THE INTERNATIONALIZATION OF DOMESTIC BANKS AND THE BANK-LENDING CHANNEL: AN EMPIRICAL ASSESSMENT[1]

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Abstract

This paper focuses on the case of Colombia to provide a quantitative assessment of the systematic response of the bank-lending channel to changes in the business models of domestic banks. The paper evaluates the extent to which the strength of the bank-lending channel has changed as a result of the expansion of Colombian banks abroad, widely considered the most important structural change of the Colombian banking system in recent years. The paper uses loan-level quarterly data from the Colombian Credit Registry for the period between 2003 and 2016 to estimate a panel specification that relates the change in bank loans (among others) with the interaction of changes in: 1) the share of assets of Colombian subordinates abroad, 2) the number of subordinates of Colombian banks abroad with variations in the domestic policy rate. The internationalization of domestic banks is found to reduce the power of the bank-lending transmission channel of domestic monetary policy, consistent with a cushioning role provided by the operation of domestic banks overseas. The effect of the share of foreign funding seems to weaken when the internationalization of Colombian banks is more intense.

Keywords: Bank-lending Channel, Internationalization of Banks, Subsidiaries.
JEL Codes: XXXX

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The bank-lending transmission channel of monetary policy operates whenever an increase in the policy rate (or more generally, a contractionary move of monetary policy) induces an equilibrium with lower core funding (i.e. deposits) for banks and thus lower credit for the economy at large. As can be gleaned from this broad definition, the extent to which the bank-lending channel operates depends on several features of the economy, e.g. the business model of banks (specifically the degree to which loans are financed using traditional funding sources) or the availability of alternative sources of bank funding (e.g. foreign funds). A crucial empirical question for monetary policymakers is to quantify the degree to which the bank-lending channel has changed in response to changes in those critical features of the economy.

This paper focuses on the case of Colombia to provide a quantitative assessment of the systematic response of the bank-lending channel to changes in the business models of domestic banks. The paper evaluates the extent to which the strength of the bank-lending channel has changed as a result of the expansion of Colombian banks abroad, widely considered the most important structural change of the Colombian banking system in recent years.

In this paper, we employ quarterly, loan-level data from the Colombian Credit Registry for the period between 2003 and 2016 to compute these effects. The use of credit registry data helps to mitigate the common endogeneity problem of OLS specifications by allowing the use (among others) of borrower and time fixed effects. The data allows to estimate a panel specification that relates the change in bank loans with (among others) the interaction of changes in the share of assets of Colombian subordinates abroad and changes in the number of Colombian subordinates abroad with changes in the domestic policy rate.

The primary results of the paper can be summarized as follows. Firstly, the internationalization of domestic banks has tended to reduce the effect of the domestic policy rate on domestic lending activity, thus weakening the bank-lending channel. This result supports the idea that banks use parent bank funding to finance lending in subordinates abroad or that banks switch lending activities across the jurisdictions where they operate depending on monetary conditions. As a result, the internationalization of domestic banks plays a cushioning role with respect to changes in the monetary policy stance. Secondly, the domestic lending activity is influenced by several specific bank characteristics. In particular, smaller banks, banks with larger loan-loss provisions and banks with larger commissions and fees transmit more strongly an increase in the policy rate in the form of a reduction in their lending activity. Finally, banks with a higher (lower) share of foreign (short-term) funding tend to transmit more weakly a monetary policy contractionary stance when the internationalization of Colombian banks is more intense. This reinforces the conclusion that Colombian banks appear to use domestic funding to finance lending operations of subordinates abroad.

This paper unfolds as follows. Section 1 presents a brief primer on the structure of the Colombian financial system and on the recent internationalization experience of Colombian banks. Section 2 offers a review of empirical literature on the relationship between banks' business models, monetary policy and lending activity. Section 3 provides an overview of the Colombian credit registry dataset, which will be used throughout the paper, whereas Section 4 outlines the econometric specifications that are utilized to uncover the changing characteristics of the bank-lending channel in Colombia. Sections 5 and 6 discuss the empirical results of the paper and some reflections as concluding comments, respectively.

1. A Primer on the Colombian Financial System

The Colombian financial system includes credit institutions, financial services companies (pension funds, mutual funds, brokers and other related institutions) and other financial firms (insurance companies, state-owned financial firms, etc.). This overview will focus on credit institutions, as they are the primary agents of study in this paper.

The primary role of Colombian credit institutions is to transfer liquidity from surplus to deficit agents via deposit-taking activities, that ultimately fund loans. After the late-90's financial crisis, and because of several mergers and winding-ups of many credit institutions, the total number of credit institutions has dropped considerably over time (from 105 in 1998 to 48 in March 2018). In addition, these institutions' assets to GDP ratio has increased from 56% to 62% (Table X1), which reflects a trend toward concentration in the Colombian financial system.

Table X1
Colombian credit institutions' statistics

Financial intermediary	Number of agents			Assets/GDP		
	Dec-98	Dec-08	June-18	Dec-98	Dec-08	June-18
Banks	38	18	24	44.50%	38.80%	59.10%
Financial corporations	16	3	5	6.40%	0.80%	1.37%
Finance companies (general)	27	17	12	2.00%	1.90%	1.03%
Finance companies (leasing only)	23	10	2	1.60%	2.90%	0.17%
Financial cooperatives	1	8	5	2.00%	0.60%	0.34%
Total	105	56	48	56.50%	45.00%	62.02%

Source: Superintendencia Financiera de Colombia (SFC), authors' calculations

Since 1990, banks have evolved from a specialized banking scheme to a universal banking model, in which conglomerates are the primary actors. Specifically, financial regulation in Colombia has geared for banks to conduct financial services either via the bank-subsidiary or the bank-holding

company models. As such, regulation has aimed to enhance the supervision of credit institutions and to control agency conflicts, as well to mitigate contagion risk. In 2017, Congress approved a bill that enhances the regulatory and supervisory powers over financial conglomerates for the Superintendencia Financiera de Colombia (Colombian financial regulatory authority for banks, insurance companies, and exchanges -- SFC). As financial conglomerates have become more complex, financial authorities intended with this bill to strengthen the prudential and risk management standards of these agents.

The latter is relevant given that, since 2000, the Colombian largest banks have expanded considerably their cross-border activities, quickly becoming important financial players in the region and becoming a challenge to financial authorities as their operations have become more complex and difficult to trace. As of April 2017, per information provided by the SFC, the financial conglomerates' subsidiaries and branches assets abroad amounted to USD$ 85 billion. In Central America, the Colombian financial conglomerates owned approximately 23% of the region's banking assets, leaving Colombian banks vulnerable to the region's shocks. By country, in El Salvador, these institutions held approximately 53% of the system's assets. For Panama, this figure was 22%. Overall, 12 financial conglomerates operated across 25 jurisdictions with 234 branches and subsidiaries in Central American countries only. Given that the expansion of domestic banks abroad radically alters the structure of funding sources/uses, this key structural change in the business model of Colombian banks may have a strong effect on the operation of the domestic bank-lending channel. As per the latest data available, the number of foreign subsidiaries has increased over time for three of the largest Colombian financial conglomerates (Figure X1). In addition, in 2006-2016, the number of foreign branches and subsidiaries and foreign assets of financial conglomerates have followed a rising trend (Figure X2).

Figure X1
Average annual number of subsidiaries for the largest Colombian financial conglomerates

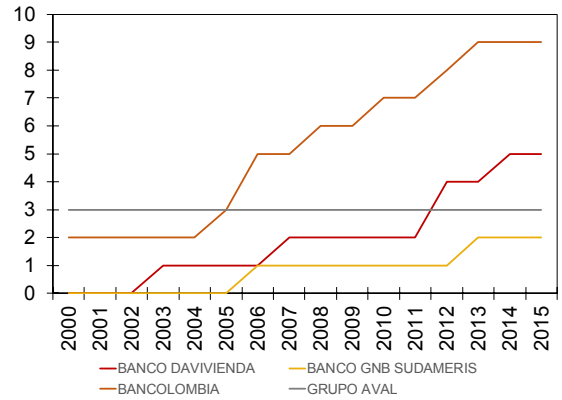
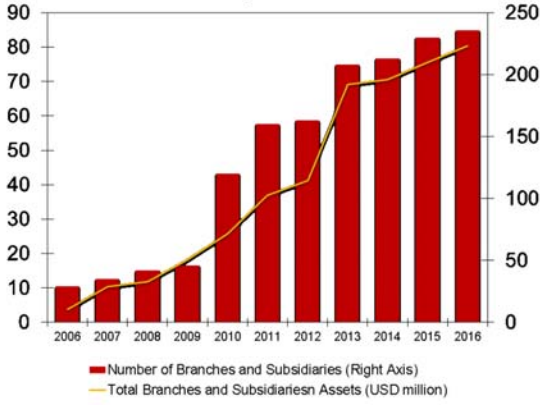


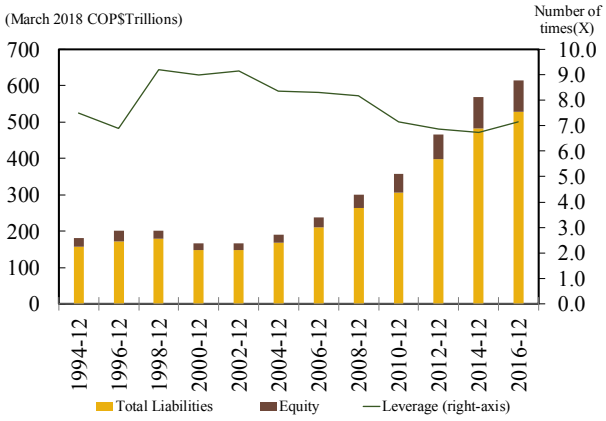
Figure X2
Colombian financial conglomerates' branches and subsidiaries abroad and foreign assets



Source: SFC, authors' calculations

Regarding the Colombian financial system's performance, since 2000 it has expanded considerably amid a backdrop of increasing financial intermediation of credit institutions and an expansion of financial services supply (e.g., working capital financing activities, leasing operations, etc.). Local monetary and financial authorities' regulations have been catalyzers in the consolidation of financial conglomerates, the strengthening of capital adequacy in the financial system and increasing savers' confidence in banks and other credit institutions. Overall, this stronger regulatory framework has contributed to assets' growth complemented by higher levels of capital (Figure X3). Moreover, over the last decade, the credit institutions' equity-to-asset ratio has risen from 12% to 13.4%, which implies that assets' growth has sustained an increase in the leverage ratio (asset-to-equity ratio).

Figure X3
Colombian credit institutions' balance sheet



Source: SFC, authors' calculations

In terms of the credit institutions' balance sheet items, loans represent the primary component (on average, a 64% participation). The credit-to-GDP ratio has shown an upward trend after the late-90's financial crisis. As of December 2017, the ratio stood at 46%, driven mainly by commercial and consumer loans, which are the primary types of bank loans in the country (Figure X4). Moreover, the credit expansion in recent years has not been accompanied by significant spikes nor a rising trend in the non-performing loan ratio (Figure X5). This downward trend in the Colombian credit institutions' credit risk can be attributed by stronger macroprudential policies and oversight of the financial system's constituents, which ultimately have led them to tighten lending standards and to put in place the necessary controls to handle the different risks these institutions face.

Figure X4
Financial deepening in Colombia
(credit-to-GDP ratio)

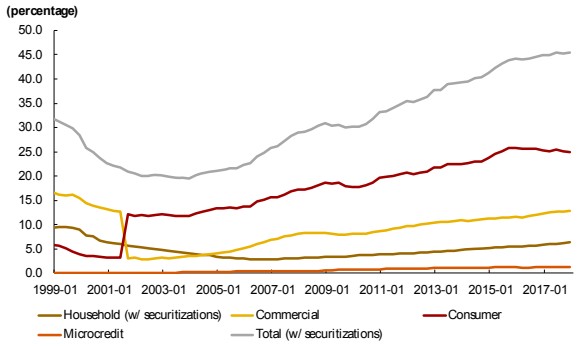
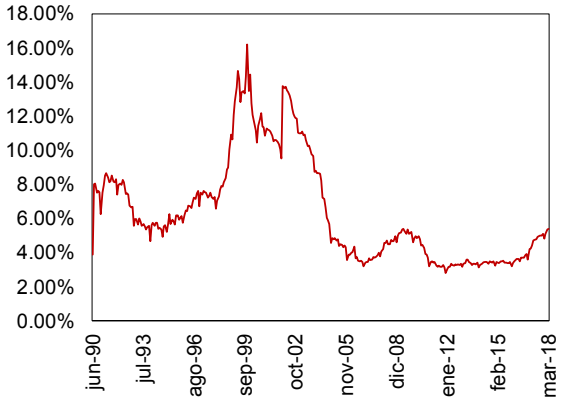


Figure X5
Non-performing loan ratio for Colombian credit institutions



Source: SFC, authors' calculations

2. Literature Review

The interaction between the business model of financial institutions and lending activity has been widely explored in the literature. Nier and Zicchino (2008) find for a sample of 600 listed banks operating in 32 different countries for the period 1992-2000 that banks' balance sheet characteristics (e.g., *Return on Equity [ROE]*, Capital, Provisions and the interaction of lagged capital with provisions) do influence lending activity. Specifically, banks with higher profits and lower loan-loss provisions increase their credit supply and extend more credit relative to their weaker counterparts. Moreover, when comparing loan growth in a recession versus normal times, the authors find that banks' credit growth depends positively on the growth of nominal GDP (a proxy for loan demand) and that banks with higher ROE and lower loan-loss provisions extend more credit. Therefore, reinforcing the idea that healthier intermediaries are prone to increase the supply of loans in good times. Lastly, when the authors attempt to answer if the impact of the bank's weak financial characteristics on the loan supply is sensible to the central bank policy, they find that weak balance sheets usually lead to a stronger reduction in loan supply when monetary policy is tight, compared to the scenario where it is loose[3]. Furthermore, they find that under a scenario of monetary tightening, an increase in capital leads to loan growth relative to tightening and neutral monetary policy stances.

At the same time, the literature has explored the effect of monetary policy on loan supply, mostly assuming that the former is somewhat independent of economic conditions (Ono et al. (2016)).

[3] An increase in provisions, when monetary policy is loose, leads to a lower reduction in credit supply relative to the setting when monetary policy is tight.

Ioannidou et al. (2015) studied for the Bolivian case between 1999 and 2003 whether monetary policy affects banks' loan risk-taking, expected returns and pricing. Given that for the period above the Bolivian financial system was almost dollarized and there was almost absence of restrictions on the capital account, the authors assumed the Fed's federal fund rates was the best proxy for the monetary policy rates in the country[4]. Using monthly credit registry data of loans granted by banks to firms, the authors find that an expansionary cycle in the U.S. encourages domestic banks prone to increase their supply loans to riskier borrowers. Furthermore, the authors find that large banks tend to grant loans to risky borrowers, grant riskier loans, and more capitalized banks and healthy balance sheets are more likely inclined to originate loans with higher levels of credit risk than their less healthy counterparts do. The latter stresses out the idea that banks' characteristics do matter in the process of originating risky loans. In the same spirit, and with the main objective aimed at disentangling loan supply needs from its demand, Jimenez et al. (2012) find for the Spanish case that higher short-term interest rates or lower economic growth reduce loan supply. Moreover, they find that the effect of monetary policy and economic conditions is stronger with banks with lower liquidity and capital in their balance sheets. Lastly, that credit crunches area feasible in the setting where a reduction in capital takes place under a tighter monetary policy stance and stressed economic times. Interestingly, the paper focuses on loan applications, the conditions for banks accepting these applications and whether those firms with rejected loan applications can find funds in other banks.

In a further step to Jiménez et al. (2012), Ono et al. (2016) examine the impact of long-term interest rates on banks loan supply via a firm-bank level panel dataset for the Japanese case covering the period 2002-2014. By modeling the change in loans a firm receives from a bank as a function of macroeconomic shocks (changes in long-term interest rates), bank-specific loan supply shocks derived from changes in the value of bond investments due to sensitivity of changes in interest rates and firm-specific loan-demand shocks the authors find first that unexpected reductions in long-term interests rates increase the bank's loan supply growth rate. Secondly, banks with larger capital gains on their bank holdings, due to decreases in long-term interest rates that consequently make the value of bond holdings higher, increase their loan supply. Moreover, the authors find that a bank will increase its loan supply to a debtor (non-financial firm) with sound financial conditions, i.e., a non-financial firm (e.g., high capital, liquidity ratios, ROA, sales growth. Thirdly, healthier balance sheets in banks lead them to increase their loan-supply to smaller, credit-constrained and risky firms. The paper extends the methodology Jiménez et al. (2012) and Hosono & Miyakawa (2014) employ, namely by using different proxies for bank net worth shocks. While the latter use the interaction term of the proxy for the monetary policy stance (short-term interest rates) and the banks' net worth before changes in the monetary policy, to

[4] At that time, the Bolivian peso was pegged to the U.S. dollar.

explain the change in loans outstanding , Ono et al. (2016) employ the capital gains accruing to banks due to their interest rate risk exposure.

Similarly, to Jiménez et al. (2012), Hosono & Miyakawa (2012) examine the impact of business and monetary policy on bank loan supply by using a firm-bank match level dataset for Japanese listed firms in a period spanning three decades. The authors model the change in loans outstanding as a function of firm characteristics, bank characteristics and aggregate-level variables (e.g., the real growth rate of GDP and dummy variables accounting for changes in monetary policy). The authors find for the Japanese case that highly capitalized and liquid banks tend to increase their loan supply relative to their weak counterparts. Secondly, the effects of the degree of capitalization and liquidity in the bank's balance sheet on loan supply are stronger when the economy is growing at lower rates. Thirdly, a tight monetary policy stance has stronger effects on banks' liquidity and their loan supply, compared to periods when monetary policy is expansionary. The study extends the findings of Jiménez et al. (2012) for the Spanish case. The authors find for Japanese firms given that banks' net worth affects their loan supply, and that the effect depends on monetary policy and economic growth, but that this balance sheet channel has an important impact on non-financial firms financing and investment. Namely, firms with better investment opportunities are prone to have higher investment when their lenders have high levels of liquidity. This connection strengthens during economic downturns.

As for the Colombian case, Vargas (2008) highlights that the economic turmoil covering the period 1998-1999 lead to an undermining of the balance sheet channel not only due to lower demand of households and firms. Additionally, because of the substantial reduction of the credit supply from the financial system, severely weakened by the high capital losses and risk exposures. In terms of the banks' asset side, there was a substitution effect between bonds and credit. Per the author, given the increased risk perception of the financial system and their capital deterioration, banks and other financial institutions turned to domestic public debt as an alternative to credit. Consequently, that lead, in part, to the development of the domestic fixed income market.

Finally, a growing body of the literature has explored the changes in the strength of monetary policy transmission mechanisms brought about by both the crisis and its associated changes in the business model of banks. Altunbas et al (2007) showed how the increase in securitization before the financial crisis of 2008-2009 in Europe had the effect of isolating the supply of bank loans from monetary policy conditions. Gambacorta and Marques (2011) explored the effect of differences in business models on the response of bank loans to the financial crisis.

Our paper contributes to the literature by studying the effect of the internationalization of domestic banks on the bank-lending channel in an emerging market. Given the recent internationalization of the banking business across the globe, to which Colombia has been a key actor in Central American markets, together with the internationalization of financial markets, it is crucial to understand the effect of these trends on the power of monetary policy at a domestic level. To the best of our knowledge, this is the first paper that attempts to understand the effects of the internationalization banks on the power of domestic economic policymaking.

3. Data

This paper uses three datasets. The first one is a credit registry that contains information about individual commercial loans reported by financial institutions to the *Superintendencia Financiera de Colombia*, the supervisor of Colombia's financial system. This dataset provides a detailed look at all the loans granted by the financial system to firms on a quarterly basis. Characteristics such as loan maturity, collateral, interest rate and amount are included from 1998:12 to 2017:06. The dataset contains about 9.4 million loan observations made to 321,000 different firms by 33 different private banks.

The second dataset contains the banks' financial statements collected by the *Superintendencia Financiera de Colombia*. We also include an array of macroeconomic characteristics and information on the bank-firm relationships. We employ lagged values on all the firm and bank's financial statement indicators as monetary and economic conditions might determine their path. In addition, given the censoring nature of some variables used in the analysis, i.e., the relationship variables, the loan observations of the first seven years are excluded. The final sample contains 1,999,510 loan observations given to 35,055 firms by 78 banks.

The third dataset contains information about the international presence of Colombian banks. Specifically, the SFC publishes annually the aggregate amount of financial assets belonging to Colombian banks overseas (see Figure X2). This data is combined with individual bank annual public reports which contain the number of bank subsidiaries belonging to each Colombian international financial conglomerate abroad over time. As such, the internationalization of Colombian banks will be measured using either of two alternatives: the degree of internationalization of the system *as a whole*, measured by the share of total financial system assets invested in bank subsidiaries abroad; and the degree of *individual* internationalization of banks, as measured by the number of subsidiaries overseas of each individual domestic bank.

Table 1 presents summary statistics of bank, firm and macroeconomic characteristics for the final sample. Among the bank variables we include three standard bank-lending channel indicators:

ln(Total Assets) which corresponds to the log of total assets of the bank (in COP), *Bank Capital Ratio*, the ratio of equity to total assets (average 14.87%), and *Liquidity Ratio*, the ratio of current assets over total assets (average 1.11%); two risk indicators: *Doubtful loan ratio*, the ratio of so-called doubtful loans over total loans[5] (average 3.41%), and the *Loan-loss provision ratio*, measured as the ratio of loan-loss provisions over the total loan portfolio (average 2.95%); two indicators of the revenue mix: *Diversification ratio*, the ratio of net interest income over total income (average 2.3%), *Commissions ratio*, the ratio of commissions to total income (average 9.5%) and *Bonds*, the ratio of the investment portfolio over total assets (average 7.21%); two funding indicators: *Short-term funding ratio*, the ratio of short term funding over total liabilities (average 38.6%), and *Foreign currency funding ratio*, the ratio of funding in foreign currency over total liabilities (average 4.06%); and Return on Assets (ROA) as a profitability indicator (average 2.32%).

As the sample of borrowing firms change over time, we control for changes in the credit demand by including a set of firm characteristics in the specifications that do not include firm-time fixed effects. Among the firm characteristics we include the log of their age as a borrower (average 3.34) and a dummy variable indicating past arrears (52.87% of firms in the sample have fallen in arrears at least once). We also include specific observables on the firm-bank relationship: length of relationship (on average 18.5 quarters, or 4.5 years) and a dummy variable indicating whether the firm has fallen in arrears with the bank.

Finally, as macroeconomic controls, we include the quarterly change in the log of real GDP (*ΔLog Real GDP),* the quarterly change on the exchange rate (ΔExchange rate) the quarterly change on the current account (ΔCurrent account) and the lagged, quarterly change in the domestic monetary policy rate (Δir(t-1)).

[5] Doubtful loans are defined by the Colombian regulation as loans rated different from A, on a scale from A to E where E is the lowest rating.

TABLE 1

Descriptive Statistics of variables used in the regression

The table provides the definition of bank, firm, relationship and macroeconomic characteristics. The mean, median, standard deviation, min and max are presented for every variable. The number of loan observations equals 3,185,036.

Variables	Units	Definition	N	Mean	St. Dev	25th percentile	Median	75th percentile	Min	Max
Dependent Variable										
Δ Log credit	%	Quarterly change on the loan amount	3,185,036	-0.06	0.83	-0.26	-0.08	0.04	-3.64	3.71
Bank-specific characteristics										
Bank lending channel standard indicators										
ln (Total assets)	-	Log of total assets	3,185,036	23.91	0.91	23.39	24.12	24.68	17.90	24.84
Bank capital ratio	%	Ratio of equity over total assets	3,185,036	14.87	5.73	11.29	13.49	17.49	5.31	96.47
Bank liquidity ratio	%	Ratio of current assets over total assets	3,185,036	1.11	1.09	0.38	0.76	1.50	0.02	13.74
Risk profile										
Doubtful loan ratio	%	Ratio of doubtful loans over total loans portfolio	3,185,036	3.41	2.27	1.60	3.12	4.41	0.00	29.33
Loan-loss provision ratio	%	Ratio of loan-loss provisions over total loans portfolio	3,185,036	2.95	1.68	1.74	2.66	3.67	0.00	17.19
Revenue mix										
Diversification ratio	%	Ratio of non-interest income over total income	3,185,036	2.31	3.76	0.60	1.02	1.68	-2.28	32.46
Commissions ratio	%	Ratio of commissions over total income	3,185,036	9.57	3.07	7.33	9.06	11.62	0.09	45.29
Bonds	%	Ratio of bonds over total assets	3,185,036	7.21	5.71	2.69	5.60	10.52	0.00	32.46
Funding										
Short-term funding ratio	%	Ratio of short-term funding over total liabilities	3,185,036	38.64	7.32	33.12	38.48	42.92	0.00	81.14
Foreign currency funding rati	%	Ratio of funding in foreign currency over total liabilities	3,185,036	4.06	2.78	2.04	3.88	5.50	0.00	17.97
Profitability										
ROA	%	Ratio of net income over total assets	3,185,036	2.32	0.97	1.90	2.32	2.70	-24.50	7.01
Foreign Presence										
Number of subsidiaries	N°	Foreign subsidiaries of the bank	3,185,036	4.87	6.21	0.00	0.00	11.00	0.00	16.00
Firm-specific characteristics										
Ln (Age as borrower)	-	The log of one plus the age as borrower	3,185,036	3.34	0.61	3.00	3.47	3.81	1.10	4.29
Previous default	0/1 %	= 1 if the firm delinquent on a loan in the past, = 0 otherwise.	3,185,036	52.87	49.92	0.00	100.00	100.00	0.00	100.00
Relationship characteristics										
Previous default with the bank	0/1 %	= 1 if firm has have an arrear before with the bank, = 0 otherwise.	3,185,036	28.85	45.31	0.00	0.00	100.00	0.00	100.00
Length of relationship	quarters	Length of the bank-firm relationship.	3,185,036	18.50	13.64	8.00	15.00	27.00	2.00	72.00
Macroeconomic controls										
Δ Log Real GDP	%	Quarterly change on the log of real GDP	3,185,036	4.00	1.89	2.61	3.53	5.75	0.35	7.95
Δ Exchange rate	%	Quarterly change of the exchange rate	3,185,036	5.38	16.80	-5.60	1.76	10.49	-23.41	50.12
Δ Current account	%	Quarterly change in the current account	3,185,036	9.03	41.60	-20.46	-1.65	28.43	-59.04	148.55
Δ ir (t-1)	%	Quarterly change in the domestic monetary policy rate	3,185,036	4.56	70.73	0.00	0.00	50.00	-250.00	100.00

4. Empirical Strategy

The empirical strategy of the paper consists in the estimation of several panel data specifications that relate the change in bank lending to specific bank characteristics, monetary policy, and the internationalization of domestic banks. In order to mitigate the common endogeneity problem of OLS regressions, the specifications presented here allow for the use (among others) of borrower, bank, and time fixed effects. To understand the changing nature of the bank-lending channel, we proceed gradually. The paper first estimates the following benchmark bank-lending channel specification for firm f, bank b and quarter t:

$$\Delta \log \text{Credit}_{fbt} = \varphi + \sum_j \theta_j{}^* B_{bt} + T_t + firm_f + bank_b + relationship_{fb} + \varepsilon_{fbt} \qquad (1)$$

In this specification, $\Delta \log \text{Credit}$ corresponds to the first difference of the (log) stock of loans, B_{bt} to specific characteristics of banks (including the number of subsidiaries abroad) and $T_t, bank_{bt-1}, firm_{ft-1}$ and $relationship_{fbt-1}$ correspond to time, bank, firm, and bank-firm relationship effects. This specification allows to study the general effects of specific bank business model characteristics (including the degree of internationalization) on lending.

The analysis proceeds with the following specification, which seeks to estimate the evolving influence of individual bank characteristics B_{bt} on the response of lending to a monetary policy shock (that is, on the bank lending channel):

$$\Delta \log \text{Credit}_{fbt} = \varphi + \sum_j \sum_{\tau=0}^{2} (\theta_j + \beta_{\tau j}{}^* \Delta \text{i}_{\text{t-j}})\, B_{bt} + T_t + firm_f + bank_b + relationship_{fb} + \varepsilon_{fbt} \qquad (2)$$

Where $\Delta \text{i}_{\text{t-j}}$ corresponds to the quarterly change in the monetary policy rate set by the Central Bank of Colombia. In this specification, $\sum_{\tau=0}^{2} \beta_{\tau j} > 0$ for some j in specification (2) will be taken as an indication that the bank lending channel is indeed weakened by specific characteristic j.

In a similar fashion, we also estimate the evolving influence of individual bank characteristics B_{bt} on the response of lending to the internationalization of banks:

$$\Delta \log \text{Credit}_{fbt} = \varphi + \sum_j (\theta_j + \beta_j{}^* C_t) B_{bt} + T_t + firm_f + bank_b + relationship_{fb} + \varepsilon_{fbt} \qquad (3)$$

Where C_t corresponds to either of the two measures of internationalization of banks considered in this paper: $C_t = B_{bt}$ corresponds to the number of subsidiaries abroad of bank b at time t, and $C_t = I_t$ corresponds to the share of foreign banking assets of the aggregate of Colombian banks at time t. In either case B_{bt} does not include internationalization variables. In this specification, $\beta_j > 0$ for some j in specification (2) will be taken as an indication that effect of internationalization is weakened by specific characteristic j.

The main specifications combine the effects (triple-interaction) of monetary policy shocks and internationalization in the following fashion:

$$\Delta \log \text{Credit}_{fbt} = \varphi + \sum_j \sum_{\tau=0}^{2} (\theta_j + \beta_{\tau j} * C_t * \Delta i_{t-j}) B_{bt} + \cdots + T_t + firm_f + bank_b + relationship_{fb} + \varepsilon_{fbt} \qquad (4)$$

Where the double interactions are included as well. In this case, when the estimated value of $\sum_{\tau=0}^{2} \beta_{\tau j} \neq 0$ for some j in specification (1), this will be taken as an indication that the specific measure of internationalization of domestic banks has affected the bank-lending channel over time depending on specific bank characteristics. More specifically, an estimate of $\beta_{\tau j} > 0$ will be interpreted as internationalization having weakened the bank-lending channel, as an increase in the share of subordinate assets (or number of subsidiaries) abroad increased the (in principle, negative) change in loans associated with an increase in the monetary policy rate.

5. Results

Tables 2-7 present the results of the estimation of specifications (1), (2), (3) and (4) for the two alternative definitions of C_t. Table 2 presents the results of estimating specification (1). From the table, it is apparent that large and well capitalized banks tend to provide a larger supply of credit. From the specification with the full set of bank characteristics, it emerges that banks with more doubtful loans (as a percentage of total loans) and with higher diversification provide less supply of credit.

Table 3 presents the results of estimating specification (2), which interacts bank characteristics with monetary policy shocks. From the table, banks with more doubtful loans, more commissions income and more funding in foreign currency transmit more strongly changes in the monetary policy stance. That is, banks with those characteristics tend to reduce loans more to comparable banks without those characteristics after a contractionary monetary policy shock. At the same time, banks with higher short term funding and a higher participation of bonds over assets transmit less changes in the monetary policy rate. This set of results indicate the power of specific bank characteristics to alter the power of the bank lending channel.

Tables 4 and 6 present the results of the estimation of specification (3) with the two alternative measures of bank internationalization. Regarding the number of subsidiaries abroad (table 4), as the number of subsidiaries abroad increase, larger and more liquid banks and banks with a higher share of funding in foreign currency tend to decrease the domestic supply of credit. This is consistent with the idea that banks, by expanding abroad, tend to diversify the composition of their loan portfolio across jurisdictions. At the same time, as the number of subsidiaries increase, banks with higher loan loss-provisions ratio, higher commission income, higher participation of bonds and higher short-term funding increase the domestic supply of credit. This would be indicative of the tendency of certain bank characteristics to determine the specific internationalization business model: higher short term local funding, for instance, would incentivize domestic banks to maintain separate balance sheets between parents and subsidiaries abroad. With regard to the share of international assets (table 6), more liquid banks tend to increase the domestic supply of credit, which contradicts the results with the number of subsidiaries.

Finally, tables 5 and 7 present the results of the estimation of specification (4) with the two alternative measures of bank internationalization. Regarding the number of subsidiaries abroad (table 4), as the number of subsidiaries abroad increase, more diversified banks tend to transmit more strongly a contractionary policy move. At the same time, as the number of subsidiaries increase, banks with higher provisions, higher commissions income and with a higher profitability tend to transmit more weakly a contractionary policy move. This results would point to indicate a particular model of international expansion of domestic banks, one based on decentralized funding and loan operations, in such a way that higher profitability at home allows them to isolate their lending conditions from monetary policy compared to banks with lower profitability at home that have also expanded abroad. With regard to the share of international assets (table 7), more liquid banks and more profitable banks tend to transmit more strongly a contractionary policy move. At the same time, more capitalized banks, banks with a higher commissions ratio and banks with a higher doubtful loans ratio at home tend to transmit more weakly a contractionary policy move.

6. Conclusions

-TO BE ELABORATED-

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TABLE 2

Effects of Changes in Bank´s Characteristics on the Supply of Credit

The table reports OLS regressions for a sample of 3,185,036 loans observations of firms with multiple relationships. The dependent variable is Δ Log credit. Column (1) report results of a model that includes bank lending channel standard indicators, Column (2) includes risk profile variables, Column (3) includes variables that characterize the revenue mix of a bank, Column (4) includes variables that characterize the funding composition, Column (5) includes profitability and Column (6) includes a variable that proxies the foreign presence of a bank with the number of subordinates abroad. All the specifications include **Firm X Time FE and Bank FE**. Definition of the variables can be found in Table 1. Coefficients are listed in the first row, robust standard errors that are corrected for clustering at the bank level are reported in the second row and p-values are in the third row.

Model	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Bank lending channel standard indicators							
ln (Total assets)	0.03146**						0.03175
	(0.01277)						(0.02178)
	0.02096						0.15748
Bank capital ratio	0.32533***						0.53382***
	(0.09790)						(0.08961)
	0.00274						0.00000
Bank liquidity ratio	-0.32429						-0.27059
	(0.35133)						(0.34348)
	0.36480						0.43823
Risk profile							
Doubtful loans		-0.23412					-0.20912*
		(0.13943)					(0.10764)
		0.10557					0.06339
Loan-loss provision ratio		-0.26384					-0.48931
		(0.28980)					(0.29825)
		0.37130					0.11341
Revenue mix							
Diversification ratio			-0.02328				-0.19212***
			(0.07616)				(0.06711)
			0.76243				0.00838
Commissions ratio			0.02546				0.07933
			(0.20749)				(0.20523)
			0.90333				0.70237
Bonds ratio			0.12250				-0.04364
			(0.08923)				(0.12985)
			0.18198				0.73959
Funding							
Share of short-term funding				0.00451			0.03612
				(0.05881)			(0.07243)
				0.93955			0.62236
Share of funding in foreign currency				0.07406			-0.14531
				(0.08073)			(0.18188)
				0.36768			0.43185
Profitability							
ROA					0.40719		0.05229
					(0.65786)		(0.46307)
					0.54154		0.91099
Foreign Presence							
Number of Subsidiaries						0.00183	-0.00139
						(0.00130)	(0.00118)
						0.16991	0.24923
Constant	-0.87110***	-0.07509***	-0.11091***	-0.10614***	-0.11372***	-0.10359***	-0.82788
	(0.30470)	(0.01853)	(0.02987)	(0.02622)	(0.01616)	-0.00793	(0.56270)
	0.00845	0.00043	0.00103	0.00044	0.00000	0.000000	0.15369
Observations	3,185,036	3,185,036	3,185,036	3,185,036	3,179,829	3185036	3,179,829
R-squared	0.43040	0.43040	0.43040	0.43040	0.43090	0.43040	0.43100
Adjusted R-squared	0.08428	0.08419	0.08418	0.08417	0.08415	0.08418	0.08433

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

TABLE 3

Bank´s Characteristics and the Transmission of Monetary Policy Shocks

The table reports OLS regressions for a sample of 3,185,036 loans observations of firms with multiple relationships. The dependent variable is Δ Log credit. Columns 1-8 present different specifications that include the various groups of bank variables as well as a double interaction between each bank variable and the change in the domestic monetary policy rate. All the specifications include **Firm X Time FE and Bank FE**. Definition of the variables can be found in Table 1. Coefficients are listed in the first row, robust standard errors that are corrected for clustering at the bank level are reported in the second row and p-values are in the third row. Note that in the second part of the table (right side) the stars that typically signal the significance level of a variable are not included, instead variables are highlighted.

								Interactions with ∑ j=1-2 Δi(t-j)						
Model	**(1)**	**(2)**	**(3)**	**(5)**	**(6)**	**(7)**	**(8)**	**(1)**	**(2)**	**(3)**	**(5)**	**(6)**	**(7)**	**(8)**
Bank lending channel standard indicators														
ln (Total assets)	0.03442***						0.03960**	-0.0014						0.0025
	(0.01228)						(0.01860)	0.0035						0.0053
	0.00964						0.04325	0.6865						0.6393
Bank capital ratio	0.26314***						0.42414***	0.1357						0.1283
	(0.08716)						(0.08436)	0.0991						0.1092
	0.00577						0.00003	0.183						0.2512
Bank liquidity ratio	-0.37986						-0.18044	-0.0854						-0.1208
	(0.26086)						(0.29360)	0.1863						0.2286
	0.15779						0.54440	0.6504						0.6018
Risk profile														
Doubtful loans		-0.16377					-0.09732		**-0.4305**					**-0.2374**
		(0.11370)					(0.10000)		**0.1713**					**0.0956**
		0.16218					0.33978		**0.0188**					**0.0201**
Loan-loss provision ratio		-0.25022					-0.31837		**0.5652**					0.0475
		(0.29397)					(0.28653)		**0.255**					0.2249
		0.40275					0.27708		**0.036**					0.8345
Revenue mix														
Diversification ratio			-0.09168				-0.20196***			**0.2436**				0.1694
			(0.07717)				(0.06127)			**0.1368**				0.1702
			0.24603				0.00293			**0.0872**				0.3292
Commissions ratio			0.02294				0.06129			**-0.1212**				**-0.2053**
			(0.11837)				(0.14518)			**0.0570**				**0.0876**
			0.84789				0.67652			**0.0436**				**0.0274**
Bonds ratio			0.01933				-0.09760			**0.2939**				**0.3095**
			(0.08341)				(0.11550)			**0.0569**				**0.0781**
			0.81864				0.40612			**0.0000**				**0.0005**
Funding														
Share of short-term funding				0.03316			0.08045				-0.0723			**0.083**
				(0.05791)			(0.05741)				0.0603			**0.0404**
				0.57204			0.17342				0.2416			**0.0507**
Share of funding in foreign currency				0.06005			0.08144				0.1501			**-0.3057**
				(0.08875)			(0.14493)				0.1711			**0.1414**
				0.50489			0.57918				0.3887			**0.0404**
Profitability														
ROA					0.37977		-0.27374					-0.0196		0.0442
					(0.54808)		(0.44884)					0.3067		0.2516
					0.49475		0.54745					0.9494		0.8619
Foreign Presence														
Number of Subsidiaries						0.00159	-0.00220**						**0.0012**	-0.0008
						(0.00119)	(0.00095)						**0.0006**	0.0008
						0.19436	0.02837						**0.0664**	0.2977
R-squared								0.4306	0.4304	0.4306	0.4304	0.4309	0.4305	0.4312
Adjusted R-squared								0.08451	0.08425	0.08445	0.08426	0.08416	0.08431	0.08472

TABLE 4

Effects of the Number of Subsidiaries Abroad on the Supply of Credit

The table reports OLS regressions for a sample of 3,185,036 loans observations of firms with multiple relationships. The dependent variable is Δ Log credit. Columns 1-8 present different specifications that include the various groups of bank variables as well as a double interaction between each bank variable and the number of subsidiaries abroad of each bank. All the specifications include **Firm X Time FE and Bank FE**. Definition of the variables can be found in Table 1. Coefficients are listed in the first row, robust standard errors that are corrected for clustering at the bank level are reported in the second row and p-values are in the third row.

Model	(1)	(2)	(3)	(5)	(6)	(7)
Bank lending channel standard indicators						
ln (Total assets)	0.03784**					0.04325*
	(0.01623)					(0.02147)
	0.02812					0.05488
ln (Total assets) * Number of Subsidiaries	0.00021					0.00524***
	(0.00090)					(0.00093)
	0.81293					0.00001
Bank capital ratio	0.31666**					0.50724***
	(0.14788)					(0.15316)
	0.04219					0.00282
Bank capital ratio* Number of Subsidiaries	0.01111					-0.00393
	(0.01261)					(0.01410)
	0.38687					0.78251
Bank liquidity ratio	0.67116**					0.59619**
	(0.29117)					(0.25315)
	0.02975					0.02667
Bank liquidity ratio* Number of Subsidiaries	-0.14054***					-0.14409***
	(0.02247)					(0.02671)
	0.00000					0.00001
Risk profile						
Doubtful loans		-0.25680*				-0.12305
		(0.13863)				(0.11189)
		0.07581				0.28192
Doubtful loans * Number of Subsidiaries		-0.01712				0.01517
		(0.02566)				(0.01916)
		0.51077				0.43587
Loan-loss provision ratio		-0.18312				-0.17854
		(0.27953)				(0.26943)
		0.51839				0.51362
Loan-loss provision ratio * Number of Subsidiaries		0.08784***				0.06234**
		(0.02099)				(0.02333)
		0.00031				0.01306
Revenue mix						
Diversification ratio			-0.02316			0.02246
			(0.11709)			(0.14261)
			0.84480			0.87610
Diversification ratio* Number of Subsidiaries			0.00146			-0.01266
			(0.01208)			(0.01108)
			0.90473			0.26414
Commissions ratio			-0.37777***			-0.30416**
			(0.09411)			(0.14544)
			0.00048			0.04683
Commissions ratio * Number of Subsidiaries			0.08712***			0.10181***
			(0.01240)			(0.01099)
			0.00000			0.00000
Bonds ratio			0.04620			-0.09748
			(0.15753)			(0.19584)
			0.77175			0.62301
Bonds ratio * Number of Subsidiaries			0.01732**			0.04165***
			(0.00713)			(0.00958)
			0.02261			0.00020
Funding						
Share of short-term funding				-0.01304		0.02877
				(0.05289)		(0.07000)
				0.80726		0.68460
Share of short-term funding * Number of Subsidiaries				0.01185***		0.02865***
				(0.00305)		(0.00564)
				0.00065		0.00003
Share of funding in foreign currency				-0.19659		0.21612
				(0.16517)		(0.17801)
				0.24514		0.23607
Share of funding in foreign currency * Number of Subsidiaries				0.03344***		-0.02499
				(0.01111)		(0.01636)
				0.00590		0.13904
Profitability						
ROA					0.04541	0.11393
					(0.47112)	(0.31075)
					0.92398	0.71699
ROA * Number of Subsidiaries					0.04493	0.03344
					(0.07717)	(0.03541)
					0.56561	0.35395
Foreign Presence						
Number of Subsidiaries	-0.00674	0.00046	-0.01052***	-0.00496***	0.00028	-0.15776***
	(0.02181)	(0.00117)	(0.00174)	(0.00169)	(0.00204)	(0.02212)
	0.75992	0.69962	0.00000	0.00718	0.89037	0.00000
R-squared	0.4305	0.4304	0.4305	0.4304	0.4309	0.4312
Adjusted R-squared	0.08434	0.08426	0.08436	0.08420	0.08417	0.08461

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

TABLE 5

Changes on the Transmission of Domestic Monetary Policy when Banks Expand their Bussiness Abroad

The table reports OLS regressions for a sample of 3,185,036 loans observations of firms with multiple relationships. The dependent variable is Δ Log credit. Columns 1-8 present different specifications that include double interactions between: i) each bank variable and the number of subsidiaries (of that specific bank) and each bank variable and the change in the domestic monetary policy rate. Each specification also includes the triple interaction between the bank variable, the number of subsidiaries and the change in the monetary policy rate. All the specifications include Firm X Time FE and Bank FE. Definition of the variables can be found in Table 1. Coefficients are listed in the first row, robust standard errors that are corrected for clustering at the bank level are reported in the second row and p-values are in the third row. Note that in the second part of the table (right side) the stars that typically signal the significance level of a variable are not included, instead variables are highlighted.

								Interactions with ∑ j=1-2 Δi(t-j)						
Model	**(1)**	**(2)**	**(3)**	**(5)**	**(6)**	**(7)**	**(8)**	**(1)**	**(2)**	**(3)**	**(5)**	**(6)**	**(7)**	**(8)**
Number of Subsidiaries	0.00159	-0.03281	-0.00022	-0.00534**	-0.00756**	0.00125	0.10053	**0.0012**	0.0773	-0.0011	-0.0009	0.0054	0.0003	0.1372
	(0.00119)	(0.02201)	(0.00109)	(0.00198)	(0.00290)	(0.00126)	(0.05923)	**0.0006**	0.0535	0.0013	0.0024	0.0079	0.0018	0.189
	0.19436	0.14866	0.84264	0.01228	0.01510	0.32913	0.10210	**0.0664**	0.1609	0.4061	0.7152	0.5043	0.8764	0.4745
Bank lending channel standard indicators														
ln (Total assets)		0.03401**					0.04352**		-0.0017					0.0022
		(0.01556)					(0.02097)		0.0053					0.0074
		0.03843					0.04844		0.7462					0.7659
ln (Total assets) * Number of Subsidiaries		0.00142					-0.00381*		-0.0034					-0.0066
		(0.00093)					(0.00221)		0.0022					0.0069
		0.14000					0.09636		0.1298					0.3461
Bank capital ratio		0.30768*					0.43637***		-0.109					-0.0735
		(0.16122)					(0.15404)		0.1322					0.111
		0.06789					0.00899		0.4174					0.5135
Bank capital ratio* Number of Subsidiaries		-0.00878					-0.01775		**0.0457**					0.0494
		(0.01344)					(0.01608)		**0.0086**					0.0577
		0.51961					0.28009		**0.0000**					0.4003
Bank liquidity ratio		0.70840**					0.74781**		0.3572					0.0381
		(0.32364)					(0.32015)		0.2247					0.3676
		0.03816					0.02782		0.1245					0.9183
Bank liquidity ratio* Number of Subsidiaries		-0.13308**					-0.14921***		-0.0389					0.0209
		(0.02099)					(0.02161)		0.0441					0.0734
		0.00000					0.00000		0.387					0.7784
Risk profile														
Doubtful loans			-0.15979				-0.03124			**-0.399**				**-0.1904**
			(0.10240)				(0.10871)			**0.1353**				**0.1174**
			0.13123				0.77620			**0.0068**				**0.1174**
Doubtful loans * Number of Subsidiaries			0.01291				-0.00083			-0.0214				0.0287
			(0.02830)				(0.02547)			0.0295				0.128
			0.65226				0.97417			0.474				0.8246
Loan-loss provision ratio			-0.01114				-0.18059			**0.5688**				-0.0262
			(0.33255)				(0.29638)			**0.2347**				0.2029
			0.97355				0.54781			**0.0229**				0.8984
Loan-loss provision ratio * Number of Subsidiaries			0.10686***				0.16057***			**0.1018**				**0.2222**
			(0.02084)				(0.02029)			**0.036**				**0.0628**
			0.00003				0.00000			**0.0091**				**0.0016**
Revenue mix														
Diversification ratio				-0.08421			-0.18956				0.2106			**1.0473**
				(0.17024)			(0.23168)				0.3875			**0.1174**
				0.62515			0.42099				0.5916			**0.051**
Diversification ratio* Number of Subsidiaries				0.00005			0.01743				0.0034			**-0.0901**
				(0.01450)			(0.01866)				0.0292			**0.0407**
				0.99733			0.35913				0.9093			**0.036**
Commissions ratio				-0.26175**			-0.18701				**-0.1425**			-0.2135
				(0.09629)			(0.17076)				**0.0661**			0.1327
				0.01175			0.28388				**0.0408**			0.1202
Commissions ratio * Number of Subsidiaries				0.05288***			-0.04470*				0.0002			**0.1168**
				(0.01506)			(0.02447)				0.0245			**0.0556**
				0.00171			0.07973				0.9949			**0.0458**
Bonds ratio				-0.01320			-0.09145				**0.2232**			0.1444
				(0.15866)			(0.18745)				**0.0913**			0.0916
				0.93438			0.62991				**0.0219**			0.1273
Bonds ratio * Number of Subsidiaries				0.01059			0.00974				0.0005			0.044
				(0.00643)			(0.01595)				0.009			0.0595
				0.11184			0.54676				0.9537			0.4666
Funding														
Share of short-term funding					0.01374		0.06995					-0.0049		**0.0791**
					(0.04626)		(0.05471)					0.0636		**0.0425**
					0.76897		0.21278					0.9392		**0.0744**
Share of short-term funding * Number of Subsidiaries					0.01931***		0.01880					-0.0119		-0.0197
					(0.00402)		(0.01627)					0.0201		0.0596
					0.00006		0.25894					0.5596		0.7433
Share of funding in foreign currency					-0.12896		0.42531**					-0.05		**-0.4226**
					(0.17235)		(0.19249)					0.1791		**0.1657**
					0.46131		0.03653					0.7824		**0.0173**
Share of funding in foreign currency * Number of Subsidiaries					0.03303**		-0.03036					0.001		-0.0503
					(0.01320)		(0.02227)					0.0294		0.1009
					0.01923		0.18505					0.9739		0.6224
Profitability														
ROA						-0.09123	-0.09908						-0.2906	0.3247
						(0.47605)	(0.34767)						0.3602	0.3194
						0.84957	0.77800						0.4275	0.3192
ROA * Number of Subsidiaries						0.00960	-0.22717**						0.0387	**0.2243**
						(0.03846)	(0.08726)						0.0811	**0.0986**
						0.80497	0.01531						0.6375	**0.0318**
R-squared								.4305	.4308	.4306	.4307	.4306	.431	.4316
Adjusted R-squared								0.08431	0.08484	0.08452	0.08476	0.08447	0.08431	0.08529

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

TABLE 6

Effects of the Share of Subordinates Assets Abroad Owened by Colombian Banks on the Supply of Credit

The table reports OLS regressions for a sample of 3,185,036 loans observations of firms with multiple relationships. The dependent variable is Δ Log credit. Column (1) report results of a model that includes bank, firm, relationship and macroeconomic characteristics as well as interactions between the monetary policy stance and the bank variables. For simplicity, we only report the coefficients of the interaction terms. Column (2) uses the sample of outstanding loans of firms with multiple relationships and includes Firm x Time fixed effects. Definition of the variables can be found in Table 1. Coefficients are listed in the first row, robust standard errors that are corrected for clustering at the bank level are reported in the second row and p-values are in the third row.

Model	(1)	(2)	(3)	(5)	(6)	(7)
Bank lending channel standard indicators						
ln (Total assets)	0.00491					-0.00029
	(0.02200)					(0.02183)
	0.82516					0.98943
ln (Total assets) * Share of Subordinate Assets	0.10245*					0.10470
	(0.05742)					(0.06606)
	0.08654					0.12552
Bank capital ratio	0.47140					0.31155
	(0.27989)					(0.36545)
	0.10459					0.40202
Bank capital ratio* Share of Subordinate Assets	-0.88040					-0.10679
	(1.20864)					(1.53224)
	0.47312					0.94499
Bank liquidity ratio	-1.22652					-1.98127***
	(0.84489)					(0.37118)
	0.15902					0.00002
Bank liquidity ratio* Share of Subordinate Assets	3.85107					6.65063***
	(4.89252)					(1.58721)
	0.43860					0.00030
Risk profile						
Doubtful loans		1.22924***				0.46885
		(0.35477)				(0.33368)
		0.00193				0.17230
Doubtful loans * Share of Subordinate Assets		-6.24637***				-2.47552*
		(1.77592)				(1.44848)
		0.00169				0.09983
Loan-loss provision ratio		-0.91830*				-0.49566
		(0.52181)				(0.71353)
		0.09067				0.49367
Loan-loss provision ratio * Share of Subordinate Assets		2.48606				1.27718
		(2.52976)				(3.63127)
		0.33516				0.72800
Revenue mix						
Diversification ratio			-0.33464			-0.00203
			(0.29266)			(0.31535)
			0.26369			0.99492
Diversification ratio* Share of Subordinate Assets			1.01521			-0.78260
			(1.02689)			(1.16162)
			0.33232			0.50667
Commissions ratio			-0.55389**			-0.15202
			(0.25812)			(0.31150)
			0.04178			0.62979
Commissions ratio * Share of Subordinate Assets			3.03144			1.90889
			(1.96694)			(2.08325)
			0.13583			0.36826
Bonds ratio			-0.61575***			-0.69675***
			(0.20407)			(0.19748)
			0.00579			0.00164
Bonds ratio * Share of Subordinate Assets			2.74786***			2.77367***
			(0.69365)			(0.71370)
			0.00055			0.00066
Funding						
Share of short-term funding				0.18585		-0.09437
				(0.14922)		(0.12435)
				0.22450		0.45499
Share of short-term funding * Share of Subordinate Assets				-0.81048		0.50187
				(0.76733)		(0.73976)
				0.30096		0.50373
Share of funding in foriegn currency				-0.81326*		-0.31987
				(0.39777)		(0.25110)
				0.05157		0.21443
Share of funding in foriegn currency * Share of Subordinate Asse				3.57983*		0.04752
				(1.90129)		(1.18575)
				0.07141		0.96835
Profitability						
ROA					0.38677	0.53340
					(0.86743)	(0.82240)
					0.65952	0.52252
ROA * Share of Subordinate Assets					0.07439	-1.59931
					(4.54994)	(4.51974)
					0.98709	0.72642
R-squared	0.4305	0.4304	0.4305	0.4304	0.4309	0.4311
Adjusted R-squared	0.08431	0.08426	0.08430	0.08423	0.08415	0.08443

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

TABLE 7

Effect of Changes on the Share of Subordinates Assets Abroad Owened by Colombian Banks on the Transmission of Domestic Monetary Policy

The table reports OLS regressions for a sample of 3,185,036 loans observations of firms with multiple relationships. The dependent variable is Δ Log credit. Columns 1-8 present different specifications that include double interactions between: i) each bank variable and the share of subordinate assets abroad of the colombian banks and each bank variable and the change in the domestic monetary policy rate. Each specification also includes the triple interaction between the bank variable, the share of subordinate assets abroad and the change in the monetary policy rate. All the specifications include Firm X Time FE and Bank FE. Definition of the variables can be found in Table 1. Coefficients are listed in the first row, robust standard errors that are corrected for clustering at the bank level are reported in the second row and p-values are in the third row. Note that in the second part of the table (right side) the stars that typically signal the significance level of a variable are not included, instead variables are highlighted.

							Interactions with ∑ j=1-2 Δi(t-j)					
Model	**(1)**	**(2)**	**(3)**	**(5)**	**(6)**	**(7)**	**(1)**	**(2)**	**(3)**	**(5)**	**(6)**	**(7)**
Bank lending channel standard indicators												
ln (Total assets)	-0.00098					-0.01187	0.0102					**0.0261**
	(0.01796)					(0.01988)	0.0138					**0.0132**
	0.95682					0.55563	0.4653					**0.0591**
ln (Total assets) * Share of Subordinate Assets	0.13262**					0.17388***	-0.0696					-0.1006
	(0.04883)					(0.06065)	0.0722					0.0655
	0.01182					0.00829	0.3443					0.1369
Bank capital ratio	0.75876***					1.00045***	**-0.4671**					**-0.82**
	(0.25945)					(0.29517)	**0.1697**					**0.2999**
	0.00723					0.00233	**0.0109**					**0.0113**
Bank capital ratio* Share of Subordinate Assets	-2.49922**					-3.44552***	**2.9243**					**4.3323**
	(0.99034)					(1.19897)	**0.9363**					**1.6026**
	0.01834					0.00816	**0.0045**					**0.0122**
Bank liquidity ratio	-1.56987*					-2.06768**	0.8144					**2.0558**
	(0.83918)					(0.80400)	0.6459					**0.8889**
	0.07314					0.01645	0.219					**0.0293**
Bank liquidity ratio* Share of Subordinate Assets	5.31128					8.08602**	-5.2066					**-12.0482**
	(4.21924)					(3.37907)	3.736					**4.9558**
	0.21972					0.02454	0.1757					**0.0226**
Risk profile												
Doubtful loans		1.23271***				0.68797*		-0.2763				**-0.9371**
		(0.30749)				(0.34159)		0.5549				**0.5255**
		0.00048				0.05489		0.6229				**0.0867**
Doubtful loans * Share of Subordinate Assets		-6.12469***				-3.58463**		0.5589				**4.3288**
		(1.40781)				(1.50847)		2.9746				**2.3341**
		0.00020				0.02546		0.8525				**0.0755**
Loan-loss provision ratio		-0.77335				-0.36109		0.6355				0.4306
		(0.45979)				(0.54257)		1.1496				1.0555
		0.10503				0.51182		0.5853				0.6868
Loan-loss provision ratio * Share of Subordinate Assets		2.09687				1.62732		-1.0292				0.2742
		(2.63236)				(2.71492)		6.0446				5.5779
		0.43320				0.55430		0.8662				0.9612
Revenue mix												
Diversification ratio			-0.25698			-0.54111			0.7429			**2.439**
			(0.35711)			(0.46647)			1.0353			**0.5255**
			0.47844			0.25700			0.4796			**0.0981**
Diversification ratio* Share of Subordinate Assets			0.59946			1.23150			-1.916			-7.975
			(1.21617)			(1.71506)			3.4824			5.0019
			0.62638			0.47938			0.5871			0.1234
Commissions ratio			-0.36670			0.61123***			-0.1648			**-1.1924**
			(0.25410)			(0.18999)			0.2838			**0.224**
			0.16139			0.00356			0.5668			**0.0000**
Commissions ratio * Share of Subordinate Assets			2.02885			-2.59068**			-0.0307			**4.3182**
			(1.66296)			(1.10117)			1.6549			**1.317**
			0.23384			0.02682			0.9853			**0.0031**
Bonds ratio			-0.44219**			-0.64094***			0.0848			-0.1904
			(0.16983)			(0.22643)			0.1386			0.3957
			0.01529			0.00904			0.5462			0.6345
Bonds ratio * Share of Subordinate Assets			1.77169***			2.77851***			0.5623			1.3905
			(0.60391)			(0.94672)			0.6221			1.8068
			0.00708			0.00706			0.3748			0.4487
Funding												
Share of short-term funding				0.04855		-0.33343***				**0.3437**		0.2637
				(0.15071)		(0.11888)				**0.116**		0.1624
				0.75001		0.00960				**0.0066**		0.1169
Share of short-term funding * Share of Subordinate Assets				-0.05718		2.00169***				**-1.7663**		-0.8434
				(0.67989)		(0.63348)				**0.5666**		1.0927
				0.93365		0.00410				**0.0045**		0.4474
Share of funding in foriegn currency				-0.24201		0.36853				**-1.2443**		**-0.8115**
				(0.48193)		(0.28452)				**0.6864**		**0.3651**
				0.61995		0.20705				**0.0819**		**0.0355**
Share of funding in foriegn currency * Share of Subordinate Assets				1.11583		-2.03631*				5.2556		2.4218
				(2.38466)		(1.17471)				3.2824		1.7673
				0.64389		0.09533				0.1219		0.1828
Profitability												
ROA					0.64502	-0.84064					-0.415	1.1224
					(0.79724)	(0.85436)					0.897	0.723
					0.42611	0.33457					0.6476	0.1331
ROA * Share of Subordinate Assets					-2.18898	5.99129					2.6853	**-7.4249**
					(3.85792)	(5.07472)					5.4073	**4.2686**
					0.57550	0.24887					0.6238	**0.0943**
R-squared							0.4308	0.4306	0.4308	0.4307	0.431	0.4316
Adjusted R-squared							0.08491	0.08452	0.08477	0.08466	0.08438	0.08521

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1