Drug Money and Bank Lending: The Unintended Consequences of Anti-Money Laundering Policies*

Pablo Slutzky[1], Mauricio Villamizar-Villegas[2], and Tomas Williams[3]

[1]Department of Finance, University of Maryland
[2]Central Bank of Colombia
[3]Department of Economics, George Washington University

Abstract

We explore how anti-money laundering (AML) policies affect banks and credit provision to firms. For identification we exploit the enactment of a financial regulation in Colombia. Aimed at controlling the flow of money from drug trafficking into the financial system, we find that after implementation bank deposits in municipalities with high drug trafficking decline. This negative liquidity shock has consequences for credit in other municipalities. Banks sourcing their deposits from areas with high drug trafficking cut lending relative to other banks. Using a proprietary database containing data on bank-firm credit relationships, we show that small firms that rely on credit from affected banks experience a negative shock to sales, investment, and profitability. Furthermore, we use night-lights data to show that these results are not due to a reallocation of activity across firms nor between the formal and informal sectors. Our evidence uncovers a hidden to be considered when implementing AML policies.

JEL Classification: K42, G18, G21

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*Corresponding author: Pablo Slutzky, R. H. Smith School of Business, University of Maryland, 4427 Van Munching Hall, College Park, Maryland, 20742. Email: pslutzky@rhsmith.umd.edu. We received valuable comments from Allen Berger, Jason Donaldson, Joras Ferwerda, Rohan Ganduri, Şebnem Kalemli-Özcan, Michael Levi, Victor Lyonnet, Gabriel Natividad, Ronen Palan, Lorenzo Pandolfi, Jose Luis Peydro, Jacopo Ponticelli, Peter Reuter, Daniel Rico, Julio Riutort, Felipe Saffie, Andre Silva, Janis Skrastins, Bryan Stuart, Cesar E. Tamayo, and conference and seminar participants at AL CAPONE workshop on crime, AML Empirical Research Conference, Annual Conference in Financial Economics Research (IDC), ASSA 2020, the 8th MoFiR Workshop on Banking, Short-Term Funding Markets Conference, the Darla Moore School of Business (IB), IAE Business School, McGill University, and the University of Maryland. The views expressed herein are those of the authors and should not be attributed to the Central Bank of Colombia, its Executive Board, or its management. Maria Alejandra Ruiz Sanchez provided excellent research assistance.

"This year, Pemex earned $4 billion dollars, this country's biggest exporter. My organization made $15 billion dollars. I pull my money from your banks... this country crumbles. Overnight."

Diego Luna, enacting drug lord Miguél Ángel Félix Gallardo in Narcos: Mexico.

I. Introduction

Money laundering is often a key element in organized crime operations. Despite global efforts to deter it, financial globalization as well as rapid developments in technology and communications allow money to flow quickly and easily, facilitating the laundering cycle. The amount of money laundered globally each year is estimated to be somewhere between 2% and 5% of global GDP.[1] In this context, the United Nations Office on Drugs and Crime declared that the "task of combating money-laundering is more urgent than ever."[2]

Numerous studies argue that money laundering undermines the integrity of the financial system, channels resources to less efficient sectors, increases reputation risks, and facilitates corruption, among other things.[3] The economic and social benefits to an effective deterrent to money laundering seem to be fairly straightforward. Nonetheless, they could have unintended consequences. For instance, money laundering can increase liquidity in the financial system and allow firms to borrow and invest, especially in developing countries (Levi (2002)). In such cases, effective anti-money laundering (AML) policies have important negative consequences. For example, rapid implementation of these policies could produce a sudden decrease in liquidity in the financial system, reducing credit availability. This could lead to a decline in investment, employment, and economic activity.

Despite the importance and widespread use of AML policies, there are, to the best of our knowledge, no empirical studies analyzing these consequences.[4] Several empirical challenges could

[1] Early evidence of the fight against money laundering is the establishment of the Financial Action Task Force on Money Laundering (FATF) at the 1989 G-7 summit, with the goal of coordinating actions against money laundering.
[2] https://www.unodc.org/unodc/en/money-laundering/globalization.html, accessed on July 8th 2019.
[3] See, for example, Melvin and Ladman (1991), Taylor (1992), Quirk (1997), Masciandaro (1999), Bartlett (2002), Levi (2002), Thoumi (2002), Bagella et al. (2004), Reuter and Truman (2004), Holmes and De Piñeres (2006), Levi and Reuter (2006), Geiger and Wuensch (2007), Argentiero et al. (2008), Barone and Masciandaro (2008), Unger (2009), Dalla Pellegrina and Masciandaro (2009), Ferwerda (2009), Walker and Unger (2009), Schneider (2010), Barone and Masciandaro (2011), Pedroni and Yepes (2011), Slim (2011), Kumar (2012), Ardizzi et al. (2014), Chong and Lopez-De-Silanes (2015), and Loayza et al. (2017).
[4] One potential exception is Collin et al. (2015). However, the authors acknowledge that their data only allows them

explain this. First, measuring the flow of funds from illicit activities into banks is inherently difficult. Second, aggregate bank data do not allow differentiation between credit supply effects and a decline in firms' credit demand. Third, information linking banks and private firms is rarely available.

In this paper, we empirically analyze the effects of AML efforts on the financial system by studying the implementation of an AML regulation in Colombia, a developing economy and the world's largest producer of cocaine (World Drug Report 2019, UNODC). In 2008, the Colombian government issued a regulation that required financial institutions to implement an asset laundering and terrorist financing risk management system (SARLAFT) to identify and manage the risk of being used to launder money. The objective of this regulation was to prevent the flow of money from illegal activities into the financial system. We employ four steps to explore the consequences of the implementation of SARLAFT in the financial system.

First, we study whether the regulation affected the flow of funds into municipalities with higher illegal drug activity. Since illegal drug activity is unobservable, we proxy it using official records of cocaine confiscations at the municipality level prior to the AML regulation.[5] Using a difference-in-differences approach, we find that bank deposits in municipalities affected by illegal drug activities declined relative to deposits in non-affected municipalities after the implementation of the AML regulation. Quantitatively, a one standard deviation increase in exposure to illegal drug activities translates into approximately a 0.6% decline in the volume of aggregate deposits at the municipality level following the regulation. Interestingly, the decline in deposits is not immediate, becoming noticeable 18 months after the implementation and coinciding with stricter enforcement as measured by a dramatic increase in money laundering cases received by the Office of the Prosecutor.[6]

Second, we examine whether bank lending was affected by the negative liquidity shock. To do so, we compare lending by banks that source their deposits in areas with higher illegal drug

to observe correlations and not to make systemic judgments. Meanwhile, Ferwerda (2013) compiles a lists of 25 effects of money laundering mentioned in the literature and notes that "hardly any of the effects are backed by empirical evidence" (our emphasis).

[5] While data on the location of illicit coca crops are available, the proceeds from the sale of coca leaves remain mostly in the informal sector and do not enter the formal financial sector. More information is provided in Subsection A..

[6] Throughout the paper, we refer to the timing of the passage of the regulation as the "implementation" date and to the timing of the stricter enforcement of the regulation as the "enforcement" date, as measured by a noticeable increase in the number of money laundering cases processed, which more than doubled from 2009:Q4 to 2010:Q1.

activity with lending by banks that source their deposits in other areas. One potential concern with this estimation strategy is the effect that the AML regulation might have had on credit demand. For instance, it could reduce the availability of criminal money in the formal economy, reducing consumption and demand for firms' products. Such a decline would lower the demand for credit in areas with high illegal drug activity and might result in an erroneous interpretation of the results. To overcome this problem, we exploit differences in the geographical structure of banks' branch networks and only focus on bank lending in municipalities with little or no drug trafficking activity. Furthermore, we use municipality-time fixed effects that proxy for credit demand at the municipality level, which allows us to isolate the effect of credit supply changes from the demand for credit. We show that banks that source their deposits in areas with higher illegal drug activity reduced lending to firms in areas not directly affected by the AML regulation relative to banks that source their deposits from other locations. This finding suggests that the negative liquidity shock led to a contraction in credit supply to areas not directly affected by the AML regulation via banks' internal capital markets. Consistent with this channel, the timing of the fall in commercial credit coincides with that of the decline in deposits.

Third, we explore the effect of the negative credit supply shock on economic growth. Using a proprietary database, we match bank-firm credit data with firms' financial statements for more than 20,000 predominantly private firms in Colombia for the 2006-2014 period. We compare outcomes for firms within the same industry and municipality and exploit differences in indirect exposure to the AML regulation, measured as the credit-weighted share of exposure faced by each firm's lenders. We show that the credit supply shock significantly affected the growth of small firms. In particular, we find that for small firms, a one standard deviation increase in indirect exposure is associated with a 9.3% larger decline in sales, a 10% larger decline in property, plant, and equipment, a 3.4% larger decline in total assets, a 24.3% larger decline in the level of financial debt, and a 2.5% larger decline in net profits.

Last, we examine the aggregate effects in municipalities indirectly affected by the negative liquidity shock. In particular, we analyze total economic activity —both formal and informal— as proxied by the intensity of night lights. We find that indirect exposure, as measured by the

credit-weighted exposure of the banks that operate within that municipality, is associated with a decline in the intensity of night lights. Our firm-level results correspond to a decline in real economic activity, not to a reallocation of economic activity across firms or to a shift away from the formal economy.

This paper makes several contributions to the literature. First, it provides novel causal evidence on a negative unintended consequence of AML policies. This contribution stems from our ability to combine a sound research design with unusually detailed data on banks and firms. Papers such as Masciandaro (1999), Bartlett (2002), Geiger and Wuensch (2007), Barone and Masciandaro (2008), Pedroni and Yepes (2011), and Kumar (2012) focus on the benefits and costs of AML policies. However, other papers concentrate on the monetary and operational costs of these policies. Meanwhile, Agca et al. (2020) study how AML policies affect the composition of banks in areas more exposed to money laundering by imposing disproportionate costs on small banks. Our paper uncovers an additional cost, namely the reduction of the funds available to fund licit businesses via banks' internal capital markets. Our paper is, to the best of our knowledge, the first to demonstrate empirically the effectiveness of AML policies in preventing inflows of money from illegal activities into the financial system.

Our second contribution is to provide causal evidence that liquidity shortages in bank deposits lead to a contraction in credit supply with negative real effects, especially for small firms. Thus, we show the importance of deposit funding for banks. In general, previous studies have shown that liquidity windfalls for banks lead to expansions of credit supply (Gilje et al. (2016); Bustos et al. (2017); Carletti et al. (2019)), but there is little evidence of the effect of negative liquidity shocks on firms in a setting where banks do not simultaneously experience solvency issues.[7][8] Three notable exceptions are Schnabl (2012), Paravisini et al. (2015), and Restrepo et al. (2019). Schnabl (2012) looks at a negative liquidity shock experienced by Peruvian banks during the 1998 Russian crisis and how it affected their lending to firms. Relative to this paper, we make two contributions. First, we

[7] In papers such as Amiti and Weinstein (2011), Chodorow-Reich (2014), Carvalho et al. (2015), Kalemli-Ozcan et al. (2016), and Huber (2018), banks are affected by both liquidity and solvency shocks.

[8] More broadly, this paper is related to a large literature on the economic effects of credit supply shocks such as Khwaja and Mian (2008), McKenzie and Woodruff (2008), Cole (2009), Jimenez et al. (2012), Banerjee and Duflo (2014), and Chodorow-Reich (2014). We show that a regulation designed to combat money laundering had unintended consequences in the supply of credit.

provide additional evidence on the real effects of a negative liquidity shock on firm-level outcomes such as sales, investment, and profitability, and on municipality-level outcomes, such as number of firms, employment, and real economic activity. Second, we show that negative shocks to funding via deposits, as compared to bank-to-bank lending shocks, also lead to economic contractions. Meanwhile, Paravisini et al. (2015) study the effect on Peruvian exporters of exposure to banks differentially affected by the global financial crisis. However, due to large entry costs involved in exporting, the firms studied are sizable, with average debt levels above one million USD. Our data allows us to study the effect on smaller firms and on aggregate outcomes. Last, Restrepo et al. (2019) exploit a shock in Colombia subsequent to ours to study how a relative increase in the cost of very short-term debt affected the funding structure of firms. Although similar to ours in terms of geography and time period, we study the real economic effects of a shock to banks' liquidity.

Finally, our paper contributes to the literature on organized crime, where papers such as Daniele and Marani (2011), Pope and Pope (2012), Pinotti (2015), Bianchi et al. (2017), Dimico et al. (2017), Moglie and Sorrenti (2017), Ganau and Rodriguez-Pose (2018), Scognamiglio (2018), and Slutzky and Zeume (2018) study the effect of organized crime on development, productivity, and economic growth. We contribute to this literature by identifying an additional mechanism by which criminal activities affect licit firms. By laundering money, criminal organizations provide funds to the financial system that affect growth in regions other than where they operate.

The paper proceeds as follows. In Section II. we provide an overview of the illegal drugs industry in Colombia, the money laundering process, and the banking system. Section III. describes the data used in the paper. Section IV. presents the methodology we use to study the effect of the AML regulation on the economy and discusses the corresponding results. In Section V. we conclude.

II. Institutional Setting

Colombia is a unique setting to study the economic effect of illegal drug money. In this section, we provide an overview of the Colombian economy, its money laundering problem, and the efforts to control it. We also describe its banking system. For the interested reader, we provide additional information on the history of the illegal drugs industry and the fight against money laundering in

the Internet Appendix.

A. The Illegal Drugs Industry

Colombia is the fourth largest economy in Latin America and 39th globally, with a GDP of USD 323.8 billion as of 2019. Its service sector constitutes 56% of the GDP, followed by the industrial sector (38%) and agriculture (6%). It is the 26th largest country in terms of area and has a population of 49.6 million. The country is politically divided into 32 departments and a capital district. The mean department has 1.4 million inhabitants, but the population is highly concentrated in the capital district (Bogota), with over 8 million inhabitants. Each department is split into municipalities, for a total of 1,122 municipalities across the country.[9]

The illegal drugs industry in Colombia has evolved for over half a century. By the 1980s, Colombia was already the largest producer of cocaine in the world. Although some things have changed over the last two and a half decades following governmental efforts to eradicate coca production and trafficking, many others have not. The recent report issued by the United Nations Office on Drugs and Crime provides a rich description of the current situation of coca and cocaine production in Colombia.[10] Evidencing the partial failure of the war against drug production and trafficking, we find that only three out of thirty-two departments (the first political division of Colombia) are coca-free, when there were eight coca-free departments in 2008. Figure 1 shows the geographical distribution of coca crops across the country. In addition, 80% of the areas with coca plantations detected in 2016 had been previously detected, evidence that growers perceive a low risk of detection or law enforcement. The report also indicates that Colombia produces between 55% and 76% of the global cocaine base. Its estimated cocaine hydrochloride production for 2017 is 1,379 metric tons, an increase of 31% over its 2016 capacity.

The previous findings shed light on several facts. Colombia is still the largest cocaine producer in the world, a status that the country has maintained for decades. Illegal drugs activities are scattered across the country, and illegal drug activity generates large revenues.

[9]Source: DANE, Colombian National Department of Statistics.
[10]"Colombia - Survey of territories affected by illicit crops. UNODC (2017)."

B. Money Laundering

Money laundering is the conversion of revenue from illicit activities into assets that cannot be traced to the originator. There are three stages in the process: placement, layering, and integration. The initial stage involves placing the funds from illicit activities into the financial system via deposits, the purchase of money orders or checks, or via the cash purchase of financial instruments, such as securities or insurance contracts, among other avenues. The second stage is that of layering. The funds are then moved to create multiple layers between the funds and their origin. In some cases, the funds are used to purchase securities, or used to pay for goods or services via fictitious business expenses and fake invoices, transferring the funds to shell corporations. The last stage is integration. Funds flow into the licit economy via the purchase of assets, such as real estate, luxury goods, or financial assets.

C. The Fight against Money Laundering

Colombia's efforts to curb money laundering were weak until 2008.[11] That year, in response to international pressure, the Superintendencia Financiera de Colombia, which is the government agency responsible for overseeing financial institutions and regulations, passed the regulatory circular 026, requiring financial institutions implement an Asset Laundering and Terrorist Financing Risk Management System (SARLAFT, after its Spanish acronym). The system would help the supervised entities to manage the risk of being used as instruments to launder money or to channel resources towards the funding of terrorist activities. However, each supervised entity has to develop and perfect its own money laundering prevention system.[12] The goal of the system should be the effective, efficient, and timely knowledge of all customers, compliance with the processes related to international lists of suspicious people, and development of capacity to report suspicious transactions and certain cash transactions to the Financial Information and Analysis Unit (UIAF). Thus, it was not until early 2010 that financial institutions had implemented the system and the regulation had a significant impact, as illustrated by the number of money laundering cases received by the Office

[11] Detailed information is provided in the Internet Appendix.
[12] Failure to develop a proper SARLAFT for each financial institution carried a monetary penalty.

of the Prosecutor, as shown in Figure 2.[13]

While efforts to combat drug production and trafficking do not seem to have had a discernible impact in Colombia, efforts to deter money laundering seem to have had a significant effect. The Basel Anti-Money Laundering Index attempts to measure countries' risk level in money laundering/terrorist financing; in 2017 it ranked Colombia amongst the countries with the lowest risk.[14] It is the Latin American country with the lowest ranking (lowest risk), and has risk levels comparable to those of Norway and France and lower than those of Germany and the United Kingdom. Unfortunately, the index was first constructed in 2012, therefore there is no information to analyze the effect of the regulation on Colombia's risk of money laundering.

D. Colombian Banking Sector

There are four types of financial institutions in Colombia: banks, financial corporations, leasing companies, and financial cooperatives. The banking sector, which is the focus of this paper and consists of a small number of banks, is the largest, with more than 86% of total assets in the financial system under control. At the beginning of 2008, when the AML regulation was implemented, there were 16 banks authorized to operate in Colombia: 10 domestic and 6 foreign. Another characteristic of the banking sector in Colombia is that it is highly concentrated. The five largest banks control over two-thirds of total assets, and four of these banks are domestic.

In 2008, there were 4,222 bank branches across 817 municipalities. Table 1 provides summary statistics for each bank, and Figure 3 shows the number of bank branches in each municipality. There are fewer banks in the south east, in the departments of Amazonas, Vaupés, and Guainía, which are departments that border Brazil and are slightly populated (less than 0.35% of the total population).

These branches are a key resource for firms. According to the World Bank's data on domestic

[13]The number of cases received by the Office of the Prosecutor declined significantly in 2011. A potential explanation for this is that with intensified controls in the banking sector, money launderers shifted towards other mechanisms, such as illegal gold mining. Consistent with this, the Office of the Comptroller reported in August 2013 that as of 2011, 63% of the entire mining sector was operating illegally, compared to 36% a decade earlier. https://www.contraloria.gov.co/documents/20181/198738/Separata-Mineria-Ilegal.pdf/4d3d5cbe-4bda-430a-831e-ef2f6bbf5d0d?version=1.0, accessed on July 10th, 2019.

[14]Colombia ranked 125th out of 146 countries.

credit by banks, when the regulation was implemented in 2008, the private sector in Colombia ranked among the highest in Latin America in terms of reliance on domestic credit, surpassed only by Chile and Brazil. Its level of dependence on domestic credit is higher than in Argentina, Bolivia, Ecuador, Mexico, Paraguay, Peru, and Uruguay. This characteristic makes a shock to the flow of funds into banks potentially damaging for firms.

III. Data

For our study, we merge multiple datasets. Our first dataset includes quarterly information on banks' deposits and loans at the bank-municipality level for 2006:Q1 to 2014:Q4. These data were provided by the Superintendencia Financiera de Colombia, the government agency responsible for overseeing and regulating financial institutions. This information includes the volumes held in different types of deposit accounts (savings, checking, term, etc.) and loans (commercial, mortgages, consumption, microcredit, etc.). For each quarter, our dataset includes information on between 1,600 and 2,200 bank-municipality combinations. This number is lower than the total number of branches because our data are at the bank-municipality level, and in large municipalities banks have more than one branch.

Our second dataset includes Colombian firms' financial statements and was provided by the Superintendencia de Sociedades, the Colombian agency responsible for monitoring firms. We obtain information from 2006 to 2014, and the data for 2007:Q4 are summarized in Table 2. For each year, we obtain the balance sheet, income statement, and cash flow statement for reporting firms. Our dataset includes information on more than 20,000 firms. Our median firm has annual sales of USD 944,000.

The third source of data is a proprietary credit registry that includes information on new loans issued and balances outstanding of existing loans. This information is reported quarterly by financial institutions under Form 341 and includes the tax ID of the borrower, allowing us to match the data with firms' financial statements. Our fourth dataset comes from the Department of Labor of Colombia, and includes information at the municipality-year level on the number of firms and employees between 2009 and 2014.

Our fifth source of data includes information on cocaine confiscations at the *municipality-year* level. These data were provided by the Observatorio de Drogas de Colombia, the government agency responsible for the dissemination of information related to drugs and related crimes. The agency provides *yearly* information on drug confiscations at the municipality level starting in 1999. The data include information on drug seizures. We focus on cocaine seizures, since the monetary value of the production and trade of cocaine in Colombia is orders of magnitude larger than that of any other illegal drug. For instance, the year in which the regulation was implemented almost 200,000 kilograms (220.5 tons) of cocaine were seized, but only 645 kilograms (1,422 pounds) of heroin and none of LSD. Table 3 presents the annual data from 1999 to 2007 aggregated at the department level, and Figure 4 provides aggregate confiscations from 1999 to 2007 at the municipality level. Our median municipality has no cocaine confiscations, and about a quarter of the municipalities have confiscations.

The last dataset provides information on the intensity of artificial lights, used as a proxy of economic activity, which has been frequently used in the literature when reliable data are not available [for instance, in Henderson et al. (2012) and Chodorow-Reich et al. (2018)]. These data are collected by the U.S. Air Force Weather Agency and processed by the National Oceanic and Atmospheric Administration's National Geophysical Data Center. The processing involves the removal of observations for places experiencing the bright half of the lunar cycle, the summer months when the sun sets late, auroral activity, and forest fires, leaving primarily man-made light. We collect these data for 2006-2014 and match it with Colombian municipalities using geographic coordinates for each municipality.

IV. Methodology and Results

In this section, we describe the methodology we use to study the effect of the AML regulation on the economy and discuss the corresponding results. We proceed in three steps. First, we test whether controls on the flow of illicit funds into banks had an impact on deposits. Second, we test whether banks that source their deposits in areas with high levels of illegal drug activity cut lending in other areas in response to the AML regulation. Last, we explore the consequences for the

real economy looking at firms' financial statements, employment, number of firms, and intensity of artificial light in each municipality following the implementation of the AML regulation.

A. Bank Deposits

To study the effect of the AML regulation on bank deposit flows, we compare deposits in municipalities with different degrees of exposure to illicit activities, before and after SARLAFT. We use data on cocaine confiscations at the municipality level to construct a measure of its exposure to illicit activities. Our assumption is that the volume of cocaine seizures in a municipality is proportional to its level of drug-related business. While data on coca crops are readily available, our preference for data on cocaine seizures is based on the amount of money involved in the different parts of the production process and on the location where this money enters the formal financial system, the focus of our study.[15] The price of fresh coca leaves in 2018 was approximately USD 0.95 per kilogram (USD 0.43 per pound). Once the coca leaves are processed and transformed into cocaine hydrochloride, its price is USD 1,633 per kilogram (USD 740.7 per pound) in Colombia, and much higher in countries like the U.S.. This means that with a planted area of 81,000 hectares (200,155 acres) in 2008, the total price of coca leaves produced was approximately USD 370 million. Meanwhile, the price of the 1,379 metric tons of cocaine hydrochloride produced was approximately USD 2.25 billion.

A potential concern is that cocaine confiscations data are affected by selection bias. Confiscations signal among other things the inability of drug lords in that municipality to corrupt the authorities. Thus, municipalities with no confiscations might still have high levels of illegal drug activity, but drug lords find ways of evading the authorities and the law. Given this, our estimates are likely a lower bound of the effects of the AML regulation on the bank deposits. More likely, confiscations can be thought as an implicit tax on the income generated by drug-related activities that allow authorities to signal commitment and enforceability.[16]

[15] Melvin and Ladman (1991) show that, in coca-leaf-producing areas in Bolivia, the U.S. dollars derived from the illegal activity enter the informal loan market.

[16] We thank Daniel Rico for this insight.

A.1. Municipality-level Results

We test whether the AML regulation impacted the inflow of bank deposits as follows.[17] We aggregate deposits across banks at the municipality level for each quarter. We then use a difference-in-differences approach to test whether municipalities in areas with higher illegal drug activity experience a decline in deposits following the regulation.[18] In Figure 5, we plot the quarter-by-quarter coefficients of a regression of municipality-level log deposits on the exposure of the municipality to illegal drug activity, as measured by the volume of cocaine confiscations. The first vertical dashed line demarks the implementation of the AML regulation (2008:Q3, while the second vertical dashed line depicts the quarter before the large increase in AML cases reported in Figure 2 (2009:Q4). Interestingly, we find that the effect is not discernible immediately after the introduction of the AML regulation. In fact, the timing of the decline in bank deposits coincides with the sharp increase in money laundering cases received at the prosecutor's office, suggesting that the implementation and enforcement of the AML regulation was slow. This is consistent with the fact that the regulator did not provide an AML system, and that each bank had to develop its own, test it, and perfect it. In light of this evidence, in our estimations we consider the effective start of the regulation as the first quarter of 2010, when the AML cases processed increase substantially.

Our baseline empirical specification to test this is as follows:

$$ln(Deposits)_{m,q} = \alpha_m + \alpha_q + \beta\,(Exposure_m Post_q) + \varepsilon_{m,q}, \tag{1}$$

Our dependent variable, $ln(Deposits)_{m,q}$, is the log of the volume of banks deposits in municipality m in quarter q. $Exposure_m$ is the extent to which a municipality is exposed to illegal drug activity, as measured by cocaine confiscations between 1999 and 2007, the year before the passage of the AML regulation. $Post_q$ is a dummy variable set to one in 2010:Q1, when enforcement became stricter, and the following quarters. We include two sets of fixed effects: municipality fixed effects (α_m)

[17] We study the inflow of money that originated in criminal activities irrespective of the hierarchy of the individual involved in the financial transaction. While it is unlikely that the funds belong to cartel leaders –since they have other means to launder money– they might belong to local drug lords or intermediaries such as carriers or sales people.

[18] We obtain very similar estimates when using deposit growth as our dependent variable.

control for the time-invariant characteristics of bank deposits at the municipality level, and quarter fixed effects (α_q) control for common shocks that affect bank deposits. In alternative specifications, we include department-time fixed effects to control for regional shocks. For robustness, we use alternative measures of exposure, including cocaine confiscations between 2003 and 2007. Standard errors are clustered at the municipality level.

The results in Table 4 show that municipalities with higher levels of exposure to illegal drug activity experience a decline in bank deposits following the implementation of the AML regulation. In specifications for columns (1)-(3), we use data on cocaine confiscations from 1999 to 2007 to measure exposure. The coefficients in column (1) show that municipalities with a higher exposure to illegal drug activity experience a large decline in bank deposits after the AML regulation was enforced. More specifically, a one standard deviation increase in exposure to illegal drug activities translates into a 0.6% decline in deposits post-regulation. These results are similar after the inclusion of time and municipality fixed effects (column (2)) and municipality and department-time fixed effects (column (3)). For robustness, in columns (4)-(6) we use data on confiscations from 2003 to 2007 and find that the results are economically and statistically similar.[19][20]

For robustness, we perform two additional tests. First, we perform a similar test using the growth of bank deposits instead of levels and find similar results, as shown in Table A1 in the Internet Appendix. Second, to mitigate concerns that our measure of confiscations might be biased due to corruption at the local police level, we repeat the test using only cocaine confiscations by the national military forces of Colombia, which are less prone to local corruption.[21] The results in Table A2 are similar to those found using confiscations by both local and federal authorities.

[19] Interestingly, the coefficients on *Post* in columns (1) and (4) is positive and significant. While we cannot explicitly attribute this growth to the AML regulation due to other simultaneous events at the country level, it might be argued that the regulation had a positive overall effect on deposits by, for instance, improving the reputation of banks.

[20] A potential concern is that the areas where the drug cartels operate are larger than the municipalities we identify as exposed to illicit activities using the confiscations data. In this case, following the regulation, deposits would decline not only in the municipalities we identified but also in neighboring municipalities, biasing our results. While this is plausible, such an effect would bias the estimated coefficients downwards.

[21] We thank Murillo Campello for this suggestion.

A.2. Bank-level Results

The richness of our data allows us to analyze whether our results are driven by certain banks and not others. With this in mind, we test two hypotheses. First, that foreign banks were already subject to stricter scrutiny in terms of money laundering, and that our results are driven by domestic banks. Second, that the results are driven by the largest state-owned bank — Banco Agrario — the most widespread bank and the only bank present in some municipalities.

We start by replicating our results with data at the *bank-municipality* level in Table 5, where we additionally include municipality-bank and department-time fixed effects. We repeat our prior tests and obtain similar results in column (1) as those in Table 4. We then include an indicator variable for foreign banks and test whether these banks behave differently. In column (2), we do not find this to be the case, with the coefficient for the triple interaction term being indistinguishable from zero. We next repeat the analysis excluding Banco Agrario de Colombia from our sample. In column (3) we find similar results as those in column (1), suggesting that our results are not driven exclusively by the state-owned bank.

A.3. Additional Evidence on Bank Deposits

There are two alternative explanations for our results that merit evaluation. First, they might reflect a shift in locations as to where illegal drug money enters banks and not a decline in the volume. For instance, income from illicit activities could be deposited in areas with weaker enforcement of the AML regulation. In this case, the results in Table 4 would reflect a relocation rather than a decrease in money flows into the financial system.[22] Second, there is the possibility that the decline in bank deposits is not due to money laundering, but to legal money. For example, if there is a decline in drug-related businesses due to the AML regulation and this affects economic activity, people and businesses might move from municipalities with higher illegal drug activity to those with lower activity. In turn, this could lead to a differential effect on bank deposits. To rule out these concerns, we focus on the second stage of the money laundering process, *layering*.

[22] Note that this would be a violation of the Stable Unit Treatment Value Assumption (SUTVA) in our difference-in-difference model since municipalities that act as a control group would be positively affected by the treatment.

After the *placement* stage, when the funds enter the financial system, drug cartels transfer funds between jurisdictions to create additional layers between the funds and the underlying activity that generated them.

To test whether our results capture a shift in locations, we focus on the aggregate volume of money flowing to foreign jurisdictions typically used to launder money. We obtain data on cross-country claims by Colombian residents from the Bank for International Settlements (BIS). The quarterly data include the volume of claims by Colombian residents reported by 30 counterparties, which allows us to measure the effect of the AML regulation on cross-country flows of money. We use the Basel AML Index to identify jurisdictions with a higher risk of being used to launder money and test whether there is a differential effect of the regulation on the volume of claims in these countries, vis-à-vis countries with lower risk. This index was developed by the Basel Institute on Governance and is based on three aspects: the FATF Mutual Evaluation Reports, the Financial Secrecy Index, and the U.S. State Department International Narcotics Control Strategy Report. Our specification is:

$$ln(Claims)_{c,q} = \alpha_q + \alpha_c + \beta_1 High\ Risk_c \times Post_q + \varepsilon_{c,q}, \tag{2}$$

Our dependent variable, $ln(Claims)_{c,q}$, is the volume (logged) of claims owned by Colombian residents in country or jurisdiction c and quarter q. $High\ Risk_c$ is an indicator variable set to one for Guernsey, Isle of Man, Jersey, Luxembourg, and Switzerland, jurisdictions with a high risk of being used for money laundering. $Post_q$ is an indicator variable set to one from 2010 onwards. We include quarter and country fixed effects to absorb common shocks and country-specific characteristics. The results in the column (1) of Table 6 show that following the enforcement of the AML regulation, claims in high-risk countries decline by approximately 37% relative to those in low-risk countries, suggesting that our results reflect an actual decrease in volume, not a relocation of money laundering activity. We illustrate this result in Figure 6, where we plot the year-by-year coefficients of this estimation. Prior to the enforcement of the AML policies, there is no differential trend in the claims of Colombian residents between countries with low and high risk of being used for money laundering. In contrast, from 2010 onwards there is a decline in the volume of claims in high-

risk countries relative to low-risk ones, suggesting that the enforcement of the AML regulation in Colombia decreased the total volume of money laundering activity.

B. Bank Lending

We next test whether the drop in deposits affected banks' lending to domestic firms. A potential concern is that the AML regulation can simultaneously affect loan demand by firms in affected municipalities. For instance, the regulation likely reduces incentives to engage in criminal activity, affecting local employment and consumption and reducing the demand for firms' products and services, which would reduce credit demand. In order to mitigate the concern of potential confounding effects due to changes in credit, we exploit banks' branching networks and focus our analysis on municipalities with low or no illegal drug activity.

Our identification strategy is based on comparing the supply of commercial loans within a municipality by banks with different levels of exposure to the AML regulation. We construct a measure of the 2007 pre-AML regulation exposure to illicit funds at the bank level. This measure indicates the percentage of deposits sourced from municipalities with high levels of illegal drug activity relative to the total deposits for each bank, and is measured as follows:

$$Exposure_b = \frac{\sum_{m=1}^{M} Deposits_{b,m} I_m}{\sum_{m=1}^{M} Deposits_{b,m}}, \tag{3}$$

where M is the number of municipalities in which the bank operates, $Deposits_{b,m}$ is the volume of deposits in bank b and municipality m, and I_m is a proxy of whether municipality m is exposed to illegal drug activity. More specifically, I_m is equal to one if the volume of cocaine confiscations is in the top quartile across municipalities. Thus, our measure captures the percentage of bank deposits in bank b that are sourced from affected municipalities. For the banks in our study, exposure ranges from 42.43% to 100%.

Next, we test whether the decline in bank deposits affected lending to firms in municipalities not directly exposed to illegal drug activities. We do so with the following difference-in-differences specification:

$$ln(Loans)_{m,b,q} = \alpha_b + \alpha_{m,q} + \beta \left(Exposure_b Post_q\right) + \varepsilon_{m,b,q} \tag{4}$$

Our dependent variable, $ln(Loans)_{m,b,q}$, is the log of new commercial loans (volume) granted by bank b in municipality m in quarter q. $Exposure_b$ is a measure of the extent to which a bank draws its deposits from municipalities with high levels of illegal drug activity, as measured in equation (3). We include two sets of fixed effects. Municipality-quarter fixed effect ($\alpha_{m,q}$) control for shocks at the municipality level that might affect loan demand. Bank fixed effects (α_b) control for the time- invariant characteristics of the loans issued by a bank. Standard errors are clustered at the municipality level. This specification allows us to control for local demand shocks and identify the effect of the funding gap on lending. In addition, to address potential confounding effects from changes in credit demand in municipalities directly exposed to illicit activities, we focus on municipalities not directly exposed to the AML regulation. For that, we exclude municipalities in top quartile in terms of the volume of cocaine confiscations.

For the results to be meaningful, we make two assumptions. First, we follow Bustos et al. (2017), and assume that due to interbank market imperfections, banks fund part of their lending operations with their own deposits. Second, we assume that banks operate an internal capital market (i.e., funds raised in one municipality can be used to issue loans in another municipality). In our context, this is a crucial assumption, since it would transfer the shock from affected to non-affected municipalities. While this notion is consistent with findings by Gilje et al. (2016) and Ben-David et al. (2017) for the U.S. market, we study the validity of this assumption for the Colombian market by creating a loan-deposit ratio at the bank-municipality level at the end of 2007. Without internal markets — and ignoring reserve requirements — this ratio should be one or less for all bank-municipalities. Table 7 presents evidence that some municipalities are net providers of funds (those with loan-deposit ratios below one) and others are net receivers of funds (those with loan-deposit ratios above one). In some cases, the differences are stark. For instance, Banco Agrario de Colombia has branches in municipalities that are pure sources of funds (loan-deposit ratios are zero), while branches in other municipalities are net receivers, with coefficients close to 9. To provide a graphical representation, Figure 7 is a map of the distribution of net receivers and net providers of funds for Banco Agrario de Colombia at the end of 2007. This evidence suggests that there is a functioning internal capital market within banks.

Table 8 presents the results of our test of the effect of the AML regulation on bank lending. Banks with higher exposure to illegal drug activity reduce lending in non-directly exposed municipalities. In particular, the results in column (1) show that a one standard deviation increase in a bank's exposure to illegal drug activity is associated with a decline of 32% in the supply of new commercial credit following the AML regulation. When we include time fixed effects in the regression, the results do not change significantly, as shown in column (2). In addition, the results are robust to the inclusion of municipality-quarter fixed effects (column (3)) showing that, within a municipality, banks with a one standard deviation higher exposure to illegal drug activity experience a 35% decline in the supply of new commercial credit relative to other banks.[23]

To further illustrate our results we plot the quarter-by-quarter coefficients from our estimation framework in Figure 8. This figure shows that prior to the enforcement of the AML regulation, there was no differential effect in new commercial credit supplied by more and less exposed banks. This suggests that other potentially confounding shocks that might have occurred during that period do not seem to affect differentially banks with different levels of exposure to illegal drug activity. This is important for our identification strategy, since Colombia was affected by the 2007-2009 global financial crisis, which took place during the period we examine.

Moreover, we find that the fall in new commercial credit coincides with the decline in bank deposits in areas with higher illegal drug activity triggered by the stricter enforcement of SARLAFT (Figure 5). There are two reasons why our results on bank deposits and new commercial credit merit some discussion. First, while deposits in Figure 5 experience a recovery following the decline in bank deposits, there is a persistent decrease in new commercial credit, as shown in Figure 8. Second, in response to a one standard deviation increase in exposure to illegal drug activity, bank deposits fall by 3% when we consider our bank-municipality level results in Table 5. Meanwhile, new commercial credit falls by about 35% on average.[24] To put these numbers in perspective, we compare the magnitude of the effect on bank deposits to the effect on new commercial credit. A 3%

[23] In unreported results, we find that banks more exposed to illegal drug activityexperience a decline in profitability following the enforcement of the AML regulation, relative to less exposed banks. This is consistent with more exposed banks being hurt due to the reduced funding and consequent contraction in credit.

[24] We compare our estimates from the bank-municipality deposit estimations in Table 5 to our credit estimates in Table 8, which are also at the bank-municipality level.

decline in the average volume of bank deposits (81,143.4 million COP) translates into a decrease in bank deposits of 2,434.3 million COP. Meanwhile, a 35% decline in the average volume of new commercial credit (289.8 million COP) translates into a decline of 101.7 million COP per quarter. Thus, over the 2010-2011 period, new commercial credit in indirectly affected municipalities declined by 813.6 millions COP, which amounts to 33.4% of the decline in bank deposits. This magnitude seems plausible given that we are only analyzing new commercial credit in non-affected areas and that a fraction of bank deposits is held as bank reserve requirements.

B.1. Credit Supply or Credit Demand?

One potential concern with our specification is that the effect we capture is due to changes in credit demand and not a response to a decline in the credit supply. One way we address this in Table 8 is that we only consider municipalities with low or no confiscations, which should be less directly affected by the AML regulation. In addition, we present two additional pieces of evidence consistent with a credit supply channel. First, we use data on interest rates for new commercial credit from the credit registry. We re-estimate equation (4) using the level of interest rates as a dependent variable. Consistent with a credit supply channel, in Table 9 we find an increase in interest rates for banks that are more exposed to illegal drug activity, even when we control for municipality-time fixed effects. Quantitatively, a one standard deviation increase in bank exposure leads to a 34 basis points higher interest rate following the stricter enforcement of the regulation. Second, we also re-estimate equation (4) and include municipality-time fixed effects, which capture the average growth in new commercial credit within each municipality and quarter. Our results in column (3) in Table A3 in the Internet Appendix are robust to the inclusion of these fixed effects.

A potential concern is that we are not capturing all unobservable factors related to credit demand, and that our results may suffer from omitted variable bias. Altonji et al. (2005) and Oster (2019) suggest that a potential omitted variable bias can be analyzed by looking at how the R-squared and estimated coefficients change due to the introduction of observable controls.[25] In our framework, we introduce observable controls that proxy for time-varying credit demand at the

[25]See Williams (2018) for an application of this method to analyze the effects of credit supply and credit demand.

municipality level. When we compare the results in column (3) to those in column (1) in Table A3, we find that introducing fixed effects at the municipality-time level increases the R-squared from 10% to 47%, a more than fourfold increase. Despite that, the coefficient in column (3) is relatively similar and within the confidence interval of that in column (1); if anything, the coefficient in column (3) is slightly larger (in absolute terms). Therefore, the introduction of municipality-time fixed effects captures a substantial variation in credit growth, while does not appearing to affect our treatment effect. This suggests that the estimated effect we document is unlikely due to changes in credit demand at the municipality level.

C. Consequences for the Real Economy

In this subsection, we analyze the effects of the negative credit supply shock on the real economy. We start by analyzing firm-level outcomes and then examine night light intensity as a proxy for both formal and informal economic activity.

C.1. Firms' Financial Statements

We study firms' outcomes and test whether the negative liquidity shocks for banks and the consequent negative credit supply shock affect firms' growth. We exploit a proprietary dataset that includes all the loans issued to firms by all the banks in Colombia, during the 2006-2014 period.[26] We match this information with the financial statements of firms in Colombia. We end up with 2,143 firms with a relationship with at least one bank in our sample.[27]

Our empirical strategy relies on firms' differential access to financing, where the source of variation comes from the exposure to illegal drug activity of the banks each firm borrows from. For instance, two otherwise identical firms operating in the same industry and municipality might have relationships with different banks, therefore their access to financing might differ after the AML regulation and impact their outcomes. We construct a firm-level measure of indirect exposure to the regulation by evaluating the exposure of the banks the firm borrows from. Thus, we calculate

[26] Our results are robust to using alternative time periods.

[27] A number of firms obtain loans from financial institutions, such as credit cooperatives, that are not regulated by the Superintendencia Financiera de Colombia and/or that do not take deposits. Since the information provided by these financial institutions is limited, we cannot measure their exposure to illegal drug activity.

pre-regulation indirect exposure (IE) to the AML regulation as follows:

$$IE_f = \frac{\sum_{b=1}^{B} \text{Commercial Loans}_{b,f} Exposure_b}{\sum_{b=1}^{B} \text{Commercial Loans}_{b,f}}, \tag{5}$$

where B is the number of banks that lend to firm f, Commercial $\text{Loans}_{b,f}$ is the size of loans from bank b to firm f at the end of 2007, and $Exposure_b$ is our bank-level measure calculated in equation (3). Thus, our measure captures the share in a firm's credit portfolio that each bank has, as well as the exposure of each bank to the negative liquidity shock.

To illustrate, we provide a simplified example. Suppose that there are only two banks in Colombia, Bank A and Bank B. Bank A (B) sources 80% (30%) of its deposits from municipalities exposed to illegal drug activity. Now consider three firms, X, Y, and Z, that are not directly exposed to illegal drug activity (i.e., they operate in municipalities with no cocaine confiscations between 1999 and 2007). Firm X borrows exclusively from Bank A. Thus, the indirect exposure of firm X is 80% (1 x 0.8). Firm Y borrows exclusively from Bank B. Thus, the indirect exposure of firm Y is 30% (1 x 0.3). Firm Z borrows from both banks in equal amounts, therefore the indirect exposure of firm Z is 55% (0.5 x 0.3 + 0.5 x 0.8). This example shows that, even though these three firms are not exposed to the AML regulation directly, they are indirectly affected via the internal capital market of the banks and their negative liquidity shock.

Our specification to test the effect of the AML regulation on firms' outcomes is as follows:

$$y_{f,m,i,t} = \alpha_f + \alpha_{i,t} + \alpha_{m,t} + \beta_1 \times Post_t \times IE_f + \gamma_{f,t-1} + \varepsilon_{f,m,i,t}, \tag{6}$$

where $y_{f,m,i,t}$ is one of our outcome variables for firm f in municipality m, operating in industry i at time t. IE_f is the measure of exposure calculated in equation (5) and $Post_t$ is an indicator variable that is set to one starting in year 2010, when enforcement of the AML regulation became strict. We include firm fixed effects (α_f), industry-time fixed effects ($\alpha_{i,t}$), and municipality-time fixed effects ($\alpha_{m,t}$), to control for shocks to each particular industry, shocks to each municipality, and unobservable firm characteristics, respectively. We also include firm-level controls ($\gamma_{f,t-1}$), such as size and profitability, and we cluster standard errors at the firm level. In an alternative specifica-

tion, we include industry-municipality-year fixed effects ($\alpha_{m,i,t}$). In all of these specifications, we exclude firms that operate in municipalities in the top quartile in terms of the volume of cocaine confiscations.

Equation 6 allows us to compare outcomes of firms that operate in the same industry and municipality, but rely on credit from different banks. Our coefficient of interest is β_1, which measures the effect of the negative credit supply shock on firms with higher indirect exposure to the AML regulation. We report the results in Table 10. We find that, on average, there is no real effect on firms' outcomes. One potential explanation is that the average effect masks heterogeneity across firms. Arguably, the effect on small firms might be larger, since small firms are usually more financially constrained (Beck et al. (2008)). Thus, they might face larger difficulties when seeking alternatives for bank credit. In order to test this, we estimate the following:

$$y_{f,m,i,t} = \alpha_f + \alpha_{i,t} + \alpha_{m,t} + \beta_1 \times Post_t \times IE_f + \beta_2 \times Post_t \times Small_f + \\ \beta_3 \times Post_t \times Small_f \times IE_f + \gamma_{f,t-1} + \varepsilon_{f,m,i,t}, \tag{7}$$

where $Small_f$ is an indicator variable for firms below the median in terms of sales within each municipality at the end of 2007. Equation 7 allows us to test the heterogeneous effects on different sized firms. Our coefficient of interest is β_3, which measures the differential effect on small firms with higher indirect exposure to the AML regulation. As before, to address potential confounding effects, we focus on municipalities not directly exposed to illegal drug activity.

The results in Table 11 show that following the decline in bank deposits in municipalities affected by illegal drug activity, small firms that were indirectly affected experience worsening business outcomes. The results in Panel A indicate that a one standard deviation increase in indirect exposure to the credit supply shock (0.065) for small firms is associated with a 9.3% (-1.432 x 0.065) larger decline in sales, a 6.5% larger decline in cash holdings (although not significant at the 10% level), a 10% larger decline in property, plant, and equipment, a 3.4% larger decline in total assets, a 24.3% larger decline in the level of financial debt, and a 2.5% larger decline in net profit. In contrast, we find no effect on large firms. When we include industry-municipality-year fixed effects, the results remain practically unchanged, as shown in Panel B.

A potential concern is that our results are affected by a violation of the Stable Unit Treatment Value Assumption (Rubin (1980)). For instance, if drug cartels import goods from municipalities with little or no drug trafficking activity, the regulation would have a negative effect on these municipalities not only via a credit supply shock but also via a demand shock. To provide further evidence that our results correspond to the credit supply shock, we split firms in our sample into those in the tradable and non-tradable sectors.[28] We test whether firms in the tradable sector are more affected than those in the non-tradable sector by including an indicator variable ($Tradable$) that is set to one for firms in the CIIU categories A to D and interacting it with the terms in Equation 7. The results in Table A4 in the Internet Appendix show that firms in the tradable sector did not experience a different shock than those in the non-tradable sector, suggesting that our results are not driven by an import demand shock.

C.2. Real Economic Activity

An alternative explanation that is consistent with our firm-level results is that there is a shift away from the formal economy into the informal sector. To rule out this alternative explanation, we proxy real economic activity, including the informal sector, by studying satellite night lights, an approach used frequently when reliable data are not available (Chodorow-Reich et al. (2018)).

We use data for 2006-2014 and match it with Colombian municipalities using geographic coordinates for each municipality. For each municipality-year, we aggregate the data to obtain a measure of the intensity of man-made light. We use the data to test whether municipalities more exposed to the AML regulation experience a decline in economic activity as proxied by night lights. Our empirical strategy relies on the differential exposure to the AML regulation driven by differences in the composition of the banking market across municipalities. For each municipality, we create a measure of indirect exposure to the regulation that takes into consideration the loan market shares of banks operating within the municipality, as well as the degree of exposure of each bank. We

[28] In Equation 6 a shock to demand would be absorbed by our industry-year or industry-municipality-year fixed effects, thus our results responded to the credit supply shock net of any potential demand shock.

calculate the indirect exposure at the municipality level at the end of 2007 as follows:

$$IE_m = \frac{\sum_{b=1}^{B} \text{Commercial Loans}_{b,m} Exposure_b}{\sum_{b=1}^{B} \text{Commercial Loans}_{b,m}}, \tag{8}$$

where B is the number of banks that operate in municipality m, *Commercial Loans*$_{b,m}$ is the volume of the portfolio of commercial loans of bank b in municipality m, and *Exposure Bank*$_b$ is our bank-level measure calculated in equation (3). Thus, our measure of indirect exposure captures the exposure of each bank to the AML regulation and its market share within each municipality.

We use the following specification to test the effect of the credit supply shock on economic activity:

$$\ln(Nightlights)_{m,d,t} = \alpha_m + \alpha_{d,t} + \beta_1 Post_t \times IE_m + \varepsilon_{m,d,t}, \tag{9}$$

where $\ln(Nightlights)_{m,d,t}$ is the log intensity of night lights in municipality m, department d, in year t. IE_m is our measure of indirect exposure as calculated in equation (8). We include municipality fixed effects (α_m) to control for the time-invariant characteristics of night lights at the municipality level and department-time fixed effects ($\alpha_{d,t}$) to control for regional shocks. We cluster standard errors at the municipality level and, as before, we focus on municipalities not directly impacted by the regulation.

The results in Table 12 show that the credit supply shock had an economic impact on the indirectly affected municipalities. In particular, a one standard deviation increase in a municipality's indirect exposure to the AML regulation is associated with an 9.5% decrease in night light intensity when including department-year fixed effects (column (3)). Figure 9 shows the year-by-year coefficients of the framework in Equation (9).[29] Prior to the regulation, there is no discernible difference in night lights in municipalities with different exposures to the AML regulation. After the strict enforcement of the regulation in 2010, there is a fall in night light intensity in municipalities that are more indirectly exposed to the AML regulation. Taken together, these findings show that our

[29] In the Internet Appendix, Figures A1 and A2, we show plots of analogous year-by-year coefficients, but using aggregate employment and number of firms at the *municipality-year* level as dependent variables. We obtain data on employment and number of firms from the Colombian Department of Labor. Unfortunately, data for these variables are not available prior to 2009, thus we are unable to evaluate prior trends. Despite this, we observe a negative growth in employment for small firms, as well as a decrease in the total number of firms after 2009.

results respond to a significant decline in real economic activity, not to a reallocation of economic activity across firms or to a shift away from the formal economy.

V. Conclusion

In this paper, we document a hidden cost of an AML regulation in Colombia aimed at controlling the flow of money from drug trafficking into the financial system. In particular, we show that controls on money laundering had a negative effect on economic activity and firms' outcomes by reducing available funding. Our identification strategy at the bank level — for both deposits and loans — relies on difference-in-differences estimations based on heterogeneous geographic exposure to funds from illegal drug activities. We find a drop in bank deposits in municipalities exposed to illegal drug activities, as proxied by cocaine confiscations. We also find that banks that source their deposits in these areas reduce lending in municipalities not directly affected by the regulation. In addition, we show that the reduction in lending had a significant negative effect on the economy. Small firms reliant on affected banks experienced a negative shock in terms of assets, investment, profitability, and sales. Municipalities indirectly exposed to the regulation experienced a decline in economic activity as proxied by night light intensity.

To the best of our knowledge, we are the first to empirically identify and measure the potential negative economic repercussions of the war against money laundering on the real economy. This finding has important implications for regulationmakers, especially those in countries where illegal activity is intrinsically embedded in the formal and informal economy. More specifically, our findings suggest that the implementation of AML policies should be accompanied by expansionary liquidity policies to reduce the negative short-term liquidity shock to the financial system, which could in turn have long-term negative economic effects.

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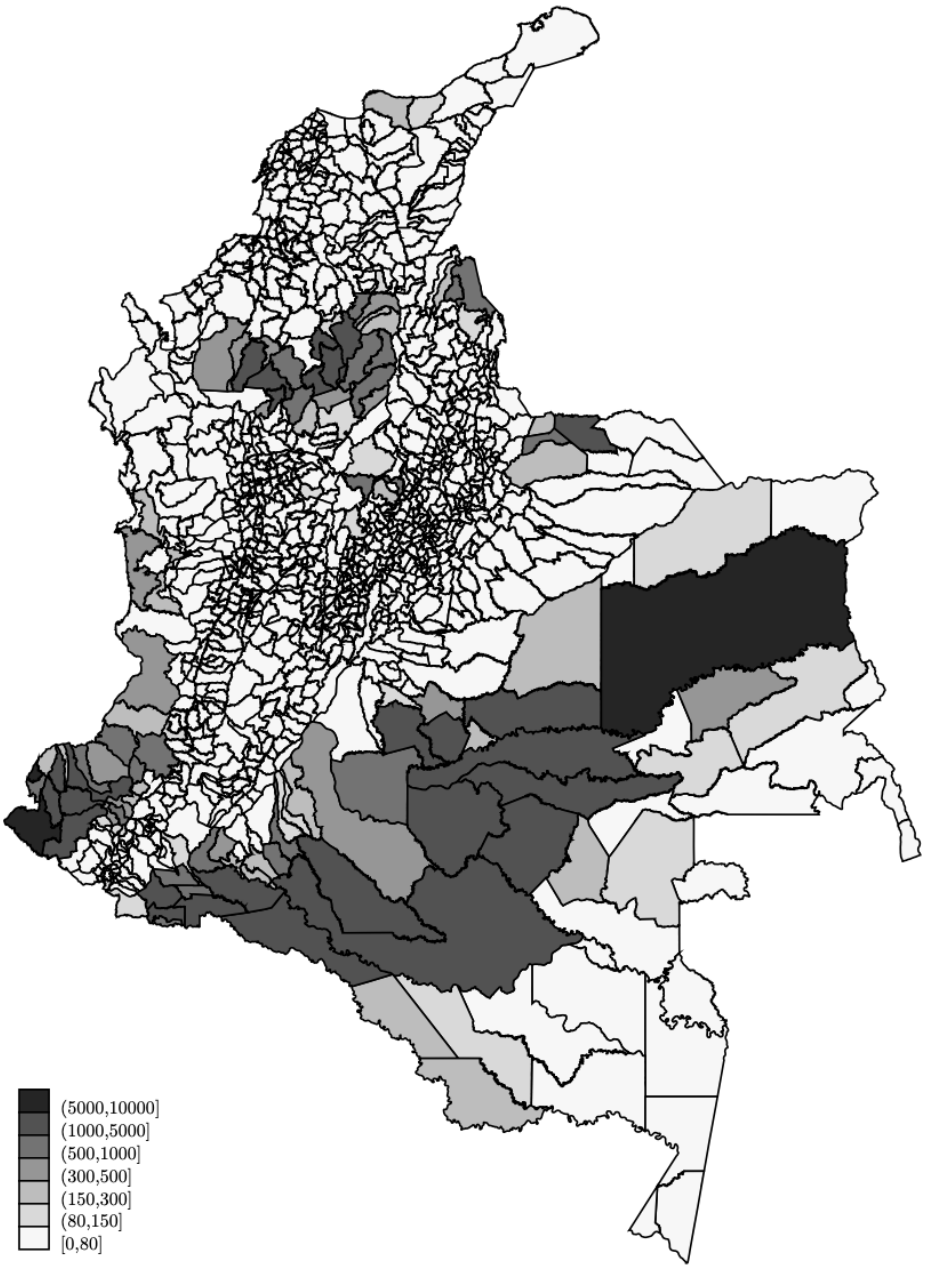
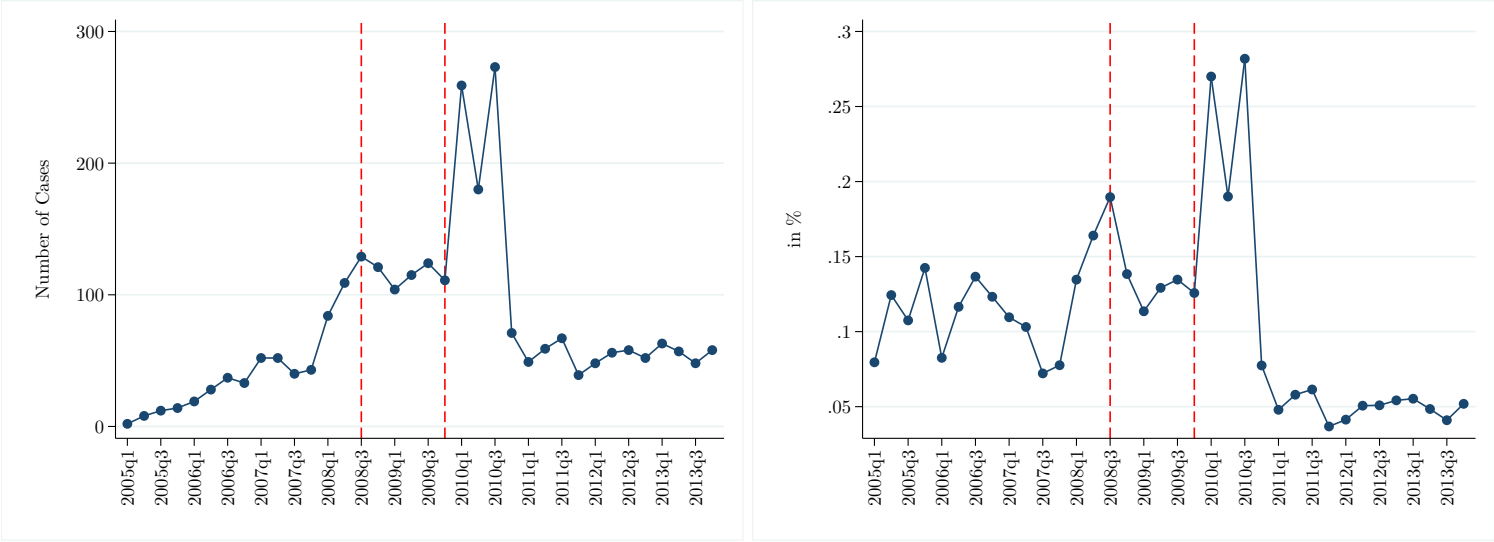
Figure 1: Cultivation of Coca



This figure shows the territories affected by crops of coca leaves, as measured by the volume of hectares dedicated to the growth of coca as of 2007. Data are obtained from the "Survey of Territories Affected by Illicit Crops" published by the United Nations Office on Drugs and Crime.

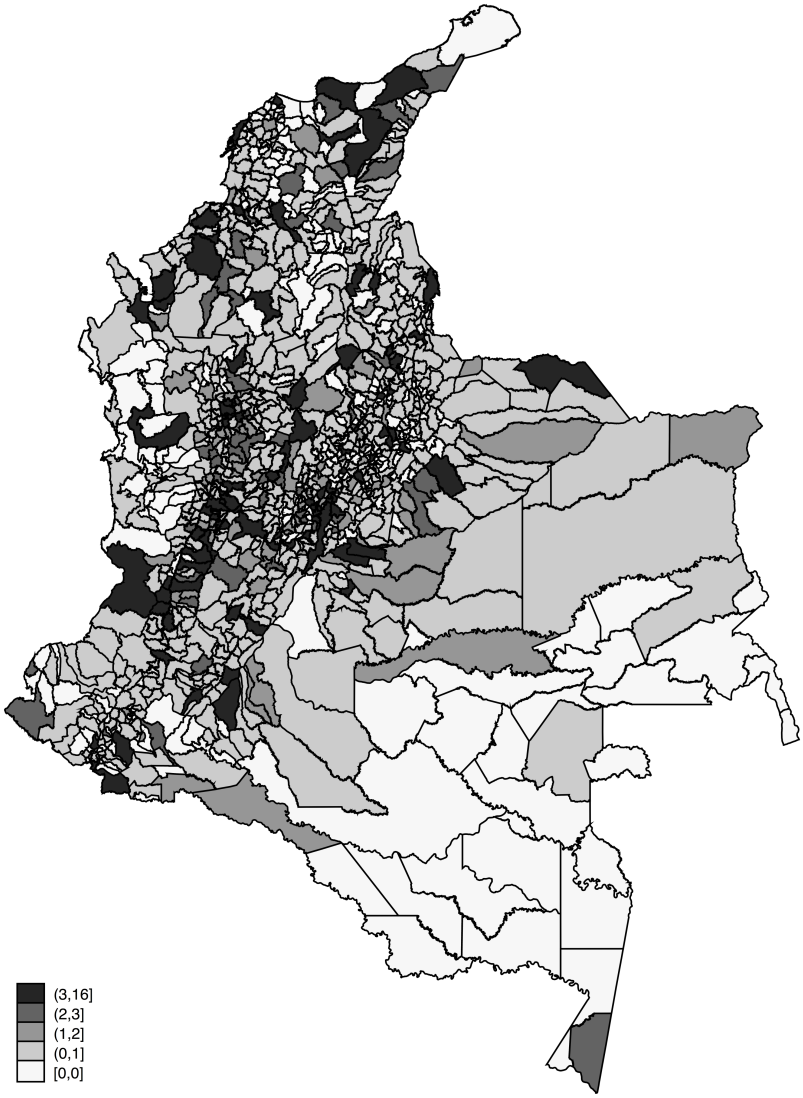
Figure 2: Money Laundering Cases



Panel A Panel B

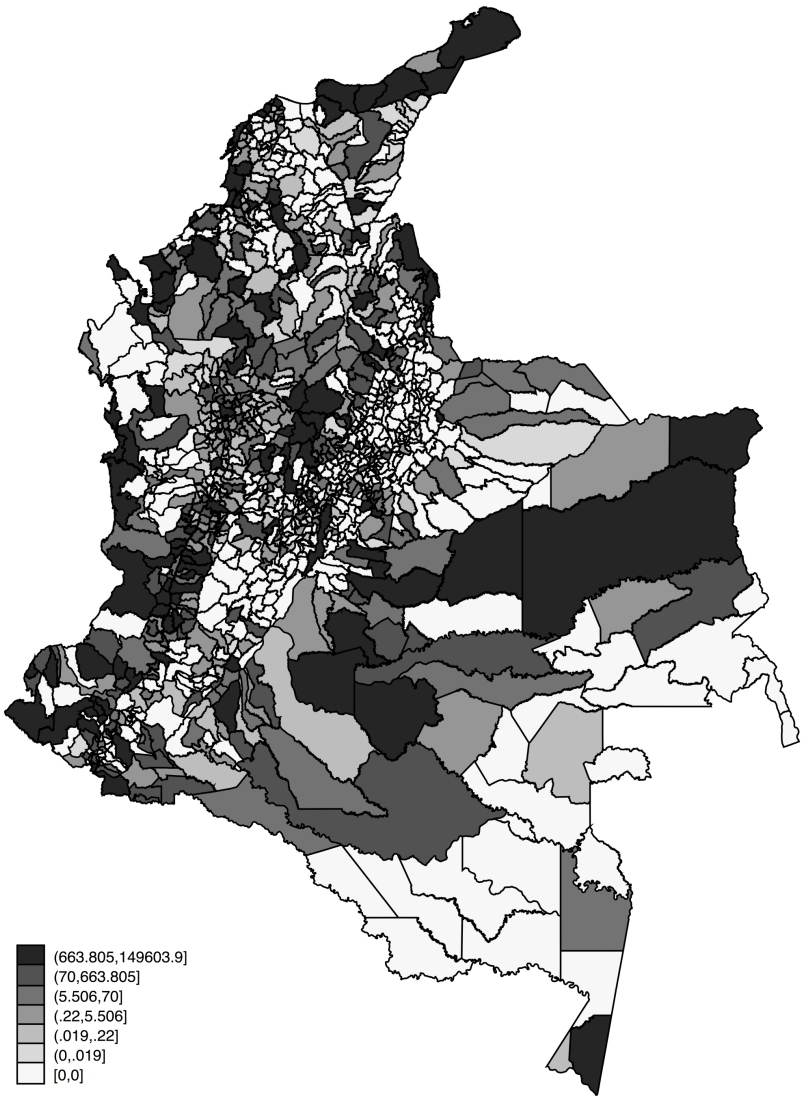
This figure shows the number of money laundering cases received by the Office of the Prosecutor between 2005 and 2013. Panel A shows the raw number of cases, on a quarterly basis. Panel B shows the percentage of money laundering cases over total number of cases received by the Office of the Prosecutor. The first vertical dashed line indicates the quarter of the passage of the regulation. The second vertical dashed line indicates the quarter before the significant increase in the processed AML cases. Data are from the Office of the Prosecutor.

Figure 3: Presence of Banks across Colombian Municipalities



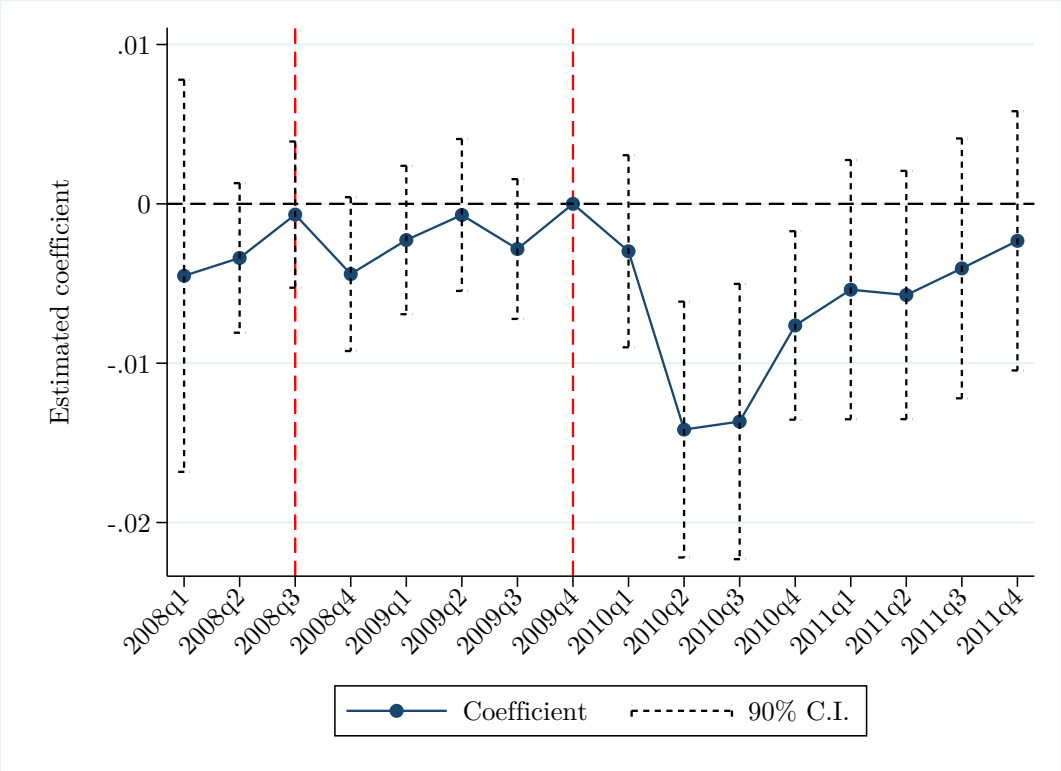
This figure shows the number of banks that operated within each Colombian municipality as of the end of 2007. Data are from the Superintendencia Financiera de Colombia, the Colombian government agency responsible for overseeing financial institutions.

Figure 4: Confiscations of Cocaine



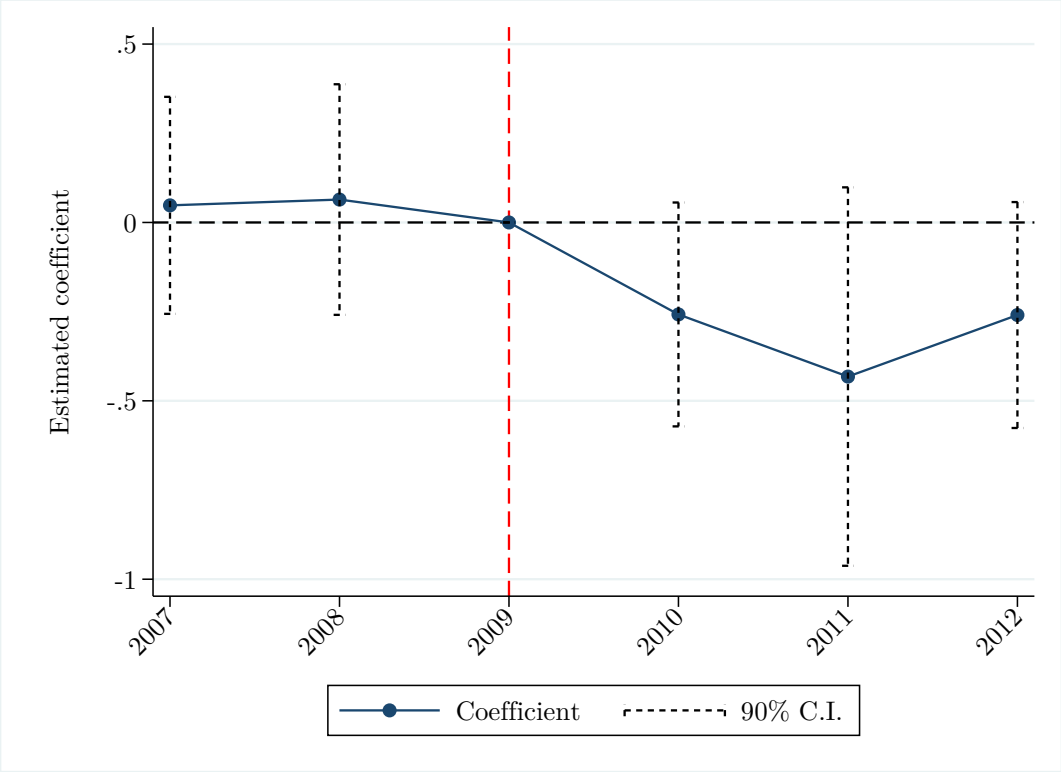
This figure shows the volume (in kilograms) of cocaine hydrochloride confiscated by the Colombian authorities between 1999 and 2007 on each Colombian municipality. Data are from the Colombia's Drug Observatory.

Figure 5: Log Deposits and Confiscations



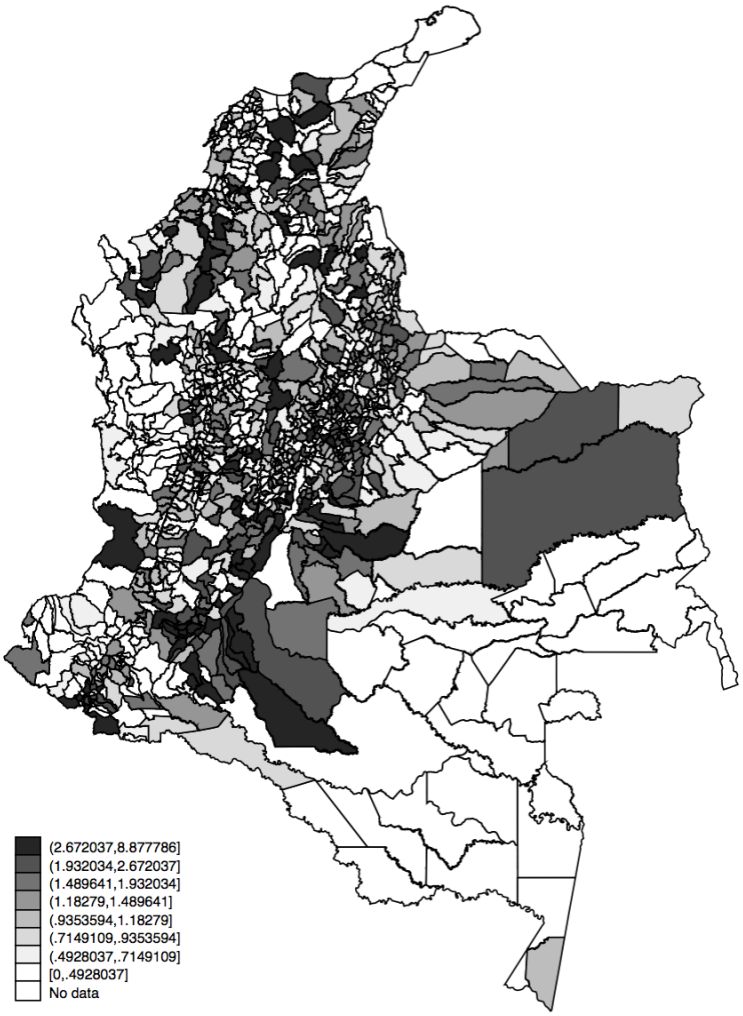
This figure shows the coefficients from an estimation of log deposits on the interaction between quarter fixed effects and exposure to illegal drugs activity at the municipality level. The estimation contains time and municipality fixed effects. Exposure to illegal drugs activity is measured by cocaine confiscations between 1999 and 2007 and is standardized. Vertical bars represent confidence intervals at the 90% level. The first dashed red line indicates the quarter of the passage of the regulation. The second dashed red line indicates the quarter before the significant increase in the processed AML cases. Data on deposits are from the Superintendencia Financiera de Colombia, the Colombian government agency responsible for overseeing financial institutions. Data on confiscations are from the agency responsible for the dissemination of information related to drugs.

Figure 6: Claims of Colombian Residents in Foreign Countries



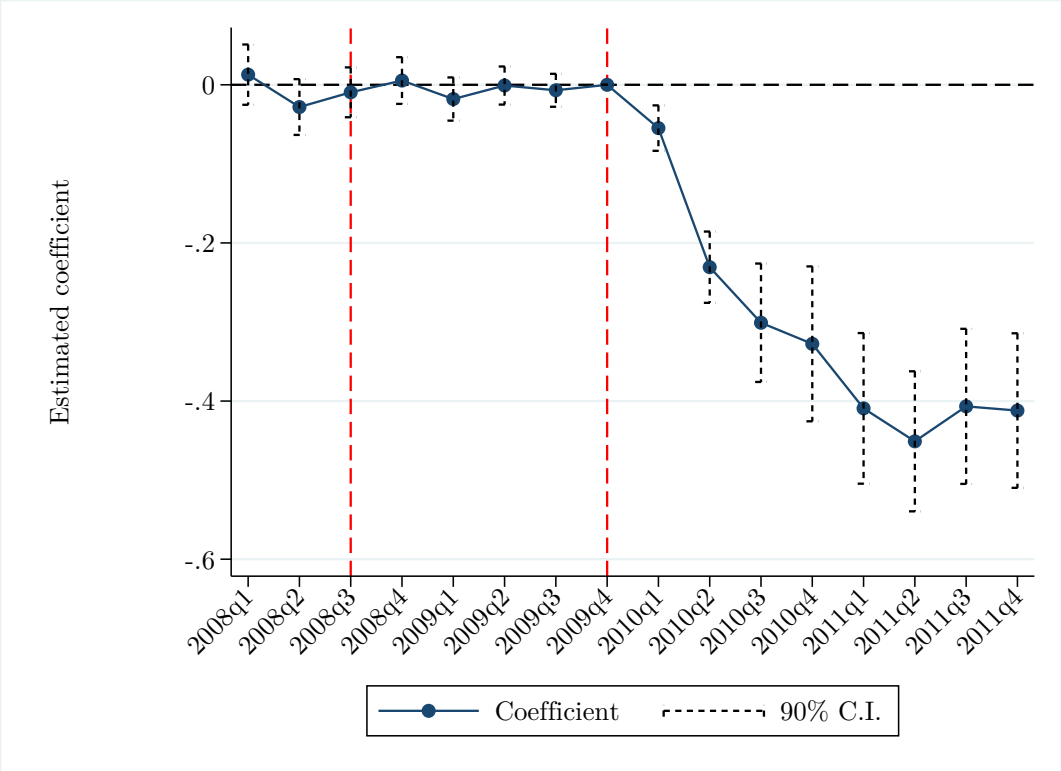
This figure shows the coefficients from an estimation of log claims on the interaction between year fixed effects and a dummy variable indicating countries with a higher risk of laundering money. This dummy variable is one for Guernsey, Isle of Man, Jersey, Luxembourg, and Switzerland. Claims are claims from Colombian residents in different foreign countries. The estimation contains country and year fixed effects. Vertical bars represent confidence intervals at the 90% level. The dashed red line indicates the year before the significant increase in AML cases. Data on claims are from the Bank for International Settlements.

Figure 7: Banks' Internal Capital Markets



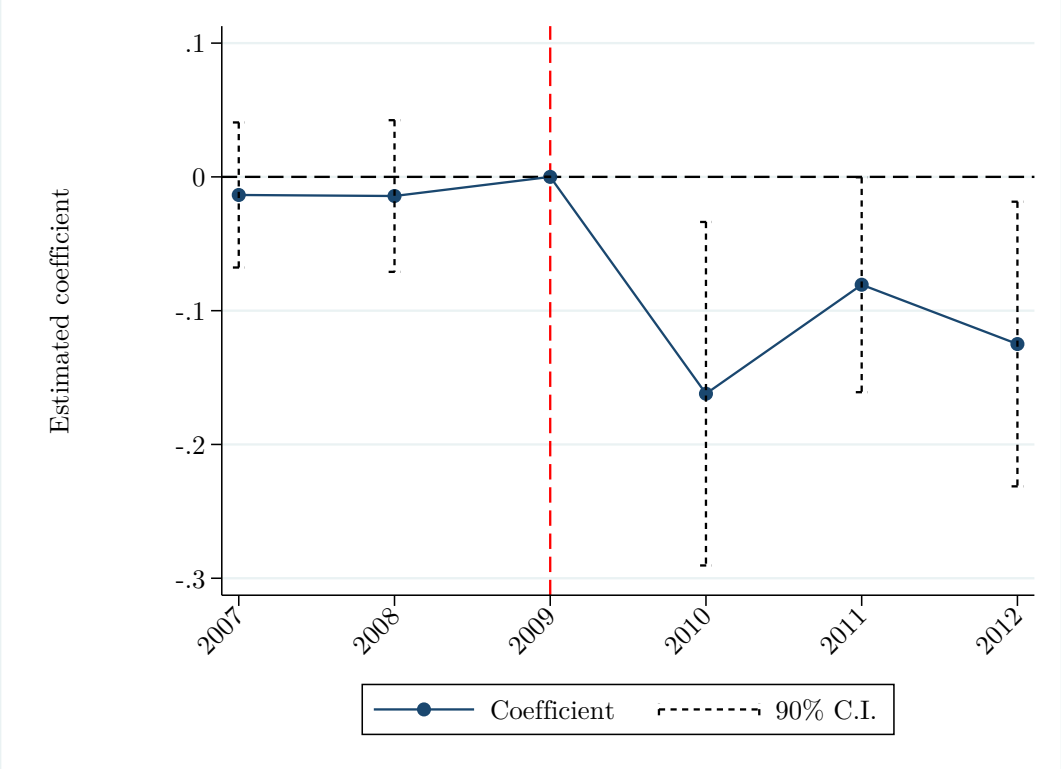
This figure shows the variation across municipalities in the loan-deposit ratio for Banco Agrario de Colombia at the end of 2007. Municipalities with ratios below one are net providers of funds, while those with ratios above one are net receivers of funds. Data are from the Superintendencia Financiera de Colombia, the Colombian government agency responsible for overseeing financial institutions.

Figure 8: Commercial Credit and Bank Exposure



This figure shows the coefficients from a regression of log of new commercial credit on bank exposure interacted with time fixed effects. The estimation also contains bank-municipality and time fixed effects. The bank exposure variable is the percentage of deposits in a given bank that is sourced from municipalities with cocaine confiscations in the top quartile across municipalities. The bank exposure variable is standardized. Vertical bars represent confidence intervals at the 90% level. The first dashed red line indicates the quarter of the passage of the regulation. The second dashed red line indicates the quarter before the significant increase in the processed AML cases. Data on deposits are from the Superintendencia Financiera de Colombia, the Colombian government agency responsible for overseeing financial institutions. Data on confiscations are from the agency responsible for the dissemination of information related to drugs.

Figure 9: Night Lights and Municipality Indirect Exposure



This figure shows the coefficients from a regression of log of night lights on indirect exposure interacted with time fixed effects. The estimation also contains municipality and time fixed effects. The indirect exposure variable is a measure of the exposure of a municipality to the funding gap as measured by the weighted average of the exposure of the banks that provide credit in that municipality. Vertical bars represent confidence intervals at the 90% level.

Table 1: Summary Statistics - Banks

Bank	Municipalities	Deposits (billion COP)
Banco Agrario	710	3,950.22
Bancolombia	167	21,750.72
Banco de Bogota	158	14,454.03
Davivienda	147	14,440.39
BBVA Colombia	92	13,975.67
Banco Popular	80	6,001.42
Banco Caja Social BCSC	62	5,205.74
AV Villas	49	3,687.21
Banco de Occidente	40	8,232.59
Red Multibanca Colpatria	28	4,219.32
Banco Santander Colombia	22	2,956.45
Banco de Credito	13	3,282.43
Banco GNB Sudameris	12	2,676.93
Citibank	10	3,999.15
Banistmo Colombia	10	1,479.02
ABN AMRO Bank Colombia	4	324.61

This table shows summary statistics for the banks operating in Colombia as of the fourth quarter of 2007. The second column indicates the number of municipalities in which the bank has presence through a physical branch. The third column reports the total volume of deposits. Data are from the Superintendencia Financiera de Colombia, the Colombian government agency responsible for overseeing financial institutions.

Table 2: Summary Statistics - Firms

Firm-level Summary Statistics						
	Observations	Mean	SD	p25	Median	p75
Cash	21734	21.81	69.41	0.15	1.20	9.54
PPE	21734	862.38	2738.16	22.66	120.81	467.11
Sales	21734	5471.30	14956.72	226.09	944.63	3644.91
Leverage	21721	0.51	0.30	0.28	0.52	0.72
Net Profit	20248	0.03	0.44	0.01	0.03	0.07
Gross Profit	20248	0.43	0.33	0.19	0.33	0.63
Tradable Dummy	21734	0.29	0.45	0.00	0.00	1.00

This table shows summary statistics for the firms operating in Colombia as of the fourth quarter of 2007. Data are from the Superintendencia de Sociedades, the governmental agency in charge of monitoring firms. Cash, property, plant, and equipment (PPE) and sales are expressed in thousand U.S. dollars.

Table 3: Cocaine Hydrochloride Confiscations

Department	1999	2000	2001	2002	2003	2004	2005	2006	2007
Amazonas	220	6	44	41	69	92	55	303	48
Antioquia	3,830	1,533	1,793	1,158	6,745	12,979	9,432	4,366	6,015
Arauca	33	1	3	19	84	42	117	4	31
Atlantico	2,356	2,537	522	3,326	82	3,296	8,766	6,675	405
Bogota	3,538	1,420	2,859	1,228	2,932	4,524	7,091	7,550	2,035
Bolivar	2,786	3,088	700	2,260	12,153	18,310	19,505	10,396	13,682
Boyaca	233	641	1,195	1,550	88	1,958	770	1,708	1,378
Caldas	28	0	0	867	2	1,560	569	2,843	241
Caqueta	211	10	1	3	0	455	1,279	115	62
Casanare	0	0	0	0	0	45	2	112	3,156
Cauca	1,663	898	1,114	31	3,707	1,791	5,127	1,823	6,919
Cesar	0	0	281	1,504	2	0	1,313	1,506	88
Choco	10	569	2	2,304	162	3,455	407	5,108	27,190
Cordoba	38	51	50	1,390	124	4,045	2,146	2,226	3,433
Cundinamarca	104	30	1,681	700	1,030	387	2,391	869	1,681
Guainia	1	0	398	0	0	0	0	0	3
Guajira	640	3,118	479	269	1,490	1,903	2,204	4,681	1,712
Guaviare	0	170	23	0	1	24	1,411	19	0
Huila	1909	75	185	256	9	79	133	8	45
Magdalena	1,521	3,096	4,661	4,015	4,128	2,800	13,238	4,482	1,686
Meta	204	713	689	9,021	918	625	789	1,045	1,275
Narino	3,121	971	2,926	17,237	14,184	31,756	44,576	20,617	15,514
Norte Santander	722	356	153	678	295	267	2,971	1,191	2,704
Putumayo	313	1,479	185	18	1	30	107	43	186
Quindio	23	91	5	951	9	4	8	15	18
Risarlada	56	252	24	10	600	863	69	82	85
San Andres y Providencia	42	3,310	6	4,191	3,796	7,067	7,809	7,012	973
Santander	1,680	542	1,353	33	50	1,209	2,349	1,093	6,030
Sucre	251	5,268	2,112	6,250	1,968	5,335	1,346	6	15
Tolima	42	101	0	18	963	45	67	26	63
Valle del Cauca	3,833	19,902	6,120	5,747	11,432	44,336	29,128	44,910	31,316
Vaupes	0	0	0	0	0	0	0	0	0
Vichada	0	0	1	0	0	0	3,274	64	3,428

This table presents the volume of cocaine hydrochloride (in kilograms) confiscated by the authorities across departments in Colombia from 1999 to 2007. Data are from the Observatorio de Drogas de Colombia, the Colombian government agency responsible for the dissemination of information related to drugs and drug-related crimes.

Table 4: Deposits and Municipality Exposure to Drug Activity

Dependent Variable - Log Deposits (2008-2011)						
	Confiscations (1999-2007)			Confiscations (2003-2007)		
	(1)	(2)	(3)	(4)	(5)	(6)
Municipality Exposure × Post	-0.006***	-0.007***	-0.005***	-0.006***	-0.006***	-0.005***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Post	0.099***			0.099***		
	(0.005)			(0.005)		
Municipality FE	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	No	Yes	No	No	Yes	No
Department-Time FE	No	No	Yes	No	No	Yes
Observations	11,921	11,921	11,852	11,921	11,921	11,852
R^2	0.977	0.980	0.980	0.977	0.980	0.980

This table presents OLS estimates of the effect of the anti-money laundering regulation on deposits at the municipality level. The dependent variable is the log of total deposits. The municipality exposure variable is the accumulated cocaine confiscations between 1999 and 2007 (columns (1)-(3)) and between 2003 and 2007 (columns (4)-(6)). Both exposure variables are standardized to have mean equal to 0 and standard deviation equal to 1. *Post* is a variable indicating the 2010-2011 year. The growth of the dependent variable is winsorized at the 5th and 95th percentile. Errors are clustered at the municipality level. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

Table 5: Deposits and Municipality Exposure to Drug Activity: Municipality-Bank Estimations

Dependent Variable - Log Deposits (2008-2011)			
	Bank-Level	Foreign	No Bank Agrario
	(1)	(2)	(3)
Municipality Exposure × Post	-0.030***	-0.029***	-0.027***
	(0.008)	(0.007)	(0.007)
Municipality Exposure × Post*Foreign		-0.017	
		(0.021)	
Post × Foreign		0.035	
		(0.027)	
Municipality-Bank FE	Yes	Yes	Yes
Department-Time FE	Yes	Yes	Yes
Observations	25,497	25,497	15,114
R^2	0.956	0.956	0.956

This table presents OLS estimates of the effect of the anti-money laundering regulation on deposits at the bank-municipality level. The dependent variable is the log of total deposits. The municipality exposure variable is accumulated cocaine confiscations between 1999 and 2007 and is standardized to have mean 0 and standard deviation 1. Column 2 includes a dummy variable that indicates whether a bank is foreign owned interacted with the municipality exposure and post period dummy. Column 3 restrict the sample to exclude Banco Agrario de Colombia, the largest state owned bank. *Post* is a variable indicating the 2010-2011 year period. The growth of the dependent variable is winsorized at the 5th and 95th percent level. Errors are clustered at the municipality level. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

Table 6: Claims by Colombian Residents in High Risk Jurisdictions

Dependent Variable - Log Claims by Colombian Residents		
	(1)	(2)
High Risk x Post	-0.377**	-0.377**
	(0.187)	(0.188)
Post	0.310***	
	(0.092)	
Time FE	No	Yes
Country FE	Yes	Yes
Observations	480	480
R^2	0.891	0.894

This table presents OLS estimates of the effect of regulation on aggregate cross-country claims during 2008-2011. The dependent variable is the log volume of claims owned by Colombian residents in foreign jurisdictions. $High\ Risk_c$ is an indicator on whether the jurisdiction contains high risk of being used to launder money, and $Post_q$ is an indicator set to one from 2010 onwards. Robust standard errors are reported in parentheses. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

Table 7: Banks' Internal Capital Markets

Loans to Deposits Ratio							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Municipalities	Mean	Min	p25	Median	p75	Max
Banco Agrario de Colombia S.A.	710	1.50	0.00	0.71	1.17	1.94	8.88
Banco Caja Social BCSC	62	1.08	0.24	0.70	1.00	1.32	3.40
Banco Colpatria - Red Multibanca	28	0.73	0.00	0.08	0.33	1.15	3.27
Banco Comercial AV Villas S.A.	49	0.80	0.22	0.52	0.76	0.93	2.83
Banco Corpbanca	22	1.26	0.21	0.50	0.76	1.89	5.28
Banco Davivienda S.A.	147	0.70	0.00	0.33	0.60	1.00	2.16
Banco de Bogota	158	0.86	0.15	0.52	0.74	1.07	6.10
Banco de Occidente	40	0.96	0.02	0.51	0.80	1.28	2.44
Banco GNB Sudameris S.A.	12	1.71	0.00	0.59	1.17	2.59	4.68
Banco Popular S.A.	80	1.78	0.34	1.16	1.60	2.47	4.05
BanColombia S.A.	167	1.25	0.07	0.67	1.06	1.54	6.99
BBVA Colombia	92	1.12	0.23	0.80	1.03	1.36	3.32
Citibank	10	1.08	0.20	0.43	1.21	1.73	1.86
Helm Bank SA	13	1.50	0.00	0.14	1.11	2.88	3.02
The Royal Bank of Scotland	4	0.75	0.00	0.01	0.53	1.49	1.93

This table presents summary statistics on the loan-deposit ratio across banks and municipalities at the end of 2007. Data are from the Superintendencia Financiera de Colombia, the Colombian government agency responsible for overseeing financial institutions.

Table 8: Commercial Credit and Bank Exposure to Affected Municipalities

Dependent Variable - Log New Commercial Credit (2008-2011)			
	(1)	(2)	(3)
Bank Exposure × Post	-0.320***	-0.319***	-0.351***
	(0.047)	(0.046)	(0.062)
Post	-0.228***		
	(0.045)		
Municipality-Bank FE	Yes	Yes	Yes
Time FE	No	Yes	No
Municipality-Time FE	No	No	Yes
Observations	18,515	18,515	11,468
R^2	0.809	0.812	0.850

This table presents OLS estimates of the effect of bank exposure to the anti-money laundering regulation on log of new commercial credit at the bank-municipality level. The bank exposure variable is measured as the share of deposits sourced from municipalities in the top quartile in terms of accumulated cocaine confiscations. The sample is restricted to municipalities not directly affected by the regulation (i.e., those outside of the top quartile in terms of volume of cocaine confiscations). The exposure variable is standardized to have mean equal to 0 and standard deviation equal to 1. *Post* is a variable indicating the 2010-2011 period. The growth of the dependent variable is winsorized at the 5th and 95th percent level. Errors are clustered at the municipality level. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

Table 9: Interest Rates and Bank Exposure to Affected Municipalities

Dependent Variable - Interest Rates on New Commercial Credit			
	(1)	(2)	(3)
Bank Exposure × Post	0.334***	0.306***	0.344***
	(0.115)	(0.111)	(0.116)
Post	-2.839***		
	(0.103)		
Municipality-Bank FE	Yes	Yes	Yes
Time FE	No	Yes	No
Municipality-Time FE	No	No	Yes
Observations	8,993	8,993	8,205
R^2	0.413	0.448	0.547

This table presents OLS estimates of the effect of bank exposure to the anti-money laundering regulation on interest rates of new commercial credit at the bank-municipality level. The bank exposure variable is measured as the share of deposits sourced from municipalities in the top quartile in terms of accumulated cocaine confiscations. The sample is restricted to municipalities not directly affected by the regulation (i.e., those outside of the top quartile in terms of volume of cocaine confiscations). The exposure variable is standardized to have mean equal to 0 and standard deviation equal to 1. *Post* is a variable indicating the 2010-2011 period. The growth of the dependent variable is winsorized at the 5th and 95th percent level. Errors are clustered at the municipality level. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

Table 10: Firm-Level Outcomes and Exposure to the AML regulation

Panel A

Dependent Variable	(1) Sales	(2) Cash	(3) PPE	(4) Assets	(5) Financial Debt	(6) Net Profit
Indirect Exposure × Post	-0.0592	-0.417	0.0819	0.0649	-0.575	-0.0757
	(0.370)	(0.729)	(0.321)	(0.0835)	(1.047)	(0.0888)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry-Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Municipality-Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry-Muni-Year FE	No	No	No	No	No	No
Observations	15,671	15,006	15,666	15,672	15,672	15,595
R^2	0.816	0.683	0.843	0.980	0.715	0.377

Panel B

Dependent Variable	(1) Sales	(2) Cash	(3) PPE	(4) Assets	(5) Financial Debt	(6) Net Profit
Indirect Exposure × Post	-0.428	-0.758	0.0137	0.0762	-0.163	-0.111
	(0.479)	(0.827)	(0.381)	(0.0895)	(1.242)	(0.102)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry-Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Municipality-Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry-Muni-Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	13,000	12,410	12,994	13,001	13,001	12,927
R^2	0.832	0.718	0.848	0.981	0.754	0.457

This table presents OLS estimates of the effect of firms' indirect exposure to the anti-money laundering regulation on firm-level outcomes. Indirect Exposure is the measure of firm-level exposure as measured by the weighted average of the exposure of the banks a firm has a credit relationship with. The sample is restricted to firms in municipalities with low or no illegal drugs activities, i.e., those outside of the top quartile in terms of the volume of cocaine confiscations. Data are from 2006 to 2014, and Post is an indicator variable for the 2010-2014 period. The dependent variables are logged and winsorized at the 1st and 99th percentiles. Standard errors are clustered at the firm level. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

Table 11: Firm-Level Outcomes and Exposure to the AML regulation: Small Firms

Panel A

Dependent Variable	(1) Sales	(2) Cash	(3) PPE	(4) Assets	(5) Financial Debt	(6) Net Profit
Indirect Exposure × Post	0.466	0.251	0.638	0.246***	0.962	0.0984
	(0.515)	(0.945)	(0.392)	(0.0848)	(1.440)	(0.108)
Small × Post	1.156**	1.166	1.272**	0.428***	3.058**	0.329**
	(0.533)	(1.186)	(0.537)	(0.145)	(1.488)	(0.130)
Indirect Exposure × Small × Post	-1.432**	-0.999	-1.524**	-0.529***	-3.742**	-0.377**
	(0.618)	(1.342)	(0.629)	(0.165)	(1.704)	(0.150)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry-Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Municipality-Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry-Muni-Year FE	No	No	No	No	No	No
Observations	15,373	14,722	15,368	15,374	15,374	15,299
R^2	0.816	0.682	0.842	0.980	0.715	0.378

Panel B

Dependent Variable	(1) Sales	(2) Cash	(3) PPE	(4) Assets	(5) Financial Debt	(6) Net Profit
Indirect Exposure × Post	0.148	-0.156	0.676	0.207**	1.324	0.0600
	(0.644)	(1.088)	(0.469)	(0.0998)	(1.699)	(0.118)
Small × Post	1.504*	1.163	1.826***	0.351*	3.089*	0.346**
	(0.771)	(1.374)	(0.656)	(0.183)	(1.841)	(0.174)
Indirect Exposure × Small × Post	-1.863**	-1.033	-2.249***	-0.441**	-3.697*	-0.387*
	(0.896)	(1.555)	(0.765)	(0.208)	(2.111)	(0.197)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry-Year FE	No	No	No	No	No	No
Municipality-Year FE	No	No	No	No	No	No
Industry-Muni-Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	12,783	12,200	12,777	12,784	12,784	12,712
R^2	0.832	0.717	0.846	0.981	0.753	0.455

This table presents OLS estimates of the effect of firms' indirect exposure to the anti-money laundering regulation on firm-level outcomes. Indirect Exposure is the measure of firm-level exposure as measured by the weighted average of the exposure of the banks a firm has a credit relationship with. The sample is restricted to firms in municipalities with low or no illegal drugs activities, i.e., those outside of the top quartile in terms of volume of cocaine confiscations. Data are from 2006 to 2014, and Post is an indicator variable for the 2010-2014 period. The dependent variables are logged and winsorized at the 1st and 99th percentiles. Standard errors are clustered at the firm level. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

Table 12: Real Economic Activity

Dependent Variable - Log Night Lights			
	(1)	(2)	(3)
Indirect Exposure × Post	-0.127**	-0.127**	-0.095***
	(0.052)	(0.052)	(0.031)
Post	0.508***		
	(0.090)		
Municipality FE	Yes	Yes	Yes
Time FE	No	Yes	No
Department-Time FE	No	No	Yes
Observations	4,454	4,454	4,446
R^2	0.954	0.959	0.971

This table presents OLS estimations of the effect of the funding gap on real economic activity, as proxied by the intensity of night lights at the municipality level. The dependent variable is the log of the intensity of lights at the municipality-year level. Indirect Exposure is a measure of the exposure of a municipality to the funding gap, constructed as the weighted average of the exposure of the banks that provide credit in that municipality. *Post* is a variable indicating the 2010-2014 period. The growth of the dependent variable is winsorized at the 1th and 99th percent level. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

A Internet Appendix

A. Colombia and the Illegal Drugs Industry

The illegal drug business in Colombia is believed to have started in the 1960s with the first marijuana crops and grew rapidly in the 1970s. In the early 1970s, and following pressure from the United States, the Mexican government engaged in a program to eradicate marijuana plantations. Thus, as the demand for marijuana in Europe and the U.S. grew, an opportunity to take over the market arose. Colombian growers seized this opportunity.

In the late 1970s, the marijuana business declined in Colombia due to increased production in the U.S. (Thoumi, 2002). The growers then transitioned to a more profitable business: cocaine. Initially a small export business to the U.S., it allowed drug traffickers to develop links with suppliers of coca paste from Bolivia and Peru and establish trafficking routes to the U.S. By the 1980s, Colombia had become the largest cocaine producer in the world.

The poor economic conditions in the countryside and the persistence of armed groups such as the National Liberation Army (ELN) and the Revolutionary Armed Forces of Colombia (FARC) in territories with low or no presence of the state likely contributed to the rise of the cocaine industry. In terms of capacities and process integration, there is one characteristic that distinguished Colombian drug cartels from others. While in countries such as Mexico the drug cartels are involved in specific processes, in Colombia the cartels were vertically integrated, and involved in multiple stages of cocaine production and trafficking.[30]

While the Colombian government has tried to combat drug production and trafficking, several factors limit its effectiveness. First, coca plantations are located in regions where the government has little presence. Second, incarcerated drug dealers can still run their businesses, since officials are prone to corruption and gangs exercise power inside prisons. In addition to local governments' efforts, the U.S. has helped Colombia fight drug cartels and insurgent groups. This was done through Plan Colombia, an initiative signed by Presidents Pastrana and Clinton in 2000 by which the U.S. government would provide funding and military training to eradicate coca cultivation in

[30]This vertical integration has disappeared in the last decade. Currently, drug traffickers are specialized.

Colombia. While supporters of the plan argue it helped transform the country, critics argue that the USD 10 billion plan did little to reduce coca production in Colombia.

B. The History of Money Laundering Policies in Colombia

Colombia had basically no measures against money laundering until 1992. In fact, between 1977 and 1991, the Central Bank of Colombia had an office where exporters could exchange currency originated from licit activities. However, since there were no controls in place, drug dealers used that same office to exchange currency (García (2003)). The amount of money laundered via this office might have had important consequences on the exchange rate and the stability of the Colombian currency (Steiner et al., 1997).

Since its inception in 1992, the Office of the Attorney General of the Nation has played a key role in the war against money laundering, as it was in charge of processing the suspicious transaction reports sent by financial institutions. These reports were issued to inform the Office of the Attorney General about potential money laundering activities, and were triggered whenever there was a financial transaction whose magnitude was inconsistent with an individual's reported income. However, almost no reports were received by this office until many years later.

In 1996, the regulator of the banking sector requested that financial institutions establish a system to monitor and prevent money laundering activities and urged banks to segment the market and to implement "know your customer" processes. The goal of these processes was to prevent banks from being used as money laundering channels. According to Hernando Barreto, the officer in charge at that time of the money laundering department within Banco Agrario, the most widespread bank in the country,"...the priority was to raise awareness and clarify to the people what money laundering consisted of, since - I do not know why - the first thing people thought about when the term money laundering was mentioned was in counterfeiting money. They imagined someone washing dollars to extract the ink and thus create new bills. It was something very curious."[31]

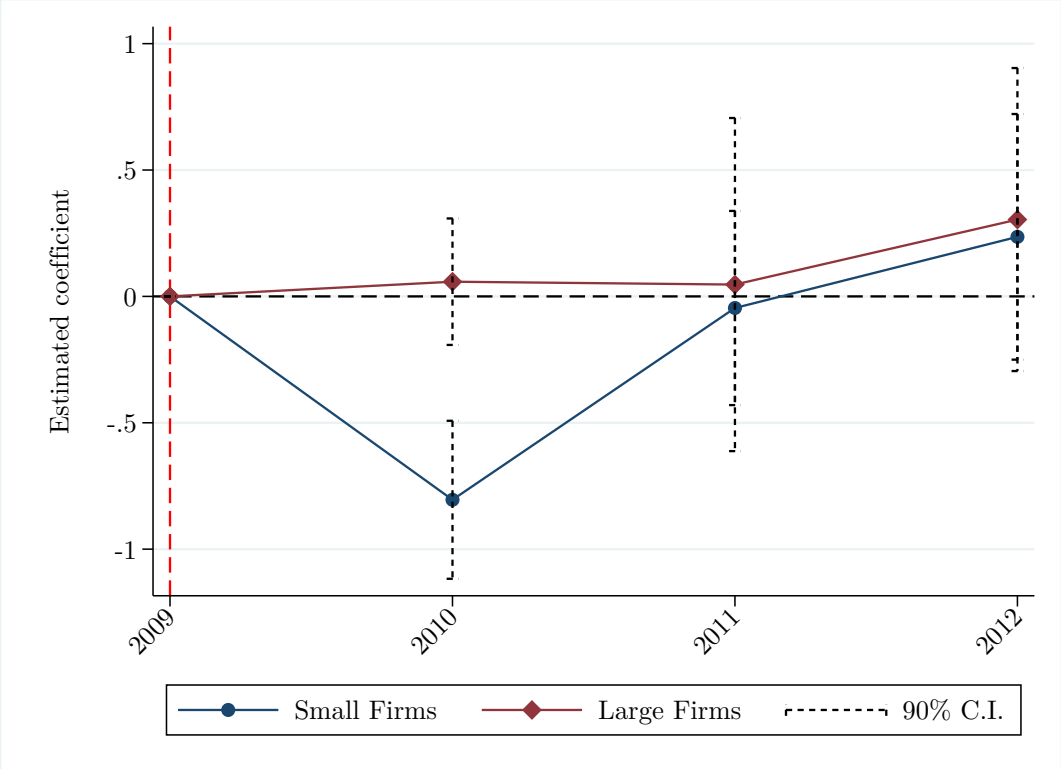
In 1999, the Financial Information and Analysis Unit (UIAF) was created. This unit was

[31] Full interview published in *Infolaft* magazine, issue 97. Interestingly, the term "money laundering" is said to have originated when organized crime purchased cash-only laundromats and used them as a front-business to hide proceeds from criminal activities. Cash flowing into the laundromats was hard to keep track of, therefore large amounts of money could go through the system unnoticed.

in charge of centralizing and analyzing the suspicious transaction reports. This was in order to comply with the Financial Action Task Force's (FATF's) requirements that mandate countries to have intelligence units for money laundering activities. However, it was not until 2005 that the UIAF published the first document listing the typology of money laundering activities, whose goal was to educate the parties involved on the behavior and magnitude of these activities. However, the number of reports on potential money laundering cases received by the UIAF in 2005 is strong evidence of the lack of efforts or resources to address the money laundering problem. That year, only 36 reports were received to initiate an investigation.

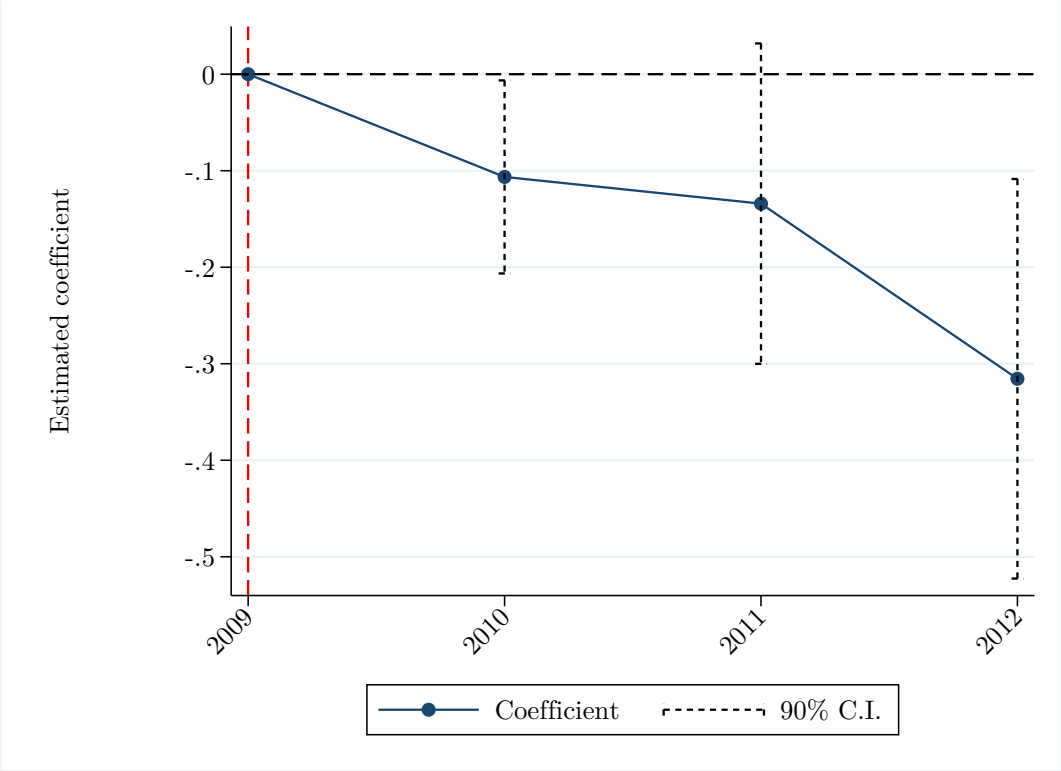
C. Additional Figures and Tables

Figure A1: Employment and Municipality Indirect Exposure



This figure shows the coefficients from a regression of log of employment on indirect exposure interacted with time fixed effects. The estimation also contains municipality and time fixed effects. The indirect exposure variable is a measure of the exposure of a municipality to the funding gap as measured by the weighted average of the exposure of the banks that provide credit in that municipality. The estimation is done separately for small (less than 51 employees) and large (51 or more employees) firms. Vertical bars represent confidence intervals at the 90% level. Data are available from 2009 onwards.

Figure A2: Total Number of Firms and Municipality Indirect Exposure



This figure shows the coefficients from a regression of log of number of firms on indirect exposure interacted with time fixed effects. The estimation also contains municipality and time fixed effects. The indirect exposure variable is a measure of the exposure of a municipality to the funding gap as measured by the weighted average of the exposure of the banks that provide credit in that municipality. Vertical bars represent confidence intervals at the 90% level. Data are available from 2009 onwards.

Table A1: Deposit Growth and Municipality Exposure to Drug Activity

Dependent Variable - Growth Deposits (2008-2011)			
	(1)	(2)	(3)
Municipality Exposure × Post	-0.011***	-0.011***	-0.010***
	(0.003)	(0.002)	(0.002)
Post	0.036***		
	(0.005)		
Municipality-Bank FE	Yes	Yes	Yes
Department-Time FE	No	No	Yes
date	No	Yes	No
Observations	11,737	11,737	11,664
R^2	0.145	0.259	0.331

This table presents OLS estimates of the effect of the anti-money laundering regulation on deposits at the municipality level. The dependent variable is the log of total deposits. The municipality exposure variable is accumulated cocaine confiscations between 1999 and 2007. The exposure variable is standardized to have mean equal to 0 and standard deviation equal to 1. *Post* is a variable indicating the 2010-2011 period. The dependent variable is winsorized at the 5th and 95th percent level. Errors are clustered at the municipality level. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

Table A2: Deposits and Municipality Exposure to Drug Activity: Confiscations by National Forces

Dependent Variable - Log Deposits (2008-2011)			
	(1)	(2)	(3)
Municipality Exposure FFMM × Post	-0.004**	-0.004**	-0.003**
	(0.002)	(0.002)	(0.001)
Post	0.099***		
	(0.005)		
Municipality FE	Yes	Yes	Yes
Time FE	No	Yes	No
Department-Time FE	No	No	Yes
Observations	11,921	11,921	11,852
R^2	0.977	0.980	0.980

This table presents OLS estimates of the effect of the anti-money laundering regulation on deposits at the municipality level. The dependent variable is the log of total deposits. The municipality exposure variable is accumulated cocaine confiscations made by the national military forces between 2002 and 2007. The exposure variable is standardized to have mean equal to 0 and standard deviation equal to 1. *Post* is a variable indicating the 2010-2011 period. The dependent variable is winsorized at the 5th and 95th percent level. Errors are clustered at the municipality level. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

Table A3: Commercial Credit Growth and Bank Exposure to Affected Municipalities

Dependent Variable - Growth New Commercial Credit (2008-2011)			
	(1)	(2)	(3)
Bank Exposure × Post	-0.027***	-0.028***	-0.037***
	(0.004)	(0.004)	(0.006)
Post	-0.047***		
	(0.004)		
Municipality-Bank FE	Yes	Yes	Yes
Time FE	No	Yes	No
Municipality-Time FE	No	No	Yes
Observations	11,311	11,311	11,311
R^2	0.101	0.211	0.466

This table presents OLS estimates of the effect of bank exposure to the anti-money laundering regulation on log growth of new commercial credit at the bank-municipality level. The bank exposure variable is measured as the share of deposits sourced from municipalities in the top quartile in terms of accumulated cocaine confiscations. The sample is restricted to municipalities not directly affected by the regulation (i.e., those outside of the top quartile in terms of volume of cocaine confiscations). The exposure variable is standardized to have mean equal to 0 and standard deviation equal to 1. *Post* is a variable indicating the 2010-2011 period. The dependent variable is winsorized at the 5th and 95th percent level. Errors are clustered at the municipality level. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

Table A4: Firm-Level Outcomes and Exposure to the AML regulation: Tradable vs. Non-tradable

	(1) Sales	(2) Cash	(3) PPE	(4) Assets	(5) Financial Debt	(6) Net Profit
Post × Indirect Exposure	1.305**	-1.826	1.052	0.366**	-0.605	-0.0132
	(0.588)	(1.342)	(1.268)	(0.164)	(1.958)	(0.188)
Small × Post	2.756***	0.712	2.451*	0.704*	0.941	0.116
	(0.986)	(2.364)	(1.414)	(0.372)	(2.194)	(0.218)
Small × Post × Indirect Exposure	-3.285***	-0.308	-3.045*	-0.844**	-1.154	-0.111
	(1.163)	(2.670)	(1.611)	(0.421)	(2.526)	(0.244)
Small × Post × Tradable	-1.840	0.634	-1.059	-0.557	3.285	0.385
	(1.423)	(2.824)	(1.591)	(0.411)	(3.345)	(0.334)
Post × Indirect Exposure × Tradable	-1.661	2.563	-0.592	-0.227	2.834	0.113
	(1.080)	(1.949)	(1.329)	(0.206)	(2.963)	(0.237)
Small × Post × Indirect Exposure × Tradable	2.117	-1.387	1.473	0.642	-4.093	-0.483
	(1.669)	(3.197)	(1.835)	(0.466)	(3.867)	(0.380)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry-Municipality-Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	12,783	12,200	12,777	12,784	12,784	12,712
R^2	0.832	0.717	0.846	0.981	0.753	0.455

This table presents OLS estimates of the effect of firms' indirect exposure to the anti-money laundering regulation on firm-level outcomes. Indirect Exposure is the measure of firm-level exposure as measured by the weighted average of the exposure of the banks a firm has a credit relationship with. Tradable is an indicator for firms in the tradable sector. The sample is restricted to firms in municipalities with low or no illegal drugs activities, i.e. those outside of the top quartile in terms of volume of cocaine confiscations. Data are from 2006 to 2014, and Post is an indicator for the 2010-2014 period. The dependent variables are logged and winsorized at the 1st and 99th percentile. Errors are clustered at the firm level. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.