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Bank of Canada
Monthly Research Update

November 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

Matteo Cacciatore & Nora Traum, "Trade Flows and Fiscal Multipliers", Review of Economics and Statistics, Vol 104(6): 1206-1223, November 2022

George W. Evans & Cars Hommes & Bruce McGough & Isabelle Salle, "Are long-horizon expectations (de-)stabilizing? Theory and experiments", Journal of Monetary Economics, Vol 132: 44-63, November 2022

Shanjun Li & Youming Liu & Chao Wei, "The Cost of Greening Stimulus: A Dynamic Discrete Choice Analysis of Vehicle Scrappage Programs", International Economic Review, Vol 63(4): 1561-1594, November 2022

Sebastian Poledna & Michael Gregor Miess & Cars Hommes & Katrin Rabitsch, "Economic forecasting with an agent-based model", European Economic Review, Vol 151, January 2023

Forthcoming

Marco Bonomo & Carlos Carvalho & Oleksiy Kryvtsov & Sigal Ribon & Rodolfo Rigato, "Multiproduct Pricing: Theory and Evidence from Large Retailers", The Economic Journal

Xing Guo & Pablo Ottonello & Diego J. Perez, "Monetary Policy and Redistribution in Open Economies", Journal of Political Economy Macroeconomics

Yuko Imura, "Reassessing trade barriers with global production networks", Review of Economic Dynamics

Janet Hua Jiang & Daniela Puzello & Cathy Zhang, "Inflation, Output and Welfare in the Laboratory", European Economic Review

Jiaqi Li, "Predicting the demand for central bank digital currency: A structural analysis with survey data", Journal of Monetary Economics

Francisco Rivadeneyra & Nellie Zhang, "Payment Coordination and Liquidity Efficiency in the New Canadian Wholesale Payments System", Journal of Financial Market Infrastructures

STAFF WORKING PAPERS

Pierre-Olivier Gourinchas & Şebnem Kalemli-Özcan & Veronika Penciakova & Nicholas Sander, "Fiscal Policy in the Age of

COVID-19: Does It 'Get in All of the Cracks'?", Bank of Canada Staff Working Paper 2022-45

Julien Bengui & Louphou Coulibaly, "Stagflation and Topsy-Turvy Capital Flows", Bank of Canada Staff Working Paper 2022-46

Lin Shao & Faisal Sohail & Emircan Yurdagul, "Are Working Hours Complements in Production?", Bank of Canada Staff Working Paper 2022-47

Rodney J. Garratt & Sofia Priazhkina, "Regulatory Requirements of Banks and Arbitrage in the Post-Crisis Federal Funds Market", Bank of Canada Staff Working Paper 2022-48

ABSTRACTS

Trade Flows and Fiscal Multipliers

We present novel insights on the role of international trade following unanticipated fiscal changes in a flexible exchange rate environment. We show analytically that fiscal multipliers can be larger in economies more open to trade, even when fiscal expansions imply trade deficits. Three factors determine how trade linkages matter: the relative import share of public and private goods, the financing of government debt, and the currency invoicing of exports. A Bayesian prior-predictive analysis shows that a quantitative model bears the same predictions. Conditioning on Canadian and U.S. data, we find support for larger multipliers relative to a counterfactually closed economy.

Are long-horizon expectations (de-)stabilizing? Theory and experiments

The impact of finite forecasting horizons on price dynamics is examined in a standard infinite-horizon asset-pricing model. Our theoretical results link forecasting horizon inversely to expectational feedback, and predict a positive relationship between expectational feedback and various measures of asset-price volatility. We design a laboratory experiment to test these predictions. Consistent with our theory, short-horizon markets are prone to substantial and prolonged deviations from rational expectations, whereas markets with even a modest share of long-horizon forecasters exhibit convergence. Longer-horizon forecasts display more heterogeneity but also prevent coordination on incorrect anchors – a pattern that leads to mispricing in short-horizon markets.

The Cost of Greening Stimulus: A Dynamic Discrete Choice Analysis of Vehicle Scrappage Programs

This article investigates the potential trade-off between the stimulus and environmental objectives in the context of the U.S. vehicle scrappage program. We develop and estimate a dynamic model of vehicle ownership and conduct a counterfactual analysis comparing the implemented policy with alternative designs. We find the cost of the implemented policy 25% higher in terms of induced sales and 64% higher in terms of induced spending than a policy design without the environmental objective. The findings serve as a caution for green stimulus programs to address both climate change and the economic crisis from the ongoing pandemic.

Economic forecasting with an agent-based model

We develop the first agent-based model (ABM) that can compete with benchmark VAR and DSGE models in out-of-sample forecasting of macro variables. Our ABM for a small open economy uses micro and macro data from national accounts, sector accounts, input–output tables, government statistics, and census and business demography data. The model incorporates all economic activities as classified by the European System of Accounts (ESA 2010) and includes all economic sectors populated with millions of heterogeneous agents. In addition to being a competitive model framework for forecasts of aggregate variables, the detailed structure of the ABM allows for a breakdown into sector-level forecasts. Using this detailed structure, we demonstrate the ABM by forecasting the medium-run macroeconomic effects of lockdown measures taken in Austria to combat the COVID-19 pandemic. Potential applications of the model include stress-testing and predicting the effects of monetary or fiscal macroeconomic policies.

Multiproduct Pricing: Theory and Evidence from Large Retailers

We study a unique dataset with comprehensive coverage of daily prices in large multiproduct retailers in Israel. Retail stores synchronize price changes around occasional ‘peak’ days when they reprice around 10% of their products. To assess aggregate implications of partial price synchronization, we develop a new model in which multiproduct firms face economies of scope in price adjustment, and synchronization is endogenous. Synchronization of price changes attenuates the average price response to monetary shocks, but only high degrees of synchronization can substantially strengthen the real effects of monetary policy shocks. Our calibrated model generates real effects similar in magnitude to those in Golosov and Lucas (2007).

Monetary Policy and Redistribution in Open Economies

This paper develops an open-economy heterogeneous-agent New Keynesian model in which households differ in their income, wealth, and real and financial integration with international markets. We use the model to reassess classic questions in international macroeconomics from a distributional perspective. Our analysis yields two main takeaways. First, heterogeneity in households’ international integration plays a central role in driving the unequal consumption responses to external shocks, more so than income and wealth. Second, the conduct of monetary policy in open economies faces a

stabilization-inequality trade-off, with fixed-exchange-rate regimes leading to amplified but less unequal consumption responses to external shocks.

Reassessing trade barriers with global production networks

This paper develops a two-country general equilibrium model with forward-looking participation decisions on exporting and multinational production, and examines the effects of final-goods tariffs and intermediate-input tariffs. I show that permanent unilateral tariffs lead to a recession in the policy-imposed country. In the policy-imposing country, investment experiences a short-run boom while consumption falls immediately and persistently, with intermediate-input tariffs resulting in a larger contraction. At the firm level, the least productive exporters exit from the policy-imposing country, while the most productive ones relocate production there. Relative to a model without multinational firms, this production relocation partially offsets the contractionary effects of tariffs. Crucial to the short-run investment expansion and firms' participation in multinational production in the policy-imposing country is the persistence of tariffs. When tariffs are temporary, investment falls immediately, driving an immediate recession there, in contrast to permanent tariffs. Further, temporary tariffs induce hysteresis in firms' participation in exporting and multinational production, which in turn diminishes the expansionary effects of multinational entry.

Inflation, Output and Welfare in the Laboratory

We develop an experimental framework to investigate the quantity theory of money and the real effects of inflation in an economy where money serves as a medium of exchange. We test the classical view that inflation reduces output and welfare by taxing monetary exchange. Inflation is engineered by constant money growth where newly-issued money is injected in one of three ways: to finance government spending, lump-sum transfers, or proportional transfers. Experimental results largely support theoretical predictions. Higher money growth leads to higher inflation. Output and welfare are significantly lower with government spending, output is significantly lower with lump-sum transfers, while there are no significant real effects with proportional transfers. A deviation from theory is that the detrimental effect of money growth depends on the implementation scheme and is stronger with government spending relative to lump-sum transfers.

Predicting the demand for central bank digital currency: A structural analysis with survey data

What would be the potential demand for central bank digital currency (CBDC)? Which design attributes would affect the demand for CBDC? By applying a structural model to a unique Canadian survey dataset, I find that the aggregate CBDC holdings as a percentage of the total household liquid assets could range from 4–52%, based on households' demand perspective. Allowing banks to respond to CBDC would substantially constrain the take-up of CBDC, reducing the upper bound prediction to below 20%. Important design attributes of CBDC identified are budgeting usefulness, anonymity, bundling of bank services, and rate of return.

Payment Coordination and Liquidity Efficiency in the New Canadian Wholesale Payments System

A new wholesale payments system will launch in Canada in 2021. This real-time gross settlement system called Lynx will have two types of settlement mechanisms, one allowing offsetting and the other not. This paper studies the decision problem of the Bank of Canada: which of the two settlement mechanisms should it use to send its payments. Using extensive simulation, we show that, mainly due to the benefits of liquidity pooling, Lynx would achieve its highest liquidity efficiency—even better than that of the current Large Value Transfer System (LVTS)—if all payments (urgent and non-urgent) from all participants were sent to the mechanism allowing offsetting. The minimum amount of liquidity required to settle all payments by critical deadlines is approximately $10 billion, around half the amount of collateral that LVTS participants allocate (pre–COVID-19). Since time-critical payments sent to the offsetting mechanism could experience a delay, the high level of liquidity efficiency is accompanied by an increase in the number of participants' operational interventions (to pledge more collateral or to alter payment priorities) to ensure that those time-critical payments are never delayed. When coordination does not occur, liquidity efficiency can be far lower than in the LVTS. The results highlight that the Bank of Canada helping with coordination is more important than the specific choice of mechanism.

Fiscal Policy in the Age of COVID-19: Does It "Get in All of the Cracks"?

We study the effects of fiscal policy in response to the COVID-19 pandemic at the firm, sector, country and global levels. First, we estimate the impact of COVID-19 and policy responses on small and medium-sized enterprise (SME) business failures. We combine firm-level financial data from 50 sectors in 27 countries, a detailed I-O network, real-time data on lockdown policies and mobility patterns, and a rich model of firm behavior that allows for several dimensions of heterogeneity. We find that absent government support, the failure rate of SMEs would have increased by 9 percentage points, significantly more so in emerging-market economies (EMs). With policy support it increased by only 4.3 percentage points, and even decreased in advanced economies (AEs). We also find that fiscal policy was poorly targeted: most of the funds disbursed went to firms that did not need it. Nevertheless, we find little evidence of the policy merely postponing mass business failures or creating many "zombie" firms: failure rates rise only slightly in 2021 once policy support is removed. Next, we build a tractable global intertemporal general equilibrium I-O model with fiscal policy. We calibrate the model to 64 countries and 36 sectors. We find that a sizeable share of the global economy is demand-constrained under COVID-19, especially so in EMs. Globally, fiscal policy helped offset about 8% of the downturn in COVID-19, with a low "traditional" fiscal multiplier. Yet it significantly reduced the share of demand-constrained sectors, preserving employment in these sectors. Fiscal policy exerted small and negative spillovers to output in other countries but positive spillovers on employment. A two-speed recovery would put significant upward pressure on global interest rates which imposes an additional headwind on the EM recovery. Corporate and sovereign spreads rise when global rates increase, suggesting that EMs may face challenging external funding conditions as AEs normalize.

Stagflation and Topsy-Turvy Capital Flows

Are unregulated capital flows excessive during a stagflation episode? We argue that they likely are, owing to a macroeconomic externality operating through the economy's supply side. Inflows raise domestic wages through a wealth effect on labor supply and cause unwelcome upward pressure on marginal costs in countries where monetary policy is trying to drive down costs to stabilize inflation. Yet market forces are likely to generate such inflows. Optimal capital flow management instead requires net outflows, suggesting topsy-turvy capital flows following markup shocks.

Are Working Hours Complements in Production?

This paper uses Canadian matched employer-employee data to show that working hours are gross complements in production rather than perfect substitutes, as is typically assumed. We exploit within-establishment and individual-level variation in hours and wages to document novel evidence consistent with complementarities in hours worked. Next, we estimate an elasticity of substitution in working hours of 0.69 in the aggregate and between 0.52 and 1.04 at the industry level. We validate our estimates by showing that industries with higher elasticities exhibit greater flexibility in hours. Our findings have important implications for research on labor supply and the efficacy of policies that aim to influence it.

Regulatory Requirements of Banks and Arbitrage in the Post-Crisis Federal Funds Market

This paper explains the nature of interest rates in the U.S. federal funds market after the 2007- 09 financial crisis. We build a model of the over-the-counter lending market that incorporates new aspects of the financial system: abundance of liquidity, different regulatory standards for banks, and arbitrage opportunities created by limited access to the facility granting interest on excess reserves. The model determines the equilibrium federal funds rate as a function of the policy rates and explains the “leaky floor” phenomenon in which we observe federal funds rates that are strictly below the interest rate paid on reserves. Using the model, we explain the impact of raising government yields and tightening the Liquidity Coverage Ratio (LCR) and the Supplementary Leverage Ratio (SLR) requirements on the federal funds rates.

UPCOMING EVENTS

Fatih Guvenen (Minnesota)
Organizer: CEA/INT EFR Seminar Series
Date: 2 December 2022

Thomas M. Eisenbach (Federal Reserve Bank of New York)
Organizer: FMD/FSD EFR Seminar Series
Date: 6 December 2022

Todd Keister (Rutgers University)
Organizer: BAP Hybrid Speaker
Date: 9 December 2022

Ken Kikkawa (University of British Columbia, Sauder)
Organizer: CEA/INT EFR Seminar Series
Date: 9 December 2022

Sergio Lago Alves (Central Bank of Brazil and Carleton)
Organizer: Bank-Wide Brown Bag Lunch
Date: 13 December 2022