

# Bank of Canada Monthly Research Update

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February 2016

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

Altug, Sumru & Serdar Kabaca “Search Frictions, Financial Frictions and Labor Market Fluctuations in Emerging Markets”, Emerging Markets Finance and Trade

Dahlhaus, Tatjana, “Monetary Policy Transmission during Financial Crises: An Empirical Analysis”, Journal of Applied Econometrics

Hernandez, Lola, Nicole Jonker, & Anneke Kosse, “Cash versus Debit Card: The Role of Budget Control”, Journal of Consumer Affairs

Imura, Yuko, “Endogenous Trade Participation with Price Rigidities”, Journal of International Economics

Wong, Russell Tsz-Nga, “Monetary Exchange and the Irreducible Cost of Inflation”, Journal of Economic Theory

## STAFF WORKING PAPERS

Cheung, Calista, & Dmitry Granovsky “New Housing Registrations as a Leading Indicator of the BC Economy”, Bank of Canada Staff Discussion paper 2016-03

Fay, Robert & Maxime Leboeuf, “What Is Behind the Weakness in Global Investment?”, Bank of Canada Staff Discussion paper 2016-05

Fique, Jose “A Microfounded Design of Interconnectedness-Based Macroprudential Policy”, Bank of Canada Staff Working Paper 2016-06

Gnocchi, Stefano & Luisa Lambertini “Monetary Commitment and the Level of Public Debt”, Bank of Canada Staff Working Paper 2016-03

Jo, Soojin & Rodrigo Sekkel, “Macroeconomic Uncertainty Through the Lens of Professional Forecasters”, Bank of Canada Staff Working Paper 2016-05

Kruger, Mark, Robert Lavigne, & Julie McKay “The Role of the International Monetary Fund in the Post-Crisis World”, Bank of Canada Staff Discussion Paper 2016-06

- Pinnington, James & Maral Shamloo, “Limits to Arbitrage and Deviations from Covered Interest Rate Parity”, Bank of Canada Staff Discussion paper 2016-04
- Raykov, Radoslav “To Share or Not to Share? Uncovered Losses in a Derivatives Clearinghouse”, Bank of Canada Staff Working Paper 2016-04
- Richards, Simon & Matthieu Verstraete “Understanding Firms' Inflation Expectations Using the Bank of Canada's Business Outlook Survey”, Document de travail du personnel de la Banque du Canada 2016-07

## ABSTRACTS

### *Search Frictions, Financial Frictions and Labour Market Fluctuations in Emerging Markets*

This paper examines the role of the extensive and intensive margins of labour input in the context of a business cycle model with a financial friction. We document significant variation in the hours worked per worker for many emerging-market economies. Both employment and hours worked per worker are positively correlated with each other and with output. We show that a search-theoretic context in a small open-economy model requires a small income effect to explain these regularities at the expense of a smaller wage response. On the other hand, introducing a financial friction in the form of a working capital requirement can explain the observed movements of labour market variables such as employment and hours worked per worker, as well as other distinguishable business cycle characteristics of emerging economies. These include highly volatile and cyclical real wages, labour share, and consumption.

### *Monetary Policy Transmission during Financial Crises: An Empirical Analysis*

This paper studies the effects of a monetary policy expansion in the U.S. during times of financial crises. The analysis is carried out by introducing a Smooth Transition Factor Model where the transition between states (“normal” times and financial crises) depends on a financial condition index. The model is estimated using Bayesian MCMC methods. Employing a quarterly dataset over the period 1970Q1-2009Q2 containing 108 U.S. macroeconomic and financial time series, I find that a monetary expansion during financial crises has stronger and more persistent effects on macroeconomic

variables, such as output, consumption, and investment than during “normal” times. Differences in effects among the regimes seem to originate from non-linearities in the credit channel.

### *Cash versus Debit Card: The Role of Budget Control*

Due to the financial crisis, an increasing number of households face financial problems. This may lead to an increasing need for monitoring spending and budgets. We demonstrate that both cash and the debit card are perceived as helpful in this respect. We show that, on average, consumers responsible for the financial decision making within a household find the debit card more useful for monitoring their household finances than cash. Individuals differ in major respects, however. In particular, low earners and the liquidity-constrained prefer cash as a monitoring and budgeting tool. Finally, we present evidence that at an aggregated level, such preferences strongly affect consumer payment behaviour. We suggest that the substitution of cash by cards may slow down because of the financial crisis. Also, we show that cash still brings benefits that electronic alternatives have been unable to match. This suggests that inclusion of enhanced budgeting and monitoring features in electronic payment instruments may encourage consumers to use them more frequently.

### *Endogenous Trade Participation with Price Rigidities*

This paper investigates the interaction of endogenous export participation and nominal rigidities and its implications for the dynamics of intensive and extensive margins of trade. I develop a two-country dynamic stochastic general equilibrium model wherein firms make state-dependent decisions on entry and exit in the export market, and where price adjustments are staggered across firms and time. My model reveals that, when an aggregate shock has significant effects on optimal export prices, such as a shock to domestic productivity or monetary policy, it generates large responses in the number of exporters. These movements in turn amplify responses along the intensive margin of trade and international transmission of the shock. I trace this result to the micro-level price rigidities in my model. Because staggered price changes delay intensive margin adjustments among incumbent exporters following aggregate shocks, they permit sizable shifts in the profitability of export participation. Whereas such shifts are virtually eliminated in models of exporter entry and exit with flexible prices, here they are sufficient to induce quantitatively important movements along the extensive margin of trade.

### *Monetary Exchange and the Irreducible Cost of Inflation*

This paper applies a mechanism design approach to construct a lower bound to the welfare cost of inflation that does not depend on quasi-linear preferences or details of how agents trade. An incentive-feasible trading protocol is derived to minimize the welfare loss subject to frictions rendering money essential. The welfare cost of inflation under this optimal protocol is the lower bound over all pairwise trading protocols of monetary exchange. In general, the first-best is not implementable, even under the Friedman's rule, patient agents and the optimal mechanism. Thus, the lower bound depends on fundamentals like preferences and technology. Finally, I estimate the irreducible cost of 10% inflation with the U.S. data from 1900 to 2000.

### *New Housing Registrations as a Leading Indicator of the BC Economy*

Housing starts and building permits data are commonly used as leading indicators of economic activity. In British Columbia, all new homes must be registered with the Homeowner Protection Office, a branch of BC Housing, before the issuance of building permits and the start of construction. Data on new housing registrations (NHR) could thus potentially be used as an even earlier leading indicator of economic activity. This study assesses whether NHR data have significant predictive power for economic activity in British Columbia. The authors find that quarterly increases in new registrations for single detached homes have statistically significant predictive content for growth in real GDP over the next one to three quarters, and provide stronger signals compared to housing starts and building permits over this forecast horizon. These signals remain significant for growth in real GDP over the next two quarters even in the presence of other leading indicators in the equations. However, forecasts using quarterly NHR data with other leading indicators are not able to outperform simple benchmark forecasts in an out-of-sample forecasting exercise. Nonetheless, adding the NHR variable to an AR(1) equation does produce forecasts that are superior to a simple AR(1) and that at one quarter ahead also outperform an AR(1) augmented with building permits.

### *What Is Behind the Weakness in Global Investment?*

The recovery in private business investment globally remains extremely weak more than seven years after the financial crisis. This paper contributes to the ongoing policy debate on the factors behind this weakness by analyzing the role of growth prospects and uncertainty in explaining developments in non-residential private business investment in large advanced economies since the crisis. Augmenting the traditional models of investment with measures of growth expectations for output and uncertainty about global demand improves considerably the ability to explain investment growth. Our results suggest that the main driver behind the weakness in global investment in recent years is primarily a pessimistic outlook on the part of firms regarding the strength of future demand. Lower levels of uncertainty have supported investment growth modestly over 2013–14. Similarly, diminishing credit constraints, lower borrowing costs and relatively stronger corporate profits have also supported the recovery in business investment from 2010 onward. Our findings have two important implications for the global outlook for investment. First, the expected improvements in global growth should support a recovery in investment; however, a slowdown in growth in emerging-market economies or further growth disappointment in advanced economies could restrain this recovery. Second, the ongoing recovery in investment remains vulnerable to uncertainty shocks.

### *A Microfounded Design of Interconnectedness-Based Macroprudential Policy*

To address the challenges posed by global systemically important banks (G-SIBs), the Basel Committee on Banking Supervision recommended an “additional loss absorbency requirement” for these institutions. Along these lines, I develop a microfounded design of capital surcharges that target the interconnectedness component of systemic risk. These surcharges increase the costs of establishing interbank connections, which leads to a non-monotonic welfare effect. While reduced interconnectedness decreases welfare by restricting the ability of banks to insure against liquidity shocks, it also increases it by reducing contagion when an interconnected bank fails. Thus, the regulator faces a trade-off between efficiency and financial stability. Furthermore, I show that capital requirements are more effective than default fund contributions when tail-risk exposure is the private information of banks. I conclude by analyzing how resolution regimes and stable funding requirements interact with these surcharges.

### *Monetary Commitment and the Level of Public Debt*

We analyze the interaction between committed monetary policy and discretionary fiscal policy in a model with public debt, endogenous government expenditures, distortive taxation and nominal rigidities. Fiscal decisions lack commitment but are Markov-perfect. Monetary commitment to an interest rate path leads to a unique level of debt. This level of debt is positive if the central bank adopts closed-loop strategies that raise the real interest rate when inflation is above target owing to fiscal deviations. More aggressive defence of the inflation target implies lower debt and higher welfare. Simple Taylor-type interest rate rules achieve welfare levels similar to those generated by sophisticated closed-loop strategies.

### *Macroeconomic Uncertainty Through the Lens of Professional Forecasters*

We analyze the evolution of macroeconomic uncertainty in the United States, based on the forecast errors of consensus survey forecasts of different economic indicators. Comprehensive information contained in the survey forecasts enables us to capture a real-time subjective measure of uncertainty in a simple framework. We jointly model and estimate macroeconomic (common) and indicator-specific uncertainties of four indicators, using a factor stochastic volatility model. Our macroeconomic uncertainty has three major spikes, aligned with the 1973–75, 1980, and 2007–09 recessions, while other recessions were characterized by increases in indicator-specific uncertainties. We also demonstrate for the first time in the literature that the selection of data vintages substantially affects the relative size of jumps in estimated uncertainty series. Finally, our macroeconomic uncertainty has a persistent negative impact on real economic activity, rather than producing “wait-and-see” dynamics.

### *The Role of the International Monetary Fund in the Post-Crisis World*

The International Monetary Fund (IMF, or the Fund) has undergone a number of significant policy changes and reforms in the wake of the global financial crisis. Most notably, in December 2015, the United States approved long-delayed legislation to increase the representation of developing countries in the Fund’s governance structure. The vital progress on quota shares has finally allowed for a resumption of wider and increasingly critical discussion of the strategic role of the IMF in the post-crisis world. This paper aims to relaunch the debate by assessing the recent reforms and changes,

identifying areas where progress is still needed and proposing solutions. Our findings suggest that, while much has been accomplished by the Fund's management and staff since the global crisis, there is still a pressing need for member countries to push for further reforms if the IMF is to remain a relevant player in the rapidly evolving global economic and financial system. Emerging-market economies remain under-represented at the Fund and continue to perceive the IMF as biased against them, undermining the influence of its advice, despite the increase in their quota share and changes to improve the quality, efficiency and even-handedness of the IMF's surveillance and lending. In advanced economies, where the Fund has traditionally had little traction on national policies, the institution faces the challenge of managing and communicating its independence in programs involving large shareholders. We propose reforms aimed at improving country representation, granting the IMF real operational independence and enhancing its catalytic role.

### *Limits to Arbitrage and Deviations from Covered Interest Rate Parity*

We document an increase in deviations from short-term covered interest rate parity (CIP) in the first half of 2015. Since the Swiss National Bank's (SNB) decision to abandon its minimum exchange rate policy, both the magnitude and volatility of deviations from CIP have increased across several currency pairs. The effect is particularly pronounced for pairs involving the Swiss franc. These deviations are distinct from those observed during the financial crisis. We argue that they are a consequence of reduced liquidity in foreign exchange markets, rather than imbalances in international funding markets. A reduction in the supply of forward contracts, owing to limited dealer capacity following the SNB decision, led to wide bid-ask spreads in the forward market. This friction, pertaining specifically to the foreign exchange market rather than broader funding markets, allowed deviations from CIP to persist.

### *To Share or Not to Share? Uncovered Losses in a Derivatives Clearinghouse*

This paper studies how the allocation of residual losses affects trading and welfare in a central counterparty. I compare loss sharing under two loss-allocation mechanisms – variation margin haircutting and cash calls – and study the privately and socially optimal degree of loss sharing. For losses allocated using variation margin haircuts, I find that trading volume is sensitive to the degree of loss sharing and to the risk sensitivity of skin-in-the-game capital. By contrast, for cash



calls, the degree of loss sharing does not affect trading volume but instead affects the chance that a cash call is honoured, which can constrain the recovery of funds. A welfare analysis characterizes the market outcome and compares it with the social optimum.

### *Understanding Firms' Inflation Expectations Using the Bank of Canada's Business Outlook Survey*

Inflation expectations are a key determinant of actual and future inflation and thus matter for the conduct of monetary policy. We study how firms form their inflation expectations using quarterly firm-level data from the Bank of Canada's *Business Outlook Survey*, spanning the 2001 to 2015 period. The data are aggregated to construct an inflation expectations index. Results based on the index suggest that expectations are not consistent with the rationality assumption but are, still, more complex than purely adaptive expectations. Firms' own unique experiences, such as the dynamics of the prices they expect to pay (wages/inputs), significantly influence aggregate expectations. Expectations are also found to be significantly and positively correlated with movements in oil prices. Most of the preceding results hold at the firm level. The estimation of structural shift specifications suggests that inflation expectations in Canada have drifted downward since the Great Recession. However, the data do not suggest that Canadian businesses' expectations have become unanchored.