

The Impact of Anti-Money Laundering Regulation on Payment Flows: Evidence from SWIFT Data

Matthew Collin, Samantha Cook, and Kimmo Soramäki

Abstract

Regulatory pressure on international banks to fight money laundering (ML) and terrorist financing (TF) increased substantially in the past decade. At the same time there has been a rise in the number of complaints of banks denying transactions or closing the accounts of customers either based in high risk countries or attempting to send money there, a process known as de-risking. In this paper, we investigate the impact of an increase in regulatory risk, driven by the inclusion of countries on an internationally-recognized list of high risk jurisdictions, on subsequent cross-border payments. We find countries that have been added to a high risk greylist face up to a 10 percent decline in the number of cross border payments received from other jurisdictions, but no change in the number sent. We also find that a greylisted country is more likely to see a decline in payments from other countries with weak AML/CFT institutions. We find limited evidence that these effects manifest in cross border trade or other flows. Given that countries that are placed on these lists tend to be poorer on average, these impacts are likely to be more strongly felt in developing countries.

The Impact of Anti-Money Laundering Regulation on Payment Flows: Evidences from SWIFT Data

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1 Introduction

1.1 Overview

The past fifteen years have seen an unprecedented level of attention on anti-money laundering and countering-the-finance-of-terrorism (AML/CFT) issues by financial regulators, law enforcement agencies and international standard-setters. Following the financial crisis and several high profile cases of sanctions violations, the international banking sector in particular has been under scrutiny. The result has been a resurgence in the number and size of AML-related enforcement actions filed by regulators: as is shown in Figure 1 the total value of fines levied by regulators peaked at \$15 billion in 2014 in the US alone.¹ During this same time period there has been a marked increase in the naming and shaming of countries that do not do enough to fight money laundering within their own borders. Between 2010 and 2015, the Financial Action Task Force (FATF), an international group tasked with setting common AML standards across the globe, added over fifty different countries to an internationally-recognized list of high risk countries.

While terrorism and illicit finance are real and present threats, there are growing concerns that this increase in regulatory activity is leading to a chilling effect on cross-border economic activity as banks limit their exposure to high risk clients or jurisdictions, a process known as ‘de-risking’ (Collin et al. 2015; Durner and Shetret 2015). Recent surveys of banks suggest that services offered between partner banks to facilitate international payments, known loosely as ‘correspondent banking’ relationships, are declining along several corridors (SWIFT 2012; ECB 2014; World Bank 2015b; Erbenova et al. 2016; CPMI 2016), perhaps exclusively in ‘high risk’ jurisdictions (BBA 2014). This contraction of the correspondent banking network has sounded a number of alarm bells, as these services are seen as being crucial for most cross-border services (CPMI 2015). One of the oft-cited reasons for this decline is a sharp increase in the costs of compliance resulting from AML/CFT enforcement. For example, a 2014 survey by the International Chamber of Commerce of 298 banks in 127 countries found that over 31% claimed to have terminated relationships “due to the increasing cost of compliance (including more stringent AML and KYC)” (ICC 2014). Similarly a World Bank survey of large international banks conducted last year found that over 60% cited the cost of customer due diligence (CDD) as a driver for the decline in correspondent banking relationships.

There are also concerns that AML/CFT activity is affecting a number of different types of cross-border transactions, both directly by increasing the regulatory hurdles for transactions to be processed or indirectly by creating incentives for banks to withdraw from whole industries which specialise in these transactions. The ICC survey reported that over 40% of respondents felt that AML and know-your-customer (KYC) requirements were a significant impediment to trade finance, with nearly 70% reporting they declined transactions that year (ICC 2014). The British Banker’s Association reporting on global de-risking recorded several case studies where banks have lost the ability to process import/export letters of credit (LCs) as a result of losing their correspondent bank account.

The global payments business is also under pressure, as reports suggest that a large number of money transfer companies in the US, the UK and Australia have lost access to banking services as a result of banks’ desire to reduce their exposure to regulatory risk, potentially leading to a reduction to a decrease in formal remittances to developing countries, a critical source of development finance (BBA 2014; Attridge 2015; World Bank 2015a). A recent report

¹In 2014, US regulators fined BNP Paribas \$8.9 billion for Iran sanctions violation. Even without this particular fine, the value of enforcement actions still rose markedly in the 2010-2015 period.

Figure 1: AML-related enforcement actions by US regulators (2000-2015)



Note: data compiled from from ACAMS.org reports on enforcement actions.

by the financial intelligence agency AUSTRAC found declines in remittance payments between Australia and both five Asian countries and Somalia during 2014 and 2015, which it attributed to de-risking in the remittance market (AUSTRAC 2015). There have also been concerns, amidst reports by NGOs that risk-averse banks are making it more difficult for them to transfer money overseas, that de-risking might be disrupting humanitarian aid flows.

The combined effect of all of these pressures should be leading to declines in the aggregate flow of cross-border payments, yet to date there have only been a few empirical studies of the effect of AML/CFT enforcement and regulation on these flows. Kudrle (2009) investigate the impact of financial ‘greylisting’ by the Financial Action Task Force (FATF) on cross-border bank flows to 38 tax havens, but found little effect. However, the study only considered a small number of jurisdictions during the early 2000s), when the enforcement of AML regulation was considerably less likely to bite (see Figure 1). Farías and Almeida (2014) find that greylisting leads to a reduction in the ratio of FDI to GDP in a small sample of Latin American and Caribbean countries, but the analysis also did not extend beyond the mid-2000s. In a study of the global network of customer-to-customer payments across SWIFT, Cook and Soramäki (2014) report a decline in connections where at least one of the countries was listed as an offshore financial centre or subject to international sanctions. Most recently, Balakina et al. (2016) examined how banking flows (measured using BIS data on total foreign claims) respond to FATF greylisting, finding no consistent effects. However, their analysis was confined to annual data on *net* flows, when in reality concerns over regulatory risk are likely to affect both payments sent to high-risk locations and payments received from those locations.

In this paper, we examine the direct effect of financial ‘greylisting’ on cross-border payments to and from countries. To do this, we combine proprietary data provided by SWIFT on the monthly number of cross-border payments made between customers in every country

connected to the SWIFT network between 2004 and mid-2014 together with data on the timing of greylisting of countries by the FATF. We find that being added to a greylist results in a 7-10% reduction in the number of payments being sent to a country by the rest of the world, but we find no evidence of a consistent effect on the number of payments being sent out of an affected country. We also find no evidence that the reduction in bilateral payments to and from greylisted countries is concentrated amongst countries with strong AML/CFT institutions or more regulatory effort.

This paper makes several contributions. To date, we are the first paper to use actual bank-to-bank payment data to examine the interplay between anti-money laundering regulation and cross-border transactions. Also, unlike previous research into the affect of AML/CFT regulation, we examine changes in the structure and direction of payments by examining how bilateral flows change in the face of greylisting.

The paper is structured as follows: Section 2 outlines a framework for thinking about how AML/CFT regulation might drive de-risking and a subsequent reduction in payment flows to and from high-risk countries, as well as detailing the pre-specified hypotheses we test in this paper. Section 3 describes the data we use in more detail, both that used to measure payment flows as well as our measure of greylisting. In Section 4 we describe the econometric specifications we use to test our hypothesis, as well as issues of identification. Section 5 contains the main results of the paper and we discuss these results and conclude in Section 6.

2 Framework

In this paper, we examine whether greater regulatory scrutiny, brought on by changes in international AML greylisting, leads to a reduction in both the volume or direction of payment flows to and from affected countries. In this section we sketch out a very basic framework for how risk rating and regulatory scrutiny might lead to de-risking and, in turn, lead to a reduction in payment flows.

2.1 How can greater regulatory risk lead to de-risking?

On the surface, banks face a relatively straight forward cost-benefit decision when they process transactions or take on new clients and correspondents. Each of these services provide some revenue for the bank, which has to be weighed against the costs associated with the relationship. Clients and transactions carry with them an element of *regulatory risk*, which is the risk that a bank will be sanctioned by a financial regulator at a later date for doing business with that client. Regulatory scrutiny carries with it the possibility of large formal fines, but the costs of litigation can also extend well into the future as banks are often forced to undertake costly compliance investments. Reputational damage can also be severe: Karpoff, Lee, and Martin (2008) estimate the lost revenue through lower sales and higher contracting and financing costs to exceed the size of a regulatory fine by over seven fold. There may even be a significant market penalty, as firms fined for financial misconduct tend to perform worse compared to those not under litigation (ESRB 2015). There is evidence that reputational risk factors heavily into the decisions that banks make with regards to the customers they do business with (Artingstall et al. 2016).

These expected costs can be mitigated if the bank invests heavily in AML compliance activities such as customer due diligence (CDD) or enhanced due diligence (EDD).² However, due

²Examples of enhanced due diligence provided by FATF (2012) include approval by senior management, examining patterns of transactions, regular updates of the customer/beneficial owner's data and obtaining more

diligence work is growing substantially more costly as global demand has increased (KPMG 2014). Enhanced due diligence brings even greater costs: in a recent report commissioned by the UK's Financial Conduct Authority, a UK-based bank indicated that enhanced due diligence checks on a correspondent account could add between £7,000 to £20,000 onto the cost of a relationship which typically would cost no more than £2,400 to maintain (Artingstall et al. 2016).

In Figure 2 we illustrate a simplified version of the relationship between the expected costs of regulatory action (regulatory risk) and compliance costs/due diligence work for a given customer i .³ Regulatory risk is decreasing as banks spend more on due diligence, as regulators are more likely to be satisfied if the bank was watching a customer carefully, even if they later turned out to have facilitated a illicit transaction. Banks will choose an optimal amount of due diligence DD^* which balances these compliance costs with a tolerable level of regulatory risk. This equivalent to the least-cost point in the total cost curve, C^* . If the regulatory risk associated with a given client or transaction increases, then it does so for every level of due diligence, shifting up both the regulatory risk and total cost curves, leading to an increase in the optimal level of due diligence the bank must invest in to offset the increase in regulatory risk.

As the optimal level of due diligence increases, the chance that the client or transaction will be unprofitable for the bank goes up. As certain classes of clients or regions where clients operate are designated by regulators as being of inherently higher risk of abuse or requiring greater degrees of due diligence, banks may err towards de-risking by closing accounts and denying transactions for these clients. As discussed in the introduction, there is growing anecdotal and survey evidence that this is happening (World Bank 2015b; World Bank 2015a) and that it is being driven by a combination of regulatory-driven cost concerns and profitability (Durner and Shetret 2015).

How does financial greylisting play a role? As we will describe in Section 3.3, greylisting sends signals to banks (both directly and indirectly via their pertinent regulators) that the desired level of due diligence for transactions or clients related to an affected country has gone up, hence raising the regulatory risk associated with these clients. Next we will describe how derisking should manifest in data on cross-border payment flows.

2.2 How can de-risking lead to lower payment flow volumes?

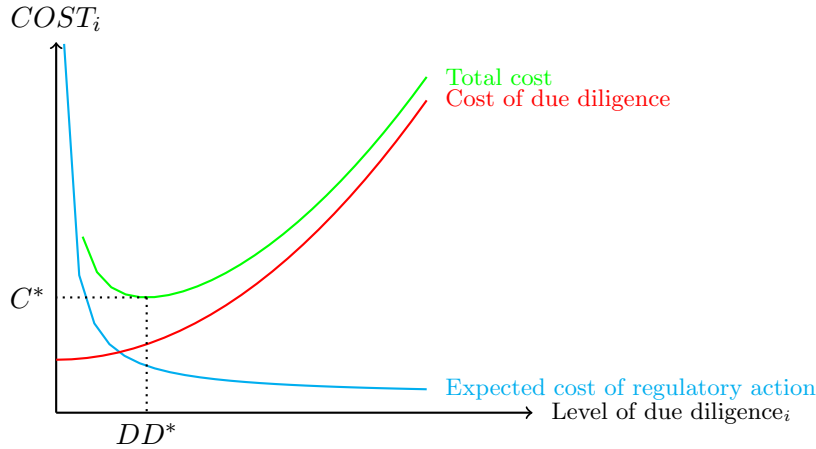
The next step of the causal chain is the impact of de-risking on cross-border payments. As discussed in the introduction, there is growing evidence that de-risking is affecting a number of cross-border activities, including remittances, correspondent banking relationships, trade finance and humanitarian operations run by NGOs (Collin et al. 2015). Banks are worried about both outgoing and incoming payments; the former might be subsequently laundered or use to finance overseas terrorism, while the latter might be already-laundered money or an attempt at ducking economic sanctions. A decrease in incoming flows such as remittances or humanitarian aid flows to a given jurisdiction should manifest as a decrease in the aggregate number of cross-border payments being sent there.

The breaking of correspondent banking relationships will have a more complex effect on cross border payments. The practice is seen as the backbone of the global payment system, as banks rely on these relationships to offer their customers cross-border services (including remittances) (CPMI 2016). If a bank does not have a direct correspondent relationship with another bank in

information on the purpose of transactions.

³This is an over-simplification of a very complex set of decisions, but aims to isolate how regulatory risk factors into the decision to terminate relationships. In reality, banks will find the distribution of regulatory risk is difficult to pin down.

Figure 2: Banks balance the cost of due diligence and regulatory risk



its target jurisdiction, then it must ‘complete the chain’ by relying on correspondents in other jurisdictions who themselves have a correspondent relationship with the target jurisdiction. Relying on these less direct means of completing payments can be more costly, especially if new relationships must be established to replace ones lost through de-risking. This increase in cost is likely to lead to a reduction in flows. In the short term, services may be disrupted altogether, leading to a reduction in payments in both directions.

To date, there is no available empirical evidence on the causal importance of correspondent banking connections for cross-border flows. In reality, the empirical relationship between the two is likely to be deeply endogenous, as the creation and destruction correspondent relationships are typically driven by the same market forces that drive cross-border flows. Recent evidence from the Bank of International Settlement’s Committee on Payments and Market Infrastructures (CPMI) suggests that, causality aside, growth in correspondent networks and payment flows are closely related. The relationship between changes in correspondent banking connections between 2012 and 2015 and both the volume and value of cross-border payments is illustrated in Figure 3. A one percent decline in correspondents connected to a jurisdiction is associated with a .82% and 1.3% decline in the volume and value of cross border payments respectively.

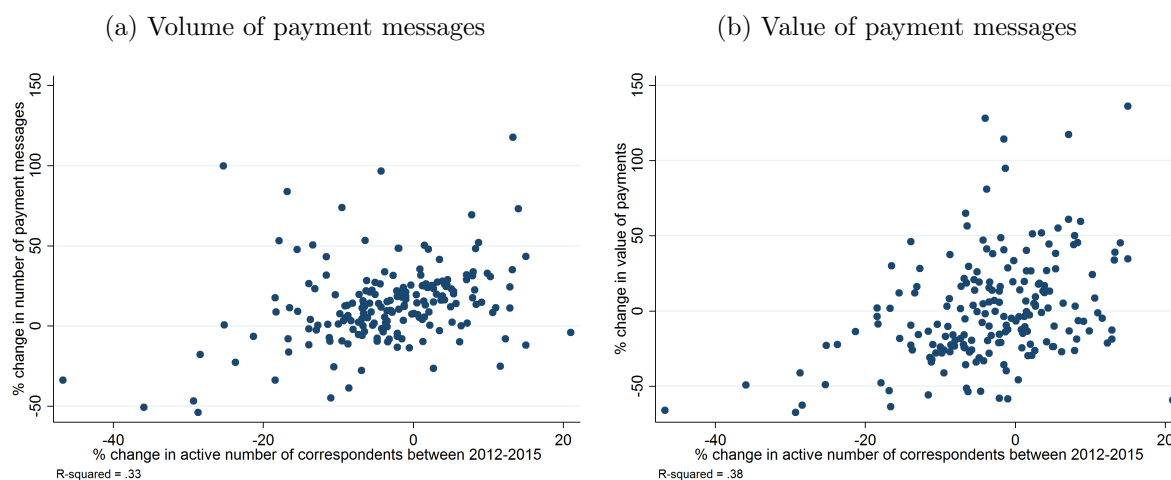
Either by directly affecting payments or indirectly by eroding the correspondent banking network, de-risking is likely to have an impact on both flows in and out of affected countries. This brings us to a number of hypothesis that we can use SWIFT data on cross-border payments to investigate.

2.3 Hypotheses

In this paper, we will test three main hypotheses. The first is related to the number of payments leaving and entering countries for which the regulatory risk of doing business has gone up. The second two are related to the direction of payments entering and leaving these countries. These hypotheses, including the specifications we will use to test them, have all been pre-registered online as part of a pre-analysis plan.⁴ As of this draft we have not yet fully ‘converged’ to the pre-analysis plan, although we will do so in future drafts. For full transparency, we highlight

⁴The PAP was registered at both the Open Science Framework (<https://osf.io/mxg7u/>) and Evidence in Governance and Politics (<http://egap.org/registration/2219>) on 20/10/16.

Figure 3: Relationship between changes in correspondent connections and the volume/value of cross-border payments by country (2012-2015)



Notes: data taken from Table 1 of CPMI (2016), itself derived by SWIFT and Deutsche Bank estimates. Outliers at top/bottom 1% of distributions trimmed.

areas where we have not yet included results specified in the PAP or have included results that we have not specified in the PAP with the footnotes ^{*} and [†].

Hypothesis 1: *There will be a decline of total payments entering and leaving countries who see a rise in their associated AML/CFT regulatory risk.*

Given the anecdotal and survey evidence on de-risking to date, our prior is that when the relative AML/CFT regulatory risk of doing business with clients from a given country increases, then banks outside that territory will limit their exposure by severing correspondent banking connections, refusing individual payments or closing the accounts of entities that facilitate payments. The net effect of these practices will be a decline of payments both in and out of affected jurisdictions.

This decline will be mitigated by any alternative arrangements that affected countries find, such as correspondents in third party countries. If there is no affect on aggregate payments to and from affected countries, de-risking might still have occurred.

Hypothesis 2: *The decline in payments will be greater between affected countries and countries with more regulatory scrutiny/stronger AML/CFT institutions.*

Banks in jurisdictions with more regulatory scrutiny (such as the United States or other members of the FATF), are likely to face a higher level of regulatory risk associated with doing business with an affected country. These are likely to be the first countries for which de-risking will reduce payments to/from affected countries.

Hypothesis 3: *Affected countries will increase their routing of payments to and through coun-*

tries with less regulatory scrutiny/weaker AML/CFT institutions. There will be an increase in the number of payments from affected countries which are handled by ‘third party’ countries but routed to countries with greater regulatory scrutiny.

Regardless of de-risking, banks and customers in affected countries (or those wishing to send payments to affected countries) will wish to continue making payments in both directions. If no arrangements can be made to continue direct payments to/from their preferred country, they will rely on other correspondents in third party countries to complete payments. In some cases, payments will be completely diverted to other countries. In others, payments will continue on their path to/from countries with strong AML/CFT institutions (such as the US or other FATF members), via this new route. This would indicate that de-risking only diverts payments to/from affected countries, rather than eliminating them.

As we will show in Section 5, these hypotheses are not uniformly supported by the data.

3 Data sources and description

3.1 SWIFT data on cross-border payments

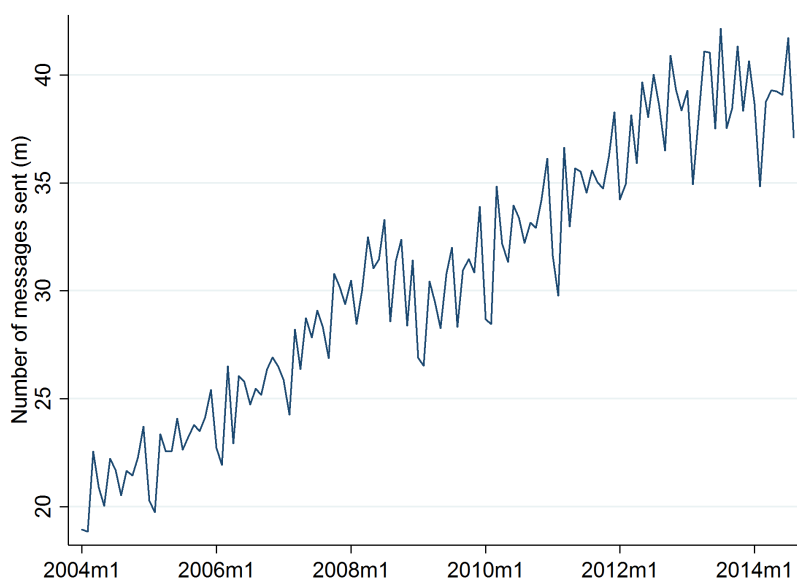
The data we will be using this analysis comprises monthly counts of cross-border payment messages being sent between banks across SWIFT, covering the period January 2004 to August 2014. For each month, we have the total number of MT 103 messages sent between a country A and another country B (in both directions). As described in Cook and Soramäki (2014), the MT 103 data forms a directed network, with a link indicating that a bank in country A has sent a message to a bank in country B during that month.

The MT 103 message type, known as a ‘single customer credit transfer’, is used for all customer-to-customer payments across SWIFT. For example, if a Kenyan IT firm wishes to buy computer processors from a firm based in Silicon Valley, it would instructs its bank in Nairobi to transfer the money to the vendor in California. The Nairobi bank would then send an MT 103 message, either directly to the Californian bank or along a chain of intermediaries, informing the receiving bank to credit its customer’s account. These messages make up the plurality of SWIFT message traffic. While the MT 103 covers most customer-to-customer payments, it does not capture bank transfers not made on behalf of customers (such as bank-to-bank transfers), transactions related to trade finance, treasury/security market related transfers or travellers checks.

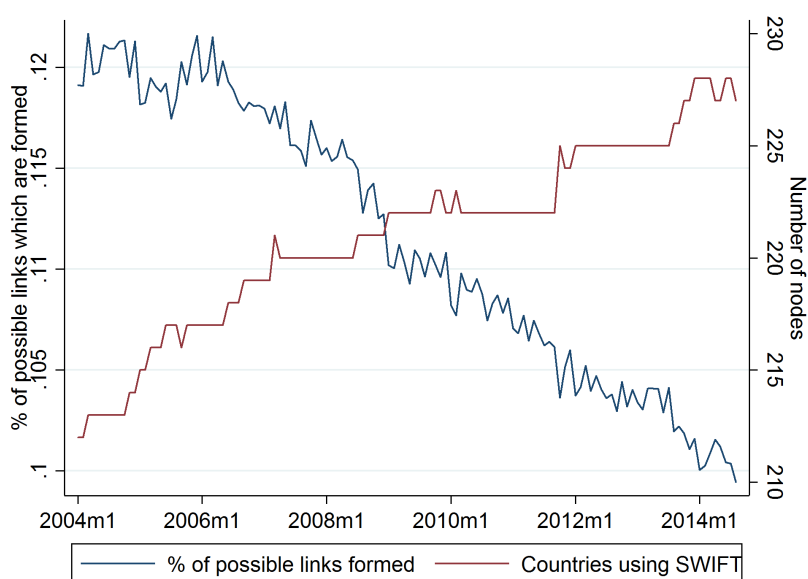
There are two types of MT 103 messages. One is a *serial* payment, which is sent between every bank in a payment chain. If the Nairobi bank needs to send its payment via a correspondent bank in London, one serial MT 103 message will be sent between Kenya and the United Kingdom and a second one will be sent between the United Kingdom and the United States. The other possible type of message is a ‘covered’ MT 103, which is sent directly to the receiving institution, but is followed up with a cover message, known as an MT202 COV, which is sent along the payment chain to manage settlement. In the above example, the Kenyan bank would send an MT 103 directly to the American Bank, and would send an MT202 cover message via its correspondent in London. Figure 7 in the appendix illustrates how payments are structured under both systems. If only a single correspondent is involved in the transfer (e.g. the Kenyan bank and the American bank), then a single MT 103 message between the two institutions suffices. While we are unable to directly discern between these two methods of sending MT 103 message in the data, it seems that the vast majority of customer-to-customer payments sent via

Figure 4: Evolution of MT 103 messages across time (2004-2014)

(a) Total number of messages



(b) Number of bilateral links and participating countries



SWIFT are sent using the serial method.⁵

The structure of the data means that we are unable to observe the ultimate destination of messages that move between more than two countries. In the above example a Kenyan bank sending a serial MT 103 message to the USA via the UK, we would observe two links reflected

⁵The CPMI (2016) report reveals that approximately 40 million MT 103 messages are sent every month, compared to only 5 million MT 202 COV messages. There can be, at the very least, two MT202 COV messages for every covered MT 103, indicating that there are, at most, 2.5 million MT 103 message sent via the covered method in a given month, only 6% of the total.

the flow of messages, rather than a single link between Kenya and the US. This has implications for our interpretation of the results, which we will discuss below.

3.1.1 Cross-border payments over time

Figure 4 shows the evolution of MT 103 messages over the period we have data for. Except for a brief decline following the 2008 financial crisis, the number of messages being sent has been steadily increasing, peaking at just above 40 million per month. The series also shows substantial seasonal variation.⁶ Over the period the series covers, the number of directed bilateral ‘links’ between countries (instances where one country has sent the other at least one message) has been steadily declining. At the end of the panel, countries had formed links with roughly 10% of the potential partners in the network. As described in Cook and Soramäki (2014), the SWIFT message network can be divided into ‘core’ and ‘periphery’ countries: core countries receive and send messages to most other countries in the network, and are likely to host many of the correspondent connections that countries on the periphery of the network use to move money around the world. By contrast, periphery countries rarely send messages to each other at all. Finally, Figure 4 shows the steady onboarding of new jurisdictions onto the SWIFT network, which has grown by 25 territories since the panel began.

A large number of countries show many of the same time-series trends observed at the global level, including a steady rise in the number of payments over time and a drop around the time of the financial crisis. Figure 8 in the Appendix shows message counts over time for nine randomly-chosen (and anonymized) countries. Roughly half of country-specific series in the panel show signs of being non-stationary. To account for the general trends in payment counts as well as the occasional structure break around the time of the financial crisis, we will estimate our results including country-specific time trends as well as separately for the period following 2008.

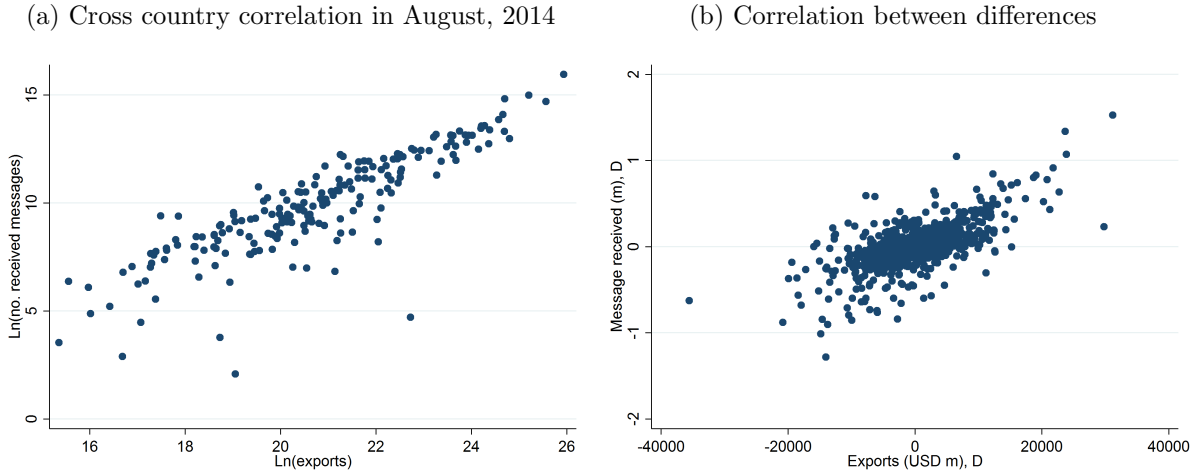
3.1.2 SWIFT payment message counts versus total value of messages

At present we only have access to the total number of MT 103 messages sent between two countries, not the actual value of those messages. In most circumstances we would expect AML/CFT regulatory risk to affect both of these outcomes in a similar fashion. For example, if our Kenyan bank loses access to its correspondent account in the United States and no suitable replacements are found (or replacements are more expensive), then we would expect either a fall in the frequency of payments between Kenya and the United States or in the value of those payments, or both.

One potential challenge to this assumption would be if increased regulatory scrutiny or risk created an incentive for banks or customers to break up larger payment into smaller ones in order, for instance, to avoid enhanced forms of due diligence by partner banks. An extreme version of this is known as ‘smurfing,’ where money launderers intentionally break up cross-border transfers to fall underneath legal limits for compliance checks. This is unlikely to be a problem for remittance payments, as the actual cross-border bank transfers which are used to settle remittance payments are highly-aggregated in nature. Smurfing can be a real issue for other types of transactions coming from high risk countries, but because these locations are both more likely to be the *source* of illicit money and are less likely to employ due diligence checks, this is less likely to be a problem with payments being sent to those locations. In the

⁶As described in Cook and Soramäki (2014), there are peaks in global payment flows in April and December and troughs over January, February and August.

Figure 5: Correlation between monthly received SWIFT messages and exports



Source: COMTRADE

instances where these kinds of practices are enabled by enhanced due diligence checks, they will likely bias any estimates of the impact of risk-rating on payment volumes downward.

In terms of measurement, the number of messages seems to track the value of messages reasonably well. The correlation between percentage changes in volume and value using data taken from CPMI (2016) indicates that a 1% increase in volume is associated with a 0.5% increase in value, with a correlation between the two of about 33%, although the association is dampened somewhat by a number of influential observations.

3.2 Do SWIFT payments measure anything?

Even if the volume of messages is a decent measure of the value of cross-border payments, it isn't clear if message payments are indicative of any real flows. An observed reduction in payment messages sent to a country can't - in isolation - be considered to be an inherently negative outcome, but it might hint at one. To better motivate the use of SWIFT messages as an outcome measure, we calculated correlations between MT 103 messages and other measures of economic activity at both the national and bilateral levels. Table 1 shows the correlation between the number of sent and received messages with a number of indicators of country-level economic activity, including total exports, imports, overseas development assistance, GDP, and remittances, both in levels and in changes over time.⁷ While most measures are cross-sectionally correlated with both sent and received messages, exports and imports are tightly correlated both in cross section and in differences (see Figure 5).

Table 2 shows correlations between various measures of cross-border activity measured at the bilateral level and SWIFT messages. Here the correlations are smaller. Because bilateral SWIFT messages do not always track the ultimate source and destination for payments, messages counts and measures of cross-border activity will diverge even further if a large share of SWIFT messages are serial payments moving through a third (or fourth or fifth...) country.

Even though there are correlations between SWIFT messages and some measures of cross-border activity, this is not a sufficient condition for any negative effects of regulatory risk on SWIFT messages to also imply an impact on economic activity (Lucas 1976).

⁷Monthly trade data is taken from COMTRADE. ODA data is taken from OECD-DAC.

Table 1: Country-level correlations with MT103 messages

	Sent	Received	Δ Sent ^b	Δ Received ^b	Obs
Exports (USD) ^a	.845	.888	.445	.474	28191
Imports (USD) ^a	.875	.925	.601	.635	28191
GDP per capita	.356	.31	.021	.017	2046
Remittances sent	.561	.53	.256	.151	322
Remittances received	.195	.267	.009	-.004	1894
ODA sent (committments)	.865	.837	-.056	-.06	2433
ODA sent (disbursed)	.884	.852	-.033	-.055	2433
ODA received (committments)	-.074	-.026	.002	.004	2433
ODA received (disbursed)	-.074	-.029	-.001	0	2433

^a both imports and exports measured at monthly level.

^b indicates correlations between changes in both variables.

Sources: World Bank, COMTRADE, OECD-DAC

Table 2: Bilateral-level correlations with MT103 messages

	Sent (<i>i</i> to <i>j</i>)	Received (<i>i</i> from <i>j</i>)	Δ Sent ^b	Δ Received ^b	Obs
Exports <i>i</i> to <i>j</i> (USD) ^a	.567	.649	.119	.197	2077112
Imports <i>i</i> from <i>j</i> (USD) ^a	.146	.14	.044	.036	2077112
Remittances <i>i</i> to <i>j</i>	.385	.211	-.008	.001	118950
ODA committed <i>i</i> to <i>j</i>	.038	.028	.001	0	534958
ODA disbursed <i>i</i> to <i>j</i>	.038	.028	.001	0	534958

^a both imports and exports measured at quarterly level.

^b indicates correlations between changes in both variables.

Sources: World Bank, COMTRADE, OECD-DAC

3.3 FATF greylisting

Our aim is to isolate a time-varying treatment measure that raises the regulatory risk associated with a given jurisdiction abruptly. Our main measure is taken from a list of countries with AML/CFT deficiencies which is maintained by the Financial Action Task Force (FATF). Through a myriad of formal review processes, FATF routinely monitors each country's compliance with its official recommendations on fighting money laundering and terrorist financing. Countries for which compliance with the recommendations is found to be a major issue are monitored by FATF's International Co-operation Review Group (ICRG). Three times a year, the ICRG places countries who continue to struggle with compliance on its High-risk and Non-Cooperative Jurisdictions list.⁸ This list comprises both territories which have AML regime deficiencies but are making efforts to improve compliance to those who are not making any attempt to improve their regime. FATF classifies countries on this list by three categories:

1. Jurisdictions with an action plan for which FATF calls on its member countries to consider the information it has presented on AML/CFT deficiencies (56 countries since Feb, 2010).
2. Jurisdictions for which FATF calls on all other countries to consider the risks arising from AML/CFT deficiencies (22 countries since Feb, 2010).
3. Jurisdictions for which FATF calls on all other countries to apply counter-measures to protect the international financial system from the money laundering/terrorist financing risks (2 countries since Feb, 2010).

While only in the third case does being added to FATF's list include recommendations for other countries to enact explicit countermeasures, the FATF "grey and black list" is widely seen as being a direct signal that regulators consider a territory to be particularly risky. Regulators in turn offer guidance to financial institutions either implicitly or explicitly asking them to take on board FATF's assessment. For example, following FATF's publication of its list, the US regulator FinCEN issues guidance advising banks to consider the risks associated with jurisdictions in category (1), enact enhanced due-diligence on jurisdictions in category (2) and to employ explicit countermeasures⁹ to prevent jurisdictions in category (3) from having substantial access to the global financial system. Banks interpret signals from FATF and from their own regulators as a call to perform enhanced due diligence on customers from these jurisdictions or else face the risk of enforcement actions or fines from regulators (Hodge and Trofimov 2014).

We have gathered data on FATF 'greylisting' decisions over the past fifteen years, coding them according to the severity of the designation.¹⁰ Since 2008, FATF has made these announcements three times a year in February, June and October. This timing is an advantage to the analysis: while the ICRG considers recent developments in making its decisions, the exact timing of the announcement is plausibly exogenous with respect to underlying changes in money laundering risk. In Tables 11, 12 and 13 in the appendix we indicate which countries in our sample have been subject to greylisting between 2004 and mid-2014.

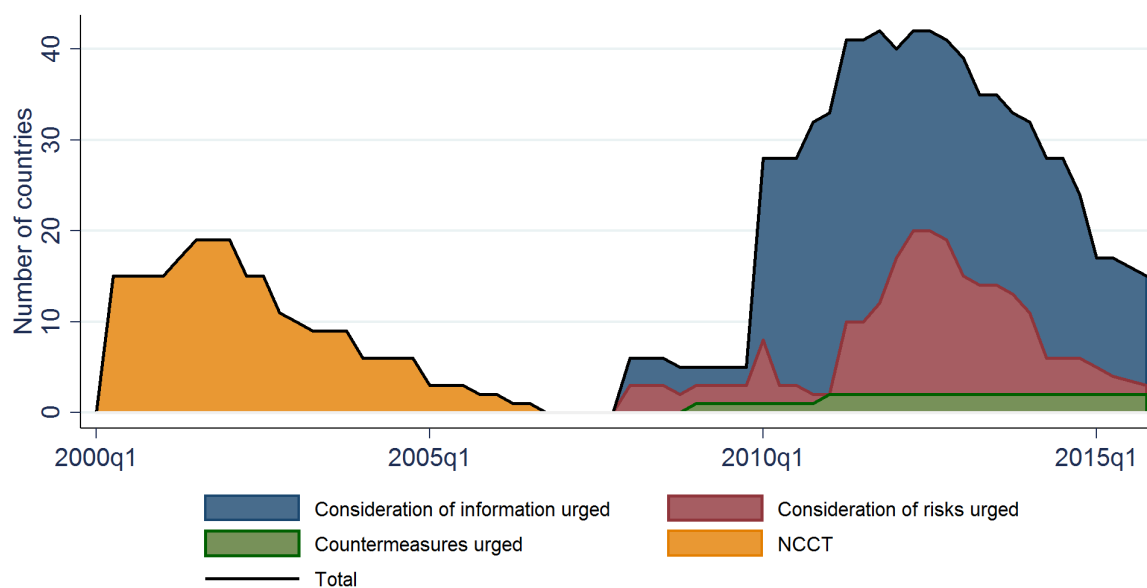
We can see in Figure 6 that FATF greylisting spiked in the past three years, with over forty countries being listed at one time. This will be our main treatment measure used in the analysis

⁸Formerly known as the non-cooperative countries and territories (NCCT) list.

⁹While not fully prohibitive, the countermeasures suggested by FATF are extremely restrictive, in line with restrictions imposed by most financial sanctions.

¹⁰This includes jurisdictions which "have strategic AML/CFT deficiencies for which they have developed an action plan with the FATF," jurisdictions which have the same deficiencies but have not made progress or agreed on a plan to deal with them and jurisdictions for which the FATF has called on its members to enact countermeasures to prevent money from being laundered through these locations.

Figure 6: FATF grey/blacklisting (2000-2015)



Note: Graph shows the current number of countries publicly listed by the FATF as high risk or non-cooperative.

below. Because some FATF greylisting carries with it the requirement of counter-measures, we also present results that distinguish between the three types of designations, although in reality only two countries (Iran and North Korea) have ever been included on this list.

Because institutions in developing countries tend to be weaker altogether, overall compliance with FATF requirements for this group is also lower. The probability of greylisting by the FATF is increasing with income: countries with a GDP per capita under \$20,000 face greylisting rates as high as 40% (see figure 9 in the Appendix). If greylisting carries with it any significant negative consequences, these are most likely to be borne by the poorest countries in the world.

3.4 Other treatment measures

We will employ two other ‘treatment’ measures in this analysis.[✱] As each of these outcomes may co-vary with FATF greylisting, we will also include them as controls as a robustness test. We will use these in the first two specifications (described below), but not the third, which is explicitly designed with FATF greylisting in mind.

3.4.1 INCSR ratings and designations

Every year the US State Department produces its International Narcotics Control Strategy Report (INCSR). In its second volume, it summarizes actions taken by governments to curb money laundering and designates jurisdictions which are “of primary concern” for money laundering. We will construct an index of government ‘effort’ against money laundering, which will be the

[✱]We specified a third treatment measure in the PAP which we have not included here: compliance scores from the FATF’s mutual evaluation process. To date, we have had difficulty obtaining evaluation scores prior to the third round. As a result, only a handful of countries in the sample have more than one mutual evaluation score across the panel. In future drafts we will present results for this subset of countries in the appendix.

percentage of positive actions a country has taken out of the total number of possible actions put forth by the INCSR.[†] We construct this index in a way that it changes value within the month/quarter/year that the report was released, to better capture the change in information provided by the report’s release.

3.4.2 Economic Sanctions

While changes in FATF or INCSR designations should in theory lead to changes in the ways that bank assess clients from certain jurisdictions, they do not mandate explicit restrictions on the flow of money in and out of these locations.¹¹ If we are unable to reject the hypothesis that FATF greylisting does has no impact on SWIFT messages, it won’t be clear if this is because the true effect of greylisting on cross-border transactions is zero or if our outcome measure is unable to pick up the true effect. To account for this, we also investigate the impact of regulatory decisions that place explicit restrictions on cross-border payments, which should show up in SWIFT data. To do this, we will construct an indicator which is equal to one if a country is subject to OFAC, EU or UN Sanctions and zero otherwise.

4 Specification issues and identification

In this section we will discuss our specification choices for testing the hypotheses laid out in Section 2 as well as identification issues we may face.

Specification 1: The impact of greylisting on aggregate MT 103 payment counts

To investigate the impact of greylisting on MT 103 messages, we will use the following specification:

$$M_{it} = \theta T_{it} + \mathbf{X}_{it}\delta + \mu_i + \gamma_t + t\mu_{it} + \varepsilon_{it} \quad (1)$$

Where M_{it} indicates the number of MT 103 messages being sent from (or to) country i in a given period t . We will estimate equation (1) separately for incoming and outgoing messages. T_{it} is a treatment indicator which is equal to one when a jurisdiction i is identified on a FATF greylist during time period t .¹² θ is our estimate of the impact of the treatment (greylisting, etc) on the count of incoming or outgoing messages. \mathbf{X}_{it} is a vector of time-varying country characteristics (described below). The parameters μ_i , γ_t and $t\mu_{it}$ control for country fixed effects,¹³ period fixed effects and country time trends, respectively. By including $t\mu_{it}$, we aim to account for both violations of the parallel trends assumption necessary for a multi-period difference-and-difference, as well as the non-stationary nature of some of the series.

For θ to be identified, several assumptions need to hold in reality. There can be no country-specific shocks which affect both the propensity of FATF greylisting and payment flows at the

[†]In the PAP, we specified that we would also construct a second indicator for when a country is listed as a jurisdiction of primary concern, which we will include in future drafts.

¹¹The only exception is when FATF indicates a country should be subject to countermeasures, which usually happens concurrent with sanctions.

¹²For other treatment measures, T_{ij} may be continuous.

¹³Masciandaro (2005) finds that the probability a jurisdiction is reviewed by the FATF depends on a number of country-level characteristics, ranging from GDP per capita, foreign deposits, and the presence of organized crime or terrorist activities.

same time. For example, if FATF decides to greylist a country at the same time it is subject to international sanctions, our estimates of θ will be biased. We will attempt to account for these types of shocks by including them in \mathbf{X}_{it} .

We can also rely on a peculiarity of the data to help with identification: since 2008, the FATF holds its plenary meetings and announces changes to its greylist three times year, nearly always in February, June and October. Thus changes in FATF announcements are, to some extent, slightly removed from other time-varying changes in countries: even if a war breaks out in a given country in March, it cannot end up on a greylist until the following June.

While the regular timing of FATF announcements does mitigate the possibility that FATF ICRG decisions reflect recent exogenous changes in countries being considered for greylisting, it does create another potential threat to identification. Anecdotal evidence suggests that countries are aware of the negative effects of FATF greylisting and do take steps to change their AML/CFT policies in order to avoid it.¹⁴ If these changes are last-minute and banks take their signals directly from legislative changes, then it is possible that θ will pick up changes in payment flows due to underlying AML/CFT risk, rather than solely the regulatory risk brought on by greylisting.

While country level trends will somewhat guard against this, they won't account for last minute shifts in AML enforcement induced by the threat of greylisting. There are a number of reasons - both empirical and theoretical - why we do not expect this to be a major concern. First, as we will show in Section 5, there appears to be no significant anticipatory drop in payments to countries which are about to be greylisted. Second, as we will show, there is evidence that the effects of greylisting appear to manifest with some delay, which would indicate that banks are not immediately reacting to changes in country-level policy (or if they are, they are doing so with a significant delay). Third, greylisting is thought to be a function of *changes* in a country's effort in fighting money laundering, rather than absolute levels of effort: mutual evaluation reports reveal discrepancies in the adherence of a country to FATF's recommendations, and only when a country fails to address these deficiencies do they run the risk of being greylisted. Banks might be concerned with the overall levels of money laundering risk associated with a given jurisdiction, but there is less evidence that they would be as concerned with recent *changes* in that risk brought about by legalisation. Finally, until recently the FATF ICRG has been mainly concerned with legislative effort in fighting money laundering, rather than actual *de facto* evidence that a country's institutions are effectively preventing the movement of illicit money.¹⁵ Since *de jure* changes in legislation are less likely to affect a country's general risk of money laundering or terrorist financing (even less so in the short term), there is another reason to doubt that a decline in payments coinciding with FATF greylisting is being driven by bank concerns over a country's recent decisions rather than the regulatory risk generated by the greylisting.

We will estimate equation (1) using monthly, quarterly and annual periods.¹⁶ Because of the count nature of the MT 103 message data, we will estimate equation (1) using a Poisson

¹⁴For example, the Afghan government passed special legislation just a day before a FATF plenary to avoid being 'upgraded' from the category of "consideration of information urged" to that of "consideration of risks urged" (EIU 2014) Similarly, less than a month before a FATF plenary, the Philippines passed legislation to avoid upgraded to the worst possible position on the greylist, instead being downgraded to the "consideration of information urged" category (Bordadora 2012).

¹⁵FATF began reviewing the actual effectiveness of countries' AML/CFT systems in 2013, but as of the end of this panel it has reviewed no more than 16 countries using the new methodology. None of these have been greylisted to date (and in most cases, there has been not enough time since their mutual evaluations for countries who have not made progress in addressing their deficiencies to be identified).

¹⁶Some covariates in \mathbf{X}_{it} will only be observed at quarterly or annual levels.

regression as our preferred specification. We will also present results using ordinary least-squares (OLS) and a negative binomial regression in the Appendix.^{17*} This specification is aimed at being a direct test of hypothesis (1). Our registered prior was that is that $\theta < 0$ for both incoming and outgoing messages.

Specification 2: The impact of risk-rating on the path of MT 103 payment counts

To investigate the impact of a given treatment on the direction of MT 103 payments in the network, we will use the following specification:

$$M_{ijt} = \rho T_{jt} + \alpha(T_{jt} \times E_i) + \mathbf{X}_{it}\delta_X + \mathbf{Y}_{jt}\delta_Y + \mathbf{Z}_{ijt}\delta_Z + \mu_{ij} + \gamma_t + t\mu_{ij} + \varepsilon_{ijt} \quad (2)$$

In this specification, the data is organized in dyadic form, with country pairs i and j . M_{ijt} indicates the number of MT 103 messages sent from country i to country j (or, separately, country j to country i) in a given period t . Because a large number of countries never send each other messages in a given period, we will also consider an indicator variable = 1 if country i sent j at least one message and vice versa (i.e. whether the two countries formed a link in a given period). The treatment indicator T_{jt} indicates when country j is subject to FATF greylisting (or our other treatment measures). Thus when M_{ijt} is defined as the number of messages sent from i to j , ρ picks up the effect of greylisting on the receiving country and when M_{ijt} is defined as the number of messages sent from j to i , ρ picks up the effect on the sending country (j). We also interact the treatment indicator with E_i , which is a fixed characteristic of country i which we - a priori - expect to scale treatment effect further downward. In Subsection 4 below we discuss the characteristics we included in E_i to investigate *which* countries decrease or increase their exposure to the country that was greylisted, as well as our motivation for including them.

The vectors \mathbf{X}_{it} , \mathbf{Y}_{jt} and \mathbf{Z}_{ijt} contain time-varying characteristics for country i , country j and pairwise characteristics capturing the relationship between countries i and j . The parameters μ_{ij} , γ_t and $t\mu_{ij}$ will respectively capture pairwise fixed effects, period fixed effects and pairwise time trends. As before, we will estimate specification (2) using Poisson and OLS regressions at the monthly, quarterly and yearly level.

Heterogeneity/diversion across countries

The goal of specification (2) is to determine if certain types of countries (i) are more or less likely to send or receive payment messages to greylisted countries (j). We will investigate this by running specification (2) multiple times, swapping out different characteristics for parameter E_i . We pre-specified characteristics in our pre-analysis plan which we felt would predict de-risking by country i . These include:

1. **The USA:** as the source of much of the AML/CFT regulatory risk around the world, banks in the US might be more likely to close accounts than anywhere else. In this case, $E_i = 1$ if country i is the US.

¹⁷The SWIFT data shows signs of over-dispersion, making a negative binomial model more appropriate. However, given the concerns over implementing fixed effects in these models (Allison and Waterman 2002; Guimaraes 2008), these results will only be reported in the appendix

*This is specified in the PAP. As of this draft these results have not yet been included.

2. **Members of FATF:** members of FATF are more beholden to enforce AML/CFT activity than those outside. They have, on average, stronger AML/CFT institutions which are more likely to be responsive to the FATF’s greylist. We construct an indicator = 1 if country i was a member of FATF as of 2004. We choose this year as it is at the beginning of our panel and thus predates most of the FATF greylisting activity that we observe. The list of members is available in Table 10 in the Appendix.
3. **Countries with strong AML/CFT institutions:** Similar to members of FATF, banks countries with the strongest AML/CFT institutions are more likely to be subject to stringent regulation and expectations that AML practices will put in place. We construct an indicator = 1 if country i was at or above the 75th percentile in INCSR ‘effort’ (i.e. the % of actions taken) as of 2004. The original values of ‘effort’ are displayed in Tables 11, 12 and 13 in the appendix.
4. **Home countries of banks subject to US regulation:** When foreign banks establish a branch in the US, that activities of that branch are subject to US AML/CFT regulation. Even though this regulatory authority does not technically extend to the operations of foreign banks beyond US soil, in practice once banks have established a presence in the US they may become more wary of risky customers wanting to do business in US dollars. If large international banks which are partially based in the US become more risk averse, we might expect to see more de-risking in their home jurisdictions as well. To test this, we construct an indicator = 1 if country i has a large international bank which also has a branch based in the US. The original number of banks based in the US are also displayed in Tables 11, 12 and 13 in the appendix.
5. **Countries highly dependent on access to the US for cross-border payments:** Many banks rely on direct access to US-based correspondents to do business in US dollars. There is anecdotal evidence that some banks have undergone de-risking not because they are concerned with regulatory risk where they are based, but because they are concerned with maintaining their correspondent account access to the US (Durner and Shetret 2015). To test if countries which are highly reliant on US access are more likely to de-risk, we define the indicator $E_i = 1$ if 50% or more of the sum of messages going in or out of the country went to or came from the US.

Returning to Specification (2): testing whether we can reject the null of $\alpha = 0$ will inform the second hypothesis: whether countries that fall into our categories of E_i will see a greater decline in payments to/from greylisted countries. Our prior is that $\alpha \leq 0$ and $\alpha + \rho$ (the combined effect for countries described by E_i is < 0 . The parameter ρ in isolation isolates the change in payments from countries with less robust AML/CFT regimes (or those less affected by regulatory concerns). It is a partial test of our third hypothesis, and we would expect to see $\rho > 0$, which would indicate an increase in payments via third party countries.

The identification issues here are similar to those of Specification (1), although here our concerns are over shocks which affect both the overall number of MT 103 messages being sent to or from country j as well as those which affect the bilateral relationship specifically.

Specification 3: The impact of risk-rating on use of third party jurisdictions to complete payments

Where the second specification aims to uncover whether certain jurisdictions (such as the US or FATF-members as a whole) reduce their exposure to payments from/to greylisted countries, the

aim of this specification is to investigate whether greylisted countries are more likely to divert payments through ‘third party’ jurisdictions onward to jurisdictions like the US or members of FATF. This would be driven by the use of third party correspondents to complete payments. MT 103 messages contain both the origin and ultimate beneficiary of a transaction, so there is nothing illicit about such a diversion. However, it would indicate that greylisted countries have to take more circuitous routes to reach their destination. If payments are being channeled through multiple jurisdictions, but are still reaching their destination, then greylisting will have made global payments more expensive as well as potentially less transparent.

We are largely limited by the data here, as we only observe one leg of an MT 103 messages’s journey (and are also unable to discern whether a given leg is the final leg or not). To account for this, we will investigate the correlation between payments between non-greylisted countries and incoming payments from greylisted countries.

Let $i \in I$ index countries which are likely to reduce their direct exposure to greylisted countries (e.g. the US, FATF-members, countries with strong AML/CFT policies). Let $k \in K$ index countries which are not in I which are greylisted at some point during the entire time series.¹⁸ Finally, let $j \in J$ index countries which are neither I nor K (our third party countries) and let $\mathcal{K} = I \cup J$. Consider the following equation:

$$M_{Ijt} = \pi M_{jKt} + \beta(M_{jKt} \times P_{Kt}) + \eta M_{j\mathcal{K}t} + \phi(M_{j\mathcal{K}t} \times P_{Kt}) + \mathbf{X}_{it}\delta + \mu_i + \gamma_t + t\mu_{it} + \varepsilon_{it} \quad (3)$$

In the above equation, M_{Ijt} indicates the aggregate number of messages sent to countries in I that are sent from country j . The variable M_{jKt} indicates the total number of messages sent from countries in K to country j in the same period. Thus, in isolation, π captures the partial correlation between messages sent to j from ever-greylisted countries and messages sent to countries in I from j . An increase in π would suggest that more MT 103 messages are ‘passed on’ as subsequent messages to ‘protected’ jurisdictions. We allow this partial correlation to vary across time by introducing the interaction term $M_{jKt} \times P_{Kt}$, where P_{Kt} is equal to the proportion of countries in K which are *currently* greylisted in time t . This allows the partial correlation to change as more countries in K are added to the greylist. When $\beta > 0$, this would indicate that more messages from greylisted countries are being passed on to countries in I via j .

The above equation is similar to that seen in the literature on the fungibility of foreign aid (Van de Sijpe 2012) or in the response of trade transshipment to policy changes (Rotunno, Vézina, and Wang 2013). The aim is to test the extent to which payments from high risk countries to third party countries are translated into payments to countries which might - depending on the results from Specification (2) - have reduced their direct exposure to high risk countries.

In addition to the standard set of controls, we also control for incoming messages from all other countries which are not in K (\mathcal{K}) and let it vary by the number of countries in K which are greylisted. This is to account for increase in flows from other third parties that may result from greylisting (e.g. greylisted Venezuela sends payments to Chile, then Argentina (j) then the US). These ‘third degree’ payments are just as interesting as the ‘second degree’ payments capture in $\beta > 0$, but as we are unable to discern whether third degree payments are coming from greylisted countries are not, we can only include the total amount as a control.

If $\beta > 0$, we take this as evidence that greylisted countries are more likely to send payments to ‘protected’ countries via third parties, a sign that greylisting only diverts money through

¹⁸Because very few countries are greylisted at the start of the panel, we only consider countries which are greylisted after the financial crisis.

other channels, and further support of hypothesis 3. We should also observe that $\beta > \eta$, as more greylisting might have other effects on the global payments network that lead to an increase in overall payments to third party countries.

For I we will use the following categories: the United States, members of FATF. In addition, we will also use any category for which there is significant evidence that α is negative in specification (3).

4.1 Controls, heterogeneity across time and inference

In all three specifications, where possible we will include controls at the appropriate period-level (e.g. we will include per capita GDP at the annual level, but not the monthly level).

At the country-level, when available for the period chosen, we will include: GDP per capita (World Bank), a country’s democracy score (POLITY IV), the World Bank World Governance Indicators,[✎] a dummy variable indicating whether or not there is an ongoing conflict, the country’s current exchange rate against the dollar.¹⁹ When we use FATF greylisting as our treatment indicator we will also check, for robustness, whether or not the results are robust to including the other treatment indicators described in Section 3.4. For the dyadic specification, we will include the above controls for both country i and country j , as well as measure of the bilateral exchange rate.

As discussed in the introduction, there has been a significant rise regulatory pressure and AML/CFT enforcement in the past few years. Fines have increased drastically in the past five years, and what few anecdotes and limited survey evidence exists points to a sharp rise in incidents of de-risking over this time period. It is plausible, then, that increases in regulatory risk have only been binding for banks since 2010, when fine levels began to rise sharply.

Also, in addition to the fact that several of the country-level series show signs of being non-stationary, others sign of a significant structural break around the time of the 2008 financial crisis. To account for both of these, for all three specifications we will examine heterogeneity in effect sizes across time by also presenting separate estimates for the 2010-2014 time period. For quarterly specifications, we will divide the series at Q3-2009 and for monthly specifications we will divide the series in July, 2009.

All country-level regressions (specification (1)) will be clustered at the country level. All bilateral-pair specifications (2 and 4) will be clustered both at the i country level and at the j country level (i.e. two-ways for each of the pairs) following Cameron et al. (2012).²⁰

5 Results

5.1 Does FATF greylisting reduce the aggregate number of payment flows?

In Table 4, we display the results from Specification (2) using a poisson regression on monthly MT 103 payment data. Columns (1)-(4) and (5)-(6) are divided up between using the number of sent messages and the number of received messages as outcomes, respectively. Each column iteratively introduce country fixed effects, month fixed effects, monthly country controls as well as linear country trends.

[✎]In the PAP, we indicated we would use the WB’s CPIA scores, but subsequently felt that the WB WGI measures would be more robust. Future versions of the paper will include CPIA scores as a robustness check.

¹⁹Exchange rate data is taken from Oanda.com

²⁰Ideally, we would also implement the standard errors which specifically take into account the dyadic nature of the data (a la (Fafchamps and Gubert 2007), but at the moment there is no easy implementation with a Poisson model. At present, we can assume that our dyadic standard errors are biased downward.

Table 3: Impact of FATF greylisting on monthly payment flows - Poisson regression

	Messages sent				Messages received			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Greylisted	0.0742* (0.0384)	0.0837*** (0.0321)	0.0270 (0.0247)	0.0259 (0.0242)	-0.109** (0.0553)	-0.0987** (0.0480)	-0.0867** (0.0423)	-0.0855** (0.0417)
country f.e.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
month f.e.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
country trends			Yes	Yes			Yes	Yes
country controls		Yes		Yes		Yes		Yes
adjusted R^2								
# countries	225	203	225	203	225	203	225	203
Obs	28054	24857	28054	24857	28054	24857	28054	24857

Greylisted = country is currently included in FATF's list of high risk jurisdiction. Messages indicate the total number of MT103 messages sent to/from the country each month. Standard errors are clustered at the country level, * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 4: Impact of FATF greylisting on monthly payment flows - Poisson regression

	Messages sent				Messages received			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Greylist lvl 1	0.0561* (0.0321)	0.0625** (0.0287)	0.0177 (0.0231)	0.0169 (0.0227)	-0.0909** (0.0421)	-0.0819** (0.0385)	-0.0806* (0.0454)	-0.0813* (0.0447)
Greylist lvl 2	0.137** (0.0549)	0.149*** (0.0421)	0.0684 (0.0428)	0.0660 (0.0430)	-0.135 (0.109)	-0.124 (0.0935)	-0.116** (0.0559)	-0.107** (0.0523)
Greylist lvl 3	-1.206*** (0.0435)	-1.192*** (0.0322)	-0.322*** (0.0387)	-0.289*** (0.0407)	-2.042*** (0.0333)	-2.020*** (0.0284)	-0.455*** (0.0446)	-0.404*** (0.0420)
country f.e.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
month f.e.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
country trends			Yes	Yes			Yes	Yes
country controls		Yes		Yes		Yes		Yes
adjusted R^2								
# countries	225	200	225	200	225	200	225	200
Obs	28054	24515	28054	24515	28054	24515	28054	24515

Greylisted level 1 = FATF calls on member countries to consider information presented. Greylisted level 2 = FATF calls on member countries to consider the risks from AML/CFT deficiencies. Greylisted level 3 = FATF calls for active countermeasures to protect international financial system from AML/CFT risks. Messages indicate the total number of MT103 messages sent to/from the country each month. Standard errors are clustered at the country level, * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

The results indicate no consistently significant relationship between being added to a FATF greylist and payment volumes leaving an affected country (the results are slightly positive, between a 3-7% increase, but are largely insignificant). However, there is a robust negative relationship between greylisting and payment volumes received by an affected country, where being added to a list is correlated with an 8-11% decline. This effect appears robust to alternate period specifications, restricting the panel to the post-2008 period, and using OLS instead of Poisson, where greylisting leads to a decline of between 5-32,000 messages received per month, depending on the specification (Tables 14 and 15 in the Appendix).

These results are partially consistent with our first hypothesis, that greylisting would reduce the number of payments moving in and out of a given jurisdiction. As there is only a significant and negative effect on messages received, these results are more consistent with a state of the world in which de-risking is preventing certain types of transactions (e.g. remittances, payments for exports) from reaching their destination. But it is less consistent with one in which general declines in correspondent banking access are affected cross-border transactions, as these declines should affect payments both to and from affected countries.

There are, of course, other explanations. It is possible that increased regulatory scrutiny leads banks to enact more due diligence checks which legitimately identify and deny transactions that do not meet a basic requirement. However, as we show below, it appears that the negative effects of greylisting are consistent across both the first and second level of FATF greylisting, where only the second of these two leads to active calls for enhanced due diligence measures.

5.1.1 Intensity of the treatment

As we discussed in Section 3.3, FATF greylisting involves multiple ‘levels’ of severity, with the more severe actually requiring banks and governments to take active steps to limit their exposure to an affected country. To separate out the effects of separate rankings, we repeat Specification (2) with a separate indicator variable for each level of greylisting.[✕] Level three, which calls for active countermeasures and to date has only been applied to Iran and North Korea, has a substantial impact on both the number of sent and received messages, resulting in roughly a 30% and 40% reduction in the former and latter respectively (in our preferred specification with country trends).

We find mixed results for the other two level. On the receipt of messages, both levels one and two have significant, negative impacts ranging from a 8% to a 11% reduction. The second level of greylisting seems to lead to an even larger decrease in received messages, although it is not statistically different than the lowest level of greylisting. The first two levels of greylisting are correlated with an increase in messages being sent by affected countries, although this result is not robust to the inclusion of country-specific trends.

The most surprising result here is the relative similarity that the first two levels of FATF greylisting have on payment flows. If greylisting has a ‘stigma’ effect (Masciandaro 2005), it appears to be fairly stable, regardless of the FATF’s specific recommendations.

5.1.2 Leads and lags of the treatment

To both investigate whether or not a parallel trends assumption is justified and to see whether or not the effect of greylisting is immediate or appears with some delay, we re-estimate Specification (1) including two ‘leads’ and four ‘lags’, indicating the number of periods prior and

[✕]In the PAP, we specified that we would run the main specification after having dropped these two countries. By contrast, this table separates out the impact of this third level greylisting from the lower levels that we are more interested in. The main results are robust to dropping these two countries

Table 5: Testing leads/lags of greylisting - Poisson regression

	Messages sent			Messages received		
	(1) Month	(2) Quarter	(3) Year	(4) Month	(5) Quarter	(6) Year
2 period(s) before	0.0385 (0.0318)	0.00867 (0.0299)	0.0113 (0.0346)	0.0240 (0.0264)	0.0803** (0.0337)	0.0734 (0.0598)
1 period(s) before	0.0380 (0.0290)	0.0300 (0.0307)	0.0109 (0.0394)	0.0225 (0.0425)	0.0163 (0.0229)	0.112 (0.0732)
Greylisting period	0.0306 (0.0302)	0.0398 (0.0292)	0.0467 (0.0333)	0.0363 (0.0292)	-0.00140 (0.0229)	0.0589 (0.0429)
1 period(s) after	0.0607** (0.0289)	0.0476* (0.0287)	0.0817** (0.0383)	0.00840 (0.0293)	-0.00691 (0.0273)	-0.00764 (0.0455)
2 period(s) after	0.0403 (0.0307)	0.0565** (0.0255)	0.0960** (0.0474)	-0.0231 (0.0245)	-0.00196 (0.0318)	-0.116* (0.0637)
3 period(s) after	0.0348 (0.0306)	0.0466 (0.0292)	0.156** (0.0606)	-0.0149 (0.0263)	-0.0371 (0.0286)	-0.151* (0.0850)
4 period(s) after	0.0511* (0.0275)	0.0684** (0.0343)	0.223*** (0.0847)	-0.0202 (0.0220)	-0.0428 (0.0372)	-0.163 (0.149)
More than 4 periods after	0.0934** (0.0415)	0.112** (0.0500)	0.110* (0.0643)	-0.122* (0.0641)	-0.151* (0.0836)	-0.737*** (0.0555)
country f.e.	Yes	Yes	Yes	Yes	Yes	Yes
period f.e.	Yes	Yes	Yes	Yes	Yes	Yes
adjusted R^2						
# countries	223	223	223	223	223	223
Obs	27798	9346	2398	27798	9346	2398

Greylisted = country is currently included in FATF's list of high risk jurisdiction. Each variable indicates a year relative to the greylisting period for a greylisted country. Periods used are indicated at the top of every column. Messages indicate the total number of MT103 messages sent to/from the country each period. Standard errors are clustered at the country level, * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

following a greylisting event. We also include an indicator =1 to capture all periods five and later. We do this over each period type of specification, in effect extending the reach of the lead/lag period (e.g. four months in the monthly specification and four years in the annual specification), to investigate how quickly the negative effects of greylisting manifest. In both the full specification presented in Table 5 below and the post-2008 sample presented in Table 16 in the Appendix, there appears to be a delayed impact of greylisting on received messages in most specifications, with the strongest effects seen in the indicator for more than four periods following the greylisting event. Only in the annual specification do we see effects manifest within two periods, indicating that it may take a year or longer on the greylist before payments react. The results on sent messages are less consistent and occasionally significantly and strongly positive. If greylisting is leading to de-risking, it appears to have substantially different effects on payment flows out of affected countries.

It is worth highlighting that in both the full specification and in the post-2008 specification, there is some evidence of the violation of parallel trends, with one or more pre-treatment indicators showing positive, significant coefficients. This further motivates our use of country-specific trends, which we consider to be the most robust specification.

5.1.3 Effects of other ‘treatments’ on payment flows

In Tables 14 and 15 in the Appendix, we repeat Specification (1), swapping out our greylisting measure alternatively with a measure of a country’s INCSR rating and an indicator equal to one if the country is subject to US, UN or EU economic sanctions. We find some evidence that economic sanctions lead to a reduction in the number of payment messages sent from sanctioned countries (between a 7-8% reduction), but primarily in the post-2008 period. Updates to INCSR ratings appear to have negative effect on payments received, but the effect appears combined to the period preceding the financial crisis. These effect sizes run counter to intuition: when a new INCSR report is released indicating an improvement in an country’s AML/CFT regime, we see a fall in payments received. Instead of capturing regulatory risk (which, unlike FATF greylisting, is not implied by our INCSR measure), these results may be picking up the effect of regulatory reforms which raise the cost of moving money in an out of these jurisdictions (for example, because of higher compliance costs at the destination). However, in our most robust specification, we also find a positive impact on payments sent, but only in the post-2008 period, which runs against the cost hypothesis.

5.1.4 Effects of greylisting on intermediate financial flows

In Tables 19 and 20 in the Appendix, we investigate the impact of FATF greylisting (as well as our other treatment measures) on the volume of exports and imports (obtained from COMTRADE) from/to an affected country. In our preferred specification we find weak evidence of a negative impact of greylisting on the volume of exports, a result consistent with AML/CFT regulation impeding the ability of payments being sent to exporting countries. However, this result is not robust to all variations on the Poisson specification. Prior to including country-trends, there is evidence of a positive effect on greylisting on imports, which is consistent with the positive effects we have found on payments sent.

In Table 21, we display the results when we use annual ODA disbursements and remittances received as outcomes.²¹ While our preferred specification shows negative effects on the amount of remittances received, the results are not statistically significant at the 10% level. If anything,

²¹Our sources are the OECD-DAC, Aid Data and the World Bank.

we find a positive impact of greylisting on aid disbursements in the post-2008 period. As these disbursements primarily represent bilateral aid, they would not pick up any of the negative effects of de-risking on aid provided directly by NGOs.

5.2 Does greylisting change the direction of payment flows?

So far there is evidence that greylisting leads to a reduction in the volume of payment messages received by affected countries, but the effect on outgoing payments is no statistically different from zero, or - in some specifications - it appears to be slightly positive. However, aggregate changes in payment might be masking changes in the *direction* of payments, as greylisted countries may choose (or be forced) to channel payments to and from different jurisdictions.

To test for this, we present the results from estimating Specification (2) using annual data[‡] in Table 6. These estimates are the result of a dyadic regression of the number of payments sent to a country i by another country j and vice versa.[†] The table is divided into multiple rows, each one indicating our estimates of ρ and α as we vary our definition of E_i , that is the type of country that the affected country j is sending or receiving messages to/from.

What evidence we do find runs counter to our expectations and hypotheses: in our preferred specification, we find that there is no negative effect of greylisting on payments sent to affected countries by the United States (the total effect is the sum of ρ and α , or -0.13 and 0.14 in this example). We similarly find no negative effect when country i is a member of FATF or has a high INCSR rating. It appears that these ‘core’ countries with strong AML/CFT institutions and a high degree of regulatory oversight are not necessarily the source of de-risking, or at least do not appear to reduce their direct exposure to high risk countries. This might be driven by countries with weak AML/CFT institutions lacking the apparatus to cheaply or easily perform due diligence on clients, making de-risking more likely. We do, however, find that countries which are subject to regulation indirectly by having a banking presence in the US see a decrease in the number of payments sent to greylisted countries. We find no consistent results on payments sent from affected countries to our various country categories.

To investigate this further, we re-run Specification (2) using a binary outcome which is equal to one if j sent i at least one payment and vice versa. Where the previous results display the effect of FATF greylisting on both the extensive and intensive margins, this specification will tell us to what extent greylisted countries change the type of countries they sent payments to, irrespective of how much is sent. The results are displayed in Table 7. Here, we find that greylisted countries are approximately 1% more likely to receive any payments from the USA, but are 1% less likely to receive payments from FATF members as a whole, relative to non-members. We find similar results for INCSR ratings, but little else. These results suggest that - despite the lack of decline in payments received from FATF countries or those with good AML/CFT institutions, there is still a slight contraction in the number of countries which do form links with affected countries. Again, there are no significant results for payment sent from affected countries, which is consistent with what we have seen so far.

[‡]Monthly and quarterly data will be presented in future versions.

[†]In the PAP, we indicated that we would also restrict the set of i countries to those in the ‘core’ of the global payments network. We will do so in future drafts - failing to impose this restriction will - if anything - bias our results towards zero.

Table 6: Effect of greylisting on payments to/from specific countries (Poisson - annual results)

	Sent by j				Received by j			
No interaction								
Country j greylisted	0.077** (0.031)	0.019 (0.017)	0.030 (0.028)	0.0071 (0.024)	-0.097 (0.10)	-0.0090 (0.021)	-0.090 (0.059)	-0.056*** (0.013)
i is the USA								
Country j greylisted	0.056 (0.053)	0.035 (0.022)	0.050 (0.044)	0.018 (0.065)	-0.19 (0.13)	-0.015 (0.025)	-0.13* (0.079)	-0.13*** (0.036)
Greylisted $\times (i = \text{USA})$	0.042 (0.041)	-0.032*** (0.012)	-0.037 (0.038)	-0.015 (0.055)	0.25* (0.13)	0.016 (0.012)	0.12 (0.084)	0.14** (0.066)
Test of combined effect - p value	0	0.66	0.20	0.70	0	0.88	0.065	0.50
i is a FATF member^a								
Country j greylisted	-0.11 (0.12)	0.063 (0.070)	0.000036 (0.18)	-0.17 (0.14)	-0.54*** (0.17)	0.081*** (0.013)	-0.34*** (0.11)	-0.28*** (0.052)
Greylisted $\times (i = \text{member})$	0.20* (0.11)	-0.049 (0.066)	0.033 (0.17)	0.19 (0.13)	0.54*** (0.17)	-0.11 (.)	0.32*** (0.11)	0.30*** (0.072)
Test of combined effect - p value	0.0010	0.31	0.13	0.40	0.89	0.14	0.15	0.45
i has high INCSR rating^b								
Country j greylisted	-0.099 (0.10)	-0.00096 (0.039)	-0.14 (0.094)	-0.16 (0.11)	-0.49*** (0.18)	0.040 (0.041)	-0.33*** (0.10)	-0.26*** (0.058)
Greylisted $\times (i \text{ has high rating})$	0.20** (0.098)	0.021 (0.037)	0.19** (0.087)	0.18* (0.099)	0.50*** (0.18)	-0.061** (0.030)	0.31*** (0.11)	0.29*** (0.081)
Test of combined effect - p value	0	0.26	0.12	0.35	0.78	0.19	0.28	0.44
i has bank exposed to US reg^a								
Country j greylisted	0.078*** (0.019)	0.0065 (0.013)	0.014 (0.021)	-0.0065 (0.019)	0.050*** (0.012)	0.0018 (0.0076)	-0.016** (0.0079)	0.020 (0.028)
Greylisted $\times (i \text{ exposed})$	-0.0042 (0.022)	0.027** (0.011)	0.040** (0.016)	0.058 (0.046)	-0.25* (0.14)	-0.019 (0.015)	-0.12 (0.087)	-0.16** (0.067)
Test of combined effect - p value	0.099	0.087	0.099	0.36	0.15	0.53	0.087	0
i is US dependent^c								
Country j greylisted	0.080*** (0.030)	0.017 (0.018)	0.035 (0.028)	0.011 (0.024)	-0.100 (0.11)	-0.0048 (0.019)	-0.092 (0.061)	-0.057*** (0.015)
Greylisted $\times (i \text{ dependent})$	-0.093*** (0.033)	0.052 (0.059)	-0.15** (0.071)	-0.089 (0.082)	0.074 (0.11)	-0.086 (.)	0.034 (0.067)	0.018 (0.040)
Test of combined effect - pvalue	0.81	0.23	0.13	0.37	0.23	0	0	0.20
country f.e.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
period f.e.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
country trends	No	No	Yes	Yes	No	No	Yes	Yes
adjusted R^2								
# countries	206	206	206	137	206	206	206	137
Obs	88435	88435	188472	81716	88746	88746	188961	81607

Note: ^a in 2004. ^b = 75th percentile or higher in number of actions taken in 2004 INCSR annual report. ^c = 50% or more of total messages were sent/received by the US.

Table 7: Effect of greylisting on links to/from specific countries - annual results

	Sent by j				Received by j			
No interaction								
Country j greylisted	0.0072 (0.0053)	-0.00058 (0.0063)	0.0050 (0.0034)	0.0047 (0.0047)	-0.0041 (0.0042)	-0.0088* (0.0049)	0.0011 (0.0023)	0.0012 (0.0026)
i is the USA								
Country j greylisted	0.0071 (0.0053)	-0.00098 (0.0064)	0.0049 (0.0034)	0.0047 (0.0047)	-0.0043 (0.0042)	-0.0090* (0.0050)	0.0010 (0.0026)	0.0011 (0.0026)
Greylisted $\times (i = \text{USA})$	0.026*** (0.0043)	0.054*** (0.011)	0.027*** (0.0034)	0.0062 (0.0053)	0.026*** (0.00015)	0.028*** (0.010)	0.022*** (0.00087)	0.012** (0.0050)
Test of combined effect - p value	0	0	0	0	0	0.075	0	0.055
i is a FATF member^a								
Country j greylisted	0.011** (0.0051)	0.00043 (0.0067)	0.0058* (0.0034)	0.0052 (0.0048)	-0.00100 (0.0042)	-0.0069 (0.0052)	0.0022 (0.0020)	0.0028 (0.0026)
Greylisted $\times (i = \text{FATF member})$	-0.024** (0.0093)	-0.0070 (0.011)	-0.0052 (0.0056)	-0.0030 (0.0060)	-0.020* (0.011)	-0.013 (0.012)	-0.0071 (0.0060)	-0.011** (0.0046)
Test of combined effect - p value	0.23	0.54	0.92	0.75	0.058	0.067	0.44	0.091
i has high INCSR rating^b								
Country j greylisted	0.0027 (0.0038)	0.0074** (0.0036)	0.0066 (0.0043)	0.0056 (0.0052)	0.0037 (0.0025)	0.0028 (0.0026)	0.0036 (0.0025)	0.0036 (0.0031)
Greylisted $\times (i \text{ has high rating})$	-0.010** (0.0040)	-0.0050 (0.0043)	-0.0056 (0.0041)	-0.0039 (0.0056)	-0.012** (0.0057)	-0.0059 (0.0043)	-0.0087** (0.0044)	-0.011* (0.0059)
Test of combined effect - p value	0.17	0.63	0.82	0.78	0.15	0.43	0.23	0.15
i has bank exposed to US reg^a								
Country j greylisted	0.0048* (0.0027)	0.0074** (0.0031)	0.0066** (0.0031)	0.0066 (0.0041)	0.0015 (0.0027)	0.0035 (0.0024)	0.0017 (0.0023)	0.00024 (0.0031)
Greylisted $\times (i \text{ has bank exposed to US reg})$	-0.018** (0.0080)	-0.0044 (0.0072)	-0.0066 (0.0061)	-0.0063 (0.0070)	-0.0043 (0.0055)	-0.0070 (0.0063)	-0.00018 (0.0064)	0.0034 (0.0080)
Test of combined effect - p value	0.13	0.67	0.99	0.97	0.57	0.53	0.80	0.59
i is US dependent^c								
Country j greylisted	-0.000084 (0.0042)	0.0064* (0.0039)	0.0058 (0.0039)	0.0064 (0.0053)	-0.00046 (0.0030)	0.0020 (0.0026)	0.00086 (0.0027)	0.0024 (0.0031)
Greylisted $\times (i \text{ is US dependent})$	0.0015 (0.0042)	-0.00048 (0.0042)	-0.0015 (0.0040)	-0.0039 (0.0051)	0.0037 (0.0040)	-0.0028 (0.0039)	0.00034 (0.0041)	-0.0038 (0.0056)
Test of combined effect - p value	0.74	0.089	0.30	0.66	0.31	0.81	0.74	0.75
country f.e.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
period f.e.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
country trends	No	No	Yes	Yes	No	No	Yes	Yes
adjusted R^2	0.89	0.91	0.88	0.88	0.89	0.91	0.88	0.88
# countries	206	206	206	137	206	206	206	137
Obs	274186	274186	493935	200027	274186	274186	493935	200027

Note: ^a in 2004. ^b = 75th percentile or higher in number of actions taken in 2004 INCSR annual report. ^c = 50% or more of total messages were sent/received by the US.

5.3 Does greylisting change the route that payment messages take to or from high-risk countries?

Our motivation for using Specification (3) was to investigate whether ‘third party’ countries were more likely to pass messages from greylisted countries onward to countries with strong AML/CFT institutions, under the assumption that the result from Specification 2 would reveal that countries with strong institutions would reduce their direct exposure to high risk countries. The results in the previous section suggest that this is not the case - that it is actually countries with weaker AML/CFT institutions that are more likely to reduce their exposure to greylisted jurisdictions.

Regardless, we present results from Specification (3), both because we pre-specified its inclusion, but also because the estimates are interesting even if we have no strong evidence for de-risking along certain country characteristics. Table 9 show the results from estimating Specification (3) when the outcome of interest is the number messages sent from a given country j and the explanatory variables of interest are the number of messages sent to j from ever-greylisted countries (and its interaction with the number of currently-greylisted countries). We use OLS here for ease of interpretation (Poisson estimates are available in Tables 22 and 23 in the Appendix). We find significant interaction effects when I is defined as being members of FATF in 2004 or countries which were above the 75th percentile in INCSR ratings: when no countries are included on the greylist, every message received from a (soon to be) greylisted country is correlated with 3.4 and 1.6 messages passed on to members of FATF and INCSR ‘darlings’, respectively. With every country that is added to the FATF greylist, the correlation between every message received from ever-greylisted countries and those passed on to FATF and INCSR members increases by 0.06 and 0.122 messages, respectively. However, while these results are robust to the Poisson specification, they disappear when we include country trends. Given that we have already found that greylisted countries might increase their number of sent messages, this could just be picking up that increase in output across the entire payments network.

We perform the same exercise, this time examining payments in the other direction: the correlation between payments sent from countries listed in I (e.g. the US, FATF countries, etc) to a given country j and the number of payments sent on to ever-greylisted countries. Here, we find no robust evidence that third party countries are more likely to pass payments on to greylisted countries as they become greylisted, which is consistent with our previous results that greylisted countries see a drop in overall payments received.

6 Discussion and conclusion

Since the creation of the Financial Action Task Force in 1989, anti-money laundering and counter the financing of terrorism (AML/CFT) policy has grown from a collection of national policies into a global regime. In more recent years, that regime has developed significantly more influence on the decisions that banks and governments around the world make concerning which customers or jurisdictions can be trusted and which require further scrutiny. The combination of large scale fines, higher compliance costs and international naming-and-shaming has - anecdotally - led many banks to withdraw from certain lines of business or geographic areas, to the potential detriment of cross-border economic activity. However, to date, this issue of ‘de-risking’ has received little in the way of empirical analysis, making it difficult to know whether it has become a substantial problem.

This paper is one of the first attempts to bring real data to the question. Using proprietary data provided by SWIFT, we have examined how cross-border payment messages to and from

Table 8: Impact of greylisting on number of messages passed on from greylisted countries to specific classes of countries by intermediaries

	I = USA		FATF member		INCSR darling		Exposed Bank		US Dependent	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
# $K \rightarrow j$ messages	-0.0590 (0.864)	0.121 (0.345)	2.963 (3.924)	3.427 (2.178)	5.390*** (1.726)	1.659 (1.190)	17.48*** (0.521)	18.08*** (0.515)	5.622*** (1.260)	6.023*** (1.234)
(# $K \rightarrow j$) \times (# greylisted)	-0.00761 (0.0155)	0.000731 (0.00374)	0.171*** (0.0317)	0.0594* (0.0340)	0.237*** (0.0450)	0.122*** (0.0418)	0.0157 (0.0172)	0.0133 (0.0313)	0.00953 (0.0105)	-0.000888 (0.00657)
# other $\rightarrow j$ messages	0.0615 (0.0538)	0.0544** (0.0239)	1.625*** (0.646)	0.920* (0.501)	1.293* (0.728)	3.104*** (1.184)	0.832** (0.334)	0.714*** (0.263)	0.0164 (0.0445)	-0.0619 (0.0627)
(# other $\rightarrow j$) \times (# greylisted)	0.00125 (0.00101)	0.000250 (0.000334)	0.0115 (0.00764)	0.0113** (0.00509)	-0.0284* (0.0166)	-0.0180 (0.0158)	-0.00119 (0.00609)	0.000641 (0.0106)	-0.00153* (0.000781)	-0.000744** (0.000356)
country f.e.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
period f.e.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
country trends		Yes		Yes		Yes		Yes		Yes
country controls										
adjusted R^2	0.921	0.958	0.961	0.971	0.964	0.976	0.999	0.999	0.991	0.993
# countries	168	168	138	138	115	115	122	122	136	136
Obs	1795	1795	1465	1465	1221	1221	1296	1296	1443	1443

Outcome = # of messages sent by intermediary j to country in classification I . (# $K \rightarrow j$ messages) = number of messages sent to intermediary country j by all countries that will ever be greylisted. (# greylisted) = number of countries in K that are greylisted in current period. (# other $\rightarrow j$ messages) = number of messages sent to intermediary country by all others in sample outside of K . Standard errors are clustered at the country level, * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 9: Impact of greylisting on number of messages passed to greylisted countries from specific classes of countries by intermediaries

	I = USA			FATF member			INCSR darling			Exposed Bank			US Dependent		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)					
# $j \rightarrow K$ messages	-0.0787 (0.0754)	-0.00937 (0.0143)	0.0690** (0.0288)	-0.0140 (0.0200)	-0.137 (0.136)	-0.400** (0.169)	12.96*** (0.882)	13.19*** (1.239)	0.448 (0.315)	0.248 (0.293)					
(# $j \rightarrow K$) \times (# greylisted)	-0.00580 (0.00602)	-0.000788 (0.00127)	-0.00504*** (0.00179)	-0.000845 (0.000527)	0.00188 (0.00478)	0.00577 (0.00389)	-0.00627 (0.0111)	0.0157 (0.0111)	0.0215*** (0.00535)	0.0147** (0.00710)					
Sent to all other countries by j	0.132** (0.0596)	0.0672*** (0.0194)	0.148 (0.406)	0.470 (0.490)	2.119 (1.314)	5.524*** (2.018)	0.527 (0.849)	0.908 (1.023)	0.148* (0.0871)	0.156 (0.101)					
(# $j \rightarrow \text{other}$) \times (# greylisted)	0.000686 (0.000504)	0.000240 (0.000156)	0.0287*** (0.00843)	0.00803** (0.00394)	-0.0115 (0.0237)	-0.0295 (0.0214)	-0.00167 (0.00717)	-0.0137* (0.00823)	-0.00174* (0.00104)	-0.00121 (0.00114)					
country f.e.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes					
period f.e.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes					
country trends		Yes		Yes		Yes		Yes		Yes					
country controls															
adjusted R^2	0.919	0.973	0.961	0.970	0.932	0.964	0.998	0.999	0.988	0.991					
# countries	168	168	138	138	115	115	122	122	136	136					
Obs	1795	1795	1465	1465	1221	1221	1296	1296	1443	1443					

Outcome = # of messages sent by countries in classification I to intermediary j . (# $j \rightarrow K$ messages) = number of messages sent to all countries that will ever be greylisted by intermediary country j . (# greylisted) = number of countries in K that are greylisted in current period. (# $j \rightarrow \text{other}$ messages) = number of messages sent by intermediary country by all others in sample outside of K . Standard errors are clustered at the country level, * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

countries change when those countries are subject to higher levels of AML/CFT regulatory scrutiny. We find evidence that greylisting by the FATF is consistent with up to a 10% reduction in the number of payments received by an affected country. While we find no consistent evidence that greylisting has similar effects on other observable measures of cross-border flows (trade, remittances and ODA), given the current anecdotal evidence and the size of the effect, there is reason to worry that these reduction in payment flows represent sizable losses for affected countries. Given that greylisted countries are - on average - more likely to be poor, there should be concern that the negative effects of greylisting are being born by those who are least able to bear it.

We do, however, also find that affected countries are no less (and possible more) likely to *send* cross border payments to other countries, despite their status as an AML/CFT pariah. This result is less consistent with the hypothesis that greylisting isolates countries from the international financial system and presents a puzzle we have yet to reconcile with the results on inflows.

Issues of economic impact aside, these results suggest there is more work to be done on assessing both the effectiveness and the efficiency of the global AML/CFT regulatory regime. For those whose aim it is to fight the flow of illicit money around the world without preventing licit money from flowing, then there are a several things to be alarmed about. First, the reduction in payments received by countries subject to greater regulatory scrutiny raises the spectre of potential losses to these countries. Second, that there is either no effect or a positive effect of FATF greylisting on the number of payments leaving a designated country suggests that increased scrutiny may not do much to prevent illicit money from leaving high risk countries and entering the international financial system at large.

However, at present the story appears to be more complex than recent narratives have suggested. We do not find any evidence that countries that have frequently been mentioned as sources of de-risking or sources of pressure to de-risk are the ones where there are substantial declines payment flows to and from greylisted countries. We find some results of a small degree of consolidation around countries with strong AML/CFT institutions, which suggests that at least some of the increased payments are making their way to countries that are best suited to vet them.

This paper faces several caveats and limitations, ranging from an outcome variable which is an imperfect measure of the value of cross-border transactions, to the assumptions required to obtain causal estimates from a difference in difference specification with country-level trends. As is customary at the end of the paper, we suggest that more research is needed, preferably using even more precise measures of cross-border transactions, not only for bank-to-bank transactions, but also for other measures of cross-border economic activity, such as bilateral remittances and trade finance.

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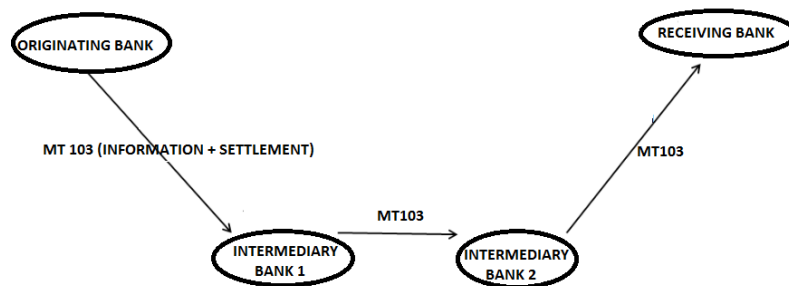
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7 Appendix

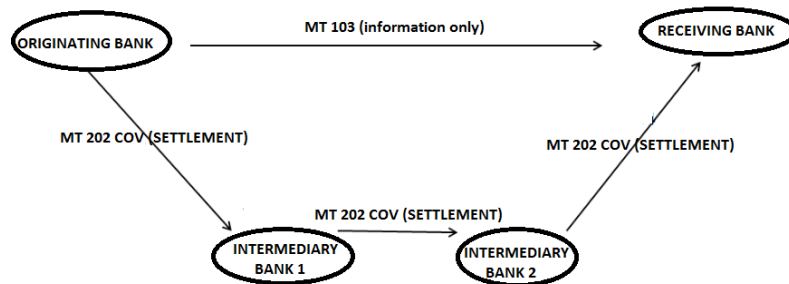
7.1 Extra Graphs

Figure 7: Routing of MT 103 messages when intermediaries/correspondents are involved

(a) Serial method

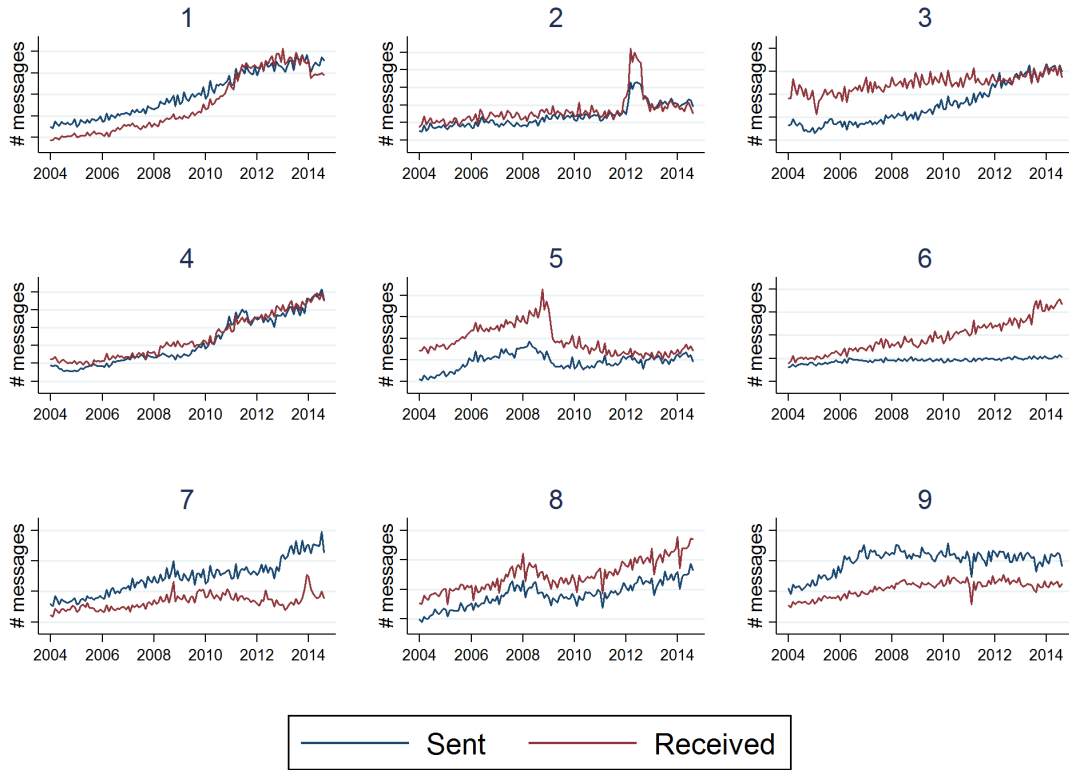


(b) Cover method



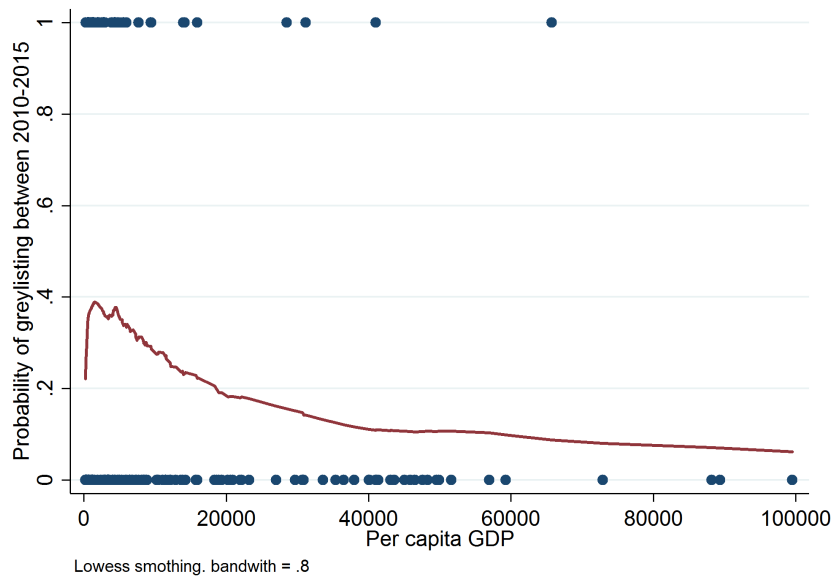
Note: both figures drawn based on CPMI (2016)

Figure 8: Nine randomly-chosen monthly series



Note: Country identifiers and messages totals are hidden to prevent identification.

Figure 9: Per capita GDP in 2010 and the probability of FATF greylisting



7.2 Extra tables

Table 10: Members of FATF as of 2004

Argentina
Australia
Austria
Belgium
Brazil
Canada
China
Denmark
Finland
France
Germany
Greece
Hong Kong
Iceland
India
Ireland
Italy
Japan
Korea, Republic of
Luxembourg
Mexico
Netherlands
New Zealand
Norway
Portugal
Russian Federation
Singapore
South Africa
Spain
Sweden
Switzerland
Turkey
United Kingdom
United States

Table 11: Greylisting status, AML ‘effort’ and bank exposure for sample countries.

Name	Ever greylisted	INCSR AML effort (2004)	# of banks based in US (2004)
Afghanistan	Yes	0.1875	0
Albania	Yes	0.8125	0
Algeria	Yes	0.3125	0
Andorra	No	0.6875	0
Angola	Yes	0.125	0
Anguilla	No	0.8125	0
Antigua and Barbuda	Yes	0.875	0
Argentina	Yes	0.75	4
Armenia	No	0.375	0
Aruba	No	0.8125	0
Australia	No	0.9375	6
Austria	No	0.875	3
Azerbaijan	Yes	0.4375	0
Bahamas	No	0.8125	0
Bahrain	No	0.666667	3
Bangladesh	Yes	0.3125	0
Barbados	No	0.875	0
Belarus	No	0.6875	0
Belgium	No	0.75	8
Belize	No	0.8125	0
Benin	No	0.4375	0
Bermuda	No	0.8125	0
Bhutan	No	0.8125	0
Bolivia, Plurinational State of	Yes	0.5625	1
Bosnia and Herzegovina	No	0.375	0
Botswana	No	0.642857	0
Brazil	No	0.875	11
Brunei Darussalam	Yes	0.571429	0
Bulgaria	No	0.875	0
Burkina Faso	No	0.125	0
Burundi	No	0.1875	0
Cambodia	Yes	0.3125	0
Cameroon	No	0.0625	0
Canada	No	0.9375	63
Cape Verde	No	0.8125	0
Cayman Islands	No	0.875	3
Central African Republic	No	0.8125	0
Chad	No	0.571429	0
Chile	No	0.8125	3
China	No	0.5625	8
Colombia	No	0.625	5
Comoros	No	0.166667	0
Congo	No	0.1875	0
Congo, the Democratic Republic of the	No	0.0625	0
Cook Islands	Yes	0.625	0
Costa Rica	No	0.875	0
Croatia	No	0.9375	0
Cuba	Yes	0.4	0
Cyprus	Yes	0.875	2
Czech Republic	No	0.75	0
Cte d'Ivoire	No	0.6875	0
Denmark	No	0.875	1
Djibouti	No	0.533333	0
Dominica	No	0.8125	0
Dominican Republic	No	0.75	1
Ecuador	Yes	0.4375	2
Egypt	No	0.75	1
El Salvador	No	0.8125	3
Equatorial Guinea	No	0.8125	0
Eritrea	No	0.0625	0
Estonia	No	0.875	0
Ethiopia	Yes	0.1875	0
Fiji	No	0.5625	0
Finland	No	0.875	2
France	No	0.9375	37
Gabon	No	0	0

Note: ever greylisted = country was greylisted between 2004 and mid-2014. INCSR AML effort measures the proportion of possible positive AML actions taken by country as measured in INCSR reports. # banks = number of banks originating in country which have a branch in the US.

Table 12: Greylisting status, AML ‘effort’ and bank exposure for sample countries, continued

Name	Ever greylisted	INCSR AML effort (2004)	# of banks based in US (2004)
Gambia	No	0.3125	0
Georgia	No	0.375	0
Germany	No	0.8125	37
Ghana	Yes	0.6875	0
Gibraltar	No	0.6875	
Greece	Yes	0.8	2
Grenada	No	0.8125	0
Guatemala	No	0.8125	0
Guernsey	No	0.6875	
Guinea	No	0.1875	0
Guinea-Bissau	No	0.0625	0
Guyana	No	0.5	0
Haiti	No	0.5625	0
Honduras	Yes	0.75	0
Hong Kong	No	0.8125	14
Hungary	No	0.8125	0
Iceland	No	0.8125	0
India	No	0.8125	9
Indonesia	Yes	0.5	2
Iran, Islamic Republic of	Yes	0.125	1
Iraq	Yes		0
Ireland	No	0.75	12
Isle of Man	No	0.875	
Israel	No	0.9375	13
Italy	No	0.9375	16
Jamaica	No	0.75	1
Japan	No	0.875	55
Jersey	No	0.75	
Jordan	No	0.5625	1
Kazakhstan	No	0.4	0
Kenya	Yes	0.6	0
Korea, Democratic People’s Republic of	Yes	0	
Korea, Republic of	No	0.6875	17
Kuwait	Yes	0.6875	1
Kyrgyzstan	Yes	0.2	0
Lao People’s Democratic Republic	Yes	0	0
Latvia	No	0.6875	0
Lebanon	No	0.6875	0
Lesotho	No	0.375	0
Liberia	No	0.125	0
Libya	No		0
Liechtenstein	No	0.8125	
Lithuania	No	0.75	0
Luxembourg	No	0.875	2
Macao	No	0.625	0
Macedonia, the Former Yugoslav Republic of	No	0.75	0
Madagascar	No	0.2	0
Malawi	No	0.285714	0
Malaysia	No	0.75	1
Maldives	No	0.214286	0
Mali	No	0.125	0
Malta	No	0.6875	0
Marshall Islands	No	0.8125	0
Mauritania	No		0
Mauritius	No	0.6875	0
Mexico	No	0.875	3
Micronesia, Federated States of	No	0.4375	0
Moldova, Republic of	No	0.75	0
Monaco	No	0.866667	
Mongolia	Yes	0.0625	0
Montenegro	No	0.5625	0
Montserrat	No	0.75	0
Morocco	Yes	0.3125	0
Mozambique	No	0.6875	0
Myanmar	Yes	0.375	0
Namibia	Yes	0.1875	0
Nauru	Yes	0.5625	
Nepal	Yes	0.39	0
Netherlands	No	0.875	24
New Zealand	No	0.9375	0
Nicaragua	Yes	0.5625	0

Table 13: Greylisting status, AML ‘effort’ and bank exposure for sample countries, continued

Name	Ever greylisted	INCSR AML effort (2004)	# of banks based in US (2004)
Niger	No	0.266667	0
Nigeria	Yes	0.8125	1
Niue	No	0.533333	
Norway	No	0.9375	2
Oman	No	0.642857	0
Pakistan	Yes	0.375	5
Palau	No	0.625	0
Palestine, State of	No		0
Panama	Yes	0.9375	2
Papua New Guinea	Yes	0.0625	0
Paraguay	Yes	0.6875	0
Peru	No	0.75	3
Philippines	Yes	0.75	6
Poland	No	0.75	0
Portugal	No	0.875	9
Qatar	Yes	0.75	1
Romania	No	0.6875	1
Russian Federation	No	0.8125	0
Rwanda	No	0.125	0
Saint Kitts and Nevis	No	0.875	0
Saint Lucia	No	0.5625	0
Saint Vincent and the Grenadines	No	0.875	0
Samoa	No	0.75	0
San Marino	No	0.555556	0
Sao Tome and Principe	Yes	0.0625	0
Saudi Arabia	No	0.625	1
Senegal	No	0.333333	0
Serbia	No	0.75	0
Seychelles	No	0.533333	0
Sierra Leone	No	0.2	0
Singapore	No	0.875	5
Slovakia	No	0.875	0
Slovenia	No	0.75	1
Solomon Islands	No	0	0
South Africa	No	0.8125	2
Spain	No	0.9375	13
Sri Lanka	Yes	0.25	0
Sudan	Yes		0
Suriname	No	0.533333	0
Swaziland	No	0.625	0
Sweden	No	0.866667	4
Switzerland	No	0.8125	24
Syrian Arab Republic	Yes	0.1875	0
Taiwan, Province of China	No	0.8	26
Tajikistan	Yes	0.3125	0
Tanzania, United Republic of	Yes	0.666667	0
Thailand	Yes	0.8125	4
Timor-Leste	No	0	0
Togo	No	0.571429	0
Tonga	No	0.5625	0
Trinidad and Tobago	Yes	0.75	0
Tunisia	No	0.375	0
Turkey	Yes	0.75	2
Turkmenistan	Yes	0.25	0
Turks and Caicos Islands	No	0.75	
Uganda	Yes	0.266667	0
Ukraine	Yes	0.6875	0
United Arab Emirates	No	0.75	1
United Kingdom	No	0.875	43
United States	No	0.9375	0
Uruguay	No	0.6875	1
Uzbekistan	Yes	0.625	0
Vanuatu	No	0.75	0
Venezuela, Bolivarian Republic of	Yes	0.75	7
Viet Nam	Yes	0.5	40
Virgin Islands, British	No	0.875	
Yemen	Yes	0.375	0
Zambia	No	0.4375	0
Zimbabwe	Yes	0.1875	0

Table 14: Specification 1, full results, Poisson regression

	Sent					Received				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
FATF greylisting^a										
Monthly - full sample	0.29*** (0.049)	0.074* (0.038)	0.063 (0.040)	0.027 (0.025)	0.028 (0.025)	0.13* (0.067)	-0.11** (0.055)	-0.11** (0.054)	-0.087** (0.042)	-0.078* (0.044)
Monthly - post 2008	0.073** (0.037)	0.037 (0.031)	0.021 (0.028)	0.011 (0.019)	0.028 (0.021)	-0.048 (0.045)	-0.091* (0.047)	-0.091* (0.047)	-0.075*** (0.024)	-0.059** (0.024)
Quarterly - full sample	0.28*** (0.047)	0.074** (0.038)	0.065* (0.038)	0.026 (0.024)	0.027 (0.025)	0.12* (0.065)	-0.11** (0.054)	-0.11** (0.051)	-0.089** (0.046)	-0.084* (0.047)
Quarterly - post 2008	0.084*** (0.032)	0.041 (0.031)	0.022 (0.028)	0.011 (0.017)	0.026 (0.019)	-0.034 (0.046)	-0.094* (0.055)	-0.097* (0.053)	-0.068*** (0.024)	-0.054** (0.024)
Annual - full sample	0.26*** (0.045)	0.080** (0.037)	0.035 (0.044)	0.028 (0.027)	0.018 (0.030)	0.11* (0.062)	-0.092* (0.049)	-0.11*** (0.040)	-0.083** (0.040)	-0.052* (0.027)
Annual - post 2008	0.19*** (0.036)	0.076** (0.036)	0.043 (0.038)	0.025 (0.018)	0.015 (0.019)	0.047 (0.068)	-0.096 (0.067)	-0.11 (0.069)	-0.037*** (0.014)	-0.036*** (0.012)
Subject to sanctions^b										
Monthly - full sample	0.22** (0.094)	0.017 (0.086)	-0.0088 (0.070)	-0.0100 (0.026)	-0.037* (0.020)	0.19*** (0.063)	-0.0060 (0.043)	-0.026 (0.035)	0.034 (0.041)	0.022 (0.034)
Monthly - post 2008	0.100*** (0.038)	0.028 (0.044)	-0.014 (0.034)	-0.063*** (0.023)	-0.079*** (0.023)	0.098** (0.040)	0.031 (0.039)	0.0093 (0.032)	0.0026 (0.016)	-0.017 (0.017)
Quarterly - full sample	0.083 (0.093)	-0.088 (0.093)	-0.11 (0.091)	-0.060 (0.044)	-0.076* (0.039)	0.19*** (0.064)	-0.0098 (0.087)	-0.088 (0.062)	0.055 (0.092)	-0.016 (0.054)
Quarterly - post 2008	0.0059 (0.024)	-0.012 (0.062)	-0.052 (0.052)	-0.069*** (0.021)	-0.081*** (0.020)	0.029 (0.032)	-0.0089 (0.059)	-0.022 (0.048)	-0.012 (0.022)	-0.026 (0.016)
Annual - full sample	-0.043 (0.072)	-0.088 (0.093)	-0.050 (0.099)	-0.056 (0.045)	-0.035 (0.035)	0.075 (0.077)	-0.0098 (0.087)	-0.12 (0.082)	0.058 (0.094)	-0.068 (0.092)
Annual - post 2008	-0.15*** (0.048)	-0.0089 (0.067)	0.031 (0.052)	-0.059** (0.023)	-0.10** (0.050)	-0.11* (0.062)	-0.012 (0.067)	-0.026 (0.082)	0.00037 (0.028)	0.0043 (0.028)
INCSR rating^c										
Monthly - full sample	0.060 (0.41)	-0.15*** (0.033)	-0.097** (0.038)	-0.036 (0.023)	-0.00012 (0.032)	0.10 (0.43)	-0.14*** (0.029)	-0.11*** (0.027)	-0.11*** (0.025)	-0.12*** (0.033)
Monthly - post 2008	-0.086 (0.13)	-0.097*** (0.024)	-0.049* (0.029)	0.041*** (0.013)	0.037** (0.016)	-0.11 (0.14)	-0.14*** (0.021)	-0.12*** (0.023)	0.015 (0.021)	-0.0094 (0.012)
Quarterly - full sample	0.046 (0.38)	-0.15*** (0.032)	-0.096** (0.038)	-0.028 (0.023)	0.0020 (0.032)	0.087 (0.39)	-0.13*** (0.029)	-0.11*** (0.027)	-0.11*** (0.027)	-0.12*** (0.035)
Quarterly - post 2008	-0.091 (0.097)	-0.096*** (0.024)	-0.050* (0.029)	0.059*** (0.016)	0.041*** (0.016)	-0.12 (0.10)	-0.14*** (0.022)	-0.12*** (0.024)	0.031 (0.029)	-0.0096 (0.013)
Annual - full sample	0.033 (0.28)	-0.15*** (0.032)	-0.093 (0.058)	-0.028 (0.023)	-0.019 (0.018)	0.067 (0.30)	-0.13*** (0.029)	-0.17*** (0.046)	-0.11*** (0.027)	-0.10*** (0.036)
Annual - post 2008	-0.068 (0.063)	-0.11*** (0.026)	-0.15*** (0.048)	0.057*** (0.016)	0.076*** (0.025)	-0.099 (0.065)	-0.15*** (0.023)	-0.19*** (0.040)	0.024 (0.027)	-0.00042 (0.019)
country f.e.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
period f.e.		Yes	Yes	Yes	Yes		Yes	Yes	Yes	Yes
country trends			Yes	Yes	Yes			Yes	Yes	Yes
controls			Yes		Yes			Yes		Yes

Note: Each cell displays an estimate of θ from Specification (1) in Section 4. Bold headings indicate the treatment being used. Subsequent rows indicate the period and sample being used. Each column introduces different levels of controls, which are described at the bottom of the table. ^atreatment is greylisting by the FATF. ^bcountry is subject to US, EU or UN sanctions. ^ccontinuous measure of percentage of AML policy actions listed by INCSR that a country has taken, updated with the release of the INCSR report. Standard errors clustered at the country level, * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 15: Specification 1, full results, OLS regression

	Sent					Received				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
FATF greylisting^a										
Monthly - full sample	9.86*** (3.08)	-29.6** (13.8)	-9.39 (10.1)	0.83 (1.58)	-0.17 (2.18)	6.89 (4.24)	-32.7*** (12.6)	-12.5 (9.95)	-5.54* (3.04)	-6.16 (3.94)
Monthly - post 2008	2.68* (1.41)	-7.94* (4.33)	-7.28 (6.30)	-3.28* (1.92)	-0.83 (1.58)	-2.41 (2.43)	-13.2*** (4.64)	-11.4* (6.59)	-7.83*** (2.59)	-5.14** (2.28)
Quarterly - full sample	27.9*** (8.52)	-83.8** (39.4)	-26.1 (28.4)	-3.94 (6.34)	-3.49 (7.03)	19.0 (11.9)	-93.1*** (35.7)	-35.6 (28.0)	-21.4** (10.2)	-21.5* (12.6)
Quarterly - post 2008	9.11** (3.82)	-24.3* (13.2)	-25.6 (18.3)	-22.8** (10.3)	-16.5 (11.0)	-5.01 (7.10)	-39.0*** (14.4)	-36.8* (19.4)	-34.0*** (11.0)	-26.8** (11.6)
Annual - full sample	98.0*** (28.9)	-271.9** (137.8)	-241.9 (153.1)	-49.6 (51.1)	-54.8 (62.4)	65.3 (41.6)	-306.6** (123.8)	-300.9* (158.2)	-105.1* (57.5)	-112.4 (74.5)
Annual - post 2008	76.9*** (23.2)	-99.5 (75.0)	-128.4 (103.4)	-202.2** (101.7)	-228.9 (151.2)	25.8 (38.7)	-154.0* (79.0)	-160.6 (102.6)	-207.7** (99.2)	-216.2 (145.3)
Subject to sanctions^b										
Monthly - full sample	20.9 (19.0)	-5.94 (24.3)	-8.95 (28.6)	-2.26 (2.11)	-5.59* (3.27)	18.1* (9.66)	-8.53 (15.2)	-11.2 (20.6)	1.91 (3.96)	-1.02 (4.49)
Monthly - post 2008	14.4 (13.5)	2.28 (15.2)	-8.42 (19.7)	-12.6 (9.91)	-14.0 (11.1)	13.4 (8.72)	1.32 (10.7)	-8.53 (16.0)	-1.61 (2.35)	-3.16 (3.68)
Quarterly - full sample	6.22 (8.31)	-35.6 (28.4)	-68.4 (49.2)	-7.10 (6.80)	-9.06 (9.25)	15.2** (6.35)	-26.3 (27.8)	-60.5 (46.0)	3.06 (7.75)	-0.14 (8.74)
Quarterly - post 2008	0.81 (3.60)	-26.9 (18.4)	-19.7 (24.8)	-34.1 (22.4)	-38.0 (23.8)	3.86 (4.30)	-23.7 (18.4)	-11.1 (24.0)	-16.6* (9.13)	-19.9** (7.92)
Annual - full sample	-13.2 (22.0)	-110.6 (88.7)	-143.8 (174.7)	-44.0 (73.0)	-28.1 (112.2)	23.9 (23.3)	-72.3 (88.0)	-108.8 (164.2)	14.5 (48.0)	16.5 (82.0)
Annual - post 2008	-75.0 (55.3)	-63.6 (64.2)	-56.6 (139.3)	-249.9 (200.5)	-337.2 (302.2)	-52.9 (43.4)	-40.8 (55.7)	-49.9 (131.0)	-141.0 (103.0)	-207.4 (182.3)
INCSR rating^c										
Monthly - full sample	9.74 (60.8)	-447.6 (304.2)	-476.0 (347.6)	-54.3 (42.9)	-62.5 (50.0)	16.0 (57.7)	-421.5 (279.0)	-445.5 (319.3)	-83.2 (73.9)	-97.9 (86.9)
Monthly - post 2008	-28.3 (64.8)	-313.4 (225.1)	-353.5 (253.4)	-27.4* (16.0)	-19.1 (16.2)	-33.6 (68.4)	-329.3 (236.6)	-367.9 (267.2)	-40.2 (27.6)	-36.0 (31.6)
Quarterly - full sample	22.2 (170.0)	-1256.1 (856.6)	-1335.4 (975.1)	-63.8 (55.1)	-70.1 (62.0)	41.2 (160.6)	-1176.3 (780.1)	-1243.0 (889.6)	-156.8 (154.4)	-185.4 (180.8)
Quarterly - post 2008	-90.1 (165.4)	-772.5 (566.2)	-870.6 (630.4)	-173.3 (121.1)	-149.4 (135.0)	-109.4 (178.9)	-830.3 (610.6)	-926.8 (682.5)	-209.8 (157.7)	-199.1 (178.7)
Annual - full sample	63.2 (500.8)	-3735.3 (2589.6)	-4845.1 (3248.0)	166.9 (261.4)	346.7 (280.7)	124.0 (472.4)	-3480.2 (2339.3)	-4601.2 (2969.0)	-228.7 (255.9)	-192.3 (344.1)
Annual - post 2008	-228.3 (377.8)	-1873.8 (1457.5)	-2545.1 (1837.6)	-1772.5 (1339.2)	-1951.1 (1768.1)	-315.6 (435.5)	-2141.4 (1660.0)	-2887.5 (2107.9)	-1915.8 (1471.2)	-2158.0 (1960.4)
country f.e.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
period f.e.		Yes	Yes	Yes	Yes		Yes	Yes	Yes	Yes
country trends				Yes	Yes				Yes	Yes
controls			Yes		Yes			Yes		Yes

Note: Each cell displays an estimate of θ from Specification (1) in Section 4. Effect sizes are in thousands of messages. Bold headings indicate the treatment being used. Subsequent rows indicate the period and sample being used. Each column introduces different levels of controls, which are described at the bottom of the table. ^atreatment is greylisting by the FATF. ^bcountry is subject to US, EU or UN sanctions. ^ccontinuous measure of percentage of AML policy actions listed by INCSR that a country has taken, updated with the release of the INCSR report. Standard errors clustered at the country level, * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 16: Testing leads/lags of greylisting - Poisson regression

	Messages sent			Messages received		
	(1) Month	(2) Quarter	(3) Year	(4) Month	(5) Quarter	(6) Year
2 period(s) before	-0.0292 (0.0426)	-0.0634 (0.0548)	0.00541 (0.0774)	0.0212 (0.0480)	0.0791 (0.0497)	0.0872* (0.0479)
1 period(s) before	-0.0224 (0.0405)	-0.0472 (0.0581)	-0.0464 (0.0845)	0.0355 (0.0686)	0.0158 (0.0603)	0.148** (0.0721)
Greylisting period	-0.0291 (0.0469)	-0.0220 (0.0546)	0.00149 (0.0760)	0.0564 (0.0560)	0.00234 (0.0604)	0.101* (0.0531)
1 period(s) after	-0.00172 (0.0450)	-0.0221 (0.0548)	0.0519 (0.0739)	0.0145 (0.0547)	-0.0147 (0.0532)	0.0329 (0.0468)
2 period(s) after	-0.0217 (0.0431)	-0.0194 (0.0479)	0.0664 (0.0718)	-0.0217 (0.0449)	-0.0117 (0.0527)	-0.0660 (0.0611)
3 period(s) after	-0.0304 (0.0446)	-0.00499 (0.0481)	0.106 (0.0745)	-0.00966 (0.0414)	-0.0414 (0.0475)	-0.0995 (0.0844)
4 period(s) after	-0.00109 (0.0461)	0.0126 (0.0484)	0.189** (0.0840)	-0.0168 (0.0422)	-0.0671 (0.0524)	-0.110 (0.147)
More than 4 periods after	0.0461 (0.0340)	0.0562 (0.0449)	0.245*** (0.0823)	-0.105* (0.0542)	-0.116 (0.0744)	-0.576*** (0.0828)
country f.e.	Yes	Yes	Yes	Yes	Yes	Yes
period f.e.	Yes	Yes	Yes	Yes	Yes	Yes
adjusted R^2						
# countries	223	223	223	223	223	223
Obs	13446	4629	1325	13446	4629	1325

Greylisted = country is currently included in FATF's list of high risk jurisdiction. Each variable indicates a year relative to the greylisting period for a greylisted country. Periods used are indicated at the top of every column. Messages indicate the total number of MT103 messages sent to/from the country each period. Standard errors are clustered at the country level, * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 17: Specification 1, number of links - OLS

	Sent					Received				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
FATF greylisting^a										
Monthly - full sample	-2.01** (0.83)	0.22 (0.88)	-0.42 (0.86)	0.42 (0.55)	0.52 (0.58)	-3.05*** (0.81)	-0.83 (0.77)	-1.22 (0.76)	0.18 (0.34)	0.27 (0.35)
Monthly - post 2008	-0.71 (0.49)	-0.23 (0.48)	-0.32 (0.49)	0.40 (0.34)	0.47 (0.34)	-0.47 (0.30)	0.060 (0.30)	0.015 (0.30)	0.028 (0.21)	0.069 (0.22)
Quarterly - full sample	-2.37*** (0.86)	0.34 (0.91)	-0.17 (0.87)	0.56 (0.58)	0.60 (0.61)	-3.19*** (0.80)	-0.85 (0.76)	-1.10 (0.68)	0.066 (0.35)	0.19 (0.36)
Quarterly - post 2008	-0.83 (0.55)	-0.25 (0.53)	-0.30 (0.52)	0.55 (0.37)	0.63* (0.37)	-0.60* (0.31)	-0.025 (0.31)	-0.058 (0.32)	-0.18 (0.24)	-0.16 (0.25)
Annual - full sample	-2.37*** (0.88)	0.46 (0.94)	-0.20 (0.93)	0.52 (0.61)	0.60 (0.66)	-3.31*** (0.75)	-0.79 (0.72)	-1.20 (0.76)	-0.19 (0.38)	-0.14 (0.37)
Annual - post 2008	-1.56** (0.65)	-0.54 (0.63)	-0.24 (0.59)	0.19 (0.52)	0.14 (0.57)	-1.03*** (0.36)	-0.18 (0.37)	-0.30 (0.39)	-0.50 (0.35)	-0.63* (0.36)
Subject to sanctions^b										
Monthly - full sample	-1.40 (2.78)	0.22 (2.27)	0.29 (2.36)	0.21 (0.92)	0.019 (0.83)	-1.94 (1.71)	-0.23 (1.13)	-0.35 (1.12)	-0.67 (0.56)	-0.51 (0.48)
Monthly - post 2008	-0.77 (0.57)	0.057 (0.74)	-0.12 (0.73)	-1.17** (0.59)	-1.17* (0.60)	-1.33*** (0.20)	-0.46 (0.29)	-0.50 (0.31)	-0.92*** (0.31)	-0.94*** (0.33)
Quarterly - full sample	-4.51*** (1.42)	-3.66*** (1.22)	-3.88*** (1.38)	-0.86 (1.10)	-0.21 (1.12)	-4.28** (2.10)	-3.41* (1.96)	-3.59 (2.21)	-0.94 (0.57)	-0.52 (0.61)
Quarterly - post 2008	-2.45* (1.34)	-1.56 (1.25)	-1.92 (1.29)	0.14 (0.68)	0.017 (0.69)	-1.84 (1.29)	-0.95 (1.22)	-1.20 (1.25)	-0.054 (0.56)	-0.078 (0.59)
Annual - full sample	-4.68*** (1.43)	-3.60*** (1.23)	-3.12* (1.71)	-1.10 (1.34)	-0.47 (1.27)	-4.35** (2.00)	-3.34* (1.88)	-4.20 (2.57)	-0.97 (0.60)	-0.18 (0.70)
Annual - post 2008	-2.54 (1.55)	-1.41 (1.46)	-0.96 (1.52)	0.93 (1.30)	0.43 (1.50)	-2.23 (1.42)	-1.21 (1.37)	-1.26 (1.67)	0.33 (1.09)	-0.26 (1.22)
INCSR rating^c										
Monthly - full sample	-5.28*** (1.35)	1.74 (2.42)	2.07 (2.72)	-0.70 (1.16)	-0.21 (1.14)	-5.69*** (1.04)	5.73*** (1.98)	5.67*** (2.15)	0.42 (0.68)	0.40 (0.78)
Monthly - post 2008	-2.62*** (0.89)	-0.22 (1.30)	-0.30 (1.46)	1.04 (0.87)	1.44 (0.90)	-2.77*** (0.74)	1.70* (0.94)	1.78* (1.05)	0.094 (0.68)	0.17 (0.76)
Quarterly - full sample	-5.78*** (1.42)	1.99 (2.57)	2.21 (2.85)	-0.64 (1.22)	-0.15 (1.21)	-6.03*** (1.07)	6.08*** (2.11)	5.81** (2.25)	0.53 (0.71)	0.58 (0.82)
Quarterly - post 2008	-3.29*** (0.96)	0.014 (1.44)	0.058 (1.61)	1.13 (0.98)	1.58 (1.01)	-3.16*** (0.78)	2.11** (1.04)	2.22* (1.16)	0.20 (0.65)	0.41 (0.71)
Annual - full sample	-6.56*** (1.48)	3.06 (2.75)	2.80 (3.35)	-0.38 (1.30)	-0.63 (1.34)	-6.47*** (1.13)	6.69*** (2.20)	5.52** (2.63)	0.68 (0.79)	0.42 (0.95)
Annual - post 2008	-4.06*** (1.07)	0.66 (1.62)	0.25 (1.97)	1.19 (1.18)	1.42 (1.34)	-3.71*** (0.80)	2.43** (1.10)	1.92 (1.42)	0.68 (0.69)	0.77 (0.85)
country f.e.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
period f.e.		Yes	Yes	Yes	Yes		Yes	Yes	Yes	Yes
country trends				Yes	Yes				Yes	Yes
controls			Yes		Yes			Yes		Yes

Note: Each cell displays an estimate of θ from Specification (1) in Section 4. Effect sizes are in number of sending/receiving partners. Bold headings indicate the treatment being used. Subsequent rows indicate the period and sample being used. Each column introduces different levels of controls, which are described at the bottom of the table. ^atreatment is greylisting by the FATF. ^bcountry is subject to US, EU or UN sanctions. ^ccontinuous measure of percentage of AML policy actions listed by INCSR that a country has taken, updated with the release of the INCSR report. Standard errors clustered at the country level, * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 18: Specification 1, number of links - Poisson

	Sent					Received				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
FATF greylisting^a										
Monthly - full sample	-0.061** (0.026)	-0.018 (0.026)	-0.026 (0.026)	0.0049 (0.016)	0.010 (0.017)	-0.073*** (0.019)	-0.029 (0.019)	-0.033* (0.019)	0.0027 (0.0086)	0.0056 (0.0092)
Monthly - post 2008	-0.022 (0.015)	-0.013 (0.015)	-0.014 (0.016)	0.011 (0.0095)	0.015 (0.0099)	-0.012 (0.0077)	-0.0022 (0.0075)	-0.0027 (0.0078)	0.00065 (0.0050)	0.0015 (0.0053)
Quarterly - full sample	-0.061** (0.025)	-0.016 (0.026)	-0.020 (0.025)	0.0084 (0.016)	0.012 (0.017)	-0.073*** (0.019)	-0.029 (0.018)	-0.031* (0.017)	0.00046 (0.0087)	0.0033 (0.0092)
Quarterly - post 2008	-0.024 (0.017)	-0.015 (0.016)	-0.015 (0.016)	0.014 (0.0097)	0.018* (0.010)	-0.015* (0.0079)	-0.0046 (0.0076)	-0.0052 (0.0079)	-0.0045 (0.0055)	-0.0044 (0.0058)
Annual - full sample	-0.066*** (0.025)	-0.016 (0.025)	-0.013 (0.024)	0.0055 (0.016)	0.0087 (0.015)	-0.074*** (0.017)	-0.028* (0.016)	-0.030* (0.016)	-0.0055 (0.0090)	-0.0037 (0.0076)
Annual - post 2008	-0.044** (0.019)	-0.027 (0.018)	-0.013 (0.016)	0.0038 (0.012)	0.0055 (0.014)	-0.024*** (0.0089)	-0.0093 (0.0088)	-0.012 (0.0086)	-0.011 (0.0072)	-0.016** (0.0072)
Subject to sanctions^b										
Monthly - full sample	-0.027 (0.057)	0.0015 (0.043)	0.0057 (0.043)	0.0068 (0.016)	0.0028 (0.014)	-0.032 (0.030)	0.000082 (0.015)	-0.0030 (0.015)	-0.0077 (0.0086)	-0.0053 (0.0070)
Monthly - post 2008	-0.016 (0.012)	0.0018 (0.015)	-0.00049 (0.015)	-0.024** (0.011)	-0.023** (0.011)	-0.021*** (0.0036)	-0.0043 (0.0042)	-0.0057 (0.0043)	-0.013** (0.0056)	-0.014** (0.0060)
Quarterly - full sample	-0.16*** (0.045)	-0.13*** (0.042)	-0.14*** (0.047)	-0.036 (0.036)	-0.018 (0.037)	-0.12** (0.058)	-0.097* (0.055)	-0.11* (0.062)	-0.033** (0.015)	-0.025 (0.017)
Quarterly - post 2008	-0.087* (0.046)	-0.063 (0.045)	-0.069 (0.045)	0.032 (0.030)	0.028 (0.030)	-0.051 (0.033)	-0.029 (0.031)	-0.033 (0.031)	0.023 (0.028)	0.023 (0.028)
Annual - full sample	-0.16*** (0.041)	-0.12*** (0.039)	-0.12** (0.053)	-0.040 (0.040)	-0.033 (0.040)	-0.12** (0.052)	-0.090* (0.050)	-0.11 (0.073)	-0.031** (0.012)	-0.017 (0.018)
Annual - post 2008	-0.086* (0.051)	-0.056 (0.050)	-0.046 (0.053)	0.056 (0.047)	0.047 (0.052)	-0.060* (0.036)	-0.035 (0.034)	-0.043 (0.045)	0.034 (0.044)	0.027 (0.051)
INCSR rating^c										
Monthly - full sample	-0.13*** (0.034)	-0.043 (0.042)	-0.035 (0.047)	-0.015 (0.025)	-0.0019 (0.022)	-0.13*** (0.024)	0.034 (0.051)	0.037 (0.056)	0.013 (0.015)	0.010 (0.015)
Monthly - post 2008	-0.061*** (0.022)	-0.028 (0.022)	-0.025 (0.023)	0.025 (0.018)	0.031* (0.019)	-0.062*** (0.018)	0.0033 (0.021)	0.0064 (0.023)	0.0049 (0.015)	0.0058 (0.015)
Quarterly - full sample	-0.14*** (0.034)	-0.043 (0.044)	-0.030 (0.049)	-0.018 (0.025)	-0.0060 (0.023)	-0.14*** (0.024)	0.035 (0.053)	0.039 (0.057)	0.0099 (0.015)	0.0087 (0.015)
Quarterly - post 2008	-0.074*** (0.023)	-0.031 (0.024)	-0.025 (0.025)	0.026 (0.019)	0.032 (0.020)	-0.068*** (0.019)	0.0052 (0.023)	0.0090 (0.025)	0.0055 (0.013)	0.0088 (0.013)
Annual - full sample	-0.16*** (0.035)	-0.034 (0.049)	-0.036 (0.050)	-0.0081 (0.025)	-0.015 (0.024)	-0.14*** (0.024)	0.041 (0.056)	0.016 (0.049)	0.017 (0.017)	0.0090 (0.016)
Annual - post 2008	-0.090*** (0.026)	-0.030 (0.027)	-0.043 (0.028)	0.028 (0.021)	0.024 (0.022)	-0.080*** (0.019)	0.0051 (0.025)	-0.012 (0.023)	0.017 (0.013)	0.015 (0.014)
country f.e.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
period f.e.		Yes	Yes	Yes	Yes		Yes	Yes	Yes	Yes
country trends				Yes	Yes				Yes	Yes
controls			Yes		Yes			Yes		Yes

Note: Each cell displays an estimate of θ from Specification (1) in Section 4. Bold headings indicate the treatment being used. Subsequent rows indicate the period and sample being used. Each column introduces different levels of controls, which are described at the bottom of the table. ^atreatment is greylisting by the FATF. ^bcountry is subject to US, EU or UN sanctions. ^ccontinuous measure of percentage of AML policy actions listed by INCSR that a country has taken, updated with the release of the INCSR report. Standard errors clustered at the country level, * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 19: The effect of FATF blacklisting on trade outcomes (Poisson)

	Imports					Exports				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
FATF greylisting^a										
Monthly - full sample	0.41*** (0.039)	0.16*** (0.040)	0.15*** (0.039)	0.017 (0.021)	0.0075 (0.020)	0.31*** (0.050)	0.022 (0.055)	0.015 (0.055)	-0.042 (0.032)	-0.054* (0.030)
Monthly - post 2008	0.040** (0.020)	0.041** (0.021)	0.027 (0.023)	0.023 (0.021)	0.035*** (0.012)	0.058* (0.034)	-0.054** (0.021)	-0.052** (0.021)	-0.010 (0.031)	-0.013 (0.031)
Quarterly - full sample	0.40*** (0.043)	0.15*** (0.041)	0.15*** (0.039)	0.013 (0.023)	0.0040 (0.021)	0.30*** (0.054)	0.020 (0.055)	0.022 (0.054)	-0.040 (0.033)	-0.052* (0.030)
Quarterly - post 2008	0.037* (0.021)	0.038* (0.021)	0.022 (0.024)	0.018 (0.023)	0.019* (0.011)	-0.060*** (0.022)	-0.057** (0.022)	-0.014 (0.029)	-0.016 (0.029)	-0.039* (0.023)
Annual - full sample	0.40*** (0.057)	0.16*** (0.047)	0.12*** (0.032)	0.0059 (0.027)	-0.013 (0.024)	0.31*** (0.056)	0.032 (0.057)	-0.0037 (0.037)	-0.0075 (0.030)	-0.017 (0.027)
Annual - post 2008	0.072*** (0.026)	0.056** (0.026)	0.024 (0.029)	0.0035 (0.023)	0.042 (0.030)	0.0011 (0.024)	0.0042 (0.031)	0.050 (0.038)	0.056 (0.038)	0.018 (0.031)
Subject to sanctions^b										
Monthly - full sample	-0.020 (0.049)	-0.038 (0.047)	-0.11*** (0.034)	-0.11*** (0.033)		-0.074 (0.058)	-0.10* (0.059)	0.024 (0.053)	0.042 (0.050)	
Monthly - post 2008	-0.052* (0.028)	-0.046* (0.026)	-0.14*** (0.053)	-0.13*** (0.051)		-0.010 (0.052)	-0.0036 (0.051)	0.0087 (0.035)	0.011 (0.035)	
Quarterly - full sample	0.046 (0.050)	0.023 (0.046)	-0.083 (0.054)	-0.090* (0.049)		-0.32* (0.18)	-0.38** (0.18)	0.072 (0.057)	0.081 (0.055)	
Quarterly - post 2008	-0.042 (0.031)	-0.038 (0.029)	-0.13*** (0.046)	-0.13*** (0.043)		-0.064 (0.11)	-0.056 (0.11)	0.19 (0.13)	0.19 (0.13)	
Annual - full sample	0.030 (0.055)	0.011 (0.056)	-0.10* (0.056)	-0.071 (0.047)		-0.33* (0.18)	-0.39* (0.21)	0.067 (0.059)	0.078 (0.057)	
Annual - post 2008	-0.049 (0.036)	0.00051 (0.037)	-0.15*** (0.055)	-0.12*** (0.035)		-0.095 (0.13)	-0.052 (0.13)	0.23 (0.18)	0.23 (0.17)	
INCSR rating^c										
Monthly - full sample	0.71 (0.52)	0.18*** (0.052)	0.18*** (0.051)	-0.15*** (0.016)	-0.13*** (0.017)	0.14 (0.41)	0.12** (0.058)	0.12** (0.057)	-0.22*** (0.022)	-0.21*** (0.024)
Monthly - post 2008	0.019 (0.017)	0.029* (0.015)	-0.012 (0.012)	0.0013 (0.013)		-0.042 (0.12)	-0.031 (0.020)	-0.029 (0.020)	-0.019 (0.016)	-0.011 (0.017)
Quarterly - full sample	0.71 (0.53)	0.18*** (0.051)	0.18*** (0.051)	-0.15*** (0.016)	-0.13*** (0.017)	0.13 (0.41)	0.13** (0.059)	0.14** (0.057)	-0.23*** (0.024)	-0.22*** (0.026)
Quarterly - post 2008	0.019 (0.016)	0.031** (0.014)	-0.0041 (0.013)	0.012 (0.015)		-0.030 (0.020)	-0.027 (0.021)	-0.016 (0.019)	-0.0058 (0.020)	
Annual - full sample	0.68 (0.53)	0.17*** (0.052)	0.023 (0.039)	-0.16*** (0.016)	-0.10*** (0.021)	0.11 (0.40)	0.13** (0.061)	-0.084** (0.037)	-0.22*** (0.022)	-0.11*** (0.033)
Annual - post 2008	0.015 (0.019)	-0.029* (0.017)	-0.0066 (0.014)	-0.00032 (0.021)		-0.023 (0.024)	-0.051* (0.027)	0.00016 (0.016)	0.020 (0.024)	

Note: Each cell displays an estimate of θ from Specification (1) in Section 4. Bold headings indicate the treatment being used. Subsequent rows indicate the period and sample being used. Each column introduces different levels of controls, which are described at the bottom of the table. ^atreatment is greylisting by the FATF. ^bcountry is subject to US, EU or UN sanctions. ^ccontinuous measure of percentage of AML policy actions listed by INCSR that a country has taken, updated with the release of the INCSR report. Standard errors clustered at the country level, * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 20: The effect of FATF blacklisting on trade outcomes (OLS)

	Imports					Exports				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
FATF greylisting^a										
Monthly - full sample	957.4*** (233.8)	-667.8* (403.7)	-336.4 (365.3)	45.2 (83.1)	-59.7 (100.7)	122.8*** (42.9)	-202.4 (124.6)	-79.8 (99.1)	-31.0 (23.0)	-55.7 (34.6)
Monthly - post 2008	304.9*** (94.9)	-305.2* (156.4)	-334.7** (161.5)	-160.4 (128.2)	-222.3 (136.6)	27.7 (18.9)	-96.2* (49.9)	-94.7* (54.1)	-55.0 (34.7)	-66.1* (37.0)
Quarterly - full sample	2762.4*** (680.8)	-2040.2* (1187.8)	-1008.4 (1075.3)	96.9 (245.5)	-122.5 (292.8)	353.4*** (128.9)	-600.9 (367.3)	-196.6 (295.8)	-82.1 (62.1)	-139.3 (90.4)
Quarterly - post 2008	860.9*** (281.4)	-995.6** (480.7)	-1103.6** (497.2)	-567.9 (389.3)	-771.2* (420.3)	72.0 (60.9)	-298.5* (154.7)	-306.3* (174.5)	-161.5 (106.1)	-191.5* (111.1)
Annual - full sample	10605.7*** (2726.8)	-8545.4* (4783.6)	-13284.5 (9413.9)	250.6 (1174.9)	-1474.8 (1759.3)	1417.0*** (508.8)	-2386.7 (1495.2)	-4019.2 (3019.8)	-176.2 (280.5)	-637.3 (488.8)
Annual - post 2008	6931.0*** (1991.0)	-6532.5* (3356.5)	-8669.1* (4584.3)	-3825.1 (2513.7)	-6607.2** (3130.5)	1112.9*** (349.5)	-1522.7 (1069.9)	-1964.4 (1419.9)	-599.0 (699.8)	-1158.0 (926.0)
Subject to sanctions^b										
Monthly - full sample	908.5 (646.6)	-346.2 (838.9)	-299.3 (884.2)	-838.2* (470.1)	-843.7* (479.8)	41.9 (34.7)	-196.3 (139.7)	-203.1 (188.3)	-29.3 (23.9)	-42.2 (42.8)
Monthly - post 2008	253.4 (263.6)	-473.6 (392.2)	-615.5 (474.1)	-1446.1 (901.1)	-1392.9 (876.3)	26.2 (31.1)	-104.1 (80.6)	-164.3 (127.2)	-34.6 (29.9)	-31.6 (35.7)
Quarterly - full sample	1457.1** (666.6)	-770.7 (1078.9)	-1022.9 (1253.0)	-799.7 (498.1)	-766.0 (586.6)	-71.4 (92.5)	-494.6* (277.6)	-629.2 (388.7)	-36.7 (87.7)	-2.72 (113.2)
Quarterly - post 2008	813.3** (392.4)	-1387.4* (838.5)	-1137.6 (1014.8)	-1680.2 (1332.6)	-1768.1 (1355.8)	25.3 (45.1)	-380.7* (225.7)	-237.2 (273.5)	28.2 (107.6)	26.7 (126.2)
Annual - full sample	5920.7** (2734.4)	-3238.4 (4356.4)	6136.1 (7149.4)	-3875.5 (2506.5)	-43.6 (3624.1)	-289.3 (371.8)	-2028.9* (1124.5)	-897.1 (2497.7)	-177.2 (363.1)	834.0 (738.8)
Annual - post 2008	4408.8** (2040.0)	-6103.7 (4232.5)	4770.1 (7714.2)	-7867.7 (7068.7)	-5449.1 (9676.0)	130.9 (209.7)	-1839.9 (1116.8)	1146.4 (2400.0)	113.9 (605.6)	1037.7 (1489.6)
INCSR rating^c										
Monthly - full sample	3390.2*** (1102.6)	-8486.6*** (3074.1)	-8410.7*** (3210.9)	-1597.2* (813.5)	-1665.1* (877.2)	214.5 (482.8)	-3240.1 (2257.6)	-3333.6 (2358.0)	-710.7 (609.9)	-767.6 (658.3)
Monthly - post 2008	1797.2* (953.6)	-5863.5** (2756.8)	-6030.8** (2829.4)	-313.1 (760.3)	-282.2 (808.9)	-137.0 (502.8)	-2595.9 (1918.9)	-2688.8 (1975.3)	40.8 (186.2)	49.0 (197.7)
Quarterly - full sample	10162.2*** (3410.1)	-26463.1*** (9670.1)	-26070.1** (10074.8)	-3650.9* (1879.4)	-3704.7* (2038.3)	589.8 (1515.0)	-10100.7 (7037.9)	-10345.7 (7324.4)	-1802.8 (1654.0)	-1942.3 (1782.5)
Quarterly - post 2008	5294.3* (3112.6)	-18577.3** (8783.9)	-18848.6** (8936.8)	-332.5 (2797.9)	-254.0 (2947.0)	-566.3 (1662.7)	-8253.4 (6121.7)	-8433.4 (6239.9)	390.5 (705.1)	419.0 (737.2)
Annual - full sample	39755.6*** (13787.9)	-105158.2*** (39666.0)	-156269.4*** (47163.5)	-17318.0* (9757.4)	-25326.0* (13549.1)	2089.8 (6185.6)	-40344.3 (28289.4)	-60741.8* (35137.6)	-7586.3 (6943.2)	-10884.0 (9478.4)
Annual - post 2008	25447.4* (15190.0)	-93996.3** (45646.0)	-133748.4** (53195.8)	-243.9 (13998.3)	-3632.5 (19000.0)	-2057.5 (7571.3)	-39337.4 (29027.6)	-55045.0 (35867.5)	2697.0 (4645.8)	2710.1 (6045.6)

Note: Each cell displays an estimate of θ from Specification (1) in Section 4. Bold headings indicate the treatment being used. Subsequent rows indicate the period and sample being used. Each column introduces different levels of controls, which are described at the bottom of the table. ^atreatment is greylisting by the FATF. ^bcountry is subject to US, EU or UN sanctions. ^ccontinuous measure of percentage of AML policy actions listed by INCSR that a country has taken, updated with the release of the INCSR report. Standard errors clustered at the country level, * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 21: The effect of FATF blacklisting on other annual financial flows

	Aid disbursements					Remittances received				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Poisson results										
full sample	0.78* (0.41)	0.68* (0.40)	0.95** (0.47)	-0.62 (0.69)	-0.63 (0.64)	0.50*** (0.15)	0.25* (0.14)	0.27** (0.13)	-0.054 (0.12)	-0.099 (0.11)
post 2008	0.27*** (0.054)	0.71*** (0.15)	-0.28 (0.25)	0.27*** (0.054)	0.71*** (0.15)	-0.057 (0.18)	-0.14 (0.18)	-0.097 (0.17)	-0.14 (0.17)	-0.41 (0.33)
OLS results										
full sample	0.0058 (0.0059)	-0.047** (0.023)	0.0028 (0.030)	0.0093 (0.0093)	0.015 (0.015)	231840.3 (155003.0)	-161384.3 (183434.8)	-151041.3 (276364.4)	-160.1 (112505.2)	-31055.8 (146383.0)
post 2008	0.0042 (0.0032)	-0.015 (0.014)	-0.0051 (0.024)	-0.0045 (0.012)	-0.00064 (0.017)	24945.9 (170221.2)	-119939.7 (198267.0)	-115913.2 (237071.8)	-62347.8 (128753.1)	-62959.4 (150260.8)
country f.e.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
period f.e.		Yes	Yes	Yes	Yes		Yes	Yes	Yes	Yes
country trends				Yes	Yes				Yes	Yes
controls			Yes		Yes			Yes		Yes

Note: Each cell displays an estimate of θ from Specification (1) in Section 4. Bold headings indicate the treatment being used. Subsequent rows indicate the period and sample being used. Each column introduces different levels of controls, which are described at the bottom of the table. Standard errors clustered at the country level, * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 22: Impact of greylisting on number of messages passed to greylisted countries from specific classes of countries by intermediaries

	I = USA		FATF member		INCSR darling		Exposed Bank		US Dependent	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
# $j \rightarrow K$ messages	-0.0406 (0.0411)	0.0230 (0.0342)	-0.0562 (0.0397)	-0.0333*** (0.00990)	-0.0765*** (0.0230)	-0.0582*** (0.0105)	-0.187*** (0.0555)	-0.522*** (0.114)	0.00608 (0.0292)	-0.00771 (0.0306)
(# $j \rightarrow K$) \times (# greylisted)	-0.00201 (0.00167)	0.000934 (0.000788)	0.000872 (0.00103)	0.000131 (0.000336)	0.00204** (0.00103)	0.000722 (0.000611)	0.00497** (0.00212)	0.00641*** (0.00222)	-0.000527 (0.000417)	-0.000403 (0.000437)
Sent to all other countries by j	0.0189 (0.0118)	-0.00727 (0.00600)	0.346* (0.181)	0.0166 (0.135)	0.170** (0.0799)	0.543*** (0.0738)	0.0674 (0.0413)	0.293*** (0.0799)	0.00184 (0.00565)	-0.00285 (0.00607)
(# $j \rightarrow \text{other}$) \times (# greylisted)	-0.00000457 (0.000220)	-0.0000712 (0.0000778)	-0.00237 (0.00537)	-0.00504** (0.00209)	-0.00609*** (0.00117)	-0.00581*** (0.000687)	-0.00237 (0.00144)	-0.00373** (0.00152)	0.000158* (0.0000949)	0.000136 (0.0000987)
country f.e.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
period f.e.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
country trends										
country controls				Yes		Yes		Yes		Yes
adjusted R^2				Yes		Yes		Yes		Yes
# countries	167	167	138	138	114	114	121	121	127	127
Obs	1789	1789	1465	1465	1215	1215	1294	1294	1362	1362

Outcome = # of messages sent by countries in classification I to intermediary j . (# $j \rightarrow K$ messages) = number of messages sent to all countries that will ever be greylisted by intermediary country j . (# greylisted) = number of countries in K that are greylisted in current period. (# $j \rightarrow \text{other}$ messages) = number of messages sent by intermediary country by all others in sample outside of K . Standard errors are clustered at the country level, * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 23: Impact of greylisting on number of messages passed on from greylisted countries to specific classes of countries by intermediaries

	I = USA			FATF member			INCSR darling			Exposed Bank			US Dependent		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)					
# $K \rightarrow j$ messages	-0.228 (0.457)	-0.231 (0.167)	1.770 (1.489)	0.574 (0.672)	0.446 (0.400)	0.0609 (0.238)	0.291*** (0.0860)	-0.164** (0.0754)	0.0657 (0.117)	-0.0492 (0.126)					
(# $K \rightarrow j$) \times (# greylisted)	0.0000267 (0.00634)	0.00399** (0.00157)	0.0477*** (0.0131)	-0.00263 (0.0125)	0.0567*** (0.0143)	0.00413 (0.00412)	-0.00468 (0.00959)	0.00527 (0.00442)	-0.00107 (0.00141)	0.000145 (0.00206)					
# other $\rightarrow j$ messages	0.0218 (0.0299)	0.00604 (0.0107)	0.659** (0.324)	-0.225 (0.251)	0.0340 (0.168)	0.159 (0.0998)	-0.125*** (0.0288)	0.0329 (0.0236)	-0.00648 (0.0142)	0.00129 (0.0177)					
(# other $\rightarrow j$) \times (# greylisted)	-0.00000540 (0.000456)	-0.000195 (0.000124)	-0.00613 (0.00434)	-0.00295 (0.00221)	-0.00899** (0.00364)	-0.00257** (0.00131)	0.00217 (0.00351)	-0.00176 (0.00163)	0.000337** (0.000154)	0.000119 (0.000314)					
country f.e.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes					
period f.e.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes					
country trends		Yes		Yes		Yes		Yes		Yes					
country controls				Yes		Yes		Yes		Yes					
adjusted R^2															
# countries	166	166	138	138	114	114	122	122	129	129					
Obs	1778	1778	1465	1465	1215	1215	1296	1296	1383	1383					

Outcome = # of messages sent by intermediary j to country in classification I . (# $K \rightarrow j$ messages) = number of messages sent to intermediary country j by all countries that will ever be greylisted. (# greylisted) = number of countries in K that are greylisted in current period. (# other $\rightarrow j$ messages) = number of messages sent to intermediary country by all others in sample outside of K . Standard errors are clustered at the country level, * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 24: Country categorization for specification (2)

$E_i =$	Motivation	Construction	Source
The USA	Source of strongest AML/CFT regulatory oversight	$E_i = 1$ if i is the USA	n/a
Members of FATF (as of 2004)	Members are expected to follow FATF recommendations; have strong AML/CFT institutions;	= 1 if FATF member in 2004	FATF documentation
Countries with strong AML/CFT institutions	Banks in these countries are more likely to be subject to stringent regulation, CDD expectations	= 1 if country scored at or above 75 percentile in INCSR ratings in 2004	INCSR reports
Home countries of banks subject to US regulation	Banks are exposed to US, thus will limit own exposure to risky customers	= 1 if country has banks listed as having a branch based in the USA	Federal Reserve Board list of foreign banks
Countries highly dependent on SWIFT access to US.	Countries dependent on flows to/from US will want to protect the link.	= 1 if 50% of total SWIFT payments in/out of the country in 2004 came/went to the USA	SWIFT data