

Bank of Canada Monthly Research Update

May 2021

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

In-Press

Allen, Jason & Hortaçsu, Ali & Kastl, Jakob, “Crisis Management in Canada: Analyzing Default Risk and Liquidity Demand during Financial Stress”, *American Economic Journal: Microeconomics*, Vol 13(2): 243-275, May 2021

Forthcoming

Feunou, Bruno & Fontaine, Jean-Sebastien & Le, Anh & Lundblad, Christian T., “Tractable Term-Structure Models”, *Management Science*

Davoodalhosseini, Mohammad, “Central Bank Digital Currency and Monetary Policy”, *Journal of Economic Dynamics and Control*

Duprey, Thibaut & Klaus, Benjamin, “Early warning or too late? A (pseudo-)real-time identification of leading indicators of financial stress”, *Journal of Banking & Finance*

Garratt, Rod & Oordt, Maarten van, “Entrepreneurial Incentives and the Role of Initial Coin Offerings”, *Journal of Economic Dynamics and Control*

STAFF WORKING PAPERS

Schroth, Josef, “Optimal Monetary and Macroprudential Policies”, Bank of Canada Staff Working Paper 2021-21

Amano, Robert & Gosselin, Marc-André & McDonald-Guimond, Julien, “Evolving Temperature Dynamics in Canada: Preliminary Evidence Based on 60 Years of Data”, Bank of Canada Staff Working Paper 2021-22

Kosse, Anneke, “An Empirical Analysis of Bill Payment Choices”, Bank of Canada Staff Working Paper 2021-23

Boire, Francois-Michel & Duprey, Thibaut & Ueberfeldt, Alexander, “Shaping the future: Policy Shocks and the GDP growth distribution”, Bank of Canada Staff Working Paper 2021-24

STAFF DISCUSSION PAPERS

Chen, Heng & Engert, Walter & Huynh, Kim & O’Habib, Daneal, “An Exploration of First Nations Reserves and Access to Cash”, Bank of Canada Staff Discussion Paper 2021-8

ABSTRACTS

Crisis Management in Canada: Analyzing Default Risk and Liquidity Demand during Financial Stress

Using detailed information from the Canadian interbank payments system and liquidity-providing facilities, we find that despite sustained increases in market-rate spreads, the increase in banks' willingness to pay for liquidity during the 2008–2009 financial crisis was short-lived. Our study suggests that high-frequency distress indicators based on demand for liquidity offered by central banks can be complementary, and perhaps even superior, to market-based indicators, especially during times and in markets where uncertainty in the economic environment may lead to lack of meaningful information in prices due to absence of trading.

Tractable Term-Structure Models

We introduce a new framework that facilitates term structure modeling with both positive interest rates and flexible time-series dynamics but that is also tractable, meaning amenable to quick and robust estimation. Using both simulations and U.S. historical data, we compare our approach with benchmark Gaussian, stochastic volatility, and shadow rate models, where the latter enforces positive interest rates. Our approach, which remains arbitrarily close to arbitrage free, offers a more accurate characterization of bond Sharpe ratios due to a better fit of the volatility dynamics and a more efficient estimation of the return dynamics. Further, standard shadow rate and stochastic volatility models exhibit important restrictions that are largely absent in our approach.

Central Bank Digital Currency and Monetary Policy

Many central banks are contemplating whether to issue a central bank digital currency (CBDC). A CBDC has certain potential benefits, including the possibility that it can bear interest. However, using a CBDC is costly for agents. I study the optimal monetary policy when only cash, only a CBDC, or both cash and a CBDC are available to agents. If the cost of using a CBDC is not too high, more efficient allocations can be implemented by using a CBDC than using cash, and the first best can be achieved. Having both cash and a CBDC available may result in lower welfare than in the cases where only cash or only a CBDC is available. The welfare gains of introducing a CBDC are estimated under various scenarios for the United States

and Canada. For example, if the cost of using a CBDC relative to cash is around 0.25% of the transaction value, introducing a CBDC can lead to an increase of 0.12%-0.21% consumption for the United States and 0.04%-0.07% for Canada.

Early warning or too late? A (pseudo-)real-time identification of leading indicators of financial stress

This paper predicts phases of the financial cycle by using a continuous financial stress measure in a Markov switching framework. The debt service ratio and property market variables signal a transition to a high financial stress regime, while economic sentiment indicators provide signals for a transition to a tranquil state. Whereas the in-sample analysis suggests that these indicators can provide an early warning signal up to several quarters prior to the respective regime change, the out-of-sample findings indicate that most of this performance is owing to the data gathered during the global financial crisis. Comparing the prediction performance with a standard binary early warning model reveals that the Markov switching model is outperforming the vast majority of model specifications for a horizon up to three quarters prior to the onset of financial stress.

Entrepreneurial Incentives and the Role of Initial Coin Offerings

Initial coin offerings (ICOs) are a new mode of financing start-ups that saw an explosion in popularity in 2017 but declined in popularity in the second half of 2018 as regulatory pressure, instances of fraud and reports of poor performance began to undermine their reputation. We examine whether ICOs are a passing fad or a worthwhile form of financing with beneficial economic properties. We do so by examining how financing a start-up through an ICO changes the incentives of an entrepreneur relative to debt and venture capital financing. Depending on market characteristics, an ICO can result in a better or worse alignment of the interests of the entrepreneur and the investors compared with conventional modes of financing. Notably, an ICO can be the only form of financing that induces optimal effort and hence maximizes the net present value of the start-up, and there are projects that should not take place at all unless they can be financed through an ICO.

Optimal Monetary and Macroprudential Policies

This paper studies monetary policy in an economy where banks make risky loans to firms and provide liquidity services in the form of deposits to households. For given bank equity, market discipline implies that banks can take more deposits when assets are safer or more profitable. Banks respond to loan losses by making their balance sheets safer—i.e., they reduce risky lending sharply and accumulate more safe bonds. In contrast, a social planner would respond by making banks temporarily more profitable such that a riskier balance sheet can be maintained. A planner would temporarily reduce the expansiveness of monetary policy to avoid bonds becoming too liquid in support of the liquidity premium banks earn via deposits. Specifically, when bank equity is low, then optimal monetary policy stabilizes output by supporting bank lending rather than employment.

Evolving Temperature Dynamics in Canada: Preliminary Evidence Based on 60 Years of Data

Recent discussions on climate change have led to an interest in its potential impact on economic phenomena and public policy. In this paper, we focus on one aspect of the climate change question by documenting the time-series properties of temperatures across Canada. In particular, we examine the evolving dynamics of daily average temperature and diurnal temperature range (the difference between the daily maximum and minimum temperatures at a given location) for select Canadian cities using data from the past 60 years. While rising mean temperature levels in Canada and elsewhere has been well documented, research exploring the other elements of temperature dynamics using modern econometric methods and rich model specifications are sparse. To fill in this gap, we extend the work of Diebold and Rudebusch (2019) and examine the evolution of daily temperature averages, volatility, seasonality and duration. This new evidence provides economists exploring issues related to climate change with a better understanding of the nature of Canadian temperature dynamics and their magnitudes.

An Empirical Analysis of Bill Payment Choices

The aim of this paper is to examine which payment instruments Canadians use for paying bills and to assess the factors driving their bill payment behaviour. I use 2019 survey data collected among over 4,000 Canadians and estimate a set of binomial and multinomial regressions to assess the factors influencing consumers' use and

perception of different bill payment options. I find that there is no single dominant payment method for all consumer groups: demographics, financial situation, new technology adoption and POS payment habits play a significant role in the usage of bill payment methods as well as in consumers' stated reasons and barriers of use. Moreover, I demonstrate that consumers' bill payment behaviour strongly varies by bill type. The conclusions are useful for policy discussions on how to encourage a migration away from paper-based payment methods and how to (re)design a retail payments system to accommodate end-user needs.

Shaping the future: Policy Shocks and the GDP growth distribution

We incorporate quantile regressions into a structural vector autoregression model to empirically assess how monetary and fiscal policy influence risks around future GDP growth. Using a panel of six developed countries, we find that both policy instruments affect the location of the distribution of future GDP growth, whereas fiscal shocks also impact the shape of the distribution. Fiscal stimulus generates upside risk, paving the path to a faster recovery, especially when the policy rate is constrained by the zero lower bound (ZLB). Unconventional monetary policy during ZLB episodes has a comparable effect on future GDP growth as conventional monetary policy

An Exploration of First Nations Reserves and Access to Cash

Providing bank notes is one of the Bank of Canada's core functions. The Bank is therefore interested in whether cash is adequately distributed across society, and this also influences the Bank's thinking on issuing a central bank digital currency. We provide a perspective on these issues by exploring access of First Nations reserves to cash. To do so, we measure the distance between the 637 reserve band offices in Canada and their closest cash sources. In this study, these cash sources are branches of financial institutions (FIs), automated bank machines (ABMs) owned by FIs, and white label ABMs. We measure the distance between band offices and cash sources by geographical distance ("as the crow flies") and by travel distance (e.g., road routes). We also provide some information on access to financial services more generally and set out questions for future research.

UPCOMING EVENTS

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

Jennifer La'O (Columbia)
Organizer: EFR CEA/INT Speaker Series
Date: 4 June 2021

Stephen Hansen (Imperial College London and CEPR)
Organizer: FBD Virtual Speaker
Date: 7 June 2021

Saki Bigio (UCLA)
Organizer: FMD / FSD EFR Seminar Series
Date: 10 June 2021

Yan Chen (Michigan)
Organizer: CUR-EFR Visiting Speaker Series
Date: 14 June 2021

Adi Sunderam (Harvard Business School)
Organizer: FMD / FSD EFR Seminar Series
Date: 17 June 2021

Sebastien Betermier (McGill)
Organizer: FMD / FSD EFR Seminar Series
Date: 17 June 2021

Nicolas Crouzet (Northwestern, Kellogg SoM)
Organizer: EFR CEA/INT Speaker Series
Date: 18 June 2021

Raphael Auer (BIS)
Organizer: FBD Virtual Speaker
Date: 21 June 2021