STUDIES IN THE POLITICAL ECONOMY OF ANTI-MONEY LAUNDERING REGULATION

Karen Nershi

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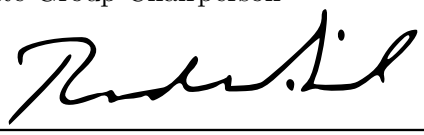
Supervisor of Dissertation

Beth Simmons
Andrea Mitchell University Professor in Law, Political Science and Business Ethics

Graduate Group Chairperson



Rudra Sil
Professor of Political Science

Dissertation Committee

Beth Simmons, Andrea Mitchell University Professor in Law, Political Science and Business Ethics

Edward D. Mansfield, Hum Rosen Professor of Political Science

Julia Gray, Associate Professor of Political Science

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[1] All mistakes are my own.

ABSTRACT

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Karen Nershi

Beth Simmons

Money laundering causes significant societal harm through its connection to predicate crimes. Efforts to address money laundering must be coordinated at the international level because the global financial system allows individuals to easily move funds across borders. Despite the importance of this topic for international relations, the dynamics of how, why, and when states cooperate to address money laundering remain poorly understood. This dissertation presents three studies that begin to shed light on these questions. Using the synthetic control method, we test whether states experience economic harm following news of a major money laundering investigation. To enable this research, we collected a first-of-its-kind dataset of money laundering investigations based on news coverage in two major international newspapers, which provides insight into which countries carry out investigations and where investigated entities are located. We also test whether states experience economic losses after being placed on the "blacklist" of an international organization, the Financial Action Task Force (FATF), using the synthetic control method. Our results support the conclusion that although states experienced economic harm following blacklisting by the FATF, there is no clear evidence of reputational harm (measured by economic losses) following news of a major money laundering investigation. We also measure how well countries enforce a new anti-money laundering law for cryptocurrency by collecting transactions directly from cryptocurrency exchanges, which allows customers to trade cryptocurrency for government-issued currency. Use bunching estimation and instrumental variable estimation, we show that countries vary in how stringently they enforce the new law; this finding sug-

gests that current evaluation methods (including at the international level) do not adequately measure how well countries enforce these laws, hindering international efforts to obtain a high level of efficacy across countries. Our results call for the continued empirical study of international-level efforts to combat money laundering.

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Abstract

An important factor in the global adoption of anti-money laundering laws was the use of a blacklist by the Financial Action Task Force (FATF), an international organization dedicated to coordinating the fight against money laundering. Although the blacklist is now defunct, it was an extremely effective tool that allowed the FATF to bring about widespread policy changes in a short period of time. Despite near universal recognition of its success, there is a lack of consensus about how the blacklist functioned and whether it caused financial harm to listed states. We explore several explanations of how blacklisting functioned and argue it primarily relied on economic coercion enabled by the FATF's powerful members. We then test whether blacklisting caused economic harm to listed countries using the synthetic control method, which enables causal estimates by creating a counterfactual "synthetic" control unit using a weighted average of like countries. We find that blacklisting contributed to lower gross domestic product (GDP) per capita in the decade after blacklisting for one third of the countries in the sample. Based on these findings, we argue that blacklisting's legacy as a tool of economic coercion – along with the very real consequences for some listed countries – can help explain the rapid global diffusion of anti-money laundering laws and continues to influence international efforts to address money laundering today.

1.1 Introduction

Money laundering remains a major international problem despite widespread adoption of anti-money laundering laws.[1] Money laundering (i.e., the process by which criminals disguise and integrate illegal funds into the legitimate financial system) harms society primarily through its connection to "predicate crimes" that create funds for laundering. One of the fundamental goals of anti-money laundering laws is to decrease crime by catching criminals or discouraging them from committing crimes in the first place by limiting their ability to use illegally-obtained funds.[2] Importantly, implementing these laws requires a coordinated global response because criminals often launder funds in countries other than where initial crimes were committed.[3] Although traditional knowledge holds that failure to enforce anti-money laundering laws is primarily a problem for poor countries and so-called "tax havens,"[4] growing evidence shows that lapses are widespread and also happen in wealthy Western countries.

One major area of weakness is customer due diligence laws, which require banks to screen their customers for money laundering risk. Some lapses have been revealed through data leaks, such as a major data breach from HSBC Switzerland that showed Swiss bankers had helped clients hide €180.6 billion from tax authorities.[5] Another data leak, the Panama Papers, revealed that banks and law firms around the world had routinely violated anti-money laundering laws and conducted business with tax evaders, corrupt officials, members of organized crime, and even terrorists.[6] Similarly, recent field experiments shows that banks often fail to ade-

[1] Ninety-six percent of states are compliant or largely compliant with the FATF's directive to criminalize money laundering.

[2] In 2012, the FATF amended its recommendations to include tax evasion as a predicate crime for money laundering.

[3] For example, money laundering case show heads of Mexican drug cartels have extensively used U.S. banks to launder funds. (U.S. Department of Justice 2012)

[4] Schwarz 2011.

[5] Michel, Davet, and Lhomme 2017.

[6] Lipton and Creswell 2016.

quately screen their customers for money laundering risk as required by law. Surprisingly, wealthy countries were among the worst offenders, with compliance rates in the United States and United Kingdom at 30% and 52% respectively.[7] These data leaks, experimental evidence, and money laundering cases reveal the breadth of failures to enforce anti-money laundering laws worldwide.

Given these major lapses in enforcement, social scientists seek to better understand the mechanism(s) that led countries to adopt and enforce anti-money laundering laws in order to better understand behavior in the anti-money laundering regime. One such potential mechanism is economic costs caused directly by money laundering itself. Indeed, some scholars argue that money laundering causes significant economic harm for countries, including decreased foreign investment,[8] financial instability,[9] and poor economic growth.[10] This presents a generally optimistic prognosis – if counties are motivated to enforce anti-money laundering laws because they prevent economic harm, the countries with the means to do so will enforce anti-money laundering laws to protect their economies from harm. However, despite the ubiquitousness of this argument in the anti-money laundering literature, there is little documented evidence that money laundering itself causes harm at the national level.[11]

Another potential mechanism that led countries to adopt anti-money laundering laws is the risk of sanctioning by an international organization. Beginning in 2000, the Financial Action Task Force (FATF) – an international organization dedicated to combating money laundering – placed 21 countries on its list of "Non-Cooperative Countries and Territories," which became known as the blacklist; FATF members (including many OECD countries) responded by issuing financial advisories or other sanctions against blacklisted countries until the FATF deemed them compliant and

[7] Findley, Nielson, and Sharman 2014, p. 76.
[8] Morse 2019.
[9] Quirk 1997.
[10] Masciandaro, Takats, and Unger 2007.
[11] Reuter 2013; Levi, Reuter, and Halliday 2018.

removed them from the list. Although scholars agree that blacklisting was an extremely effective tool in bringing about widespread policy changes, they disagree as to how this process functioned and whether it caused financial harm to blacklisted states.

We explore explanations from the literature about how blacklisting functioned and argue that it relied on the threat and use of economic restrictions by powerful FATF members to pressure states into making policy changes. We test whether blacklisting caused significant economic harm to countries using the synthetic control method, which enables causal estimates by generating a counterfactual "synthetic" control unit using a weighted average of like countries. We find that blacklisting contributed to lower gross domestic product (GDP) per capita in the decade after listing for one third of the countries in our sample. Importantly, the size of the services sector appears to have mediated the economic impact of blacklisting, with poorer countries virtually unaffected while wealthier countries with larger service sectors experienced more economic harm. Accordingly, we argue that blacklisting's legacy as a tool of economic coercion – along with the very real consequences for some listed countries – can help explain the rapid global diffusion of anti-money laundering laws and policies, while problems measuring enforcement can help explain widespread lapses today.[12]

The rest of this paper is divided into four main parts. First, we provide background about the process of blacklisting and explore three explanations from the literature about how this process functioned. Next, we detail our research design and discuss our results. We then discuss several conclusions about the legacy of blacklisting and offer a few concluding thoughts about the FATF's role in promoting international cooperation today.

[12]Nershi 2021a.

1.2 Understanding Blacklisting

1.2.1 FATF Formation and Blacklisting

The G7 countries formed the FATF as a temporary task force in 1989. The FATF's initial mandate was to help coordinate the international response to illegal financial flows stemming from the illegal drug trade, an effort it began by drafting a set of policy recommendations for best practices to combat money laundering. The FATF released these recommendations one year later and then began reviewing member states progress toward these goals; to do this, the FATF established a process of peer review called Mutual Evaluation Reports. Completed by a team of assessors from FATF member states, these periodic reports provide technical evaluations of how states' legal and regulatory systems compare to the FATF's standards. Using this process, the FATF was able to achieve a high level of policy convergence from its members during the 1990s.[13]

Near the end of the decade, the FATF turned its attention outward toward non-members. The FATF and the G7 countries began encouraging non-members to adopt the FATF's standards by offering technical assistance and other material support, leading many countries to incorporate these new standards into national law.[14] Not all countries were willing to comply, however, as small countries with large financial sectors in particular faced a strong incentive to resist these standards since they challenged the right to financial secrecy.[15] Thus, the FATF turned to a new process to push reluctant states to adopt these standards – the blacklist.

In February 2000, the FATF published criteria and a timeline for reviewing countries for inclusion on a list of "non-cooperative countries and territories in the

[13] One exception to the cooperative nature of this process occurred when the FATF threatened to remove Austria as a member if the country did not agree to drop one of its financial secrecy laws, which it did (Sharman 2009).

[14] Hülsse 2008.

[15] Simmons 2001.

Table 1.1: New Members Admitted to the FATF

Plenary Year	**New Members**
1989	Canada, France, Germany, Italy, Japan, United Kingdom, United States, European Commission, Australia, Austria, Belgium Luxembourg, Netherlands, Spain, Sweden, Switzerland
1990-91	Denmark, Finland, Greece, Ireland, New Zealand, Norway, Portugal, Turkey, Hong Kong, and the Gulf Cooperation Council
1991-92	Iceland and Singapore
1999-00	Argentina, Brazil, and Mexico
2002-03	South Africa and the Russian Federation
2006-07	People's Republic of China
2009-10	Korea and India
2015-16	Malaysia
2018-19	Israel

Source: Financial Action Task Force 2019, p. 69.

international fight against money laundering;"[16] this document also included a menu of economic "countermeasures" FATF members should be ready to implement if directed to by the FATF, which ranged from issuing financial advisories up to full economic sanctions.[17] In the next few months, the FATF reviewed 29 jurisdictions and placed 15 on the first blacklist, which was issued in June.[18]

Blacklisting sparked swift and decisive action from nearly all listed jurisdictions. The four biggest offshore financial centers on the list – the Bahamas, Cayman Islands, Liechtenstein, and Panama – responded by quickly meeting all the FATF's demands.[19] Another seven countries – the Cook Islands, Dominica, Israel, Lebanon, the Marshall Islands, St. Kitts and Nevis, and Russia – made significant concessions, while three others – Niue, Philippines, and St. Vincent and the Grenadines – took actions that allowed them to avoid sanctioning by FATF members. Only one country, Nauru, did not make concessions quickly enough to satisfy the FATF, leading the United State and other FATF members to impose full economic sanctions against the country; the FATF later removed Nauru from the blacklist several years later after implementing major policy changes.[20]

The following year, the FATF reviewed another 18 countries and territories and placed another 8 on the blacklist.[21] These countries also responded quickly to the FATF's stipulations and avoided full sanctions by FATF members. The FATF then abruptly suspended review of new countries for the list in 2002, but continued to review the progress of blacklisted countries until 2006, when the last country was removed from the list.

By nearly all accounts, the blacklist was extremely successful in bringing about policy changes in listed countries.[22] Blacklisting led 73% of listed countries to im-

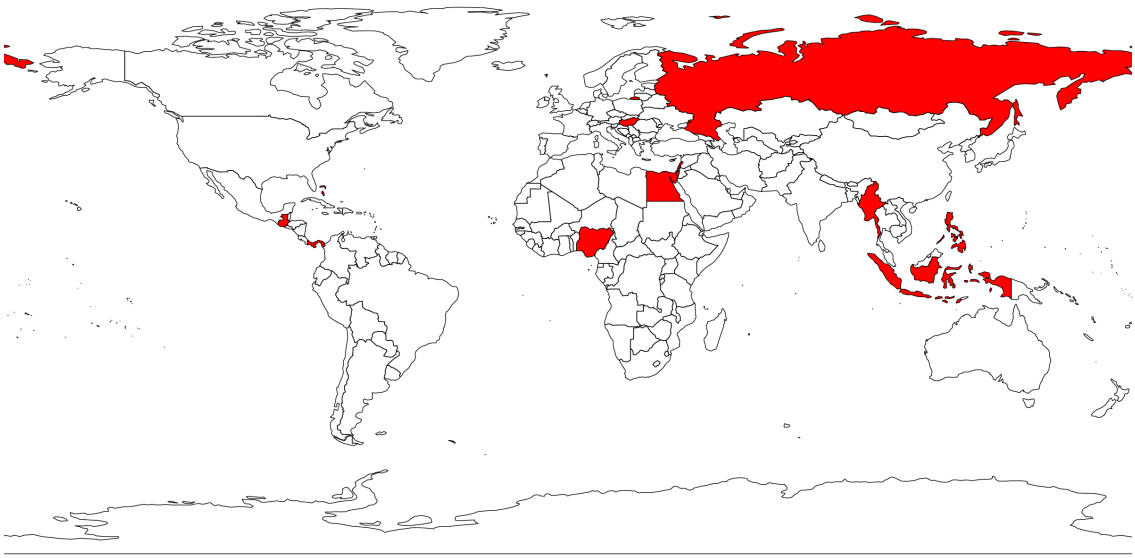
[16]Financial Action Task Force 2000, p. 1.
[17]For simplicity, we refer to FATF member states as FATF members.
[18]Drezner 2003.
[19]Eggenberger 2018.
[20]Drezner 2003.
[21]Sharman and Chaikin 2009.
[22]Sharman 2009; Sharman and Chaikin 2009; Drezner 2008; Eggenberger 2018; Hülsse 2008.

plement major concessions,[23] and it is also credited with having created a "demonstration effect" that led other reluctant countries to adopt policies to avoid being listed.[24] The FATF also judged blacklisting to be a success, with a representative commenting, "[O]verall the [blacklist] has proved to be a very useful and efficient tool to improve worldwide implementation of the FATF 40 Recommendations."[25] Despite wide recognition of its effectiveness, scholars have proposed several different explanations for how the list functioned, three of which – market driven enforcement, naming and shaming, and economic coercion – we examine in the next section.

Why is understanding how blacklisting functioned important? Chiefly, it can help put the findings regarding blacklisting's economic costs into context, especially since the proposed explanations yield very different conclusions about the process. On the one hand, market driven compliance describes a decentralized process in which economic actors acting in their own self interest create economic pressure that may lead states to implement new policies. On the other hand, economic coercion suggests that blacklisting was primarily a state-driven process in which powerful states imposed partial restrictions on listed states and threatened more if they did not comply. Somewhere between these two lies a naming and shaming explanation, whereby states played an important role in the process by issuing economic advisories, but both market actors and states responded to this new information in a way that created costs for countries. After considering each of these explanations, we argue that a process of economic coercion best describes how blacklisting led to policy change, as the FATF instructed its members to impose economic countermeasures against blacklisted states.

[23] Drezner 2003.
[24] Drezner 2005, pp. 852–853.
[25] Hülsse 2008.

Figure 1.1: Blacklisted Countries



1.2.2 Market Driven Compliance

One explanation for how blacklisting functioned is market driven compliance. This explanation rests on the idea that the blacklist served as a source of information for market actors by identifying countries that are at risk for money laundering; investors and financial institutions, who are concerned about the safety of their funds, respond to this information by shifting capital away from listed countries toward safer ones. Importantly, there is no need for coordination on the part of market actors;[26] rather, each investor acting in her own self-interest contributes to a changing wave of capital flows that, in the aggregate, holds the power to inflict significant costs on a state that may lead it to implement policy changes.

Morse (2019) argues that market driven compliance explains how a subsequent FATF noncomplier list – the so-called greylist – functioned, and we examine her broader theoretical argument as an explanation for blacklisting. Morse (2019)'s work is part of a new body of literature that examines how global performance in-

[26]Tomz (2012) makes this point in the context of sovereign debt lending.

dicators – regularized public ratings of a state's performance for a given issue – can bring about policy change. The thesis behind this research is that by simplifying complex information, global performance indicators can impact state behavior by leveraging states' concerns about reputation. Though scholars have identified several channels through which global performance indicators might create reputation concerns for states,[27] Morse (2019) focuses on one particular channel of influence: transnational market pressure.

Specifically, Morse (2019) argues that unlike Mutual Evaluation Reports – which are several hundred pages long, highly technical, and may be up to eight years old[28] – the FATF's noncompliance lists offer clear, up-to-date information about which countries pose money laundering risk. Because market actors seek reliable information about market conditions, they respond to this information by moving resources away from listed jurisdictions to others that pose less risk. Thus, noncomplier lists shapes how investors and banks view the market by "reduc[ing] uncertainty about country risk and serv[ing] as heuristics that shape expectations about market sentiments."[29] However, there are a few problems when considering this process as an explanation for blacklisting.

State Intervention

First, states played a major role in directing how markets responded to blacklists, as the FATF relied on its members to implement countermeasures against blacklisted states. At the minimum, FATF members agreed to issue financial advisories against blacklisted states, which required intermediaries in these countries to perform enhanced customer due diligence for all transactions involving a listed country. This imposed additional costs on intermediaries, which already face significant costs

[27] Kelley and Simmons 2019; Kelley and Simmons 2015; Kelley and Simmons 2020.
[28] Levi, Reuter, and Halliday 2018.
[29] Morse 2019, p. 514.

from compliance programs more generally.[30] Indeed, costly compliance measures often lead banks to engage in de-risking, whereby they abrogate business relations with specific types of customers, or even all customers from a specific country, because they are deemed not worth the compliance hassle.[31] Further, because FATF members included the world's biggest and most sophisticated economies, whatever countermeasures they imposed were multiplied by their combined market power. Thus, though some financial institutions severed relations with blacklisted countries, this may have been because the costs of compliance were too high rather than because financial institutions were concerned about reputational harm or the risks posed by money laundering itself.

In addition to financial advisories, some countries also imposed economic restrictions *beyond* the FATF's recommendations; Argentina, for example, issued financial restrictions against blacklisted countries and did not remove these until years after the countries were delisted by the FATF.[32] Further, intermediaries in the United States in particular may have also feared an increased risk of prosecution in money laundering cases involving one of the blacklisted countries given their enhanced political salience.[33] Thus, while markets imposed costs on blacklisted countries, this occurred primarily through state coordination that required intermediaries to participate in national countermeasures.

Legitimacy Concerns

Another reason market driven compliance does not serve as a good explanation of blacklisting is that unlike in the literature on global performance indicators, which emphasizes that indicators must come from a credible source in order to influence states' behavior,[34] the FATF's role in blacklisting was criticized by many countries

[30] See Levi, Reuter, and Halliday (2018) for a discussion of these costs.
[31] Levi, Reuter, and Halliday 2018.
[32] Sharman 2010a.
[33] Balakina, D'Andrea, and Masciandaro 2017.
[34] Kelley and Simmons 2015; Kelley and Simmons 2019; Doshi, Kelley, and Simmons 2019.

as illegitimate.[35]

In particular, many smaller states argued that the process amounted to a group of powerful countries imposing rules on developing countries. For example, a representative of Antigua called the FATF the "creation of a handful of rich countries" and declared it unacceptable that "a handful of states, however powerful, should usurp the right to dictate standards to the rest of the world under the threat of imposition of sanctions;"[36] similarly, another representative of Caribbean states called blacklisting a form of "fiscal colonialism."[37] Thus, many small countries opposed the process of blacklisting by arguing that it violated state sovereignty.[38]

Developing countries also raised concerns about how the process functioned in practice. The FATF reviewed select countries for blacklisting, but there was no clear criteria for how it selected countries to review. Indeed, the FATF did not review any of its members for blacklisting, and if it had, it would have been forced to blacklist two of its members (Switzerland and Luxembourg). The FATF also reviewed countries for blacklisting according to a more stringent set of criteria than its 40 Recommendations, which it used to evaluate efforts by its members.[39] This led to some cases where the FATF required more exacting standards for blacklisted countries than those maintained by its members, such as when the FATF required that the Bahamas license all financial institutions to be removed from the blacklist even though no FATF country had similar requirements.[40] Accordingly, frustrations with this process led a representative of Liechtenstein to comment: "[Liechtenstein] considers the decision of the FATF unreasonable, particularly since FATF's pro-

[35]Kelley and Simmons (2019, pp. 6–7) note that a source of legitimate authority is trust, which "develops out of a perception that an actor is fair, knowledgeable, and/or competent" and note that a key source of legitimacy for non-state actors is independence from powerful political actors. In the case of blacklisting, however, many states did not view the FATF as an unbiased actor or the process of blacklisting as legitimate.

[36]Hülsse 2008, p. 464.

[37]Sanders 2002.

[38]Sharman 2011; Drezner 2003; Hülsse 2008; Eggenberger 2018.

[39]Eggenberger 2018.

[40]Sharman 2011.

cedures at no point demonstrated the transparency that could be expected in a process of such gravity."[41]

Thus, market driven compliance cannot adequately explain the blacklisting process since states played a fundamental role in coordinating the actions of markets and many voiced serious concerns about the legitimacy of the FATF. Market driven compliance also cannot explain why the FATF dispensed with such a powerful tool so soon after its introduction.

1.2.3 Naming and Shaming

Another potential explanation for how blacklisting functioned is as a form of "naming and shaming" that created reputational costs for listed countries,[42] as scholars argue that inter-governmental and international organizations can impact state behavior by identifying states that have performed poorly in a certain area. This act of identifying a state as a poor performer holds the constitutive power to transform how actors – including the state itself – view the issue. Thus, the act of naming by an organization can create pressure on the state (shaming) that may lead internal or external actors to push for policy change.[43] Indeed, one might argue that the very act of placing a state on a blacklist is a form of shaming since it publicly "highlight[s] actions or practices that are inconsistent with international norms."[44]

A naming and shaming explanation is similar to a market driven explanation in that both hinge on the role of reputation, although the target audience for naming and shaming is generally much larger. This target audience may include domestic elites – who view their country's reputation as an important asset and may be embarrassed by negative international attention, leading them to take action; do-

[41] Hülsse 2008, p. 465.

[42] Sharman 2009; Eggenberger 2018; Sharman and Chaikin 2009; Masciandaro 2005; Masciandaro 2008; Balakina, D'Andrea, and Masciandaro 2017.

[43] Joachim, Reinalda, and Verbeek 2007; Hendrix and Wong 2013; Lebovic and Voeten 2006; Murdie and Davis 2012.

[44] Eggenberger 2018, p. 483.

mestic constituents – who may capitalize on the international salience of an issue to pressure their government to make changes; and even government actors themselves – who may use the increased international salience of an issue as justification for pushing through reforms that unpopular domestically.[45] Another difference between the two explanations is that while the scholarship on global performance indicators emphasize that ratings must come from a credible source in order to be influential, the literature on naming and shaming generally does not make an *a priori* judgment about the objectivity of the process through which states are "named."

Accounts that identify blacklisting as a form of naming and shaming emphasize that reputation is a key asset for countries seeking to attract foreign investment, and thus jurisdictions with major financial centers are especially sensitive to reputational concerns.[46] Accordingly, blacklisting stigmatized countries by associating them with criminal activity, which is something actors in blacklisted countries considered much worse than be being called "tax havens."[47] Although some countries did express concern that blacklisting harmed their reputations,[48] we argue that the primary way blacklisting functioned was by leveraging the economic power of its member states.

1.2.4 Economic Coercion

A third explanation for how blacklisting functioned is as a form of economic coercion. Proponents of this theory argue that blacklisting relied on the coordinated actions of FATF members to threaten states with economic restrictions if they did not comply with the FATF's standard,[49] and we argue this explanation is most convincing given that the process was political and driven by powerful states.

[45] Simmons 2010.
[46] Sharman 2009; Eggenberger 2018.
[47] Eggenberger 2018.
[48] For example, nearly all blacklisted states expressed displeasure at being included in a list with some of the *other* blacklisted states (Eggenberger 2018).
[49] Drezner 2003; Drezner 2008.

We have already established that elements of the blacklisting process can be considered unfair in that non-FATF members were treated differently than FATF members. In some cases, this can be traced directly to politics behind the scenes; Switzerland, for example, was able to withstand pressure to limit its financial secrecy laws due to a tacit agreement with Britain. Although Swiss representatives had previously argued that British trusts created a loophole for tax evaders, Switzerland agreed to drop these objections in exchange for Britain's agreement not to take issue with Swiss financial secrecy laws.[50] This sort of political horse trading was not a viable option for less powerful states, which did not hold a seat at the table during these negotiations.

Further, some argue that the true impetus behind blacklisting was the G7 countries' desire to minimize financial secrecy in offshore financial centers. Drezner (2008) argues that because developed countries stood to benefit from the coordination of international anti-money laundering standards, they had a strong incentive to push for international regulatory convergence. However, because they anticipated opposition from small financial centers and developing countries, they chose to work toward this goal through the FATF – a small organization made up of wealthy states – rather than the IMF or the World Bank, both of which had broader membership bases and consensus-based decision making.[51] Indeed, G7 countries voiced strong support for blacklisting, even going so far as to emphasize their commitment to imposing financial restrictions as part of the process:

> "We are prepared to act together when required and appropriate to implement coordinated countermeasures against those [Non-compliant Countries and Territories] that do not take steps to reform their system appropriately, including the possibility to condition or restrict financial transactions with those jurisdictions."[52]

Although it is unclear whether this was the true motivation behind blacklisting,

[50] Sharman 2009.
[51] Drezner 2008, pp. 5–11, 124–129.
[52] Drezner 2008, p. 143.

some blacklisted countries believed it to be. For example, the director of the Caribbean Financial Action Task Force (a regional FATF-style body) commented, "Caribbean countries feel there is a second agenda... to claw back revenues coming to the offshore centers because of their competitiveness."[53]

Beyond the politics involved in the process, the process itself depended on FATF members' willingness to impose economic restrictions against blacklisted countries, which is clear from firsthand accounts of states' experiences with blacklisting. One example of this comes from the Philippines, which the FATF blacklisted in June 2000 and gave until September of the following year to implement legislation meeting the FATF's standards or else face additional countermeasures. The process was rocky. As the September 30$^{\text{th}}$ deadline approached, Philippines' congress convened to pass a new set of anti-money laundering laws only to see them rejected by the FATF before the president had a chance to sign them into law. This led the president to send the laws back to congress, urging them to quickly amend the legislation so that it would meet all the FATF's standards.[54] One senator likened the situation to that of a dependent territory, commenting, "I thought the Philippines is a Republic, not a commonwealth."[55]

Drezner (2008) describes another amazing scene that unfolded in a U.S. Treasury Department meeting. Representatives of the United States and several other allies sat reviewing an unnamed country's new anti-money laundering legislation line-by-line, noting passages of unclear text or potential loopholes that the country's representative promised would be addressed through amendments. Earlier, the country in question had been blacklisted and now was responding directly to its

[53] Hülsse 2008.

[54] Garcia 2001; Casayuran 2003.

[55] Another senator's comments about the situation were even more colorful: "[The FATF's actions are] a deadly game for the independence of this country. If they don't want us to assert the rights of our people, may be they should now abolish the Senate and the House of Representatives and just appoint people in Congress who will do the bidding of their foreign masters" (Casayuran 2003).

member states.[56] This presents an incredible scene for scholars of international relations – one where concerns about state sovereignty were pushed to the side as a group of powerful states directly influenced another state's domestic legislation. Thus, we conclude that blacklisting primarily functioned as a form of economic coercion based on the power politics involved in the process and evidence from firsthand accounts.

This explanation also comports with the circumstances surrounding the FATF's suspension of blacklisting. In the 2002, the FATF was in talks with the IMF about receiving assistance completing mutual evaluation reports. Although the IMF was supportive of the FATF's goals, it took issue with the practice of blacklisting. Board members from developing countries in particular argued that the process was unfair and incompatible with the character of the IMF as an organization, which centered on consensus-based decision making and voluntary participation by states. Accordingly, the IMF made dropping blacklisting a condition to receive the organization's support, and the FATF complied.[57] These events underscore that even another international organization viewed blacklisting as too harmful.

1.3 Research Design

The existing literature has found mixed results when considering the impact of blacklisting. Balakina, D'Andrea, and Masciandaro (2017) analyze panel data for 125 countries between 1996-2014 and conclude that noncompliance lists did not cause a significant decrease in capital flows. Kudrle (2009), meanwhile, uses ARIMA (autoregressive integrated moving average) regression analysis and finds no clear effect of blacklisting: the results show a decrease in financial transactions for some countries though not for others. Lastly, Sharman (2009) employs case studies to examine the effect of blacklisting and concludes that blacklisting resulted in significant

[56] Drezner 2008, pp. xi–xii.
[57] Scott-Joynt 2002; Hülsse 2008.

financial harm for some listed countries (those with primarily institutional business) but produced little harm for others (those with more private client business).

However, several factors limit our ability to draw broad inferences based on these results. Two of these studies estimate the impact of blacklisting in models that also include other less powerful forms of sanctioning, which underestimates the potential impact of blacklisting.[58] Specific modeling choices also make it difficult to interpret the findings of one study in substantive terms.[59] And while case studies provide insight into blacklisting through interviews with key players and detailed analysis,[60] they cover only a handful of blacklisted countries and lack comparisons to counterfactuals.

Accordingly, we build on these existing studies in several important ways. First, we expand the analysis to examine more cases than those covered using case studies and analyze *only* the effect of blacklisting. Second, we account for the presence of major macroeconomic trends before and after blacklisting by removing these countries from the sample; this is important since major events like the Asian Financial Crisis greatly impacted some blacklisted countries' financial outcomes, thus biasing an estimate of the effect of blacklisting. Third, our analysis employs counterfactual estimates that offers a means of comparison for blacklisted countries; these counterfactual estimates can account for regional and international trends as well as approximate each country's unique trajectory for a given outcome. This is important since blacklisting could affect countries by causing a decrease in economic *growth* without causing a decrease in the overall levels of other outcomes, something

[58]Balakina, D'Andrea, and Masciandaro (2017) consider the impact of blacklisting and greylisting together, even though these were very different processes. Kudrle (2009) combines analysis of both FATF blacklisting and a parallel OECD effort to identify tax havens.

[59]Kudrle (2009) constructs the outcome variable as the share of country's financial transactions out of all financial transactions for tax havens in a given year. However, there is both conceptual and operational murkiness about use of the term "tax haven," and this construction of the dependent variable assumes the existence of direct and cross elasticitities across tax havens, which remains unproven. See Morais, Simioni, and Thomas-Agnan (2016) for a discussion of modeling assumptions when the outcome variable is specified as a share.

[60]Sharman 2009.

that is difficult to assess without a counterfactual estimate.

We measure the economic impact of blacklisting using the synthetic control method.[61] This method creates a synthetic control unit using a weighted combination of control units based on key characteristics of the treated unit; importantly, this method enables causal inference by estimating the counterfactual for the treated unit in the absence of an intervention. This approach provides transparency into the case selection of control unit included in the weighted average.[62] Another important advantage of the this method is that it enables comparative case studies when no individual control unit serves as a good counterfactual for the treated unit.[63] This is fundamentally the case for countries, since there are relatively few countries and each is highly idiosyncratic.

We follow the synthetic control method developed by Abadie, Diamond, and Hainmueller (2015), which we summarized here. For simplicity, we consider a case with one treated unit drawn from a sample of $J+1$ units indexed by j. We assume that the first unit ($j = 1$) undergoes the treatment, while all other units ($j = 2$ to $j = J + 1$) do not and are potential donor units that can be used to create a synthetic control unit for the treated unit. We also assume a balanced panel dataset ($t = 1, ...T$) with both pre-intervention periods (T_0) and post-intervention periods (T_1). The treated unit is exposed to a treatment effect during periods ($T_0 + 1, ...T$) with no effect from the treatment during the pre-period.

Because pre-intervention characteristics for a treated unit can be better approximated using a weighted combination of control units rather than drawing from a single control unit, we develop a vector of weights for all control units. This is represented by a $(Jx1)$ vector of weights $W = (w_2 + ... + w_{J+1} = 1)\prime$, with each untreated unit assigned a weight of $0 \leq w_j \leq 1$ and all weights summing to one $(w_2 + ... + w_{J+1} = 1)$. Weights are assigned by minimizing the difference between

[61] Abadie and Gardeazabal 2003; Abadie, Diamond, and Hainmueller 2010.
[62] Abadie, Diamond, and Hainmueller 2015.
[63] Abadie, Diamond, and Hainmueller 2015.

pre-intervention of the actual treated unit and the synthetic control unit, represented by the vector $X_1 - X_0W$. Thus, the synthetic control unit is chosen by W^*, which is the value of W that minimizes:

$$\sum_{m=1}^{k} v_m(X_{1m} - X_{0m}W)^2, \tag{1.3.1}$$

where v_m represents the weight assigned to the m^{th} variable.

The treatment effect is then estimated as the difference between post-intervention outcomes for the treated unit and the synthetic control estimate, written as

$$Y_{1t} - \sum_{j=1}^{J+1} w_j^* Y_{jt}. \tag{1.3.2}$$

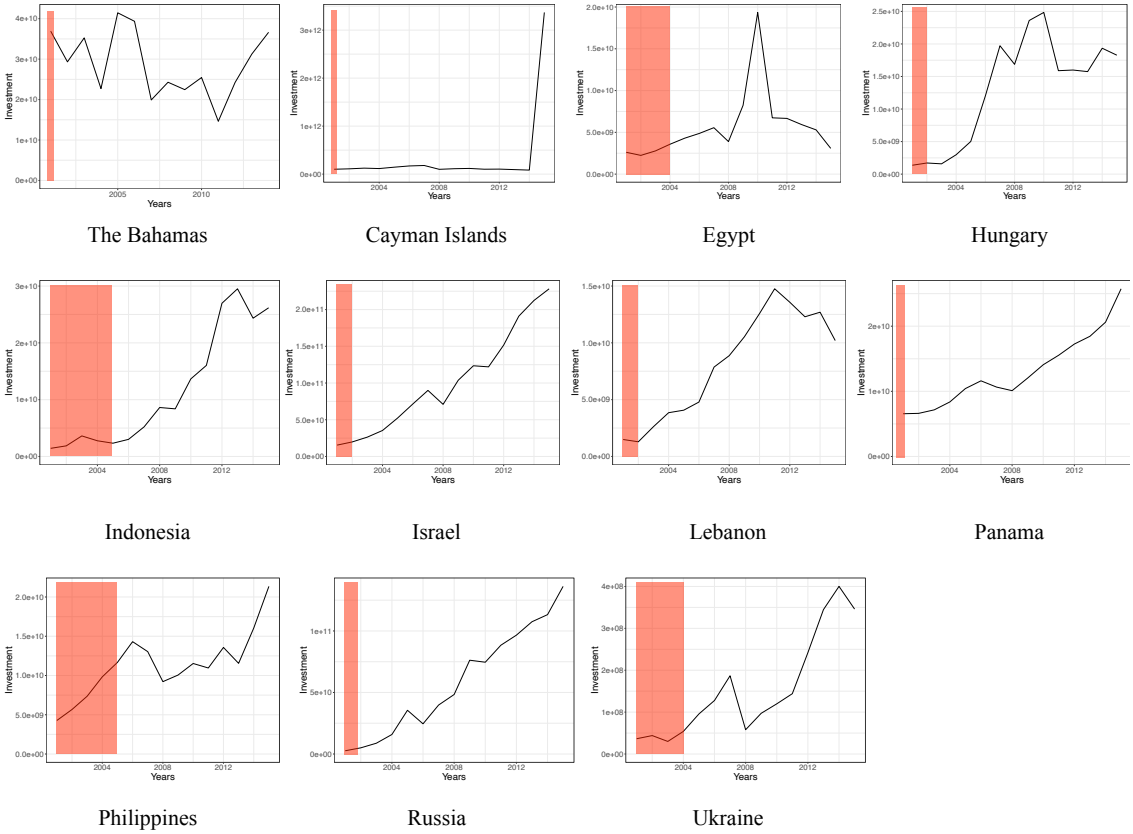
Dependent Variable

Scholars argue that the primary way blacklisting may harm countries is by leading to a decrease in foreign portfolio investment. Though some studies operationalize the outcome using cross-border bank liabilities (albeit with different specifications),[64] recent studies suggest cross-border portfolio asset investments offer a better outcome to measure the effect of blacklisting because they are a more liquid asset class than cross-border bank liabilities.[65] Figure 1.2 shows foreign portfolio investment for each blacklisted country with available data (2001-2014) using data on cross-border portfolio asset investments from the Bank of International Settlements. These graphs show that most countries did not experience a decrease in foreign portfolio investment following blacklisting, but without additional information, it is impossible to understand how these levels compare to what the total investment *would have been* without blacklisting. Thus, this outcome cannot be used to measure the impact of

[64] Balakina, D'Andrea, and Masciandaro (2017) constructs a measure of bank flows as $BankFlow_{i,t+1} = \log(\frac{BankLiabilities_{i,t+1}}{BankLiabilities_{i,t}})$, while Morse (2019) considers the log of bank liabilities for a given year.

[65] Case-Ruchala and Nance 2020.

Figure 1.2: Total Investment for Blacklisted Countries



Notes: These graphs show the yearly investment (2001-2014) for each blacklisted country with available data from the IMF Coordinated Investment Portfolio Survey dataset. Shaded portions present time spent on the blacklist.

blacklisting because data is not available for the years before blacklisting.

Accordingly, we use an aggregate measure of economic output as the dependent variable – gross domestic product (GDP) per capita. This aggregate measure can capture ways that blacklisting might harm the economy independently of foreign investment, such as if fewer new businesses are incorporated in a jurisdiction after blacklisting. However, an aggregate measure also sets a high bar for measuring a potential treatment effect since generally only major exogenous events (e.g., financial crises) impact GDP per capita. Thus, while GDP per capita offers the best outcome variable to test the effect of blacklisting given the lack of available data,

we should view this specification as a "hard test" of the prediction that blacklisting causes financial harm.

1.3.1 Covariates

We also include several covariates identified by the literature as important for predicting GDP per capita using the synthetic control method.[66] These predictors share information about the size of three major sectors of the economy – agriculture, trade, and services – as a percent of GDP.[67] We use yearly data (1990-2014) from the the World Bank World Development Indicators dataset for the dependent variable and all covariates. We choose to anlayze data starting from 1990 since there is a significant decrease in available data on both the dependent and independent variables before 1990.

1.3.2 Sample

We begin by considering all blacklisted countries and territories, displayed in Figure 1.2. We remove blacklisted countries that experienced a major macroeconomic event before or after blacklisting that impacted GDP per capita, which could confound an estimate of the impact of blacklisting. Thus, we remove countries that were affected by the Asian Financial Crisis in the late 1990s (Philippines, Indonesia), former Soviet Union countries (Russian Federation, Ukraine), and Lebanon, which experienced a war in 2006.[68] We also remove nine jurisdictions that are missing data on the dependent variable. Afterward, we are left with a sample of 165 control countries and 9 treated countries, roughly 40% of blacklisted countries and territories.

Table 1.3 shows the means for the actual and synthetic countries across the

[66] Abadie and Gardeazabal 2003; Abadie, Diamond, and Hainmueller 2015.

[67] Trade includes the percent of GDP generated by both exports and imports.

[68] Although Hungary was also a part of the Soviet Union, its GDP per capita does not show unusual activity in the pre-period.

Table 1.2: Blacklisted Countries

Country	**Years on Blacklist**	**Sample**	**Reason Excluded**
Bahamas	2000	✓	
Cayman Islands	2000	–	Missing data
Cook Islands	2000-2005	–	Missing data
Dominica	2000-2002	✓	
Egypt	2001-2004	✓	
Grenada	2001-2003	–	Missing data
Guatemala	2001-2004	✓	
Hungary	2001	✓	
Indonesia	2001-2005	–	Macroeconomic trends (*Asian Financial Crisis*)
Israel	2000-2002	✓	
Lebanon	2000-2002	–	Macroeconomic trends (*war*)
Liechtenstein	2000	–	Missing data
Marshall Islands	2000-2002	–	Missing data
Myanmar	2001-2006	–	Missing data
Nauru	2000-2005	–	Missing data
Nigeria	2001-2006	✓	
Niue	2000-2002	–	Missing data
Panama	2000	✓	
Philippines	2000-2005	–	Macroeconomic trends (*Asian Financial Crisis*)
Russia	2000-2002	–	Macroeconomic trends (*Former USSR*)
St. Kitts and Nevis	2000-2002	–	Missing data
St. Vincent and the Grenadines	2000-2003	✓	
Ukraine	2001-2004	–	Macroeconomic trends (*Former USSR*)

Notes: This tables presents all blacklisted countries and specifies which are included in the sample. Each country that was excluded from the sample has a reason specified. *Missing data* denotes jurisdictions that are missing data for the dependent variable in the pre-period. *Macroeconomic trends* denotes jurisdictions that experienced a major disruptive event before or after blacklisting.

Table 1.3: Predictor Means before FATF Blacklisting

	Agriculture		Trade		Services	
	Country	Synthetic	Country	Synthetic	Country	Synthetic
2000 Blacklist						
Bahamas	2.253	2.254	96.895	96.895	71.219	71.219
Dominica	13.730	13.730	97.655	97.655	60.386	60.386
Israel	1.554	2.015	61.865	61.902	63.956	63.955
Panama	6.739	6.777	143.642	143.648	67.798	67.797
St. Vincent & the Grenadines	9.453	9.453	105.036	105.036	60.445	60.445
Full Sample	15.777		81.803		50.179	
2001 Blacklist						
Egypt	16.132	16.132	49.261	49.262	47.786	47.786
Guatemala	24.318	24.316	43.951	43.962	55.849	55.846
Hungary	5.426	5.427	87.219	87.219	53.476	53.476
Nigeria	24.166	24.166	37.903	37.903	40.682	40.682
Full Sample	15.611		82.331			50.259

Notes: Means for the actual and synthetic controls units for each country during the pre-period for three covariates – the share of GDP (%) produced by agriculture, trade (imports and exports), and services. The full sample includes 165 control countries. The sample mean for countries listed in 2000 includes all control countries between 1990-1999, while the sample sample mean for countries listed in 2001 includes all control countries between 1990-2000.

predictors. These summary statistics confirm a close match between the actual and synthetic blacklisted countries across these variables. The breakdown of the weighted average for each country is also included in Table A.1 in the Appendix. This table hows that the majority of each synthetic control unit comes from three or fewer countries, which helps to prevent overfitting through the use of regularization within the algorithm.

1.3.3 Results

Figure 1.3 presents the main results of the analysis. These graphs show GDP per capita for the actual (solid line) and synthetic (dashed line) countries, with time spent on the blacklist denoted by the shaded portion of each graph. We find

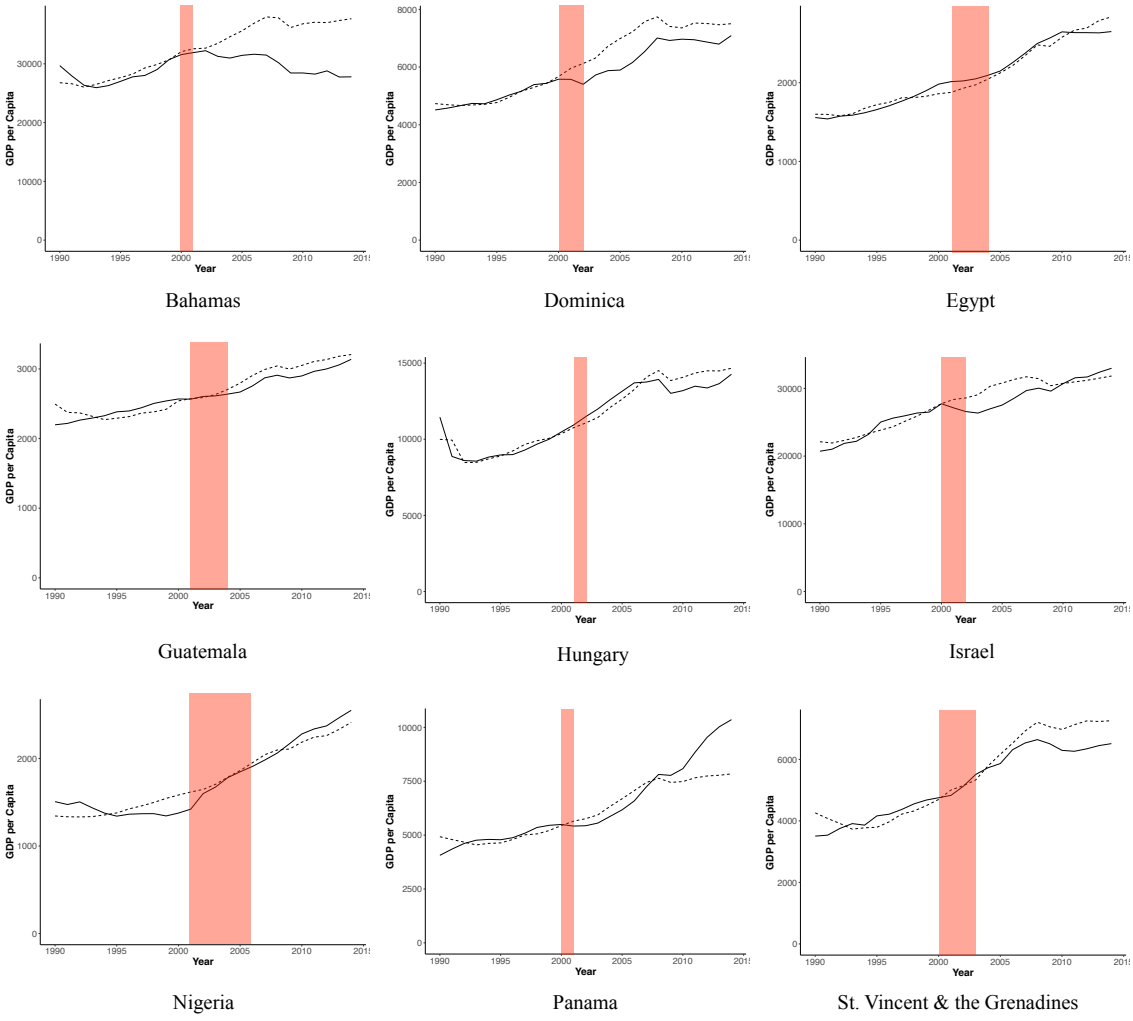
that three countries – the Bahamas, Dominica, and Israel – show lower levels of GDP per capita in the period after blacklisting, while six other countries – Egypt, Guatemala, Hungary, Nigeria, Panama, and St. Vincent and the Grenadines – show little difference between the predicted and actual values. The differences for these listed countries are substantial, with the Bahamas showing an average 19% lower GDP per capita than predicted in the period after blacklisting, Dominica 10% lower, and Israel 4% lower. The effect is also long lasting: Israel's GDP per capita only converges with its synthetic counterpart after ten years, while the Bahamas' and Dominica's actual GDP per capita fail to reach predicted levels in the fourteen years after blacklisting.

We can also consider the results in terms of effect size. Figure 1.4 shows the effect size for each country – the difference between the actual and synthetic GDP per capita in dollars by year – on a common scale. From these graphs, we can clearly see that the largest divergence occurs for the Bahamas followed by Israel. Dominica also experienced a negative difference, though it was smaller in absolute terms than the other two. These plots also highlight that there is little divergence between the actual and synthetic GDP per capita at the time of blacklisting for the remaining countries in the sample.

A Mediating Variable: The Size of the Services Sector

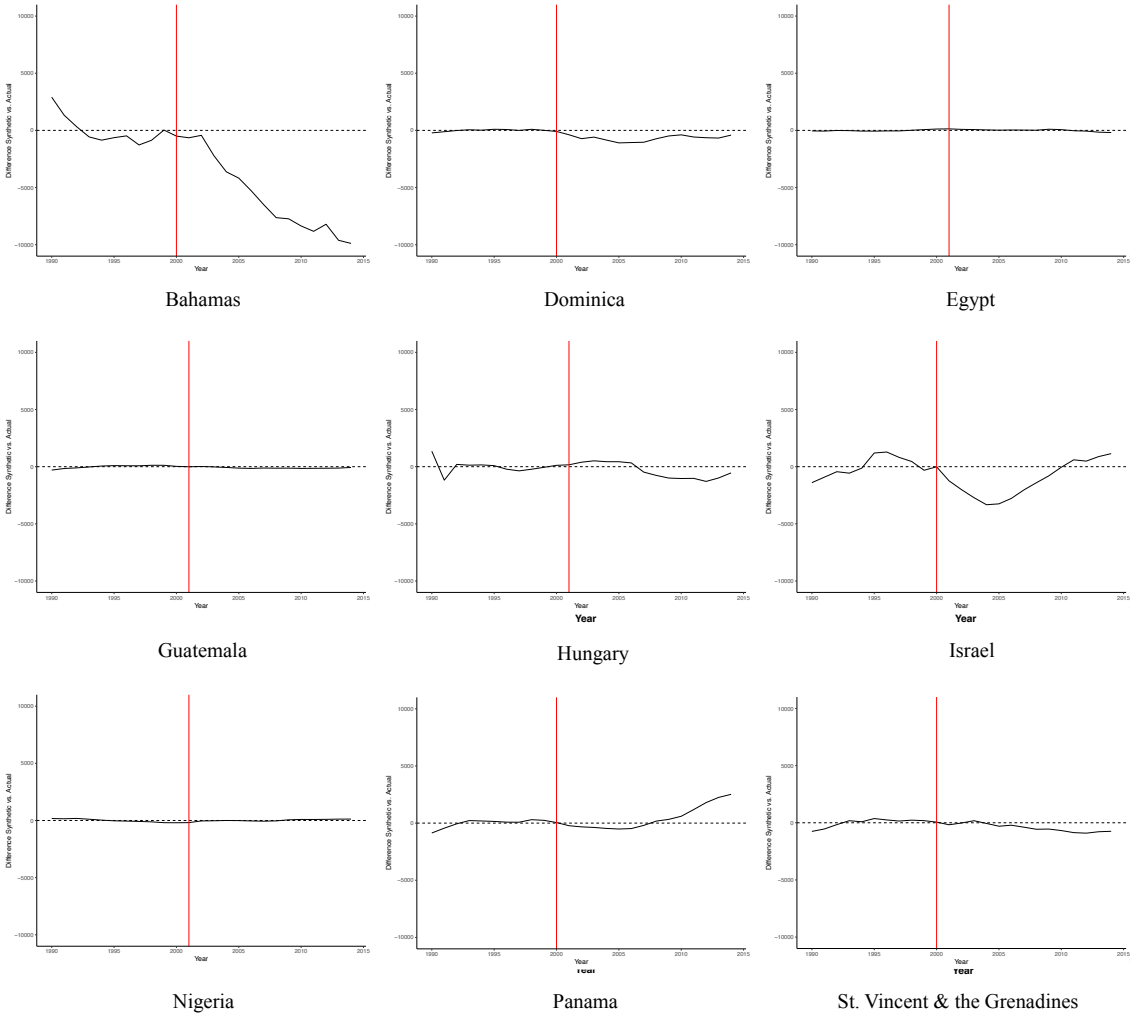
What explains variation in outcomes across blacklisted countries? One possible explanation is that the makeup of a country's economy mediates the effect of FATF blacklisting. Specifically, countries whose economies are more dependent on services experience a greater loss as a result of blacklisting than countries whose economies are more dependent on agriculture or industry. This makes intuitive sense, since the services sector (and especially the financial services) is more vulnerable to changes in behavior by international investors than other sectors. Figure 1.5 plots the percent difference between the actual and synthetic GDP per capita in the period

Figure 1.3: Synthetic vs. Actual GDP per capita for Blacklisted Countries



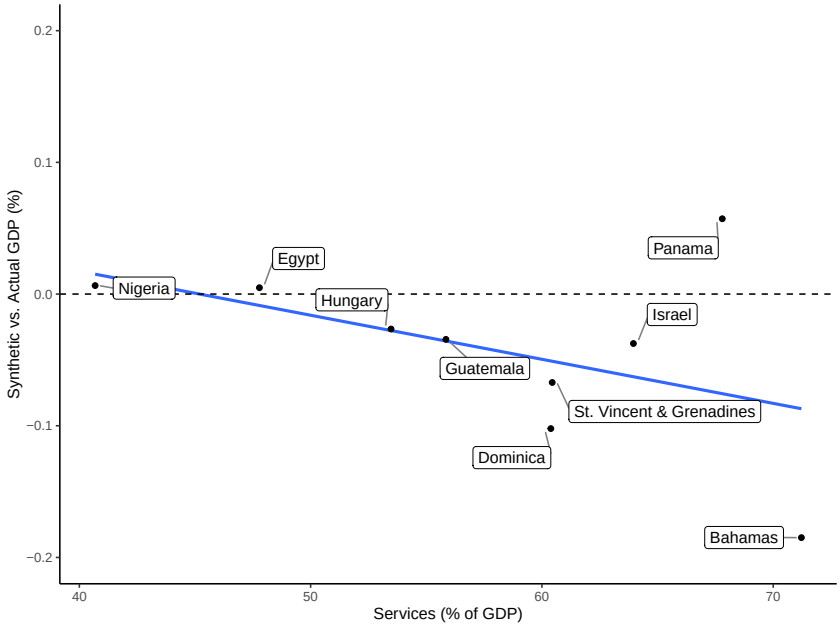
Notes: Synthetic (dashed line) versus actual (solid line) GDP per capita for blacklisted countries (1990-2014). Shaded rectangles denote the years a country was blacklisted.

Figure 1.4: Effect Size for Blacklisted Countries



Notes: Plots show the effect size – the difference between the actual and synthetic GDP per capita in dollars – for each blacklisted country. Vertical intercepts denote the year a country was blacklisted.

Figure 1.5: Synthetic vs. Actual GDP for Blacklisted Countries



after blacklisting against the size of the services sector (as a percent of GDP); this relationship is approximately linear.

This insight can also help explain why states reacted differently to blacklisting. Because some countries experienced greater harm from blacklisting, they moved quickly to be removed from the list: the Bahamas, Israel, and Dominica acted quickly and were among the first removed from the blacklist, while other countries like Egypt and Nigeria moved more slowly and consequently spent longer on the blacklist. Thus, while we hesitate to draw firm conclusions given the small sample size, we propose that countries with large service sectors experience more economic harm as a result of FATF blacklisting as a working hypothesis.

1.4 Discussion

Blacklisting was consequential both in its impact on some countries' economic outcomes and in the far reaching policy changes brought about by the process. Our empirical results show that blacklisting caused substantial economic harm for some blacklisted countries, and we argue these costs were primarily driven by economic countermeasures imposed by FATF members. Below, we discuss three broad conclusions about the impact of blacklisting on international efforts to combat money laundering today.

1.4.1 Developing States and a "Luxury Good"

Blacklisting played an instrumental role in leading many countries to adopt anti-money laundering laws, but these laws have imposed a significant burden on developing countries without yielding much in the way of results. FATF recommendations require that states make changes to the legal code (criminalizing money laundering and terrorist financing, stipulating the right of regulators to fine financial institutions for anti-money laundering failures, etc.), regulatory changes (expanding the purview of regulators, hiring new personnel, training regulators), and establish a financial intelligence unit – a government agency that coordinates the national response and screens analyzes national data. These requirements pose a significant challenge for any state, let alone developing ones that often lack government resources.

Although developing countries have devoted a great deal of time and resources to creating national anti-money laundering systems, there is little evidence that these efforts have produced benefits for the states themselves or the international financial system as a whole. Developing countries have had few money laundering convictions (many have not tried a single money laundering case) and little in the way of confiscated criminal assets. Niger, for example, which is one of the

world's least developed countries, established and staffed a financial intelligence unit, yet 18 months later, the agency had still not received a single suspicious activity report. These underwhelming results are not particularly surprising given that the FATF's recommendations were developed based on the experiences of its members – wealthy states with sophisticated financial systems. This has created mismatches between policies and conditions on the ground in some places, such as the requirement that financial institutions record a customer's address and make copies of identity documents, even though people in some developing countries may lack a fixed address or official documents.[69]

Despite the significant costs and poor results, the FATF has not made revising its policy guidelines for developing countries a priority. This fact speaks to both the path dependency of the organization and the lack of program evaluation for anti-money laundering laws that has hindered a better understanding of how these laws function.[70] Accordingly, a preeminent scholar has called today's one-size-fits-all anti-money laundering systems a"luxury good" for developing countries, stating that it remains an "article of faith" by developed countries that uniform measures are necessary to achieve an effective international response to money laundering.[71] Some developing countries, meanwhile, have come to view maintaining anti-money laundering systems as a costly "paper exercise" that must be performed to satisfy powerful foreigners.[72] Thus, the field requires more empirical research on the money laundering and terrorist financing risks that developing countries face to determine which policies offer the best defense without placing an undue burden on these states.

[69]Sharman and Chaikin 2009.
[70]Levi, Reuter, and Halliday 2018.
[71]Reuter 2005, pp. 7, 184.
[72]Sharman and Chaikin 2009, p. 43.

1.4.2 A New Type of List

The FATF has also taken measures to develop better relationships with developing countries in the years since blacklisting, signaling a major shift in the organization's approach. One example of this is the FATF's noncompliance list after blacklisting known as the greylist, which was released in 2009 and war part of the FATF's effort to urge countries to criminalize terrorist financing. Greylisting, which is still in effect today, differs from blacklisting in several important ways. To begin with, it includes two tiers of review: one for "low capacity countries" and another for "vulnerable jurisdictions that are failing to implement effective anti-money laundering/counter terrorism financing systems."[73] The FATF offers technical assistant to the first group while seeking to obtain policy changes from the second through a process of dialogue and persuasion. Notably, this process does not include threats of economic sanctions by FATF members, and the FATF has stated that public condemnation of countries on this list should be a last resort. Thus, greylisting represents a significant shift in tone for the FATF and has been perceived as less punitive and more equitable than blacklisting.[74]

Further, evidence suggests that greylisting has had far less of a detrimental impact on countries economically than blacklisting. Although one study[75] finds that greylisting led to a significant decrease in financial transactions, analysis of high-frequency SWIFT transaction data[76] and a replication and extension of the aforementioned study[77] find no evidence of decreased financial flows to greylisted countries. These findings also fit within the framework for how the blacklist functioned proposed here. Specifically, because blacklisting was primarily a process driven by states, it produced serious economic costs for some countries, while the decentralized process of greylisting does not appear to have significantly impacted

[73] Financial Action Task Force 2008, p. i.
[74] Hülsse 2008.
[75] Morse 2019.
[76] Collin et al. 2021.
[77] Case-Ruchala and Nance 2020.

economic outcomes.

1.4.3 The FATF Today

Lastly, the politics of the FATF have permanently changed thanks to the addition of new members. Since blacklisting, the FATF has admitted seven new members – six of which are developing countries. Some of these new members, and particularly Russia and China, have not hesitated to dissent from the consensus view.

This shift in the organization's politics is discernible in recent discussions over whether Pakistan should be placed on the FATF's greylist. News accounts suggest that Pakistan lobbied Russia and China to block any effort to greylist it and received tacit assurances from these two countries and Malaysia that they would block any such move by other FATF members.[78] This sort of alliance among developing countries – and especially involving countries that are often out of the United States' good graces – would have been unheard of twenty years ago and signals that FATF members are no longer as unified as they once were.

1.5 Conclusion

In this paper, we analyze the process of FATF blacklisting and measure its economic impact on countries. We argue that blacklisting primarily functioned as a form of economic coercion since countries were selected for blacklisting through a political process and FATF members (including the most powerful countries in the world) agreed to implement countermeasures against listed countries. Using the synthetic control method, we find evidence that blacklisting led to a substantial decrease in GDP per capita in the decade after blacklisting for one third of the countries in our sample, though this affect appears to be mediated by the size of the services sector.

[78] Masood and Abi-Habib 2019; "FATF keeps Pakistan on grey list until June despite 'significant progress'" 2021.

Consequently, we argue that blacklisting's legacy as a tool of economic coercion can help explain the widespread adoption of anti-money laundering laws, while lapses in enforcement today are primarily driven by a lack of reliable data about enforcement at the national level.[79]

Even though blacklisting was highly controversial, there are several reasons to be optimistic about the FATF's role in promoting international cooperation to address money laundering today. For one, the FATF has shown itself willing to pilot and adopt new methodologies and policies. This is an important strength for an organization working in a new field, since the body of knowledge on the topic continues to evolve over time. This flexibility also suggests that the FATF can continue to improve its methodologies over time through a process of incremental improvement.

Another reason to be optimistic about the FATF's role is that it has already accomplished several major feats. These include creating a set of policy recommendations intended to help states combat money laundering, achieving widespread adoption of these laws by countries around the world, and promoting international cooperation in efforts to combat money laundering more broadly. Even though some may take issue with the organization's methods, this should not detract from the major challenges the FATF has surmounted to achieve these goals. Thus, the FATF has proven itself to be an extremely capable and influential organization, albeit sometimes controversial.

Finally, there is reason for optimism given that the FATF dropped use of blacklisting and has since taken steps to engage with a broader range of national views. More than ever, the international community can benefit from the guidance of a competent organization dedicated to promoting international cooperation to address money laundering. The FATF can fulfill this role by remaining committed to an even-handed approach to promoting efforts by both developing and developed countries.

[79] Nershi 2021a.

Chapter 2

Testing Money Laundering's Financial Costs

Evidence from States and Financial Institutions

Abstract

Most countries have adopted anti-money laundering laws during the last twenty years, but growing evidence shows widespread lapses in enforcement. Accordingly, scholars seek to understand what factors lead states to enforce these laws. One argument is that countries enforce these laws to protect against the reputational harm that involvement with money laundering could cause. Specifically, scholars argue that both states and financial institutions can experience reputational harm from association with money laundering, leading to decreased foreign investment as actors move their funds to safer jurisdictions. Although this theory is widely referenced, the literature lacks a convincing test of it. To test this, we have collected a new dataset of money laundering cases based on international news coverage. At the state level, we use the *synthetic control* method to test for changes in countries' foreign portfolio investment following news of major money laundering cases in Switzerland, Panama, and Denmark. For financial institutions, we use the *event study* method to test whether the price of a financial institution's security decreases following news of a money laundering investigation. For both states and financial institutions, we find no evidence that news of a money laundering case causes reputational harm. Thus, our findings call into question claims that actors enforce anti-money laundering laws to protect their reputations.

2.1 Introduction

Money laundering can cause severe harm to society through "predicate crimes," which generate funds for laundering. In response, the Financial Action Task Force (FATF) – an international organization dedicated to coordinating the response to money laundering – has released a series of anti-money laundering standards designed to catch criminals and prevent their access to the international financial system. Although most countries have adopted the FATF's standards over the last twenty years, growing evidence from data leaks, field experiments,[1] and money laundering cases shows that in practice, many countries fail to uphold these standards. Accordingly, scholars seek to understand what factors lead countries to enforce these laws.

One explanation put forth by the literature is that states enforce anti-money laundering laws because they wish to safeguard against the reputational harm money laundering can cause. Once a country becomes known for money laundering, the argument holds, transnational economic actors (namely financial institutions and investors) will no longer want to do business in that country, leading to a decrease in foreign investment. This argument is particularly referenced in the context of developed countries, as scholars argue they have a powerful incentive to enforce anti-money laundering laws given the importance they place on protecting their well-developed financial sectors.[2] Scholars also argue that financial institutions themselves run the risk of reputational harm as a result of money laundering, since economic actors will cut off business with financial institutions that are perceived as risky.[3]

Though this theory is popular in the literature, a lack of reliable data about money laundering has hindered efforts to test it empirically. Because money laundering is a clandestine activity, it is incredibly difficult to estimate how much money

[1] Findley, Nielson, and Sharman 2014.
[2] Verdugo Yepes 2011.
[3] Unger et al. 2006; Morse 2019.

is actually laundered. Indeed, there are no credible estimates of money laundering,[4] cross-national statistics about money laundering do not provide a viable means of comparison,[5] and FATF peer review reports do not provide reliable information about a country's enforcement of anti-money laundering laws or its overall risk due to data and methodological limitations.[6] Thus, we argue that the only reliable signal of a country or financial institution's money laundering risk is news of a major money laundering case.

Accordingly, we have collected a new dataset of money laundering cases based on articles in the *New York Times* and *The Financial Times* between 2001-2019. The data provide insight for the first time into which countries carry out the most public money laundering investigations and which are home to the most publicly investigated intermediaries (i.e., private sector actors like financial institutions charged with screening their customers for money laundering risk). The data show that the United States and (to a lesser extent) the United Kingdom play an outsized role on both scores, with the United States responsible for nearly half of all money laundering investigations worldwide. The data offer the chance to test whether financial institutions involved in these investigations experience reputational harm as a result.

We use the *event study* methodology to measure whether financial institutions with securities listed on one of three major exchanges experienced a decrease in security prices following news of the financial institution's involvement in a money laundering investigation. We also test for reputational costs at the state level for Switzerland, Panama, and Denmark following news of major money laundering cases that revealed significant regulatory failures. Using the *synthetic control*

[4]Reuter 2013.

[5]Takats 2011.

[6]Levi, Reuter, and Halliday (2018) and Levi, Halliday, and Reuter (2014) detail shortcomings in the mutual evaluation process. Ferwerda and Reuter (2019) detail issues with national risk assessments. Pol (2018) discuss shortcomings of FATF measures of "effectiveness." See also Verdugo Yepes (2011) and Willebois et al. (2011) for a discussion of concerns with how well the overall system functions.

method,[7] we measure whether these countries experienced a decrease in foreign portfolio investment following news of these cases.

For both states and financial institutions, we find no evidence that news of money laundering cases causes reputational harm. For states, the synthetic estimate and actual foreign portfolio investment did not differ significantly following news of a major money laundering case. For financial institutions, we also do not find evidence that the actual security returns differed significantly from the predicted returns following news of a financial institution's involvement in a money laundering investigation. These findings suggest that concern over reputational harm may not act as an incentive to enforce anti-money laundering laws, which, in turn, suggests that achieving widespread enforcement of these laws is likely more difficult than previously believed.

The rest of this paper is divided into four main parts. First, we examine theories about how money laundering can cause financial harm, considering each claim in light of the relevant empirical evidence. We focus our attention on the claim that money laundering can cause reputational harm for states and financial institutions while paying special attention to the series of events that must occur for these actors to experience reputation costs. Next, we detail the research design, focusing on our operationalization of the independent variable (exposure to the reputational risk of money laundering) and outline the method and results for our analysis at the level of states and financial institutions. We then discuss these findings, including implications for our broader understanding of international efforts to combat money laundering, and offer a few concluding thoughts.

[7]This method was developed by Abadie and Gardeazabal (2003) and Abadie, Diamond, and Hainmueller (2010).

2.2 Financial Harm Caused by Money Laundering

Theories about the ability of money laundering to cause financial harm are widely referenced in the literature. However, most of these claims have not been subject to empirical testing because of a major hurdle: a lack of reliable data about money laundering. Thus, many of these discussions center on a theoretical analysis of money laundering's potential to cause economic harm through a variety of channels. We build on this scholarship by seeking to assess these arguments within the context of the current empirical evidence.

2.2.1 Economic Distortions and Poor Economic Growth

First, scholars contend that money laundering distorts the productive use of capital, which harms economic growth.[8] Unger et al. (2006, p. 86) writes,

> Money laundering has a significant negative impact on growth rates. Since in the context of this activity, funds are redirected from sound to risky ventures, from the productive to sterile investments and crime and corruption are facilitated, economic growth can suffer. When a particular venture or industry is no longer appealing to launderers, they tend to simply abandon it, potentially causing the collapse of these sectors and serious damage to the respective economies.

This argument is premised on the fact that because criminals wish to obscure the origins of illegally-obtained funds, they value maintaining secrecy more than legal customers. As such, they may be willing to pay above-market prices for assets if purchasing these assets allows them to maintain a higher level of secrecy than would be available for other purchases. On a large scale, this pattern of behavior can lead money launderers to drive up prices in certain sectors.

Turning to the empirical evidence, case studies show that money laundering has, indeed, artificially driven up prices in certain sectors.[9] This phenomenon is most

[8] Quirk 1997; Masciandaro, Takats, and Unger 2007.
[9] Unger et al. 2006.

closely associated with the real estate sector, since the United States and a number of other wealthy countries have laws that require less scrutiny of the identity of a person purchasing real estate than other types of assets (e.g., stocks, bonds, etc.).[10] These lax laws are credited with driving a surge in purchases of high end properties in several major international cities, including London, New York City, Miami, and Vancouver.[11]

Although artificially high prices are bad for society, it is less clear that price distortions – and the inefficient use of capital caused by money laundering more broadly – harm national economic growth. Specifically, this claim rests on the assumption that the capital which is ultimately laundered would have been used more productively in the absence of money laundering. However, a major difficulty for attempts to prove this claim is that it is unclear what the substitutes are for money that goes to crime and is ultimately laundered; thus, it is difficult to assess whether these alternative uses would be better for the economy as a whole. Further, laundered money can also provide some economic benefits for countries in the form of increased revenue for businesses and increased tax revenue. Thus, it is unclear whether price distortions created by money laundering harm economic growth.

2.2.2 Financial Instability

Second, scholars contend that money laundering can create national financial instability.[12] The logic behind this claim is similar to the last: because criminals have different objectives than legitimate actors – namely to launder illegally-obtained funds while avoiding detection rather than to (solely) maximize profits – this may lead them to behave in ways that increase volatility in the market. For example,

[10] In the United States, the real estate sector lobbied for and obtained an exemption in the 2001 Patriot Act that excluded realtors from performing customer due diligence. Unger et al. (2006) also documents price distortions driven by money laundering in the Dutch real estate market.

[11] Story and Saul 2015; Konotey-Ahulu 2020; Osborne 2020; Stokel-Walker 2019; Nehamas and Rodriguez 2018; Levinson-King 2019; Hoekstra 2019.

[12] Quirk 1997; Unger et al. 2006.

a criminal might rapidly withdraw funds from a given investment because of the introduction of a new law that threatens to expose her identity.

Turning once again to the empirical evidence, there is little that suggests money launderers behave differently than legal customers by withdrawing funds at will. In fact, money launderers are often subject to the same constraints as legal customers, such as the time it takes to sell real estate holdings. Financial instability at the national level would also require that this individual behavior was widespread enough to create a macroeconomic effect, something that seems unlikely given the current evidence. Indeed, the only documented cases in which money laundering was linked to financial instability involve Latvia in the 1990s and the Dominican Republic in 2002, and in both cases, it is likely that the underlying crime created instability rather than money laundering itself.[13]

2.2.3 Criminal Contagion

Third, scholars contend that countries exposed to money laundering run the risk of criminal contagion: because money laundering in the financial sector introduces an element of law breaking, actors in the financial sector will be more likely to break other laws including bribing government officials, which will increase corruption.[14] Some scholars describe this process as driven by the fact that "criminal money attracts crime," arguing that criminals will become familiar with a country as they launder money and will proceed to develop new criminal networks there.[15] Thus, the logic goes, the presence of money laundering opens the door to many other potential problems that can severely harm a state's economic performance.

Although it is plausible that individuals involved in money laundering might be more likely to offer a bribe to a government official or break another law, we do not

[13]Reuter 2013.

[14]Quirk (1997, pp. 8–9) writes, "[C]ontempt for the law is contaminating – breaking one law makes it easier to break others."

[15]Unger et al. 2006, p. 9.

yet have evidence that this has happened on a large scale. Here, it is worth considering that most large-scale money laundering cases involving banks have played out in ways that are more innocuous than some might imagine; for example, bank officials may turn a "blind eye" by failing to perform customer due diligence. Indeed, our new data show that most documented cases of money laundering involving banks have occurred in wealthy countries like the United States, United Kingdom, and Switzerland, all of which have low levels of corruption and generally low levels of crime in the financial sector. Thus, the evidence suggests that the presence of money laundering does not necessarily increase criminality in the private sector and corruption in the public sector.

2.2.4 Reputational Harm

We now turn to the last argument: states that become known for money laundering will suffer harm to their reputations that will lead to a loss of foreign investment. To test this, prior studies have examined changes in foreign investment for countries placed on an FATF noncompliance list and have reached mixed conclusions.[16] However, the process through which the FATF placed countries on these lists differs from an impartial assessment of countries' money laundering risk.[17] Thus, it is unclear whether transnational economic actors respond to direct evidence of money laundering risk *itself* as opposed to the actions of the FATF. We seek to test this theory using a new measure of exposure to the reputational risk associated with money laundering: evidence of a major anti-money laundering failure. We discuss this choice in detail in the next section, but first, we briefly consider the theoretical arguments detailing how money laundering may cause reputational harm.

Theories of reputation costs in international relations start from the premise that states can gain more through cooperation than by acting alone. However,

[16]Schwarz 2011; Masciandaro 2004; Gnutzmann, McCarthy, and Unger 2010; Morse 2019.
[17]See Nershi (2021b) for a discussion of the FATF blacklisting process.

states run a risk by cooperating with others, since another state's defection from an agreement can leave the cheating state better off and the cooperative state worse off.[18] Because states coexist in a competitive environment, they may hesitate to enter into cooperative agreements as there is no third-party actor that can ensure states will abide by their international commitments. Consequently, neoliberal institutionalists argue that states will rely on another state's reputation – its record of past behavior – to determine whether a state is a reliable partner for a cooperative agreement. Thus, a state's reputation for cooperation becomes a valuable asset, and the potential for long-term cooperation can create a "shadow of the future" that leads states to prioritize maintaining a good reputation over whatever short-term gains they might accrue by breaking an international commitment.[19]

Since these theories were first introduced in the 1980s, they have become extremely influential. Scholars of international law have primarily focused on reputation costs as an explanation for why states comply with international law,[20] while international relations scholars have explored ways that states' reputation concerns can influence international cooperation more broadly. Critics have also engaged with these ideas; in particular, realists argue that state power plays a key role in how reputation costs function by determining which issues are addressed through cooperative agreements,[21] the types of cooperative agreements that are formed,[22] and how politics within international organizations function.[23] Other critiques highlight the conceptual mismatch between some theoretical insights about reputation – many of which were initially developed through analysis of game theoretic frameworks like the Prisoner's dilemma – and the context in which states

[18]For example, if two states agree to a disarmament treaty but only one complies, the cooperative state is considerably less safe than before.

[19]Keohane 2005; Axelrod 1984.

[20]Brewster 2009.

[21]Drezner 2005; Simmons 2001.

[22]Krasner 1991.

[23]Steinberg 2002; Drezner 2008.

actually cooperate.[24]

Scholars have also identified a number of factors that may limit the ability of states to impose reputation costs on defecting states in practice. Specifically, this process requires that interested actors must (1) obtain relevant information about a country's compliance, (2) infer from this information that a country has not complied, and (3) take action that results in a cost for the targeted state. In practice, however, it is often difficult for states to obtain information about another state's compliance as this requires both effort (time, resources, etc.) and access (a state must agree to share information with another state). Consequently, neoliberal institutionalists argue that international institutions can help overcome this challenge by streamlining resources to gather information and gaining access to states through their status as a neutral third party.[25]

However, even when states obtain access to high quality information, they may struggle to interpret it. For example, it can be difficult to judge what constitutes noncompliance because states may behave ambiguously.[26] Though international institutions can once again help alleviate this burden by identifying instances of noncompliance for punishment by member states,[27] even this process can sometimes go awry.[28] Lastly, "regime complexity," or patterns of overlapping international commitments, can also complicate states' efforts to monitor and respond to instances of noncompliance, thereby diluting the power of reputation costs for any one issue.[29]

Reputational Harm for States

Returning to the anti-money laundering literature, scholars argue that evidence of money laundering will harm a state's reputation and lead transnational economic

[24]Brewster 2009; Downs and Jones 2002.
[25]Keohane 2005.
[26]Simmons 1998.
[27]Garrett 1992.
[28]Nershi 2021b.
[29]Drezner 2009.

actors – who are concerned by the potential financial risk associated with money laundering – to move funds away from the involved country and toward others with safer regulatory environments.[30] Importantly, this theory depends on the fact that actors view the presence of money laundering cases within a country as evidence of the country's financial risk. Unger et al. (2006, p. 90) describes the process through which actors may aggregate risk from financial institutions to the country as a whole this away:

> The damaged integrity of the financial sector as a result of association with money laundering... can negatively impact foreign direct investment. Once a country's commercial and financial systems are perceived as being under the influence of criminal elements, this may compromise the jurisdictions' reputation and undermine investors' trust."[31]

We predict that states are unlikely to experience reputation costs from money laundering because the act of gathering information about money laundering risk, interpreting it, and acting on it is very difficult. Further, it is not clear that economic actors view money laundering as something that endangers their investments.

Reputational Harm for Financial Institutions

Scholars argue that financial institutions also experience reputational harm as a result of involvement in money laundering.[32] Reputational harm for financial institutions differs from harm for states because financial institutions themselves are directly implicated in money laundering investigations. However, because these investigations are ongoing, there is typically uncertainty about a financial institution's guilt, since additional evidence could incriminate or exculpate it. Regardless,

[30] Morse 2019; Quirk 1997; Unger et al. 2006; Sharman 2009.

[31] Unger et al. 2006, p. 90.

[32] For example, Unger et al. (2006, p. 91) writes, "Once a financial institution becomes involved in money laundering operations and is subsequently detected, it will lose credibility and customer confidence. Due to the perceived risk of fraud and corruption associated with money laundering, economic agents will choose to avoid such institutions and conduct their business elsewhere." See also Morse (2019).

Figure 2.1: Timeline of Danske Bank Security Prices

Notes: This graph shows Danske Bank's security prices during the course of U.S. and Danish investigations of the bank for anti-money laundering violations.

news of a money laundering investigation introduces uncertainty, and if investors are concerned about potential money laundering risk, we should expect a market reaction to the news.

Evidence shows that financial institutions sometimes experience reputational harm following news of a money laundering investigation, though the record is mixed. Danske Bank, for example, experienced a rapid decrease in stock prices during a six-month period in which Danish authorities reprimanded the bank, U.S. authorities launched a criminal investigation, and Estonian authorities arrested several of the bank's employees at its Estonian branch (Figure 2.1).[33] However, the bank's fall from grace may be the exception rather than the norm, as many financial institutions emerge from investigations seemingly unscathed.

Indeed, the Department of Justice, the main actor bringing money laundering cases against banks internationally, has been criticized for dealing too leniently with

[33]Milne 2018.

big banks accused of money laundering violations. U.S. prosecutors have chosen not to charge individual bank employees with wrongdoing in these cases (even though oversight lapses are sometimes severe), and instead issue fines against the banks, which have sometimes been perceived as light relative to the crimes committed. For example, HSBC received a fine equal to one week of the bank's revenue ($1.9 billion) to settle a case in which the bank routinely violated sanctions and allowed at least $880 million from Mexican drug cartels to pass through the bank;[34] in response, many commentators declared the bank had become "too big to prosecute" for money laundering violations.[35] Further, the high number of repeat offenders – banks that are involved in more than one criminal case brought by the Department of Justice – suggests that the consequences of money laundering cases for banks' reputations may not be as severe as previously argued.

2.3 Research Design

2.3.1 Measuring Money Laundering Risk

Operationalizing the reputational risk of money laundering presents a challenge because there is a lack of reliable data about money laundering. For one, previous attempts to estimate money laundering have been subject to serious methodological flaws that render them impractical for most applications;[36] this makes it impossible to compare states by the amount of money laundered and greatly complicates efforts to measure how well states enforce anti-money laundering laws.[37] Other types of money laundering statistics – namely the number of suspicious activity reports from banks – also provide a poor cross-national metric because reporting guidelines vary

[34]Teodorczuk 2018.

[35]Chang 2012; Greenwald 2012; Taibbi 2013; Morgenson 2016; Ross, Mosk, and Boettcher 2012.

[36]Reuter 2013; Levi, Reuter, and Halliday 2018.

[37]In section B.2, we provide a discussion of some of the shortcomings of approaches to estimating money laundering.

across countries.[38] Meanwhile, statistics that *are* standardized across countries (e.g., currency transaction reports) do not offer a good way to compare states' money laundering risk.

Prior studies seeking to test this theory have operationalized exposure to the reputational risk of money laundering by considering states placed on FATF non-compliance lists.[39] FATF noncompliance lists are controversial, however, as politics played a role in the review process and many developing states came to view the process as non-transparent, overly punitive, and part of an effort to privilege the interests of developed countries over those of developing ones.[40] Thus, FATF non-compliance lists do not present a neutral assessment of countries' money laundering risk that can be used to study the reputational harm associated with the act of money laundering itself (and independent of the FATF's political dynamics).

Accordingly, we argue the best signal of a country's money laundering risk is evidence of a major anti-money laundering failure. We identify several cases that exposed major failings at the national level and use these to test for reputational harm among states. Importantly, news coverage provides a "shock" of information about a significant anti-money laundering failure, which allows us to measure changes in foreign investment in response to these events. We also test whether financial institutions experience decreased security returns following news of their involvement in a money laundering case.

2.3.2 National Financial Harm

We focus on three major money laundering cases to test for reputational harm, which we chose on the basis of two factors: (1) the scale of the money laundered, and (2) the amount of international attention each case attracted. We provide a brief overview of each case below.

[38] Takats 2011.
[39] Schwarz 2011; Masciandaro 2004; Gnutzmann, McCarthy, and Unger 2010; Morse 2019.
[40] See (Nershi 2021b).

Swiss Leaks

In February 2015, the International Consortium of Investigative Journalists published a series of stories documenting widespread anti-money laundering lapses by HSBC Private Bank (Suisse) in Geneva, Switzerland. The now publicly-available data revealed that bankers failed to disclose tax evasion and other illegal sources of their customers' wealth as required by law; not only that, but bankers routinely advised their customers on how to avoid anti-money laundering laws in order to move money from their home countries to the Swiss bank.[41] The scale of these operations was enormous – accounting for a suspected $100 billion in suspicious money, much of it tied to tax evasion. These revelations sparked international outrage and spurred governments around the world to open criminal investigations. Although most of these investigations were targeted against individual citizens for tax evasion, the French government opened a case against the bank that was ultimately settled for €300 million.[42]

Although Switzerland has long maintained a reputation for banking secrecy (and has experienced money laundering scandals in the past), this case was unique because it clearly and concretely showed the breadth of the bank's disregard for customer due diligence laws; further, these violations were not detected or addressed by Swiss authorities. Thus, this case could influence international perceptions of Switzerland given the scale of the major failure it showed.

Panama Papers

Second, we examine Panama's economic outcomes in the wake of the Panama Papers. This leak of 11.5 million financial documents from a Panamanian law firm, Mossack Fonseca, is the biggest data leak in history; it revealed that the law firm had obfuscated customer due diligence laws and conducted business with tax evaders,

[41] Fitzgibbon 2015.
[42] Reuters Staff 2017.

terrorist financiers, members of organized crime groups, and corrupt public officials from around the world. Like the Swiss Leaks, the Panama Papers sparked international outrage, which ultimately led to the ousting of Iceland's prime minister, Sigmundur Gunnlaugsson, in response to his offshore financial dealings exposed in the leak.[43] Although documents from the leak revealed failures by intermediaries from all over the world, this leak (and the bad press associated with it) is most closely tied to its namesake country. As such, it presents an opportunity to test for reputational harm.

Danske Bank Scandal

Third and last, we consider the aftermath of the Danske Bank money laundering scandal. This case centered on Danske Bank, Denmark's largest bank, which failed to apply proper anti-money laundering controls and oversight of its branch in Estonia, allowing an estimated €200 billion of dirty cash (most of it from Russian organized crime groups) to pass through the bank. During an eight-year period, top officials at the bank ignored warnings from regulators and an internal whistleblower, with the bank only responding to the crisis once pressure from the media made it impossible to ignore. In response, both Denmark and the United States opened criminal investigations into the bank's conduct.[44]

The Danske Bank case holds the distinction of being the biggest money laundering case in history in terms of funds laundered. This case was also unusual because it featured a major failing by a bank from a country with a reputation for a strong regulatory environment. Accordingly, these events may have led some transnational economic actors to revise their opinions of the money laundering risk present in Denmark.

[43] Fitzgibbon and Hudson 2021.
[44] Milne 2018.

Synthetic Control Method

To measure the impact of major money laundering cases on foreign investment, we use the synthetic control method developed by Abadie, Diamond, and Hainmueller (2015). This method offers a way to examine treatment effects when there are a small number of treated units. This method also offers a good approach when treated units are highly idiosyncratic, so that no single control unit can serve as a good counterfactual. Both these facts are true of our analysis, as we consider a treatment effect for just three countries; further, because they are countries, no other unit can serve as a reliable counterfactual. The synthetic control method addresses this problem by creating a "synthetic" control unit using a weighted average of the potential control units; this estimate is based on key characteristics of the treated unit during the period before treatment.

For simplicity, we consider a case with one treated unit drawn from a sample of $J+1$ units indexed by j. We assume that the first unit ($j = 1$) undergoes the treatment, while all other units ($j = 2$ to $j = J+1$) do not and are potential donor units that can be used to create a synthetic control unit. We also assume a balanced panel dataset ($t = 1, ...T$) with both pre-intervention periods (T_0) and post-intervention periods (T_1). The treated unit is exposed to a treatment effect during periods (T_0+1, ...T) with no exposure to the treatment during the pre-period.

Because pre-intervention characteristics for a treated unit can be better approximated using a weighted combination of control units rather than drawing from a single control unit, we develop a vector of weights for all control units. This is represented by a $(Jx1)$ vector of weights $W = (w_2 + ... + w_{J+1} = 1)\prime$, with each untreated unit assigned a weight of $0 \leq w_j \leq 1$ and all weights summing to one $(w_2 + ... + w_{J+1} = 1)$. Weights are assigned by minimizing the difference between the actual treated unit and the synthetic control unit during the pre-period, represented by the vector $X_1 - X_0W$. Thus, the synthetic control unit is chosen by W^*,

Table 2.1: Predictor and Outcome Means before Major Money Laundering Cases

	GDP Growth (%)			Foreign Portfolio Investment (millions of dollars)		
	Country	Synthetic	Full Sample	Country	Synthetic	Full Sample
Switzerland	1.82	1.82	3.14	1,873.0	1,873.0	805.5
Panama	6.54	6.54	3.12	13.0	13.2	834.2
Denmark	1.21	1.21	3.11	576.0	584.0	901.3

Notes: Means for the actual and synthetic controls units for each country during the pre-period for the predictor – GDP growth (as the percent change in yearly GDP) – and the outcome – foreign portfolio investment (in millions of dollars). Sample means differ across countries because major money laundering cases occurred in different years, with Switzerland's in 2015, Panama's in 2016, and Denmark's in 2018. Synthetic control estimates are based on a sample of 65 control countries.

which is the value of W that minimizes:

$$\sum_{m=1}^{k} v_m (X_{1m} - X_{0m}W)^2, \tag{2.3.1}$$

where v_m represents the weight assigned to the m^{th} variable.

The treatment effect is then estimated as the difference between post-intervention outcomes for the treated unit and the synthetic control estimate, formally

$$TreatmentEffect = Y_{1t} - \sum_{j=1}^{J+1} w_j^* Y_{jt}. \tag{2.3.2}$$

Analysis and Results

To test whether news of a money laundering case causes harm to a state's reputation, we measure changes in *foreign portfolio investment* from the IMF Coordinated Portfolio Investment Survey. The data represent a fairly liquid class of investments that foreign investors might adjust in response to changing information about money

laundering risk, and includes measures of investment securities, short-term debt instruments, and long-term debt instruments. Scholars have also recently used this data to test for changes in foreign investment following FATF greylisting.[45]

We include one predictor in our model – GDP growth (as a percent) – using data from the World Bank World Development Indicators dataset.[46] We do not include additional predictors – such as a measure of trade volumes – because doing so would greatly restrict our sample of potential control countries due to missing data. Accordingly, we plan to rerun the analysis with additional predictors once this data becomes available for more countries in the sample. Table 2.1 displays the mean of the predictor and outcome for each synthetic and treated unit, showing close matches between the two.

Figure 2.8, Figure 2.9, and Figure 2.10 display our results. These graphs show a close match between predicted and actual foreign portfolio investment for Denmark, including following news of the Danske Bank scandal. Switzerland's graph, meanwhile, shows some divergence between the predicted and actual foreign portfolio investment, though this does not occur following news of the Swiss Leaks; instead, the two outcomes diverge around 2013, which suggests that another factor may have changed the course of Switzerland's trajectory. Lastly, Panama's predicted and actual foreign portfolio investment follow a roughly similar trajectory and reach similar levels by 2019. Panama's worse fit between the predicted and actual foreign portfolio investment can be explained by the fact that there are fewer developing countries included in the sample, which limits the number of countries that might be a good match for Panama; this is true because a higher proportion of developed countries share data about foreign portfolio investment than developing ones. Importantly, however, we do not see a significant divergence between the predicted and actual outcome following news of the Panama Papers.

[45] Case-Ruchala and Nance 2020.

[46] Vo et al. (2017) identify GDP growth as a relevant predictor of foreign portfolio investment flows.

Figure 2.2: Switzerland Investment Growth

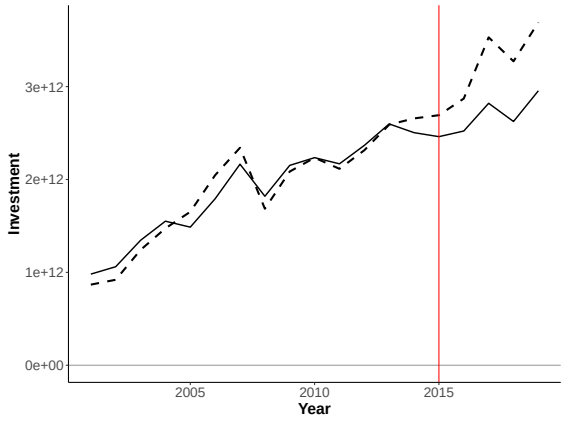


Figure 2.3: Panama Investment Growth

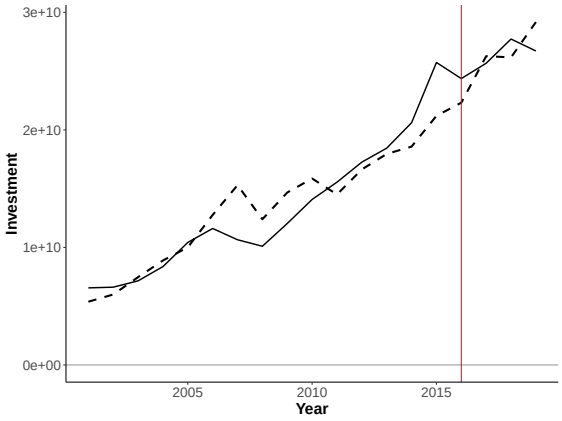
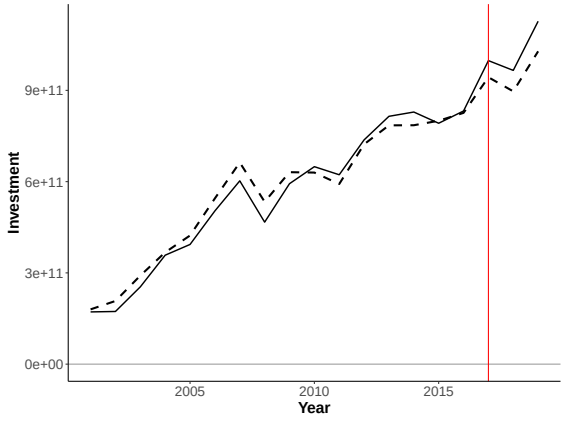


Figure 2.4: Denmark Investment Growth



Notes: Graphs show synthetic control estimates for Switzerland, Panama, and Denmark between 2001 and 2019. Each solid line represents the yearly foreign portfolio investment in dollars while each dashed line represents the estimate of foreign portfolio investment for the counterfactual synthetic control unit. Each vertical intercept denotes the year of a major money laundering case.

Figure 2.5: Switzerland GDP Growth

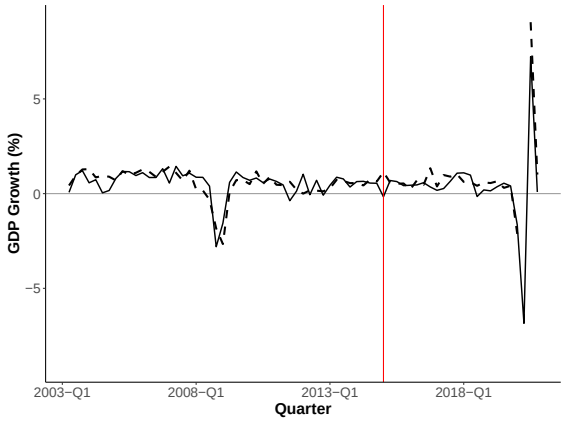


Figure 2.6: Panama GDP Growth

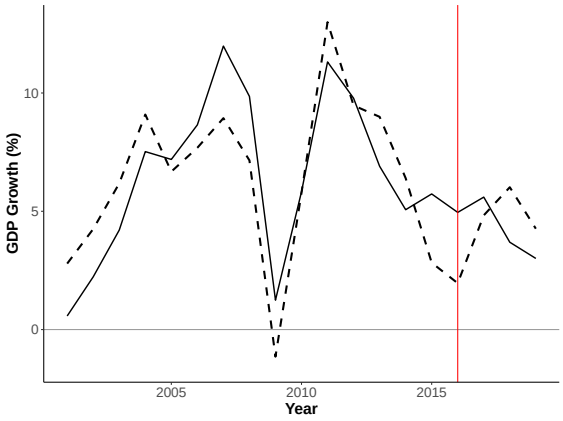
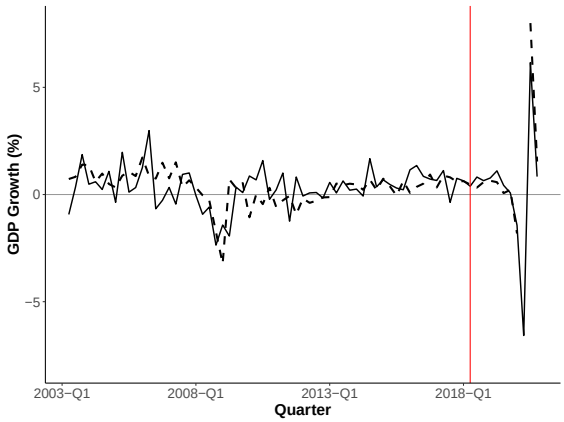


Figure 2.7: Denmark GDP Growth



Notes: Graphs show the actual (solid line) and synthetic estimate (dashed line) of GDP growth (as a percent) for Switzerland, Panama, and Denmark. Graphs for Switzerland and Denmark show quarterly GDP growth between Q2-2003 and Q4-2020, with estimates drawn from a sample of 36 OECD countries. Panama's graph shows yearly GDP growth between 2003 and 2019, with the estimate drawn from a sample of 160 control countries. Each vertical intercept denotes the year of a major money laundering case.

As a robustness check, we also estimate synthetic and actual GDP growth following news of a major money laundering case.[47] We measure GDP growth (as a percent) using quarterly data from the Organisation for Economic Co-operation and Development (OECD) for Switzerland and Denmark and yearly data from the World Bank World Indicators Dataset for Panama. Figure 2.5, Figure 2.6, and Figure 2.7 show synthetic control estimates for GDP growth for Panama (2003-2019) and Switzerland and Denmark (Q2 2003-Q4 2020). These graphs show a close fit between the predicted and actual GDP growth for Switzerland and Denmark and a relatively close fit for Panama. As with our first analysis, we find no significant effect of news of a major money laundering case on the outcome.

Our results support the conclusion that news of a major money laundering case *does not* have a significant impact on foreign portfolio investment. We also do not observe a change in GDP growth following news of these cases. Thus, these findings call into question the theory that evidence of money laundering can cause reputational harm for states leading to decreased foreign investment.

2.3.3 Harm for Financial Institutions

To enable analysis of reputational harm for financial institutions, we have collected a first-of-its-kind dataset of money laundering cases based on articles from two major newspapers – the *New York Times* and *The Financial Times* – between January 1, 2001 and December 30, 2019.[48] Research assistants reviewed articles from each newspaper, creating cases based on articles that described a government opening an investigation into a financial institution or other intermediary for a money laundering related offense. For each case, research assistants noted the location

[47] Although several prior studies have used cross-border bank liabilities to test for an impact of FATF noncompliance lists (Masciandaro 2004; Morse 2019), concurrent trends would bias an estimate using this outcome since there has been widespread consolidation of correspondent banking relationships in the last decade (see Collin et al. (2021)).

[48] We chose January 1, 2001 as the starting point since money laundering and terrorist financing increased in salience as an international issue following the September 11th terrorist attacks.

of the investigated intermediary, the investigating party, whether the investigation resulted in a fine (and if so, how much), and the date of initial coverage of the case from the *New York Times* or *The Financial Times*. Research assistants later consolidated entries from both newspapers into a single dataset of money laundering cases.

Figure 2.8: Total Cases

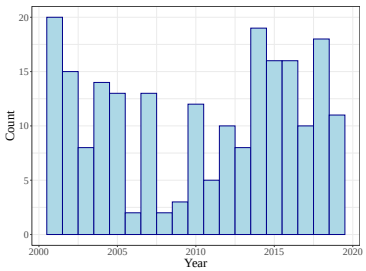


Figure 2.9: Average Fine

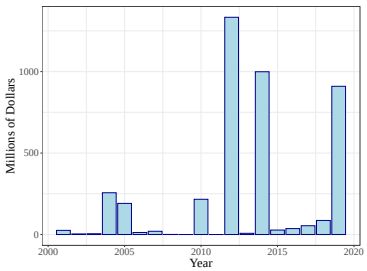
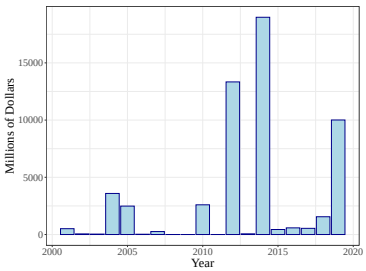


Figure 2.10: Total Fines



Notes: Histograms show the total cases by year and average and total fines in money laundering cases by year (in hundreds of millions of dollars).

This dataset provides new insight into temporal and geographic trends for money laundering cases. Figure 2.8 shows a histogram of the number of money laundering cases by year, which shows noticeable dips in the number of money laundering cases around the time of the global financial crisis (2008-09) and the euro crisis (2012); this suggests that financial stress caused by these events may have led governments to divert resources away from the investigation and prosecution of money laundering cases and toward other goals. The data also reveal information about the amount of fines involved in these cases (Figure 2.9 and Figure 2.10), with total fines reaching nearly $20 billion in 2014; the average fine is much lower though, even equal to zero for a few years.

Importantly, the data also provide insight into where most investigated intermediaries are located and which countries pursue money laundering cases most often. The country with the highest number of investigated intermediaries is the United States (63), followed by the United Kingdom (26), Italy (11), Russia (9), France

Figure 2.11: Histogram of Cases by Location of Intermediary

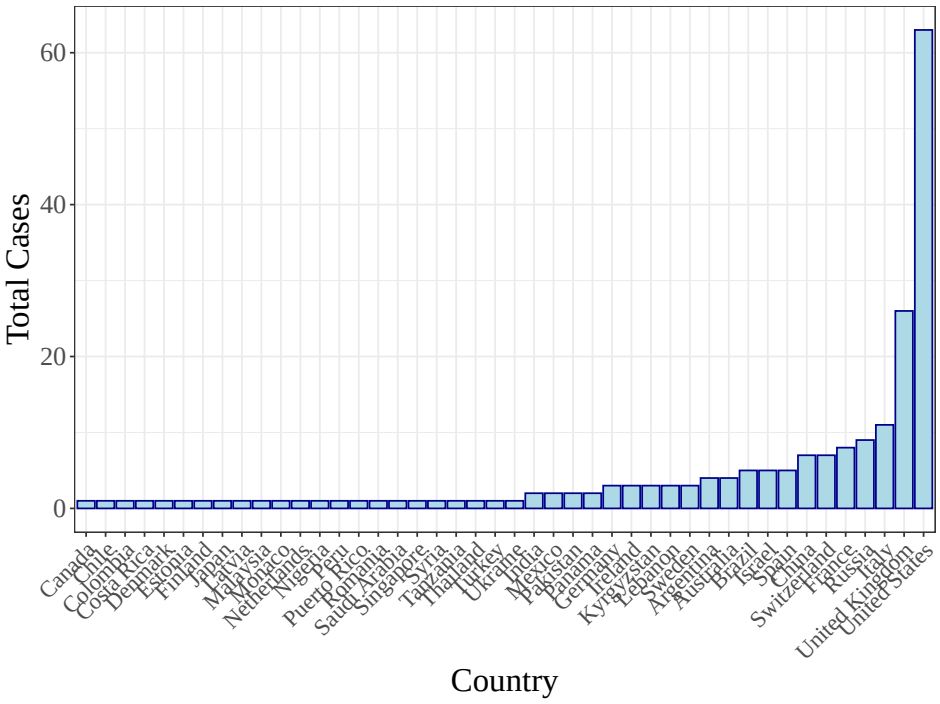


Figure 2.12: Histogram of Cases by Investigating Party

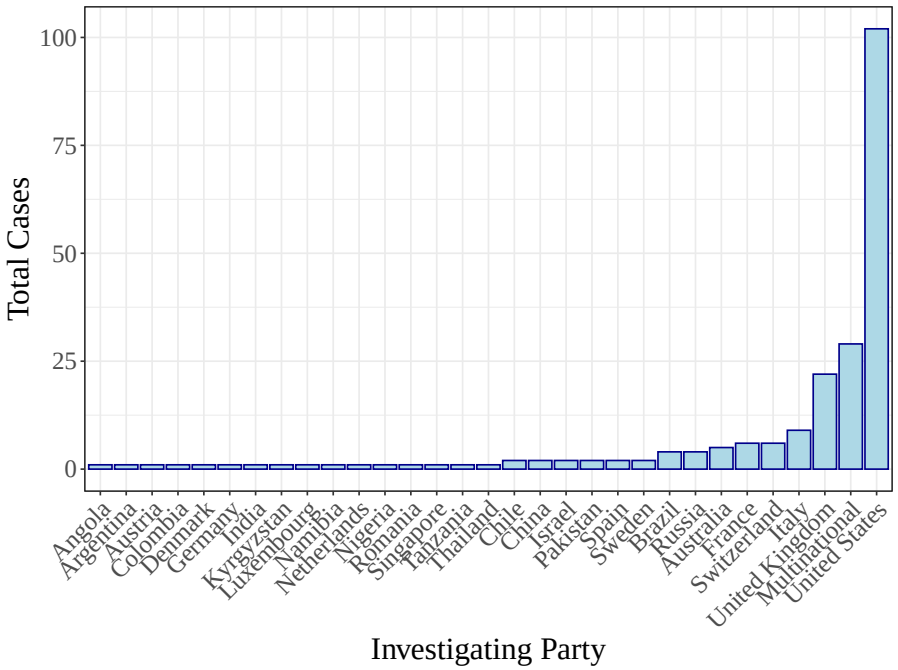
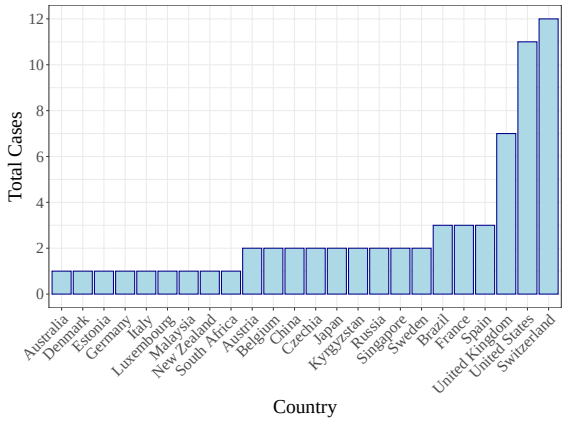


Figure 2.13: Histogram of Multinational Cases by Investigating Country



(8), Switzerland, and China (both with 7) (Figure 2.11). The country leading the most money laundering investigations was also the United States, with 102 cases, followed by multinational investigations (29), the United Kingdom (22), Italy (9), Switzerland, and France (both with 6) (Figure 2.12). Figure 2.13 shows the frequency of countries participating in multinational money laundering investigations, with Switzerland participating in the most cases (12) followed by the United States (11).

From this data, it is clear that the United States is the dominant actor in money laundering investigations worldwide, accounting for nearly half of all investigations led by a single country. The next closest country, the United Kingdom, investigated less than a quarter the number of cases. While the United States and the United Kingdom are also the number one and two countries with intermediaries involved in money laundering cases, here the skew is not quite as strong, with the U.S. accounting for roughly 29% of all investigated intermediaries worldwide. These trends are likely driven by selection bias – because the United States and (to a lesser degree) the United Kingdom more actively investigate money laundering cases, this leads to a higher number of cases involving intermediaries from these countries.

While selection bias may be present in the cases included in the dataset, this does not present a major concern for our study because we use these cases to

measure reputational harm for financial institutions. In our analysis at the state level, meanwhile, we consider several major money laundering cases that were made public through data leaks or investigative journalism. Thus, while certain countries more actively investigate money laundering cases than others, we examine cases that were exposed through means other than government investigations to test for reputational harm at the state level.

Using this dataset, we identify a sample of all financial institutions with securities listed on a major exchange during the time that news of a money laundering case became public; this allows us to measure the impact of this news on security returns. If a bank or financial institution was involved in more than one money laundering case, we consider the most recent case in our analysis. Accordingly, we are left with a sample of 34 unique financial institutions, which allows us to test for the first time whether news of a money laundering investigation causes reputational harm for financial institutions.

Event Study Method

The event study method offers a way to test for abnormal security returns following news of an event; this method is widely used in the finance literature to measure reactions to earnings announcements and in the economics and law literature to measure price changes following news of new regulations.[49] This method relies on the fact that a security's average returns can be estimated from past returns, which allows researchers to estimate the change in a security's price that is associated with a particular event. We use this method to test whether financial institutions' securities experience abnormal returns in the period after news of a money laundering investigation

We follow the approach to the event study method outlined by Kothari and Warner (2007). Suppose that $t = 0$ represents the day that news of a money

[49]Kothari and Warner 2007.

laundering investigation becomes public. The returns for a given security (i) is given by

$$R_{it} = K_{it} + e_{it} \tag{2.3.3}$$

where K_{it} is the predicted return and e_{it} represents the abnormal component of the return generated by the event. Thus, the abnormal return can be rewritten as

$$e_{it} = R_{it} - K_{it}, \tag{2.3.4}$$

which is the actual return (R) minus the predicted return (K).

The goal of an event study is to establish whether the cross-sectional distribution of returns following news of an event is abnormal – that is, it differs from the expected returns. Thus, testing the null hypothesis for a sample of N securities one moment after the event requires testing whether the average residual is equal to zero, formally:

$$AR_t = \frac{1}{N}\sum_{i=1}^{N} e_{it} = 0. \tag{2.3.5}$$

However, since we wish to test for abnormal returns in some period after news of an event ($T \in [t_1, t_2]$), we must account for multiple time periods. Accordingly, we take the average of the average residual across time periods in the event window, given by the cumulative average residual (CAR),

$$CAR(t_1, t_2) = \sum_{t=t_1}^{t_2} AR_t. \tag{2.3.6}$$

To calculate a standard test statistic, we take the cumulative average residual divided by the variance, written as:

$$\frac{CAR(t_1, t_2)}{[\sigma^2(t_1, t_2)]^{1/2}}. \tag{2.3.7}$$

This test statistic is then compared to the assumed distribution under the null

hypothesis ($CAR(t_1, t_2) = 0$).

We calculate a confidence interval for each estimate using bootstrapping.[50] We draw 10,000 samples from the data with replacement, and then calculate the cumulative average residual for each. We then use the distribution of these 10,000 estimates to calculate 95% confidence intervals.

We also make use of one additional approach within the event study methodology – the market model, which controls for market-specific fluctuations by including the market index as a covariate within the model.[51] Thus, the return for a security (i) is given by

$$R_{it} = K_{it} + \beta rm_t + e_{it}, \tag{2.3.8}$$

where rm is the market index. Here, the abnormal return is given by the actual return minus the expectation of the predicted return conditional on the market index, formally:

$$e_{it} = R_{it} - E(K_{it} \mid rm_t). \tag{2.3.9}$$

Analysis and Results

We test for abnormal returns following news of a money laundering investigation using a sample of 34 securities from financial institutions. We calculate returns as the one-day change in a security's opening price divided by the previous day's opening price. The sample includes 19 stocks listed on the New York Stock Exchange, 11 stocks listed on Over the Counter (OTC) Markets, and 4 stocks listed on the Nasdaq. The New York Stock Exchange and the Nasdaq are both major stock exchanges headquartered in New York City, while OTC Markets, also headquartered in New York City, trades securities that are typically worth less. In our sample, a higher proportion of non-U.S. financial institutions are listed on OTC Markets than for the other two.

[50] DiCiccio, Efron, et al. 1996.
[51] Lefebvre 2007.

Table 2.2: Aggregated Descriptive Statistics by Exchange

	N	Mean	St. Dev.	Min	Max
New York Stock Exchange	93,878	0.0003	0.026	−0.720	0.753
Over the Counter (OTC) Markets	38,429	0.0004	0.036	−0.510	2.333
Nasdaq	16,392	0.001	0.044	−0.522	1.424

Notes: Table presents the minimum, maximum, mean, and standard deviations for securities in the sample grouped by exchange. The unit of observation is the percent change in security price by day.

Figure 2.14: NYSE†

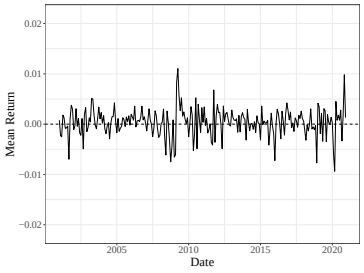


Figure 2.15: OTC Markets

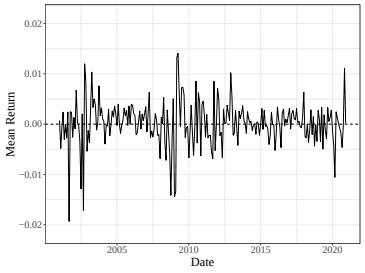
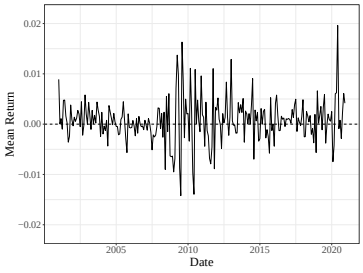
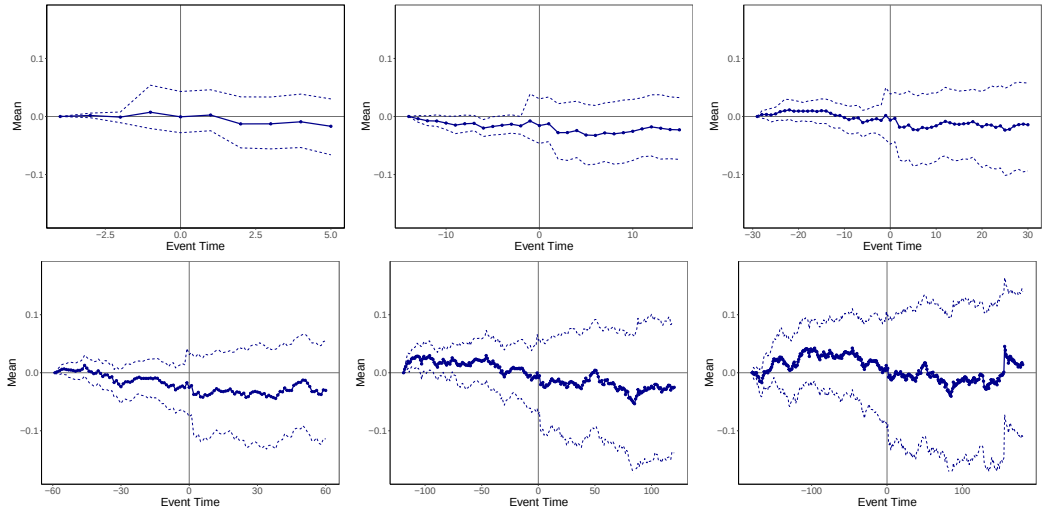


Figure 2.16: Nasdaq



Notes: Average monthly returns for securities in the sample between January 1, 2001 and December 31, 2020 (grouped by exchange). †New York Stock Exchange

Figure 2.17: Full Sample, Mean Adjusted Model

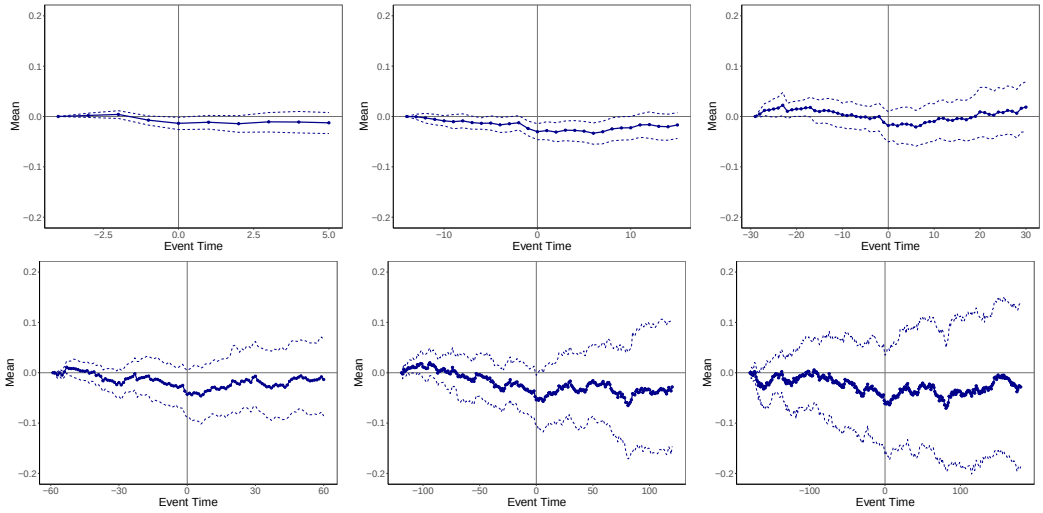


Notes: Graphs show security returns for financial institutions following news of involvement in a money laundering case for event windows of 5, 15, 30, 60, 120, and 180 days using a mean adjusted model. The solid lines denote the estimates while the dashed lines denote the 95% confidence intervals for each.

Table 2.2 presents summary statistics for the sample; we also include a full list of all financial institutions and descriptive statistics for each security in section B.1. In addition, Figure 2.14, Figure 2.15, and Figure 2.16 show the average monthly return for securities in the sample grouped by exchange. These graphs show greater variance in mean prices for securities listed on OTC Markets and the Nasdaq than the New York Stock Exchange. This suggests that an estimate of the securities listed on the New York Stock Exchange will have more power than estimates of securities listed on the other two exchanges.

We begin by estimating a mean adjusted model for the full sample. Figure 2.17 displays these plots for event windows of 5, 15, 30, 60, 120, and 180 with 95% confidence intervals. These graphs show that news of a money laundering case is not associated with a significant change in security returns, as the estimate and confidence intervals remain close to zero. Thus, we cannot reject the null hypothesis that there are no abnormal returns in the period after news of a money laundering

Figure 2.18: New York Stock Exchange, Market Model



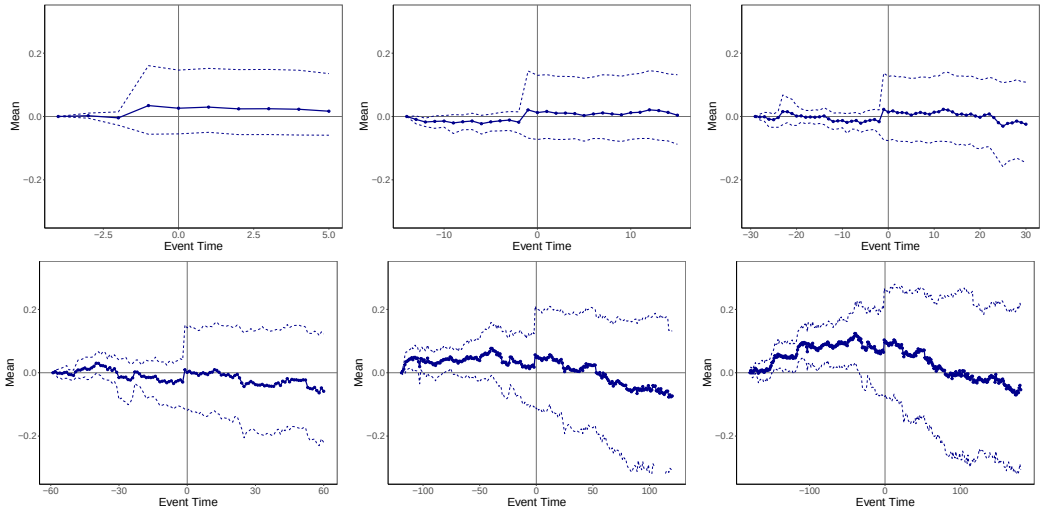
Notes: Graphs show security returns for financial institutions listed on the New York Stock Exchange following news of involvement in a money laundering case for event windows of 5, 15, 30, 60, 120, and 180 days using the market model. The solid lines denote the estimates while the dashed lines denote the 95% confidence intervals for each estimate.

investigation.

We also provide estimates for two subsamples of the data: securities on the New York Stock Exchange and securities on OTC Markets.[52] For securities on the New York Stock Exchange, we use the market model, which includes a coefficient for the market index in the model. Estimates derived using the market model are displayed in Figure 2.18 for event windows of 5, 15, 30, 60, 120, and 180 days with 95% confidence intervals. These plots show that securities on the New York Stock Exchange experienced abnormal negative returns for several days following news of a money laundering investigation for event windows of 5 and 15 days. However, we do not see a significant negative effect following news of a money laundering investigation for longer event windows. Thus, while news of a money laundering investigation may cause a small decrease in security prices (roughly 1%) in the short

[52]We do not provide an estimate for securities on the Nasdaq because the sample size is too small to provide a reliable estimate.

Figure 2.19: OTC Market, Mean Adjusted Model



Notes: Graphs show security returns for financial institutions listed on the New York Stock Exchange following news of involvement in a money laundering case for event windows of 5, 15, 30, 60, 120, and 180 days using the mean adjusted model. The solid lines denote the estimates while the dashed lines denote the 95% confidence intervals for each estimate.

term, we do not consistently observe this effect for other event windows.

Lastly, we estimate the mean adjusted model for securities listed on OTC Markets (Figure 2.19). As with estimates based on the full sample, we do not find evidence of abnormal returns in the period after news of a major money laundering case. Accordingly, we cannot reject the null hypothesis that there are no abnormal returns following the event, and this finding is consistent across each of the event windows.

Overall, we do not find evidence that news of involvement in a money laundering case leads to abnormal returns for financial institutions. Though securities listed on the New York Stock Exchange show negative returns in the days following news of a money laundering investigation, this effect is not present for longer event windows. Thus, our findings *do not* support the conclusion that news of a money laundering investigation leads to a decrease in the price of a financial institution's security.

2.4 Discussion

Our research design presents several potential limitations we seek to address here. One potential concern centers on whether the cases we have chosen to test for reputational harm among states are appropriate ones to test this theory. Although our findings can be strengthened through additional testing, we argue that these cases offer a good test of the theory as they are some of the most famous money laundering cases with the biggest international impact. Thus, if money laundering cases cause reputational harm for states, we should expect to see harm in these cases given their scale. Of course, additional scope conditions may play a role (e.g., only poor and middle income countries experience reputation costs from money laundering), but for now, we offer a basic test of this theory.

Another potential concern is that transnational investors may have already "priced in" money laundering risk for countries before these money laundering cases became public. For example, investors may have already viewed Panama as presenting a substantial level of money laundering risk even before the Panama Papers, which would explain the absence of changes in investment following this news. We argue this is unlikely because obtaining information about a country's true money laundering risk is extremely difficult. Additionally, one country in the sample, Denmark, had no prior history of money laundering scandals and is consistently regarded as one of the least corrupt countries in the world.[53] Thus, we argue that it is unlikely that transnational economic actors had already "priced in" money laundering risk for these countries.

For financial institutions, meanwhile, the case that money laundering does not cause reputational harm is more straightforward. We find that financial institutions did not experience lower returns on securities following news of a money laundering investigation, which suggests that the market did not view this news as a sign of a major problem.

[53] *Corruption Perceptions Index* 1995-2020.

One additional explanatory variable that might prove important is the size of a financial institution. Specifically, smaller financial institutions may experience a greater loss of trust – and more reputational harm – as a result of involvement in a money laundering case. Thus, in future research, we plan to include the size of a financial institution as an independent variable to test whether this mediates the reputational harm caused by involvement in a money laundering case.

2.4.1 Implications for International Cooperation

Our findings call into question claims that money laundering causes reputational costs for states and financial institutions. Importantly, if enforcing these laws does not actually protect against reputational harm because it is not present to begin with, then this removes a powerful incentive for states to enforce these laws.

This point is especially pertinent when considering expectations for wealthy countries, as some argue that wealthy countries are better enforcers of anti-money laundering laws than other countries because they (1) have the resources available and (2) wish to safeguard their often large financial sectors from reputational harm. For example a report from the IMF on the subject states, "The financial sector makes an important contribution to the economies of many of the higher-income jurisdictions, and these jurisdictions have taken steps to protect the integrity of their financial industry and their reputations."[54] Thus, while these states possess the resources to enforce these laws, they may be less committed to enforcing them than previously believed. Indeed, evidence from field studies[55] suggests that developed countries *do not* enforce anti-money laundering laws more actively than developing countries or tax havens, which is consistent with the premise that these actors do not experience significant reputational harm from association with money laundering.

Lastly, these findings suggest that international efforts to combat money laun-

[54]Verdugo Yepes 2011, pp. 12–13.
[55]Findley, Nielson, and Sharman 2014.

dering may be better framed in terms of preventing social harm rather than preventing financial harm. Although international efforts to promote anti-money laundering enforcement are often framed as a way to protect against financial harm including reputational harm,[56] there is little documented evidence to support these claims. By contrast, there is an abundance of evidence that shows money laundering's predicate crimes cause severe harm, including from crimes involving the illegal drug trade, corruption, and organized crime. Therefore, we suggest that international efforts to combat money laundering may be better presented in terms of an effort to prevent predicate crimes and catch those who commit them rather than an effort to protect against financial harm.

2.5 Conclusion

In this paper, we empirically examine the theory that money laundering causes reputational harm for states and financial institutions. Unlike prior studies, we operationalize exposure to the reputational risk associated with money laundering using news of a major money laundering case. We use the synthetic control method to test whether news of a major money laundering case led to a decrease in foreign investment (measured by foreign portfolio investment) for three countries and find that it did not. For financial institutions, we use a new dataset of money laundering cases to identify financial institutions with securities listed on a major exchange; we then use the event study method to test whether news of a money laundering investigation led to decreased security returns for involved financial institution, and similarly find no effect. Thus, our analysis supports the conclusion that news of money laundering cases did not cause reputational harm for states or financial institutions.

Although these findings are informative, they also highlight the need for ad-

[56] See for example Lewis (2019).

ditional empirical testing. Future research can help establish whether states experience *other* types of financial harm resulting from money laundering, as well as whether states experience reputational harm under any specific circumstances. Future research can also shed light on whether additional variables mediate the impact of money laundering investigations on financial institutions' reputations. Thus, this research highlights the need for additional empirical testing of theories in the anti-money laundering literature.

Chapter 3

How Strong Are Anti-Money Laundering Regulations in Practice?

Evidence from Cryptocurrency Transactions[1]

[1]For their helpful comments on this draft, I would like to thank Beth Simmons, Edward D. Mansfield, Julia Gray, Daniel Nielson, Michael Levi, Kirsten Rodine-Hardy, and Devin Case-Ruchala.

Abstract

Money laundering causes significant harm through its association with predicate crimes – including those stemming from the illegal drug trade, organized crime, corruption, and tax evasion – and presents a major international challenge since criminals can commit crimes in one country and launder them in another. To address this challenge, countries formed an international organization, the Financial Action Task Force (FATF), which has released legal recommendations and pushed countries to incorporate them into national law. Despite widespread adoption of these laws, growing evidence shows significant failures by states to enforce them. We argue that the FATF's inability to adequately measure states' enforcement has contributed to these failings, as its reports on states' compliance have failed to use data consistently or informatively. We test this proposition by collecting a dataset from a novel data source – cryptocurrency transactions from over 60 cryptocurrency exchanges – to measure cross-national enforcement of a new law for cryptocurrency. We use bunching estimation and instrumental variable estimation to measure how users adjust the amount of their crypto-to-fiat (government-issued) transactions to avoid a 1,000 dollar/euro threshold that triggers customer due diligence. Our findings suggest that there is significant variation in how stringently countries enforce anti-money laundering laws, and that FATF methods have failed to measure enforcement, leading to great costs for the effectiveness (and perceived legitimacy) of the organization.

3.1 Introduction

In February 2014, news broke that Mt. Gox – the biggest cryptocurrency business in the world at the time – had been hacked. Hackers stole over $460 million in customer cryptocurrency from Mt. Gox, which they later secretly converted into fiat (government-issued) currency through another exchange.[2] Seven years later, the stolen funds have still not been recovered; unfortunately, this crime represents a much larger trend within the cryptocurrency sector.[3] Although cryptocurrency makes up only a fraction of all the laundered funds each year, it is an important new area of money laundering risk, and it presents a useful tool for the study of anti-money laundering enforcement, which has been held back by a lack of reliable data. In this paper, we seek to address this gap in the literature by collecting a new dataset of cryptocurrency transactions directly from exchanges and measuring cross-national enforcement of a new anti-money laundering law for cryptocurrency.

Money laundering, which can be defined simply as the integration of illegal funds into the legitimate economy, primarily harms society through its connection to "predicate crimes" that generate funds for laundering. Common predicate crimes stem from the illegal drug trade, human trafficking, and organized crime – contributing to violence and instability in some parts of the world. Corruption, another common source of predicate crimes, limits the ability of citizens to access basic services and hold their government leaders accountable, while another source, tax evasion, impedes governments' ability to pursue redistributive policies. Anti-money laundering laws offer a way to combat these ills, but enforcing them presents a major challenge since states involved in laundering often do not internalize these harms.

Since the 1980s, increased capital mobility and financial integration have made it easier for criminals to commit crimes in one country and launder the proceeds

[2]Cryptocurrency exchanges allows users to convert cryptocurrency to fiat (government-issued) currency (and vice versa).

[3]Baydakova 2020; McMillan 2018.

in another. Speaking before the IMF in 2000, US Treasury Secretary Lawrence Summers called money laundering the "dark side of international capital mobility," concluding that "[m]oney laundering activities have the potential to... hurt the credibility [or] integrity of the international financial system."[4] To address this challenge at the international level, the G7 countries formed a temporary task force – the Financial Action Task Force (FATF) – that was initially charged with coordinating the international response to proceeds from the illegal drug trade. In the three decades since its formation in 1989, the FATF has grown into a permanent international organization with 39 members – including most Oganisation for Economic Co-operation and Development (OECD[5]) countries, the European Commission, and the Gulf Co-operation Council – and has expanded its mission to include combating all forms of money laundering, terrorist financing, and the financing of weapons of mass destruction.[6]

One key role the FATF has played is releasing legal recommendations for how states can best address money laundering and pushing them to incorporate these standards into national law. The FATF has been overwhelmingly successful in these efforts, with most countries showing technical compliance with many of the FATF's recommendations.[7] This presents a paradox: more states than ever before have adopted wide-ranging anti-money laundering laws, yet there is growing evidence in the last decade – from data leaks like the Panama Papers, major money laundering cases like Danske Bank, and large field experiments[8] – of countries' failure to enforce them.

We argue that a key factor contributing to countries' failure to enforce anti-money laundering laws is that the FATF has not yet developed an effective method of measuring countries' enforcement of these laws. While the FATF and partner

[4]Reuter 2005, p. 78.
[5]https://www.oecd.org/.
[6]Financial Action Task Force 2019.
[7]Halliday, Levi, and Reuter 2019.
[8]Findley, Nielson, and Sharman 2014.

organizations have released lengthy reports intended to capture each states' compliance with FATF recommendations, careful analysis of these reports and the FATF's methods shows that evaluators have failed to use data in a systematic or informative way, so the ensuing reports do not offer a meaningful evaluation of how well states enforce these laws.[9] Accordingly, we argue that the FATF is severely limited in its ability to push for widespread enforcement of these laws.

Because one of the chief hurdles of efforts to evaluate enforcement is a lack of reliable data, we collect a dataset from a new source – cryptocurrency transactions – and use this to measure cross-national enforcement of a new law for cryptocurrency. Specifically, we focus on a type of anti-money laundering law, customer due diligence, that requires private businesses to screen their customers for money laundering risk, and examine enforcement by cryptocurrency exchanges, which allow users to convert cryptocurrency to fiat (government-issued) currency and vice versa. We compare exchanges by measuring suspicious activity (activity consistent with efforts to avoid due diligence screening) just below the transaction threshold that requires exchanges to perform due diligence. Accordingly, we interpret higher levels of suspicious activity as evidence exchanges are more laxly enforcing this law, since it also compels exchanges to perform additional screening below the threshold as well as detect and address suspicious trends.

We find significant variation in levels of suspicious activity across exchanges (aggregated at the national level), suggesting there is significant variation in how well countries enforce this law. This suggests that current FATF evaluation methods have not adequately identified enforcement, and thus the FATF should adopt new data-driven methods of evaluation to better coordinate intentional cooperation in anti-money laundering enforcement.

The rest of the paper is structured as follows: in Section 2, we discuss this paper's contributions to the anti-money laundering and international cooperation

[9]Levi, Halliday, and Reuter 2014.

literature. In Section 3, we analyze the anti-money laundering regime as an area of international cooperation, and highlight the FATF's shortcomings as an institution seeking to share information about states' enforcement of anti-money laundering laws. Section 4 presents relevant background about cryptocurrency and the new law, while Section 5 details our predictions. Section 6 presents the research design and empirical analysis using both bunching estimation and instrumental variable estimation. In Section 7, we offer a discussion of the results followed by concluding thoughts in Section 8.

3.2 Contributions

This research contributes to the literature in two main ways. First, it adds to the anti-money laundering literature by analyzing enforcement at the sub-state level and using a new data source to measure enforcement in a data-scarce field; this research also provides insight into how individuals and intermediaries respond to anti-money laundering laws, which can help inform our understanding of how these actors behave. Second, this research contributes to the literature on international cooperation by providing estimates of how well countries enforce anti-money laundering laws, which holds important implications for FATF efforts to promote international cooperation.Specifically, our results suggest that FATF methods have not adequately measured compliance with FATF recommendations, which helps explain why the FATF has struggled to promote widespread enforcement of these laws.

3.2.1 A New Data Source: Cryptocurrency Transactions

One of the key obstacles confronting empirical studies of anti-money laundering laws is a lack of reliable data.[10] Although researchers have devoted a great deal of effort

[10]Verdugo Yepes 2011; Willebois et al. 2011; Levi, Reuter, and Halliday 2018; "What Have We Learned from Hosting Two Years of Empirical AML Research Conferences?"

toward developing national estimates of money laundering, nearly two decades of research on this topic has delivered little in the way of credible estimates, since most are based on unreliable data and use models that lack external validity.[11] This makes evaluating national enforcement on the basis of statistics like investigations, prosecutions, or convictions virtually impossible since we do not have an estimate of the denominator – money laundering; consequently, we cannot assess the effectiveness of any country's efforts without understanding the scale of the money laundering problem them face. Other types of money laundering statistics – namely the number of suspicious activity reports from banks – also do not offer a good cross-national metric since reporting guidelines vary widely across countries.[12] Lastly, there are important differences in countries' ability to collect relevant statistics, as well as evidence that countries may sometimes share manipulated statistics with the FATF to avoid an unfavorable national evaluation.[13]

Another common challenge for the empirical analysis of anti-money laundering enforcement relates to the level of analysis – while most research has focused on the national level, intermediaries play a crucial yet understudied role in enforcement. In particular, intermediaries enforce customer due diligence laws and are the first line of defense in preventing criminals access to the financial system; more and more, cases reveal the importance of their role as gatekeepers, as failures by these actors can allow billions or even trillions of suspicious dollars to enter the international financial system.[14] Conducting research at the sub-state level also helps to overcome many of the concerns about endogeneity encountered when using national-level data.[15] For example, many explanatory variables of interest like rule of law, corruption,

[11]See Reuter (2013) for a discussion of the methodological challenges and concerns associated with efforts to estimate money laundering.

[12]Takats 2011.

[13]Deleanu 2017; Ferwerda, Deleanu, and Unger 2017.

[14]"FinCEN Files: All you need to know about the documents leak" 2020.

[15]Empirical studies of anti-money laundering laws at the national level include Rose and Spiegel (2007), Schwarz (2011), Ferwerda, Deleanu, and Unger (2019), Deleanu (2017), Morse (2019), Masciandaro (2005), Masciandaro (2008), Barone and Masciandaro (2008), Walker (1999), Walker and Unger (2013), and Ferwerda et al. (2013).

regulatory quality, and gross domestic product are correlated at the national level or may have unknown common causes, which makes identifying causal relationships in state-level outcomes extremely difficult.

In this project, we address both these challenges – a lack of reliable data and the need for analysis of customer due diligence laws at the intermediary level – by identifying a new data source and collecting a dataset of cryptocurrency transactions. This enables the analysis of customer due diligence enforcement using the ideal data source – transactions, which are unavailable for most other intermediaries like bankers and lawyers. While previous advances in the field have been made on the basis of experimental data,[16] this study is the first to use observational data to present cross-national estimates of anti-money laundering enforcement. This project also expands the empirical analysis of anti-money laundering enforcement into a new field – cryptocurrency – and contributes to the small but growing empirical literature on cryptocurrency linked to illegal activity.[17]

3.2.2 Measuring Compliance with International Standards

Although scholars of international laws are often interested in studying the impact of international agreements on state behavior, one of the key challenges is that most cases of international law adoption are subject to selection bias.[18] This problem underlies one of the main critiques by realists, who argue that international agreements merely reflect the underlying preferences of states, and states that have no interest in engaging in a particular behavior will not sign onto an agreement stipulating it.[19] Another related critique is that international law primarily reflects standards about which states already agree, so that laws tend to address "easy" issues for which there is already a broad consensus. Anti-money laundering laws –

[16] Sharman 2010b; Findley, Nielson, and Sharman 2014.
[17] Custers, Oerlemans, and Pool 2020; Pieters and Vivanco 2017; Meiklejohn et al. 2013.
[18] Simmons 1998.
[19] citation

a set of international standards states have incorporated into national law – present a unique chance to study how how well states enforce international standards given the unique context around countries' adoption of anti-money laundering laws for cryptocurrency.

In June 2019, the FATF issued a comprehensive new set of national legal recommendations for regulating cryptocurrency businesses. Chief among these obligations was the responsibility for cryptocurrency exchanges – which allow users to exchange cryptocurrency for government-issued, fiat currency – to develop anti-money laundering compliance programs and perform customer due diligence. In response, the FATF's 35 member states and OECD countries (many of which are FATF members) pledged to incorporate these new standards into national law by June 2020.

This set up helps remove a number of potential confounders present in studies of compliance with international regulations, including selection bias at the national level, adopting laws at different times, differences in the regulation of the issue prior to adoption of the new guidelines, and variation in the specific laws adopted. By contrast, the adoption of new laws for cryptocurrency was driven by an external party (the FATF) and occurred within a set period of time (one year) for an issue area (cryptocurrency) with very little previous regulation. Further, the FATF stipulated that all countries must adopt laws in line with its specific recommendations, leading to broadly standardized national laws. This context allows us to estimate cross-national levels of suspicious activity in cryptocurrency exchanges, which we interpret as evidence that an exchange has failed to adequately enforce due diligence laws. This research provides insight into the dynamics of international cooperation in anti-money laundering enforcement, which we discuss in the next section.

3.3 International Cooperation in the Anti-Money Laundering Regime

Despite the significance of money laundering for international finance, anti-money laundering enforcement remains poorly understood as an area of international cooperation. Theories from the literature on international cooperation, however, help to explain key functions the FATF plays to promote cooperation in anti-money laundering enforcement. We argue that while the FATF has succeeded in setting international standards for anti-money laundering enforcement and coordinating international efforts to punish states it deems non-compliant, the FATF has failed to effectively monitor compliance, with great costs to its ability to promote widespread enforcement of these laws. We begin this discussion by outlining the background and key features of the anti-money laundering regime and how these relate to key ideas from the international cooperation literature.

Although today there is a broad international consensus around enforcing anti-money laundering laws, the issues they address emerged piecemeal and are surprisingly broad. In the 1980s, the United States and United Kingdom were the first countries to criminalize laundering money from the illegal drug trade. Although European countries became increasingly concerned with tax evasion in the 1990s, it was not until the 9/11 attacks that international support (led by the US) converged around efforts to address money laundering, as well as the new goal of combating terrorist financing.[20] Since then, the FATF has added limiting the financing of the proliferation of weapons of mass destruction as another key issue.[21]

Unsurprisingly, this broad range of issue areas comes with a diverse set of goals; goals include suppressing the underlying predicate crimes, limiting the amount of money laundering and financing of terrorism, identifying and confiscating illegal funds, preventing criminals and terrorists access to illegal funds, preventing terrorist

[20] Levi 2020.
[21] Financial Action Task Force 2019, p. 39.

attacks, and preserving the international financial system's integrity and stability. However, there are important obstacles to achieving these goals, as some are not clearly defined and the FATF lacks the data and methods to accurately measure progress toward them. Even more fundamentally, the FATF has not yet demonstrated that the proscribed laws and regulations help to achieve the stated goals.[22] Although part of this shortcoming can be blamed on the difficulty of measuring crime statistics, part is due to the FATF's general disregard for any serious program evaluations of its recommendations. Levi, Reuter, and Halliday (2018, p. 309) lament that "data are relatively unimportant in policy creation and sustenance [in the anti-money laundering regime]," and conclude that "the anti-money laundering initiatives were not developed alongside any measures of effectiveness or even efficiency."

To accomplish these wide-ranging goals, the FATF relies on states and private sector businesses (called intermediaries) to perform wide-ranging functions, which imposes significant costs on both groups. First and foremost, states are charged with adjusting their legal and financial systems in line with FATF standards, as well as investigating and prosecuting money laundering crimes. States also supervise intermediaries – which include businesses in the financial sector, legal services, real estate, casinos, and other designated non-financial professions – to ensure they adequately screen their customers for money laundering risk. These laws require businesses to gather and store information about their customers – including copies of identification and other information – and report high-value transactions and suspicious activity to government authorities. These obligations are extremely costly, and impose a significant burden on poor countries that often lack the resources to provide even basic services for their citizens,[23] as well as intermediaries, with one compliance director of a major international bank guesstimating that his bank pays

[22]Halliday, Levi, and Reuter 2019, pp. 9–11.
[23]Halliday, Levi, and Reuter 2019, p. 11.

$2 billion annually in compliance costs.[24]

Unlike international efforts to address climate change – where the wide diversity of issues and actors' varied interests have led to the emergence of small, club-like organizations dedicated to specific issues,[25] international efforts to address money laundering are extremely centralized under the FATF. This is no accident, as political force played an important role in the development of the current system. Simmons (2001) writes that the adoption of anti-money laundering laws was a political process driven by the dominant financial powers – namely the United States and United Kingdom – that exerted coordinated international pressure on weaker countries to coerce them into adopting national laws in line with the international standards they helped create. Although a dozen or so small countries with important financial sectors initially sought to resist the new international standards, intense economic pressure channeled through FATF blacklisting soon led these countries to give into the FATF's demands.[26] Thus, the anti-money laundering regime presents a case where a group of powerful countries pushed weaker ones (some actively opposed) to adopt national laws in line with international standards.

3.3.1 Standards, Monitoring, and Punishment

Why then should we expect states – many of which were reluctant or downright opposed to the regime[27] – to enforce a set of laws many were forced to adopt under intense international pressure? In short, neoliberal institutionalists argue that the watchful eye and dutiful reporting of an international organization can prompt states to cooperate lest they face punishment from the organization's members. Specifically, international cooperation problems that can be conceptualized in the game theoretic framework of the Prisoner's dilemma – where two actors are better

[24]Halliday, Levi, and Reuter 2019, pp. 11–12.
[25]Keohane and Victor 2011.
[26]Sharman 2009.
[27]Simmons 2001; Sharman 2009; Sharman 2011.

off cooperating but each face an incentive to cheat (which would lead to a better payoff for the cheater and a significantly worse payoff for the "sucker") – international institutions can help mitigate concerns over cheating by monitoring and sharing information about each actor's compliance with the rules.[28] This role is crucial because the transaction costs of cooperative agreements are never negligible, as it is "always difficult to communicate, to monitor performance, and especially to enforce compliance with rules."[29] We explore each of these functions in more detail below.

1. Standard setting

First, it is crucial for countries to adopt common rules to ensure that states will be judged by shared standards. An international institution can aid this process by developing recommendations for best practices, which has the added benefit of acting as a resource to poor countries who may lack the capability to develop new laws on their own.[30] Beginning a year after its formation, the FATF released a set of recommendations designed to help states create a national legal and regulatory framework to address money laundering. The FATF has continued to revise and release new recommendations – including ones designed to help states prevent terrorist financing – and has been extremely successful in pushing countries to incorporate these recommendations into national law.[31]

2. Monitoring Compliance

Second, the FATF seeks to monitor compliance with FATF guidelines through Mu-

[28]Indeed, this is the role Simmons (2001, p. 599) argues the FATF plays in the AML regime, writing, "Since defection problems often create incentives to misrepresent behavior, multilateral institutions under these conditions will often be essential in gathering'objective' information through surveillance protocols. International institutions will also be important to the dominant financial center for coordinating potentially costly punishments that might be subject to problems of free-ridership in their absence."

[29]Keohane 1988, pp. 386–387.

[30]Simmons 2010.

[31]Halliday, Levi, and Reuter 2019, pp. 4–5.

tual Evaluation Reports, which it shares with other states. This function is important since it is often very difficult for states to obtain high-quality, timely information about other states' actions. These reports are completed by a team from one of several international institutions – the FATF, the IMF, the World Bank, or one of the FATF-style regional bodies – on a rotating basis, which means that each country is evaluated roughly once every eight years. This process typically begins with an extensive "desk analysis" of a country's legal and financial system, followed by an extensive questionnaire sent to country officials, a 2-3 week on-site visit by a small team of evaluators who conduct interviews with public and private sector professionals, followed by several rounds of comments and responses on the draft report between the evaluating team and country officials. Finally, the evaluating team sends the draft report to the FATF Secretariat's office for a quality check before the report is officially adopted in an FATF plenary meeting and publicly shared on the FATF's website.[32]

3. Coordinating Punishment

The third main function an IO can perform is identifying defecting countries and coordinating sanctioning by member states. With large groups of states, there is often a collective action problem surrounding efforts to punish defecting states.[33] Institutions can help to overcome this problem by "painting 'scarlet letters' on transgressors" to identify defectors for punishment by the institution's member states.[34] Institutions can also delegate the responsibility for punishing defectors. Indeed, the FATF has placed countries on the Non-Cooperative Countries or Territories list, prompting FATF member states to respond with economic restrictions or other sanctions until the FATF removed the state from the list. Most scholars agree that FATF blacklisting caused significant economic harm to listed countries and greatly

[32]Halliday, Levi, and Reuter 2019, pp. 5–6.
[33]Axelrod and Keohane 1985, pp. 235–236.
[34]Garrett 1992, p. 535.

influenced state behavior.[35]

Neoliberal institutionalists argue that these functions – and particularly the act of gathering and sharing information about compliance – are a key way that international institutions can promote cooperation. Reciprocity is one such mechanism that can promote cooperation when two actors interact iteratively;[36] computer simulation shows that a tit-for-tat strategy – wherein a player copies her partner's last move to cooperate or defect – proved the optimal strategy for long-term gains when paired against any other strategy.[37] Similarly, actors' reputations can also promote cooperation by leading actors to prioritize long-term gains through cooperation over short-term interests.[38] Others extend this logic to argue that states entering international commitments will be discouraged from reneging since this could harm a country's international reputation (and limit access to meaningful cooperative arrangements in the future).[39]

Crucially, both mechanisms of reputation and reciprocity depend on an institution's ability to share meaningful and timely information about states' compliance with the rules. However, this is not a given, since political interests could influence the process of information gathering and sharing; indeed, Garrett (1992, p. 535) argues that political interests played an important role in information sharing processes within the European Union's institutions, writing that it would be wrong to characterize these institutions as "apolitical providers of information." Another concern is that an institution may simply prove incapable of accurately identifying defection for a complicated issue area involving a wide array of actors. For these issues, gathering information about states' compliance may simply prove too costly, time consuming, or difficult – even for an institution. We argue that the

[35]Morse 2019; Sharman 2009; Ferwerda, Deleanu, and Unger 2019.
[36]Axelrod and Keohane 1985.
[37]Axelrod and Hamilton 1981.
[38]Axelrod and Keohane 1985; Kreps and Wilson 1982.
[39]Simmons 2000.

anti-money laundering regime presents one such case and discuss specific problems with the FATF's evaluation process below.

3.3.2 Shortcomings of the Evaluation Process

Despite the significant resources devoted to the mutual evaluation process,[40] outside evaluators commissioned by the IMF have documented serious deficiencies with the methodology used in this reports. Some of these deficiencies stem from the review process itself. For one, inexperienced assessors – many of which may only work on one report – can harm the quality of the final product.[41] Second, because several different international organizations carry out these evaluations, the resulting reports often vary significantly in quality. One example of a poor quality evaluation comes from Moneyval, which gave Cyprus relatively high ratings shortly before Cyprus's financial crisis revealed widespread money laundering.[42] Finally, there is the potential for political influence by the country being evaluated on the final report. Since FATF draft reports are reviewed at FATF plenary meetings – and FATF members are allowed to comment on the draft reports and propose revisions – this presents the opportunity for FATF member states exercise greater influence over their final reports than non-members.[43]

Beyond the evaluation process itself, outside reviews commissioned by the IMF have raised serious concerns about how evaluators use data within the reports. For example, one important weakness is that the data included in the final report is highly dependent on the data provided by the officials of the evaluated country.

[40]The mutual evaluation report process is extremely costly and time-consuming for both the reviewing body and the reviewed country, with the IMF estimating that one such report costs the Fund more than $300,000.(Halliday, Levi, and Reuter 2019, p. 13)

[41]Levi, Halliday, and Reuter 2014, p. 30.

[42]Levi, Halliday, and Reuter 2014, pp. 9, 45.

[43]There is also evidence countries with the resources to lobby also receive better reports. For example, Germany sent a diplomatic team to Washington, D.C. when government officials were unhappy with some of the comments included in the draft version of Germany's mutual evaluation report (Halliday, Levi, and Reuter 2019, p. 7).

One reviewer wrote,

> In practice, the assessment of effectiveness depends on what the supervised entities and countries' authorities tell the assessors and the measurement of effectiveness by the existing assessment tools continues to be quite rudimentary. The assessors' judgment is heavily dependent upon the quality and quantity of the information that the entities and authorities are willing to share. Furthermore, there are other factors undermining the evaluation of effectiveness, including the absence of agreed definitions of effectiveness and rudimentary measurements... Overall, the entire assessment apparatus suffers from a lack of data and the difficulty of interpreting data meaningfully.[44]

Although these comments date from 2011, there seems to have been little improvement since then. In an exhaustive report, Levi, Halliday, and Reuter (2014) note that data is used minimally in the reports, and the statistics that do appear are often inconsistent or difficult to interpret. The authors conclude, "There have been few efforts by country evaluators in the FATF Mutual Evaluation Reports (MERs) to acquire qualitative data or seriously analyze either quantitative or qualitative data," and while the FATF has made some efforts to improve its use of data in the most recent round of evaluations, the "FATF has still not established procedures that provide sufficiently informative evaluations."[45]

3.3.3 With Little Monitoring, Few Comply

Given that mutual evaluation reports do not adequately identify defection in the anti-money laundering regime, what then drives countries to enforce these laws? One potential explanation centers on state power: Sharman (2011) argues that the anti-money laundering regime presents a case of "hypocrite standards" whereby a

[44]Verdugo Yepes 2011, p. 13.
[45]Levi, Reuter, and Halliday 2018, pp. 307, 317.

group of powerful countries have forced weaker countries to adopt strict standards to which they themselves do not adhere. Using a novel transnational audit study, Sharman (2010b) exposes varied enforcement of customer due diligence laws across countries – with OECD countries like the United States and the United Kingdom having some of the lowest levels of compliance. He attributes this finding to the fact that OECD countries have effectively pressured weaker countries – especially so-called tax havens like the Bahamas – to abide by strict financial laws through FATF blacklisting while often failing to enforce them themselves.

While this and subsequent audit studies play an invaluable role in exposing varied compliance across countries as well as significant failures by OECD countries,[46] Sharman (2011)'s theoretical argument, which is focused on state power, overlooks an important locus of compliance for these laws: private sector intermediaries. Perhaps a more fitting framework with which to conceptualize the enforcement of anti-money laundering laws is as a two-tiered principal-agent model.[47] At the international level, the FATF acts as the principal seeking to obtain compliance from states (the agents), while at the national level, each state (principal) seeks to obtain compliance from hundreds of thousands of independent intermediaries (the agents). While I explore the specific incentives for states and intermediaries in Section 3.5, we can reasonably conclude that it should be difficult to obtain a high level of compliance from such a large group of actors with varied interests and incentives.

In fact, given that enforcement is costly, there are no clear links between enforcing these laws and minimizing the harms they seek to address,[48] the alleged harms of money laundering (at least at the macroeconomic level) as yet remain unproven,[49] and compliance requires monitoring hundreds of thousands of private sector actors to ensure they enact costly changes, the net incentives suggest states may not achieve high levels of enforcement. Yet, since the FATF has not yet *de-*

[46]Findley, Nielson, and Sharman 2014.
[47]Ferwerda, Deleanu, and Unger 2019.
[48]Halliday, Levi, and Reuter 2019, pp. 9–11.
[49]Reuter 2013.

veloped a process to identify defection at the state level, there is little incentive for states to try. Thus, given the incentives, we should expect effective enforcement of anti-money laundering laws to be the exception rather than the norm.

Indeed, this understanding fits with the findings of an IMF-commissioned report, which concluded that major problems in the FATF process "at least raise the question of whether focusing on [FATF measures] ensures progress toward mitigating real money laundering/terrorist financing risk."[50] This statement shows low confidence in the current system's ability to achieve its goals, despite the significant investment of time and resources by the FATF, the IMF, and other organizations along with the states themselves. Recent comments by a top FATF official also show growing public recognition by the FATF that the current system has failed to achieve the key goal of widespread enforcement. FATF Executive Secretary David Lewis commented, "[E]veryone is doing badly, but some are doing less badly than others." Lewis also identified a lack of political will as a major hurdle to enforcement, saying, "We have some way to go to get global political support for anti-money laundering measures as a good thing, in their own right, rather than just [measures necessary] to avoid a bad [FATF evaluation] report."[51]

Accordingly, the true puzzle becomes why there has been so little interest and effort devoted to developing effective measures of compliance in the anti-money laundering regime, as Halliday and others that the methods used for evaluation often lag far behind those used in the applied social sciences. This is especially puzzling given that audit-based testing is a cheap and reliable way to test measures of compliance by actors in the private sector.[Halliday paper] First and foremost, these results call for the FATF to develop data-based evaluations of country compliance, as many recent works have concluded.[52]

Accordingly, the true puzzle becomes: why has the FATF failed to pursue data-

[50]Verdugo Yepes 2011, p. 14.
[51]Bowers 2020.
[52]I discuss specific proposals for reform in the penultimate section.

driven methods of evaluation? This is especially puzzling given that the FATF could use audit-based assessments of customer due diligence, which offers a cost-effective and compelling way to measure enforcement of these laws.[53] Even beyond audit-based testing, other methods from the applied social sciences offer a significant improvement to the FATF's current evaluation methods.[54] Accordingly, the FATF should take steps to develop data-based evaluations of country compliance. Until the FATF takes major steps to reform its review process, FATF evaluations will be "open to allegations of ad hoc, impressionistic or politicized judgments."[55]

For the study of international cooperation, the anti-money laundering regime presents a case where an institution has failed to adequately identify defection, with great costs for its effectiveness – and perceived legitimacy. This case suggests that an institution's ability to identify defection and share unbiased information should not be taken at face value, as either politics or practical struggles may significantly inhibit the ability of an institution to perform this role. Finally, this finding calls for more empirical testing of the micro-foundations of broader theories of international cooperation in order to understand under what conditions these propositions to apply. No less than Robert Keohane voiced a similar view over three decades ago, writing of theories of international cooperation:

> ...[F]ormal theory alone is unlikely to yield answers to our explanatory puzzles. Rationalistic theory is good at posing questions and suggesting lines of inquiry, but it does not furnish us with answers. ...[M]ost of all we need more empirical research, guided by theory. Such research could begin to delineate the specific conditions under which cooperation takes place.[56]

[53]Findley, Nielson, and Sharman (2014) demonstrate the feasibility of this approach for large-scale evaluations. Levi, Halliday, and Reuter (2014, p. 25) specifically recommend this as a method the FATF should adopt.

[54]Levi, Halliday, and Reuter 2014, p. 24.

[55]Levi, Reuter, and Halliday 2018, p. 307.

[56]Keohane 1988, p. 388.

3.4 New Laws for Cryptocurrency

Cryptocurrency is a form of digital money that uses encryption to generate new units and secure transactions.[57] Use of cryptocurrency has increased dramatically since the introduction of Bitcoin in 2009, and today there are 1,670 unique cryptocurrency coins worth an estimated $197 billion in market capitalization.[58] Although the vast majority of transactions are legal, cryptocurrency has been used extensively in illegal activity. One major source of illicit cryptocurrency is dark web marketplaces, which allow users to anonymously buy and sell illegal goods like weapons, stolen credit cards, and drugs using cryptocurrency and encrypted IP addresses.[59] These sites have continued to attract new users since the first dark web market opened in 2011, with sales for these markets generating at least $660 million in 2017.[60] [61]

Cybercrime is another major source of illicit cryptocurrency, many of which are directly enabled by cryptocurrency. During ransomware attacks, for example, hackers encrypt a victim's computer system and demand a cryptocurrency ransom to decrypt the victim's files. These attacks are often incredibly costly, leading some 17% of private businesses and 45% of public offices to pay a cryptocurrency ransom (according to a recent survey).[62] [63] Other types of cybercrime have also been on the rise, including fraud, scams, and theft connected to cryptocurrency exchanges. Indeed, in addition to misappropriation and theft by exchange operators, outside hackers have stolen tens of millions of dollars from exchanges, often forcing

[57] Greenberg 2017.

[58] *All Cryptocurrencies* 2019.

[59] Greenberg 2014b; Cox 2015.

[60] United Nations 2019; Soska and Christin 2015; Greenberg 2015.

[61] This estimate is provided by Chainalysis Team (2018), but estimates vary. In 2018, FinCen estimated that at least $4 billion had passed through the Dark Web since 2011 (Ott 2019). A 2019 study estimates that $76 billion worth of illegal activity involves Bitcoin annually (Foley, Karlsen, and Putniņš 2019).

[62] CyberEdge 2019.

[63] In 2019, the City of Baltimore became the victim of such an attack that brought down the city's payment system for water bills, property taxes, and vehicle citations and prevented city employees from accessing email and a parking fine database (Chokshi 2019). Though Baltimore refused to pay the 13 Bitcoin ($76,000) ransom, it paid $6 million to restore computer systems and an estimated $18 million in damages (Broadwater 2019).

exchanges to close down without repaying users for their lost funds. All told, cybercrime generated at least $4.26 billion in 2019 and creates significant public and private costs.[64]

Once cyberthieves or dark web sellers obtain illicit cryptocurrency, they must convert the funds into fiat (government-issued) currency to use it in the broader economy. However, cryptocurrency presents a paradox for money launderers. On the one hand, cryptocurrency transactions offer secrecy because they are pseudonomynous, and those making transactions can only be identified only through digital keys that are not linked to public identities. On the other hand, most cryptocurrencies record information about each transaction – including the time, date, amount, and keys of senders and recipients – in decentralized ledgers that create a permanent public record of all transactions; accordingly, law enforcement and researchers who manage to match a digital key to a user's public identity can often learn much about a person's previous transactions.[65] Thus, those who wish to launder illicit funds must convert cryptocurrency to fiat currency without drawing attention to their legal identities or previous crimes, and the primary way criminals have done this is through exchanges.[66]

Although law enforcement has long voiced concerns over cryptocurrency's money laundering risk, most countries only recently passed laws for cryptocurrency in response to new recommendations by the FATF. In June 2019, the FATF released a set of guidelines for regulating cryptocurrency, which articulated two main obligations for exchanges: (1) perform customer due diligence for transactions of 1,000 euros/dollars or more and, (2) design and implement additional risk-based measures appropriate for the scale and type of money laundering risk an exchange faces. First, performing customer due diligence requires that exchanges obtain information

[64]CipherTrace Cryptocurrency Intelligence 2018, p. 4.

[65]Although users can make unlimited keys (up to one per transaction), most are not so careful (Greenberg 2017).

[66]Laundering through exchanges has been documented for ransomware attackers (Apuzzo 2014), cyberthieves, and dark web marketplace sellers (Meiklejohn et al. 2013).

about a customer's identity "using reliable, independent source documents, data or information," understand the nature of a customer's business, and maintain records of this information. Risk-based measures, meanwhile, require exchanges to "identify, assess, and take effective action to mitigate their money laundering/terrorist financing risks," including conducting customer due diligence for transactions below the threshold that are deemed high risk.[67] Thus, while one obligation is clearly articulated with a clear rationale for when to apply it (customer due diligence), the other much vaguer and relies on the proactive efforts of exchanges to address money laundering risk.

This risk-based approach is part of the FATF's broader strategy for anti-money laundering laws; first adopted in 2007, it is intended to ensure that intermediaries use resources efficiently to address the money laundering risks that are most pressing for each individual business. Intermediaries apply minimum standards to all their customers, and then selectively apply additional measures for customers or transactions they deem high risk. Accordingly, each intermediary must assess risks for her business and design a custom compliance system that addresses money laundering risks for her sector and company. Importantly, this approach requires that intermediaries proactively monitor money laundering risk, yet in reality, intermediaries may prove reluctant to perform these full duties because they are costly and offer no direct benefits. Accordingly, we hypothesize that exchanges will not adequately enforce risk-based measures, and from this draw three specific predictions: (1) at least some criminal actors will continue to use regulated cryptocurrency exchanges, (2) we will see significant variation in levels of suspicious activity across countries, and (3) we will see significant levels of suspicious activity in OECD countries. We detail these predictions in Section 5.

[67] Mnuchin 2019.

3.5 Predictions

3.5.1 Suspicious Activity in Regulated Exchanges

First (and fundamental to this research design), we predict that criminals will use regulated exchanges to launder illegal cryptocurrency after countries adopt the new guidelines. Although many in the cryptocurrency community have argued that new regulations will drive money launderers from exchanges to more secretive peer-to-peer trading sites on the dark web (making it harder for law enforcement to track them),[68] we argue that a mass migration to these sites is unlikely because they are less convenient (users must arrange each transaction) and riskier (there is no third-party guarantee).

In fact, this tradeoff between security and secrecy is inherent to money laundering more generally, as many of the world's safest and most lucrative investments are located in industrialized countries with extensive anti-money laundering laws. In response, criminals have opted to exploit weaknesses in anti-money laundering enforcement across certain sectors that offer a high level of security for an acceptable level of secrecy.[69] Security is an especially salient concern for cryptocurrency users since scams, fraud, and theft are widespread among cryptocurrency businesses. Although criminals laundering other types of funds have greater flexibility, cryptocurrency launderers have few options other than to use exchanges, which are the only mainstream businesses to offer conversions between cryptocurrency and fiat currency. Given these constraints, cryptocurrency launderers will likely strategically adapt their behavior to avoid detection under the new regulation rather than abandon regulated exchanges altogether.

[68] Havilland 2019; Aguilar 2019.

[69] Masciandaro, Takats, and Unger 2007, p. 155.

3.5.2 Cross-National Variation

Since national regulators oversee intermediaries' enforcement, we argue that the relative stringency or laxness of the national regulatory environment will likely determine how well exchanges enforce risk-based measures. We base this assumption on the fact that prior research shows the quality of national regulation plays an important role in how well intermediaries enforce these laws,[70] and regulators vary greatly in resources and methods across countries.[71] Even wealthy countries that generally show good financial supervision for other issues have shown significant failings when it comes to supervising anti-money laundering enforcement.[72] Thus, we predict varied levels of suspicious activity (discussed in the next section) as countries enforce risk-based measures to varying degrees as required by national regulators.

Notably, this view differs from the standard one in the literature, which takes intermediaries' enforcement of national laws at face value;[73] research that has considered adverse incentives for intermediaries has typically examined cases of collusion with criminals,[74] from which we might infer that intermediaries may be either criminal or honest. Yet another view is that financial institutions are likely to enforce these laws because they are concerned about potential harm to their reputations should they become involved in a money laundering scandal.[75] However, as of yet, we do not have proof that reputational concerns play an important role in intermediary enforcement of anti-money laundering laws, and in fact, there is evidence from major money laundering cases that suggests the opposite.[76]

[70] Verdugo Yepes 2011, p. 6.

[71] Levi, Halliday, and Reuter 2014, p. 30; Willebois et al. 2011, pp. 4–5.

[72] *Anti-money laundering and counter-terrorist financing measures, Denmark: Mutual Evaluation Report*, pp. 199, 201; *Anti-money laundering and counter-terrorist financing measures, Finland: Mutual Evaluation Report*, pp. 197–199.

[73] Unger and Ferwerda 2008; Schwarz 2011; Gnutzmann, McCarthy, and Unger 2010; Takats 2011.

[74] Reuter 2005; Masciandaro, Takats, and Unger 2007, p. 30.

[75] Morse 2019.

[76] In a number of high-profile money laundering cases like Danske Bank and HSBC 2012, banks

An important exception to these views of intermediaries as agents of the state or actors driven by reputational concerns is research by Sharman (2009; 2010; 2011) and Findley, Nielson, and Sharman (2014), who show varied levels of enforcement by intermediaries. We build on this research to argue that intermediaries are rarely strict enforcers of the law or openly colluding with criminals, but rather strategically respond to the demands of the regulatory environment and adjust their level of enforcement accordingly. Thus, rather than outright dereliction of customer due diligence obligations, we should instead expect to see many intermediaries tow the line of acceptable conduct by seeking to minimize their efforts while avoiding punishment from regulators.

3.5.3 OECD Countries

Third and last, we predict that OECD countries will show significant levels of suspicious activity. This inquiry is significant since much of the literature assumes that OECD countries are among the best enforcers of anti-money laundering laws. Consequently, many authors argue that OECD countries have stronger anti-money laundering systems for a number of theoretical reasons, including because their extensive capabilities make implementing these measures possible;[77] because they have reputations for low levels of corruption and high rule of law; or because they are concerned about their international reputations.[78] However, we have little proof that OECD countries are better enforcers of anti-money laundering laws than other countries. Instead, the few audit-based tests we have show that intermediaries in OECD countries actually enforce customer due diligence laws at lower rates than tax havens and at levels on par with many developing countries.[79] These findings suggest enforcement by OECD countries may represent an important area of weakness in

continued to serve high-risk clients even after receiving warnings from regulators.

[77]Verdugo Yepes 2011, p. 12.

[78]Morse 2019.

[79]Findley, Nielson, and Sharman 2014.

the global regime since these countries handle a high number of all transactions in the international financial system.

3.6 Research Design

Using bunching estimation, we measure what we term suspicious activity – behavior consistent with efforts to avoid due diligence screening – by measuring the amount of unusual transaction activity just below the due diligence threshold. While prior studies have traced the laundering process for specific cryptocurrency transactions,[80] measuring suspicious activity allows us to analyze a much larger sample of cryptocurrency transactions – virtually all crypto-to-fiat trades from exchanges with daily trading volume. One drawback of this approach, however, is that some activity measured using this method may not be criminal, as some customers may seek to avoid screening for other reasons (e.g., privacy). Non-criminal users are unlikely behind a large portion of these transactions, though, since evading screening requires specific knowledge (sometimes of multiple exchange rates) and completing the screening process is relatively easy (sharing a copy of a government-issued form of identification and answering a few basic questions) and clears the customer for all future transactions of any amount. Finally, regardless of a customer's motive, avoiding screening presents a failure by an exchange to adequately enforce due diligence laws.

In addition to bunching estimation, we use an instrumental variable – the exogenous variation between two fiat exchange rates – to measure how the proportion of trades at a given amount of cryptocurrency changes in response to fluctuations in the due diligence threshold. We find that the proportion of trades at a given amount of cryptocurrency *decreases* once it is no longer below the due diligence threshold, even after controlling for the crypto-to-fiat exchange rate in the trade.

[80] Meiklejohn et al. 2013; Apuzzo 2014.

The findings using an instrumental variable, which plausibly enables causal inference, confirms a similar country ranking of suspicious activity in exchanges, and both models are robust to the inclusion of placebo tests. Together, these two methods offer a robust test of the predictions and provide compelling evidence that the amount of suspicious activity in cryptocurrency exchanges varies significantly across countries.

3.6.1 Data

To test these predictions, we collected a new dataset of cryptocurrency trades using public trade data from 60 of the world's biggest exchanges that offer crypto-to-fiat trades. To automate the process, we set up remote servers using Amazon Web Services that collected trades every 15, 30, 60, or 150 seconds, with increments chosen based on the volume and number of trades available from each site's application programming interface (API). We collected trades from the two most widely used cryptocurrencies – Bitcoin and Ethereum – to FATF member states' fiat currencies between 07/01/2020 and 08/31/2020. Each trade in the dataset includes information about the time of the trade (to the second), the quantity of cryptocurrency, and the exchange rate of the currency pair at the time the trade was executed.[81] Because many exchanges had low daily trade volumes that prohibited analysis using these methods, the final sample includes 23 exchanges located in 8 countries and represents all countries with high-volume exchanges offering crypto-to-fiat trades. This sample presents a diverse cross-section of countries including wealthy, industrialized countries (US, UK, and Japan), a middle-upper income country (Estonia), a developing country (China), and several tax havens (St. Kitts and Nevis, the British Virgin Islands, and Singapore).

Because experts have raised concerns about the reliability of data from cryptocurrency exchanges, we take several steps to ensure the validity of our data. In

[81] Prices vary by site and are not pegged to a currency.

particular, concerns center around the claim that some exchanges provide fake data to make their daily trade volume appear higher, increasing their ranking on the popular exchange aggregator *CoinMarketCap* (which displays exchanges according to volume).[82] To address these concerns, we collected trade-level data directly from exchanges in real-time, which is unlike most cryptocurrency research that uses aggregate exchange data acquired from third-party sites. We also examined the data for statistical anomalies – such as distributions that mimic a perfect exponential distribution – and removed these trading pairs from the analysis.[83] Lastly, it is important to note that even if an exchange included some fake trade data, this alone would not bias the results unless the fake data systematically increased the number of transactions below the due diligence threshold, which is highly unlikely given previously uncovered patterns of fake data.[84]

3.6.2 Bunching Estimation

Bunching estimation is an econometric strategy introduced by Saez (2010) and further developed by Chetty et al. (2011). It exploits a discontinuity in incentives at a cutoff point where individuals can sort below the cutoff and employs the mass of a distribution to measure how individuals respond to a change in incentives. Figure 3.1 provides a visual representation of this strategy. The number of trades is represented by a smooth density distribution $h(z)$ across a continuous variable z, which denotes the total fiat amount of each trade.[85] Because of the introduction

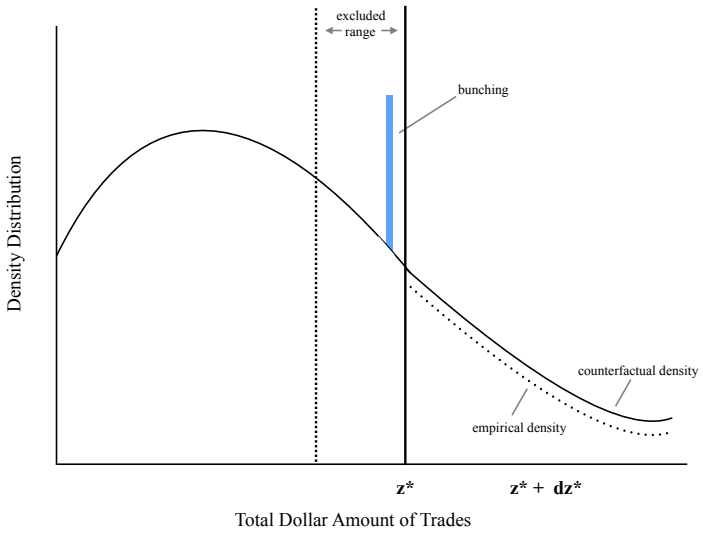
[82]Kauflin 2019; *The Anatomy Of A Fake Cryptocurrency Trade: How Exchanges Create Phony Transactions* 2019.

[83]We removed a handful of trading pairs involving the Russian ruble, which closely resembled an exponential distribution. One possible explanation for this is that these exchanges had low volumes of trading between cryptocurrency and rubles, and so sought to artificially increase their trading volume so as to appear more trustworthy to potential customers.

[84]See Bitwise Asset Management (2019) for a discussion of patterns of fake transaction data from cryptocurrency exchanges.

[85]Importantly, bunching estimation does not require that a researcher know the global distribution of z, but rather that one can approximate the local distribution within the bunching window (Kleven 2016).

Figure 3.1: Density Distribution

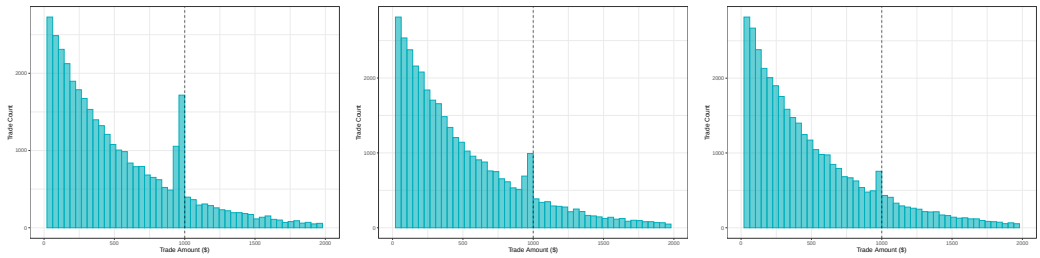


of the due diligence threshold at z^* (termed "kink" in the bunching estimation framework), we see bunching for trades that would have fallen in the range of $[z^*,\ z^* + d(z)]$ as users adjust the quantity of their transactions so the total fiat amount of the trade falls below z^*. This creates excess mass below z^*, and shifts the distribution beyond it downward. Because there is some randomness in how individuals choose to adjust their transactions, bunching may more closely resemble a hump rather than a spike in some exchanges.[86]

Bunching estimation has been used to study phenomenon that involve evasion or avoidance, and in particular, researchers have used it to study how people's reported income changes in response to tax brackets. One important finding of this literature is that people often face costs for adjusting their behavior to take advantage of an incentive (termed "optimization friction").[87] For example, a self-employed person who adjusts her income (by reducing hours worked) to take advantage of a lower

[86]Bastani and Selin 2014.
[87]Chetty et al. 2011; Bastani and Selin 2014; Kleven and Waseem 2013.

Figure 3.2: Simulated Density Distributions with Excess Mass



(a) (b) (c)

Caption: Density plots showing simulated bunching at 5% (a), 2% (b), and 1% (c) excess mass below the threshold (dashed line) for simulations using an exponential distribution of 10,000 trades with a mean of 500.

tax rate must forfeit the additional income she would have earned had she worked more hours. Accordingly, studies of income and tax rates assume only individuals in a small band above a tax bracket will respond to the lower tax rate incentive since the optimization friction increases the further a person's income would have fallen from the cutoff point. In our analysis, we dispense with the assumption that only people whose transactions would have fallen in a narrow band above the due diligence threshold will respond to the incentive since the optimization friction for cryptocurrency transactions is low.

Following Chetty et al. (2011)'s procedure for bunching estimation, we create a counterfactual estimate of the distribution by fitting a flexible polynomial to the distribution while excluding a range close to the kink where we suspect unusual activity may occur. The model takes the following form:

$$C_j = \sum_{i=0}^{p} \beta_i^0 * (Z_j)^i + \sum_{i=-R}^{0} \gamma_i^0 * \mathbf{1}[Z_j = i] + \varepsilon_j^0, \tag{3.6.1}$$

where C denotes the number of transactions in bin j, Z denotes the total fiat amount of a trade in 10 dollar or euro increments, p is the order of the polynomial, and $[-R,0]$ is the excluded range (100 dollars or euros) below the threshold. The

initial estimate of the counterfactual density is the predicted values from (3.6.1) excluding the contribution of the dummies in the range below the threshold $\hat{C_j^0} = \sum_{i=0}^{p} \hat{\beta_i^0} * (Z_j)^i$. Thus, the excess number of the transactions in the range below the threshold can be calculated relative to the counterfactual density as $\hat{B_N^0} = \sum_{j=-R}^{0} C_j - \hat{C_j^0} = \sum_{i=-R}^{0} \hat{\gamma_i^0}$. However, this overestimates the amount of excess mass below the threshold because it does not account for the downward shift of the distribution beyond $z*$. To address this, we compare the excess mass around the kink relative to excess mass in the rest of the distribution.

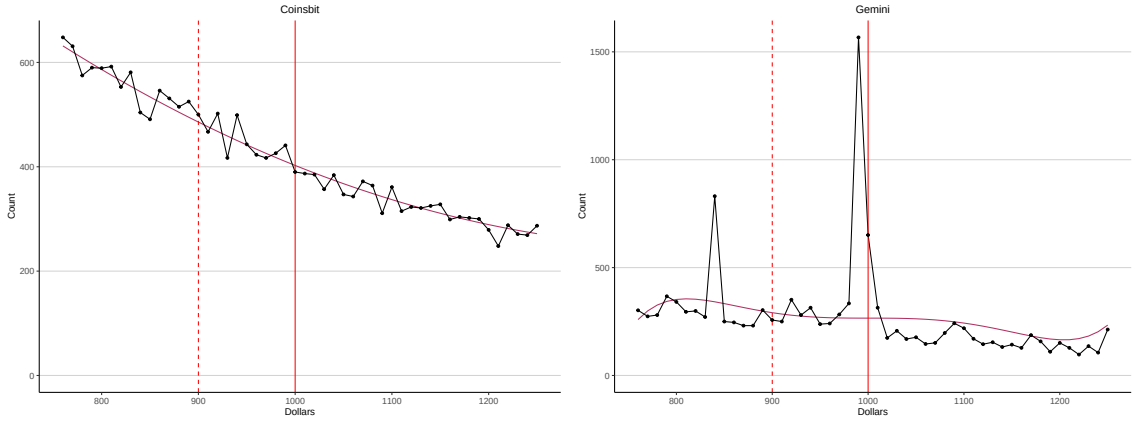
Finally, there are two major threats to inference using bunching estimation,[88] neither of which pose a problem for this research. First, the presence of another policy that also makes use of the 1,000 euro/dollar cutoff could confound these estimates, but there are no other policies that affect transactions at these thresholds. Second, a kink that also serves as a natural reference point could also confound estimates. However, because we analyze bunching in the 100 units *below* the 1,000 dollar/euro mark, this actually introduces bias against finding bunching below the threshold since there are often a higher number of trades at the 1,000 dollar/euro (which serves as a natural reference point) that shifts the distribution trades outside the excluded range upward.

Estimation Procedure

First, we aggregate the number of trades within 10 dollar or euro bins for crypto-to-fiat trading pairs. In order to minimize the potential bias from estimating a counterfactual distribution for a large number of trades, we restrict the analysis to a bandwidth of 250 dollars/euros above and below the due diligence threshold. Because it is not clear which transaction amount below the threshold is optimal for those seeking to avoid due diligence screening and it may vary over time and across

[88] Kleven 2016.

Figure 3.3: Excess Bunching by Exchange



(a) (b)

Caption: Graphs show examples of excess bunching in two exchanges: Coinsbit (a) and Gemini (b).

exchanges, we measure bunching in the 100 dollars/euros below the threshold.[89] We then fit a third-degree polynomial to the data (excluding the range below the threshold) to estimate the predicted distribution of trades. Next, we calculate the difference between the predicted and actual distribution of trades within the range below the threshold and subtract this from the difference between the predicted and actual values for the rest of the distribution, yielding an estimate of bunching in the range below the threshold. We estimate standard errors using parametric bootstrapping by drawing 1,000 samples with replacement from the vector of errors ε_j in Equation 3.6.1, calculating a new estimate of excess mass for each sample, and deriving the standard error as the standard deviation of these coefficients.

Figure 3.3 illustrates this approach. These graphs show the distribution of trades by 10 dollar increments for two exchanges in the 500 dollars surrounding the threshold. We fit a third-degree polynomial to each sample's data (excluding the range below the threshold) to provide a counterfactual estimate of the distribution.

[89]Since it is inconvenient to conduct many transactions at low amounts (i.e., 10 transactions at $100 each), a savvy user is likely to conduct a transaction relatively close to the threshold (e.g., $950) but still far enough away to avoid transactions that appear very suspicious (e.g., $999 signals likely avoidance).

As we can see, the prediction fits the actual data well for Coinsbit (a), a U.S. exchange; Gemini (b), a UK exchange, meanwhile, shows a significant spike in the distribution just below the due diligence threshold. Our intuitions are borne out in the estimates of excess bunching: Coinsbit has an estimate of 0.11 excess mass below the threshold, which is not statistically significant, while Gemini has a coefficient of 6.38 with a standard error of 1.96, leading us to reject the null hypothesis of no excess mass in the excluded region. This indicates that the actual number of trades in the range below the threshold (excess mass) is more than six times greater than predicted and statistically significant ($p < 0.01$).

Results by Trading Pair

Table 3.1: Excess Bunching by Trading Pair

	Bitcoin			**Ethereum**		
Threshold	*Dollar*	*Euro*	*Yen*	*Dollar*	*Euro*	*Yen*
	(1)	(2)	(3)	(4)	(5)	(6)
700	−1.018	−0.310	5.804	−0.432	−0.567	−0.952
	(0.785)	(0.860)	(6.611)	(0.784)	(0.642)	(4.102)
1,000	5.779***	5.348***	18.135***	2.903**	3.203***	17.871***
	(0.439)	(0.429)	(2.201)	(0.887)	(0.438)	(2.490)
1,300	−0.140	−0.463	12.332	−0.113	−0.713	13.107
	(0.414)	(0.402)	(7.860)	(0.544)	(0.446)	(140.415)
Count Exchanges	11	7	3	11	8	3

Notes: Excess bunching by trading pair between 07/01/20 and 08/03/20; standard errors are in parentheses and stars indicate the statistical significance level: *p<0.05; **p<0.01; ***p<0.001.

Table 3.4 presents the results of bunching estimation aggregated by trading pair. Each coefficient can be interpreted as the number of times greater the actual number of trades is relative to the predicted number of trades in the 100 units below the

threshold. All trading pairs show statistically significant excess mass below the due diligence threshold; however, this varies significantly. Notably, Bitcoin and Ethereum trades to Japanese yen show the highest levels of excess mass below the threshold, at 18 and 17 times greater than predicted respectively. Bitcoin to dollar trades show the next highest level with nearly 6 times greater trades than predicted, followed by Bitcoin to euro trades (5 times greater). Lastly, Ethereum to dollar and euro trades show nearly 3 times greater excess mass than predicted. For each pair, we also test bunching below two placebo thresholds – 700 and 1,300 dollars/euros (which were chosen based on their proximity to the threshold) – and do not find statistically significant excess mass, which highlights how unusual the excess mass below the threshold is.

Results by Country

Table 3.2: Bitcoin Trades Excess Bunching by Country

Threshold	*China*	*Japan*	*St. Kitts & Nevis*	*United Kingdom*	*BVI†*	*Estonia*	*United States*
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
700	−2.412	3.854	−5.903	−0.051	−3.216	−0.639	−2.102
	(1.452)	(118.545)	(2.907)	(0.950)	(0.927)	(0.677)	(2.051)
1,000	20.600*	16.605***	11.033***	5.394***	1.947**	1.857***	−0.188
	(7.675)	(2.129)	(2.961)	(0.408)	(0.692)	(0.525)	(3.249)
1,300	1.441	−5.210*	4.041	−0.443	0.506	−0.487	−24.257
	(1.154)	(2.162)	(9.874)	(0.446)	(0.370)	(0.352)	(520.638)
Exchanges	1	4	1	3	3	7	3
Pairs	2	4	1	5	3	8	3

Notes: Excess bunching by country between 07/01/20 and 08/03/20. Pairs denotes the number of trading pairs and exchanges denotes the number of exchanges included in each estimate; standard errors are in parentheses and stars indicate the statistical significance level: *p<0.05; **p<0.01; ***p<0.001; †British Virgin Islands

We also analyze bunching in cryptocurrency exchanges by country. Each country estimate represents the average excess mass below the threshold for all crypto-to-fiat trades in that country. The results (Table 3.2) show statistically significant excess mass for all countries except one (the United States). At the extreme, China shows 20 times the predicted number of trades, followed by Japan (nearly 17 times greater), St. Kitts and Nevis (11 times) and the United Kingdom (5 times). Meanwhile, the British Virgin Islands and Estonia show nearly twice the number of trades as predicted, and U.S. exchanges showed no statistically significant excess mass. Estimates of the excess mass below two placebo thresholds – 700 and 1,300 dollars/euros, meanwhile, are not statistically significant with one exception.

Table 3.3: Ethereum Trades Excess Bunching by Country

Threshold	*Japan*	*BVI†*	*Estonia*	*United Kingdom*	*Singapore*	*United States*
	(1)	(2)	(3)	(4)	(5)	(6)
700	2.278	−0.325	0.004	−0.271	0.239	−1.218
	(3.278)	(0.818)	(1.035)	(0.776)	(0.218)	(1.720)
1,000	15.475***	6.446***	5.192***	3.838***	1.336***	0.217
	(2.496)	(1.135)	(1.242)	(0.329)	(0.341)	(1.749)
1,300	2.439**	−1.731*	−2.980	−0.148	−0.077	0.309
	(0.680)	(0.655)	(0.652)	(0.465)	(0.551)	(0.734)
Count Exchanges	3	3	5	3	1	6
Trading Pairs	4	3	7	5	1	6

Notes: Excess bunching by country between 07/01/20 and 08/03/20. Pairs denotes the number of trading pairs and exchanges denotes the number of exchanges included in each estimate; standard errors are in parentheses and stars indicate the statistical significance level: *p<0.05; **p<0.01; ***p<0.001; †British Virgin Islands

Country estimates for Ethereum trades (Table 3.3) show a similar ranking of countries as in Table 3.2. Japan is once again at the extreme end showing excess mass 15.5 times greater than predicted, followed by the British Virgin Islands (6.4),

Estonia (5.4), and the United Kingdom (3.8). Singapore, meanwhile, shows excess mass equal to 134% of the predicted number of trades, while U.S. exchanges again show no statistically significant excess mass.

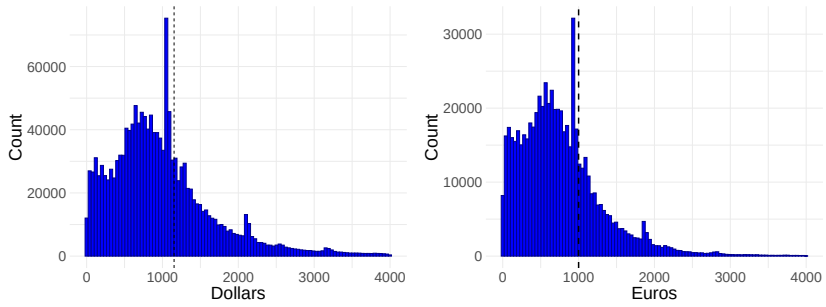
Several important trends emerge from this data. First, we consistently see excess mass below the due diligence threshold (and the absence of excess mass below placebo thresholds) for Bitcoin and Ethereum trades, though Bitcoin-to-fiat trades typically show higher levels of excess mass than Ethereum trades.[90] We also do not see excess mass below the 1,000 dollar/euro mark for crypto-to-crypto trades, which do not require due diligence as they do not involve a transfer into cash. Importantly, the pattern of bunching depends on whether the exchanges enforces due diligence threshold at 1,000 dollars or euros. For example, we see bunching below 1,000 euros and 1,115 dollars (approximately 1,000 euros) for European exchanges, while we see bunching below 1,000 dollars and 890 euros (approximately 1,000 dollars) for exchanges enforcing the threshold in dollars. Taken together, these trends support an interpretation of excess mass as the consequence of individuals' efforts to avoid due diligence screening, and all three trends appear in the distribution of trades for Extstock, a UK-based exchange (Figure 3.4).

3.6.3 Instrumental Variable Estimation

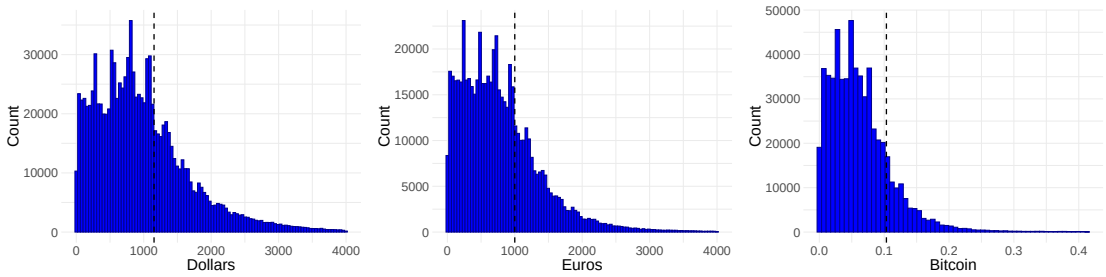
We also employ instrumental variable estimation as a second test of unusual activity below the threshold. Because some exchanges offer crypto-to-fiat trades in one currency and enforce the due diligence threshold in another, we can exploit exogenous variation in fiat-to-fiat exchange rates to measure how people adjust their trading behavior in response to movement of the due diligence threshold while controlling for all other relevant factors. For example, Extstock, a UK-based exchange, offers trades from Bitcoin to dollars and enforces the due diligence threshold at 1,000

[90]We may see more suspicious activity for Bitcoin trades because most illegal activity is conducted in Bitcoin. Bitcoin also has a higher daily trading volume than Ethereum, which may make it a more attractive market for money launderers.

Figure 3.4: Distribution of Trades in Extstock Exchange



(A) Bitcoin



(B) Ethereum

Caption: The height of each bin marks the number of transactions at each 10 dollar/euro increment for all trades between 07/01/20 and 08/03/20. The dashed line denotes the 1,000 euro threshold (for trades to euros) or the average 1,000 euro threshold based on the exchange rate between euros and dollars or euros and Bitcoin during the 34 day period.

We see significant bunching below 1,000 euros and 1,125 dollars (approx. 1,000 euros) for trades from Bitcoin and Ethereum to fiat currency. We do not see bunching below the equivalent 1,000 euro mark for trades from Ethereum to Bitcoin (crypto-to-crypto), which do not require customer due diligence at the 1,000 euro threshold.

euros. This allows us to use fluctuations in the dollar-euro exchange rate to measure how users adjust transactions in response to movement of the due diligence threshold *independently* of how the threshold moves in response to changes in the the Bitcoin-dollar exchange rate (which could influence the proportion of trades at a given amount for other reasons).

A simple model illustrates the intuition of how users respond to changes in the threshold. First, the fiat amount of each trade is a product of the quantity of cryptocurrency and the crypto-to-fiat exchange rate ($D_i = p_t * q$ where p is the crypto-to-fiat price at hour t and q is the quantity of cryptocurrency). If the crypto-to-fiat price increases ($p_{t+1} > p_t$), the total fiat amount of the trade will also increase. However, since a higher price also decreases the quantity of cryptocurrency a new user can buy with a given amount of fiat currency, we should expect the long-term net effect of changes in the crypto-to-fiat exchange rate on the total amount of each trade to be close to zero.

Of course, changes in the crypto-to-fiat price also affects whether the total fiat amount of a trade falls above the due diligence threshold (K). Accordingly, a user who wishes to avoid due diligence screening may adjust the quantity of a trade by some arbitrary amount (b) to keep the transaction's total fiat value below the threshold ($D_i = (q - b) * p < K$). However, we cannot use changes in the crypto-to-fiat exchange rate to measure how the proportion of trades at a given quantity changes in response to movement of the threshold since this relationship could have common causes or be driven by reverse causality. For example, an increase in the demand for cryptocurrency could lead to an increase in the proportion of trades at a given quantity *and* lead to an increase in the crypto-to-fiat exchange rate (moving the due diligence threshold downward). Thus, we measure exogenous variation introduced by fiat-to-fiat exchange rates.

Accordingly, we measure the proportion of trades at a given quantity of cryptocurrency for an exchange in a given hour (the dependent variable) as a function

of (a) whether or not the bin sits above the due diligence threshold and (b) the crypto-to-fiat exchange rate (the independent variable). This logic is formalized in the following model:

$$Y_{jt} = \beta_0 + \beta_1 X_{jt} + \beta_2 Price_t + \varepsilon_{jt}, \tag{3.6.2}$$

where Y denotes the proportion of trades in bin j in hour t, X is a dummy variable indicating whether the bin is above the due diligence threshold, and $Price$ denotes the crypto-to-fiat exchange rate. To minimize potential bias, I restrict the analysis to trade amounts within 250 dollars/euros from the due diligence threshold. Since we estimate this equation for each exchange at each hour across the 30 days, we are left with hundreds of thousands of observations across the dataset.

To address endogeneity concerns, we calculate a first-stage estimate of X using the the fiat-to-fiat exchange rate (Z) as an instrument and substitute this estimate of X in Equation 3.6.2, formally

$$X_{jt} = \beta_0 + \beta_1 Z_t + \delta_j + \varepsilon_t. \tag{3.6.3}$$

Because we wish to estimate how the threshold passing below a bin affects the proportion of trades at that quantity rather than an average effect of this process across all quantities, we include fixed effects for reach quantity of cryptocurrency in the first-stage equation.

This strategy rests on the assumptions that fiat-to-fiat exchange rates are exogenous and affect the proportion of trades at a given quantity *only through manipulation of the due diligence threshold*. Given that fiat currencies are traded widely in markets like Forex and subject to arbitrage, our assumption that exchange rates are exogenous appears well founded. There is also no reason to suspect that fiat-to-fiat exchange rates affect crypto-to-fiat trading in any way other than through the due diligence threshold; indeed, most exchanges offer crypto-to-fiat trading pairs for

major currencies, which allows users to convert cryptocurrency into the currency of their choice rather than performing additional conversions later.

Results

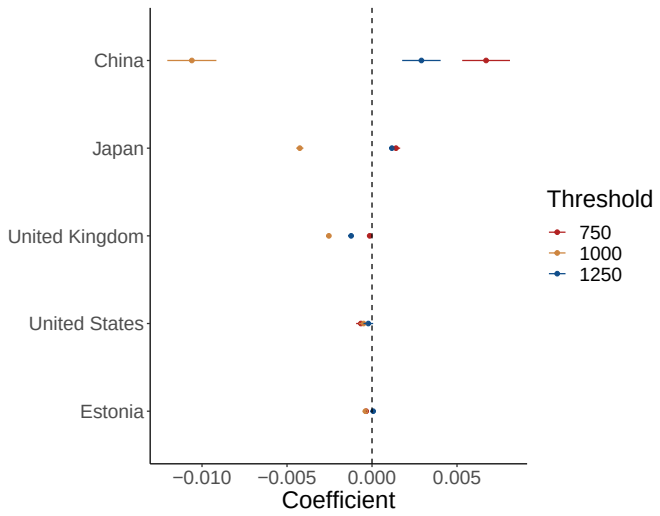
Table 3.4: Proportion of Trades in Bin by Country

	China	Japan	United Kingdom	United States	Estonia
	(1)	(2)	(3)	(4)	(5)
Threshold	-0.018^{***}	-0.004^{***}	-0.003^{***}	-0.002^{***}	-0.0004^{***}
	(0.001)	(0.0001)	(0.0001)	(0.0001)	(0.000)
Price	0.000^{**}	-0.000^{***}	0.000^{***}	-0.000^{***}	-0.000^{***}
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Constant	-0.006	0.023^{***}	-0.003	0.025^{***}	0.004^{***}
	(0.017)	(0.002)	(0.0005)	(0.001)	(0.0004)
Observations	2,874	42,088	62,717	6,069	41,164
Site FEs	N	Y	Y	N	Y
Number of Exchanges	1	4	3	1	5
R^2	0.03	0.07	0.10	0.09	0.17
Residual Error	0.02	0.01	0.007	0.005	0.002
F Statistic	190.5	138.6	91.9	66.6	214.9

Notes: The unit of observation is the hour-bin. For countries with more than one exchange, I include exchange fixed effects. Standard errors are in parentheses and stars indicate the statistical significance level: *p<0.05; **p<0.01; ***p<0.001.

Table 3.4 presents the main results of the instrumental variable regression with exchanges aggregated by country. These results show that there is a statistically significant *decrease* in the proportion of trades in a bin above the threshold, although this varies in magnitude across countries. At the extreme, China's exchange shows an average 1.8% decrease in the proportion of hourly trades for a given bin once the due diligence threshold passes below it. Other countries show a smaller but still statistically significant decreases in the proportion of hourly trades for bins above

Figure 3.5: Coefficient Plot by Threshold and Country



the threshold, with a 0.4% decrease for Japan, 0.3% for the United Kingdom, 0.2% for the United States, and 0.04% for Estonia. Notably, the threshold coefficients are larger in absolute terms than coefficients for the crypto-to-fiat exchange rate (*Price*), suggesting that the threshold has a bigger influence than price on the proportion of trades at a given amount when controlling for both factors. The country ranking of these results also closely mirrors those obtained using bunching: China and Japan are at the far end followed by the United Kingdom, with the United States and Estonia showing smaller absolute coefficients for the decrease of trades in bins above the threshold. All models have F-statistics well above 10, indicating that the instruments are strong; we also include fixed effects by exchange for countries with more than one exchange included in the estimate.

Similar to the bunching analysis, we provide estimates for two placebo thresholds – 750 and 1,250 euros/dollars. Figure 3.5 shows that coefficients for the actual due diligence threshold are consistently larger in magnitude and negatively signed when compared to coefficients for the placebo thresholds. The spread between coefficients for the actual threshold and the placebo thresholds also follows the same ranking as

the magnitude of the coefficients. These results suggest that behavior close to the due diligence threshold is significantly different than below the two placebos, with significant divergence in Chinese and Japanese exchanges. In U.S. and Estonian exchanges, meanwhile, all coefficients were close to zero, showing that movement of the due diligence threshold has less effect on the proportion of trades at a given amount of cryptocurrency.

3.7 Discussion

My findings support two micro-level conclusions about how sub-state actors respond to customer due diligence regulation and two macro-level conclusions about trends at the national level. These insights in turn have important implications for our understanding of international cooperation in anti-money laundering enforcement.

3.7.1 Response by Sub-state Actors

First, our results suggest that a small number of individuals seek to avoid due diligence screening by keeping their transactions below the threshold and that national governments and the FATF should take this into consideration when designing laws and regulations. Using both bunching estimation and instrumental variable estimation, we find significant unusual activity at transaction amounts just below the due diligence threshold across many exchanges and trading pairs. Further, the instrumental variable estimation shows that users in some exchanges adjust the size of their transactions in response to movement in the due diligence threshold, showing a causal relationship between exogenous fluctuations in the threshold and users' trading behavior. Of course, it is important to keep in mind that the amount of unusual activity uncovered across exchanges was relatively small when compared to daily volume of cryptocurrency transactions, which is expected since only a small

fraction of cryptocurrency activity is criminal.[91]

Second, our results suggest that intermediaries' application of risk-based measures is weak, which comports with recent and contemporaneous research.[92] Specifically, our findings suggest that exchanges comply with easily verifiable measures (due diligence at the threshold) while neglecting others (risk-based measures). We draw this conclusion based on the first-order assessment that a spike indicates exchanges are enforcing due diligence at the threshold (or else there would be no incentive for users to keep transactions below this amount); we then draw the second-order conclusion that many exchanges do not perform additional risk-based measures since the persistence of spikes over time suggests customers continue to evade screening. Although the absence of a spike could also indicate that intermediaries are *not* enforcing due diligence at the threshold (giving customers no reason to avoid it), I argue this is unlikely since these measures can be easily verified by regulators through a check of company records. Indeed, the only country in which exchanges did not show consistent suspicious activity below the threshold is the United States, which is explained by the fact that these U.S. exchanges perform due diligence at the time a new customer is registered.

3.7.2 National-Level Trends

At the national level, results show significant variation in how well states manage money laundering risk for cryptocurrency despite having similar laws in place. These differences vary in orders of magnitude; for example, China's excess mass below the due diligence threshold is 20 times the predicted distribution while the U.S. shows no significant excess mass. Similarly, the instrumental variable estimation shows that Japanese exchanges had an average decrease of 0.4% of the hourly trades for a quantity of cryptocurrency once it was no longer below the threshold,

[91] Roughly 1% of all Bitcoin transactions are believed to be illegal (Popper 2020).
[92] Findley, Nielson, and Sharman 2014; Findley, Nielson, and Sharman 2015.

while U.S. exchanges showed a decrease of half that (0.2%) and Estonian exchanges showed one-tenth the decrease (0.04%). These findings underscore that there is significant variation in how well countries implement anti-money laundering laws.

Results also show that OECD countries are not immune to money laundering risk, with the UK and Japan – two major financial centers – showing high levels of suspicious activity. Although siloed from the cryptocurrency sector, recent events call into question the UK's supervision of intermediaries in the financial sector; the UK has experienced a string of high-profile money laundering cases int eh alst decade, with one leaked U.S. report stating that the UK should now be considered a "higher risk" jurisdiction for money laundering on par with Cyprus.[93] Japan, meanwhile, has experienced several major cryptocurrency scandals, with a 2014 hack of a Japanese exchange (the biggest in the world at the time) prompting a 30% tumble in Bitcoin prices worldwide.[94] Thus, these findings call into question assertions that rich countries generally do a better job of enforcing anti-money laundering laws because they (1) have the resources, (2) seek to minimize potential harm to their economies caused by money laundering, or (3) are concerned about potential harm to their reputations.

3.7.3 International Implications

These findings suggest that there is a clear distinction between technical compliance and enforcement in the anti-money laundering regime, and FATF evaluations have not adequately measured the latter. This shortcoming limits the ability of the FATF to prevent cheating, which scholars of international cooperation argue is one of the key ways international institutions can increase the chances of cooperation for a given issue. As a result, FATF evaluations and methods of punishment are open to allegations of political bias, including the critique that the anti-money laundering

[93]"FinCEN Files: All you need to know about the documents leak" 2020.
[94]Greenberg 2014a.

regime ultimately supports U.S. foreign policy goals.[95] At a more fundamental level, the FATF's failure to identity defection inhibits the organization's ability to push for broad enforcement of these laws.

This finding presents a clear conclusion: the FATF should develop and adopt new data-driven methods that would enable it to better evaluate states' compliance in the anti-money laundering regime.[96] Though far from a panacea, we offer several specific recommendations below for how the FATF can begin to strengthen its evaluation process.

Audit-Based Evaluations

Audit-based testing is an objective, simple, and easily replicable evaluation method to test intermediaries' enforcement of customer due diligence laws. This method offers a more objective assessment than current ones, which rely on onsite visits and data shared by national regulators and intermediaries themselves. It is also very flexible and can be used to establish benchmark estimates of enforcement across a sector or probe particular areas of weakness, which allows regulators to gather information about a large number of intermediaries or an entire sector without requiring onsite visits or extensive resources.

Risk-Based Approach

Second, we propose the FATF should reconsider the risk-based approach to customer due diligence for intermediaries. Although this approach is intended to allow intermediaries and regulators to customize compliance systems and move away from a "tick-box" approach, it also places a great deal of discretion in the hands of intermediaries and regulators who may be unwilling or unable to carry out these duties. Instead, a revised set of guidelines – perhaps customized for each sector – might

[95] Halliday, Levi, and Reuter (2019) detail that this one critique leveled against the FATF.

[96] A similar conclusion is reached by Verdugo Yepes (2011), Levi, Reuter, and Halliday (2018), Halliday, Levi, and Reuter (2019), Findley, Nielson, and Sharman (2014), and Sharman (2011)

take some of the responsibility off both intermediaries and regulators to design, implement, and assess customized systems. At the very least, FATF rule-setters should recognize that "minimum standards" may be all that is imposed by many intermediaries and design them accordingly.

Random Due Diligence Screening

Lastly, the FATF should consider switching to a system of randomized due diligence screening rather than screening customers above a threshold. This system could randomly select customers for due diligence screening with more checks performed for higher transaction amounts;[97] with proper implementation, this system could avoid placing additional burdens on intermediaries or customers. And although one potential benefit of the current system is that intermediaries keep records of all transactions above 1,000 USD/EUR, there is little evidence that these records are commonly used in law enforcement investigations. Thus, by introducing randomness to the screening process, intermediaries can make it harder for criminals to avoid.

3.8 Conclusion

This paper tests a simple question – how well do countries enforce anti-money laundering laws – by honing in on a new law for cryptocurrency. Although the results are limited to the cryptocurrency sector, evidence from other sources suggests similar trends are present in other sectors. For example, Findley, Nielson, and Sharman (2014) uncover widespread due diligence lapses by bankers and corporate service providers, while the Panama Papers reveals similar failings by a host of intermediaries around the world.

General challenges aside, cryptocurrency is a sector better positioned than most

[97]For example, regulators could randomly select 5% of transactions worth up to $500 for due diligence screening, 15% of transactions between $501-$800, and %50 of transactions between $801-$1200, and %100 of transactions above $1,200.

for managing money laundering risk. Key features of cryptocurrency like traceability and visibility help parties identify suspicious activity, and several companies have emerged that specialize in advising clients on their money laundering risk. Further, new research suggests that the days of Bitcoin's near anonymity may be numbered, although developers continue to create new vehicles of secrecy for cryptocurrency transactions. Regardless of the technology, obtaining high levels of customer due diligence enforcement in cryptocurrency will require better evaluation methods from national regulators and international evaluators to enable a better understanding of enforcement.

Appendix A

Appendix to Chapter 1

Table A.1: Control Unit Weighting

Bahamas		**Dominica**		**Egypt**	
0.347	United States	0.442	Samoa	0.404	Guinea
0.206	Slovak Republic	0.061	Djibouti	0.214	Peru
0.145	Hong Kong	0.053	Equatorial Guinea	0.096	South Sudan
0.145	Bermuda	0.024	Cuba	0.090	India
0.027	Aruba	0.007	Jordan	0.012	Brazil
Guatemala		**Hungary**		**Israel**	
0.581	Comoros	0.287	Slovak Republic	0.300	United States
0.103	Cuba	0.271	South Africa	0.259	Puerto Rico
0.064	The Gambia	0.064	Equatorial Guinea	0.254	South Africa
0.062	Bangladesh	0.024	Djibouti	0.077	United Kingdom
0.032	Samoa	0.007	Botswana	0.035	Hong Kong
Nigeria		**Panama**		**VCT**[1]	
0.606	India	0.326	Cuba	0.377	Cuba
0.056	South Sudan	0.285	Djibouti	0.159	Djibouti
0.036	Bangladesh	0.082	Samoa	0.076	Equatorial Guinea
0.023	Sierra Leone	0.043	Equatorial Guinea	0.013	Cabo Verde
0.018	Burundi	0.030	Hong Kong	0.010	South Sudan

Notes: Full sample includes 165 countries.

Appendix B

Appendix to Chapter 2

B.1 Descriptive Statistics

Table B.1: New York Stock Exchange Descriptive Statistics

	N	Mean	St. Dev.	Min	Max
American Express Company	5,030	0.0004	0.022	−0.196	0.192
Bank of America Corporation	5,140	0.001	0.030	−0.314	0.371
Banco Bilbao Vizcaya Argentaria	5,140	0.0001	0.024	−0.221	0.245
Barclays	5,140	0.0003	0.032	−0.451	0.753
Bank of New York	5,030	0.0002	0.023	−0.198	0.319
Citibank	5,030	0.0001	0.032	−0.429	0.483
Credit Suisse	5,030	0.0001	0.026	−0.220	0.321
Deutsche Bank	5,030	−0.00001	0.028	−0.246	0.241
Goldman Sachs Group	5,030	0.0004	0.023	−0.269	0.344
HDFC Bank	5,002	0.001	0.023	−0.172	0.200
HSBC Holdings plc	5,030	−0.00003	0.018	−0.219	0.154
ING Group	5,030	0.0002	0.031	−0.295	0.382
JP Morgan Chase	5,030	0.0005	0.024	−0.196	0.287
Lloyds Bank	4,805	−0.0001	0.031	−0.586	0.395
Mitsubishi UFJ Financial Group	4,968	0.0001	0.022	−0.188	0.218
NatWest Group	3,323	−0.0004	0.037	−0.720	0.292
Oppenheimer Holdings	5,030	0.0004	0.026	−0.236	0.283
U.S. Bancorp	5,030	0.0004	0.022	−0.216	0.309
Westpac	5,030	0.0003	0.019	−0.144	0.168

Table B.2: Over the Counter (OTC) Markets Descriptive Statistics

	N	Mean	St. Dev.	Min	Max
Agricultural Bank of China	2,560	0.00002	0.020	−0.119	0.129
BNP Paribas	4,424	0.0004	0.026	−0.216	0.203
CryoBanks International Inc.	5,140	0.002	0.062	−0.400	0.594
Commonwealth Bank of Australia	2,705	0.0003	0.019	−0.164	0.121
Commerzbank	5,030	−0.0002	0.034	−0.382	0.521
Danske Bank	2,766	0.0001	0.021	−0.120	0.115
Industrial & Commercial Bank of China	3,281	0.0004	0.030	−0.167	0.250
Julius Baer Group	2,690	0.0004	0.020	−0.208	0.124
Handelsbanken	2,756	0.0002	0.019	−0.151	0.143
Swedbank	3,146	0.0004	0.030	−0.315	0.292
Halkbank	2,756	0.0001	0.055	−0.510	2.333

Table B.3: Nasdaq Exchange Descriptive Statistics

	N	Mean	St. Dev.	Min	Max
Banco Popular de Puerto Rico	5,030	0.0002	0.028	−0.212	0.387
Broadway National Bank	5,030	0.001	0.058	−0.382	1.022
Carlyle Group	2,179	0.0004	0.023	−0.143	0.201
MoneyGram International	4,153	0.0004	0.049	−0.522	1.424

B.2 Money Laundering Estimates

Efforts to estimate levels of money laundering present one of the most robust strains of research in the academic literature on money laundering. And although any viable estimate would undoubtedly have significant implications for both policy and research, two decades of research have produced limited results with few useful applications. Below, I outline the foremost approaches in the field – the gravity model and latent variable models – and highlight the methodology and criticisms of each.

B.2.1 Gravity Model

The "gravity model" was first proposed by John Walker in 1994 and uses crime statistics to estimate the amount of money generated by crime for each country.[1] In a second step, the model estimates the exchange of illicit funds between countries using distance and linguistic differences, where both are predicted to deter money launderers.[2] In this second step, the model also includes the overall "attractiveness" of markets to money launderers. To measure attractiveness, Walker relies on a range of country-level characteristics including GDP per capita, financial services as a percent of GDP, enforcement of anti-money laundering regulations, and levels of financial secrecy, among others.[3] While most countries have low scores on the attractiveness index (68% of countries have a score of 2 or lower), a handful of wealthy countries with well-developed financial sectors have very high scores and are thus deemed "attractive" to money launderers (see Table 2 in the Appendix).[4] Using this method, Walker estimates that most money of illegal origin is laundered in Europe and North America.[5] Walker later refined this model with Brigitte Unger,

[1] Walker and Walker 1995.
[2] Walker and Walker 1995; Barone, Delle Side, and Masciandaro 2018.
[3] Models for attractiveness and affinity are listed in the appendix.
[4] Walker 2015.
[5] Walker and Walker 1995.

who used a version of the gravity model to estimate levels of money laundering in the Netherlands.[6] More recently, a specification of the gravity model was used in a United Nations Office on Drugs and Crime (UNDOC) report to estimate regional levels of money laundering generated by organized crime and the illegal drug trade (see Figure 1).

Although the gravity model presents a method for estimating national levels of money laundering, it has not been widely accepted in the field as a viable one.[7] One major weakness is that the model depends on country-level variables to predict a market's attractiveness to money launderers, and there is no consensus as to which variables should be included. Two of the best known studies using this method included very different variables in these calculations.[8] Beyond that, there is no clear, theoretical-motivation for how variables are weighted, with Walker noting that exponents in the model were determined by "'ocular inspection' – i.e. they produced the most credible results."[9] Given these significant concerns over methodology, estimates based on the gravity model do not present a viable option for comparison with levels of anti-money laundering regulation compliance.

B.2.2 Latent Variable Model

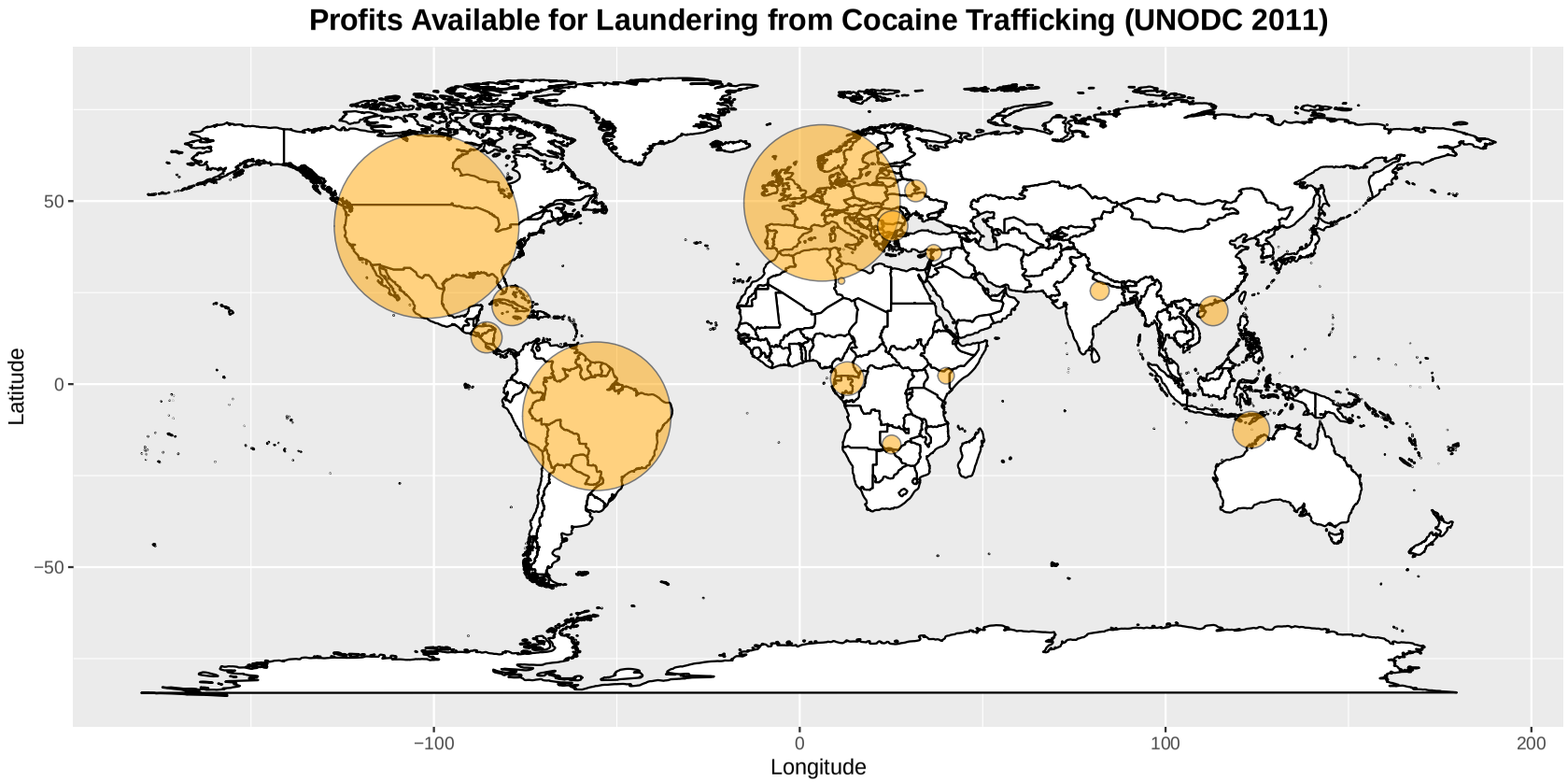
More recently, scholars have turned to latent variable approaches that use two sets of observable variables to estimate the unobservable outcome, money laundering. Like the gravity model, latent variable approaches use national crime statistics to estimate the cash generated by criminal activities and available for laundering.[10] Latent variable approaches differ, however, in the second stage of estimation, by relying on country-specific characteristics related to anti-money laundering regulation to estimate national levels of money laundering instead of "pairwise attractiveness"

[6] Unger et al. 2006; Walker and Unger 2009.
[7] Reuter 2013; Van Duyne 2006; Van Duyne 2007; Barone, Delle Side, and Masciandaro 2018.
[8] Walker and Walker 1995; Drugs and Crime 2011.
[9] Walker 2015.
[10] Drugs and Crime 2011, pp. 16–17.

between countries (gravity model). A major criticism of the latent variable approach approach is that the variables included in the second stage are speculative and "not necessarily reinforced theoretically."[11] Despite this criticism, latent variable models have been used to estimate money laundering in several recent studies.

[11]Drugs and Crime 2011, p. 17.

Figure B.1: Map of Estimated Laundered Funds by Region



Schneider and coauthors use a latent variable model to create country-level estimates of the size of the shadow economy (i.e., the total amount generated by illegal activities) between 1995-2006.[12] Schneider and Windischbaer adapt this model to estimate levels of money laundering in 20 OECD countries using statistics on drugs (i.e., amount of confiscated drugs, number of drug users, and drug prices, etc.) and national anti-money laundering systems (i.e., the number of suspicious transaction reports, number of convictions, and membership in the FATF).[13] Similarly, Barone and coauthors estimate levels of money laundering connected to the illegal drug trade using a latent variable model and data from UNDOC yearly reports (1998-2011).[14] Their estimates show that profits from the illegal drug trade peaked in the mid-2000s and have declined slightly since.[15]

Since latent variable estimates of money laundering are only available for a limited number of countries, I compare Schneider and coauthor's estimate of the size of the shadow economy to anti-money laundering compliance.[16] This descriptive comparison could prove useful for understanding patterns of compliance with anti-money laundering regulations because the presence of a large shadow economy might motivate governments to enforce anti-money laundering regulations at higher levels to combat illegal activities. Of course, it is important to note how the shadow economy and money laundering differ. While the shadow economy refers to the amount of funds generated by illegal activities, money laundering refers to funds that are processed though the financial system. Therefore, it is possible that a country could have a large shadow economy and limited money laundering if funds are laundered in other jurisdictions. To test the relationship between the size of the shadow economy and compliance, I compare Schneider and coauthors' estimates

[12]Schneider, Buehn, and Montenegro 2010.
[13]Schneider and Windischbauer 2008, pp. 397–398.
[14]Barone, Delle Side, and Masciandaro 2018.
[15]Barone, Delle Side, and Masciandaro 2018, pp. 417–420.
[16]Barone and coauthor's estimate of money laundering is at the regional level while Schneider and Windischbaer's estimate only covers 20 countries.

of the size of the shadow economy with a consolidated index of compliance with FATF regulations, the Financial Secrecy Index (2013), provided by the Tax Justice Network.

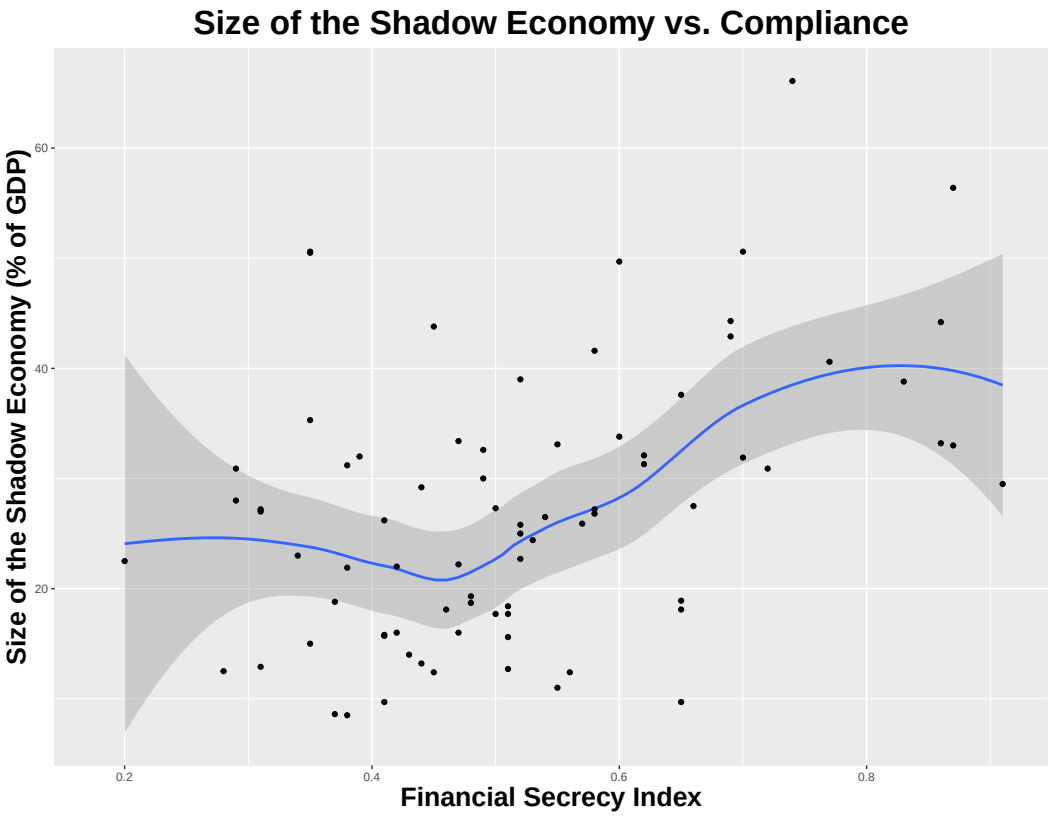
The results shows that countries with larger shadow economies are generally less compliant with anti-money laundering regulations (Figure 2). This is likely true because although the presence of a large shadow economy provides an incentive for governments to enforce anti-money laundering regulations, shadow economy size is strongly *negatively* correlated with bureaucratic quality (-0.72),[17] which is necessary to pass and enforce anti-money laundering regulations. After controlling for bureaucratic quality in a simple OLS regression model, the size of the shadow economy has no significant effect on compliance with anti-money laundering regulations. Although these results should be interpreted with caution, they suggest that the size of the shadow economy does not play a significant role in anti-money laundering compliance.

B.2.3 National Estimates

Countries with national estimates of money laundering include the United States, United Kingdom, Australia, the Netherlands, Germany, and Italy. These estimates come from a variety of sources including academics, the FATF, and a national agency (the UK Office of National Statistics).[18] Although these reports diverge in terms of methodology (some use specifications of the gravity model) and years covered, results show that the illegal drug trade is one of the top sources of proceeds from violent crime. Tax evasion and fraud make up a large portion of the funds from "white collar" crime, which is estimated to generate much higher levels of profit than violent crime. These results are summarized in Table 1.

[17] I include a measure of bureaucratic quality from the International Country Risk Guide.
[18] Drugs and Crime 2011, pp. 21–30.

Figure B.2: Size of the Shadow Economy vs. Compliance



Note: The Financial Secrecy Index measures compliance with FATF anti-money laundering regulations and ranges from 1 (most secretive and least compliant) to 0 (least secretive and most compliant).

Table B.4: Summary of proceeds of crime in selected industrialized countries

as a percentage of GDP				
	Year of Estimate	**Drugs**	**Total crime, excluding tax evasion**	**Total crime including tax evasion**
USA	2000	0.7%	2.3%	8.0%
UK	1996/2004	0.5%	1.2%	n.a.
Australia	2003	0.3%	1.5%	n.a.
Netherlands	2003	0.4%	1.7%	3.5%
Germany	2007	0.4%	1.3%	2.3%
Italy	2009	0.7%	7.7%	n.a.
Unweighted averaged		0.5%	2.6%	4.6%
Rounded average		0.6%	2.5%	5.3%
Global level (2009) in trillion US $		0.35	1.5	3.1

Source: Drugs and Crime 2011, p. 30

B.2.4 Criticisms

Although the gravity model and latent variable approaches are the most widely recognized approaches in the field,[19] they have faced significant criticism. Some scholars now argue that money laundering estimates hold limited usefulness given the lack of reliable data for inclusion in models and the inability to establish the validity of such estimates.[20] Peter Reuter – a respected scholar who himself estimated levels of money laundering in his 2005 book[21] – has since criticized such efforts writing, "...there is no prospect, either in surveys of estimates or in studies of crimes themselves as reflected in criminal justice statistics, for developing persuasive estimates [of money laundering]."[22]

In his critique, Reuter notes that crime statistics used in money laundering models are often unreliable. He highlights that the most cited estimate of fraud in the United States is based on a 2002 survey at one U.S. company, General Motors. The survey had a 10% response rate, suggesting that the results are strongly biased by patterns of non-response. Nevertheless, the survey results led to an estimate that losses form fraud totaled 6% of corporate profits, which was used in specifications of the gravity model to estimate that the proceeds of fraud in the United States total 6% of GDP annually.[23] Of course, this type of estimation strategy seriously calls into question the reliability of the model's estimate.

In sum, estimating levels of money laundering is extremely challenging given the quality of underlying crime statistics, from which experts extrapolate the level of crime at the national level based on best guesses. In a second step, scholars estimate the level of money generated by each crime, although there is no standardized or reliable way to perform these calculations.[24] Third, models take into account a

[19] Barone, Delle Side, and Masciandaro 2018.
[20] Reuter 2013; Van Duyne 2006; Van Duyne 2007; Levi 2012.
[21] Reuter 2005.
[22] Reuter 2013, p. 224.
[23] Reuter 2013, p. 227.
[24] Reuter 2013, p. 228.

range of factors that may impact the likelihood of money laundering in a particular country, although there is no theoretical consensus on which factors should be included. Beyond that, there is no clear strategy for how these factors should be weighted. Lastly, one of the biggest challenges facing these efforts is that there is no way to establish the validity of estimates given the absence of any benchmark statistic with which they can be compared. Unsurprisingly, different estimation strategies have yielded vastly different estimates of money laundering.[25]

[25]Walker and Unger 2009; Walker and Stamp 2007; Reuter 2013.

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