

Bank of Canada Monthly Research Update

April 2020

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

Kryvtsov, Oleksiy & Peterson, Luba, “Central Bank Communication that Works: Lessons from Lab Experiments”, *Journal of Monetary Economics*

Ahnert, Toni & Chapman, James & Wilkins, Carolyn, “Should Bank Capital Regulation Be Risk Sensitive?”, *Journal of Financial Intermediation*

Feunou, Bruno & Aliouchkin, Ricardo Lopez & Tédongap, Roméo & Xu, Lai, “The Term Structures of Expected Loss and Gain Uncertainty”, *Journal of Financial Econometrics*

Wright, Randall & Xiao, Sylvia & Zhu, Yu, “Frictional Capital Reallocation with Ex-Post Heterogeneity”, *Review of Economic Dynamics*

Adam, Klaus & Matveev, Dmitry & Nagel, Stefan, “Do Survey Expectations of Stock Returns Reflect Risk Adjustments?”, *Journal of Monetary Economics*

Halaj, Grzegorz, “Resilience of Canadian banks to funding liquidity shocks”, *Latin American Journal of Central Banking*

STAFF WORKING PAPERS

Ghironi, Fabio & Ozhan, Galip Kemal, “Interest Rate Uncertainty as a Policy Tool”, *Bank of Canada Staff Working Paper 2020-13*

Zhao, Guihai, “Learning, Equilibrium Trend, Cycle, and Spread in Bond Yields”, *Bank of Canada Staff Working Paper 2020-14*

Chang, Bo Young & Orosi, Greg, “A Simple Method for Extracting the Probability of Default from American Put Option Prices”, *Bank of Canada Staff Working Paper 2020-15*

ABSTRACTS

Central Bank Communication that Works: Lessons from Lab Experiments

The causal effects of central bank communication on economic expectations and their underlying mechanisms are tested in controlled laboratory experiments. We find that central bank communication has a stabilizing effect on individual and aggregate outcomes, and the size of the effect varies with the type of communication. Announcing past interest rate changes has the largest effect, reducing volatility of individual price and expenditure forecasts by one-quarter and four-fifths, respectively, and cutting a quarter of macroeconomic volatility. Forward-looking announcements have less effect on individual forecasts, especially if they do not clarify the timing of future policy changes. There is little evidence that central bank communication transmits via its influence on forecasters' ability to predict future nominal interest rates. Rather, communication is effective via simple and relatable backward-looking announcements that exert strong influence on less-accurate forecasters.

Should Bank Capital Regulation Be Risk Sensitive?

We present a screening model of the risk sensitivity of bank capital regulation. A banker funds a project with uninsured deposits and costly capital. Capital resolves a moral hazard problem in the choice of the probability of default (PD). The project's loss given default (LGD) is the banker's private information. The regulator receives a noisy signal about the LGD and imposes a minimum capital requirement. We show that the optimal sensitivity of capital regulation is non-monotonic in the accuracy of risk assessment. If the signal is inaccurate, the regulator should use risk-insensitive capital requirements. Given sufficient accuracy, the regulator should separate types via risk-sensitive capital requirements, reducing the risk-sensitivity of bank capital as accuracy improves.

The Term Structures of Expected Loss and Gain Uncertainty

We document that the term structures of risk-neutral expected loss and gain uncertainty on the S&P500 returns are upward sloping on average. These shapes mainly reflect the higher premium required by investors to hedge downside risk, and the belief that potential gains will increase in the long-run. The term structures exhibit substantial

time series variation with large negative slopes during crisis periods. Through the lens of Andersen et al. (2015)'s framework, we evaluate the ability of existing reduced-form option pricing models to replicate these term structures. We stress that three ingredients are particularly important: (1) the inclusion of jumps; (2) disentangling the price of negative jump risk from its positive analog in the stochastic discount factor specification; (3) specifying three latent factors.

Frictional Capital Reallocation with Ex-Post Heterogeneity

This project studies economies with markets for capital reallocation, where gains from trade are driven by firm-specific productivity shocks, but are hindered by search frictions and liquidity considerations. Results are provided on existence, uniqueness and efficiency. The model is tractable enough to analyze monetary and fiscal policy using simple graphs. Additionally, we calibrate it to investigate quantitatively the effects of changes in productivity and credit conditions. The framework can capture several facts deemed interesting in the literature — e.g., capital misallocation is countercyclical, while its price and reallocation are procyclical. We also discuss how well productivity dispersion measures inefficiencies or frictions.

Do Survey Expectations of Stock Returns Reflect Risk Adjustments?

To reconcile the disconnect between survey expectations of stock returns and rational expectations, researchers have hypothesized that survey participants may confound beliefs and preferences by (i) reporting risk-neutral forecasts of future returns; or (ii) reporting pessimistically-tilted forecasts reflecting ambiguity aversion or robustness concerns. We find that these hypotheses are strongly rejected by the data, albeit for different reasons: Inconsistent with hypothesis (i), survey return forecasts are reliably much higher than risk-free interest rates and survey expected excess returns are predictably time-varying. Inconsistent with (ii), agents are not always pessimistic about future returns, but often predictably optimistic and unconditionally unbiased.

Resilience of Canadian banks to funding liquidity shocks

We calibrate the agent-based model of Halaj (2018) to data from granular liquidity reporting of the largest banks in Canada. The model describes the propagation and amplification of funding shocks between banks interacting on the interbank market. By applying some stylised stress test scenarios of funding outflows, we demonstrate

how the model can be used to assess two vulnerabilities of the banking system: one cyclical (funding liquidity) and one structural (interconnectedness).

Interest Rate Uncertainty as a Policy Tool

We study a novel policy tool—interest rate uncertainty—that can be used to discourage inefficient capital inflows and to adjust the composition of external account between short-term securities and foreign direct investment (FDI). We identify the trade-offs faced in navigating between external balance and price stability. The interest rate uncertainty policy discourages short-term inflows mainly through portfolio risk and precautionary saving channels. A markup channel generates net FDI inflows under imperfect exchange rate passthrough. We further investigate new channels under different assumptions about the irreversibility of FDI, the currency of export invoicing, risk aversion of outside agents, and effective lower bound in the rest of the world. Under every scenario, uncertainty policy is inflationary.

Learning, Equilibrium Trend, Cycle, and Spread in Bond Yields

Some key features in the historical dynamics of U.S. Treasury bond yields—a trend in long-term yields, business cycle movements in short-term yields, and a level shift in yield spreads—pose serious challenges to existing equilibrium asset pricing models. This paper presents a new equilibrium model to jointly explain these key features. The trend is generated by learning from the stable components in GDP growth and inflation, which share similar patterns to the neutral rate of interest (R^*) and trend inflation (π^*) estimates in the literature. Cyclical movements in yields and spreads are mainly driven by learning from the transitory components in GDP growth and inflation. The less-frequent inverted yield curves observed after the 1990s are due to the recent secular stagnation and procyclical inflation expectation.

A Simple Method for Extracting the Probability of Default from American Put Option Prices

In this paper, we present a novel method to extract the risk-neutral probability of default of a firm from American put option prices. Building on the idea of a default corridor proposed in Carr and Wu (2011), we derive a parsimonious closed-form formula for American put option prices from which the probability of default can be inferred. The proposed method is easy to implement and helps overcome the

main limitation of the method used in Carr and Wu (2011), which relies on the price of one deep-out-of-the-money put option. Our empirical results are based on seven large U.S. firms for the period 2002 to 2010. These results show that, in some cases, the option-implied probability of default can provide a more accurate estimate of default probability, compared to the estimates implied from credit default swap spreads.

UPCOMING EVENTS

*** All onsite conferences and events are suspended until further notice.**