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Monetary Policy Spillover to Small Open Economies: Is the Transmission Different under Low Interest Rates?

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Abstract

We explore the impact of low and negative monetary policy rates in core world economies on bank lending in four small open economies—Canada, Chile, the Czech Republic and Norway—using confidential bank-level data. Our results show that the impact on lending in these small open economies depends on the interest rate level in the core. When interest rates are high, monetary policy cuts in core economies can reduce credit supply in small open economies. In contrast, when interest rates in core economies are low, further expansionary monetary policy increases lending in small open economies, consistent with an international bank lending channel. These results have important policy implications, suggesting that central banks in small open economies should watch for the impact of potential regime switches in core economies' monetary policy when rates shift to and from the very low end of the distribution.

Topics: Financial institutions; Monetary policy transmission; International topics
JEL codes: E43, E52, E58, F34, F42, G21, G28

1. Introduction

Since the Global Financial Crisis (GFC) of 2007–2009, policy rates in core world economies have remained low relative to historical levels for a prolonged period of time. An extensive body of literature has focused mostly on the impact of this environment on *domestic* outcomes such as monetary policy pass-through, bank profits, risk-taking, and credit allocation (Altavilla et al., 2021; Basten and Mariathasan, 2018; Bittner et al., 2020; Bottero et al., 2019; Brunnermeier and Koby, 2018; Eggertsson et al., 2019). However, considerably less attention has been given to the cross-border spillovers of such a policy, which is of particular relevance since monetary policy spillovers from the core economies can substantially limit the effectiveness of domestic monetary policy in small open economies (SOEs. See, for example, Cao and Dinger (2021)). In theory, expansionary monetary policy in a core economy has an ambiguous effect on the lending of banks – not only multinational banks, but also domestic banks – in an SOE.[2] On the one hand, the *international bank lending channel* suggests that monetary expansion in the core makes money market funding there cheaper, inducing banks in SOEs to increase their funding from the core and lend more in SOEs (Kashyap and Stein, 2000; Cetorelli and Goldberg, 2012). In contrast, the *portfolio channel* argues that lowering interest rates in the core improves borrowers' creditworthiness, inducing banks to shift credit supply away from SOEs (Adrian et al., 2014; Hills et al., 2019). Such ambiguous effects of cross-border monetary policy spillover are further complicated by the current historically low interest rates in the core countries: Although the recent literature shows that a low and negative interest rate environment (LNIRE) can distort monetary policy pass-through and bank lending within the core economies, there is almost no evidence on whether cross-border monetary policy spillovers are modified by LNIRE in the core.

In this paper, we attempt to fill in this gap and investigate the role of monetary policy spillovers from core world economies to lending in SOEs, with particular attention to the degree of spillovers at low or negative interest rates. We trace the impact of monetary policy shocks in three core economies – the US, euro area (EA), and UK – on lending in four SOEs – Canada, Chile, the Czech Republic, and Norway (CCCN hereafter). In the case of Norway, we also account for spillovers from Sweden, as the same Scandinavian banks have a presence in both the Swedish and Norwegian banking sectors. We use proprietary data on bank lending in these four SOEs for the period 2002–2019. Employing such a long time horizon enables us to trace the monetary policy spillovers in times of substantial variations in core economies' interest rates and contrast low-interest-rate periods with periods of higher

[2]We discuss this in more detail in Section 3.

interest rates.[3] Our main contribution to the existing literature is to examine how LNIRE in the core shapes monetary policy spillovers to SOEs.

Table 1: All countries share similar characteristics

	Canada	**Chile**	**Czech Republic**	**Norway**
Credit to non-financial sector from all sectors to GDP[a]	305%	188%	120%	284%
Credit to non-financial sector from banks to GDP[a]	112%	88%	51%	80%
5-bank asset concentration[b]	92%	77%	66%	64%
Share of foreign-owned banks in total assets[b]	2%	44%	86%	29%
Share of cross-border liabilities in total assets[b]	9%	12%	24%	35%
Share of cross-border assets in total assets[b]	35%	6%	10%	21%
Share of loans to private sector in foreign currency[b]	0%[d]	11%	20%	8%
Year of inflation-targeting adoption	1991	1999	1998	2001
Currency regime	Freely floating	Managed floating	Managed floating	Freely floating
Capital mobility	"Open"	"Gate"[c]	"Open"	"Open"

[a] As of 2019, according to the BIS total credit statistics database. [b] As of 2019Q4, according to internal information from each central bank.[c] "Gate" means that a moderate share of types of cross-border financial transactions are subject to significant capital controls (see Fernández et al., 2016). [d] Since we define domestic loans in Canada as the loans given in Canadian dollars, the share of loans in foreign currency by default is zero.

The availability of confidential bank-level data in the four economies gives us an opportunity to abstract from bilateral confounding effects while we can still explore a sample of sufficiently similar countries. The countries in our sample are all small, financially open economies, with a substantial presence of global banks, and operate an inflation-targeting monetary policy regime with flexible exchange rates (Table 1)[4]. Moreover, CCCN are all bank-oriented economies. In Canada and Norway, banks hold total assets of more than 100% of GDP; in Chile and the Czech Republic, the size of the banking sector is smaller but still high compared to emerging economies on average. Also, bank credit is the main source of financing to the non-financial private sector in all four economies. CCCN's banking sectors are highly concentrated, particularly in Canada and Chile, where the 5-bank asset concentration is above 90% and 75%, respectively. Furthermore, banks' cross-border exposure in terms of assets and liabilities is relatively high in all CCCN countries, and accounts for 18% and 20% on average of total bank assets and liabilities, respectively. Also, the average share of foreign currency-denominated loans is 13% of total lending (excluding Canada), and 20% in the Czech Republic. These characteristics might be informative about the role that foreign monetary policies play in

[3] During our sample period, core countries' monetary policy rates range from zero or negative to more than 5% – just before the GFC.

[4] The Czech Republic generally operates a managed floating exchange rate regime; however, during 2013–2017 the CNB employed a temporary asymmetric exchange rate commitment against EUR.

shaping domestic lending in CCCN. On top of that, banking sectors in all four countries share important features exposing them to international shocks, including changes in foreign monetary policy rates. Although the four countries vary greatly in size – Canada, Chile, the Czech Republic, and Norway represent 1.4%, 0.3%, 0.3%, and 0.5% respectively of global GDP at purchasing power parity rates as at 2019 – they are all small enough that the monetary policy of the core countries can be considered exogenous to developments in the CCCN's domestic sectors. Owing to their role as commodity exporters, the monetary policy of Canada, Chile and Norway is less synchronized with the global business cycles, implying that domestic policy rates can differ relative to the core economies. Emerging market status for Chile and the Czech Republic also contributes to differences in policy rates relative to the core.

We start the empirical analysis with a common framework across countries, allowing lending in all sample countries to be contingent on spillovers from all core countries. We first look at the impact of changes in short-term interest rates in core countries. We define a core policy rate as "low" if it is in the 1st quartile of its distribution; otherwise, we define it as "high". As a part of this exercise, we also investigate the role of long-term interest rates. In particular, we explore whether changes in the yield curve matter for monetary policy spillovers conditional on the short-term policy rate. Next, we explore whether the effect on lending is driven by multinational banks, which may employ their internal capital markets to channel funds across borders. In a more general sense, assuming that frictions in the interbank market are not too pronounced, this channeling of funds can also be intermediated through the interbank market. In this case, we will observe spillover effects in the lending dynamics of multinational and a wider population of banks. Last but not least, we dig deeper into exploring whether the lending response to changes in the core policy rate is uniform across all lending categories, or whether it is driven by specific types of lending. We therefore look at the dynamics of different loan categories in response to changes in the core policy rate. Finally, we subject our results to a battery of robustness checks.

By employing a common empirical framework across countries, we reach four main conclusions. First, we find evidence of a portfolio channel effect when the core interest rate is high. Specifically, a decrease in a core interest rate when the interest rate is high leads to a decrease in lending in CCCN. In contrast, when the core policy rate is low, we find evidence of an international bank lending channel at least in two of the four countries, Canada and Norway. A decrease in the core policy rate increases bank lending in SOEs during the period of low policy rates. These results are robust to different measures of monetary policy changes (such as variations in money market rates or shock measures such as shocks recovered from an SVAR or the residuals from estimating a Taylor Rule),

alternative estimation approaches, and a wide range of controls.

Second, both the portfolio and international bank lending channel remain at play even if we consider long-term interest rates, proxied by changes in the yield curve. These channels are prominent especially in the Czech Republic and Norway. The results for Canada and Chile also support the existence of both channels as they yield quantitatively and qualitatively similar results (the same size and direction of the effect). Not surprisingly, these results are less precise (not statistically significant at the 5% level), given the relatively lower number of observations for the two latter countries.

Third, we show that multinational banks' lending exhibits stronger spillover effects in Norway, while the opposite is true for Chile and the Czech Republic. The result for Norway provides some support for the existence of an internal capital market used by multinational banks to channel funds across borders in response to changes in the core policy rate. However, the mixed evidence might also be generated by the fact that well-functioning interbank markets are a fairly good substitute for internal capital markets in terms of shifting liquidity. Moreover, while the majority of banks in Chile and the Czech Republic are foreign-owned, both domestic and foreign banks face the same regulation, limiting the use of the internal capital market.

Fourth, we show that, in all countries except the Czech Republic, the international bank lending channel at low rates operates primarily through mortgage lending and consumer loans. Similar results are found for Chile and Norway when it comes to riskier corporate loans. The latter is consistent with increased risk-taking associated with the international bank lending channel (Morais et al., 2019).

Our paper fits into two strands of the literature. The first strand of studies focuses on the bank dimension of the cross-border transmission of monetary policy, in particular, on the transmission of the core world economies' monetary policy to other countries through banks' exposure in international money and capital markets. For instance, Morais et al. (2019) identify how monetary policy in the core economies influences corporate lending in Mexico. They find that a foreign policy rate shock affects the supply of credit to Mexican firms mainly via their respective foreign banks in Mexico. In contrast, investigating the transmission of global financial cycles to domestic credit market conditions in Turkey, di Giovanni et al. (2021) find that an easing in global financial conditions is transmitted mostly by domestic banks that are more exposed to international capital markets. Tracking components of banks' balance sheets, Cao and Dinger (2021) document how foreign monetary policy, jointly with global risk factors, affects international banks' domestic lending by changing their funding conditions, and how such an effect propagates through the domestic money market where non-international banks borrow from international banks. Furthermore, Bush et al. (2021)

emphasize that international monetary policy spillovers to domestic lending can also be affected by the domestic macro-prudential policy stance.

The second strand of related literature explores the impact of a negative interest rate on bank lending. However, existing studies focus mainly on domestic transmission, especially on how bank lending is affected by policy rate pass-through, i.e., how deposit rates and loan rates react to a low monetary policy rate. For instance, Bittner et al. (2020) find that a negative interest rate is less expansionary in the core economy because the policy rate pass-through to deposit rates is more impaired; such an impaired bank lending channel under impaired monetary policy pass-through is also documented in Eggertsson et al. (2019) for the case of Sweden. Bottero et al. (2019) and Basten and Mariathasan (2018) find that the bank lending channel is less impaired when banks are able to pass on the negative interest rate to depositors by increasing fees; similarly, Altavilla et al. (2021) find that sound banks are able to pass on negative interest rates to corporate depositors, and this incentivizes corporate borrowers to reduce cash holdings and increase investments, which strengthens the real effects of monetary expansion under negative interest rates.

Our main contribution to the existing literature is to investigate whether the level of the core's policy rate influences how core economies' monetary policy spills over to small open economies. We document two novel findings. First, we show that the dominating channel of international monetary policy spillovers varies with the level of the core's policy rates. Specifically, we find evidence that the international bank lending channel is primarily active when the core's policy rates are at their historically low or negative levels. The portfolio channel appears to dominate when interest rates in the core are high. Using granular bank-level data from four SOEs spanning over almost two decades including both periods under LNIRE and periods under higher interest rates, our results can therefore reconcile the seemingly contradictory results of existing studies that find evidence on either the international bank lending channel (for example, Morais et al. (2019)) or the portfolio channel (for example, Hills et al. (2019)), based on relatively shorter sample periods. Our results illustrate an international search-for-yield channel that is consistent with – but also adds an international angle to – the domestic search-for-yield literature on banking, such as Jiménez et al. (2014). Second, focusing on the period of LNIRE, we specifically show that low and negative policy rates in the core increase bank lending in SOEs.

The rest of the paper is organized as follows. In Section 2, we describe the main features and sources of data that are deployed in this paper. In Section 3, we present our conceptual framework and our main hypotheses for further tests. In Section 4, we investigate the spillover of monetary policy from the core to SOEs; in Section 5, we show how our results are robust to a wide variety of measurements of monetary policy shocks in the core, as well

as different specifications of regression equations. Section 6 concludes.

2. Data and measurements

In this section, we describe the main sources and features of our data. We combine several quarterly datasets for the period of 2002–2019 for Canada, Chile, the Czech Republic and Norway. Bank-level balance sheet items come from the Office of the Superintendent of Financial Institutions (OSFI) for Canada, the former Superintendence of Banks and Financial Institutions (Superintendencia de Bancos e Instituciones Financieras, SBIF) of Chile[5], the Czech National Bank (CNB) for the Czech Republic, and Official Financial Reports by Banks and Financial Undertakings (Offentlig Regnskapsrapportering fra Banker og Finansieringsforetak, ORBOF) for Norway.

In Canada, the OSFI supervises federally chartered commercial banks, trust and loan companies, and foreign bank branches. The sample of Canadian banks employed in the analysis consists of nine banks, including the six largest banks, two smaller domestic banks and one foreign subsidiary.[6] Foreign branches are excluded from the sample as they are not subject to Canadian capital regulations.

Chilean banks are heterogeneous across several dimensions, including size, business model, funding structure, and ownership origin, with 40% foreign-owned banks and one state-owned bank that accounts for 10% of total assets. The sample included in this study focuses on internationally active banks relevant to domestic markets, i.e. big and medium-sized banks as classified by Jara and Oda (2015).[7] By the end of 2019, this group of banks totaled ten institutions, six domestically-owned, and four foreign-bank subsidiaries, and accounted for more than 95% of total banking sector assets.

In the Czech Republic, the CNB supervises domestic banks and subsidiaries and, to a limited extent, also branches of foreign banks. As of 2019Q4, the Czech banking sector consists of twenty-four domestic banks and subsidiaries, with the five largest accounting for nearly 70% of all assets in the banking sector. Regarding the business model, the majority of banks provide funding to the private non-financial sector, with some focused solely on mortgage lending; in particular, the sample of banks employed in the analysis includes five

[5]On 1 June 2019, the SBIF was integrated into the Financial Market Commission (Comisison para el Mercado Financiero or CMF, in Spanish).

[6]For Canadian data, domestic lending is defined by loans in Canadian dollars. In addition,there was a large change in the reporting of federally regulated banks' balance sheets in 2011Q4 due to the application of the International Financial Reporting Standards in Canada. We apply a dummy variable to control for its impact.

[7]In terms of the Jara and Oda (2015) bank taxonomy, retail banks are not internationally active, while tesoreria banks do not participate in domestic credit markets.

building societies and two mortgage banks.

The Norwegian banking sector has a relatively high number of banks. As at 2019Q4, there are 99 savings banks and 36 commercial banks in Norway; among the commercial banks, twelve are foreign-owned banks, including six subsidiaries and six branches. Commercial banks are limited liability companies. Foreign commercial banks are either subsidiaries or branches of mostly Swedish and Danish banks. Savings banks ("sparebank") were originally established by Norwegian municipalities as independent entities without external owners, taking deposits and providing credit to local households and regional businesses. Nowadays the difference between savings banks and commercial banks is relatively small. For instance, savings banks and commercial banks compete in the same credit markets.[8]

Table 2 summarizes the main set of variables used in our empirical analysis described in the following section. As for left-hand side variables, we consider banks' credit growth rates to the private sector, as well as credit to different sectors (mortgages, consumer, and corporate loans). Also, we include a traditional set of banks' controls (deposits, capital adequacy, liquidity, and financial security to total asset ratios), as well as macro-financial control variables (GDP growth, inflation, domestic interest rates, and time dummies).[9]

Figure 1 displays the series of interest rates and monetary policy shocks, as well as the low-interest rate periods in the four core countries. We use the 3-month average interbank lending rate as our standard monetary policy measure (Christiano et al., 1999). However, we also show that our results are robust to alternative policy rate measures, such as shadow rates as defined by (Wu and Xia, 2016, 2020), a residual from a Taylor Rule and monetary policy shocks from SVAR (Gertler and Karadi, 2015). We use the difference between the average 10-year government bond yield and the interbank lending rate as our measure for the interest rate spreads. We define a period as a "low interest rate period" if the interbank rate of the core country is below its 1st quartile or negative.[10]

[8]In our database some banks appear and/or disappear throughout the sample period, resulting in an unbalanced panel. To account for entry and exit, we adopt different strategies depending on the scenario. In Chile, we account for mergers using a binary variable equal to one at the quarter of merger. The biggest mergers and acquisitions occurred in the 1990s and early 2000s (Ahumada et al. (2001)). In the Czech Republic, we do not record any major merger or acquisition during the time span, while in Norway minor ones remain untreated. In Canada, the sample of banks are selected to represent the balanced panel data and, while there are mergers and acquisitions by large Canadian banks during the data, none of them are sizable.

[9]For Canada, the summary statistics for banks exclude the numbers from the date of the accounting standard change. In addition, some numbers are reported as "n.a." for Canadian banks due to the privacy restrictions associated with the use of data from regulatory reports.

[10]Table A.8 in the Appendix presents the main descriptive statistics of core countries' interest rates, the quarter-on-quarter changes of interest rates, as included in our regression analysis below, and the low-interest rates periods. Notice that the interest rates thresholds that define low-interest rate periods in the case of the US, euro area, UK, and Sweden are 0.28, 0, 0.57, and 0, respectively.

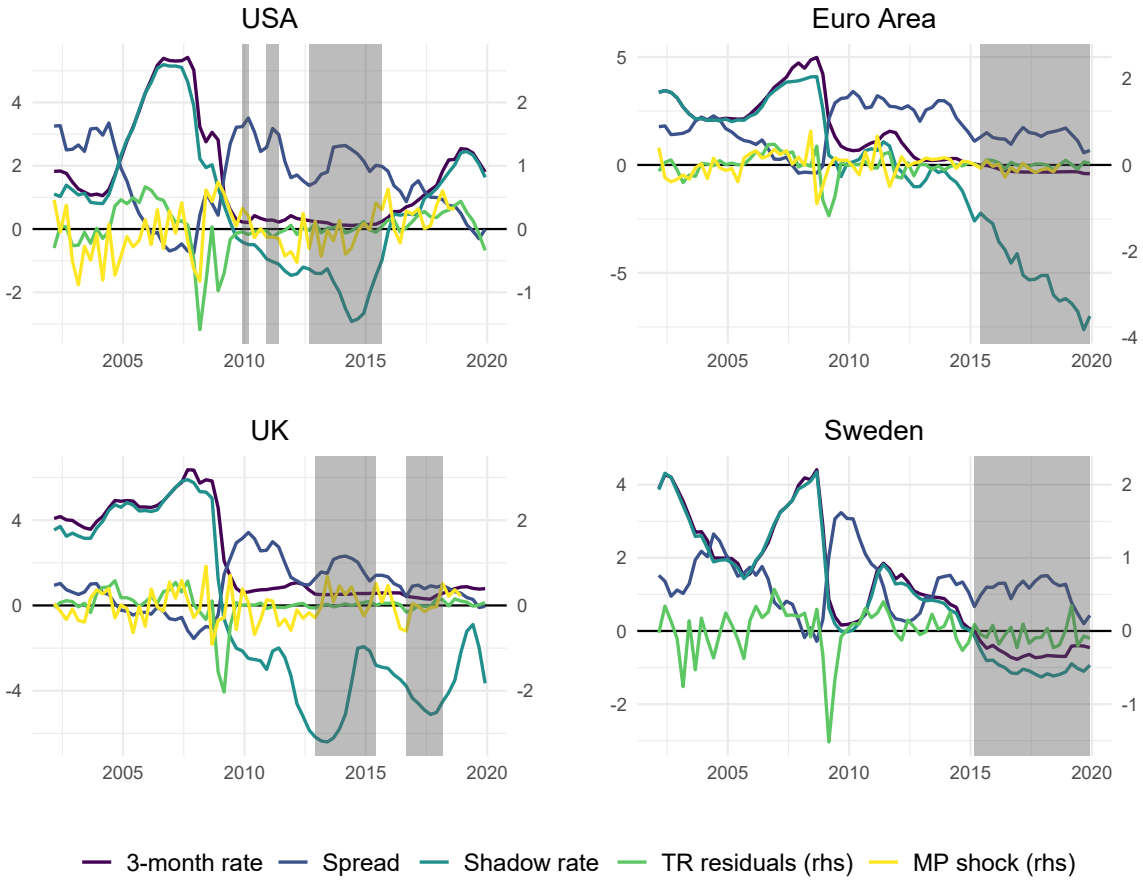
Table 2: Summary statistics

	Canada (9 banks)							Chile (15 banks)						
	Obs	Min	p25	p50	Mean	p75	Max	Obs	Min	p25	p50	Mean	p75	Max
LHS: QoQ credit growth (%)														
Total	639	n.a.	n.a.	n.a.	6.5	n.a.	n.a.	885	-8.7	0.3	1.9	2.5	3.9	83.6
Mortgages	639	n.a.	n.a.	n.a.	6.1	n.a.	n.a.	828	-14.8	1.2	2.5	3.1	4.3	74.6
Consumer	639	n.a.	n.a.	n.a.	6.1	n.a.	n.a.	828	-16.3	0.2	2.0	3.1	4.1	84.2
Corporate	639	n.a.	n.a.	n.a.	5.2	n.a.	n.a.	885	-8.8	-0.2	1.8	2.5	4.1	114.0
Bank control variables (ratios in %)[a]														
Deposits to liabilities	639	n.a.	n.a.	n.a.	53.8	n.a.	n.a.	885	0.0	65.0	71.0	69.0	76.0	96.0
Capital to assets	639	n.a.	n.a.	n.a.	5.6	n.a.	n.a.	885	0.0	6.0	7.0	8.0	9.0	27.0
Liquid assets	639	n.a.	n.a.	n.a.	11.6	n.a.	n.a.	885	2.0	11.0	15.0	16.0	20.0	49.0
Securities assets	639	n.a.	n.a.	n.a.	21.5	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Macro-financial control variables (%)														
GDP growth	72	-9.1	1.0	2.3	2.0	3.5	5.9	72	-4.2	0.3	0.9	0.9	1.4	3.4
Inflation rates	72	-3.9	1.1	1.7	1.9	2.9	5.3	72	-0.8	0.2	0.8	0.8	1.3	3.1
Domestic interbank rate	72	0.4	1.2	1.5	2.0	2.8	4.9	72	0.4	2.7	3.4	3.7	5.0	8.2
Domestic Spread	72	-0.3	0.8	1.1	1.4	2.1	3.4	62	-2.6	0.2	0.9	1.2	1.8	5.7
Change in domestic rate	72	-1.5	0.0	0.0	0.0	0.1	0.5	72	-4.1	-0.2	0.0	-0.1	0.3	1.3
Change in domestic Spread	72	-0.7	-0.2	-0.1	0.0	0.1	0.7	61	-2.3	-0.3	-0.1	-0.1	0.2	3.7
Domestic Low IR period	72	0.0	0.0	0.0	0.3	0.5	1.0	72	0.0	0.0	0.0	0.3	1.0	1.0

	Czech Republic (21 banks)							Norway (226 banks)						
	Obs	Min	p25	p50	Mean	p75	Max	Obs	Min	p25	p50	Mean	p75	Max
LHS: QoQ credit growth (%)														
Total	1,353	-4.9	0.0	2.5	3.4	6.1	15.8	8,904	-35.3	0.4	2.1	3.1	3.9	88.9
Mortgages	1,308	-9.2	0.2	3.0	4.3	7.1	22.8	8,134	-26.9	0.3	2.3	2.8	4.2	66.4
Consumer	984	-27.0	-1.0	2.1	4.9	7.7	52.6	8,131	-100.0	-5.8	0.6	0.7	7.3	100.0
Corporate	1,334	-12.8	-3.1	0.8	2.4	5.9	26.5	8,417	-57.2	-1.0	1.7	2.4	4.7	93.0
Bank control variables (ratios in %)[a]														
Deposits to liabilities	1378	0.0	60.8	77.7	73.3	96.9	100.0	8904	0.0	56.0	72.0	63.0	82.0	99.0
Capital to assets	1378	1.4	5.9	7.9	10.4	11.1	99.6	8904	-16.0	7.0	9.0	10.0	12.0	100.0
Liquid assets	1378	0.0	1.7	8.6	13.5	20.9	82.0	8904	0.0	3.0	5.0	8.0	8.0	100.0
Securities assets	1295	0.0	5.8	16.5	20.9	32.4	76.8	8904	-7.0	6.0	9.0	10.0	13.0	85.0
Macro-financial control variables (%)														
GDP growth	72	-3.4	0.4	0.7	0.7	1.2	2.7	72	-6.3	-3.2	-0.8	0.5	3.3	9.8
Inflation rates	72	-0.8	0.1	0.4	0.5	0.7	3.9	72	-1.6	0.1	0.4	0.5	0.8	2.7
Domestic interbank rate	72	0.3	0.5	1.7	1.7	2.4	4.3	72	0.8	1.5	2.1	2.7	3.1	7.2
Domestic Spread	72	-0.8	0.7	1.3	1.3	2.0	3.4	72	-1.9	-0.1	0.5	0.5	1.2	2.8
Change in domestic rate	71	-1.2	-0.2	0.0	0.0	0.1	0.6	71	-2.5	-0.1	0.0	-0.1	0.2	0.6
Change in domestic Spread	71	-0.8	-0.4	0.0	0.0	0.2	2.1	71	-1.1	-0.3	-0.1	0.0	0.2	2.2
Domestic Low IR period	72	0.0	0.0	0.0	0.3	1.0	1.0	72	0.0	0.0	0.0	0.3	0.5	1.0

[a] *In this table, we present bank control variables in percentages (ratios multiplied by 100) for more detail and better comparison between countries; in the actual regression, however, bank controls are included as simple ratios not multiplied by 100. Remaining variables enter the regression in the same units as presented in this table.*

Figure 1: Interest rates and monetary policy shocks employed in our analysis



Shaded areas indicate low interest rate periods.

3. Conceptual framework and main hypotheses

As a prerequisite, an understanding of the effect of core economies' low (or even negative) interest rates on the dynamics of bank lending in SOEs requires an understanding of the general channels of monetary policy spillovers. The literature so far has proposed two main channels working in opposite directions. First, the international bank lending channel (Bernanke, 1983, 1993; Kashyap and Stein, 2000; Cetorelli and Goldberg, 2012) presumes that following an expansionary monetary policy shock in the core, internationally active banks may increase their lending in SOEs due to their lower cost of funding. Morais et al. (2019) present empirical evidence for the effectiveness of this channel and also show that it is driven by search for yield in the sense that, when interest rates in the core are low, banks borrow there and lend in high-yield destinations, i.e., the SOEs. The other channel, the portfolio channel, predicts the opposite effect: A tightening

of core monetary policy may reduce the creditworthiness of core economies' borrowers and reduce their collateral values, which may induce multinational banks to increase lending in SOEs (see Barbosa et al. (2018) and Hills et al. (2019)). A loosening of core monetary policy can reverse these effects, thus reducing lending to SOEs. The contrasting predictions of these channels motivate us to empirically test the following hypothesis:

H1: An expansionary monetary policy shock in the core leads to an expansion of bank lending in the small open economies.

Finding support for this hypothesis will be consistent with the international bank lending channel, while rejecting it will deliver evidence for the portfolio channel.

Note that the effects described in the above two channels can be present even if the interest rates in the core are not particularly low. Exploring the spillovers of low interest rates in particular, therefore, requires an examination of how these channels are reinforced or inhibited when monetary policy rates in the core are low or even negative. That is, for example, the international lending channel can be reinforced by particularly strong search-for-yield concerns at the very low end of the interest rate distribution. This effect can be accelerated even further if banks in core economies perceive negative interest rates as a cost they can circumvent by cross-border portfolio rebalancing. On the other hand, the portfolio channel can be less effective when interest rates are generally low, since the net worth of firms in the core is possibly less sensitive to a mild monetary policy tightening in the lower range of the interest rate distribution. To examine how the importance of the above channels change in low and negative interest rate environments, we therefore test the following hypothesis:

H2: An expansionary monetary policy shock in the core has stronger effects on bank lending in the small open economies when core interest rates are low.

Next, we focus on documenting the channels behind these spillovers. We start by exploring the role of multinational banks. To this end, we lean on a recent literature which argues that multinational banks play a central role in cross-border spillover of monetary policy. As is shown by Bräuning and Ivashina (2020), multinational banks with affiliates in both core and SOEs allocate credit and raise funding on a "global" basis, taking into account spatial variation in funding costs and returns. Expansionary monetary policy in the core incentivizes these banks to rebalance their global balance sheets, which may lead to changes in lending to the SOEs. Morais et al. (2019) also identify multinational banks as the main drivers of core monetary policy spillovers to Mexico. These results are consistent with the existence of an internal capital market (Campbell et al., 2012) within multinational banks which could reinforce both the international bank lending and the

portfolio channel. We explicitly test the conjectures about the role of multinational banks by formulating our third hypothesis:

H3: The spillover of monetary policy shocks in the core to the small open economies is stronger for multinational banks that have operations in both the core and the small open economies.

Monetary policy also influences banks' incentive to take risks (Jimenez et al., 2013), and this risk-taking channel also holds in the international context. For example, changes in funding conditions due to monetary policy spillovers can affect bank risk-taking in the SOEs. As a result of such a risk-taking channel, we would expect riskier bank lending categories to be more sensitive to monetary policy spillover from the core. This leads to our next hypothesis:

H4: The sensitivity of bank lending to the spillover of monetary policy shocks in the core differs across loan categories.

Finally, we expect that the impact of a monetary expansion in a low interest rate environment also depends on banks' expectations with regard to how long such an environment will persist. As is argued by Rajan (2006), when monetary policy rate remains "low for long", the search-for-yield incentive is stronger. We therefore expect the monetary policy spillovers in a low-rate environment to also be influenced by banks' expectations with regard to how long low or negative interest rates in the core will last. This leads to our last hypothesis:

H5: When core policy rates are low, the effect of monetary policy spillover from the core to the small open economies is stronger if banks expect monetary policy rates in the core to stay low for a long period.

4. Monetary policy spillovers from the core to small open economies

We start by investigating the degree of monetary policy spillovers and whether these spillovers change when the core policy rate is low. For this purpose, we estimate the following baseline model:

$$\begin{aligned}\Delta Y_{b,t} =&\alpha_0 + \beta_1^c \Delta r_t^c + \beta_2^c \Delta Spread_t^c + \beta_3^c Low_t^c + \delta_1^c(\Delta r_t^c \times Low_t^c) + \\ &\delta_2^c(\Delta Spread_t^c \times Low_t^c) + \gamma_1 X_{b,t-1} + \gamma_2 Z_{t-1} + f_b + \epsilon_{b,t} \end{aligned} \quad (1)$$

where $\Delta Y_{b,t}$ is the quarter-on-quarter log-change in lending of bank b at time t in percentage points, Δr_t^c is the quarter-on-quarter change (first difference) in interest rate in core country c, $\Delta Spread_t^c$ is the quarter-on-quarter change (first difference) in the difference between the the 10-year government bond yield and 3-month interbank rate in core country c, Low_t^c is dummy equal to one for the period when the interest rate in country c is low (i.e. below a 1st quartile value) or negative, f_b are bank fixed effects. Z_t represents the vector of macroeconomic controls (quarterly GDP growth, quarterly CPI inflation) and $X_{b,t-1}$ the vector of lagging bank-level controls (deposits over liabilities, equity over assets, securities over assets, liquid assets over total assets).

In our empirical approach, we closely follow the model by Claessens et al. (2018), who regress bank's net interest income (or ROA) on the 3-month market rate, the spread between the 3-month and 10-year bond yields and a dummy variable for low interest rate periods, controlling for time-varying bank characteristics and macroeconomic controls, and including fixed effects. The proposed methodology allows estimating the direct monetary policy spillovers from the core economies to lending in SOEs in the low and high interest rate environment, while controlling for other factors. By including SOEs' GDP growth and CPI inflation (and later on also the core's GDP growth and CPI inflation), we control for general economic conditions, acknowledging the difficulty to fully address the endogeneity in monetary policy. Nevertheless, following one clear and well-established model specification allows for comparability across countries, which is one of the key benefits of this paper.

The model is constructed based on three main assumptions driving international monetary policy spillovers. First, global banks from the core economies may be incentivized to move funds abroad to seek higher return. Thus, they may increase credit supply to the receiving countries through their internal capital markets. Second, when the low interest rate environment in core economies squeezes global banks' net interest margin at home, they may have the incentive to explore other sources of profit, which may incentivize their foreign subsidiaries to take higher risks. Third, low funding costs in core economies may encourage banks (both domestic- and foreign-owned) in SOEs to increase their funding from core economies, and hence affect bank lending within SOEs. All these arguments are consistent with an international bank lending channel, while, as discussed in the introduction, portfolio channel arguments may work in the opposite direction.

Table 3 offers a cross-country comparison of the baseline model estimates. The model specification in equation (1) is estimated for each core country separately. Hence, the table contains three columns for each country, exploring spillovers from the US, EA and UK, and an additional column for Norway that includes results focusing on Sweden as a core country.

Estimates for a full list of control variables can be found in the Appendix.

Table 3: Baseline results

	Canada			**Chile**		
	US	EA	UK	US	EA	UK
	(1)	(2)	(3)	(4)	(5)	(6)
Δr_t^c	**2.96****	**3.71***	**4.44****	0.47	**2.18*****	**1.36****
	(1.46)	**(1.98)**	**(1.95)**	(0.68)	**(0.56)**	**(0.62)**
$\Delta Spread_t^c$	1.98	0.54	2.07	-0.16	0.54	**-0.83*****
	(1.33)	(1.57)	(1.57)	(0.28)	(0.44)	**(0.26)**
Low_t^c	0.58	-1.15	**-1.43***	-0.57	-0.01	-0.30
	(0.83)	(1.02)	**(0.73)**	(0.68)	(0.59)	(0.77)
$\Delta r_t^c * Low_t^c$	**-38.69***	-19.04	-10.10	-8.13	10.16	-1.67
	(21.94)	(14.38)	(10.22)	(8.60)	(12.26)	(2.97)
$\Delta Spread_t^c * Low_t^c$	-3.93	-2.71	-2.12	-0.51	-0.75	0.21
	(2.42)	(2.31)	(2.50)	(1.05)	(0.91)	(0.95)
N	648	648	648	885	885	885
No. of banks	9	9	9	15	15	15
Adjusted R^2	0.412	0.411	0.413	0.440	0.450	0.440

	Czechia			**Norway**			
	US	EA	UK	SE	US	EA	UK
	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Δr_t^c	0.06	**1.82*****	0.83	**2.68*****	**1.38*****	**4.11*****	**2.75*****
	(0.47)	**(0.59)**	(0.56)	**(0.38)**	**(0.43)**	**(0.50)**	**(0.46)**
$\Delta Spread_t^c$	0.03	**1.35*****	0.63	**1.32*****	0.32	**1.22*****	**1.71*****
	(0.45)	**(0.50)**	(0.57)	**(0.35)**	(0.30)	**(0.42)**	**(0.40)**
Low_t^c	**-1.70*****	**-1.45*****	**-1.93*****	**-2.90*****	**-0.54****	**-2.70*****	**-1.42*****
	(0.31)	**(0.38)**	**(0.29)**	**(0.30)**	**(0.26)**	**(0.32)**	**(0.25)**
$\Delta r_t^c * Low_t^c$	-5.98	1.55	-3.83	**-7.26*****	-0.97	-7.63	**-5.70****
	(6.58)	(7.50)	(3.02)	**(2.27)**	(5.31)	(6.88)	**(2.62)**
$\Delta Spread_t^c * Low_t^c$	0.13	**-2.46****	0.08	-1.28	0.03	-0.28	**-1.55****
	(1.00)	**(1.11)**	(0.95)	(0.92)	(0.83)	(0.94)	**(0.68)**
N	1,274	1,274	1,274	8,904	8,904	8,904	8,904
No. of banks	21	21	21	226	226	226	226
Adjusted R^2	0.165	0.166	0.173	0.266	0.254	0.268	0.258

*The table presents the coefficient estimates of regression specification (1) whereby the dependent variable is a Q-o-Q growth (in %) in domestic lending (excl. interbank loans) by bank b in quarter t in a small open economy outlined on top (Canada, Chile, the Czech Republic or Norway), and the dependent variables are (1) a quarterly change (first difference) in average 3-month interbank rate in a core country/currency c (US, EA, UK or SE) in quarter t, (2) a quarterly change (first difference) in the spread between the average 10-year government bond yield and the average 3-month interbank rate in currency c in quarter t, (3) a dummy variable Low equal to 1 if the average 3-month interbank rate in currency c in quarter t was lower than the 25th percentile within years 2002-2019, and (4 and 5) interaction terms between dummy Low and the other two variables. The specification includes bank-fixed effects and time-varying bank and macro controls but for brevity they are not reported. Full tables can be found in appendix. Every column presents results for a different core country/currency c, and columns are grouped by a small open economy. Note: ***, ** and * denote the 1%, 5% and 10% significance levels. Robust standard errors in parentheses. Bank fixed effects and control variables included.*

When core policy rates are high, our results suggest that there are substantial spillovers (depending on the countries, the transmission works either through short market rates or spreads), and that expansionary monetary policy in the core decreases lending in CCCN. This finding is consistent with a portfolio channel, where lower core policy rates improve borrower quality and induce banks to reallocate credit away from the SOE and to the core. In economic terms, the estimated effects are sizeable. A 1 unit reduction in a core policy rate is associated with a 1.4–4.4 pp average decrease in quarter-on-quarter lending in the SOEs.

However, this relationship changes substantially when interest rates are low, as highlighted by the negative coefficient on $\Delta r^c \times \text{Low}^c$. This suggests that lending in the SOEs reacts to changes in the core interest rates significantly differently in the low interest rate period. When interest rates are low, a decrease in the core policy rate is associated with faster growth in domestic bank lending, suggesting that the portfolio channel is outweighed by the international bank lending channel. This effect is found significant in case of Canada, the Czech Republic and Norway. For the Czech Republic, the relationship passes through changes in the spread of the EA rates, while for Canada and Norway the effect transmits through US short market rates and those of the SE and UK, respectively.

To visualize our results, we calculate marginal effects at mean values of other covariates and plot the adjusted effects for different values of interest rate and spread changes (see Figures B.2–B.4 in Appendix). The difference in effect between the two periods suggests that different transmission channels are at play. During the low interest rate period, marginal effects are mostly negative, as indicated by mostly downward sloping red lines. This suggests that larger positive (negative) changes in the core countries' policy rates are associated with slower (faster) lending growth in SOEs, which serves as evidence supporting an international bank lending channel. In contrast, mostly upward sloping blue lines suggest the dominance of the portfolio channel when rates are high.

Based on our results, we are able to identify which core policy rates matter for the different countries in our sample. In this respect, we find that changes to the market interest rates (as captured by changes in the three-month inter-bank rates) in the euro area are associated with changes in lending in all four countries. The UK rates matter for Chile, Norway and Canada (only when considering the changes to the market rates, Δr_t^c) and the US rates for Canada (only when considering the changes to the market rates) and Norway. On top of that, we find that Norway is highly exposed to changes in the interest rates of its neighbor, Sweden.

Having investigated the general role of a low interest rate environment in international monetary policy spillovers, we next provide evidence on the transmission mechanisms, e.g. in terms of the role of international banks, variation across different types of lending and the duration of the low interest rate period.

4.1. The role of international banks

We next test whether spillovers are bigger for multinational banks, in line with our third hypothesis. For this purpose, we define a dummy variable family_b^c capturing whether the bank b has a family member (i.e. a branch, subsidiary or headquarter) belonging to the same banking group in a core country c. We form double and triple interaction terms to

explore the differences.

The results of these estimations are presented in Table 4. During a low interest rate period, the family$_b^c$ dummy plays a role especially in Norway. In particular, as indicated by the negative and statistically significant coefficient on the triple interaction term between the short-term rate, dummy "Low" and dummy "Family", the negative effect of the Swedish short-term rate on Norwegian domestic bank lending when interest rates are low is much stronger for banks that have a family member in Sweden. Similarly, the same effect of the UK short-term rate is stronger for banks that have a family member in the UK. This lends support to the internal capital market channel, whereby banks with access to money markets or central bank liquidity in low interest rate countries channel that cheap liquidity to higher-yield countries. Potential limits to arbitrage, possibly caused by post 2008–2009 crisis regulations and evidenced by deviations in covered interest rate parity (CIP), might have contributed to making this possible.

The interpretation is less conclusive for the other countries, with effects often going in the opposite direction. For example, the change in the core country's spread during the low interest rate period has a positive significant effect on the domestic lending of Chilean banks with a family member in the core but a negative effect on the domestic lending of Chilean banks without such a member. Similar effects can be observed for the Czech Republic.

Furthermore, when the core policy rate is high, the interaction terms with the family$_b^c$ are mostly not statistically significant, with the exception of Norway. Here we can see again a much stronger positive reaction in the domestic lending of banks with a family member in the core country.

Nevertheless, the significant results for Norway and the lack of significance for other SOEs may be explained by the fact that Norway has enough variation to test the triple interaction, as it has a relatively large group of banks. The lack of variation (low number of banks) in other countries can explain why results are less precise. The mixed evidence might also be generated by the fact that well-functioning interbank markets are a fairly good substitute for internal capital markets in terms of shifting liquidity.

Table 4: The role of international banks

	Canada			Chile		
	US	EA	UK	US	EA	UK
	(1)	(2)	(3)	(4)	(5)	(6)
Δr_t^c	**2.96****	**3.71***	8.72	0.08	**2.95*****	**1.62****
	(1.46)	**(1.98)**	(6.55)	(0.59)	**(0.76)**	**(0.59)**
$\Delta Spread_t^c$	1.98	0.54	6.37	0.40	**1.11****	0.07
	(1.33)	(1.57)	(9.23)	(0.49)	**(0.47)**	(0.72)
$\Delta r_t^c * Low_t^c$	**-38.69***	-19.04	17.97	-13.29	15.39	-0.94
	(21.94)	(14.38)	(15.66)	(16.52)	(10.54)	(3.64)
$\Delta Spread_t^c * Low_t^c$	-3.93	-2.71	-8.17	**-3.54*****	**-2.98*****	-0.98
	(2.42)	(2.31)	(10.06)	**(0.74)**	**(0.91)**	(1.00)
Low_t^c	0.58	-1.15	**-1.44****	**-1.30****	0.51	**-1.17*****
	(0.83)	(1.02)	**(0.74)**	**(0.52)**	(0.45)	**(0.32)**
$Low_t^c * Family_b^c$	-	-	-	-	-	-
$\Delta r_t^c * Family_b^c$	-	-	-4.83	0.76	-1.86	-0.80
			(7.22)	(1.30)	(1.23)	(0.92)
$\Delta Spread_t^c * Family_b^c$	-	-	-4.83	-1.71	**-2.75*****	-1.21
			(10.21)	(1.05)	**(0.90)**	(1.12)
$\Delta r_t^c * Low_t^c * Family_b^c$	-	-	-31.63	9.64	-13.19	-1.91
			(19.76)	(17.40)	(30.93)	(4.97)
$\Delta Spread_t^c * Low_t^c * Family_b^c$	-	-	6.79	**5.26*****	**5.46*****	**3.57*****
			(11.12)	**(1.56)**	**(1.25)**	**(1.15)**
N	648	648	648	885	885	885
No. of banks	9	9	9	15	15	15
Adjusted R^2	0.412	0.411	0.412	0.450	0.450	0.440

	Czech Republic			Norway			
	US	EA	UK	SE	US	EA	UK
	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Δr_t^c	0.02	2.98	0.84	**2.02*****	**1.47*****	**3.39*****	**2.42*****
	(0.53)	(1.88)	(0.65)	**(0.34)**	**(0.38)**	**(0.40)**	**(0.43)**
$\Delta Spread_t^c$	0.04	**3.02***	0.68	**0.96*****	0.45	**1.28*****	**1.57*****
	(0.51)	**(1.63)**	(0.68)	**(0.31)**	(0.28)	**(0.33)**	**(0.37)**
$\Delta r_t^c * Low_t^c$	-4.54	**-37.56***	-3.43	**-4.11****	-2.72	-8.25*	-1.40
	(7.43)	**(21.50)**	(3.61)	**(1.68)**	(3.83)	(4.98)	(1.87)
$\Delta Spread_t^c * Low_t^c$	0.41	**-6.39****	-1.02	-0.73	-0.36	-0.50	**-1.74*****
	(1.13)	**(3.20)**	(1.13)	(0.71)	(0.61)	(0.69)	**(0.53)**
Low_t^c	**-1.57*****	0.18	**-2.10*****	**-2.39*****	**-0.75*****	**-2.40*****	**-1.19*****
	(0.35)	(1.09)	**(0.35)**	**(0.23)**	**(0.21)**	**(0.25)**	**(0.20)**
$Low_t^c * Family_b^c$	-0.63	-1.67	0.53	**-4.59*****	2.44	-2.50	-2.61
	(0.72)	(1.09)	(0.62)	**(1.60)**	(2.21)	(1.82)	(1.85)
$\Delta r_t^c * Family_b^c$	0.20	-1.24	-0.02	**7.01*****	-1.25	**7.16****	3.76
	(1.07)	(1.94)	(1.14)	**(2.27)**	(3.58)	**(3.01)**	(2.80)
$\Delta Spread_t^c * Family_b^c$	-0.03	-1.87	-0.15	**3.65***	-1.68	-0.74	1.65
	(1.03)	(1.71)	(1.23)	**(2.19)**	(2.07)	(2.86)	(2.59)
$\Delta r_t^c * Low_t^c * Family_b^c$	-6.76	**44.72****	-1.18	**-26.72***	22.09	4.65	**-49.70****
	(15.63)	**(22.62)**	(6.48)	**(14.25)**	(47.71)	(44.48)	**(21.79)**
$\Delta Spread_t^c * Low_t^c * Family_b^c$	-1.31	4.49	**3.50***	-5.24	4.85	2.07	1.91
	(2.39)	(3.38)	**(2.03)**	(5.54)	(7.19)	(6.16)	(5.56)
N	1,274	1,274	1,274	8,904	8,904	8,904	8,904
No. of banks	21	21	21	226	226	226	226
Adjusted R^2	0.162	0.174	0.174	0.271	0.254	0.272	0.262

*The table presents the coefficient estimates of a regression that is similar to specification (1) but includes a dummy variable Family, which equals to 1 if bank b had a family member (a branch, a subsidiary or a headquarter) belonging to the same banking group in both the small open economy outlined on top and the core country c. The dummy Family is interacted with the dummy Low, the change in 3-month rate and the change in spread. The triple interactions test weather the results revealed by interaction terms in the baseline regression are stronger/weaker for banks with family members in the core countries. Note: ***, ** and * denote the 1%, 5% and 10% significance levels. Robust standard errors in parentheses. Bank fixed effects and control variables included.*

4.2. Bank lending across loan categories

In Tables 5–7 we investigate whether the core monetary policy spillovers vary across loan categories. Our presumption is that the spillovers from core economies' monetary policy might have a differential impact on different types of loans if risk varies across these loans. We differentiate here between corporate, mortgage and consumer loans. Our results indicate that when core policy rates are high, the transmission works to a varying degree through all loan categories, with corporate loans being affected in all countries by the rate of at least one core country. In addition, as the countries in our sample are small open economies, the export-import orientation of firms and the usage of foreign currency loans may play a role. For example, exporters use foreign currency loans as a natural hedge against exchange rate risk in the Czech Republic.[11,12]

The results with regard to the period of low interest rates indicate substantial differences across countries and loan categories. More specifically, the negative effect of the core country's interest rate changes seems to be passed on the SOEs mostly through mortgages and consumer loans when interest rates are low. For example, the interaction between the Low^c dummy and changes in core policy rates are significant and negative for Norway and Chile in the case of both mortgage and consumer loans and Canada for mortgage loans, consistent with a search-for-yield channel in the low interest rate environment. This channel appears strong with SE, UK and EA rates for Norway, and all three rates for Canada and Chile. The effect on corporate loans is significant and negative, however, only for Chile (US rate) and Norway (SE rate).

[11]The share of foreign currency loans in banks' total corporate loans grew from around 10% to 30% during the period analyzed in the Czech Republic. The share of the foreign currency loans of the 1,000 largest exporters was higher, accounting for more than half of banks' loan portfolio as of 2018.

[12]For Chile, we also find differences depending on the currency in which the loan is denominated (not reported).

Table 5: Spillovers across loan categories – mortgage lending

	Canada			**Chile**		
	US	EA	UK	US	EA	UK
	(1)	(2)	(3)	(4)	(5)	(6)
Δr_t^c	**4.59****	**5.98*****	**8.22*****	-0.63	0.61	0.21
	(1.83)	**(2.21)**	**(2.16)**	(0.76)	(0.76)	(0.82)
$\Delta Spread_t^c$	2.58	0.09	**3.60***	-0.49	0.52	0.01
	(1.67)	(1.93)	**(2.11)**	(0.77)	(0.76)	(0.98)
Low_t^c	**2.44*****	**-2.77***	-0.99	-0.21	-0.41	**-0.69****
	(0.92)	**(1.48)**	(0.86)	(0.36)	(0.55)	**(0.30)**
$\Delta r_t^c * Low_t^c$	**-60.37***	**-46.83*****	**-24.66***	**-25.44****	2.26	-2.00
	(31.32)	**(16.81)**	**(14.62)**	**(11.14)**	(12.61)	(2.59)
$\Delta Spread_t^c * Low_t^c$	**-5.43****	-0.72	-2.99	0.23	-1.49	0.65
	(2.58)	(2.54)	(2.80)	(1.68)	(1.13)	(1.15)
N	648	648	648	828	828	828
No. of banks	9	9	9	14	14	14
Adjusted R^2	0.464	0.462	0.466	0.390	0.390	0.390

	Czech Republic			**Norway**			
	US	EA	UK	SE	US	EA	UK
	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Δr_t^c	0.29	**1.69****	0.85	**1.57*****	-0.14	**2.76*****	**1.87*****
	(0.68)	**(0.86)**	(0.81)	**(0.39)**	(0.42)	**(0.43)**	**(0.46)**
$\Delta Spread_t^c$	-0.15	**1.32***	0.63	0.44	-0.38	0.53	0.29
	(0.66)	**(0.73)**	(0.83)	(0.31)	(0.27)	(0.34)	(0.36)
Low_t^c	**-1.45*****	**-2.31*****	**-1.68*****	**-1.88*****	**-0.62*****	**-1.86*****	**-0.70*****
	(0.46)	**(0.55)**	**(0.44)**	**(0.23)**	**(0.21)**	**(0.25)**	**(0.21)**
$\Delta r_t^c * Low_t^c$	-5.42	-2.55	-1.55	**-4.87****	2.83	-6.94	-1.28
	(9.59)	(10.93)	(4.44)	**(1.95)**	(3.96)	(5.60)	(1.98)
$\Delta Spread_t^c * Low_t^c$	1.38	-1.72	0.05	**-1.80****	0.85	**-1.36***	0.75
	(1.46)	(1.61)	(1.39)	**(0.81)**	(0.65)	**(0.79)**	(0.58)
N	1,229	1,229	1,229	8,134	8,134	8,134	8,134
No. of banks	21	21	21	226	226	226	226
Adjusted R^2	0.215	0.130	0.141	0.207	0.200	0.209	0.202

*The table presents the coefficient estimates of regression specification (1) that was used for the baseline results but here the dependent variable includes only mortgage loans. Note: ***, ** and * denote the 1%, 5% and 10% significance levels. Robust standard errors in parentheses. Bank fixed effects and control variables included.*

Table 6: Spillovers across loan categories – consumer lending

	Canada			**Chile**		
	US	EA	UK	US	EA	UK
	(1)	(2)	(3)	(4)	(5)	(6)
Δr_t^c	-1.69	1.82	0.90	-0.19	**4.19*** **	**2.43***
	(1.81)	(2.39)	(2.18)	(0.87)	**(1.20)**	**(1.41)**
$\Delta Spread_t^c$	2.21	3.25	3.12	-0.82	2.00*	0.44
	(1.60)	(1.99)	(2.14)	(0.97)	(1.13)	(1.49)
Low_t^c	**-3.09*** **	**-5.10*** **	**-5.40*** **	-0.68	**-2.43*** **	**-2.26*** **
	(1.02)	**(1.15)**	**(0.90)**	(0.53)	**(0.84)**	**(0.49)**
$\Delta r_t^c * Low_t^c$	-16.06	14.72	-2.03	-4.11	-1.95	**-5.11***
	(22.84)	(13.44)	(12.52)	(13.77)	(12.30)	**(3.01)**
$\Delta Spread_t^c * Low_t^c$	-2.35	**-4.83***	-3.18	1.85	**-2.55***	-1.08
	(2.93)	**(2.81)**	(2.76)	(2.58)	**(1.30)**	(1.53)
N	648	648	648	828	828	828
No. of banks	9	9	9	14	14	14
Adjusted R^2	0.209	0.222	0.223	0.220	0.240	0.230

	Czech Republic			**Norway**			
	US	EA	UK	SE	US	EA	UK
	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Δr_t^c	**4.08** **	**5.24** **	3.12	0.06	**9.35*** **	**2.13***	1.59
	(2.03)	**(2.56)**	(2.44)	(1.08)	**(1.45)**	**(1.22)**	(1.19)
$\Delta Spread_t^c$	0.75	1.53	1.86	0.41	0.97	0.55	**2.34** **
	(1.99)	(2.17)	(2.53)	(0.93)	(0.79)	(1.00)	**(1.11)**
Low_t^c	-0.04	**-4.33** **	0.67	**-2.59*** **	0.46	**-2.40*** **	-0.62
	(1.50)	**(1.69)**	(1.34)	**(0.68)**	(0.58)	**(0.74)**	(0.58)
$\Delta r_t^c * Low_t^c$	-30.71	-16.05	5.87	**-11.31** **	-4.08	-23.36	**-14.31*** **
	(28.42)	(32.30)	(13.13)	**(5.38)**	(11.71)	(16.58)	**(5.50)**
$\Delta Spread_t^c * Low_t^c$	-0.48	-5.65	-0.78	0.41	2.37	**6.67*** **	-1.10
	(4.30)	(4.76)	(4.11)	(2.35)	(1.88)	**(2.30)**	(1.62)
N	910	910	910	8,128	8,128	8,128	8,128
No. of banks	18	18	18	226	226	226	226
Adjusted R^2	0.001	0.010	-0.004	0.028	0.034	0.029	0.028

*The table presents the coefficient estimates of regression specification (1) that was used for the baseline results but here the dependent variable includes only consumer loans. Note: ***, ** and * denote the 1%, 5% and 10% significance levels. Robust standard errors in parentheses. Bank fixed effects and control variables included.*

Table 7: Spillovers across loan categories – corporate lending

	Canada			Chile		
	US	EA	UK	US	EA	UK
	(1)	(2)	(3)	(4)	(5)	(6)
Δr_t^c	3.53	**6.20****	1.67	0.42	**1.53****	1.02
	(2.45)	**(3.11)**	(2.95)	(0.75)	**(0.63)**	(0.68)
$\Delta Spread_t^c$	1.64	2.87	-3.16	-0.59	-0.57	-1.04
	(2.71)	(2.73)	(3.06)	(0.72)	(0.66)	(0.84)
Low_t^c	0.57	**4.51****	2.63	-0.18	0.60	**-0.89*****
	(1.81)	**(2.17)**	(1.85)	(0.41)	(0.50)	**(0.31)**
$\Delta r_t^c * Low_t^c$	-19.24	3.05	19.53	**-24.83***	7.24	-2.26
	(38.13)	(45.51)	(20.18)	**(14.52)**	(13.29)	(3.45)
$\Delta Spread_t^c * Low_t^c$	-0.60	-6.67	5.50	-1.14	0.37	**2.08***
	(5.41)	(6.96)	(5.90)	(1.31)	(1.13)	**(1.10)**
N	648	648	648	885	885	885
No. of banks	9	9	9	15	15	15
Adjusted R^2	0.020	0.034	0.028	0.410	0.410	0.420

	Czech Republic			Norway			
	US	EA	UK	SE	US	EA	UK
	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Δr_t^c	**2.04****	**2.95****	**2.85****	**2.28*****	0.05	**3.46*****	**1.80*****
	(0.94)	**(1.19)**	**(1.12)**	**(0.51)**	(0.60)	**(0.64)**	**(0.64)**
$\Delta Spread_t^c$	0.82	**2.06****	1.06	**1.12****	0.16	**1.61*****	**1.08***
	(0.92)	**(1.00)**	(1.16)	**(0.48)**	0.41	**(0.53)**	**(0.56)**
Low_t^c	**-1.10***	**-3.17*****	**-2.05*****	**-2.38*****	**-1.02*****	**-2.41*****	**-1.72*****
	(0.63)	**(0.75)**	**(0.59)**	**(0.40)**	**(0.33)**	**(0.44)**	**(0.33)**
$\Delta r_t^c * Low_t^c$	-8.48	-1.27	-7.40	**-5.35***	-1.20	-10.06	-0.64
	(13.22)	(14.97)	(6.08)	**(2.94)**	(6.90)	(8.38)	(3.05)
$\Delta Spread_t^c * Low_t^c$	1.28	-2.35	0.89	-1.14	0.16	-1.10	-0.79
	(2.01)	(2.21)	(1.90)	(1.25)	(1.04)	(1.19)	(0.89)
N	1,260	1,260	1,260	8,417	8,417	8,417	8,417
No. of banks	21	21	21	226	226	226	226
Adjusted R^2	0.064	0.080	0.072	0.102	0.096	0.103	0.099

*The table presents the coefficient estimates of regression specification (1) that was used for the baseline results but here the dependent variable includes only corporate loans. Note: ***, ** and * denote the 1%, 5% and 10% significance levels. Robust standard errors in parentheses. Bank fixed effects and control variables included.*

5. Robustness checks

In this section we explore the sensitivity of our main results to changing the definition of core economy monetary policy shocks, the set of control variables as well as the estimation approach.

5.1. Alternative monetary policy indicators

In the baseline regression, we use the 3-month average interbank lending rate as our standard measure for monetary policy in the core. However, this variable may capture not only monetary policy shocks but also a prolonged environment of low rates when small or little variation was observed while the impact was still evident. As Christiano et al. (1999) argue, there is still little consensus in the literature on the measurement of monetary policy shocks. Therefore, we examine whether our baseline results are robust to using several alternative monetary policy indicators that are typically used in the literature: (i) shadow rates; (ii) residuals from SVAR, (iii) residuals from the Taylor Rule and (iv) a proxy variable for a prolonged period of low rates.

5.1.1. Shadow rates

The first alternative we explore is shadow rates, which especially during periods when the zero lower bound (ZLB) is binding might substantially deviate from reported monetary policy rates and interbank rates. In countries where the ZLB is applicable, policy as well as interbank interest rates have been stuck at the lower bound and no longer necessarily convey all relevant information about the stance of monetary policy, as central banks have introduced several unconventional monetary policy tools. For example, the US, the UK, as well as the euro area have performed several rounds of quantitative easing. The shadow rate is a measure of the effective monetary stimulus when these unconventional tools are also taken into account. To explore robustness with regard to shadow rates, we replace the 3-month market rate with shadow rates (see Figure 1) that we estimate following the approach of Wu and Xia (2016, 2020).

The shadow rates are computed using information from longer-term interest rates to infer a hypothetical short-term interest rate in the absence of a ZLB. Empirically, the shadow rate is extracted from the term structure of interest rates, especially medium- and long-term interest rates. As shadow rates are estimated using the whole yield curve, they enter the model specification alone, that is, without the yield curve spreads. In addition, we keep the definition of the low interest rate period as before for comparability of estimates (i.e. the period is the same as in the baseline regression).

The full regression results are presented in Table C.14 in the Appendix, demonstrating that our main results are robust to using shadow rates. The estimates on the coefficients of interest rates remain quantitatively and qualitatively very similar, even though their precision decreases in some instances. In other words, an increase in the core's shadow rate has a positive effect on lending in the SOE when interest rates are high and a negative effect if they are low or negative.

The evidence for the international bank lending channel during the low interest rate period remain statistically significant for the Czech Republic and Norway, while revealing some additional channels for Canada. Specifically, Canadian lending responds significantly to monetary policy changes in the euro area and UK. Our results with shadow rates also reveal an additional channel from euro area monetary policy to Norwegian domestic lending at low rates which is not present in our baseline specification, consistent with unconventional monetary policy in the euro area having a significant impact on bank lending in Norway. The effect for Chile remains statistically not significant while the sign of estimated coefficients points to the same direction as for the other three small open economies. The picture is very similar during the period of high interest rates, supporting our previous evidence for the portfolio channel.

Finding robust estimation results when using shadow rates instead of short-term interbank rates emphasizes the importance of longer interest rates in the identified transmission channels. As evident from our baseline results, both portfolio and international bank lending channels remain at play if we consider a proxy for changes in the yield curve, calculated as a spread between long and short rates. Not surprisingly then, the alternative specification with shadow rates provides consistent results as they are estimated using the whole yield curve. Hence, we suspect that the transmission is affected not only by monetary policy surprises (shocks) but also by expectations about the future path of monetary policy. Next, we focus on the two components, i.e. residuals from SVAR and residuals from the Taylor rule.

5.1.2. Residuals from SVAR and the Taylor rule

In our next robustness exercise, we address the issue that bank lending in SOEs may be driven by banks' expectation about monetary policy in the core that in turn is likely to reflect global real economic dynamics. In this sense, both bank lending in SOEs and monetary policy in the core may be driven by confounding expectations about global economic developments. To sharpen the identification and focus on unexpected changes in monetary policy, we now adopt two alternative measures of monetary policy shocks from the core: (1) the residual of

SVAR, based on Gertler and Karadi (2015)[13], or (2) the residual from the Taylor Rule, such that monetary policy shocks are proxied by the Taylor-rule residuals obtained by regressing the core country's 3-month interbank rate on GDP growth and inflation.[14] Residuals above zero indicate monetary policy tightening, while residuals below zero proxy for monetary policy easing.

In Table C.15 in the Appendix we present the results based on the residual of SVAR, and in Table C.16 in the Appendix we present the results based on the residual of the Taylor rule. In the case of the Taylor rule residual we find that the results are qualitatively comparable to those of our baseline model. With regard to the SVAR residual the results are also comparable but the statistical significance of the estimates is lower.

5.1.3. Persistently low interest rates

Banks are unlikely to substantially change their behavior if the low level of core economies' interest rates is only transitory. Next, we therefore investigate whether the monetary policy spillovers in a low rate environment depend on whether or not the interest rate is expected to stay low for a long period of time. In the baseline model, we use the difference between the average 10-year government bond yields and the interbank lending rate, or, the interest rate spread, as a measure of the market's expectation regarding the future monetary policy stance in the core. In this section we explicitly focus on the role of the duration of the low interest rate period. For this purpose, we include a "low-for-long" variable, Low for long^c , which is defined as the number of consecutive quarters in which the Low^c dummy is equal to one (i.e. the 3-month interest rate has been below its first quartile).

Results of the estimation of equation (1) including the Low for long^c variable are reported in Table C.17 in the Appendix. Similarly to the previous exercises, we reach quantitatively and qualitatively similar estimates of the coefficients on interest rates which supports our main results. On top of that, we find a statistically significant role of the length of the period during which interest rates remain low or negative. With each subsequent quarter of the core's interest rates being below their 1st quartile, the lending dynamics in SOEs is generally more subdued. The effect linked to the prolonged period of low rates more or less replaces the effect previously identified on the Low^c dummy, suggesting that not only the level of rates matter but also the length of the period when they are at low levels.

Not surprisingly, we find a stronger and statistically significant reaction of SOEs' bank lending to the core's spreads in the specification with the Low for long^c variable. By

[13]The SVAR residuals are based on a VAR considering output, inflation and a variety of interest rates. The VAR is identified using daily data and changes in fed funds futures occuring on FOMC days.

[14]The residuals are estimated using OLS regression.

controlling for the effect of each subsequent quarter of low rates, we reveal the impact of changing expectations about the core's monetary policy (captured by a rotating yield curve) on SOEs' lending. Specifically, a decrease in the slope of the yield curve at low rates translates to higher lending dynamics in Canada and Norway, expanding on our baseline results.

5.2. Alternative sets of control variables

5.2.1. Including domestic rates

In the next step, we include domestic interest rates (3-month interbank rate and spread) in the same structure as the foreign ones in order to control for domestic monetary conditions. Table C.18 presents the results. During the low interest rate period, the negative significant effect of a core country's interest rates on domestic bank lending is preserved for most countries, compared to baseline specification. For some countries, the effect is stronger (Chile) while for others there is a switch of the significance from one core country's rates to another (Canada and the Czech Republic). For Norway, the results appear to be mostly robust. We presume that the different outcomes from including domestic interest rates are driven by the varying correlation between domestic rates and those in the respective core economy. Moreover, consistently with the existence of a domestic bank lending channel, both domestic short-term rates and spread receive negative coefficients for most countries with the exception of Chile. During a period of high rates, the estimates remain fairly similar to the baseline specification.

5.2.2. Macroeconomic controls for the core

We start by including the inflation rate and the GDP growth rate of core countries to account for potential omitted variable bias and potential confounding effects related to the fact that bank lending might be affected by expected global trends in real economic dynamics and real interest rates rather than by loan supply shifts. The results presented in Table C.19 indicate that when rates are high, including these additional controls does not qualitatively change the estimated coefficients. However, during low-interest rates periods, the results are robust to this new specification for the Czech Republic and Norway, while the estimates become imprecise for Canada and Chile. This divergence across countries might be driven by a varying intensity of real economic links between the core and the SOEs. Following Section 5.1.3, we also include the low-for-long dummy here to account for the quarter duration of these periods (Table C.19). For most cases, this dummy variable proves to be negative and statistically significant, absorbing partially the effects previously attributed to interest rates. Further, we add currency pairs between the core and CCCN and the foreign currency structure of bank funding in the CCCN.

5.2.3. Bank-level controls

Next, we explore whether our results are robust to expanding the set of bank-level control variables that can pick loan supply effects not necessarily related to monetary policy shocks in core economies. We expand the set of controls by including additional bank-level controls, such as bank size, non-performing loans to total loans ratio, and changes in the house price index. We do not include these controls in the main specification to retain a tractable number of parameters to estimate and assure cross-country comparability that we cannot guarantee in the most saturated specifications since not all additional controls are available for all countries. The results of this robustness exercise indicate that in general, adding more controls does not affect our main estimates.

5.2.4. Alternative estimations

Last but not least, we turn our attention to employing alternative estimation approaches. For this purpose, in an unreported test, we first consider a dynamic model specification instead of a static one to check for the potential missing variable issue. Reassuringly, estimates related to the coefficients of interest remain quantitatively and qualitatively unchanged.

In unreported tests, we also estimate additional specifications, considering: (i) annual instead of quarter-to-quarter changes of the dependent variable, (ii) different winsorization schemes, (iii) richer lag structure, (iv) contemporaneous macro controls instead of lagged ones, (v) excluding the interest rate spread or using it in level. In all these cases, we observe little to no change in our main estimates.

Finally, in unreported tests we use a dummy variable "easing" interacted with our variables of interest from the baseline specification in order to test if our main results are symmetric in the cases of monetary policy tightening and easing. Our estimates do not indicate any asymmetry.

6. Concluding Remarks

Exploring proprietary bank-level data for four countries – Canada, Chile, the Czech Republic, and Norway – we provide evidence on the monetary policy spillovers from core world economies to lending in the small open economies. The main take-away of our analysis is that low interest rates in the core – the US, euro area and UK – reinforce the existence of an international bank lending channel. In other words, when interest rates in the core countries are low, further expansionary monetary policy in these countries is associated with increased lending in small open economies. In contrast, when interest rates are relatively high, a core economy's monetary policy expansion can result in shrinking lending volumes

in SOEs. This suggests that the portfolio channel dominates outside the low interest rate period.

We subject our main analysis to a battery of robustness checks, which support our main results and further expand our understanding of transmission channels. First, long-term yields and expectations about the future path of the core's monetary policy seems to play an important role in the identified transmission. Specifically, lower long-term yields in the core during the low rate periods tend to contribute to higher lending in the small open economies. Second, we find evidence of internal capital markets fueling the transmission in Norway, as lending by multi-national banks exhibits stronger spillover effects; however, the results for other countries show quite the opposite. Third, the international bank lending channel at low rates operates through different types of loans, reflecting the specifics of each economy and risk-taking associated with this channel.

The presented results provide an improved understanding of the impact of monetary policy cross-border spillovers and help reconcile the existence of both a portfolio channel and an international bank channel. In terms of policy implications, they illustrate that central banks should watch for potential regime switches in the impact of core monetary policy when rates shift to and from the very low end of the distribution. That is, for example, while monetary policy expansions in the core might initially tighten local credit supply in small open economies, the credit supply could start increasing once core economies' rates drop to a sufficiently low level. The reverse is likely to happen once the core starts tightening its monetary policy.

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Appendix A. Core economies summary statistics

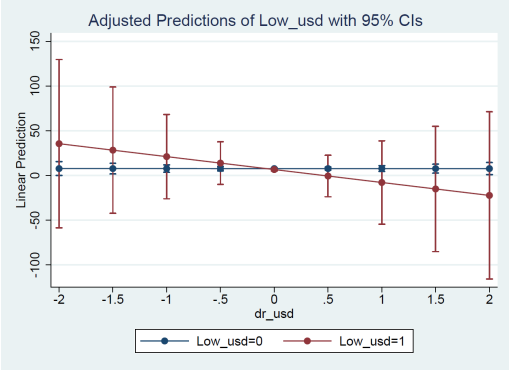
Table A.8: Core economies summary statistics

	Obs	Min	p25	p50	Mean	p75	Max
US							
Interbank rate	72	0,1	0,3	1,1	1,6	2,5	5,4
Change in Interbank rate	72	-1,8	-0,1	0,0	0,0	0,2	0,6
Low IR period	72	0,0	0,0	0,0	0,3	0,5	1,0
Low for long periods	72	0,0	0,0	0,0	1,4	0,5	13,0
Spread	72	-0,8	0,7	1,6	1,6	2,6	3,5
Change in spread	72	-0,9	-0,3	-0,1	0,0	0,1	1,2
Shadow rate	72	-2,9	-1,0	0,9	0,9	2,0	5,2
Change in shadow rate	72	-1,7	-0,2	0,0	0,0	0,3	0,9
MP shock	67	-0,9	-0,3	0,0	0,0	0,3	0,7
GDP growth	72	-2,2	0,3	0,6	0,5	0,9	1,7
CPI inflation	72	-4,0	0,0	0,6	0,5	1,2	2,5
EA							
Interbank rate	72	-0,4	0,0	0,9	1,4	2,3	5,0
Change in Interbank rate	72	-2,2	-0,1	0,0	-0,1	0,1	0,4
Low IR period	72	0,0	0,0	0,0	0,3	1,0	1,0
Low for long periods	72	0,0	0,0	0,0	2,6	1,5	19,0
Spread	72	-0,4	1,1	1,5	1,7	2,5	3,4
Change in spread	72	-0,6	-0,2	0,0	0,0	0,2	2,2
Shadow rate	62	-7,6	-3,5	-0,3	-0,8	2,1	4,1
Change in shadow rate	61	-2,2	-0,3	0,0	-0,2	0,1	0,6
MP shock	67	-0,9	-0,1	0,0	0,0	0,2	0,8
GDP growth	72	-3,1	0,1	0,4	0,3	0,6	1,2
CPI inflation	72	-0,6	0,1	0,4	0,4	0,7	1,4
UK							
Interbank rate	72	0,3	0,6	0,8	2,3	4,6	6,4
Change in Interbank rate	72	-2,5	-0,1	0,0	-0,1	0,1	0,6
Low IR period	72	0,0	0,0	0,0	0,3	0,5	1,0
Low for long periods	72	0,0	0,0	0,0	1,3	0,5	11,0
Spread	72	-1,5	-0,1	0,9	0,9	1,5	3,4
Change in spread	72	-0,7	-0,2	-0,1	0,0	0,1	1,9
Shadow rate	72	-6,4	-3,6	-2,0	-0,4	4,2	5,9
Change in shadow rate	72	-3,8	-0,3	-0,1	-0,1	0,3	1,6
MP shock	68	-0,9	-0,3	0,0	0,0	0,2	0,9
GDP growth	72	-2,1	0,2	0,5	0,4	0,7	1,4
CPI inflation	72	-0,7	0,1	0,5	0,5	0,8	2,1

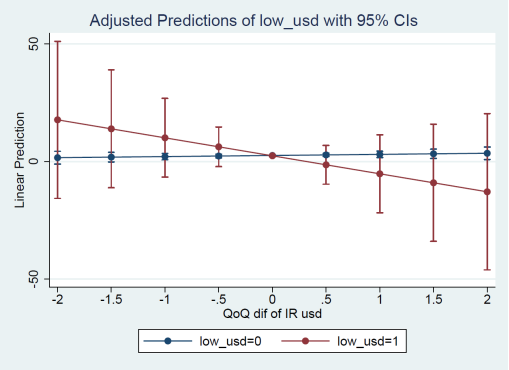
Appendix B. Marginal effects

Figure B.2: Marginal effects of change in the US 3-month interbank rate

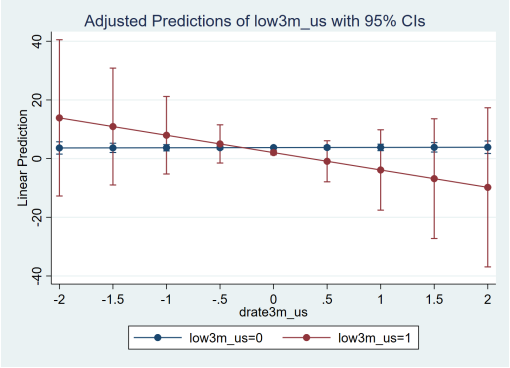
(A) Canada



(B) Chile



(C) Czech Republic



(D) Norway

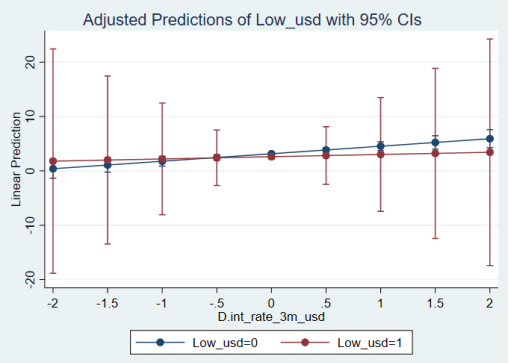
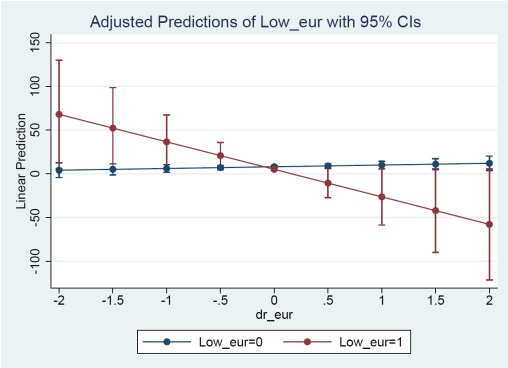
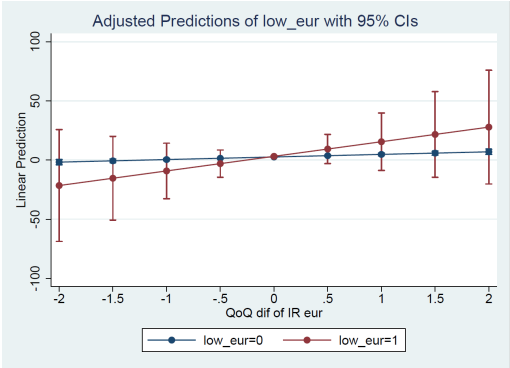


Figure B.3: Marginal effects of change in the euro area 3-month interbank rate

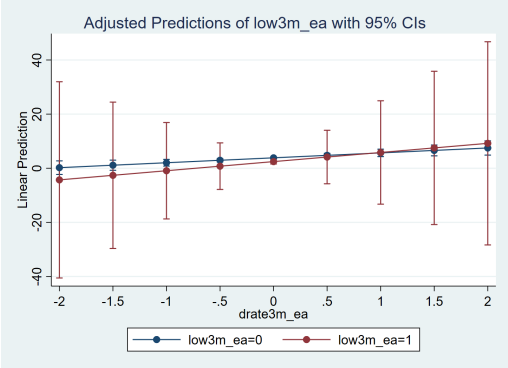
(A) Canada



(B) Chile



(C) Czech Republic



(D) Norway

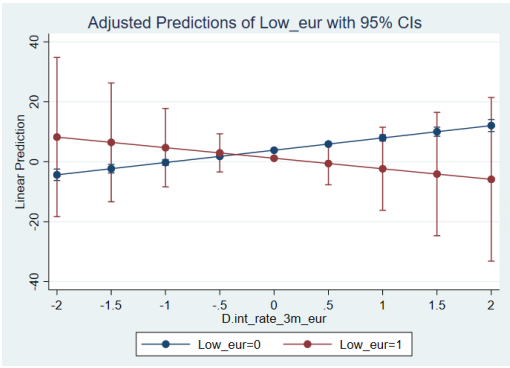
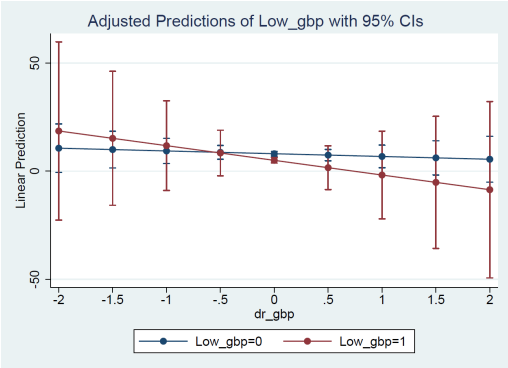
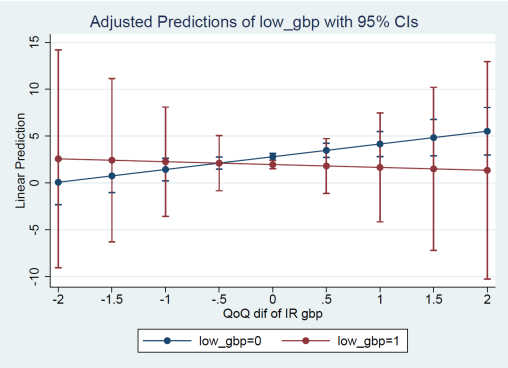


Figure B.4: Marginal effects of change in the UK 3-month interbank rate

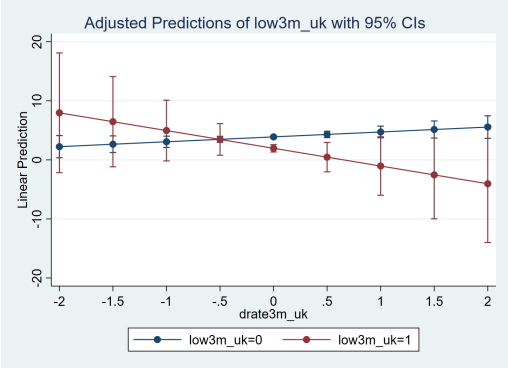
(A) Canada



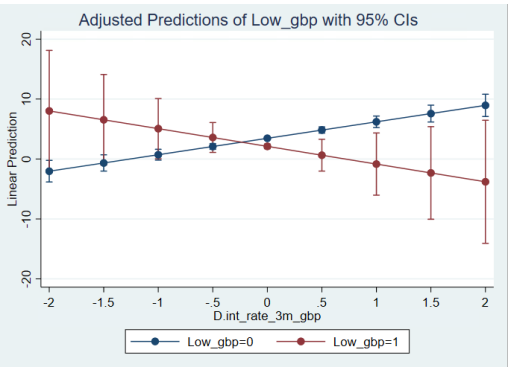
(B) Chile



(C) Czech Republic



(D) Norway



Appendix C. Full regression results

Table C.9: Baseline results

LHS: QoQ Loan Growth

	Canada			**Chile**			**Czech Republic**			**Norway**			
	US	EA	UK	US	EA	UK	US	EA	UK	SE	US	EA	UK
Δr_t^c	2.96**	3.71*	4.44**	0.47	2.18***	1.36**	0.06	1.82***	0.83	2.68***	1.38***	4.11***	2.75***
	(1.46)	(1.98)	(1.95)	(0.68)	(0.56)	(0.62)	(0.47)	(0.59)	(0.56)	(0.38)	(0.43)	(0.50)	(0.46)
$\Delta Spread_t^c$	1.98	0.54	2.07	-0.16	0.54	-0.83***	0.03	1.35***	0.63	1.32***	0.32	1.22***	1.71***
	(1.33)	(1.57)	(1.57)	(0.28)	(0.44)	(0.26)	(0.45)	(0.50)	(0.57)	(0.35)	(0.30)	(0.42)	(0.40)
Low_t^c	0.58	-1.15	-1.43*	-0.57	-0.01	-0.30	-1.70***	-1.45***	-1.93***	-2.90***	-0.54**	-2.70***	-1.42***
	(0.83)	(1.02)	(0.73)	(0.68)	(0.59)	(0.77)	(0.31)	(0.38)	(0.29)	(0.30)	(0.26)	(0.32)	(0.25)
$\Delta r_t^c * Low_t^c$	**-38.69***	-19.04	-10.10	-8.13	10.16	-1.67	-5.98	1.55	-3.83	**-7.26*****	-0.97	-7.63	**-5.70****
	(21.94)	(14.38)	(10.22)	(8.60)	(12.26)	(2.97)	(6.58)	(7.50)	(3.02)	**(2.27)**	(5.31)	(6.88)	**(2.62)**
$\Delta Spread_t^c * Low_t^c$	-3.93	-2.71	-2.12	-0.51	-0.75	0.21	0.13	**-2.46****	0.08	-1.28	0.03	-0.28	**-1.55****
	(2.42)	(2.31)	(2.50)	(1.05)	(0.91)	(0.95)	(1.00)	**(1.11)**	(0.95)	(0.92)	(0.83)	(0.94)	**(0.68)**
Dep. to liab.$_{t-1}$	18.60***	17.61**	15.11**	8.08***	8.37***	8.11***	-6.40***	-6.77***	-5.79***	-1.46	-4.18**	-1.57	-4.05**
	(7.17)	(7.79)	(7.62)	(1.63)	(1.69)	(1.63)	(1.37)	(1.36)	(1.38)	(2.05)	(2.07)	(2.04)	(2.05)
Equity to assets$_{t-1}$	-166.10***	-129.50*	-125.40*	13.11	13.97	14.18	10.24***	8.94***	10.37***	60.81***	57.93***	60.06***	57.98***
	(60.23)	(77.32)	(64.23)	(13.48)	(13.91)	(13.71)	(2.94)	(2.93)	(2.92)	(5.08)	(5.19)	(5.04)	(5.12)
Sec. to assets$_{t-1}$	0.75	-2.77	-2.65	-	-	-	12.12***	9.58***	10.93***	0.08	-3.38	1.67	-1.51
	(10.38)	(10.46)	(10.56)	-	-	-	(1.23)	(1.33)	(1.22)	(3.05)	(3.21)	(3.06)	(3.13)
Liq. assets ratio$_{t-1}$	17.34	8.34	6.23	17.76***	20.54***	18.32***	8.89***	7.67***	8.61***	33.08***	33.20***	33.72***	33.52***
	(17.59)	(17.12)	(16.77)	(4.21)	(4.39)	(4.33)	(1.29)	(1.40)	(1.29)	(3.92)	(3.97)	(3.93)	(3.95)
Dummy M&As	-	-	-	40.33***	40.49***	40.31***	-	-	-	-	-	-	-
	-	-	-	(11.24)	(11.22)	(11.22)	-	-	-	-	-	-	-
Accounting dummy	67.55***	66.44***	66.49***	-	-	-	-	-	-	-	-	-	-
	(10.92)	(10.95)	(10.98)	-	-	-	-	-	-	-	-	-	-
QoQ GDP growth$_{t-1}$	-0.06	-0.09	-0.04	0.33	0.07	0.04	0.57***	0.68***	0.67***	-0.03	-0.07*	-0.06	-0.04
	(0.23)	(0.24)	(0.23)	(0.21)	(0.24)	(0.26)	(0.16)	(0.18)	(0.16)	(0.04)	(0.04)	(0.04)	(0.04)
QoQ CPI growth$_{t-1}$	0.26	0.03	0.02	0.18	0.09	0.20	0.38**	0.44***	0.43***	0.63***	-0.06	0.66***	0.19
	(0.28)	(0.28)	(0.28)	(0.24)	(0.24)	(0.23)	(0.17)	(0.17)	(0.16)	(0.16)	(0.16)	(0.16)	(0.16)
N	648	648	648	885	885	885	1,274	1,274	1,274	8,904	8,904	8,904	8,904
No. of banks	9	9	9	15	15	15	21	21	21	226	226	226	226
R^2	0.430	0.430	0.431	0.460	0.460	0.460	0.185	0.186	0.194	0.285	0.274	0.287	0.278
Adjusted R^2	0.412	0.411	0.413	0.440	0.450	0.440	0.165	0.166	0.173	0.266	0.254	0.268	0.258
FE	Bank	Bank	Bank	Bank	Bank	Bank	Bank	Bank	Bank	Bank	Bank	Bank	Bank

Table C.10: The role of international banks

LHS: QoQ Loan Growth

	Canada			**Chile**			**Czech Republic**			**Norway**			
	US	EA	UK	US	EA	UK	US	EA	UK	SE	US	EA	UK
Δr_t^c	2.96**	3.71*	8.72	0.08	2.95***	1.62**	0.02	2.98	0.84	2.02***	1.47***	3.39***	2.42***
	(1.46)	(1.98)	(6.55)	(0.59)	(0.76)	(0.59)	(0.53)	(1.88)	(0.65)	(0.34)	(0.38)	(0.40)	(0.43)
$\Delta Spread_t^c$	1.98	0.54	6.37	0.40	1.11**	0.07	0.04	3.02*	0.68	0.96***	0.45	1.28***	1.57***
	(1.33)	(1.57)	(9.23)	(0.49)	(0.47)	(0.72)	(0.51)	(1.63)	(0.68)	(0.31)	(0.28)	(0.33)	(0.37)
$\Delta r_t^c * Low_t^c$	0.58	-1.15	-1.44**	-13.29	15.39	-0.94	-4.54	-37.56*	-3.43	-4.11**	-2.72	-8.25*	-1.40
	(0.83)	(1.02)	(0.74)	(16.52)	(10.54)	(3.64)	(7.43)	(21.50)	(3.61)	(1.68)	(3.83)	(4.98)	(1.87)
$\Delta Spread_t^c * Low_t^c$	-38.69*	-19.04	17.97	-3.54***	-2.98***	-0.98	0.41	-6.39**	-1.02	-0.73	-0.36	-0.50	-1.74***
	(21.94)	(14.38)	(15.66)	(0.74)	(0.91)	(1.00)	(1.13)	(3.20)	(1.13)	(0.71)	(0.61)	(0.69)	(0.53)
Low_t^c	-3.93	-2.71	-8.17	-1.30**	0.51	-1.17***	-1.57***	0.18	-2.10***	-2.39***	-0.75***	-2.40***	-1.19***
	(2.42)	(2.31)	(10.06)	(0.52)	(0.45)	(0.32)	(0.35)	(1.09)	(0.35)	(0.23)	(0.21)	(0.25)	(0.20)
$Low_t^c * Family_t^c$	-	-	-	-	-	-	-0.63	-1.67	0.53	-4.59***	2.44	-2.50	-2.61
	-	-	-	-	-	-	(0.72)	(1.09)	(0.62)	(1.60)	(2.21)	(1.82)	(1.85)
$\Delta r_t^c * Family_t^c$	-	-	-4.83	0.76	-1.86	-0.80	0.20	-1.24	-0.02	7.01***	-1.25	7.16**	3.76
	-	-	(7.22)	(1.30)	(1.23)	(0.92)	(1.07)	(1.94)	(1.14)	(2.27)	(3.58)	(3.01)	(2.80)
$\Delta Spread_t^c * Family_t^c$	-	-	-4.83	-1.71	**-2.75*** **	-1.21	-0.03	-1.87	-0.15	**3.65***	-1.68	-0.74	1.65
	-	-	(10.21)	(1.05)	**(0.90)**	(1.12)	(1.03)	(1.71)	(1.23)	**(2.19)**	(2.07)	(2.86)	(2.59)
$\Delta r_t^c * Low_t^c * Family_t^c$	-	-	-31.63	9.64	-13.19	-1.91	-6.76	**44.72****	-1.18	**-26.72***	22.09	4.65	**-49.70****
	-	-	(19.76)	(17.40)	(30.93)	(4.97)	(15.63)	**(22.62)**	(6.48)	**(14.25)**	(47.71)	(44.48)	**(21.79)**
$\Delta Spread_t^c * Low_t^c * Family_t^c$	-	-	6.79	**5.26*****	**5.46*****	**3.57*****	-1.31	4.49	**3.50***	-5.24	4.85	2.07	1.91
	-	-	(11.12)	**(1.56)**	**(1.25)**	**(1.15)**	(2.39)	(3.38)	**(2.03)**	(5.54)	(7.19)	(6.16)	(5.56)
Dep. to liab.$_{t-1}$	18.60***	17.61**	15.37**	8.61***	8.92***	8.81***	-6.40***	-7.71***	-5.68***	-1.40	-4.23**	-1.66	-3.85*
	(7.17)	(7.79)	(7.71)	(1.88)	(1.93)	(1.89)	(1.37)	(1.39)	(1.39)	(2.04)	(2.07)	(2.03)	(2.04)
Equity to assets$_{t-1}$	-166.10***	-129.50*	-120.40*	16.83***	15.76**	15.78**	10.64***	8.59***	10.18***	60.67***	57.63***	59.67***	58.06***
	(60.23)	(77.32)	(65.75)	(5.29)	(5.98)	(5.54)	(2.97)	(2.91)	(2.92)	(5.04)	(5.24)	(5.00)	(5.12)
Sec. to assets$_{t-1}$	0.75	-2.77	-2.30	-	-	-	12.17***	9.89***	10.78***	-0.44	-3.19	1.02	-1.94
	(10.38)	(10.46)	(10.66)	-	-	-	(1.23)	(1.33)	(1.23)	(3.01)	(3.23)	(2.99)	(3.13)
Liq. assets ratio$_{t-1}$	17.34	8.34	7.06	19.10**	21.45***	19.07**	8.76***	8.07***	8.79***	34.10***	33.16***	34.66***	33.61***
	(17.59)	(17.12)	(17.30)	(6.75)	(5.62)	(6.64)	(1.30)	(1.41)	(1.31)	(3.83)	(3.95)	(3.84)	(3.93)
Dummy M&As	-	-	-	40.60***	40.36***	40.29***	-	-	-	-	-	-	-
	-	-	-	(12.58)	(12.61)	(12.71)	-	-	-	-	-	-	-
Accounting dummy	67.55***	66.44***	66.48***	-	-	-	-	-	-	-	-	-	-
	(10.92)	(10.95)	(10.88)	-	-	-	-	-	-	-	-	-	-
QoQ GDP growth$_{t-1}$	-0.06	-0.09	-0.04	0.32	0.07	0.03	0.57***	0.65***	0.67***	-0.03	-0.07*	-0.05	-0.04
	(0.23)	(0.24)	(0.24)	(0.23)	(0.21)	(0.27)	(0.16)	(0.18)	(0.16)	(0.04)	(0.04)	(0.04)	(0.04)
QoQ CPI growth$_{t-1}$	0.26	0.03	0.02	0.19	0.10	0.20	0.38**	0.42**	0.43***	0.63***	-0.05	0.67***	0.19
	(0.28)	(0.28)	(0.28)	(0.25)	(0.27)	(0.24)	(0.17)	(0.17)	(0.16)	(0.16)	(0.16)	(0.16)	(0.16)
N	648	648	648	885	885	885	1,274	1,274	1,274	8,904	8,904	8,904	8,904
No. of banks	9	9	9	15	15	15	21	21	21	226	227	228	229
R^2	0.430	0.430	0.434	0.470	0.470	0.460	0.186	0.197	0.197	0.290	0.274	0.292	0.282
Adjusted R^2	0.412	0.411	0.412	0.450	0.450	0.440	0.162	0.174	0.174	0.271	0.254	0.272	0.262
FE	Bank	Bank	Bank	Bank	Bank	Bank	Bank	Bank	Bank	Bank	Bank	Bank	Bank

Table C.11: Spillovers across loan categories – mortgage lending

LHS: QoQ Mortgage Loan Growth

	Canada			**Chile**			**Czech Republic**			**Norway**			
	US	EA	UK	US	EA	UK	US	EA	UK	SE	US	EA	UK
Δr_t^c	4.59**	5.98***	8.22***	-0.63	0.61	0.21	0.29	1.69**	0.85	1.57***	-0.14	2.76***	1.87***
	(1.83)	(2.21)	(2.16)	(0.76)	(0.76)	(0.82)	(0.68)	(0.86)	(0.81)	(0.39)	(0.42)	(0.43)	(0.46)
$\Delta Spread_t^c$	2.58	0.09	3.60*	-0.49	0.52	0.01	-0.15	1.32*	0.63	0.44	-0.38	0.53	0.29
	(1.67)	(1.93)	(2.11)	(0.77)	(0.76)	(0.98)	(0.66)	(0.73)	(0.83)	(0.31)	(0.27)	(0.34)	(0.36)
Low_t^c	2.44***	-2.77*	-0.99	-0.21	-0.41	-0.69**	-1.45***	-2.31***	-1.68***	-1.88***	-0.62***	-1.86***	-0.70***
	(0.92)	(1.48)	(0.86)	(0.36)	(0.55)	(0.30)	(0.46)	(0.55)	(0.44)	(0.23)	(0.21)	(0.25)	(0.21)
$\Delta r_t^c * Low_t^c$	-60.37*	**-46.83*** **	**-24.66***	**-25.44****	2.26	-2.00	-5.42	-2.55	-1.55	**-4.87****	2.83	-6.94	-1.28
	(31.32)	**(16.81)**	**(14.62)**	**(11.14)**	(12.61)	(2.59)	(9.59)	(10.93)	(4.44)	**(1.95)**	(3.96)	(5.60)	(1.98)
$\Delta Spread_t^c * Low_t^c$	**-5.43****	-0.72	-2.99	0.23	-1.49	0.65	1.38	-1.72	0.05	**-1.80****	0.85	**-1.36***	-0.75
	(2.58)	(2.54)	(2.80)	(1.68)	(1.13)	(1.15)	(1.46)	(1.61)	(1.39)	**(0.81)**	(0.65)	**(0.79)**	(0.58)
Dep. to liab.$_{t-1}$	26.26***	21.61**	20.53**	0.06	0.10	0.88	-16.28***	-15.81***	-15.57***	0.15	-1.85	0.07	-2.15
	(8.66)	(10.01)	(9.46)	(2.42)	(2.66)	(2.42)	(1.98)	(1.96)	(2.01)	(1.76)	(1.79)	(1.76)	(1.78)
Equity to assets$_{t-1}$	-82.84	21.72	-22.72	1.96	2.13	2.60	-3.82	-4.96	-3.38	46.85***	44.26***	46.15***	43.97***
	(79.23)	(115.40)	(93.90)	(12.54)	(13.20)	(13.01)	(4.38)	(4.33)	(4.36)	(5.35)	(5.45)	(5.30)	(5.36)
Sec. to assets$_{t-1}$	14.26	8.01	10.52	-	-	-	14.21***	10.79***	13.28***	-13.00***	-15.44***	-11.28***	-14.90***
	(13.30)	(13.31)	(13.71)	-	-	-	(1.80)	(1.94)	(1.81)	(2.53)	(2.64)	(2.57)	(2.58)
Liq. assets ratio$_{t-1}$	35.27	18.75	16.16	12.57**	12.35**	12.48**	10.16***	7.67***	10.06***	24.65***	25.54***	25.30***	25.96***
	(23.94)	(22.76)	(22.20)	(5.34)	(5.89)	(5.55)	(1.88)	(2.02)	(1.89)	(3.19)	(3.24)	(3.19)	(3.23)
Dummy M&As	-	-	-	33.72***	34.05***	33.86***	-	-	-	-	-	-	-
	-	-	-	(10.35)	(10.43)	(10.39)	-	-	-	-	-	-	-
Accounting dummy	102.60***	100.20***	101.10***	-	-	-	-	-	-	-	-	-	-
	(17.72)	(17.79)	(17.82)	-	-	-	-	-	-	-	-	-	-
QoQ GDP growth$_{t-1}$	-0.54*	-0.58*	-0.54*	0.45*	0.43	0.39	0.46**	0.71***	0.57**	-0.02	-0.03	-0.03	-0.04
	(0.30)	(0.31)	(0.30)	(0.26)	(0.28)	(0.31)	(0.23)	(0.26)	(0.23)	(0.04)	(0.04)	(0.04)	(0.04)
QoQ CPI growth$_{t-1}$	0.31	-0.07	-0.03	0.25	0.28	0.25	0.37	0.38	0.36	0.30**	-0.17	0.40***	0.17
	(0.36)	(0.34)	(0.33)	(0.26)	(0.26)	(0.26)	(0.25)	(0.24)	(0.24)	(0.14)	(0.14)	(0.14)	(0.13)
N	648	648	648	828	828	828	1,229	1,229	1,229	8,134	8,134	8,134	8,134
No. of banks	9	9	9	14	14	14	21	21	21	226	226	226	226
R^2	0.480	0.479	0.482	0.410	0.400	0.400	0.240	0.152	0.163	0.227	0.220	0.229	0.222
Adjusted R^2	0.464	0.462	0.466	0.390	0.390	0.390	0.215	0.130	0.141	0.207	0.200	0.209	0.202
FE	Bank	Bank	Bank	Bank	Bank	Bank	Bank	Bank	Bank	Bank	Bank	Bank	Bank

Table C.12: Spillovers across loan categories – consumer lending

LHS: QoQ Consumer Loan Growth

	Canada			**Chile**			**Czech Republic**			**Norway**			
	US	EA	UK	US	EA	UK	US	EA	UK	SE	US	EA	UK
Δr_t^c	-1.69	1.82	0.90	-0.19	4.19***	2.43*	4.08**	5.24**	3.12	0.06	9.35***	2.13*	1.59
	(1.81)	(2.39)	(2.18)	(0.87)	(1.20)	(1.41)	(2.03)	(2.56)	(2.44)	(1.08)	(1.45)	(1.22)	(1.19)
$\Delta Spread_t^c$	2.21	3.25	3.12	-0.82	2.00*	0.44	0.75	1.53	1.86	0.41	0.97	0.55	2.34**
	(1.60)	(1.99)	(2.14)	(0.97)	(1.13)	(1.49)	(1.99)	(2.17)	(2.53)	(0.93)	(0.79)	(1.00)	(1.11)
Low_t^c	-3.09***	-5.10***	-5.40***	-0.68	-2.43***	-2.26***	-0.04	-4.33**	0.67	-2.59***	0.46	-2.40***	-0.62
	(1.02)	(1.15)	(0.90)	(0.53)	(0.84)	(0.49)	(1.50)	(1.69)	(1.34)	(0.68)	(0.58)	(0.74)	(0.58)
$\Delta r_t^c * Low_t^c$	-16.06	14.72	-2.03	-4.11	-1.95	**-5.11***	-30.71	-16.05	5.87	**-11.31****	-4.08	-23.36	**-14.31*****
	(22.84)	(13.44)	(12.52)	(13.77)	(12.30)	**(3.01)**	(28.42)	(32.30)	(13.13)	**(5.38)**	(11.71)	(16.58)	**(5.50)**
$\Delta Spread_t^c * Low_t^c$	-2.35	**-4.83***	-3.18	1.85	**-2.55***	-1.08	-0.48	-5.65	-0.78	0.41	2.37	**6.67*****	-1.10
	(2.93)	**(2.81)**	(2.76)	(2.58)	**(1.30)**	(1.53)	(4.30)	(4.76)	(4.11)	(2.35)	(1.88)	**(2.30)**	(1.62)
Dep. to liab.$_{t-1}$	25.85**	19.46*	20.65**	-11.08**	-16.67***	-10.22**	-17.14***	-13.49***	-17.36***	-3.19	-8.25**	-3.03	-5.13
	(10.28)	(10.06)	(10.31)	(4.85)	(5.49)	(4.68)	(5.16)	(5.18)	(5.26)	(3.46)	(3.45)	(3.46)	(3.46)
Equity to assets$_{t-1}$	-562.10***	-462.80***	-513.20***	-27.33**	-25.92*	-25.64*	20.66	15.22	20.09	60.38***	53.83***	59.54***	57.72***
	(75.15)	(85.04)	(74.37)	(13.73)	(14.20)	(13.95)	(18.95)	(18.97)	(18.95)	(10.90)	(10.88)	(10.83)	(10.90)
Sec. to assets$_{t-1}$	-17.39	-25.02*	-25.69**	-	-	-	12.92	7.86	12.41	0.64	-0.71	1.83	-1.19
	(12.16)	(12.91)	(12.25)	-	-	-	(8.74)	(8.30)	(8.23)	(5.79)	(6.06)	(5.81)	(5.99)
Liq. assets ratio$_{t-1}$	7.11	16.40	2.00	-1.94	-5.55	-2.95	9.03*	4.45	10.46**	22.06***	23.76***	22.99***	22.16***
	(16.75)	(17.17)	(16.81)	(8.61)	(9.09)	(8.58)	(4.94)	(5.55)	(5.05)	(6.53)	(6.56)	(6.52)	(6.57)
Dummy M&As	-	-	-	35.30***	35.78***	35.19***	-	-	-	-	-	-	-
	-	-	-	(10.24)	(10.27)	(10.12)	-	-	-	-	-	-	-
Accounting dummy	20.67***	19.90***	20.45***	-	-	-	-	-	-	-	-	-	-
	(6.38)	(6.36)	(6.46)	-	-	-	-	-	-	-	-	-	-
QoQ GDP growth$_{t-1}$	0.03	-0.28	0.03	0.76**	0.21	0.26	0.00	-0.06	0.02	-0.15	-0.39***	-0.16	-0.14
	(0.22)	(0.23)	(0.22)	(0.36)	(0.42)	(0.46)	(0.70)	(0.79)	(0.72)	(0.12)	(0.13)	(0.12)	(0.12)
QoQ CPI growth$_{t-1}$	0.42	0.38	0.09	-1.05***	-0.97**	-1.03***	0.99	0.39	0.69	0.17	-0.10	0.31	-0.09
	(0.32)	(0.32)	(0.32)	(0.38)	(0.39)	(0.37)	(0.74)	(0.74)	(0.72)	(0.42)	(0.40)	(0.40)	(0.40)
N	648	648	648	828	828	828	910	910	910	8,128	8,128	8,128	8,128
No. of banks	9	9	9	14	14	14	18	18	18	226	226	226	226
R^2	0.234	0.246	0.247	0.240	0.260	0.260	0.032	0.040	0.027	0.054	0.060	0.055	0.054
Adjusted R^2	0.209	0.222	0.223	0.220	0.240	0.230	0.001	0.010	-0.004	0.028	0.034	0.029	0.028
FE	Bank	Bank	Bank	Bank	Bank	Bank	Bank	Bank	Bank	Bank	Bank	Bank	Bank

Table C.13: Spillovers across loan categories – corporate lending

LHS: QoQ Corporate Loan Growth

	Canada			**Chile**			**Czech Republic**			**Norway**			
	US	EA	UK	US	EA	UK	US	EA	UK	SE	US	EA	UK
Δr_t^c	3.53	6.20**	1.67	0.42	1.53**	1.02	2.04**	2.95**	2.85**	2.28***	0.05	3.46***	1.80***
	(2.45)	(3.11)	(2.95)	(0.75)	(0.63)	(0.68)	(0.94)	(1.19)	(1.12)	(0.51)	(0.60)	(0.64)	(0.64)
$\Delta Spread_t^c$	1.64	2.87	-3.16	-0.59	-0.57	-1.04	0.82	2.06**	1.06	1.12**	0.16	1.61***	1.08*
	(2.71)	(2.73)	(3.06)	(0.72)	(0.66)	(0.84)	(0.92)	(1.00)	(1.16)	(0.48)	(0.41)	(0.53)	(0.56)
Low_t^c	0.57	4.51**	2.63	-0.18	0.60	-0.89***	-1.10*	-3.17***	-2.05***	-2.38***	-1.02***	-2.41***	-1.72***
	(1.81)	(2.17)	(1.85)	(0.41)	(0.50)	(0.31)	(0.63)	(0.75)	(0.59)	(0.40)	(0.33)	(0.44)	(0.33)
$\Delta r_t^c * Low_t^c$	-19.24	3.05	19.53	**-24.83***	7.24	-2.26	-8.48	-1.27	-7.40	**-5.35***	-1.20	-10.06	-0.64
	(38.13)	(45.51)	(20.18)	**(14.52)**	(13.29)	(3.45)	(13.22)	(14.97)	(6.08)	**(2.94)**	(6.90)	(8.38)	(3.05)
$\Delta Spread_t^c * Low_t^c$	-0.60	-6.67	5.50	-1.14	0.37	**2.08***	1.28	-2.35	0.89	-1.14	0.16	-1.10	-0.79
	(5.41)	(6.96)	(5.90)	(1.31)	(1.13)	**(1.10)**	(2.01)	(2.21)	(1.90)	(1.25)	(1.04)	(1.19)	(0.89)
Dep. to liab.$_{t-1}$	13.06	20.83	17.12	8.75***	9.56***	9.10***	-11.70***	-9.81***	-10.61***	-3.00	-5.10	-2.97	-4.85
	(16.19)	(16.23)	(16.19)	(1.70)	(1.76)	(1.69)	(2.76)	(2.72)	(2.78)	(3.91)	(3.85)	(3.90)	(3.87)
Equity to assets$_{t-1}$	20.24	-102.20	-25.22	17.20	18.47	19.11	16.59**	15.72*	18.32**	35.28***	30.81***	34.76***	31.41***
	(103.60)	(114.80)	(104.00)	(24.16)	(24.89)	(24.64)	(8.39)	(8.27)	(8.35)	(9.55)	(9.71)	(9.52)	(9.63)
Sec. to assets$_{t-1}$	-55.42***	-55.70***	-52.42***	-	-	-	17.49***	12.70***	16.41***	-15.88***	-18.59***	-14.25***	-16.63***
	(18.29)	(18.37)	(18.16)	-	-	-	(2.48)	(2.67)	(2.47)	(3.99)	(4.13)	(4.04)	(4.07)
Liq. assets ratio$_{t-1}$	-31.70	-51.39*	-36.23	14.39***	18.02***	15.77***	4.69*	1.22	4.61*	24.22***	24.13***	24.73***	24.53***
	(28.84)	(28.58)	(28.36)	(4.81)	(5.21)	(5.12)	(2.60)	(2.80)	(2.61)	(6.65)	(6.68)	(6.64)	(6.65)
Dummy M&As	-	-	-	46.21***	46.38***	46.25***	-	-	-	-	-	-	-
	-	-	-	(13.88)	(13.94)	(13.94)	-	-	-	-	-	-	-
Accounting dummy	0.82	1.49	-0.74	-	-	-	-	-	-	-	-	-	-
	(6.89)	(6.88)	(7.01)	-	-	-	-	-	-	-	-	-	-
QoQ GDP growth$_{t-1}$	0.91**	0.94**	0.67*	0.06	-0.13	-0.28	0.86***	1.16***	0.75**	-0.08	-0.09	-0.09	-0.08
	(0.41)	(0.40)	(0.40)	(0.25)	(0.28)	(0.30)	(0.32)	(0.36)	(0.32)	(0.06)	(0.06)	(0.06)	(0.06)
QoQ CPI growth$_{t-1}$	-0.17	-0.35	-0.24	0.25	0.10	0.20	0.95***	0.81**	0.76**	0.83***	0.23	0.84***	0.48**
	(0.49)	(0.49)	(0.50)	(0.27)	(0.28)	(0.27)	(0.34)	(0.34)	(0.33)	(0.23)	(0.21)	(0.22)	(0.22)
N	648	648	648	885	885	885	1,260	1,260	1,260	8,417	8,417	8,417	8,417
No. of banks	9	9	9	15	15	15	21	21	21	226	226	226	226
R^2	0.051	0.064	0.058	0.430	0.430	0.430	0.087	0.103	0.095	0.125	0.120	0.126	0.123
Adjusted R^2	0.020	0.034	0.028	0.410	0.410	0.420	0.064	0.080	0.072	0.102	0.096	0.103	0.099
FE	Bank	Bank	Bank	Bank	Bank	Bank	Bank	Bank	Bank	Bank	Bank	Bank	Bank

Table C.14: Alternative monetary policy indicator – shadow rate

LHS: QoQ Loan Growth

	Canada			**Chile**			**Czech Republic**			**Norway**			
	US	EA	UK	US	EA	UK	US	EA	UK	SE	US	EA	UK
$\Delta shadow_t^c$	1.89*	3.21**	0.82	0.46	0.68*	0.30	-0.69**	0.47	0.32	1.71***	0.04	2.07***	0.62***
	(1.03)	(1.40)	(0.88)	(0.62)	(0.41)	(0.21)	(0.35)	(0.33)	(0.19)	(0.29)	(0.30)	(0.39)	(0.15)
Low_t^c	1.14	-0.90	-0.99	-0.15	0.57	-0.68**	-1.64***	-1.83***	-1.81***	-2.88***	-0.56**	-2.30***	-1.26***
	(0.87)	(1.05)	(0.77)	(0.31)	(0.49)	(0.26)	(0.29)	(0.34)	(0.29)	(0.29)	(0.25)	(0.31)	(0.25)
$\Delta shadow_t^c * Low_t^c$	-1.64	**-4.67*** **	**-1.82***	-0.11	-0.31	-0.50	-0.50	**-1.93*** **	-0.66	**-7.05*** **	-0.04	**-2.18*** **	**-0.72** **
	(2.33)	**(1.79)**	**(1.08)**	(0.84)	(0.55)	(0.35)	(0.80)	**(0.58)**	(0.43)	**(1.51)**	(0.71)	**(0.51)**	**(0.31)**
Dep. to liab.$_{t-1}$	19.39***	30.50***	15.74**	8.30***	10.02***	7.91***	-6.15***	-6.92***	-5.81***	-1.45	-3.78*	-3.47	-3.89*
	(7.15)	(9.73)	(7.47)	(1.61)	(1.92)	(1.61)	(1.36)	(1.35)	(1.37)	(2.06)	(2.09)	(2.71)	(2.04)
Equity to assets$_{t-1}$	-171.30***	-194.40**	-130.90**	13.02	13.31	13.01	10.85***	8.32***	10.39***	61.02***	58.33***	61.28***	58.20***
	(59.72)	(90.58)	(62.90)	(13.91)	(15.03)	(13.85)	(2.93)	(2.91)	(2.91)	(5.08)	(5.22)	(5.25)	(5.13)
Sec. to assets$_{t-1}$	2.99	0.93	-0.96	-	-	-	12.23***	9.19***	11.12***	-0.60	-3.69	2.08	-2.59
	(10.59)	(12.58)	(10.67)	-	-	-	(1.22)	(1.30)	(1.21)	(3.04)	(3.21)	(3.65)	(3.11)
Liq. assets ratio$_{t-1}$	16.91	21.29	9.20	18.42***	21.23***	17.79***	8.97***	7.20***	8.93***	32.93***	32.98***	34.89***	33.25***
	(17.47)	(20.07)	(16.79)	(4.29)	(5.23)	(4.29)	(1.28)	(1.36)	(1.28)	(3.92)	(3.96)	(4.29)	(3.95)
Dummy M&As	-	-	-	40.35***	39.50***	40.20***	-	-	-	-	-	-	-
	-	-	-	(11.27)	(13.74)	(11.27)	-	-	-	-	-	-	-
Accounting dummy	67.22***	69.21***	66.38***	-	-	-	-	-	-	-	-	-	-
	(10.90)	(11.02)	(10.96)	-	-	-	-	-	-	-	-	-	-
QoQ GDP growth$_{t-1}$	-0.05	-0.11	0.06	0.40*	0.44*	0.31	0.69***	0.79***	0.61***	-0.03	-0.05	-0.06	-0.05
	(0.23)	(0.24)	(0.22)	(0.20)	(0.25)	(0.21)	(0.15)	(0.15)	(0.15)	(0.04)	(0.04)	(0.05)	(0.04)
QoQ CPI growth$_{t-1}$	0.16	0.04	0.14	0.31	0.52**	0.36*	0.37**	0.57***	0.46***	0.50***	-0.05	0.32	0.15
	(0.27)	(0.34)	(0.27)	(0.19)	(0.21)	(0.21)	(0.17)	(0.16)	(0.16)	(0.16)	(0.15)	(0.21)	(0.15)
N	648	549	648	885	733	885	1,274	1,274	1,274	8,904	8,904	7,619	8,904
No. of banks	9	9	9	15	15	15	21	21	21	226	226	226	226
R^2	0.426	0.469	0.426	0.450	0.440	0.450	0.188	0.186	0.193	0.285	0.273	0.291	0.276
Adjusted R^2	0.410	0.451	0.409	0.440	0.420	0.440	0.169	0.167	0.174	0.266	0.253	0.270	0.257
FE	Bank	Bank	Bank	Bank	Bank	Bank	Bank	Bank	Bank	Bank	Bank	Bank	Bank

Table C.15: Alternative monetary policy indicator – SVAR shocks

LHS: QoQ Loan Growth

	Canada			**Chile**			**Czech Republic**			**Norway**			
	US	EA	UK	US	EA	UK	US	EA	UK	SE	US	EA	UK
$MPshock_t^c$	-1.32	2.75	1.47	**1.85*** **	**2.07*** **	**1.89*** **	-0.33	-0.79	0.21	-	**0.74*** **	**0.66*** **	0.17
	(1.09)	(1.70)	(1.27)	**(0.55)**	**(0.67)**	**(0.56)**	(0.40)	(0.53)	(0.39)	-	**(0.25)**	**(0.25)**	(0.19)
$\Delta Spread_t^c$	0.59	-1.46	-1.48	-1.09*	-1.56***	-1.64***	0.09	0.46	0.02	-	-0.31	-0.72*	0.02
	(0.99)	(1.32)	(1.48)	(0.62)	(0.48)	(0.51)	(0.36)	(0.39)	(0.39)	-	(0.28)	(0.37)	(0.36)
Low_t^c	0.67	0.04	-1.39	0.11	0.00	-0.80***	-1.66***	-1.61***	-1.83***	-	-0.80***	-1.95***	-1.50***
	(0.92)	(1.10)	(0.89)	(0.34)	(0.51)	(0.29)	(0.31)	(0.40)	(0.31)	-	(0.26)	(0.29)	(0.25)
$MPshock_t^c * Low_t^c$	0.47	-1.29	-1.84	0.78	-4.59	**-1.70** **	-0.23	3.91	-0.41	-	-1.14	-1.43	-0.65
	(3.04)	(5.74)	(2.25)	(1.23)	(6.18)	**(0.86)**	(1.08)	(2.69)	(0.84)	-	(0.74)	(1.34)	(0.55)
$\Delta Spread_t^c * Low_t^c$	-1.24	-2.18	1.72	0.13	2.03*	**1.62** **	0.30	1.33	0.78	-	0.77	-0.21	0.12
	(2.14)	(2.84)	(2.60)	(0.90)	(1.08)	**(0.82)**	(0.92)	(1.34)	(0.87)	-	(0.76)	(1.05)	(0.67)
Dep. to liab.$_{t-1}$	13.50*	15.19*	12.51	9.38***	8.76***	8.85***	-5.96***	-6.05***	-5.20***	-	-2.60	-0.89	-1.84
	(7.88)	(8.65)	(8.55)	(1.70)	(1.74)	(1.70)	(1.44)	(1.44)	(1.44)	-	(2.08)	(2.07)	(2.06)
Equity to assets$_{t-1}$	-107.00	-116.10	-99.42	14.76	16.15	15.19	10.83***	9.70***	11.13***	-	58.51***	59.96***	58.92***
	(69.55)	(77.98)	(70.18)	(14.06)	(14.53)	(14.11)	(3.03)	(3.01)	(2.99)	-	(5.68)	(5.64)	(5.51)
Sec. to assets$_{t-1}$	-1.24	-3.80	-4.17	-	-	-	12.88***	10.49***	11.94***	-	-3.31	-2.55	-2.33
	(11.23)	(11.18)	(11.02)	-	-	-	(1.34)	(1.38)	(1.29)	-	(3.25)	(3.12)	(3.10)
Liq. assets ratio$_{t-1}$	16.96	12.11	8.54	20.80***	21.41***	20.73***	9.37***	8.73***	9.75***	-	32.06***	31.54***	31.02***
	(19.28)	(19.25)	(18.19)	(4.46)	(4.53)	(4.51)	(1.49)	(1.50)	(1.41)	-	(4.08)	(4.07)	(4.00)
Dummy M&As	-	-	-	40.36***	40.47***	40.40***	-	-	-	-	-	-	-
	-	-	-	(11.08)	(11.15)	(11.15)	-	-	-	-	-	-	-
Accounting dummy	66.05***	66.74***	65.38***	-	-	-	-	-	-	-	-	-	-
	(10.89)	(10.93)	(10.97)	-	-	-	-	-	-	-	-	-	-
QoQ GDP growth$_{t-1}$	0.07	-0.01	0.06	0.54**	0.05	-0.02	0.54***	0.94***	0.70***	-	-0.12**	-0.07*	-0.06
	(0.22)	(0.24)	(0.22)	(0.21)	(0.23)	(0.24)	(0.16)	(0.17)	(0.15)	-	(0.05)	(0.04)	(0.05)
QoQ CPI growth$_{t-1}$	0.23	0.25	0.08	0.09	0.15	0.34	0.42**	0.67***	0.50***	-	-0.20	0.22	-0.06
	(0.28)	(0.29)	(0.29)	(0.25)	(0.25)	(0.24)	(0.18)	(0.17)	(0.17)	-	(0.16)	(0.16)	(0.16)
N	603	603	612	840	840	849	1,174	1,174	1,194	-	8,239	8,239	8,412
No. of banks	9	9	9	15	15	15	21	21	21	-	222	222	225
R^2	0.426	0.429	0.428	0.47	0.47	0.47	0.193	0.194	0.203	-	0.289	0.293	0.308
Adjusted R^2	0.406	0.409	0.409	0.45	0.45	0.45	0.171	0.172	0.182	-	0.268	0.273	0.288
FE	Bank	Bank	Bank	Bank	Bank	Bank	Bank	Bank	Bank	-	Bank	Bank	Bank

Table C.16: Alternative monetary policy indicator – Taylor rule residuals

LHS: QoQ Loan Growth

	Canada			**Chile**			**Czech Republic**			**Norway**			
	US	EA	UK	US	EA	UK	US	EA	UK	SE	US	EA	UK
TR_t^c	2.24	2.51	**5.07****	-0.06	**2.20*****	-0.13	0.03	**1.90*****	**0.99***	**2.61*****	0.49	**2.58*****	**1.78*****
	(1.67)	(2.79)	**(2.16)**	(0.70)	**(0.75)**	(0.62)	(0.44)	**(0.72)**	**(0.52)**	**(0.54)**	(0.36)	**(0.51)**	**(0.41)**
$\Delta Spread_t^c$	1.26	-0.63	2.26	-0.94	-0.40	-1.54**	-0.02	1.03**	0.62	1.06***	0.02	0.57	0.99***
	(1.34)	(1.54)	(1.52)	(0.65)	(0.56)	(0.77)	(0.40)	(0.46)	(0.50)	(0.37)	(0.29)	(0.43)	(0.38)
Low_t^c	0.90	-0.37	-1.12	-0.02	0.36	-0.69***	-1.59***	-1.45***	-1.81***	-2.14***	-0.52**	-2.34***	-1.19***
	(0.92)	(0.92)	(0.75)	(0.32)	(0.44)	(0.26)	(0.30)	(0.32)	(0.29)	(0.30)	(0.25)	(0.28)	(0.24)
$TR_t^c * Low_t^c$	**-27.42****	**-13.30****	-6.64	1.78	-3.39	1.61	4.27	-2.66	-2.86	-1.27	-2.36	**-5.04****	-2.72
	(12.68)	**(5.86)**	(7.25)	(3.88)	(5.43)	(2.62)	(4.02)	(3.41)	(3.24)	(1.95)	(4.01)	**(2.55)**	(2.80)
$\Delta Spread_t^c * Low_t^c$	-3.82	-2.35	-2.38	0.19	0.02	1.40	0.72	**-2.00***	0.01	-0.40	0.26	0.24	-0.91
	(2.48)	(2.23)	(2.45)	(1.01)	(0.89)	(0.99)	(0.98)	**(1.04)**	(0.92)	(0.90)	(0.75)	(0.85)	(0.68)
Dep. to liab.$_{t-1}$	18.68***	18.17**	13.31*	8.27***	8.35***	8.30***	-6.60***	-6.66***	-5.72***	-1.51	-3.96*	-1.75	-3.90*
	(7.14)	(7.77)	(7.62)	(1.61)	(1.71)	(1.60)	(1.37)	(1.36)	(1.38)	(2.06)	(2.08)	(2.06)	(2.07)
Equity to assets$_{t-1}$	-170.50***	-139.20*	-114.40*	13.62	14.68	14.30	10.05***	8.88***	10.39***	60.56***	58.14***	60.24***	58.34***
	(61.53)	(76.36)	(64.28)	(13.83)	(13.82)	(13.74)	(2.94)	(2.92)	(2.92)	(5.12)	(5.21)	(5.08)	(5.13)
Sec. to assets$_{t-1}$	-0.84	-1.28	-3.17	-	-	-	12.02***	9.45***	10.86***	0.17	-3.77	0.36	-2.09
	(10.65)	(10.51)	(10.45)	-	-	-	(1.23)	(1.31)	(1.22)	(3.08)	(3.21)	(3.08)	(3.13)
Liq. assets ratio$_{t-1}$	13.38	10.57	4.87	18.15***	20.39***	18.17***	8.98***	7.61***	8.56***	33.17***	33.04***	33.25***	33.23***
	(17.32)	(17.22)	(16.65)	(4.25)	(4.39)	(4.33)	(1.28)	(1.38)	(1.30)	(3.94)	(3.96)	(3.94)	(3.95)
Dummy M&As	-	-	-	40.30***	40.34***	40.21***	-	-	-	-	-	-	-
	-	-	-	(11.26)	(11.19)	(11.24)	-	-	-	-	-	-	-
Accounting dummy	67.14***	66.91***	67.35***	-	-	-	-	-	-	-	-	-	-
	(10.93)	(10.97)	(11.01)	-	-	-	-	-	-	-	-	-	-
QoQ GDP growth$_{t-1}$	0.04	-0.03	0.03	0.35*	0.15	0.12	0.55***	0.72***	0.65***	-0.05	-0.06	-0.06	-0.06
	(0.22)	(0.22)	(0.23)	(0.21)	(0.23)	(0.26)	(0.15)	(0.18)	(0.16)	(0.04)	(0.04)	(0.04)	(0.04)
QoQ CPI growth$_{t-1}$	0.19	0.03	0.01	0.11	0.11	0.09	0.38**	0.54***	0.49***	0.30*	-0.03	0.41***	0.14
	(0.27)	(0.29)	(0.28)	(0.25)	(0.25)	(0.24)	(0.17)	(0.16)	(0.16)	(0.16)	(0.16)	(0.16)	(0.16)
N	648	648	648	885	885	885	1274	1274	1274	8904	8904	8904	8904
No. of banks	9	9	9	15	15	15	21	21	21	226	226	226	226
R^2	0.429	0.427	0.434	0.46	0.46	0.46	0.185	0.184	0.194	0.283	0.273	0.284	0.276
Adjusted R^2	0.411	0.409	0.415	0.44	0.45	0.44	0.165	0.164	0.174	0.263	0.253	0.264	0.256
FE	Bank	Bank	Bank	Bank	Bank	Bank	Bank	Bank	Bank	Bank	Bank	Bank	Bank

Table C.17: Alternative monetary policy indicator – persistently low interest rates

LHS: QoQ Loan Growth

	Canada			**Chile**			**Czech Republic**			**Norway**			
	US	EA	UK	US	EA	UK	US	EA	UK	SE	US	EA	UK
Δr_t^c	3.00**	3.58*	4.43**	0.52	2.22***	1.39**	-0.02	1.68***	0.76	2.64***	1.38***	4.08***	2.74***
	(1.47)	(1.98)	(1.95)	(0.68)	(0.56)	(0.62)	(0.47)	(0.59)	(0.56)	(0.38)	(0.43)	(0.50)	(0.46)
$\Delta Spread_t^c$	1.84	0.58	2.09	-0.52	0.02	-0.27	0.06	1.39***	0.67	1.28***	0.33	1.19***	1.71***
	(1.34)	(1.57)	(1.57)	(0.69)	(0.60)	(0.77)	(0.45)	(0.50)	(0.57)	(0.35)	(0.30)	(0.42)	(0.40)
Low_t^c	3.01	1.81	-2.19*	1.06*	-1.05*	0.01	-0.10	-3.67***	-0.69	-0.85*	0.12	-0.02	-1.63***
	(2.50)	(1.62)	(1.33)	(0.62)	(0.61)	(0.53)	(0.71)	(0.77)	(0.63)	(0.49)	(0.76)	(0.55)	(0.53)
$\Delta r_t^c * Low_t^c$	-13.00	5.67	-13.01	4.65	-3.71	1.65	10.27	**-16.70***	0.89	-2.45	6.62	**17.32****	**-6.45****
	(23.03)	(16.84)	(11.44)	(10.03)	(12.44)	(3.55)	(9.20)	**(9.29)**	(3.69)	(2.38)	(9.68)	**(7.98)**	**(3.28)**
$\Delta Spread_t^c * Low_t^c$	**-4.54***	**-5.48****	-1.72	-0.89	0.70	-0.25	-0.37	-0.50	-0.62	**-1.81***	0.34	**-2.99*****	**-1.50****
	(2.55)	**(2.67)**	(2.50)	(1.07)	(1.01)	(1.03)	(1.02)	(1.25)	(0.99)	**(0.92)**	(0.90)	**(1.05)**	**(0.70)**
Low for Long$_t^c$	-0.35	**-0.25****	0.14	**-0.18****	**0.13*****	**-0.15***	**-0.24****	**0.19*****	**-0.23****	**-0.17*****	-0.09	**-0.22*****	0.04
	(0.31)	**(0.12)**	(0.22)	**(0.08)**	**(0.05)**	**(0.09)**	**(0.09)**	**(0.06)**	**(0.10)**	**(0.04)**	(0.10)	**(0.04)**	(0.09)
Dep. to liab.$_{t-1}$	18.49**	17.03**	15.18**	7.93***	8.63***	8.13***	-6.07***	-6.51***	-5.61***	-1.32	-4.13**	-1.37	-4.05**
	(7.18)	(7.75)	(7.63)	(1.64)	(1.70)	(1.65)	(1.37)	(1.36)	(1.38)	(2.05)	(2.07)	(2.05)	(2.05)
Equity to assets$_{t-1}$	-170.70***	-120.80	-122.90*	13.00	13.75	13.80	10.56***	9.34***	10.64***	61.30***	57.95***	60.59***	58.01***
	(60.90)	(78.06)	(65.03)	(13.48)	(13.93)	(13.75)	(2.94)	(2.92)	(2.92)	(5.06)	(5.20)	(5.01)	(5.12)
Sec. to assets$_{t-1}$	-0.25	-2.05	-2.59	-	-	-	12.18***	10.16***	11.12***	0.12	-3.35	1.72	-1.54
	(10.39)	(10.52)	(10.58)	-	-	-	(1.22)	(1.33)	(1.22)	(3.04)	(3.21)	(3.05)	(3.13)
Liq. assets ratio$_{t-1}$	18.02	8.96	6.16	17.34***	21.06***	18.31***	8.78***	8.63***	8.49***	33.04***	33.19***	33.62***	33.50***
	(17.72)	(17.15)	(16.78)	(4.23)	(4.40)	(4.33)	(1.29)	(1.42)	(1.29)	(3.92)	(3.97)	(3.92)	(3.95)
Dummy M&As	-	-	-	40.34***	40.47***	40.32***	-	-	-	-	-	-	-
	-	-	-	(11.25)	(11.21)	(11.23)	-	-	-	-	-	-	-
Accounting dummy	67.60***	66.23***	66.50***	-	-	-	-	-	-	-	-	-	-
	(10.92)	(10.96)	(10.99)	-	-	-	-	-	-	-	-	-	-
QoQ GDP growth$_{t-1}$	-0.08	-0.05	-0.04	0.30	0.04	0.03	0.68***	0.79***	0.75***	-0.05	-0.07*	-0.09**	-0.03
	(0.23)	(0.24)	(0.23)	(0.21)	(0.24)	(0.26)	(0.16)	(0.18)	(0.16)	(0.04)	(0.04)	(0.04)	(0.04)
QoQ CPI growth$_{t-1}$	0.20	0.03	0.03	0.23	0.13	0.23	0.42**	0.44***	0.42**	0.58***	-0.03	0.62***	0.19
	(0.29)	(0.28)	(0.29)	(0.24)	(0.25)	(0.23)	(0.17)	(0.17)	(0.16)	(0.16)	(0.16)	(0.16)	(0.16)
N	648	648	648	885	885	885	1,274	1,274	1,274	8,904	8,904	8,904	8,904
No. of banks	9	9	9	15	15	15	21	21	21	226	226	226	226
R^2	0.431	0.431	0.432	0.46	0.47	0.46	0.189	0.193	0.197	0.287	0.274	0.290	0.278
Adjusted R^2	0.412	0.412	0.412	0.44	0.45	0.45	0.168	0.172	0.176	0.268	0.254	0.271	0.258
FE	Bank	Bank	Bank	Bank	Bank	Bank	Bank	Bank	Bank	Bank	Bank	Bank	Bank

Table C.18: Robustness check – domestic rates

LHS: QoQ Loan Growth

	Canada			**Chile**			**Czech Republic**			**Norway**			
	US	EA	UK	US	EA	UK	US	EA	UK	SE	US	EA	UK
Δr_t^c	3.26	4.01	4.68*	0.98	4.32***	3.62***	0.14	1.81***	0.44	1.57**	0.56	2.57***	1.73**
	(1.99)	(2.44)	(2.69)	(0.78)	(0.86)	(0.85)	(0.48)	(0.68)	(0.61)	(0.67)	(0.72)	(0.70)	(0.71)
$\Delta Spread_t^c$	3.48	0.86	2.36	-0.38	0.13	-1.52***	0.06	0.81	0.05	2.22***	-1.19	0.15	1.63*
	(2.48)	(2.04)	(2.40)	(0.31)	(0.53)	(0.32)	(0.52)	(0.62)	(0.64)	(0.85)	(0.90)	(0.65)	(0.86)
Low_t^c	0.02	-1.35	-1.51**	0.34	1.93***	1.58*	-1.03***	-0.97**	-0.53	-5.27***	-0.72**	-4.78***	-1.04***
	(0.89)	(1.06)	(0.77)	(0.83)	(0.61)	(0.85)	(0.38)	(0.40)	(0.41)	(0.56)	(0.28)	(0.65)	(0.25)
$\Delta r_t^c * Low_t^c$	**-49.04****	-6.18	-8.89	-5.41	-2.88	**-6.86****	-0.04	-11.52	**-7.19****	**-5.02****	3.79	-11.16	-4.43
	(22.69)	(18.00)	(10.81)	(9.33)	(12.76)	**(3.45)**	(7.05)	(8.04)	**(3.06)**	**(2.34)**	(5.84)	(7.55)	(2.78)
$\Delta Spread_t^c * Low_t^c$	-3.10	**-5.03***	0.11	-0.73	**-2.58*****	-0.79	-0.01	-0.89	0.22	-1.54	-0.93	0.77	**-1.48***
	(2.50)	**(3.00)**	(2.64)	(1.11)	**(0.93)**	(1.03)	(1.01)	(1.15)	(1.08)	(1.58)	(0.85)	(1.39)	**(0.81)**
$\Delta r.dom_t$	-0.45	-0.21	-1.12	-1.03	-3.00***	-2.54***	0.13	-0.09	0.27	2.00***	4.03***	1.84***	2.19***
	(2.56)	(2.04)	(2.14)	(0.68)	(0.72)	(0.62)	(0.57)	(0.60)	(0.60)	(0.60)	(0.69)	(0.49)	(0.56)
$\Delta Spread.dom_t$	-2.14	-0.47	-1.54	-0.99*	-1.91***	-1.60***	0.40	0.58	0.71*	-0.07	3.50***	1.50***	0.87
	(2.87)	(2.15)	(2.52)	(0.54)	(0.49)	(0.51)	(0.40)	(0.43)	(0.40)	(0.74)	(0.99)	(0.47)	(0.72)
$Low.dom_t^c$	1.29*	1.78*	1.11	0.54	0.80	0.69	-1.88***	-2.23***	-2.05***	2.78***	-2.23***	2.30***	-1.61***
	(0.75)	(0.96)	(0.79)	(0.51)	(0.53)	(0.52)	(0.33)	(0.32)	(0.41)	(0.54)	(0.29)	(0.60)	(0.28)
$\Delta r.dom_t^c * Low.dom_t^c$	-8.45	-4.92	-8.52	3.39***	5.16***	4.70***	-18.76***	-8.36	-15.39***	-9.06***	-9.94***	-8.83***	-8.66***
	(6.23)	(5.35)	(5.75)	(1.09)	(1.31)	(1.22)	(5.56)	(5.66)	(5.39)	(2.06)	(2.19)	(2.26)	(2.07)
$\Delta Spread.dom_t^c * Low.dom_t^c$	-3.57	1.55	-1.84	3.14***	4.10***	3.50***	-0.01	-0.05	-0.16	-2.85	-3.60***	-3.84**	-1.95
	(2.94)	(3.38)	(3.07)	(0.93)	(1.06)	(1.05)	(0.74)	(0.73)	(0.80)	(2.07)	(1.24)	(1.80)	(1.50)
Dep. to liab.$_{t-1}$	18.46***	17.56**	15.60**	9.39***	9.81***	8.93***	-4.43***	-4.37***	-4.70***	-1.04	-2.84	-1.36	-2.30
	(7.09)	(7.78)	(7.55)	(1.75)	(1.94)	(1.80)	(1.39)	(1.39)	(1.39)	(2.05)	(2.06)	(2.07)	(2.09)
Equity to assets$_{t-1}$	-180.40***	-143.10*	-139.40**	12.44	14.30	15.58	11.38***	11.01***	10.99***	60.81***	58.28***	60.47***	59.21***
	(60.14)	(77.76)	(64.91)	(14.65)	(14.82)	(14.69)	(2.90)	(2.89)	(2.90)	(5.02)	(5.09)	(5.01)	(5.09)
Sec. to assets$_{t-1}$	0.04	-3.48	-2.41	-	-	-	11.21***	9.94***	10.59***	1.25	1.84	1.58	0.72
	(10.16)	(10.50)	(10.51)	-	-	-	(1.22)	(1.31)	(1.23)	(3.03)	(3.22)	(3.05)	(3.12)
Liq. assets ratio$_{t-1}$	17.82	10.06	7.71	18.75***	23.14***	20.44***	9.21***	8.16***	8.96***	33.43***	34.08***	33.66***	33.63***
	(17.18)	(17.01)	(16.43)	(4.78)	(5.36)	(4.87)	(1.31)	(1.40)	(1.31)	(3.92)	(3.95)	(3.92)	(3.94)
Dummy M&As	-	-	-	39.43***	39.86***	39.40***	-	-	-	-	-	-	-
	-	-	-	(13.84)	(13.64)	(13.63)	-	-	-	-	-	-	-
Accounting dummy	64.67***	64.72***	63.96***	-	-	-	-	-	-	-	-	-	-
	(11.02)	(11.06)	(11.10)	-	-	-	-	-	-	-	-	-	-
QoQ GDP growth$_{t-1}$	0.15	0.14	0.20	0.62**	0.51*	0.29	0.87***	0.79***	0.92***	-0.11**	-0.14***	-0.10**	-0.09**
	(0.22)	(0.23)	(0.21)	(0.28)	(0.29)	(0.33)	(0.18)	(0.19)	(0.18)	(0.04)	(0.04)	(0.04)	(0.04)
QoQ CPI growth$_{t-1}$	0.29	0.00	0.01	0.56*	0.74**	0.74**	0.35**	0.32*	0.41**	0.33**	0.34**	0.52***	0.35*
	(0.28)	(0.29)	(0.29)	(0.34)	(0.34)	(0.33)	(0.17)	(0.17)	(0.17)	(0.17)	(0.16)	(0.18)	(0.18)
N	648	648	648	733	733	733	1,274	1,274	1,274	8,904	8,904	8,904	8,904
No. of banks	9	9	9	15	15	15	21	21	21	226	226	226	226
R^2	0.434	0.434	0.435	0.450	0.460	0.470	0.217	0.220	0.216	0.291	0.285	0.291	0.284
Adjusted R^2	0.412	0.411	0.412	0.430	0.440	0.450	0.194	0.197	0.193	0.271	0.265	0.272	0.264
FE	Bank	Bank	Bank	Bank	Bank	Bank	Bank	Bank	Bank	Bank	Bank	Bank	Bank

Table C.19: Robustness check – macroeconomic controls for the core countries

LHS: QoQ Loan Growth

	Canada			**Chile**			**Czech Republic**			**Norway**			
	US	EA	UK	US	EA	UK	US	EA	UK	SE	US	EA	UK
Δr_t^c	2.13	2.78	4.29**	0.34	3.48***	1.56**	-0.27	1.72**	0.79	2.57***	1.13**	4.64***	2.34***
	(1.33)	(2.40)	(2.01)	(0.77)	(0.85)	(0.67)	(0.51)	(0.68)	(0.62)	(0.38)	(0.48)	(0.64)	(0.52)
$\Delta Spread_t^c$	1.78	0.21	2.01	-0.65	-0.58	-0.73	0.16	1.35***	0.64	1.58***	-0.06	1.06**	1.58***
	(1.29)	(1.66)	(1.59)	(0.71)	(0.65)	(0.81)	(0.45)	(0.50)	(0.57)	(0.34)	(0.29)	(0.42)	(0.43)
Low_t^c	0.82	-2.28	-1.28	0.39	1.96**	-0.10	-0.94*	-0.72	-2.85***	-2.18***	0.51	-4.20***	-2.21***
	(1.58)	(1.89)	(2.20)	(0.44)	(0.92)	(0.64)	(0.54)	(0.70)	(0.73)	(0.49)	(0.61)	(0.58)	(0.63)
$\Delta r_t^c * Low_t^c$	-38.58	-19.01	-10.93	-9.60	10.28	0.03	-0.13	1.24	-2.73	**-5.47****	4.67	-9.41	-3.82
	(28.19)	(14.15)	(8.34)	(8.08)	(14.03)	(2.89)	(7.12)	(7.66)	(3.20)	**(2.36)**	(6.13)	(7.22)	(2.67)
$\Delta Spread_t^c * Low_t^c$	-3.69	-3.40	-1.64	-0.11	0.23	0.55	-0.06	**-2.12***	-0.42	**-1.98****	0.33	-0.09	-1.65**
	(2.48)	(2.32)	(2.44)	(1.12)	(0.96)	(1.16)	(1.00)	**(1.12)**	(0.97)	**(0.98)**	(0.84)	(1.03)	(0.71)
QoQ GDP growth$_{t-1}^c$	0.80	-0.05	0.21	0.14	**-1.19*****	**-0.70****	-0.39	-0.17	-0.03	0.13	**-0.60****	-0.35	0.28
	(1.15)	(1.44)	(1.20)	(0.43)	**(0.45)**	**(0.36)**	(0.33)	(0.41)	(0.37)	(0.16)	**(0.28)**	(0.26)	(0.25)
QoQ CPI growth$_{t-1}^c$	0.37	2.18	-1.09	0.04	0.48	0.56	**0.61*****	0.59	0.02	**0.99*****	**0.87*****	0.05	-0.17
	(0.53)	(1.45)	(0.90)	(0.23)	(0.50)	(0.35)	**(0.18)**	(0.39)	(0.30)	**(0.22)**	**(0.16)**	(0.30)	(0.25)
QoQ GDP growth$_{t-1}^c * Low_t^c$	-0.39	**4.45***	-0.77	-0.60	-2.01	-0.66	-0.88	-1.30	0.35	0.27	-0.24	**3.59*****	1.18
	(2.02)	**(2.31)**	(2.91)	(0.67)	(1.27)	(0.94)	(0.65)	(1.07)	(0.95)	(0.39)	(0.57)	**(0.92)**	(0.94)
QoQ CPI growth$_{t-1}^c * Low_t^c$	-0.13	-2.56	0.55	**-0.59***	-0.69	-0.40	**-0.56***	0.08	**1.52****	**-2.35*****	**-0.91****	-0.10	0.07
	(0.89)	(1.64)	(1.86)	**(0.35)**	(0.99)	(0.72)	**(0.34)**	(0.66)	**(0.70)**	**(0.65)**	**(0.41)**	(0.54)	(0.64)
Dep. to liab.$_{t-1}$	18.32**	16.58**	14.55*	8.09***	8.50***	7.98***	-5.97***	-6.53***	-5.55***	-1.29	-3.37	-1.34	-4.20**
	(7.19)	(7.81)	(7.69)	(1.69)	(1.70)	(1.64)	(1.37)	(1.37)	(1.39)	(2.08)	(2.17)	(2.08)	(2.12)
Equity to assets$_{t-1}$	-165.80***	-116.30	-119.60*	13.11	14.87	13.41	10.70***	9.18***	10.70***	60.70***	58.47***	60.31***	57.98***
	(60.24)	(78.11)	(67.84)	(13.52)	(13.89)	(13.69)	(2.93)	(2.93)	(2.92)	(5.07)	(5.20)	(5.03)	(5.14)
Sec. to assets$_{t-1}$	0.13	-3.20	-1.02	-	-	-	12.07***	9.60***	11.15***	1.51	-2.30	1.68	-1.59
	(10.56)	(10.49)	(10.91)	-	-	-	(1.22)	(1.33)	(1.22)	(3.10)	(3.20)	(3.07)	(3.14)
Liq. assets ratio$_{t-1}$	15.55	7.67	5.94	17.75***	20.92***	18.47***	8.51***	7.80***	8.58***	33.38***	33.14***	33.73***	33.61***
	(17.74)	(16.88)	(16.75)	(4.25)	(4.50)	(4.33)	(1.29)	(1.41)	(1.30)	(3.91)	(3.96)	(3.93)	(3.97)
Dummy M&As	-	-	-	40.31***	40.36***	40.49***	-	-	-	-	-	-	
	-	-	-	(11.27)	(11.16)	(11.19)	-	-	-	-	-	-	
Accounting dummy	67.99***	66.39***	67.34***	-	-	-	-	-	-	-	-	-	
	(11.01)	(10.99)	(11.06)	-	-	-	-	-	-	-	-	-	
QoQ GDP growth$_{t-1}$	-0.08	-0.06	-0.07	0.29	-0.05	0.03	0.69***	0.75***	0.73***	-0.06	-0.03	-0.03	-0.05
	(0.24)	(0.20)	(0.23)	(0.22)	(0.25)	(0.26)	(0.18)	(0.23)	(0.18)	(0.04)	(0.04)	(0.04)	(0.04)
QoQ CPI growth$_{t-1}$	0.11	-0.12	0.17	0.19	-0.21	0.03	0.01	0.34*	0.45***	0.45**	-0.29*	0.71***	0.24
	(0.34)	(0.35)	(0.30)	(0.28)	(0.29)	(0.26)	(0.21)	(0.19)	(0.17)	(0.18)	(0.17)	(0.17)	(0.17)
N	648	648	648	885	885	885	1,274	1,274	1,274	8,904	8,904	8,904	8,904
No. of banks	9	9	9	15	15	15	21	21	21	226	226	226	226
R^2	0.431	0.434	0.433	0.460	0.470	0.470	0.195	0.190	0.198	0.288	0.276	0.289	0.278
Adjusted R^2	0.409	0.412	0.411	0.440	0.450	0.450	0.173	0.167	0.175	0.268	0.256	0.269	0.258
FE	Bank	Bank	Bank	Bank	Bank	Bank	Bank	Bank	Bank	Bank	Bank	Bank	Bank