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Bank of Canada
Monthly Research Update

July 2017

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

Letendre, Marc-Andre & Wagner, Joel, "Agency Costs, Risk Shocks, and International Cycles", Agency Costs, Risk Shocks, And International Cycles. Macroeconomic Dynamics, 1-39.

Wataru, Miyamoto, Thuy Lan Nguyen "Understanding the cross-country effects of U.S. technology shocks", Journal of International Economics, May 2017, Volume 106, Pages 143-164

Forthcoming

Bailliu, Jeannine & Kruger, Mark & Toktamyssov, Argyn & Welbourn, W., "How Fast Can China Grow? The Middle Kingdom's Prospect to 2030.", Pacific Economic Review

Cao, Shutao & Salameh, Mohanad & Seki, Mai & St-Amant, Pierre, "Trends in Firm Entry and New Entrepreneurship in Canada", Canadian Public Policy

Champagne, Julien & Kurmann, Andre & Stewart, Jay, "Reconciling the Divergence in Aggregate U.S. Wage Series.", Labour Economics

Chin, Faith & Garriott, Corey, "Options Decimalization", Journal of Derivatives

Jo, Soojin & Sekkel, Rodrigo, "Macroeconomic Uncertainty Through the Lens of Professional Forecasters", Journal of Business and Economics Statistics

STAFF WORKING PAPERS

Arifovic, Jasmina & Duffy, John & Jiang, Janet Hua, "Adoption of a New Payment Method: Theory and Experimental Evidence", Bank of Canada Staff Working Paper 2017-28

Ahnert, Toni & Georg, Co-Pierre, "Information Contagion and Systemic Risk", Bank of Canada Staff Working Paper 2017-29

Boutros, Michael & Witmer, Jonathan, "Monetary Policy Implementation in a Negative Rate Environment", Bank of Canada Staff Working Paper 2017-25

Chernoff, Alex, "Firm Heterogeneity, Technological Adoption, and Urbanization: Theory and Measurement", Bank of Canada Staff Working Paper 2017-27

Diez de los Rios, Antonio & Shamloo, Maral, "Quantitative Easing and Long-Term Yields in Small Open Economies", Bank of Canada Staff Working Paper 2017-26

Duprey, Thibaut & Klaus, Benjamin, "How to Predict Financial Stress? An Assessment of Markov Switching Models", Bank of Canada Staff Working Paper 2017-32

Fique, Jose, "Retrieving Implied Financial Networks from Bank Balance-Sheet and Market Data", Bank of Canada Staff Working Paper 2017-30

Wagner, Joel, "Downward Nominal Wage Rigidity in Canada: Evidence Against a "Greasing Effect"", Bank of Canada Staff Working Paper 2017-31

STAFF DISCUSSION PAPERS

Aaron, Meyer & Rivadeneyra, Francisco & Sohal, Samantha, "Fintech: Is This Time Different? A Framework for Assessing Risks and Opportunities for Central Banks", Bank of Canada Staff Discussion Paper 2017-10

ABSTRACTS

Agency Costs, Risk Shocks, and International Cycles

We add agency costs into a two-country, two-good international business-cycle model. In our model, changes in the relative price of investment arise endogenously. Despite the fact that technology shocks are uncorrelated across countries, the relative price of investment is positively correlated across countries in our model, much as it is in detrended U.S./Euro-area data. We also find that financial frictions tend to increase the volatility of the terms of trade and the international correlations of consumption, hours worked, output, and investment. We then compare this model to an alternative model that also includes risk shocks. We use credit spread data (for the United States) to calibrate the AR(1) process for risk shocks. We find that risk shocks are too small to significantly impact the model's dynamics

Understanding the cross-country effects of U.S. technology shocks

Business cycles are substantially correlated across countries. Yet, most existing models are not able to generate substantial transmission through international trade. We show that the nature of such transmission depends fundamentally on the features determining the responsiveness of labor supply and labor demand to

international relative prices. We augment a standard international macroeconomic model to incorporate three key features: a weak short-run wealth effect on labor supply, variable capital utilization, and imported intermediate inputs for production. This model can generate large and significant endogenous transmission of technology shocks through international trade. We demonstrate this by estimating the model using data for Canada and the United States with limited-information Bayesian methods. We find that this model can account for the substantial transmission of permanent U.S. technology shocks to Canadian aggregate variables such as output and hours, documented in a structural vector autoregression. Transmission through international trade is found to explain the majority of the business cycle comovement between the United States and Canada.

How Fast Can China Grow? The Middle Kingdom's Prospect to 2030

Given its size and importance for global commodity markets, the question of how fast the Chinese economy can grow over the medium term is an important one. This paper addresses this question by examining the evolution of the supply side of the Chinese economy over history and projecting how it will evolve over the next 15 years. Using a Cobb-Douglas production function, we decompose the growth of trend GDP into those of the capital stock, labour, human capital and total factor productivity (TFP) and then forecast trend output growth out to 2030 using a bottom-up approach based on forecasts that we build for each one of these factors. Our paper distinguishes itself from existing work in that we construct a forecast of Chinese TFP growth based on the aggregation of forecasts of its key determinants. Moreover, our analysis is based on a carefully constructed estimate of the Chinese productive capital stock and a measure of human capital – based on Chinese wage survey data – that better reflects the returns to education in China. Our results suggest that Chinese trend output growth will decelerate from around 7% currently to about 5% by 2030, and are consistent with a gradual rebalancing of the Chinese economy characterized by a decline in the investment rate.

Trends in Firm Entry and New Entrepreneurship in Canada

Since the early 1980s, the firm entry rate and the rate of new entrepreneurship have trended downward in Canada. This article documents these trends and discusses potential explanations. A shift-share analysis suggests that industrial and demographic structure changes cannot explain these long-term trends, although population aging accounts for part of the decline in new entrepreneurship since around 2000. The article discusses other factors that could contribute to the downward trends: increased industrial concentration, changing labour market conditions, increased college wage premium, higher student debt, and government regulation. Some of these may be

important, but more research is needed before firm conclusions can be reached.

Reconciling the Divergence in Aggregate U.S. Wage Series

Average hourly wages from the Labor Productivity and Costs (LPC) program, the Current Population Survey (CPS) and the Current Employment Statistics (CES) have diverged, both in trend and volatility. Supplements and irregular earnings of high-income workers, included in the LPC but not in the two other datasets, have grown more rapidly and have become more volatile, accounting for most of the divergence between LPC and CPS earnings. The more restrictive worker coverage in the CES explains a large part of the divergence between CPS and CES earnings. The results have important implications for the choice of wage series in macroeconomic analysis.

Options Decimalization

We document the outcome of an options decimalization pilot on Canada's derivatives exchange. Decimalization improves measures of liquidity and price efficiency. The impact differs by the moneyness of an option and is greatest for out-of-the-money options. In contrast with equity studies, decimalization improved depth near the best prices and improved liquidity for larger trades. We conclude with advice on decimalizing options: options that benefit most have underlying volatility less than 40, underlying equity bid-ask spread less than 50 basis points, at least one trade a day, and a distribution of depth skewed toward marketable prices.

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 various economic indicators. Comprehensive information contained in the survey forecasts enables us to capture a real-time measure of uncertainty surrounding subjective forecasts 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 show that the selection of data vintages affects the estimates and 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.

Adoption of a New Payment Method: Theory and Experimental Evidence

Business cycles are substantially correlated across countries. Yet, most existing models are not able to generate substantial transmission through international trade. We show that the nature of such transmission depends fundamentally on the features determining the responsiveness of labor supply and labor demand to international relative prices. We augment a standard international macroeconomic model to incorporate three key features: a weak short-run wealth effect on labor supply, variable capital utilization, and imported intermediate inputs for production. This model can generate large and significant endogenous transmission of technology shocks through international trade. We demonstrate this by estimating the model using data for Canada and the United States with limited-information Bayesian methods. We find that this model can account for the substantial transmission of permanent U.S. technology shocks to Canadian aggregate variables such as output and hours, documented in a structural vector autoregression. Transmission through international trade is found to explain the majority of the business cycle comovement between the United States and Canada.

Information Contagion and Systemic Risk

We examine the effect of ex-post information contagion on the ex-ante level of systemic risk defined as the probability of joint bank default. Because of counterparty risk or common exposures, bad news about one bank reveals valuable information about another bank, triggering information contagion. When banks are subject to common exposures, information contagion induces small adjustments to bank portfolios and therefore increases overall systemic risk. When banks are subject to counterparty risk, by contrast, information contagion induces a large shift toward more prudential portfolios, thereby reducing systemic risk.

Monetary Policy Implementation in a Negative Rate Environment

Monetary policy implementation could, in theory, be constrained by deeply negative rates since overnight market participants may have an incentive to invest in cash rather than lend to other participants. To understand the functioning of overnight markets in such an environment, we add the option to exchange central bank reserves for cash to the standard workhorse model of monetary policy implementation (Poole 1968). Importantly, we show that monetary policy is not constrained when just the deposit rate is below the yield on cash. However, it could be constrained when the target overnight rate is below the yield on cash. At this point, the overnight rate equals the yield on cash instead of the target rate. Modifications to the implementation framework, such as a tiered remuneration of central

bank deposits contingent on cash withdrawals, can work to restore the implementation of monetary policy such that the overnight rate equals the target rate.

Firm Heterogeneity, Technological Adoption, and Urbanization: Theory and Measurement

This paper develops a model of firm heterogeneity, technological adoption, and urbanization. In the model, welfare is measured by household real income, and urbanization is measured by population density. I use the model to derive statistics that measure the effect of a new technology on productivity, welfare, and urbanization. The empirical application of the paper estimates these effects using nineteenth-century firmlevel data on mechanical steam power in the Canadian manufacturing sector, and townshiplevel population data. The results indicate that the introduction of steam power increased productivity by 22.8 percent, and welfare by 6.0 percent. By comparing the model predicted change in urbanization to observed population density growth, I find that the introduction of mechanical steam power accounts for approximately 6.2 percent of the observed variation in urbanization during this period.

Quantitative Easing and Long-Term Yields in Small Open Economies

We compare the Federal Reserve's asset purchase programs with those implemented by the Bank of England and the Swedish Riksbank, and the Swiss National Bank's reserve expansion program. We decompose government bond yields into (i) an expectations component, (ii) a global term premium and (iii) a country-specific term premium to analyze two-day changes in 10-year yields around announcement dates. We find that, in contrast to the Federal Reserve's asset purchases, the programs implemented in these smaller economies have not been able to affect the global term premium and, consequently, their effectiveness in lowering long-term yields has been limited

How to Predict Financial Stress? An Assessment of Markov Switching Models

This paper predicts phases of the financial cycle by using a continuous financial stress measure in a Markov switching framework. The debt service ratio and property market variables signal a transition to a high financial stress regime, while economic sentiment indicators provide signals for a transition to a tranquil state. Whereas the in-sample analysis suggests that these indicators can provide an early warning signal up to several quarters prior to the respective regime change, the out-of-sample findings indicate that most of this performance is owing to the data gathered during the global financial crisis. Comparing the prediction performance with a

standard binary early warning model reveals that the Markov switching model is outperforming the vast majority of model specifications for a horizon up to three quarters prior to the onset of financial stress.

Retrieving Implied Financial Networks from Bank Balance-Sheet and Market Data

In complex and interconnected banking systems, counterparty risk does not depend only on the risk of the immediate counterparty but also on the risk of others in the network of exposures. However, frequently, market participants do not observe the actual network of exposures. I propose an approach that incorporates this network of exposures, among other factors, in a valuation model of credit default swaps. The model-implied spreads are then used to retrieve the set of networks that are consistent with market spreads. The approach is illustrated with an application to the UK banking system.

Downward Nominal Wage Rigidity in Canada: Evidence Against a "Greasing Effect"

The existence of downward nominal wage rigidity (DNWR) has often been used to justify a positive inflation target. It is traditionally assumed that positive inflation could "grease the wheels" of the labour market by putting downward pressure on real wages, easing labour market adjustments during a recession. A rise in the inflation target would attenuate the long-run level of unemployment and hasten economic recovery after an adverse shock. Following Daly and Hobijn (2014), we re-examine these issues in a model that accounts for precautionary motives in wage-setting behaviour. We confirm that DNWR generates a long-run negative relation between inflation and unemployment, in line with previous contributions to the literature. However, we also find that the increase in the number of people bound by DNWR following a negative demand shock rises with inflation, offsetting the beneficial effects of a higher inflation target. As an implication, contrary to previous contributions that neglected precautionary behaviour, the speed at which unemployment returns to pre-crisis levels during recessions is relatively unaffected by variations in the inflation target.

Fintech: Is This Time Different? A Framework for Assessing Risks and Opportunities for Central Banks

We investigate the risks and opportunities to the mandates of central banks arising from fintech developments. Fintech may affect the different areas of responsibility of central banks—mainly monetary policy and financial stability—by changing money demand and by changing the industrial organization of the financial system. We present a competitive strategy framework to help evaluate the likelihood of these changes.