BANK OF CANADA
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Bank of Canada Monthly Research Update

June 2022

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

Alex W. Chernoff & Casey Warman, "COVID-19 and Implications for Automation", Applied Economics

Myrna Hennequin & Cars Hommes, "Managing bubbles in experimental asset markets with monetary policy", Journal of Money, Credit and Banking

Amit Gandhi & Zhentong Lu & Xiaoxia Shi, "Estimating Demand for Differentiated Products with Zeroes in Market Share Data", Quantitative Economics

Serafin Grundl & Yu Zhu, "Robust inference in first-price auctions: Overbidding as an identifying restriction", Journal of Econometrics

STAFF WORKING PAPERS

Patrick Alexander & Sami Alpanda & Serdar Kabaca, "Foreign Exchange Interventions: The Long and the Short of It", Bank of Canada Staff Working Paper 2022-25

Daniela Balutel & Christopher Henry & Kim Huynh & Marcel Voia, "Cash in the Pocket, Cash in the Cloud: Cash Holdings of Bitcoin Owners", Bank of Canada Staff Working Paper 2022-26

Wei Cui & Randall Wright & Yu Zhu, "Endogenous Liquidity and Capital Reallocation", Bank of Canada Staff Working Paper 2022-27

Ugochi Emenogu & Brian Peterson, "Unregulated Lending, Mortgage Regulations and Monetary Policy", Bank of Canada Staff Working Paper 2022-28

Vladimir Skavysh & Sofia Priazhkina & Diego Guala & Thomas Bromley, "Quantum Monte Carlo for Economics: Stress Testing and Macroeconomic Deep Learning", Bank of Canada Staff Working Paper 2022-29

Serdar Kabaca & Kerem Tuzcuoglu, "International Transmission of Quantitative Easing Policies: Evidence from Canada", Bank of Canada Staff Working Paper 2022-30

STAFF DISCUSSION PAPERS

Parnell Chu & Grahame Johnson & Scott Kinnear & Karen McGuinness & Matthew McNeely, "Settlement Balances Deconstructed", Bank of Canada Staff Discussion Paper 2022-13

Tony Chernis & Chris D'Souza & Kevin MacLean & Tasha Reader & Joshua Slive & Farrukh Suvankulov, "The Business Leaders' Pulse—An Online Business Survey", Bank of Canada Staff Discussion Paper 2022-14

ABSTRACTS

COVID-19 and Implications for Automation

COVID-19 may accelerate the automation of jobs, as employers invest in technology to adapt the production process to safeguard against current and potential future pandemics. We identify occupations that have high automation potential and also exhibit a high degree of risk of viral infection. We then examine regional variation in terms of which U.S. local labor markets are most at risk. Next, we outline the differential impact that COVID-19 may have on automatable jobs for different demographic groups. We find that occupations held by U.S. females with mid to low levels of wages and education are at highest risk. Using comparable data for 25 other countries, we find women in this demographic are also at highest risk internationally.

Managing bubbles in experimental asset markets with monetary policy

We study the effect of a "leaning against the wind" monetary policy on asset price bubbles in a learning-to-forecast experiment, where prices are driven by the expectations of participants in the market. We find that a strong interest rate response is successful in preventing or deflating large price bubbles, while a weak response is not. Giving information about the interest rate changes and communicating the goal of the policy increases coordination of expectations and works stabilizing. When the steady state fundamental price is unknown and the interest rate rule is based on a proxy instead, the policy is less effective.

Estimating Demand for Differentiated Products with Zeroes in Market Share Data

In this paper we introduce a new approach to estimating differentiated product demand systems that allows for products with zero sales in the data. Zeroes in demand are a common problem in product differentiated markets, but fall outside the scope of existing demand estimation techniques. Our solution to the zeroes problem is based on constructing bounds for the conditional expectation of the inverse demand. These bounds can be translated into moment inequalities that are shown to yield consistent and asymptotically normal point estimator for demand parameters under natural conditions for differentiated product markets. In Monte Carlo simulations, we

demonstrate that the new approach works well even when the fraction of zeroes is as high as 95%. We apply our estimator to supermarket scanner data and find that correcting the bias caused by zeroes has important empirical implications, e.g., price elasticities become on the order of twice as large when zeroes are properly controlled.

Robust inference in first-price auctions: Overbidding as an identifying restriction

Laboratory experiments find consistently that bidding in first-price auctions tends to be more aggressive than predicted by the risk-neutral Bayesian Nash Equilibrium (RNBNE) — a finding known as the overbidding puzzle. Several alternative models can explain the overbidding puzzle, but no canonical alternative to RNBNE has emerged. Instead of estimating a particular model of overbidding, we use the overbidding restriction itself for identification, which allows us to bound the valuation distribution and the seller's revenue under counterfactual reserve prices in the spirit of Haile and Tamer (2003). These bounds are consistent with RNBNE and all models of overbidding, and the bounds remain valid even if there is unobserved heterogeneity in bidding strategies. We evaluate the validity of the bounds numerically and in experimental data.

Foreign Exchange Interventions: The Long and the Short of It

This paper studies the effects of foreign exchange (FX) interventions in a two-region New Keynesian model where governments issue both short-term and long-term bonds. Imperfect substitutability between bonds gives rise to portfolio balance effects that make FX interventions effective. Empirically, foreign central banks intervene in both short-term and long-term US bond markets, and therefore modelling interventions in both is critical. We calibrate the model using data for the United States and a foreign region (its trade partners), and then simulate FX interventions made by the foreign region. We find that FX interventions do not have standard beggar-thy-neighbor consequences in our model. Interventions in short-term bonds lead to lower GDP in both regions, while interventions in long-term bonds lead to higher GDP in both regions. These results are driven by the impact of the interventions on the term premium channel, which dominates the trade balance channel in our model.

Cash in the Pocket, Cash in the Cloud: Cash Holdings of Bitcoin Owners

We estimate the effect of Bitcoin ownership on the level of cash holdings of Canadian consumers. Bitcoin ownership positively correlates with cash holdings even after accounting for selection into ownership via a control function approach. On average, Bitcoin owners hold 83 percent (in 2018) to 95 percent (in 2017) more cash than non-owners. Focusing on the quantiles of cash holdings, we find that Bitcoin ownership has a highly nonlinear effect. For example, the difference in cash holdings between Bitcoin owners and non-owners in 2017 varies from 63 percent at the 25th quantile of cash to 176 percent at the 95th quantile of cash. Our results provide some evidence to reject the hypothesis that new digital currencies or technologies, such as Bitcoin, will lead to a decline in cash holdings.

Endogenous Liquidity and Capital Reallocation

We study economies where firms acquire capital in primary markets then retrade it in secondary markets after information on idiosyncratic productivity arrives. Our secondary markets incorporate bilateral trade with search, bargaining and liquidity frictions. We distinguish between full and partial sales (one firm gets all or some of the other's capital). Both exhibit interesting long- and short-run patterns in data that the model can match. Depending on monetary and credit conditions, more partial sales occur when liquidity is tight. Quantitatively, we find significant steady-state and business-cycle implications. We also investigate the impact of search, taxation and persistence in firm-specific shocks.

Unregulated Lending, Mortgage Regulations and Monetary Policy

Macroprudential policies are often aimed at the traditional banking sector while non-depository financial institutions or shadow banks have limited or no prudential regulations. This paper studies the macroeconomic impact of household-side macroprudential tightening in the presence of unregulated lenders. Our result shows that the presence of unregulated lenders dampens the impact of the policies on house prices and household debt. We also find that leakage to the unregulated sector increases when monetary policy is tightened.

Quantum Monte Carlo for Economics: Stress Testing and Macroeconomic Deep Learning

Computational methods both open the frontiers of economic analysis and serve as a bottleneck in what can be achieved. Using the quantum Monte Carlo (QMC) algorithm, we are the first to study whether quantum computing can improve the run time of economic applications and challenges in doing so. We identify a large class of economic problems suitable for improvements. Then, we illustrate how to formulate and encode on quantum circuit two applications: (a) a bank stress testing model with credit shocks and fire sales and (b) a dynamic stochastic general equilibrium (DSGE) model solved with deep learning, and further demonstrate potential efficiency gain. We also present a few innovations in the QMC algorithm itself and in how to benchmark it to classical MC.

International Transmission of Quantitative Easing Policies: Evidence from Canada

What are the cross-border spillovers from major economies' quantitative easing (QE) policies to their trading partners? We provide evidence by concentrating on spillovers from the US to Canada during the zero lower bound period when QE policies were actively used. We identify QE shocks in the US and estimate their impact on a large number of Canadian macroeconomic and financial variables. We then analyze transmission channels of foreign QE shocks to the domestic economy. Our results suggest that US QE shocks are expansionary for Canada despite a currency appreciation. This is because they spill over to domestic borrowing costs, lowering long-term rates as well as financial premiums, and increasing asset prices. We find evidence for both portfolio balance and risk channels.

Settlement Balances Deconstructed

The objective of this paper is to deconstruct settlement balances by explaining how they come to be, how they flow through the financial system and how they are managed and deployed by the central bank. This paper presents both technical and non-technical discussions to help clarify and inform market specialists and the broader public.

The Business Leaders' Pulse—An Online Business Survey

The Business Leaders' Pulse is a new online survey conducted each month. It is designed to provide timely and flexible input into the Bank of Canada's monetary policy decision making while also creating a platform to analyze business conditions and uncertainty. Since May 2021, the Bank has been reaching out to leaders of almost all types of businesses across the country with this short questionnaire inquiring about their sales and employment growth expectations, the risks to their business outlook, and topical questions that address specific information needs of the Bank. This survey is designed to complement the Bank's quarterly Business Outlook Survey conducted in person. The Business Leaders' Pulse has already proven valuable in getting timely feedback from firms about the effects of a rapidly changing economic environment, including the impact of COVID-19 and the Russian invasion of Ukraine. It has also helped Bank staff assess the extent of and reaction to ongoing economic challenges, such as supply chain bottlenecks and labour shortages.

UPCOMING EVENTS

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

Carola Binder (Haverford College)
Organizer: EFR CEA/INT Seminar Series
Date: 10 June 2022

Raphael Bostic (Atlanta Federal Reserve)
Organizer: Visits
Date: 28 June 2022

Georgios Georgiadis (European Central Bank)
Organizer: FMD FSD/EFR Seminar Series
Date: 30 June 2022