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Water in the Wine? Monetary Policy and the Impact of Non-bank Financial Intermediaries

The rapid growth of the non-bank financial intermediation sector, formerly called shadow banking, could dilute monetary policy effectiveness in Canada, and pose a risk to financial stability.

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THE STUDY IN BRIEF

Canada was lauded for surviving the 2007-08 global financial crisis relatively unscathed. In part, this was due to the success of our financial services sector. This resilience, especially in contrast to the US banking sector, is partly explained by the smaller size of the non-bank financial intermediation (NBFIs) sector in Canada – more popularly known as “shadow banking.” But signs of robust growth in Canada’s NBFIs sector after the crisis suggest this resilience might be under threat. The assets of those institutions engaged in non-bank financial intermediation have continued to grow in Canada since the global financial crisis. A more important NBFIs sector has multiple effects on the financial system and on the economy. On the one hand, intermediaries in the sector, or NBFIs, provide alternatives for both depositors and borrowers that improve the functioning of the economy by increasing competition. On the other hand, they also might increase vulnerabilities, since they are often not as closely regulated, and deposit insurance does not cover their liabilities.

We find that, as NBFIs deposit growth increases in importance, it can dilute the effectiveness of monetary policy. This drag might be the result of depositors shifting between NBFIs and traditional banks, an effect that is exacerbated as the NBFIs sector grows. We also find that contractionary monetary policy causes an increase in business credit growth for NBFIs and a fall in chartered bank business loan growth. Although the overall effect on business credit growth is the desired decrease, the increase in NBFIs business loans both decreases monetary policy effectiveness and results in a riskier composition. Lastly, we find the insignificant effect on overall mortgage credit growth following a contractionary monetary policy shock appears to be driven by a shift of credit from traditional banks to NBFIs, and could be a concern from a financial stability perspective.

Overall, these results highlight the importance of a growing NBFIs sector for monetary policy and financial stability. Our findings suggest that both the traditional monetary policy tool of the overnight rate and tightening mortgage underwriting standards through macroprudential policy might have the unintended side effect of increasing financial instability. One way to reduce this potential side effect is to limit the migration of loans between traditional banks and NBFIs by tightening regulation of NBFIs to level the playing field between the two types of financial institutions. At a minimum, the systemically important NBFIs should face capital requirements and underwriting standards similar to those imposed on traditional banks.

We hope these results help the Bank of Canada as it continues to evaluate and model the evolution of monetary policy transmission in the Canadian economy. To that end, NBFIs should be front and centre when the four coordinating bodies that provide systemic financial services oversight next meet.

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Canada's financial services sector has been recognized for surviving the 2007–08 global financial crisis relatively unscathed.

This resilience, especially in contrast to the US banking sector, is partly explained by the smaller size of the non-bank financial intermediation (NBFIs) sector in Canada – more popularly known as “shadow banking.” But signs of robust growth in Canada's NBFIs sector after the crisis suggest this resilience might be under threat. Over the past decade, assets managed by these financial intermediaries, or NBFIs, have continued to grow: Bédard-Pagé (2019), for example, estimates a 30 percent increase between 2015 and 2017 alone, and a near doubling since 2006. Bédard-Pagé puts the value of Canada's NBFIs sector at the end of 2017 at \$1.5 trillion – about 10 percent of total financial assets and 34 percent of total assets of all deposit-taking institutions.

As opposed to traditional banks, which combine deposit creation and loan origination in one entity, NBFIs split these functions into different entities. One example: an investment fund sells investors shares in money market mutual funds (MMMMFs). The shares effectively function as deposits but are not insured by the Canada Deposit Insurance Corporation (CDIC). The mutual funds use these proceeds to invest in money market securities. Some money market securities are issued by, for example, certain NBFIs private lenders, which use them to

perform loan origination. More broadly speaking, categories of NBFIs include investment funds, private lenders like mortgage finance companies, non-bank investment dealers, companies that offer private-label securitization like asset-backed securities, and more.¹

On the one hand, therefore, NBFIs provide alternatives for both depositors and borrowers that improve the functioning of the economy by increasing competition. On the other hand, they also might increase vulnerabilities, since they are often not as closely regulated, and deposit insurance does not cover their liabilities. In boom years, NBFIs provide additional liquidity to the financial system, but when uncertainty rises, NBFIs are more likely to run into problems. Indeed, the role of NBFIs in exacerbating the 2007–08 global financial crisis, particularly in the United States, is well documented (see, for example, Gorton and Metrick 2012; Mian and Sufi 2009). Despite the growing importance of NBFIs and its clear link with financial stability, relatively few research papers have investigated the influence of NBFIs on monetary policy transmission.² This *Commentary* aims to fill that gap.

A typical contractionary monetary policy shock (for example, a larger than expected increase in the bank rate) decreases credit and deposit growth,

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- 1 For a good overview of NBFIs and their activities, see Table 1 in Bédard-Pagé (2019) <https://www.bankofcanada.ca/wp-content/uploads/2019/03/sdp2019-2.pdf>.
- 2 The academic literature on NBFIs and the link with money dates back at least to Gurley and Shaw (1960) and to Tobin's (1963) “New View.” More recently, Bédard-Pagé (2019) provides an update of the Bank of Canada's monitoring of NBFIs in Canada, but does not perform an econometric analysis linking the growth of NBFIs to Canada's economic growth or to the functioning of monetary policy.

dampening aggregate demand, and thereby lowering inflation. The reverse is the case for an expansionary monetary policy shock. However, if credit and/or deposit growth does not fall at NBFIs following a contractionary monetary policy shock or when credit/deposits shift between NBFIs and traditional banks, thus offsetting some of the overall impact, monetary policy becomes less effective. Similarly, in the case of an expansionary monetary shock, the impact can be dampened if credit and deposits fail to grow at NBFIs, or shift between NBFIs and traditional banks.

Assessing Canadian financial market data from 1991 to 2015, we find that the increasing importance of the NBFI sector caused a reduction in monetary policy effectiveness – specifically, the increased importance of both NBFI deposits and business loans has diluted the transmission of monetary policy. These findings are critical for the Bank of Canada’s modelling of likely inflation behaviour following a monetary policy shock.

We then look to understand the transmission mechanism for our results. On the credit side, we find that, when businesses face higher than expected borrowing costs as a result of contractionary monetary policy, banks experience a decrease in credit (loan) origination, while NBFIs experience an increase. The increase in NBFIs’ credit growth reduces the effectiveness of monetary policy, and creates concerns regarding the risk composition of business loans.

Similarly, we find that a contractionary monetary policy shock does not reduce residential mortgage credit at NBFIs as would be expected. This result appears to be robust enough to offset the fall in traditional bank residential mortgage credit, as aggregate residential mortgage credit reacts ambiguously to a contractionary monetary

policy shock. If the insignificant change in NBFIs’ residential mortgage credit comes from borrowers’ shifting away from banks to NBFIs, this would be a concern from a financial stability perspective as well.

On the deposit side, we find that NBFIs’ deposit growth falls following a contractionary monetary policy shock but appears to migrate to traditional banks, offsetting the typical fall there. The implication is that the fall in total deposit growth we find is not as robust as it otherwise would be. Although this shift might be good from a financial stability perspective, the larger the NBFI sector the more this shift in deposits might dilute the ability of monetary policy to slow down total deposit growth.

Our results, therefore, indicate that both the traditional monetary policy tool of overnight rate tightening and the more recent addition of tightening mortgage underwriting standards through macroprudential policy – such as the recent B-20 mortgage underwriting guidelines issued by the Office of the Superintendent of Financial Institutions (OSFI) – might have the unintended side effect of increasing financial instability. One option for reducing this potential side effect is to limit the migration of loans between traditional banks and NBFIs by tightening the regulation of NBFIs to level the playing field between them. Echoing several other policy proposals (see, for example, Carney 2014; Wilson 2015), we argue that NBFIs – or shadow banks, in now outdated language – should be brought out of the shadows.³ At the very least, the systemically important NBFIs should face similar capital requirements and underwriting standards to those of traditional banks.

Further, on the issue of financial stability, Canada does not have a single prudential regulator in charge of systemic risk. It does, however, have four

3 At a meeting in Ottawa of the Financial Stability Board Plenary in October 2018 (Financial Stability Board 2018a), it was decided to replace the term “shadow banking” with “non-bank financial intermediation” in future communications. This was done in order to be consistent with the board’s goal of making shadow banking more resilient as a form of market-based finance.

coordinating bodies (committees)⁴ that involve key regulators, including the Bank of Canada, OSFI, the Department of Finance, and provincial securities regulators. These serve as forums for information sharing and discussion of financial sector developments that are responsible for, among other things, systemic risk oversight functions – see Kronick (2018) for further discussion.⁵ Our results suggest that NBFIs should be an important part of discussions among these coordinating bodies.

MONETARY POLICY TRANSMISSION

The transmission mechanism for monetary policy has changed dramatically over the past 30 years, in part as a result of the changing economic environment. Most interest rates, including central bank overnight policy rates, have fallen, with a significant and sudden decrease during the financial crisis. Similarly, long-run neutral interest rates, which are neither expansionary nor contractionary, are now lower than at any point over this period. The diminished effects of monetary policy on real activities are well documented (see, for example, Boivin and Giannoni 2006; Boivin, Kiley, and Mishkin 2010), and with a slow recovery and below-target inflation after the crisis, much work continues to be undertaken to better understand monetary policy transmission.

One transmission approach in the literature is the bank-lending channel, where the focus is on the creation of deposits and loans by financial intermediaries. The existing research on bank-

lending-based monetary transmission narrows in on commercial banks as the key financial institutions for transmitting monetary policy (see Drechsler, Savov, and Schnabl 2017; Kashyap and Stein 1995, 2000). Specifically, contractionary monetary policy – for example, a hike in the Bank of Canada’s overnight rate – causes an increase in funding costs for banks, lowering the supply of credit. As credit growth falls, so too does deposit growth. The fall in credit growth affects investment, spending and the economy at large. However, the growth of NBFIs has made it necessary to expand the bank-lending channel of monetary transmission to include these financial institutions. The Financial Stability Board (2018b) reports that NBFIs’ assets grew by 8 percent to \$99 trillion globally in 2016, faster than the assets of traditional financial institutions and representing approximately 30 percent of all total global financial assets.

Expanding the bank-lending channel is complicated by the fact that NBFIs separate deposit and credit intermediary functions. In the case of banks, the decision to issue credit (an asset entry on the balance sheet) is offset by a deposit entry on the liability side, adding to the money supply.⁶ In NBFIs, however, a deposit can go into MMMFs and non-money market mutual funds (NMMMMFs), and then becomes an entry on the liability side of the MMMF or NMMMMF balance sheet. These mutual funds invest the proceeds in short-term debt (the asset side of the balance sheet) such as

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- 4 These four bodies include the Financial Institutions Supervisory Committee, the Senior Advisory Committee, the Heads of Agencies, and the CSA Risk Committee.
- 5 We note that the *Capital Markets Stability Act*, an element of the legislative framework to establish the Cooperative Capital Markets Regulatory System, would provide (a) national data-collection powers to monitor Canada’s capital markets and proactively detect and identify systemic risks; and (b) powers to regulate systemically important products and benchmarks and systemically risky practices on a national basis.
- 6 Jakab and Kumhof (2015, 2019) provide a theoretical framework for the close interconnectedness of lending and deposit growth. They argue that the “functions of banks is indeed monetary financing” (2019, 3), where money is created by savers only when an increase in bank deposits is accompanied by an increase in loans. Otherwise, there is no new deposit created.

repurchase agreements, asset-backed commercial paper and other commercial paper – and, in the case of NMMMFs, a broader range of financial instruments. These instruments are issued by certain NBFIs (liability side of their balance sheet), which use the funds to lend (asset side of their balance sheet) to borrowers. Money is created through financial markets.

As noted, few research papers have investigated the role of NBFIs in monetary policy transmission and, to our knowledge, none of the existing empirical literature discusses Canada. This omission becomes starker when one considers the near doubling of NBFIs' assets in Canada since 2006, and 30 percent alone between 2015 and 2017 (see Bédard-Pagé 2019) and the well-documented weakening effectiveness of monetary policy in this country since 2010 (see, for example, Borio and Hofmann 2017; Kronick and Ambler 2019). In this *Commentary* we ask and answer two questions: first, what role does the growth of the NBFI sector play in monetary policy effectiveness? and second, how do NBFIs influence the transmission mechanism of monetary policy?

METHODOLOGY

To investigate the role of NBFIs in monetary policy effectiveness, we perform a two-stage analysis. The first stage involves an econometric technique whereby we estimate the effect of monetary

policy shocks on inflation, and allow the results to change over time. We are able to evaluate the cumulative effect of a shock, as well as the peak effect. In the second stage, we extract these two effects (cumulative and peak) over time, and test how they react to changes in the importance of NBFI variables – specifically, growth in the shares of deposits, household mortgage loans and business loans. Box 1 contains more details on methodology, as well as data.

In equation (1) in Box 1, γ_1 , γ_2 and γ_3 are our coefficients of interest. Since we chose to analyze contractionary monetary policy shocks measured by the cumulative or peak inflation change, negative coefficients signal increased monetary policy effectiveness – that is, inflation falls by more after an unanticipated hike in the overnight rate⁷ – and positive coefficients signal decreased effectiveness. These coefficients tell us what role NBFIs have played in affecting monetary policy.

What these coefficients do not tell us, however, is why they have the effect they do (our second research question). To answer this question, we performed a separate analysis – for economist readers, a structural vector autoregression – that tells us whether contractionary monetary policy has the expected effect of lowering deposits and loans at both NBFIs and traditional banks, as well as in aggregate, and what this entails for financial stability.⁸ We focused on the growth rates of deposit and credit *flows*, instead of share growth as we did

7 Note that a contractionary monetary policy shock can also occur from no change in the overnight rate if the market expected a fall in that rate.

8 The setup for the structural vector autoregression used the same vector of variables in the same order as in the time-varying coefficient Bayesian vector autoregression described in the first footnote to Box 1, where we added individually the NBFI, bank or aggregate variable of interest to the vector in the last position. Variables are non-stationary and integrated of order 1, and our tests confirm cointegration, meaning that we can run in levels. Additionally, the results do not change significantly when the NBFI and bank variables are run in the structural vector autoregression at the same time. For the sake of parsimony, we preferred running the structural vector autoregression one by one. Lastly, we note that credit unions and caisses populaires are in neither category, although they are part of the aggregate. Results are available from the authors upon request.

Box 1: A Note on Methodology and Data

The first stage of our analysis used a time-varying coefficient Bayesian vector autoregression (TVC-BVAR) employing the setup in Kronick and Ambler (2019), which in turn is based on work in Imam (2015) and Primiceri (2005). The TVC-BVAR allows for monetary policy's impact on inflation to change over time.

Critical in this estimation procedure is to have a truly exogenous monetary policy shock series – that is, one that does not confound other policies that are being undertaken simultaneously. We used the series from Champagne and Sekkel (2018), who use the narrative approach pioneered by Romer and Romer (2004). One can think of this approach as estimating the part of an intended Bank of Canada overnight rate change that cannot be predicted from the Bank's estimated reaction function, which takes into consideration how the Bank systematically reacts to a series of indicators.^a

In the second stage, we extracted from the TVC-BVAR the changing cumulative and peak effects of the contractionary monetary policy shock on inflation over time, and used these variables as dependent variables in the following ordinary least squares regression:

$$Y_t = \alpha_1 + \gamma_1 sb_{D,t} + \gamma_2 sb_{HL,t} + \gamma_3 sb_{BL,t} + controls + n_t, \quad (1)$$

where subscript *D* stands for year-over-year growth in the share of deposits at NBFIs, *HL* stands for year-over-year growth in the share of household mortgage loans at NBFIs and *BL* stands for year-over-year growth in the share of business loans by NBFIs.^b Peak inflation will be the largest (negative) change in inflation following the contractionary monetary policy shock, while the cumulative effects are calculated by summing the responses of inflation to the policy shock over time.

Our control variables include the term spread – the difference between ten-year government bonds and three-month treasury bills – which captures term risk in the economy (the larger the spread, the higher the perceived future risk); the Toronto Stock Exchange stock market month-end close to control for the effect of financial markets; a new housing price index; and a measure of credit risk in the economy, which, in our case, is the difference between three-month prime corporate paper and three-month treasury bills. All these control variables were obtained from Statistics Canada.

- a The vector of variables in the TVC-BVAR, in order, includes the commodity price index from the Bank of Canada, the US Federal Funds Rate, the Champagne and Sekkel (2018) Canadian monetary policy shock series, headline inflation (from Statistics Canada) and the unemployment rate (also from Statistics Canada). All variables were integrated of order one, I(1), with cointegration among the set. We thus ran the TVC-BVAR using levels (cointegration results are available from the authors upon request). Ordering the commodity price index and US Federal Funds Rate in front of the shock series was simply to ensure there are no missing effects in the shock series from contemporaneous commodity prices and US economic activity.
- b Ideally, one would use share, not growth in share, but share is integrated of order 2 – that is, I(2) – while the control variables in the regression are I(1). When we took growth in share, all variables are I(1), and are cointegrated, and the residuals are I(0), allowing us to run the regression in equation (1). Note that we controlled for bank mortgage credit growth during the November 2011–October 2012 period as a result of a one-off change to accounting standards that brought off-balance sheet securitization onto bank balance sheets.

Box 1: A Note on Methodology and Data (cont'd)

We obtained our NBFIs variables from the Bank of Canada's Historical Banking Financial Statistics and Weekly Financial Statistics, supplemented by more granular Statistics Canada data. Specifically, we evaluated both MMMF deposits, as in Xiao (2019), and NMMMF deposits. The major difference between these two forms of deposits is that the former invests almost exclusively in domestic and foreign *short-term* instruments, while the latter invests in a wider range of financial instruments. According to the Bank, "Data for non-money market mutual funds represent the assets of funds that invest in a wide range of Canadian or foreign financial instruments" (Bank of Canada Website: <https://www.bankofcanada.ca/rates/banking-and-financial-statistics/notes-for-tables-credit-and-monetary-aggregates/#E2>). MMMF deposits are part of what the Bank of Canada adds to the monetary aggregate M2 (gross) to get M2+ (gross), while non-MMMF deposits are part of what the Bank adds to M2+ (gross) to get M2++ (gross).

For both household and business credit, ideally we would follow either the definitions in the Financial Stability Board's Global Shadow Banking Monitoring Reports or Bédard-Pagé (2019), who provides a comprehensive dataset for NBFIs. As of writing, however, this dataset is annual, and goes back only 10–15 years. Thus, to answer the questions we want to address, we must obtain higher-frequency data with a longer time-series component. These data are available monthly for a subset of the Financial Stability Board's narrow definition of NBFIs.

For business credit, we used the non-deposit credit intermediaries dataset found in Statistics Canada's CANSIM table 176-0023. Statistics Canada defines non-deposit credit intermediaries as comprising "establishments, both public (government-sponsored enterprises) and private, primarily engaged in extending credit or lending funds raised by credit market borrowing, such as by issuing commercial paper and other debt instruments, and by borrowing from other financial intermediaries" (Government of Canada Website, Industry Statistics at: <https://www.ic.gc.ca/app/scr/app/cis/summary-sommaire/5222>).

For household credit, we also used non-deposit credit intermediary data from Statistics Canada's CANSIM table 176-0069. These data, however, also include "other institutions," such as Crown corporations CMHC Direct Lending and ATB Financial. Statistics Canada does separate them out, but only quarterly. As such, we tested the entire dataset monthly and, as a test of robustness, interpolated the quarterly dataset, which includes only non-depository credit intermediaries.

In absolute dollars, our NBFIs residential plus business credit amounted to a little over \$100 billion in 2015, the final year of our empirical exercise, representing 5 percent of Canada's gross domestic product. All variables are monthly, and the sample runs were from February 1991 to October 2015.^c

c The end date reflects the end of the publicly available Champagne and Sekkel (2018) monetary policy shock series.

above, as we wanted to track the response of flows over an extended period.⁹

We note, however, that, in theory, it is possible to see an aggregate fall in deposit and credit growth as expected, but also a shift from one type of an institution to another, offsetting some of the aggregate decrease. This could occur, for example, as Xiao (2019) shows for the United States, if NBFIs increased their deposit rate by more than commercial banks did following the implementation of contractionary monetary policy – as the two types of institutions would have to compete on yield – and depositors shifted from the banks to NBFIs. Such a shift would dilute the transmission of monetary policy and increase financial risk.¹⁰

RESULTS

The Effect of NBFIs on Monetary Policy Transmission

As Figure 1 indicates, cumulative and peak effects on inflation arising from a contractionary monetary policy shock improved over much of the inflation-targeting period. In other words, similar-sized monetary policy shocks have had a larger effect on inflation over time. Since 2010, however, there has been a mild reversal, consistent with the work of Borio and Hoffman (2017). This is, of course, also consistent with actual inflation in Canada, which has struggled to hit the Bank of Canada's 2 percent target for much of the period since the crisis

recovery (for more, see Ambler and Kronick 2018; Friedrich and Gosselin 2015). We note that this recent period of declining effectiveness is correlated with both market share growth and strong growth rates of NBFi deposits, driven by deposits in NMMMMF, as well as with mostly robust growth rates of NBFi credit (Figures 2 and 3).

We then used the cumulative and peak effects of contractionary monetary policy on inflation, and investigated how these effects are correlated with the growth in the share of NBFi deposits and credit.

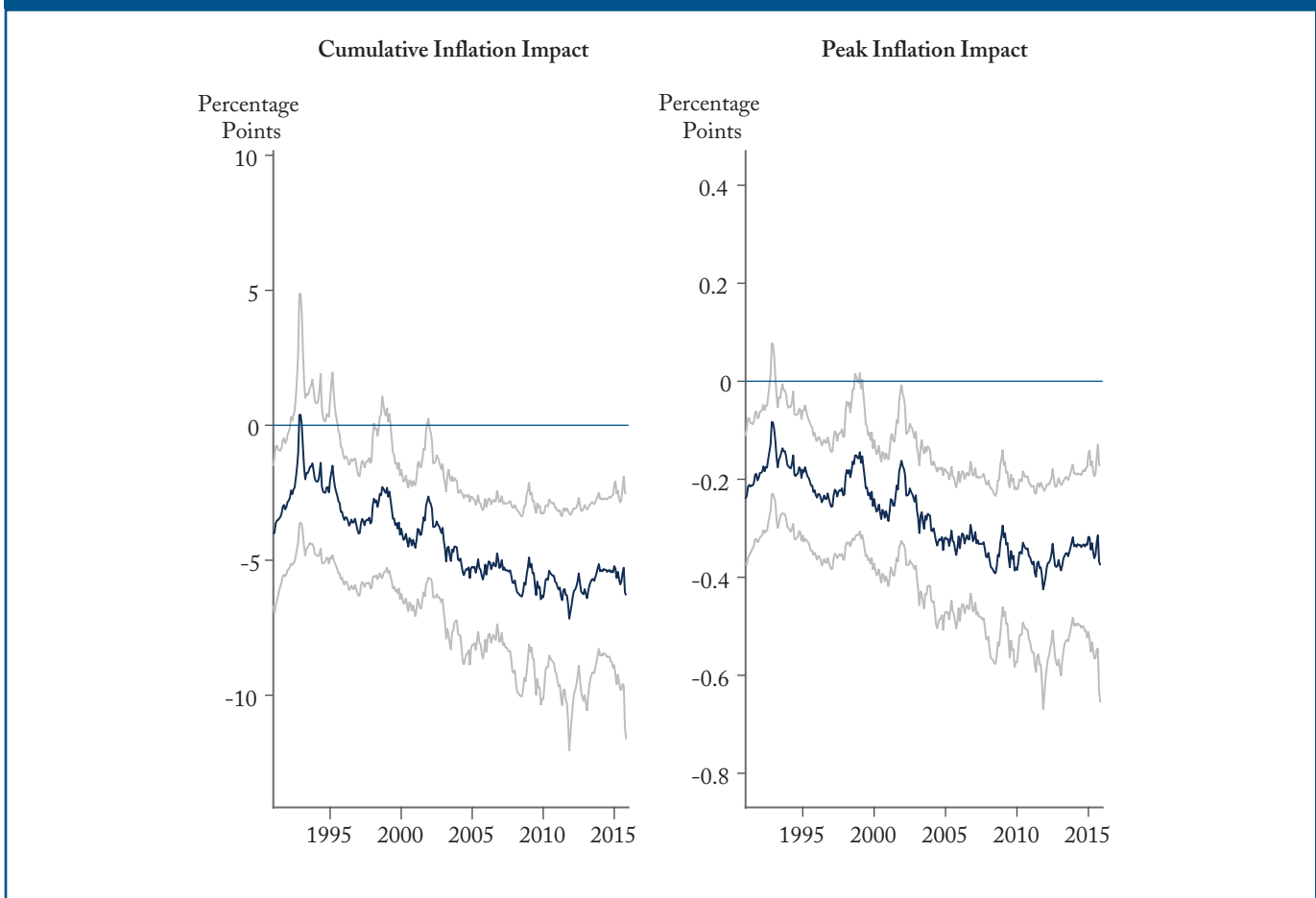
The estimation results of equation (1) are shown in Table 1 on page 13.¹¹ The coefficients on NBFi deposit share growth are mostly positive and significant, indicating that the greater the importance of NBFi deposits the more they act as a drag on monetary policy effectiveness, similar to the findings of Xiao (2019). In the case of cumulative effects, if the pace of growth of the share of NBFi deposits increases by 1 percent, inflation falls by 0.53 of a percentage point and peak inflation by 0.02 of a percentage point less than they otherwise would have. The impact is clearly stronger when we focus on the cumulative inflation effects of a contractionary monetary policy shock.

Looking at the growth in the share of household mortgage credit, the coefficients are negative but insignificant, indicating that the importance of NBFIs in the mortgage market plays no significant role in the transmission of monetary policy.¹²

Lastly, for the growth in the share of business credit, we find that an increase in the importance

9 Replacing the year-on-year growth rate with the share growth rate changed neither the results nor the implied conclusions.
 10 There is no concern over endogeneity of our first and second research questions, as in the former we are asking how NBFi variables influence the capacity of monetary policy to affect inflation, whereas in the latter we ask what role monetary policy plays in the NBFi variables themselves. In other words, NBFi variables do not affect the monetary policy shock variable, but they do affect the shock's impact on inflation.
 11 Our results were confirmed as robust across a series of tests, including different lag structures, and controls for macroprudential regulation. Results are available from the authors upon request.
 12 We ran the same regression using the interpolated version of residential mortgage credit without including credit from CMHC Direct Lending or the Alberta Crown corporation ATB Financial, and obtained similar results.

Figure 1: Evolution of the Cumulative and Peak Effect of Contractionary Monetary Policy on Inflation



Note: The light grey lines represent one standard deviation confidence intervals.

Source: Authors' calculations.

of NBFIs business credit clearly dilutes monetary policy effectiveness, with a 1 percent increase causing cumulative inflation to fall by 0.36 of a percentage point and peak inflation by 0.02 of a percentage point less than they otherwise would have. Again, the impact is stronger when we focus on the cumulative inflation effects of a contractionary monetary policy shock.

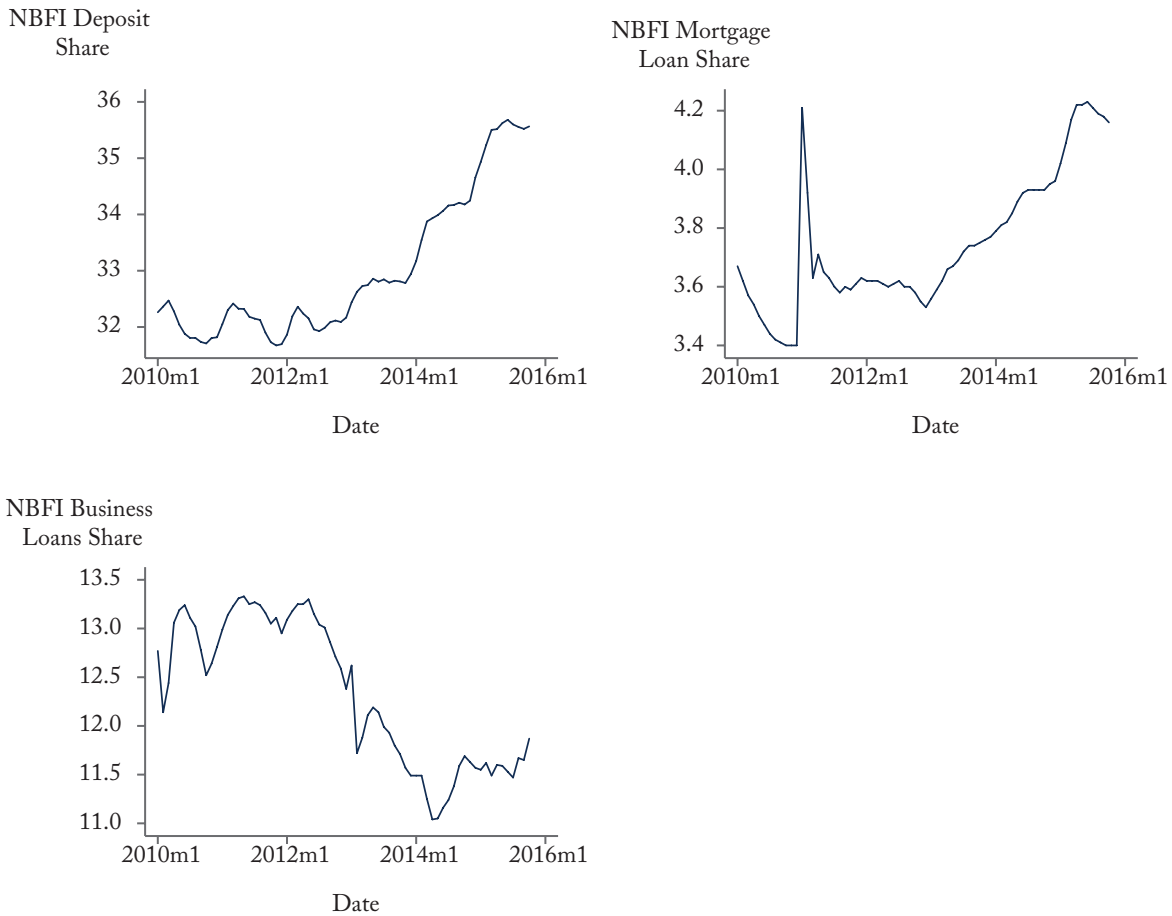
The Effect of Monetary Policy on Deposits and Loans of NBFIs and Chartered Banks

To find out why growth in the NBFIs sector has

diluted monetary policy effectiveness, we need to investigate the dynamics of the NBFIs transmission mechanism, which will also provide insight into financial stability.

Using the method described earlier, we produced a series of impulse response functions following a contractionary monetary policy shock for both credit (in the form of household and business loans) and deposits. Figures 4–6 present the results for both traditional banks and NBFIs, as well as in aggregate, in order to show both the change in the variable itself for these different financial

Figure 2: Shares of NBFIs Deposits and Credit, 2010–16, Percent



Sources: Bank of Canada, Statistics Canada, and authors' calculations.

institutions and the shift in composition.¹³

Beginning with residential mortgage credit (Figure 4), we see:

- the desired (from a monetary policy effectiveness perspective) decrease in household loan growth for *chartered banks* (with a small lag, where significance lasts through one year);

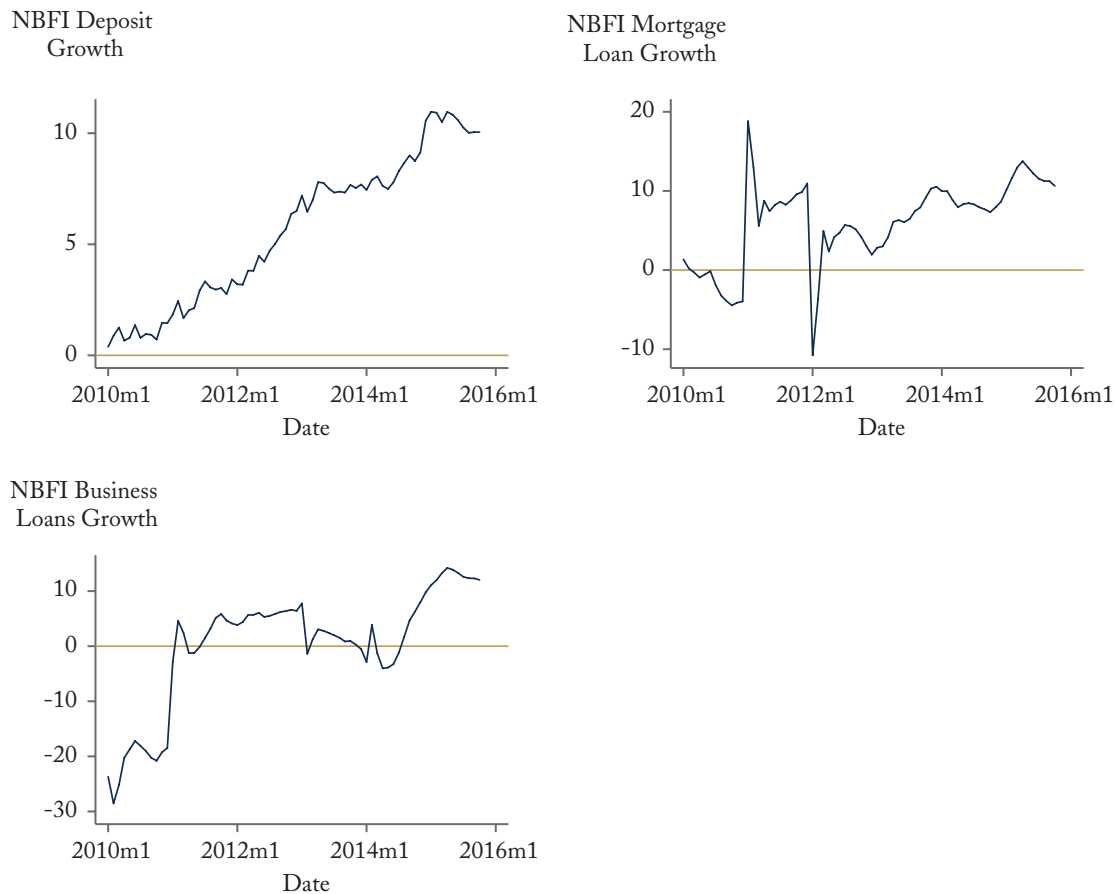
- an insignificant effect on household loan growth at *NBFIs*,¹⁴ and
- an insignificant effect on *total* credit growth.

One potential explanation for these results is that, as the overnight rate increases, both NBFIs and traditional banks increase their lending rates, as expected. As households (and businesses, as we

13 For each structural vector autoregression run, we also produced impulse response functions for inflation, unemployment and the shock itself to ensure that the economic results are appropriate, and find that they are. Results are available from the authors upon request.

14 This remains true when we use the interpolated data for NBFIs residential mortgage credit.

Figure 3: Year-over-Year Growth Rate of NBFIs Deposits and Credit, 2010–16, Percent



Sources: Bank of Canada, Statistics Canada, and authors' calculations

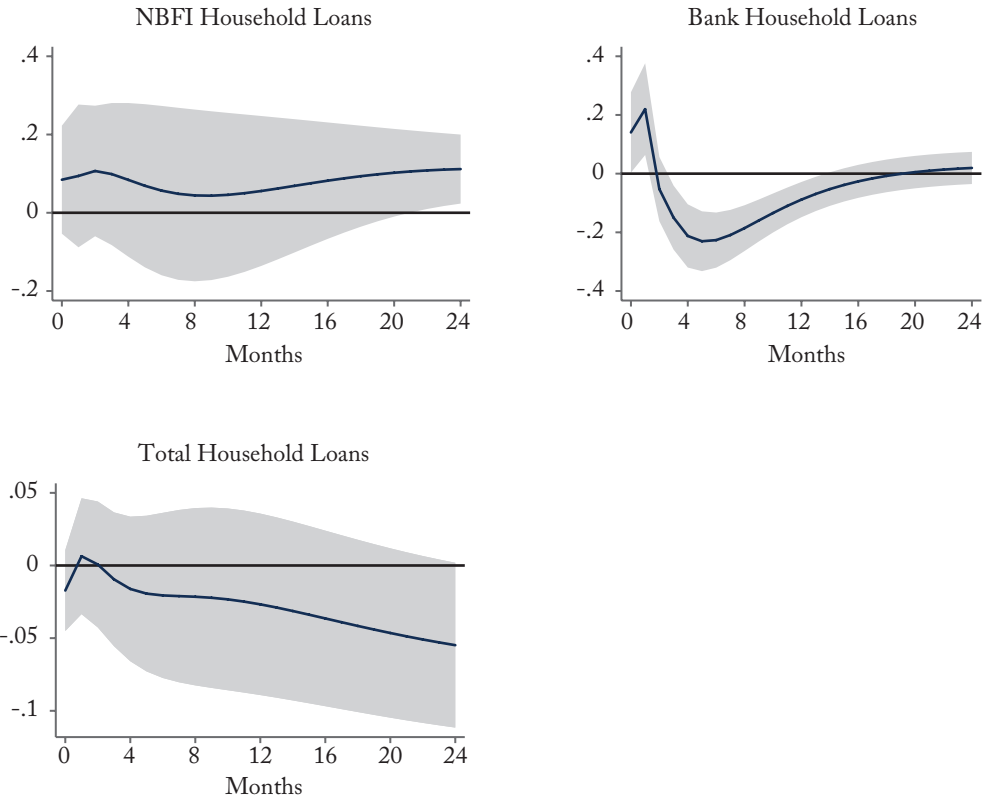
will see below) anticipate future increases, however, they increase their immediate demand for credit.¹⁵ As this demand dries up in the medium term, we then get the expected fall in bank mortgage credit growth from monetary policy tightening. If the pass through from monetary tightening to NBFIs' borrowing rates is lower than at traditional banks, some of the decrease in mortgage loans from banks

might shift to NBFIs, offsetting the expected fall there and, therefore, in aggregate.

These results suggest a financial stability concern if the typical decline in NBFIs residential mortgage credit growth is being offset by borrowers coming over from traditional banks. These findings, although not identical, are qualitatively similar to those of Drechsler, Savov, and Schnabl (2019)

15 It is also true that the initial increase comes from the fact that loan data reflect the drawing down of credit. So, if approvals happened before the contractionary monetary policy shock, but were only drawn down afterward, credit might appear to increase in the short run. This is true for both household and business credit.

Figure 4: Effect of a Contractionary Monetary Policy Shock on Real Year-over-Year Growth of Household Loans, Percentage Points



Note: Grey bands represent 68 percent confidence intervals, meaning 68 percent of the values lie within these bands, which are one standard deviation from the mean.

Source: Authors' calculations.

– namely, that tightening of monetary policy in the United States leads to a contraction in bank lending, with mortgage lending migrating to private securitized lending, thus weakening the impact of monetary tightening on mortgage lending and exposing the housing sector to potential instability. Canada's private securitized lending market is limited, but one can make the link to NBFIs more broadly. As discussed, the potential financial

instability is a result of a less stringent level of regulatory oversight for NBFIs.

Our results indicate a possible side effect of the recently implemented B-20 mortgage qualification guidelines on Canadian mortgage markets. Borrowers who fail the new guidelines might be channelled toward NBFIs as a way of bypassing tighter regulation, leading to potentially higher financial instability.¹⁶

16 There is some early evidence that private lenders have seen an increase in their market share following the implementation of the B-20 guidelines (see Bilyk and Tenyenhuis 2018).

Table 1: Primary Regression Results

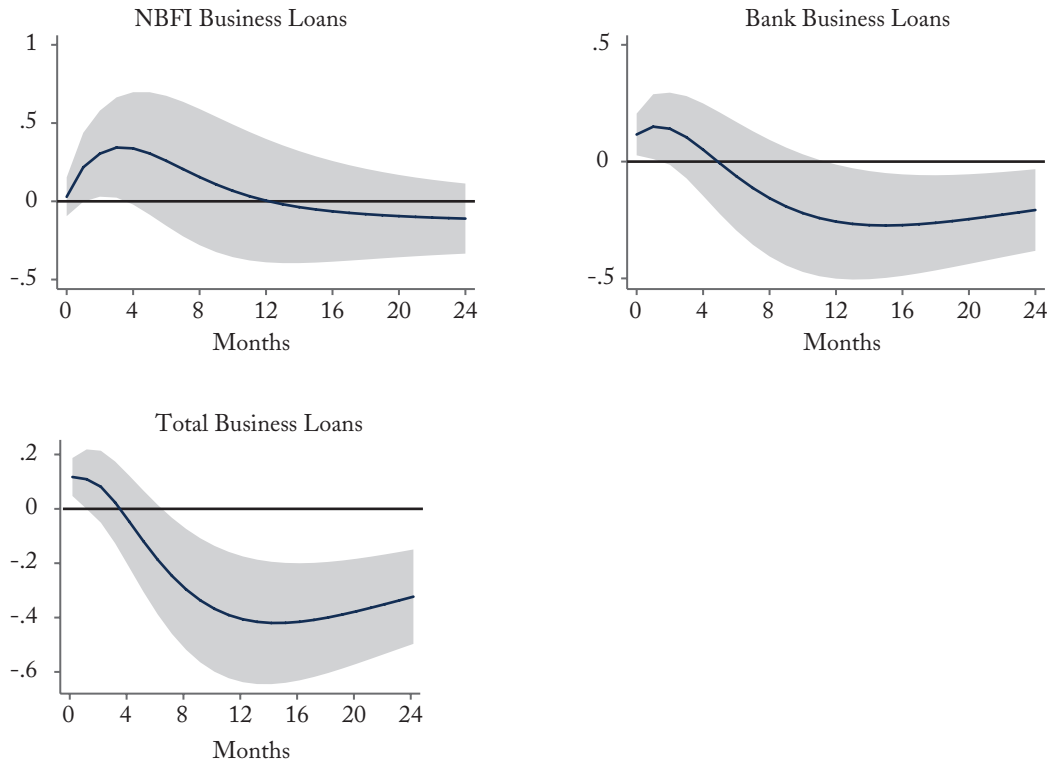
	(1)	(2)
	Cumulative Inflation	Peak Inflation
NBFI deposits share growth	0.528*** (3.27)	0.0226*** (2.91)
NBFI mortgage loan share growth	-0.186 (-0.53)	-0.0183 (-1.10)
NBFI business loan share growth	0.357*** (2.80)	0.0204*** (2.84)
Term spread	-0.168*** (-3.68)	-0.00794*** (-3.78)
TSX	-2.153*** (-9.47)	-0.0883*** (-10.12)
House prices	-1.756*** (-4.67)	-0.144*** (-7.99)
Credit spread	0.155 (1.29)	0.00862 (1.15)
Dummy	-0.535*** (-4.28)	-0.0254*** (-3.66)
Constant	22.68*** (20.98)	1.139*** (24.54)
Observations	297	297
Adjusted R^2	0.829	0.844

t statistics in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Dummy spans Nov 2011 – Oct 2012 period, and reflects the outsized change in year over year growth rates as a result of the switch to International Financial Reporting Standards, which, in part, moved off-balance sheet securitization and mortgage-backed securities onto bank balance sheets.

Figure 5: Effect of a Contractionary Monetary Policy Shock on Real Year-over-Year Growth of Business Loans, Percentage Points



Note: Grey bands represent 68 percent confidence intervals, meaning 68 percent of the values lie within these bands, which are one standard deviation from the mean.

Source: Authors' calculations.

For business credit growth, we see (Figure 5):

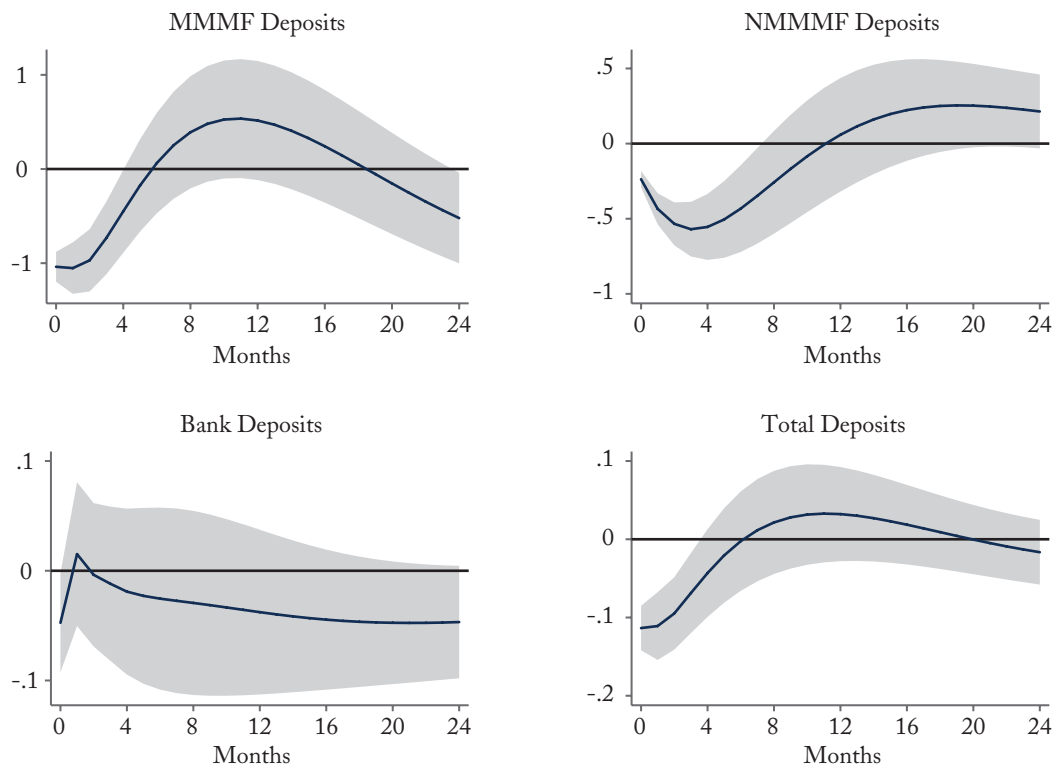
- an increase for *NBFIs* (significant for four months);
- the more expected fall, with a lag, for almost a year, for *chartered banks*; and
- in aggregate, a fall in *total* business credit growth.

Although the results give central bankers the desired decrease in total business credit growth, the decrease would have been greater if not for the

increase in *NBFI* business credit growth, consistent with our earlier findings shown in Table 1. These dynamics also lead to a riskier composition of business credit. Note that the initial increase in bank business credit is consistent with the literature regarding the demand for loans in anticipation of future increases in the overnight rate.¹⁷ This is true for *NBFIs* as well, and if there is a shift from banks to *NBFIs* for credit demand over the medium term, that might explain why *NBFIs* never see

17 See Gertler and Gilchrist (1994) and Bernanke and Gertler (1995), which document that bank loans rise after tightening monetary policy because large firms borrow heavily to smooth the impact of declining sales.

Figure 6: Effect of a Contractionary Monetary Policy Shock on Real Year-over-Year Growth of Deposits, Percentage Points



Note: MMMF and NMMMMF combine to represent aggregate NBF1 deposits. Grey bands represent 68 percent confidence intervals, meaning 68 percent of the values lie within these bands, which are one standard deviation from the mean.

Source: Authors' calculations.

a significant decrease, while banks do. This shift might occur if, for example, less of the hike in the overnight rate is passed on to borrowers at NBFIs.

Our results for deposits (Figure 6) indicate that a contractionary monetary policy shock causes:

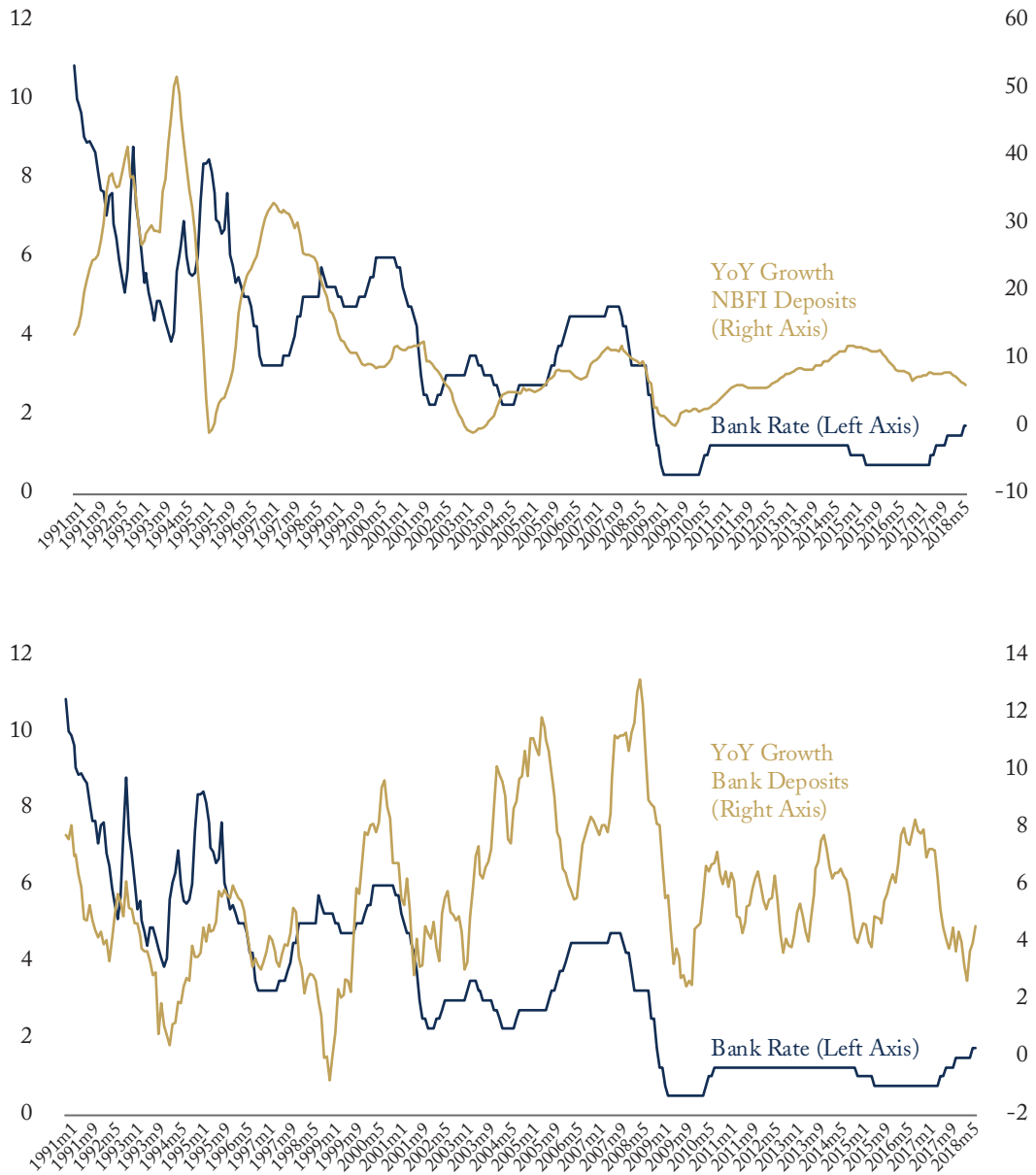
- a significant decrease in both forms of deposit growth at *NBFIs* (for four to eight months);
- an ambiguous change in deposit growth at *chartered banks*; and
- a significant decrease in *total* deposits.

The decrease in total deposits is good for overall monetary policy effectiveness, although, if some of the decrease in NBFIs' deposit growth results in a shift in deposits to traditional banks, creating the

ambiguity we see for these financial institutions, then the fall in total deposit growth might be less than it otherwise would have been.

Moreover, this potential shift would differ from the findings of Xiao (2019), who focuses only on MMMF, and determines that the shift in deposits following a contractionary monetary policy shock goes from traditional banks to NBFIs, as the latter must compete on yield and so pass more of the increase in the overnight rate on to depositors. These findings are consistent with US data that indicate that growth in NBF1 deposits increases as the Federal Funds Rate increases. In contrast, traditional bank deposit growth in the United States moves in the opposite direction to the

Figure 7: Traditional Bank and NBFY Deposit Growth and the Bank of Canada Bank Rate, 1991–2018, Percent



Sources: Bank of Canada, Statistics Canada, and authors' calculations.

Federal Funds Rate. In Canada, however, the data show an opposite pattern: traditional bank deposit growth appears to move in the same direction as the Bank of Canada's Bank Rate, while NBFi deposit growth moves in the opposite direction (see Figure 7). These empirical observations are consistent with our results for the impulse response functions. The detailed market and institutional features in Canada that cause these differences should be investigated in future research.

CONCLUSION

The assets of those institutions engaged in NBFi activities have continued to grow in Canada since the global financial crisis. A more important NBFi sector has multiple effects on the financial system and on the economy.

We find that, as NBFi deposit growth increases in importance, it can dilute the effectiveness of monetary policy. This drag might be the result of depositors shifting between NBFis and traditional banks, an effect that is exacerbated as the NBFi sector grows. We also find that contractionary monetary policy causes an increase in business credit growth for NBFis and a fall in chartered bank business loan growth. Although the overall effect on business credit growth is the desired decrease, the increase in NBFi business loans both decreases monetary policy effectiveness and results

in a riskier composition. Lastly, we find a mostly ambiguous link between NBFis and monetary policy with respect to household credit. That said, the insignificant effect on overall mortgage credit growth following a contractionary monetary policy shock appears to be driven by a shift of credit from traditional banks to NBFis, and could be a concern from a financial stability perspective.

Overall, these results highlight the importance of a growing NBFi sector for monetary policy and financial stability. Our findings suggest that both the traditional monetary policy tool of the overnight rate and tightening mortgage underwriting standards through macroprudential policy might have the unintended side effect of increasing financial instability. One way to reduce this potential side effect is to limit the migration of loans between traditional banks and NBFis by tightening regulation of NBFis to level the playing field between the two types of financial institutions. At a minimum, the systemically important NBFis should face capital requirements and underwriting standards similar to those imposed on traditional banks.

We hope these results help the Bank of Canada as it continues to evaluate and model the evolution of monetary policy transmission in the Canadian economy. To that end, NBFis should be front and centre when the four coordinating bodies that provide systemic financial services oversight next meet.

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