



BANQUE DU CANADA
BANK OF CANADA

Recherche mensuelle à la Banque du Canada

janvier 2021

Ce bulletin mensuel présente les publications les plus récentes des économistes de la Banque. Le rapport inclut des études parues dans des publications externes et les documents de travail du personnel publiés sur le site Web de la Banque du Canada.

PUBLICATIONS

Dans la presse

Benedict, Craig & Crucini, Mario J. & Landry, Anthony, “[On What States Do Prices Depend? Answers From Ecuador](#)”, *Journal of Money, Credit and Banking*, Vol 52(8): 1909-1935, décembre 2020

Xiao, Hongu & Wu, Andy & Kim, Jaeho, “[Commuting and innovation: Are closer inventors more productive?](#)”, *Journal of Urban Economics*, Vol 121: 103300, janvier 2021

Hombres, Cars & Makarewicz, Tomasz, “[Price level versus inflation targeting under heterogeneous expectations: a laboratory experiment](#)”, *Journal of Economic Behavior & Organization*, Vol 182: 39-82, février 2021

À paraître

Kitamura, Tomiyuki & Takamura, Tamon, “[Output Comovement and Inflation Dynamics in a Two-Sector Model with Durable Goods: The Role of Sticky Information and Heterogeneous Factor Markets](#)”, *Journal of Money, Credit and Banking*

Leiva-León, Danilo & Uzeda, Luis, “[Endogenous Time Variation in Vector Autoregressions](#)”, *Review of Economics and Statistics*

Garratt, Rodney & van Oordt, Maarten, “[Privacy as a Public Good: A Case for Electronic Cash](#)”, *Journal of Political Economy*

DOCUMENTS DE TRAVAIL DU PERSONNEL

Shao, Lin & Tang, Rongsheng, “[Allocative Efficiency and Aggregate Productivity Growth in Canada and the United States](#)”, Document de travail du personnel de la Banque du Canada 2021-1

Chapman, James & Desai, Ajit, “[Using Payments Data to Nowcast Macroeconomic Variables During the Onset of COVID-19](#)”, Document de travail du personnel de la Banque du Canada 2021-2

Bailliu, Jeannine & Han, Xinfen & Sadaba, Barbara & Kruger, Mark, “[Chinese Monetary Policy and Text Analytics: Connecting Words and Deeds](#)”, Document de travail du personnel de la Banque du Canada 2021-3

Dalhaus, Tatjana & Schaumburg, Julia & Sekhposyan, Tatevik, “[Networking the Yield Curve: Implications for Monetary Policy](#)”, Document de travail du personnel de la Banque du Canada 2021-4

Chafwehé, Boris & Oikonomou, Rigas & Priftis, Romanos & Vogel, Lukas, “(Optimal) Monetary Policy with and without Debt”, Document de travail du personnel de la Banque du Canada 2021-5

Kahn, Charles M. & Rivadeneyra, Francisco & Wong, Tsz-Nga, “Eggs in One Basket: Security and Convenience of Digital Currencies”, Document de travail du personnel de la Banque du Canada 2021-6

Castro, Pablo S. & Desai, Ajit & Du, Han & Garratt, Rodney & Rivadeneyra, Francisco, “Estimating Policy Functions in Payments Systems Using Reinforcement Learning”, Document de travail du personnel de la Banque du Canada 2021-7

DOCUMENTS D'ANALYSE DU PERSONNEL

D'Souza, Chris & Voll, Jane, “Qualitative Field Research in Monetary Policy Making”, Document d'analyse du personnel de la Banque du Canada 2021-1

RÉSUMÉS

On What States Do Prices Depend? Answers From Ecuador, Journal of Money, Credit and Banking

The frequency of retail price adjustment differs across goods, both in low inflationary environments, such as the United States, and in high inflationary environments typical of less developed countries. We develop a multishock menu cost model in which retailers intermediate trade between producers and consumers. Since the cost share of intermediate inputs varies across goods, the model produces a cross-sectional distribution of frequency of price adjustment even though firms face a common menu cost. The model is evaluated using a rich micropanel of retail prices in Ecuador in a period spanning a financial crisis and subsequent dollarization.

Commuting and innovation: Are closer inventors more productive?

We estimate the causal effect of workplace–home commuting distance on inventor productivity. We construct a novel panel of U.S. inventors with precisely measured workplace–home distances and inventor-level productivity. Our identification strategy exploits firm office relocations as exogenous variation in the commuting distance of inventors at the firms. We find a significant negative effect from commuting distance on inventor productivity: every 10 km increase in distance is associated with a 5% decrease in patents per inventor–firm pair per year and an even greater 7% decrease in patent quality. The highest-performing inventors suffer more from increased commuting distance. We discuss the implications of our findings in the light of recent trends around telecommuting and remote work during the COVID-19 pandemic.

Price level versus inflation targeting under heterogeneous expectations: a laboratory experiment

Since the 2007 crisis, macroeconomists have been interested in monetary policies that could help with stabilizing inflation and output (Honkapohja, 2015). Two ideas gained particular attention: (i) that inflation should be replaced by the nominal price level (PLT) as the target for the central bank; and (ii) that the central bank should provide explicit guidance about its interest rate rule. We conduct a laboratory experiment to test the validity of these two hypotheses.

Our experiment uses a Learning-to-Forecast design based on a simple DSGE economy. Subjects are given a qualitative description of the economy and are asked to predict inflation and output gap two-periods ahead for 50 periods. There are five treatments. Baseline treatment (1) incorporates a standard inflation targeting rule. The other four treatments utilize a PLT Taylor rule and are based on a two-by-two design: a ‘weak’ PLT rule (2) with guidance and (3) without guidance; and a ‘strong’ PLT rule (4) with guidance and (5) without guidance. By guidance we mean that the central bank informs subjects about the price level deviation from its target.

We find that subjects within each treatment coordinate on similar behavior, but large differences between the treatments prevail. Guidance has a negligible effect, whereas a weak or strong Taylor rule specification turns out to be crucial for stability. PLT can be a robust monetary policy, but only if it is sufficiently responsive to the deviations of output and prices.

Output Comovement and Inflation Dynamics in a Two-Sector Model with Durable Goods: The Role of Sticky Information and Heterogeneous Factor Markets

Dans un modèle simple de type nouveau keynésien à deux secteurs, la rigidité des prix engendre une covariation négative contrefactuelle de la production de biens durables et de biens non durables à la suite d’un choc monétaire. Nous montrons que des marchés de facteurs hétérogènes permettent toute combinaison de rigidité des prix strictement positive pour générer une covariation de production positive. Même si les prix des biens durables sont flexibles, l’ajout d’information rigide fait évoluer la production des deux secteurs dans le même sens. De plus, nous constatons qu’une combinaison d’information rigide et de marchés de facteurs hétérogènes engendre des réactions dynamiques en forme de bosse dans le cas de la production et de l’inflation sectorielles, comme il a été observé dans une analyse de vecteurs autorégressifs. Par contraste avec l’indexation rétrospective sur l’inflation passée, souvent présumée dans la littérature, la rigidité de l’information produit une réaction dynamique en forme de bosse pour l’inflation des biens à prix flexible. Enfin, les résultats issus de l’application de la méthode d’estimation de la distance minimale donnent à penser que l’information est plus rigide dans le cas de l’investissement résidentiel que dans celui des biens non durables et des services.

Endogenous Time Variation in Vector Autoregressions

Nous présentons une nouvelle classe de modèles vectoriels autorégressifs (VAR) à paramètres variables dans le temps dans laquelle les innovations structurelles désignées explicitement peuvent influencer – simultanément et en décalage – sur la dynamique de la constante et des coefficients autorégressifs. Nous fournissons également un algorithme d'estimation et une paramétrisation facilitant la comparaison des modèles. Nous appliquons ensuite ce cadre à l'économie américaine. Selon notre analyse de scénarios, les effets de la politique monétaire sur l'activité économique seraient plus importants et plus persistants dans les modèles proposés que dans un modèle VAR à paramètres variables dans le temps autrement standard. Nos résultats montrent aussi que les chocs d'inflation par les coûts aideraient grandement à expliquer les variations de la persistance de l'inflation au fil du temps.

Privacy as a Public Good: A Case for Electronic Cash

Privacy is a feature inherent to the use of cash for payments. With steadily increasing market shares of commercial digital payments platforms, privacy in payments may no longer be attainable in the future. In this paper, we explore the potential welfare impact of reductions in privacy in payments in a dynamic framework. In our framework, firms may use data collected through payments to price discriminate among future customers. A public good aspect of privacy in payments arises because individual customers do not bear the full cost of failing to protect their privacy. As a consequence, they may suboptimally choose not to preserve their privacy in payments. When left to market forces alone, the use of privacy-preserving means of payments, such as cash, may decline faster than is optimal.

Allocative Efficiency and Aggregate Productivity Growth in Canada and the United States

This paper evaluates the contribution of allocative efficiency to the aggregate productivity growth in Canada and the US. In particular, we are interested in explaining two puzzling facts: 1) the slowdown in productivity growth during the 1970s and the 2000s in the US, and 2) the widening Canada-US productivity gap since the middle of the 1980s. We extend the framework of Oberfield (2013) to derive sufficient statistics for allocative efficiency and decompose aggregate productivity in an input-output economy à la Jones (2013). The lack of improvement in allocative efficiency can explain two-thirds of the US's productivity slowdown and more than one-third of the widening

Canada-US productivity gap. The allocation of capital, rather than labor, was the main driver behind the overall movement in allocative efficiency. Resources allocated to service sectors were significantly lower than the optimal level. It improved markedly over time, especially in the US before the 2000s.

Using Payments Data to Nowcast Macroeconomic Variables During the Onset of COVID-19

The COVID-19 pandemic and the resulting public health mitigation have caused large-scale economic disruptions globally. During this time, there is an increased need to predict the macroeconomy's short-term dynamics to ensure the effective implementation of fiscal and monetary policy. However, economic prediction during a crisis is challenging because of the unprecedented economic impact, which increases the unreliability of traditionally used linear models that use lagged data. We help address these challenges by using timely retail payments system data in linear and nonlinear machine learning models. We find that compared to a benchmark, our model has a roughly 15 to 45% reduction in Root Mean Square Error when used for macroeconomic nowcasting during the global financial crisis. For nowcasting during the COVID-19 shock, our model predictions are much closer to the official estimates.

Chinese Monetary Policy and Text Analytics: Connecting Words and Deeds

Given China's complex monetary policy framework, the People's Bank of China's (PBOC) monetary policy rule is difficult to infer from its observed behaviour. In this paper, we adopt a novel approach, using text analytics to estimate and interpret the unknown component in the PBOC's reaction function. We extract the unknown component in a McCallum-type monetary policy rule for China through a state-space model framework using a set of summary topics extracted from official PBOC documents. Then, using a set of sectional topics extracted from the same set of PBOC documents, we provide this component with its rightful interpretation. Our results show that this unknown component is related to the Chinese government's agenda of supply-side structural reforms, suggesting that monetary policy is used as a tool to achieve structural reform objectives. Structural vector autoregression (SVAR) results confirm these findings by providing evidence of the importance of the government's supply-side reform objectives for the conduct of monetary policy.

Networking the Yield Curve: Implications for Monetary Policy

We introduce a flexible, time-varying network model to trace the propagation of interest rate surprises across different maturities. First, we develop a novel econometric framework that allows for unknown, potentially asymmetric contemporaneous spillovers across panel units and establish the finite sample properties of the model via simulations. Second, we employ this innovative framework to jointly model the dynamics of interest rate surprises and to assess how various monetary policy actions—for example, short-term, long-term interest rate targeting and forward guidance—propagate across the yield curve. We find that the network of interest rate surprises is indeed asymmetric and defined by spillovers between adjacent maturities. Spillover intensity is high on average but shows strong time variation. Forward guidance is an important driver of the spillover intensity. Pass-through from short-term interest rate surprises to longer maturities is muted, yet there are stronger spillovers associated with surprises at medium- and long-term maturities. We illustrate how our proposed framework helps our understanding of the ways various dimensions of monetary policy propagate through the yield curve and interact with each other.

(Optimal) Monetary Policy with and without Debt

We propose a framework of optimal monetary policy where debt sustainability may, or may not, be a relevant constraint for the central bank. We show analytically that in each environment the optimal interest rate path consists of a Taylor rule augmented with forward guidance terms. These terms arise either i) from “twisting interest rates” when the central bank ensures debt sustainability, or ii) under no debt concerns, from committing to keep interest rates low at the exit of the liquidity trap. The optimal policy is isomorphic to Leeper’s (1991) “passive monetary/active fiscal policy” regime in the first instance, or “active monetary/passive fiscal policy” regime in the second. We insert our framework into a standard medium scale DSGE model calibrated to the US. Optimal passive monetary policy with debt concerns is ineffective in stabilizing inflation, whereas under no debt concerns, monetary policy is very effective in stabilizing the macroeconomy.

Eggs in One Basket: Security and Convenience of Digital Currencies

Digital currencies store balances in anonymous electronic addresses. We analyze the tradeoffs between the safety and convenience of

aggregating balances in addresses, electronic wallets and banks. In our model, agents balance the risk of theft of a large account with the cost to safeguarding a large number of passwords for many small accounts. Account custodians (banks, wallets and other payment service providers) have different objectives and trade-offs along these dimensions; we analyze the welfare effects of differing industry structures and interdependencies. In particular, we examine the consequences of “password aggregation” programs, which, in effect, consolidate risks across accounts.

Estimating Policy Functions in Payments Systems Using Reinforcement Learning

This paper uses reinforcement learning (RL) to approximate the policy rules of banks participating in a high-value payments system. The objective of the agents is to learn a policy function for the choice of amount of liquidity provided to the system at the beginning of the day. Individual choices have complex strategic effects precluding a closed form solution of the optimal policy, except in simple cases. We show that in a simplified two-agent setting, agents using reinforcement learning do learn the optimal policy that minimizes the cost of processing their individual payments. We also show that in more complex settings, both agents learn to reduce their liquidity costs. Our results show the applicability of RL to estimate best-response functions in real-world strategic games.

Qualitative Field Research in Monetary Policy Making

Beaucoup de banques centrales mènent des recherches sur le terrain au cours desquelles elles effectuent des entretiens approfondis avec des acteurs du tissu économique de leur pays. Cependant, on en sait très peu sur la manière dont les renseignements ainsi recueillis sont utilisés et sur l'importance qu'ils revêtent dans la conduite de la politique monétaire. Pour remédier à cette lacune, nous réalisons une analyse thématique d'entretiens à questions ouvertes menés auprès de cadres supérieurs de banques centrales chargés des questions d'analyse et de politique économiques et qui travaillent de près avec les décideurs de leur institution. Nous constatons que, pour ces cadres, les renseignements obtenus lors des recherches sur le terrain sont non seulement utiles, mais aussi essentiels pour la formulation de la politique monétaire. Les cadres se servent de ces renseignements conjointement avec des outils quantitatifs, principalement pour éclairer leurs prévisions à court terme. Ces renseignements s'avèrent très précieux dans deux cas : quand l'économie pourrait se trouver à un point de retournement compte

tenu de l'incertitude élevée entourant le rythme de croissance économique (lorsque l'économie subit des chocs importants); et quand des données officielles à jour ne sont pas disponibles ou qu'elles ne sont pas considérées comme fiables. Les cadres supérieurs accordent aussi une grande importance au maintien d'un échantillon fiable et crédible d'agents économiques représentatifs qu'ils peuvent consulter régulièrement et très rapidement, au besoin.

ÉVÉNEMENTS À VENIR

***Toutes conférences et activités qui devaient être tenues sur place sont suspendues jusqu'à nouvel ordre. Tous les événements ci-dessous auront lieu en ligne.**

John Grigsby (Northwestern)

Organisateur: Série Conférencier EFR CEA/INT

Date: 5 mars 2021

Jens Christensen (Federal Reserve Bank of San Francisco)

Organisateur: Série Conférencier FMD/FSD EFR

Date: 11 mars 2021

Philipp Schnabl (NYU Stern)

Organisateur: Série Conférencier FMD/FSD EFR

Date: 18 mars 2021

Greg Howard (University of Illinois, Urbana-Champaign)

Organisateur: Série Conférencier FMD/FSD EFR

Date: 25 mars 2021

Matteo Maggiori (Stanford Graduate School of Business)

Organisateur: Kemal Ozhan

Date: 6 avril 2021

Garth Heutel (Georgia State University)

Organisateur: Série Conférencier FMD/FSD EFR

Date: 15 avril 2021

Michael Weber (University of Chicago)

Organisateur: Série Conférencier EFR CEA/INT

Date: 30 avril 2021