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Bank of Canada
Monthly Research Update

September 2018

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

Auer, Simone & Friedrich, Christian & Ganarina, Maja & Paligorova, Teodora & Towbin, Pascal, "International Monetary Policy Transmission through Banks in Small Open Economies", Journal of International Money and Finance - International Banking Research Network (IBRN) Special Issue

Kuncl, Martin, "Securitization under Asymmetric Information over the Business Cycle", European Economic Review

STAFF WORKING PAPERS

Dahlhaus, Tatjana & Sekhposyan, Tatevik, "Monetary Policy Uncertainty: A Tale of Two Tails", Bank of Canada Staff Working Paper 2018-50

Shao, Lin, "Financial Development Beyond the Formal Financial Market", Bank of Canada Staff Working Paper 2018-49

Ahnert, Toni & Chapman, James & Wilkins, Carolyn, "Should Bank Capital Regulation Be Risk Sensitive?", Bank of Canada Staff Working Paper 2018-48

Danielsson, Jon & Ergun, Lerby & G. de Vries, Casper, "Challenges in Implementing Worst-Case Analysis", Bank of Canada Staff Working Paper 2018-47

Vallée, Geneviève, "How Long Does It Take You to Pay? A Duration Study of Canadian Retail Transaction Payment Times", Bank of Canada Staff Working Paper 2018-46

Chiu, Jonathan & Koeppl, Thorsten, "Blockchain-Based Settlement for Asset Trading", Bank of Canada Staff Working Paper 2018-45

Carvalho, Carlos & Kryvtsov, Oleksiy, "Price Selection", Bank of Canada Staff Working Paper 2018-44

Steingress, Walter, "Market Size and Entry in International Trade: Product Versus Firm Fixed Costs", Bank of Canada Staff Working Paper 2018-43

Verstraete, Matthieu & Suchanek, Lena, "Understanding Monetary Policy and its Effects: Evidence from Canadian Firms Using the Business Outlook Survey", CESifo Working Paper 7221, August 2018

STAFF DISCUSSION PAPERS

Berger-Soucy, Léanne & Garriott, Corey & Usche, André, "Government of Canada Fixed-Income Market Ecology", Bank of Canada Staff Discussion Paper 2018-10

ABSTRACTS

International Monetary Policy Transmission through Banks in Small Open Economies

This paper studies the international transmission of monetary policy through banks in small open economies using the examples of Switzerland and Canada. We assess the inward transmission of foreign monetary policy for Switzerland and the outward transmission of domestic monetary policy for Canada. In both country cases, we focus on the international bank lending and the international portfolio channel, which make opposing predictions about how monetary policy transmits internationally through banks. Our results on the inward transmission of foreign monetary policy through banks in Switzerland are consistent with a role for the international portfolio channel, but we find no evidence for the traditional international bank lending channel. The results on the outward transmission of domestic monetary policy in Canada suggest that foreign lending by Canadian banks is affected through both channels, which work as predicted and largely balance each other.

Securitization under Asymmetric Information over the Business Cycle

This paper studies the efficiency of financial intermediation through securitization in a model with heterogeneous lending opportunities and asymmetric information about the quality of securities. Issuers of securities can signal their quality by providing recourse to security buyers. I find that signaling increases the variation in the degree of asymmetric information over the business cycle, which creates the documented growth asymmetry in the cycle. In particular, in the boom stage of the business cycle, security quality remains private information and lower-quality securities accumulate on the balance sheets of lenders. This inefficient allocation of capital implies a

deeper drop in output in a subsequent recession proportional to the length of the preceding boom.

Monetary Policy Uncertainty: A Tale of Two Tails

We document a strong asymmetry in the evolution of federal funds rate expectations and map this observed asymmetry into measures of monetary policy uncertainty. We show that periods of monetary policy tightening and easing are distinctly related to downside (policy rate is higher than expected) and upside (policy rate is lower than expected) uncertainty. Downside monetary policy uncertainty decreases over time, while upside uncertainty remains rather stable, reflecting the asymmetry in the behavior of the expectational errors—a finding that we attribute to changes in the conduct of monetary policy. We show that this behavior cannot be entirely explained by uncertainty in macroeconomic fundamentals: the asymmetry remains even when we control for macroeconomic uncertainty, emphasizing the importance of monetary policy implementation. Finally, we assess the macroeconomic effects of monetary policy uncertainty. We find that the effects are non-linear and conditional on the economy being in an easing or tightening regime. Though uncertainty is, in general, recessionary, its effects are stronger in a monetary easing regime relative to a tightening one.

Financial Development Beyond the Formal Financial Market

This paper studies the effects of financial development, taking into account both formal and informal financing. Using cross-country firm-level data, we document that informal financing is utilized more by rich countries than poor countries. To account for this empirical pattern, we build a model in which the supply of informal financing increases with financial development, while the demand for informal financing declines with it. The model generates a hump-shaped relationship between the incidence of informal financing and GDP per capita. Our analysis shows that, at the early stage of economic development, the output loss from financial frictions is reinforced by the low supply of informal financing. Informal financing contributes more to the aggregate output of the richest countries than to that of the poorer countries in our sample.

Should Bank Capital Regulation Be Risk Sensitive?

We present a simple model to study the risk sensitivity of capital regulation. A banker funds investment with uninsured deposits and costly capital, where capital resolves a moral hazard problem in the

banker's choice of risk. Investors are uninformed about investment quality, but a regulator receives a signal about it and imposes minimum capital requirements. With a perfect signal, capital requirements are risk sensitive and achieve the first-best levels of risk and intermediation: safer banks attract cheaper deposit funding and require less capital. With a noisy signal, risk-sensitive capital regulation can implement a separating equilibrium in which low-quality banks do not participate. We show that the degree of risk sensitivity is non-monotone in the precision of the signal and in investment characteristics. Without a signal, a leverage ratio still induces the efficient risk choice but leads to excessive or insufficient intermediation.

Challenges in Implementing Worst-Case Analysis

Worst-case analysis is used among financial regulators in the wake of the recent financial crisis to gauge the tail risk. We provide insight into worst-case analysis and provide guidance on how to estimate it. We derive the bias for the non-parametric heavy-tailed order statistics and contrast it with the semi-parametric extreme value theory (EVT) approach. We find that if the return distribution has a heavy tail, the non-parametric worst-case analysis, i.e. the minimum of the sample, is always downwards biased and hence is overly conservative. Relying on semi-parametric EVT reduces the bias considerably in the case of relatively heavy tails. But for the less-heavy tails this relationship is reversed. Estimates for a large sample of US stock returns indicate that this pattern in the bias is indeed present in financial data. With respect to risk management, this induces an overly conservative capital allocation if the worst case is estimated incorrectly.

How Long Does It Take You to Pay? A Duration Study of Canadian Retail Transaction Payment Times

Using an exclusive data set of payment times for retail transactions made in Canada, I show that cash is the most time-efficient method of payment (MOP) when compared with payments by debit and credit cards. I model payment efficiency using Cox proportional hazard models, accounting for consumer choice of MOP. I propose two instruments to identify and estimate the causal relationship between MOP and payment time: (1) the value of the transaction, and (2) the duration of the payment preceding the one under observation. Discounting consumer selection underestimates the efficiency of cash relative to cards. Overall, the efficiency of MOPs is an important

component of the private and social costs of making and accepting payments. The efficiency of cash helps explain its continued use in Canada, which is motivated by its low cost in terms of payment time for consumers and merchants.

Blockchain-Based Settlement for Asset Trading

Can securities be settled on a blockchain and, if so, what are the gains relative to existing settlement systems? We consider a blockchain that ensures delivery versus payment by linking transfers of assets with payments and operates using a proof-of-work protocol. The main benefit of a blockchain is faster and more flexible settlement, whereas the challenge is to avoid settlement fails when participants fork the chain to get rid of trading losses. To deter forking, the blockchain needs to restrict settlement speed through block size and block time to generate sufficient transaction fees, which finance costly mining. We show that large enough trading volume, sufficiently strong preferences for fast settlement and limited trade size and risk are necessary conditions for blockchain-based settlement to be feasible. Despite mining being a deadweight cost, our estimates based on the market for US corporate debt show that gains from moving to faster and more flexible settlement are in the range of 1 to 4 basis points relative to existing legacy settlement systems.

Price Selection

We propose a simple, model-free way to measure price selection and its impact on inflation. Price selection exists when prices that change in response to aggregate shocks are not representative of the overall population of prices. Due to selection, increases (decreases) in inflation can be amplified because adjusting prices tend to originate from levels far below (above) the average. Using detailed micro-level consumer price data for the United Kingdom, the United States and Canada, we find robust evidence of strong price selection across goods and services. At a disaggregate level, price selection accounts for around 36% of inflation variance in the United Kingdom and the United States, and 28% in Canada. Price selection is stronger for goods with less frequent price changes or with larger average price changes. Aggregation largely washes out price selection for regular price changes, but not for changes associated with price discounts. This evidence favors multi-sector sticky-price models with strong price selection at a sector level.

Market Size and Entry in International Trade: Product Versus Firm Fixed Costs

This paper develops a theoretical framework to infer the nature of fixed costs from the relationship between entry patterns in international markets and destination market size. If fixed costs are at the firm level, firms take advantage of an intrafirm spillover by expanding firm-level product range (scope). Few firms enter with many products and dominate international trade. If fixed costs are at the product level, an interfirm spillover reduces the fixed costs to export for all firms producing the product. Using cross-country data on firm and product, I find empirical evidence consistent with product-level costs. More firms than products enter in larger markets, offering their consumers lower prices and a greater variety of goods within the product category.

Understanding Monetary Policy and its Effects: Evidence from Canadian Firms Using the Business Outlook Survey

Using real time data, we show that the monetary policy rule in Canada is better described by a Taylor rule augmented with business sentiment which is captured in survey data. Stronger survey results are correlated with a significantly higher policy rate over the period of study (2001–18). Taylor rules including a measure of business sentiment have significantly better predictive accuracy. Using these modified Taylor rules in vector autoregressions and data from the Bank of Canada's quarterly Business Outlook Survey, we study the impact of monetary policy on firms' expectations of sales and prices, financing conditions and investment decisions. Given our short sample, we focus on estimates of firms' responses to monetary shocks obtained by local projections (Jordà 2005). A 100-basis-point shock in the Bank's target rate leads firms to expect significantly lower sales and slower output price growth, report tighter credit conditions and lower investment intentions. Results are robust to using Champagne and Sekkel's (2018) new monetary policy measure.

Government of Canada Fixed-Income Market Ecology

This discussion paper is the third in the Financial Markets Department's series on the structure of Canadian financial markets. These papers are called "ecologies" because they study the interactions among market participants, infrastructures, regulations and the terms of the traded contract itself.

In this ecology, we discuss the Government of Canada's domestic fixed-income market. We begin with an overview of Government of Canada securities and their characteristics. We then outline common market practices and the typical participants in the market. We provide high-level statistics on activity in the market and describe the market infrastructures that support trading. Finally, we discuss risks in these securities markets.

UPCOMING EVENTS

Matthias O. Paustian (Federal Reserve Board), 12 October 2018
Organizer: Romanos Priftis (CEA)

Natalia Ramondo (University of California in San Diego), 19 October 2018
Organizer: Anthony Landry (CEA)

Brent Hickman (Queen's University), 25 October 2018
Organizer: Jason Allen (FMD)

Kevin Lim (University of Toronto), 26 October 2018
Organizer: Ben Tomlin (CEA)

Albert Queralto (Federal Reserve Board), 16 November 2018
Organizer: Martin Kuncl (CEA)

Jonathan Parker (Massachusetts Institute of Technology), 29 November 2018
Organizer: Miguel Molico (FSD)

Decio Coviello (HEC Montreal), 7 December 2018
Organizer: Youngmin Park (CEA)

Fernanda Nechio (Federal Reserve of San Francisco), 14 December 2018
Organizer: Anthony Landry (CEA)