

# Bank of Canada Monthly Research Update

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August 2020

This monthly newsletter features the latest research publications by Bank of Canada economists. The report includes papers appearing in external publications and staff working papers published on the Bank of Canada's website.

## PUBLISHED PAPERS

### Forthcoming

Ahnert, Toni & Elamin, Mahmoud, “Bank Runs, Portfolio Choice, and Liquidity Provision”, *Journal of Financial Stability*

## STAFF WORKING PAPERS

Jonker, Nicole & Kosse, Anneke, “The Interplay of Financial Education, Financial Literacy, Financial Inclusion and Financial Stability: Any Lessons for the Current Big Tech Era?”, *Bank of Canada Staff Working Paper 2020-32*

Rojas, Diego & Estrada, Juan & Huynh, Kim & Jacho-Chávez, David T., “Survival Analysis of Bank Note Circulation: Fitness, Network Structure and Machine Learning”, *Bank of Canada Staff Working Paper 2020-33*

Blattner, Tobias & Swarbrick, Jonathan, “Monetary Policy and Cross-Border Interbank Market Fragmentation: Lessons from the Crisis”, *Bank of Canada Staff Working Paper 2020-34*

## STAFF DISCUSSION PAPERS

Amano, Robert & Carter, Thomas J. & Schembri, Lawrence L., “Strengthening Inflation Targeting: Review and Renewal Processes in Canada and Other Advanced Jurisdictions”, *Bank of Canada Staff Discussion Paper 2020-7*

## TECHNICAL REPORTS

Felt, Marie-Hélène & Laferrière, David, “Sample Calibration of the Online CFM Survey”, *Bank of Canada Technical Report No. 118*

## ABSTRACTS

### *Bank Runs, Portfolio Choice, and Liquidity Provision*

We examine the portfolio choice of banks in a micro-founded model of runs. To insure risk-averse investors against liquidity risk, competitive banks offer demand deposits. We use global games to link the probability of a run to the bank's portfolio management. Based upon interim information about risky investment, banks liquidate investments to hold a safe asset. This partial hedge against investment risk reduces the withdrawal incentives of investors for a given deposit rate. As a result, (i) banks provide more liquidity ex ante (so banks offer a higher deposit rate) and (ii) the welfare of investors increases. Our results highlight the management of both sides of a bank's balance sheet and a complementarity in the two forms of insurance that banks provide to investors.

### *The Interplay of Financial Education, Financial Literacy, Financial Inclusion and Financial Stability: Any Lessons for the Current Big Tech Era?*

The entry of Big Tech firms in the financial ecosystem might affect financial stability through the opportunities and challenges they create for financial inclusion. In this paper we survey the literature to determine the effectiveness of financial education in improving financial literacy and financial inclusion and to assess the impact of financial inclusion on financial stability. Based on our findings, we argue that new empirical research is needed to determine whether financial education can play a role in ensuring that everyone is able to reap the financial-inclusion benefits that Big Tech may bring. We also conclude that financial-inclusion opportunities created by Big Tech might potentially introduce risks for overall financial stability. Because of this, we underline the importance of proper supervision and regulation.

### *Survival Analysis of Bank Note Circulation: Fitness, Network Structure and Machine Learning*

The efficient distribution of bank notes is a first-order responsibility of central banks. We study the distribution patterns of bank notes with an administrative dataset from the Bank of Canada's Currency Information Management Strategy. The single note inspection procedure generates a sample of 900 million bank notes in which we can trace the length of the stay of a banknote in the market. We

define the duration of the bank note circulation cycle as beginning on the date the note is first shipped by the Bank of Canada to a financial institution and ending when it is returned to the Bank of Canada. In addition, we provide information regarding where the bank note is shipped and later received, as well as the physical fitness of the bank note upon return to the Bank of Canada's distribution centres. K-prototype clustering classifies bank notes into types. A hazard model estimates the duration in circulation of bank notes based on their clusters and characteristics. An adaptive elastic net provides an algorithm for dimension reduction. It is found that while the distribution of the duration is affected by fitness measures, those effects are negligible when compared with the influence exerted by the clusters related to bank note denominations.

### *Monetary Policy and Cross-Border Interbank Market Fragmentation: Lessons from the Crisis*

We present a two-country model featuring risky lending and cross-border interbank market frictions. We find that (i) the strength of the financial accelerator, when applied to banks operating under uncertainty in an interbank market, will critically depend on the economic and financial structure of the economy; (ii) adverse shocks to the real economy can be the source of banking crisis, causing an increase in interbank funding costs, aggravating the initial shock; and (iii) asset purchases and central bank long-term refinancing operations can be effective substitutes for, or supplements to, conventional monetary policy.

### *Strengthening Inflation Targeting: Review and Renewal Processes in Canada and Other Advanced Jurisdictions*

A growing number of advanced economies with monetary policy frameworks that involve inflation targeting have adopted formal processes of review and renewal. These allow policymakers and other stakeholders to assess the current framework's performance to date, explore the merits of potential alternative frameworks and reach decisions about how best to enhance design and implementation. In this paper, we argue that well-governed review and renewal processes can contribute importantly to the success of a monetary policy framework: (1) they help to adjust the framework in response to experience, theoretical developments and changes in the economy; and (2) they enhance the legitimacy and credibility of changes made to the framework. However, as these processes involve inputs from the government or legislature, they also create potential for tensions

regarding central bank independence. We use an international comparison to show that these considerations have been balanced in different ways across countries and time, with a spectrum running from relatively technocratic processes to ones more closely linked to the political cycle. We also highlight several unique aspects of the modern review and renewal experience in Canada, where renewals of the Bank of Canada's joint inflation-control agreement with the government have regularly been preceded by in-depth framework reviews, each involving a large amount of original research and significant levels of transparency.

### *Sample Calibration of the Online CFM Survey*

The Bank of Canada's Currency Department has used the Canadian Financial Monitor (CFM) survey since 2009 to track Canadians' cash usage, payment card ownership and usage, and the adoption of payment innovations. A new online CFM survey was launched in 2018. Because it uses non-probability sampling for data collection, selection bias is very likely. We outline various methods for obtaining survey weights and discuss the associated conditions necessary for these weights to eliminate selection bias. In the end, we obtain calibration weights for the 2018 and 2019 online CFM samples. Our final weights improve upon the default weights provided by the survey company in several ways: (i) we choose the calibration variables based on a fully documented selection procedure that employs machine learning techniques; (ii) we use very up-to-date calibration totals; (iii) for each survey year we obtain two sets of weights, one for the full yearly sample of CFM respondents, the other for the sub-sample of CFM respondents who also filled in the methods-of-payment module of the survey.

## UPCOMING EVENTS

**\* All onsite conferences and events are suspended until further notice. All events listed below will take place virtually.**

Modelling the transmission of COVID-19: An interdisciplinary webinar

Organizers: Don Coletti (EXE), Maryam Haghighi (CS) & James MacGee (EFR)

Date: 1 September 2020

Karen Kopecky (Federal Reserve Bank of Atlanta)

Organizer: CEA/INT EFR Speaker Series, Youngmin Park (CEA)

Date: 4 September 2020

Arlene Wong (Department of Economics, Princeton University)

Organizer: CEA/INT EFR Speaker Series, Julien Champagne (CEA)

Date: 11 September 2020

Cecilia Parlatore (Leonard N. Stern School of Business, New York University) & Eduardo Davila (Department of Economics, Yale University)

Organizer: FMD/FSD EFR Speaker Series

Date: 17 September 2020

Johannes Wieland (Department of Economics, University of California San Diego)

Organizer: CEA/INT EFR Speaker Series, Julien Champagne (CEA)

Date: 25 September 2020