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Bank of Canada Monthly Research Update

April 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

In-Press

Jason Allen & Robert Clark & Shaoteng Li & Nicolas Vincent, "Household finances and government programs to alleviate the financial impact of COVID-19", Canadian Journal of Economics, Vol 55(SI): 9-53, March 2022

Thibaut Duprey & Soheil Baharian & Daniel Rigobon & Artur Kotlicki & Phillip Schnattinger & Thomas R. Hurd, "Business Closures and (Re)Openings in Real-Time Using Google Places: Proof of Concept", Journal of Risk and Financial Management, Vol 15(4), April 2022

Kim P. Huynh & Anson T.Y. Ho & Lealand Morin & Harry J. Paarsch, "Consumer credit usage in Canada during the coronavirus pandemic", Canadian Journal of Economics, Vol 55(SI): 88-114, March 2022

Kim P. Huynh & Anson T.Y. Ho & David T. Jacho-Chavez & Alexandra Manta, "Estimating Social Effects in a Multilayered Linear-In-Means Model with Network Data", Statistics and Probability Letters, Vol 183(C), April 2022

Forthcoming

Youngmin Park & Audra Bowlus & Émilien Gouin-Bonenfant & Huju Liu & Lance Lochner, "Four Decades of Canadian Earnings Inequality and Dynamics Across Workers and Firms", Quantitative Economics

Edona Reshidi & Maarten Janssen, "Discriminatory Trade Promotions in Consumer Search Markets", Marketing Science

STAFF WORKING PAPERS

Shota Ichihashi & Byung-Cheol Kim, "Addictive Platforms", Bank of Canada Staff Working Paper 2022-16

Alejandra Bellatin & Gabriela Galassi, "What COVID-19 May Leave Behind: Technology-Related Job Postings in Canada", Bank of Canada Staff Working Paper 2022-17

Patrick Alexander & Abeer Reza, "Exports and the Exchange Rate: A General Equilibrium Perspective", Bank of Canada Staff Working Paper 2022-18

STAFF DISCUSSION PAPERS

Audra Bowlus & Youngmin Park & Chris Robinson, "Contribution of Human Capital Accumulation to Canadian Economic Growth", Bank of Canada Staff Discussion Paper 2022-7

Heng Chen & Walter Engert & Kim Huynh & Daneal O'Habib & Joy Wu & Julia Zhu, "Cash and COVID-19: What happened in 2021", Bank of Canada Staff Discussion Paper 2022-8

Matteo Cacciatore & Dmitry Matveev & Rodrigo Sekkel, "Uncertainty and Monetary Policy Experimentation: Empirical Challenges and Insights from Academic Literature", Bank of Canada Staff Discussion Paper 2022-9

Daniela Balutel & Marie-Hélène Felt & Gradon Nicholls & Marcel Voia, "Bitcoin Awareness, Ownership and Use: 2016–20", Bank of Canada Staff Discussion Paper 2022-10

ABSTRACTS

Household finances and government programs to alleviate the financial impact of COVID-19

This paper analyzes the effectiveness of debt-relief programs targeting short-run household liquidity constraints implemented in Canada in response to the COVID-19 pandemic. These programs allowed individuals to push off mortgage and credit card payments and cut in half interest rates on credit card debt. Using credit bureau data, we document that, despite potential savings above $4 billion, enrolment was limited: 24% for mortgages and 7% for credit cards. By exploiting the richness of our data set, we provide evidence that close to 80% of individuals were unaware of the credit card relief program while others faced important fixed non-monetary costs preventing uptake.

Business Closures and (Re)Openings in Real-Time Using Google Places: Proof of Concept

We present a new estimation of business opening and closure rates using data from Google Places—the data set behind the Google Maps service. Our algorithm, through a bisection routine, counts the appearance and disappearance of "pins" that represent unique businesses. As a proof of concept, we compute business opening and closure rates for the city of Ottawa during the reopening phase of the COVID-19 pandemic in mid-2021. The lifting of restrictions coincides with a wave of re-entry of temporarily closed businesses, suggesting that government support may have facilitated the survival of hibernating businesses. Our entry estimates are validated by a survey of new businesses. This methodology allows policymakers to monitor business dynamics in quasi-real-time during rapidly unfolding crises.

Consumer credit usage in Canada during the coronavirus pandemic

The recent COVID-19 pandemic has devastated economies worldwide. Using detailed, monthly data from a major consumer credit reporting agency in Canada, we have examined individuals' use of credit cards and home-equity lines of credit (HELOCs). We found a dramatic leftward shift in the distribution of credit card and HELOC outstanding balances, providing evidence for a widespread reduction in credit usage. Our findings suggest that, during the COVID-19

recession, Canadian consumers were able to meet their financial needs without increasing their debt burdens. These results complement other findings concerning a decline in consumer spending and the results of government assistance programs, and imply that the economic consequences of this pandemic are very different from those in other recessions.

Estimating Social Effects in a Multilayered Linear-In-Means Model with Network Data

This paper studies the identification and estimation of social parameters in a general version of the Linear-in-Means model commonly fitted in the Social Sciences with multilayered network data. A Monte Carlo exercise showcases its good small-sample properties while an empirical application to Canadian consumers' credit usage demonstrates its applicability. Our estimates show that one's credit-card balance increases by $0.31 for an extra $1 owed by surrounding neighbors.

Four Decades of Canadian Earnings Inequality and Dynamics Across Workers and Firms

This paper studies the evolution of individual earnings inequality and dynamics in Canada from 1983 to 2016 using tax files and administrative records. Linking these individuals to their employers (and rich administrative records on firms) beginning in 2001, it also documents the relationship between the earnings dynamics of workers and the size and growth of their employers. It highlights three main patterns over this period: First, with a few exceptions (sharp increase in top 1% and declining gender gap), Canada experienced relatively modest changes in overall earnings inequality, volatility, and mobility between 1983 and 2016. Second, there is considerable variability in earnings inequality and volatility over the business cycle. Third, the earnings dynamics of individuals are strongly related to the size and employment growth of their employers.

Discriminatory Trade Promotions in Consumer Search Markets

This paper shows that in consumer search markets discriminatory trade promotions create more profits for manufacturers than uniform pricing. The mechanism relies on consumers having heterogeneous search cost and applies even if they have identical demand. By giving some, but not all, retailers a trade promotion, manufacturers create more competition between retailers and boost demand. Relative to uniform pricing retailers who receive the trade promotion sell to a

disproportionately larger share of low search cost consumers who are more price-sensitive making these retailers compete stronger. Retailers that do not receive the trade promotion lower their margins as well as they serve a smaller customer base and are keen to prevent more consumers from leaving.

Addictive Platforms

We study competition for consumer attention, in which platforms can sacrifice service quality for attention. A platform can choose the "addictiveness" of its service. A more addictive platform yields consumers a lower utility of participation but a higher marginal utility of allocating attention. We provide conditions under which increased competition can harm consumers by encouraging platforms to offer low-quality services. In particular, if attention is scarce, increased competition reduces the quality of services because business stealing incentives induce platforms to increase addictiveness. Restricting consumers' platform usage may decrease addictiveness and improve consumer welfare. A platform's ability to charge for its service can also decrease addictiveness.

What COVID-19 May Leave Behind: Technology-Related Job Postings in Canada

We use data from online job postings listed on a job board to study how the demand for jobs linked to new technologies during the COVID-19 crisis responded to pandemic mitigation policies. We classify job postings into a standard occupation classification, using text analytics, and we group occupations according to their involvement in the production and use of digital technologies. We leverage the variation in the stringency of containment policies over time and across provinces. We find that when policies become more stringent, job postings in occupations that are related to digital infrastructure that allow for remote work fare relatively better than postings in more traditional occupations. Job postings for positions in occupations with low risk of automation recover faster during reopenings than postings for more traditional occupations. Occupations typically populated by disadvantaged groups (e.g., women and lowwage workers) post relatively few job postings if they are not linked to new technologies. We also find that cities with scarce pre-pandemic job postings related to digital technologies post fewer job ads overall when policies become more stringent.

Exports and the Exchange Rate: A General Equilibrium Perspective

Understanding and predicting the evolution of exports after a change in the nominal exchange rate is of central importance in international economics. Most of the literature focuses on estimating this relationship by reduced form, with the aim of uncovering a single structural parameter, but theory suggests it could differ depending on the shock that drives the movement in the exchange rate. Building on this insight, we develop a small-open-economy SVAR model to derive structural shocks that affect the exchange rate. We then estimate this model using Canadian data and construct the response of exports relative to the response of the exchange rate, conditional on each shock. Our findings suggest that this relationship differs greatly from one shock to another, where domestic shocks generate a much weaker relationship than global shocks. We show that these differences can be reconciled with theoretical results from a small-open-economy New Keynesian model where Canadian exports are largely invoiced in US dollars. Finally, we highlight how our results help to inform recent discussions on the evolution of the exchange rate elasticity over time, the benefits of a flexible exchange rate, and the impact of terms of trade movements on exports.

Contribution of Human Capital Accumulation to Canadian Economic Growth

This paper quantifies the contribution of human capital accumulation to the growth of real gross domestic product (GDP) in Canada. GDP growth is decomposed into contributions from physical capital, hours worked, human capital supplied per hour and total factor productivity. Using a "flat spot" identification strategy, we separately estimate the price and quantity of human capital using wage data from the Labour Force Survey. We find that growth in human capital supplied per hour explains around one-fifth of GDP growth and two-thirds of the Solow residual over the period from 1997 to 2018. While growth in hours worked is expected to slow down in the near future, human capital supplied per hour is expected to continue to be an important driver of GDP growth.

Cash and COVID-19: What happened in 2021

We provide an update on the impact the COVID-19 pandemic on the demand for cash and the use of methods of payment based on data from the Bank Note Distribution System and from consumer surveys conducted in April and August 2021. Our key findings are as follows:

• Cash in circulation remained high throughout 2021, driven mainly by demand for largedenomination notes.

• Canadians' holdings of cash on hand in April (median $70) and August (median $80) were comparable to results seen in 2020. Other cash holdings reported by Canadians remained elevated, with a median value of $260 in August.

• In August 2021, 62% of Canadians used cash for payments, and indicators of merchant acceptance of cash improved in both the April and August surveys.

• A large majority of Canadians (around 80%) in 2021 continued reporting that they have no plans to go cashless in the next five years.

Uncertainty and Monetary Policy Experimentation: Empirical Challenges and Insights from Academic Literature

Central banks face considerable uncertainty when conducting monetary policy. Some of the reasons for this include limitations of economic data, the unobservability of key macroeconomic variables such as potential output, structural changes to the economy and disagreements over the correct model for the transmission of monetary policy. At the same time, monetary policy is affected by uncertainty from various sources, including lack of or imperfect observation of economic variables, structural economic changes and possible misspecifications using models. We draw from the academic literature to review some of the key sources of this uncertainty and their implications for the conduct of monetary policy. First, we discuss evidence on release lags and revisions to economic data. We also highlight uncertainty around measuring unobservable variables such as the output gap and the natural rate of unemployment. The strength of a trade-off between these measures of economic slack and inflation—a cornerstone of monetary policy—is itself subject to continuous reassessment. Second, the literature finds that different sources of uncertainty may make the optimal conduct of monetary policy either more or less responsive to economic shocks. Additionally, the benefits of tackling uncertainty by engaging in purposeful monetary policy experimentation are typically small but may become more significant during major structural change or following unprecedented shocks.

Bitcoin Awareness, Ownership and Use: 2016–20

Since 2016, the Bank of Canada has conducted annual surveys to monitor awareness, adoption and usage of Bitcoin and other cryptocurrencies (Henry et al. 2018, 2019a, 2019b). This report incorporates results from the 2019 Bitcoin Omnibus Survey and the November 2020 Cash Alternative Survey. We find that between 2018 and 2020, the level of Bitcoin awareness and ownership among Canadians remained stable: nearly 90% of the population were aware of Bitcoin, while only 5% owned it. We find that about half of Bitcoin owners stated they usually obtained their bitcoins through mobile or web exchanges, while one-fifth used mining. Bitcoin owners were susceptible to certain risks, as evidenced by the fact that about half of current and past owners stated they had been affected by events such as price crashes, losing access to funds, scams or data breaches. The most commonly cited reasons for owning Bitcoin were related to its use for investment or based on interest in the technology. Bitcoin owners displayed greater knowledge about the Bitcoin network than nonowners, yet they scored lower on questions testing financial literacy.

UPCOMING EVENTS

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

Jeremy Bertomeu (Washington University in St. Louis)
Organizer: FMD FSD/EFR Seminar Series
Date: 14 April 2022

Nora Traum (HEC Montréal)
Organizer: EFR CEA/INT Seminar Series
Date: 22 April 2022

Kjetil Storesletten (University of Minnesota)
Organizer: EFR CEA/INT Seminar Series
Date: 26 April 2022

José-Luis Peydró (Imperial College London)
Organizer: FMD FSD/EFR Seminar Series
Date: 28 April 2022

Lorenzo Magnolfi (University of Wisconsin-Madison)
Organizer: BAP Virtual Speaker
Date: 2 May 2022

Federico Huneeus (Central Bank of Chile)
Organizer: FMD FSD/EFR Seminar Series
Date: 5 May 2022

Thomas Le Barbanchon (Bocconi University)
Organizer: INT CEA/EFR Seminar Series
Date: 6 May 2022

Robert Clark (Queen's University)
Organizer: BAP Virtual Speaker
Date: 9 May 2022

Rachel Ngai (London School of Economics)
Organizer: FMD FSD/EFR Seminar Series
Date: 12 May 2022