliability of national statistics caused by international standards and evaluations [13–16]. By mea principal-agent model with multiple agents that multi-task [17], we show that the absence of a harmonized definition for a su report (SR)–one of the main indicators used by the FATF as metric of the engagement of the private sector in exposing mo laundering–may explain the blacklisting paradox. In the absence of a harmonized legal definition of an SR, countries can av negative evaluations without burdening the private sector with the real cost of detecting money laundering. The distinguishi of our model is that the welfare of the intermediate agent (the state) depends on the welfare of the other agents (the reporti entities), as the state is not only the enforcer of the FATF regulations, but also the enforcer of the wishes of its constituents

There are at least six aspects of the definition of an SR that are vulnerable to abuse for statistical purposes: (1) the type of cash, wire, checks); (2) the subjective grounds of suspicion (the level of necessary knowledge when defining a transaction suspicious); (3) the objective grounds of suspicion (the reporting threshold of the amount of money involved in a transactio the definition of a transaction (the activities which constitute a transaction affect the applicability of reporting); (5) the inclus attempt (including the attempt of a transaction affects the number of reports); and (6) the data collection methodology (usin separate versus bundled SRs) [18]. Even in the absence of *mala fide* intent, these six vulnerabilities carry on in national sta making it difficult for the FATF to evaluate countries on the basis of their true effort to combat money laundering, and conse enlarges the gap between the metric of effort 'on paper' and 'in practice".

The paper consists of six sections. The following section introduces the literature that has theoretically discussed the streng weaknesses of the FATF blacklists strategy. Section 3 exposes the blacklist paradox and the incomparable nature of one o parameters used by the FATF to rank countries on their efforts to prevent money laundering. It also introduces a repurpose layered principal-agent model where the principal is the FATF, the intermediary agent is the national government (which inc

the policymaker, the supervisor and the Financial Intelligence Unit (FIU) mentioned by [6,7]), and the final agent is an oblig
This modeling choice allows the analysis of the dynamics between the FATF and the countries subjected to its mandate thr
standard lens of a principal-agent model (also employed by [6,7,10,19]), offers a simple explanation for why the FATF blacl
empty and helps identify the potential weaknesses, as well as, provides the strategies for remedy. Section 4 details the
consequences derived from the model, namely that, as long as strategic behavior through non-harmonized statistics is cos
efficient, using these statistics for the purpose of blacklisting will not prevent money laundering and will further reduce the
informational quality of national statistics on money laundering. Section 5 puts forward improvements to the policy of the FA
the harmonization of the definition of an SR and (2) the provision of direct metrics of engagement for the private sector. Fin
section 6 concludes.

Literature overview

Doubts on the effectiveness of the FATF strategy were voiced early on in the academic community. [6] suggested the parac
result of the "zero tolerance policy". Obliged entities (i.e. organizations legally designated to monitor their customers and re
suspicion of money laundering taking place through their dealings) have to make a trade-off: they can either report less (the
saving on the associated detection and reporting costs and on the costs of losing high net worth individuals as clients), and
the possibility of being sanctioned; or they can report more and accept the extra costs. Because law enforcement cannot
distinguish between true reports and false positives received from the obliged entities, Takats showed that the amount of re
went up as soon as the sanctions were raised but that this did not necessarily lead to more convictions of money launderer
Essentially, when sanctions are too high, law enforcement is flooded with low quality reports [20].

[7] proposed a three-player principal agent model to analyze the incentive problems present in the AML system. In their mo
principal–the policy maker–wants to maximize the true suspicious reports while being sensitive to the costs incurred by the
institutions. The policy-maker cannot observe the true effort exercised by the agent–the obliged entities. Consequently, he
intermediary agent–a supervisor–whose job is to reduce the information asymmetry. Assuming that the supervisor is not a t
shirking agent, [6] concluded that supervision is more effective than fines.

What [6,7] miss, however, is a good representation of the locus of compliance. Factually, the real locus of compliance is at
business-actor level (cf.[5]), but in the grand strategy of the FATF, the locus of compliance rests at the state-actor level. San
imposed on state actors impact thus the reporting of the private sector, though not according to the analysis of [6], and abs
international pressure, countries may not aim to maximize the number of true suspicion reports altogether, contrary to the
assumptions of [7]. Placing the state-agent in the role of an agent rather than in the role of the principal, however, requires
willingness to question the real motives of a government. Though recent studies [13,14,16] support the need to question th
objectivity of national statistics when governments face diverging national and international pressures, this possibility has n
settled yet in the mainstream literature.

Materials and methods

The paradox of money laundering with empty blacklists

The success of the global AML strategy heavily depends on the adequate participation of all countries. To this end, the FAT
mandated to set the standards for participation, monitor, and assess the efforts undertaken by countries in combating mone
laundering [21,22]. Since these efforts are not directly observable or directly enforceable, the FATF performs regular check
measure effort and compiles its findings in a series of 'Mutual Evaluation' and 'Follow-Up' reports. The FATF incentivizes cc
to cooperate by means of a naming-and-shaming strategy [23]. Its ultimate "big gun" is the blacklisting of countries that are
be non-compliant in the course of a round of mutual evaluations–with serious negative consequences for the country's repu
trade and business relations. When Pacific Island Nauru was blacklisted for money laundering, US authorities cautioned its
and asked them to take special precautions when dealing with Nauru. Eventually, several banks and financial institutions re
transact with Nauru. Economic isolation is particularly harmful for small economies [24].

The FATF published its first blacklist (officially known as the list of Non-Cooperative Countries and Territories) in 2000 with
15 countries, mainly small islands in the Caribbean and the Pacific [25]. The 2001 blacklist contained 19 countries. Their nu
declined steadily until Myanmar was removed in October 2006 (Fig 1).

Fig 1. Blacklisted countries: 2000 and 2001 in the upper chart, 2006 in the lower chart.

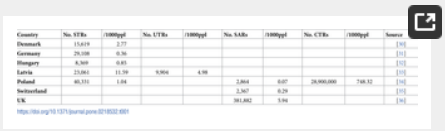
Blank map political world territories, shared under CC-BY-SA 4.0 license, altered for illustrative purposes. The blacklisted countries in 2000 and/or 2001 included: Egypt, Nigeria, Cook Islands, Indonesia, Myanmar, Marshalls lands, Nauru, Niue, Philippines, Hungary, Liechtenstein, Russia, Ukraine, Israel, Lebanon, Bahamas, Cayman Islands, Dominic Grenada, Guatemala, Saint Kitts and Nevis, Panama and Saint Vincent and the Grenadines. Blacklisted in 2006: Myann https://doi.org/10.1371/journal.pone.0218532.g001

Following criticism on its blacklisting strategy [2], the FATF published in 2009 a revised blacklist, which initially distinguishe groups of non-compliant countries, ranging from highly non-compliant to little non-compliant. In 2013, the FATF has publish simplified version where it recognized only two groups of non-compliant/non-cooperative jurisdictions [26]. The FATF soon new list empty. The 2011 FATF list consisted of only 10 countries, down from 28, in 2010 as Angola, Antigua and Barbuda, Azerbaijan, Ecuador, Greece, Indonesia, Morocco, Nepal, Nigeria, Pakistan, Paraguay, Qatar, Sao Tomé and Principe, Suc Thailand, Trinidad and Tobago, Turkmenistan, Ukraine and Yemen were removed while Cuba was placed on the list. The 2 FATF list mentioned only 5 countries: Iran, North Korea, Algeria, Ecuador and Myanmar [27] while in 2018 the FATF only m North Korea and Iran.

At the same time however, we have seen the largest leaks on off-shores, shell companies and money laundering schemes Swiss Leaks, Luxembourg Leaks, Panama papers), therewith supporting the critics of the efficiency of the current black/gre the FATF [28]. Additionally, using randomized controlled trials, [5] showed that FATF standards are often not enforced in the anonymous shell companies. Moreover, countries where compliance to the FATF standards was lowest in practice were no listed and some had never even been on a black or a grey list–e.g. Danske Bank in Denmark [29].

Comparing non-harmonized statistics

SRs represent one of the parameters used by the FATF as metric for the responsiveness of the private sector to the money laundering threat. There are four different types of SR. The most common is the Suspicious Transaction Report (STR) whic report obliged entities send to the FIU at the sight of a transaction they suspect is done to launder money. The Suspicious A Report (SAR) allows also non-transactions to be reported–e.g. opening a bank account. The Unusual Transaction Report (broadens the definition of suspicion–e.g. a transaction where there is no information or red flag suggesting money launderi that is unusual given a client's transacting patterns. Finally, the Cash Transaction Report (CTR) reports only transactions in [18] show that, in practice, these reports do not respect their limitations and that some countries use multiple types of repor shown in Table 1. They conclude that comparing countries on the basis of SRs would be imprudent.



Country	No. STRs	/1000ppl	No. UTRs	/1000ppl	No. SARs	/1000ppl	No. CTRs	/1000ppl	Source
Denmark	15,619	2.77							[36]
Germany	29,108	0.36							[31]
Hungary	8,369	0.85							[32]
Latvia	23,061	11.59	9,904	4.98					[33]
Poland	40,331	1.04			2,864	0.07	28,900,000	748.32	[34]
Switzerland					2,367	0.29			[35]
UK					381,882	5.94			[34]

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Table 1. SRs in 7 European countries in 2015, in absolute terms and per capita.
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Table 1 reveals the SR statistics in 2015 for a sample of European countries: Denmark, Germany, Hungary, Latvia, Poland, Switzerland and the United Kingdom. This sample was constructed to illustrate the diversity of SRs and that in spite of the differences SRs are used by the FATF to compare countries in their effectiveness and compliance.

In 2006, the FATF compared the Danish level of reporting to that of Hungary and Switzerland while acknowledging that it is good basis for comparison. In Denmark filing an SRT requires suspicion of money laundering in connection with a criminal punishable by imprisonment of one year or more, [37] while in Hungary "any data, facts or circumstances indicating money laundering" [38] are sufficient to file an STR. Similarly, in 2010 the FATF expressed concerns about the effectiveness of the reporting system after comparing the number of STRs with those in the United Kingdom [39]. The FATF agreed that differer may be due to the methods used to count SRs (e.g. different levels of suspicion required, comparing SARs to STRs, differe scopes of application for the reporting obligations), but nevertheless concluded that Germany had too few STRs [39]. Intere had the German STRs been compared to those of Switzerland and Denmark, the FATF could have reached the exact oppc conclusion.

Modeling the strategic response to blacklisting

The literature [6,7] has described the FATF's blacklisting strategy using the contractual lens of the principal agent theory. Tl standard principal-agent model assumes the principal delegates a task to the agent [40–42]. The successful completion of increases the payoff of the principal but does not directly increase the payoff of the agent as the agent needs to exert costly successfully complete the task. In order for a lucrative relationship to exist between the principal and the agent, the principa create the incentives for the agent to not slack. The relationship becomes problematic with asymmetric information and cor interests [43]–i.e. when the agendas of the agent and principal are not aligned, and when the principal cannot correctly ass whether the agent is slacking. We repurpose the three-layered principal-agent model such that the principal is the FATF, th intermediary agent is the national government, and the final agent is the obliged entity.

Fig 2 introduces the event tree on which our model is based. Asymmetric information assumes that the reporting entities ha indicators to answer the first question, while the principal can infer the answer only by observing the number of total suspic reports (true reports (*TR*) and false reports(*TR*)). This inference is subject to error.

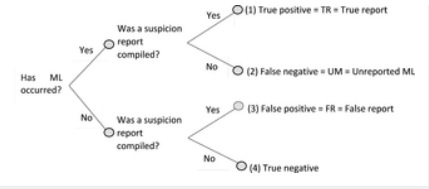

Fig 2. Event tree of reporting money laundering.
ML–money laundering.
https://doi.org/10.1371/journal.pone.0218532.g002

Fig 2 shows that the total Number of Suspicion Reports is

$$SR = TR + FR$$

Fig 2 also shows that the total number of Money Laundering attempts is

$$MA = TR + UM$$

Let us assume, for simplicity, that the payoff function of the principal only depends on the number of true SRs registered in country. As shown earlier, in practice, the FATF downgrades countries on the basis of the basis of the number of SRs put fo by their obliged entities. The payoff function of the principal is

$$u(i) = max(TR_i)$$

where $i \in \{1,n\}$ is the number of countries, and *TR* is the number of suspicionreports correctly reporting a money launderinç transaction or activity.

In order to effectively combat money laundering, countries must exert a certain degree of effort. Reporting money launderir costly effort required by the FATF and this cost is born by the country's reporting entities–the actors of the private sector wh the best position to observe potential money laundering transactions and to report them appropriately [44]. Countries face t international pressure of potential blacklisting and the domestic pressure of reporting entities which want to minimize their r costs.

Let the payoff function for a country be

$$v(i) = -c * SR(i) + p(i) * S$$

where *c* depicts the (fixed) economic costs of delivering one suspicion report to the FIU, *SR*(*i*) is the number of suspicion re sent to the FIU of country *i*, *p*(*i*) is the probability country *i* gets blacklisted, and *S* is the sanction when being blacklisted. W assume here for simplicity that the blacklisting sanction is the same for all countries, although we are aware that [32] show different countries care differently about being blacklisted. Since the FATF shames and blacklists countries, the FATF's pun is borne by the country and not by the deviant reporting entity. Consequently, the intuition is that reporting entities put in the effort possible while avoiding punishment. The punishment for the reporting entities can be a sanction from their supervisor reporting a suspicion transaction (which can be a monetary fine but can also, in some countries, include imprisonment), bu also be the reputational damage that occurs when media reports money laundering within a bank or any other reporting en

In essence, the situation for the obliged entity is somewhat similar to the trade-off that the countries face—more reporting is but reduces the reputational risk and the probability of punishment. The FATF cannot observe the true anti-money launderi exercised at the country level.

Instead, the FATF infers this from the number of recorded reports *SR* (see Eq 1). With minimum compliance standards (a blacklisting threshold of a certain number of suspicion reports), the FATF incentivizes through punishment. Consequently, *p* probability of being blacklisted is

$$p(i) = \begin{cases} 0, if\ SR(i) > T \\ 1, if\ SR(i) < T \end{cases}$$

where *T* is the threshold number of suspicion reports as set by the FATF.

Furthermore, we distinguish two types of costs associated with reporting. [45] argues that one of the main reasons why the anti-money laundering strategy is so unsuccessful is the general lack of understanding of money laundering by financial en and of how much reporting entities stand to gain from not reporting money laundering (cf. [7]). Consequently, we assume th submitting *TRs* involves high costs c_H and submitting *FRs* involves low costs c_L, where $c_H \gg c_L = c$. In thissetting, c_H incor the loss of potential high value customers and the reputation loss amongclients that value their privacy (be it for legal or ille

reasons) that the reporting entity faces when actually reporting on money laundering [46]. Conversely, c_L includes just the c filing a report–i.e. time and labor put into suspicion building, investigation, and writing of a report, such that the report meet national standards. Consequently, the cost function of the reporting entities (in line with [6]) is

$$c * SR = -c_H * TR - c_L * FR$$

In the absence of a universal legal definition of a suspicion report, governments can affect the costs of reporting $c = c_L$ as s previously. SRs can be altered in terms of: the type of suspicion report; the subjective grounds for suspicion; the objective g for suspicion; the definition of a transaction; the inclusion of attempt; and the data collection methodology. The latter is the vulnerable to strategic manipulation–e.g. file an SR for each suspicion transaction and person involved in a money launder instead of bundling them into one SR.

Limitations

For exposition purposes the model does not take into account all variables used by the FATF in assessing national perform the fight against money laundering. The first blacklist was developed in 2000 based on assessing countries with regard to 2 Criteria for Identifying Countries and Territories Non-Cooperative in Anti money Laundering and Terrorist Financing [47]. We abstract from all other geo-political motives that can underline the imposition of economic embargos–e.g. nuclear arms, po ideology, etc.

Moreover, we refrain from addressing whether it might be beneficial for a country to not fight money laundering adequately illegal capital, as described in [48,49]. Finally, we also do not expose the mechanisms through which strategic alterations o statistics are achieved–e.g. top-down pressure from the FIU to the obliged entities, horizontal peer-pressure in the professi setting, strategic cooperation between institutions etc.–at the national level.

Results

Under these assumptions, the optimization function of the government is $\min_c v(i)$. Knowing thecosts, obliged entities choo much to report by minimizing their costs ($\min_{TR,UR} c$), subject to the thresholds set by the principal. Consequently, as long costs of reporting false positives is lower than true positives, obliged entities will only report FRs and they will do so sufficie much that the country is not in danger of being blacklisted. Total costs increase as more reports are filed, since every repor costly, and thus, there is no incentive to report more than the blacklisting threshold. Consequently, if the sanction of blacklis sufficiently high ($S > c * T$), to incentivize the agents to comply, the optimal number of suspicion reports is equal with the bl threshold (see Fig 3). Finally, the payoff of the principal is

$$u(i) = max(TR) = 0$$

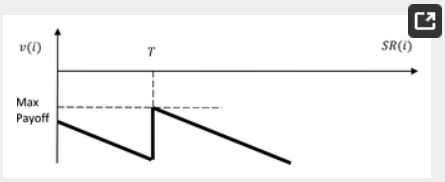

Fig 3. Pay-off function of the agent (country *i*).
The payoff function $v(i)$ of a country i is strictly negative therefore drawn in the second quadrant of the system of coordin (payoff, number of reports). Costs increase with the number of reports $SR(i)$ as long as the country is below the blacklist threshold T. At the threshold, the costs are minimal (the payoff is maximized). Costs increase directly proportional with t number of reports, when the number of reports exceeds the minimum threshold. Since reporting entities only report false reports in this setting, the slope of the curve is equal to c_L.
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Assuming countries are alike (in terms of money laundering threats, size of the economy through which money would be la number of neighbors, costs for reporting, bureaucracy and political decision-making institutions, etc.) except for the initial n reports $SR(i)$, then rationalbehavior of the countries would lead to a convergence in the number of reports over time to just the blacklisting threshold T. Countries with a high number of reports have an incentive to decrease the number of reports to costs for the reporting entities without an additional risk of being sanctioned by the FATF. At the same time, those countries have an insufficient number of reports should increase the number of reports to make it just above the blacklisting threshol same dynamics take place every time the FATF increases T to design a new blacklist. More SRs will be produced and the reporting costs will increase domestic pressures on governments to limit reporting costs at the lowest possible level. Since achieved by FRs and not TRs, the number of reports converges just above the new threshold, while the payoff of the FATF null. Data limitations do not allow the empirical testing of this argument. Nevertheless, supporting evidence is presented in in S1 Appendix.

Implications

Insofar, the principal-agent model and the anecdotal evidence suggest that the FATF's strategy of naming and shaming on basis of the number of SRs is flawed. The model helps explain why the FATF blacklists are emptying in the midst of ever m impressive leaks of information on largescale money laundering and corruption schemes and can be used to propose two improvements: (1) unifying reporting standards and (2) using different performance indicators to compare countries.

Harmonization requires the adoption of a single definition of an SR that covers uncertainty with respect to the client, to the transaction, that is related to a red flag or a gut feeling of the obliged entity is necessary. Similarly, harmonizing the legal de of an SR takes away the government's capacity to reduce reporting costs by interpreting SRs favorably and increases the effectiveness of the anti-money laundering strategy by increasing c_L relative to c_H. When costs are not fixed sums but distr within fixed intervals, unifying definitions at high standards decreases the heterogeneity of costs and increases the likelihoc reporting noise is at least as costly as reporting money launderers (see Fig 4). Consequently, when maximizing their utility reporting entities will optimally report some true cases of money laundering. This will, in turn, marginally raise the payoff of FATF.

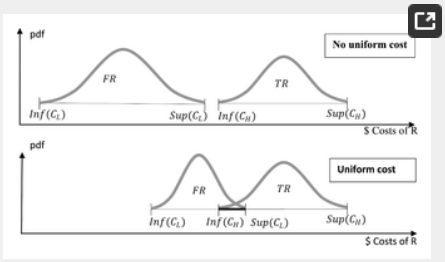

Fig 4. Unifying reporting standards and its impact on the cost of reporting money laundering relative to noise for reporting entities.
https://doi.org/10.1371/journal.pone.0218532.g004

Alternatively, random tests may offer complementary evidence of the private sector's engagement in countering money lau [5] conducted a randomized test with global shell companies. In a randomized control trial setting, the authors emailed mor 3700 corporate service providers globally, and asked them to set-up prohibited, untraceable or anonymous shell companie behalf. Their experiment revealed, among others, that setting up anonymous shell companies can be done online, fast, witl and at low costs. These are the same 'shell companies' that triggered the2016 'Panama Papers' scandal and that the interr community explicitly forbids.

Future randomized control trials can include opening a bank account without a passport, exchanging a large sum of foreigr currency, smurfing and transferring a large sum of money to a suspicious offshore company. The results of these randomiz control trials can form the bedrock for FATF evaluations. While this exercise needs to be rigorously conducted and would re significant adjustments to the mandate of the FATF, we argue it is the most reliable form of evaluation. Such an exercise wc create an independent indicator of effort that countries exercise in combating money laundering. Our suggestion is similar t independent supervisor suggestion of [7] yet we believe that less biased evidence is gathered when independent researche conduct field experiments and replicate them across countries, than when national supervisors, constrained in the national sector hierarchy, conduct them.

Investigators would observe

$$\frac{TR}{MA} = \frac{TR}{TR + UM}$$

as described in Fig 2. In this case, the expected sanctions would be

$$S = supS * \left(1 - \frac{TR}{TR + UM}\right)$$

where *supS* represents the material sanction imposed oncountries that did not correctly react to any of the money launderi attempts (e.g. no suspicion report,no investigation). If countries and reporting entities are risk neutral economic agents, the wouldmaximize their utility function, which this time is $\min_{TR} S$. This implies that all obliged entities willreport all money laur transactions and never file a false positive, thereby maximizing the payoff of the principle $u(i) = max(TR_i)$. Our theoretical re obviously an extreme corner solution. Consequently, we expect that conducting randomized control trials will not eliminate laundering. Nevertheless, it has the highest potential to raise the payoff of the FATF most.

Conclusion

In the international fight against money laundering and terrorist financing the FATF evaluates countries' anti-money launder policies. One of the parameters it uses is the number of reports on a suspicion of money laundering that the FIU in each co receives. The FATF uses this as a metric for the responsiveness of the private sector to the money laundering threat. The underlying assumption is that more reports are the result of the private sector truthfully reporting more. Thus, with little consideration to the risks of information pollution, countries with more reports are regarded as more effective in the fight ag money laundering. The question is whether statistics like the number of suspicion reports can correctly assess the effective the fight against money laundering [12].

In this paper, we argue that modeling the country as an intermediate agent whose welfare depends on the welfare of the re entities allows us to solve the paradox of the ever emptying FATF blacklists. Building on the growing empirical literature tha questions the reliability of national statistics due to international pressure, we argue that there is merit to not viewing nation governments as proportional representations of the FATF and instead as proportional representations of their national priva sector. We employ a principal-agent model with multiple agents and show that the current absence of a harmonized legal d

of a suspicion report may lead countries to engage in strategic behavior–namely to change reporting requirements such tha national statistics are altered in a way that the FATF cannot punish the country for non-compliance and at the same time th reporting entities are not overburdened with costly reports.

Despite recognizing the significant differences in what constitutes a suspicion report, the FATF uses this metric of effort in t mutual evaluation reports, thereby reinforcing the rational for countries to engage in strategic behavior. On the basis of our theoretical model and analysis, we argue that the FATF has two policy options which can remedy the inefficiency of the sta The FATF can harmonize the definition of a suspicion report in all the countries in the world. Alternatively, the FATF can ma of randomized control trials to examine the extent to which, when faced with the same suspicious transaction, different obli entities report their suspicion and trigger an investigation into the case.

Finally, if the FATF continues to use this metric without harmonization and without a complementary randomized control tria argue that more research needs to be conducted to reveal the mechanisms through which strategic behavior occurs at a na level and to reveal the magnitude thereof.

Supporting information

S1 Appendix. SR dynamics in blacklisted countries.
https://doi.org/10.1371/journal.pone.0218532.s001
(DOCX)

References

1. Methodology for assessing compliance with the FATF 40 Recommendations and the FATF 9 Special Recommendations [Internet]. Paris: FATF-OECD; 2018. Available from: www.fatf-gafi.org/media/fatf/documents/methodology/FATF%20Methodology%2022%20Feb%202013.pdf
2. Unger B, Ferwerda J. Regulating Money Laundering and Tax Havens: The Role of Blacklisting. In: Sabitha A, editor. Combating Money Launde Transnational Perspectives. Icfai University Press; 2009. (Corporate Law series of Amicus Books).
3. Ayres I, Braithwaite J. Responsive Regulation: Transcending the Deregulation Debate. Oxford University Press; 1995. 266 p.
4. Wainwright T. Narconomics—How to run a Drug Cartel. London, UK: Ebury Press; 2017.
5. Findley MG, Nielson DL, Sharman J. Global Shell Games: Experiments in Transnational Relations, Crime, and Terrorism. Cambridge University 2014. 266 p.
6. Takáts E. A Theory of "Crying Wolf": The Economics of Money Laundering Enforcement. Journal of Law, Economics, & Organization. 2011;27(1 View Article • Google Scholar
7. Dalla Pellegrina L, Masciandaro D. The Risk-Based Approach in the New European Anti-Money Laundering Legislation: A Law and Economics Review of Law and Economics. 2009;5(2):931–52. View Article • Google Scholar
8. Unger B, Van Waarden F. How to Dodge Drowning in Data? Rule- and Risk-Based Anti-Money Laundering. Review of Law and Economics. 2009;5(2):953–85. View Article • Google Scholar
9. Geiger H, Wuensch O. The fight against money laundering: An economic analysis of a cost-benefit paradoxon. Journal of Money Laundering C 2007;10(1):91–105. View Article • Google Scholar
10. Costa S. Implementing the New Anti-Money Laundering Directive in Europe: Legal and Enforcement Issues.The Italian Case. Global Business Economics Review. 2008;10(3):238–308. View Article • Google Scholar
11. Gelemerova L. On the frontline against money-laundering: the regulatory minefield. Crime Law and Social Change. 2009;52(1):9–32. View Article • Google Scholar
12. Levi M, Reuter P, Halliday T. Can the AML system be evaluated without better data? Crime Law Soc Change. 2018 Mar 1;69(2):307–28. View Article • Google Scholar
13. Michalski T, Stoltz G. Do Countries Falsify Economic Data Strategically? Some Evidence That They Might. The Review of Economics and Statis 2013;95(2):591–616. View Article • Google Scholar
14. Rauch B, Göttsche M, Brähler G, Engel S. Fact and Fiction in EU-Governmental Economic Data. German Economic Review. 2011;12(3):243–5 View Article • Google Scholar
15. Deleanu IS. Anti-Money Laundering Efforts—Failures, Fixes and the Future [Internet]. 2015 [cited 2018 May 21]. Available from: http://dspace.library.uu.nl/handle/1874/325583

View Article • Google Scholar

16. Deleanu I. Do Countries Consistently Engage in Misinforming the International Community about Their Efforts to Combat Money Laundering? E Using Benford's Law. PLOS ONE. 2017;12(1).
View Article • Google Scholar

17. Holmstrom B, Milgrom P. Multitask Principal-Agent Analyses: Incentive Contracts, Asset Ownership, and Job Design. Journal of Law, Economic Organization. 1991;7:24–52.
View Article • Google Scholar

18. Unger B, Ferwerda J, Broek M van den, Deleanu I. The Economic and Legal Effectiveness of the European Union's Anti-Money Laundering Po Cheltenham, UK; Northampton, MA, USA: Edward Elgar Pub; 2014. 264 p.

19. Masciandaro D, Takats E, Unger B. Black Finance: The Economics of Money Laundering. illustrated edition. Cheltenham, UK; Northampton, M/ Elgar Pub; 2007. 257 p.

20. Pieth M, Aiolfi G. The private sector become active: The Wolfsberg process. Journal of Financial Crime. 2003;10(4):359–65.
View Article • Google Scholar

21. FATF 40 Recommendations. Paris: FATF-GAFI/ OECD; 2003.

22. Erp J. Naming without shaming: The publication of sanctions in the Dutch financial market. Regulation & Governance. 2011;5:287–308.
View Article • Google Scholar

23. Braithwaite J. Crime, Shame and Reintegration. 1St Edition edition. Cambridge Cambridgeshire; New York: Cambridge University Press; 1989.

24. Ferwerda J, Unger B. Interview with Greg Rawlings. 2005.
View Article • Google Scholar

25. Report on Non-cooperative Countries and Territories [Internet]. Brussels, Belgium: FATF-GAFI/ OECD; 2000. Available from: www.fatf-gafi.org/dataoecd/57/22/33921735.pdf

26. FATF Public Statement [Internet]. 2013 [cited 2018 Dec 20]. Available from: http://www.fatf-gafi.org/publications/high-riskandnon-cooperativejurisdictions/documents/public-statement-june-2013.html

27. FATF Public Statement [Internet]. 2015 [cited 2018 Dec 20]. Available from: http://www.fatf-gafi.org/publications/high-riskandnon-cooperativejurisdictions/documents/public-statement-february-2015.html

28. International Consortium of Investigative Journalists [Internet]. ICIJ. [cited 2018 Dec 20]. Available from: https://www.icij.org/

29. Winter D, Milne R. Danske: anatomy of a money laundering scandal [Internet]. Financial Times. 2018 [cited 2019 Mar 19]. Available from: https://www.ft.com/content/519ad6ae-bcd8-11e8-94b2-17176fbf93f5
View Article • Google Scholar

30. Anti-money laundering and counter-terrorist financing measures: The Kingdom of Denmark [Internet]. Brussels, Belgium: FATF-GAFI/ OECD; 2 Assessment). Available from: http://www.fatf-gafi.org/media/fatf/documents/reports/mer4/MER-Denmark-2017.pdf

31. FIU An-nu-al Re-port: Germany [Internet]. Wiesbaden, Germany: Bundeskriminalamt; 2015. Available from: https://www.bka.de/SharedDocs/Downloads/EN/Publications/AnnualReportsAndSituationAssessments/FIU/fiuJahresbericht2015Englisch.html;j

32. FIU Annual Report: Hungary [Internet]. Budapest, Hungary: National Tax and Customs Administration; 2015. Available from: https://en.nav.gov.hu/anti_money_laundering/Annual_reports_semi_annual_reports

33. Supplemented Latvian National money laundering/terrorism financing risk assessment report [Internet]. Office for Prevention of Laundering of P Derived from Criminal Activity (FIU Latvia); 2018. (National ML/TF risk assessment). Report No.: 2. Available from: http://www.kd.gov.lv/images/Downloads/useful/ML_TF_ENG_FINAL.pdf

34. The implementation of the Act of 16 November 2000 on counteracting money laundering and terrorist financing [Internet]. Warsaw, Poland: Ger Inspector of Financial Information; 2016. Available from: https://www.mf.gov.pl/en/c/document_library/get_file?uuid=14912b5e-2956-4cbd-8a31 1009929af9e7&groupId=764034

35. ANNUAL REPORT BY THE MONEY LAUNDERING REPORTING OFFICE SWITZERLAND MROS [Internet]. Berne, Switzerland: Federal Offi Police; 2015. Available from: https://www.fedpol.admin.ch/dam/data/fedpol/kriminalitaet/geldwaescherei/jabe/jb-mros-2015-e.pdf

36. SARs Annual Report 2015 [Internet]. London, UK: National Crime Agency; 2015. Available from: http://www.nationalcrimeagency.gov.uk/publications/suspicious-activity-reports-sars/677-sars-annual-report-2015

37. Anti-Money Laundering and Combating the Financing of Terrorism: The Kingdom of Denmark. Brussels, Belgium: FATF-GAFI/ OECD; 2006. (3

38. Anti-Money Laundering and Combating the Financing of Terrorism: Hungary. Brussels, Belgium: Moneywal; 2005. (3rd Round).

39. Third Round Mutual Evaluation Report on Germany. Paris: FATF-GAFI/ OECD; 2010.

40. Baron DP, Myerson RB. Regulating a monopolist with unknown costs. Econometrica: Journal of the Econometric Society. 1982;50(4):911–30.
View Article • Google Scholar

41. Tirole J. Hierarchies and bureaucracies: On the role of collusion in organizations. Journal of Law, Economics and Organization. 1986;2(2):181–
View Article • Google Scholar

42. Maskin E, Riley J. Monopoly with incomplete information. The RAND Journal of Economics. 1984;15(2):171–96.
View Article • Google Scholar

43. Ross S. The Economic Theory of Agency: the Principal's Problem. The American Economic Review. 1973;63(2):134–9.
View Article • Google Scholar

44. Schott PA. Reference guide to anti-money laundering and combating the financing of terrorism. Washington DC: World Bank; 2006. (World Ban
Publications).

45. Platt S. Bribery And Corruption. In: Criminal Capital [Internet]. Palgrave Macmillan UK; 2015 [cited 2016 Apr 23]. p. 84–103. Available from:
http://link.springer.com/chapter/10.1057/9781137337306_5

46. Masciandaro D, Filotto U. Money Laundering Regulation and Bank Compliance Costs: What Do Your Customers Know? Economics and the Ita
Experience. Journal of Money Laundering Control. 2001;5(2):133–45.
View Article • Google Scholar

47. Review to Identify Non-Cooperative Countries or Territories: Increasing the Worldwide Effectiveness of Anti-Money Laundering Measures [Inter
FATF-GAFI/ OECD; 2001. Available from: http://www.fatf-gafi.org/media/fatf/documents/reports/2000%202001%20NCCT%20ENG.pdf

48. Gnutzmann H, McCarthy KJ, Unger B. Dancing with the devil: Country size and the incentive to tolerate money laundering. International Reviev
and Economics. 2010;30(3):244–52.
View Article • Google Scholar

49. Schwartz P. Money launderers and tax havens: Two sides of the same coin? International Review of Law and Economics. 2011;31(1):37–47.
View Article • Google Scholar