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Bank of Canada
Monthly Research Update

September 2021

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

Chen, Heng & Wang, Wendun & Leng, Xuan, "Multi-dimensional Latent Group Structures with Heterogeneous Distributions", Journal of Econometrics

Xie, Erhao, "Inference in Games without Equilibrium Restriction: An Application to Restaurant Competition in Opening Hours", Journal of Business & Economic Statistics

Xie, Erhao, "Empirical Properties and Identification of Adaptive Learning Models in Behavioral Game Theory", Journal of Economic Behavior & Organization

STAFF WORKING PAPERS

Bonk, Alica Ida & Simon, Laure, "From He-Cession to She-Stimulus? The Labor Market Impact of Fiscal Policy Across Gender", Bank of Canada Staff Working Paper 2021-42

Dahlhaus, Tatjana & Welte, Angelika, "Payment Habits During COVID-19: Evidence from High-Frequency Transaction Data", Bank of Canada Staff Working Paper 2021-43

Beganau, Juliane & Bigio, Saki & Majerovitz, Jeremy & Vieyra, Matías, "A Q-Theory of Banks", Bank of Canada Staff Working Paper 2021-44

Bachem, Milian & Ergun, Lerby & de Vries, Casper G., "Covariates Hiding in the Tails", Bank of Canada Staff Working Paper 2021-45

Bustamante, Christian, "More Money for Some: The Redistributive Effects of Open Market Operations", Bank of Canada Staff Working Paper 2021-46

STAFF DISCUSSION PAPERS

Ialenti, Robert, "Rising US LNG Exports and Global Natural Gas Price Convergence", Bank of Canada Staff Discussion Paper 2021-14

ABSTRACTS

Multi-dimensional Latent Group Structures with Heterogeneous Distributions

This paper aims to identify the multi-dimensional latent grouped heterogeneity of distributional effects. We consider a panel quantile regression model with additive cross-section and time fixed effects. The cross-section effects and quantile slope coefficients are both characterized by grouped patterns of heterogeneity, but each unit can belong to different groups for cross-section effects and slopes. We propose a composite-quantile approach to jointly estimate multi-dimensional group memberships, slope coefficients, and fixed effects. We show that using multiple quantiles improves clustering accuracy if memberships are quantile-invariant. We apply the methods to examine the relationship between managerial incentives and risk-taking behavior.

Inference in Games without Equilibrium Restriction: An Application to Restaurant Competition in Opening Hours

This paper relaxes the Bayesian Nash Equilibrium assumption in the estimation of discrete choice games with incomplete information. Instead of assuming unbiased/correct expectations, the model specifies a player's belief about the behaviors of other players as an unrestricted unknown function. I then study the joint identification of belief and payoff functions in a game where players have different numbers of actions (e.g., 3 × 2 game). This asymmetry in action sets partially identifies the payoff function of the player with more actions. Moreover, if usual exclusion restrictions are satisfied, the payoff and belief functions are point identified up to a scale, and the restriction of equilibrium beliefs is testable. Finally, under a multiplicative separability condition on payoffs, the above identification results are extended to the player with fewer actions and to games with symmetric action sets. I apply this model and its identification results to study the store hours competition between McDonald's and Kentucky Fried Chicken in China. The null hypothesis of unbiased beliefs is rejected. If researchers incorrectly impose the equilibrium assumption, the estimated interactive effect would be biased downward by more than 50%.

Empirical Properties and Identification of Adaptive Learning Models in Behavioral Game Theory

This paper focuses on econometric issues, especially the common assumption that monetary payoff is subjects' actual utility, in estimating subjects' learning behaviors using experimental data. I propose a generalized adaptive learning model that nests commonly used learning rules. First, I show that for a wide range of model parameters, adding a constant to the utility function alters players' learning dynamics. Such a range includes commonly used learning models, such as experience-weighted attraction (EWA), payoff assessment and impulse-matching learning. This result implies that the usual treatment of monetary reward as the actual utility is potentially misspecified, in addition to the common concern of risk preference. To deal with such an issue, the econometric model specifies a player's utility as an unknown function of monetary payoff. It is estimated jointly with the generalized learning model. I show that they are jointly identified under weak conditions. Using the experimental dataset by Selten and Chmura (2008) and Chmura et al. (2012), I reject the null hypothesis that monetary payoffs are utility. Incorrectly imposing such a restriction substantially biases the learning parameters, especially the weight on forgone utility. In addition, when a generalized model is considered, subjects are found to depreciate the unchosen action's experience more than the chosen one. Consequently, they are more responsive to the unchosen action's recent utility, rather than that of the chosen one. This feature is absent in commonly used learning models, such as EWA.

From He-Cession to She-Stimulus? The Labor Market Impact of Fiscal Policy Across Gender

Men, especially those that are young and less educated, typically bear the brunt of recessions because of the stronger cyclicality of their employment and wages relative to women's. We study the extent to which fiscal policy may offset or worsen these asymmetric effects across gender. Using micro-level data for the U.S. from the Current Population Survey, we find that the effects of fiscal policy shocks on labor market outcomes depend on the type of public expenditure. Women benefit most from increases in the government wage bill, while men are the main beneficiaries of higher investment spending. Our analysis further reveals that the fiscal component most efficient at closing gender gaps is least suitable for offsetting inequitable business cycle effects across other socioeconomic dimensions.

Payment Habits During COVID-19: Evidence from High-Frequency Transaction Data

We investigate how the COVID-19 pandemic has changed consumers' payments habits in Canada. We rely on high-frequency data on cash withdrawals and debit card transactions from Interac Corp. and Canada's Automated Clearing Settlement System. We construct daily measures of payment habits reflecting cash usage, average transaction values, and the share of transactions in which the customer or card holder and the acquiring machine (ATM or POS) are of the same bank. Using simple dummy regressions and local projection models, we assess how these indicators of payment habits have changed with the evolution of the COVID-19 pandemic. We find evidence that during the pandemic consumers adjusted their behaviour by avoiding frequent trips for cash withdrawals and point-of-sale purchases and making fewer transactions for higher amounts. They also made smaller-value cash withdrawals compared with the value of card payments, which could reflect a reduced use of cash for point-of-sale transactions. Consumers also made relatively more withdrawals from ATMs that are linked to their financial institution (on-us transactions). Finally, we highlight that estimates of economic activity based on card data alone could be biased if shifts in payment habits are not taken into account. We estimate that debit card payments might have overstated consumer expenditure growth by up to 7 percentage points over the course of the pandemic.

A Q-Theory of Banks

We document five facts about banks: (1) market and book leverage diverged during the 2008 crisis, (2) Tobin's Q predicts future profitability, (3) neither book nor market leverage appears constrained, (4) banks maintain a market-leverage target that is reached slowly, and (5) precrisis, leverage was predominantly adjusted by liquidating assets. After the crisis, the adjustment shifted towards retaining earnings. We present a Q-theory where notions of leverage differ because book accounting is slow to acknowledge loan losses. We estimate the model and show that it reproduces the facts. We examine counterfactuals where different accounting rules produce novel policy tradeoffs.

Covariates Hiding in the Tails

Scaling behavior measured in cross-sectional studies through the tail index of a power law is prone to a bias. This hampers inference; in particular, time variation in estimated tail indices may be erroneous. In the case of a linear factor model, the factor biases the tail indices in the left and right tail in opposite directions. This fact can be exploited to reduce the bias. We show how this bias arises from the factor, how to remedy for the bias and how to apply our methods to financial data and geographic location data.

More Money for Some: The Redistributive Effects of Open Market Operations

Using a general equilibrium search-theoretic model of money, I study the distributional effects of open market operations. In my model, heterogeneous agents trade bilaterally among themselves in a frictional market and save using cash and illiquid short-term nominal government bonds. Wealth effects generate slow adjustments in agents' portfolios following their trading activity in decentralized markets, giving rise to a persistent and nondegenerate distribution of assets. The model reproduces the distribution of asset levels and portfolios across households observed in the data, which is crucial to quantitatively assess the incidence of monetary policy changes at the individual level. I find that an open market operation targeting a higher nominal interest rate requires increasing the relative supply of bonds, raising the ability of agents to self-insure against idiosyncratic shocks. As a result, in the long run, inequality falls, and the inefficiencies in decentralized trading shrink. This leads agents that are relatively poor and more liquidity-constrained to benefit the most by increasing their consumption and welfare.

Rising US LNG Exports and Global Natural Gas Price Convergence

We assess how rising exports of US liquefied natural gas (LNG) affect the convergence of natural gas prices worldwide. Using standard principal component analysis and cointegrating techniques, we show that the degree of co-movement between global benchmark prices for natural gas has strengthened since the United States began the large-scale export of LNG in 2016. At the same time, we find that global natural gas prices do not yet adhere to the relative law of one price. Our results also suggest that issues related to storage access in Alberta between 2017 and 2019 have limited price co-movements between major benchmarks for natural gas in the United

States and Canada. In addition, we use vector error correction models to show that natural gas prices in Europe and Asia respond negatively to increased exports of US LNG. These results may have implications for the development of future LNG export capacity in Canada.

UPCOMING EVENTS

*** All onsite conferences and events are suspended until further notice. All events listed below will take place virtually.**

Walker Ray (London School of Economics)
Organizer: FMD / FSD EFR Seminar Series
Date: 14 October 2021

Jose Montiel Olea (Columbia University)
Organizer: EFR CEA/INT Seminar Series
Date: 15 October 2021

Corina Boar (New York University)
Organizer: FMD / FSD EFR Seminar Series
Date: 21 October 2021

Olivier Armantier (Federal Reserve Bank of New York)
Organizer: CSCE Working Group Seminar Series
Date: 27 October 2021

Mark Bils (University of Rochester)
Organizer: FMD / FSD EFR Seminar Series
Date: 28 October 2021

Ben Moll (London School of Economics)
Organizer: FMD / FSD EFR Seminar Series
Date: 4 November 2021

Michael Gelman (The Robert Day School of Economics)
Organizer: FMD / FSD EFR Seminar Series
Date: 18 November 2021

Matteo Maggiori (Stanford University)
Organizer: EFR CEA/INT Seminar Series
Date: 19 November 2021