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Employment

Bank of Canada, Ottawa

– Senior Director, Payments Policy and Research	November 2024 – Present
– Director, CBDC & FinTech Policy	February 2020 – October 2024
– Senior Research Advisor	September 2017 – January 2020
– Director of Research	October 2014 – August 2017
– Principal Researcher	July 2012 – September 2014
– Senior Analyst	August 2009 – June 2012

Deutsche Bank, New York

– Summer Associate	June – August 2007

ITAM, Mexico City

– Visiting Researcher	September 2005

Banco de México, Mexico City

– Summer Researcher	July – August 2005
– Analyst	February 2001 – September 2003

Education

Ph.D. Economics, **The University of Chicago**, June 2009.

Committee: Fernando Alvarez, Lars P. Hansen, Monika Piazzesi.

M.A. Economics, **The University of Chicago**, June 2005.

B.A. Economics, **Instituto Tecnológico Autónomo de México (ITAM)**, January 2003.

Research

Refereed publications

Estimating Policy Functions in Payment Systems Using Reinforcement Learning / with P. Castro, A. Desai, H. Du, R. Garratt / Best Empirical Paper Award, NeurIPS 2020 Workshop on Machine Learning for Economic Policy / *ACM Transactions on Economics and Computation* 13(1), 2025. [journal] [working paper]

Improving the Efficiency of Payments Systems Using Quantum Computing / with A. Desai and D. Marsden / *Management Science* 70(10), 2024. [journal] [working paper]

Payment Coordination and Liquidity Efficiency in Wholesale Payments Systems / with N. Zhang / *Journal of Financial Market Infrastructures* 10(3), March 2022. [journal] [working paper]

Alternative Futures for Government of Canada Debt Management / with C. Garriott, S. Lefebvre, G. Nolin and A. Walton / *Journal of Financial Economic Policy* 12(4), December 2020. [journal] [working paper]

Should the Central Bank Issue E-money? / with Charles M. Kahn and Russell Wong / *Journal of Financial Market Infrastructures* 8(4), 2020. [journal] [working paper]

A Policy Framework for E-Money / with M. Davoodalhosseini / *Canadian Public Policy* 46(1), March 2020. [journal] [working paper]

Government Bond Clienteles and Yields / with J. Jin and J. Sierra / in *Advances in the Practice of Public Investment Management*, Palgrave, 2018. [chapter]

Financial Development, Credit and Business Cycles / with T. Pinheiro & M. Teignier / *Journal of Money, Credit and Banking* 49(7), October 2017. [journal] [working paper]

Monopolies and Economic Growth / with Pablo Peña / *Gaceta de Economía*, Fall 2009.

The Law of One Price in Mexico: an Empirical Analysis / with M. González / *Gaceta de Economía* 9(18), 2004. [pdf]

Trade Creation and Trade Diversion from Preferential Trade Agreements: New Estimates for NAFTA / with J. Chavez / *Gaceta de Economía* / 14-2002.

Working Papers

Instant Payments, Fraud, and Optimal Consumer Protection / with Y. Cheng and C. M. Kahn / Bank of Canada Staff Working Paper 2026-41, November 2026. [link]

Public vs. Private Payment Platforms: Market Impacts and Optimal Policy / with Y. Liu and E. Reshidi / Bank of Canada Staff Working Paper 2026-10, March 2026. [link]

Intraday Liquidity Around the World / with E. Benos, J. Chapman, et al. / BIS Working Paper No. 1089, April 2023. [link]

Information Structure and Strategic Interactions in the Payments System Liquidity Management Game / with V. Aguirregabiria and E. Xie / work in progress.

Eggs in One Basket: Security and Convenience of Digital Currencies / with C. M. Kahn and R. Wong / Bank of Canada Staff Working Paper 2021-6; under review at *Journal of Cybersecurity*. [link]

Intraday Trade Dynamics in Short-term Funding Markets / with M. Rempel / work in progress.

Non-refereed

Ecosystem Models for a Central Bank Digital Currency: Analysis Framework and Potential Models / with Y. Liu, E. Reshidi, O. Shcherbakov & A. Stenzel / Bank of Canada

Staff Discussion Paper 2024-13, September 2024. [link]

The Role of Public Money in the Digital Age / with S. Hendry & A. García / Bank of Canada Staff Discussion Paper 2024-11, July 2024. [link]

The Potential Competitive Effects of CBDC on Deposits, Payments and Bank Business Models / with Y. Liu, E. Reshidi & A. Usher / in K. Stylianou, M. Iacovides and B. Lundqvist (eds.), *Fintech Competition: Law, Policy, and Market Organisation*, Hart Publishing, 2023. [link]

Central Bank Digital Currencies and Banking: Literature Review and New Questions / with J. Chapman, J. Chiu, M. Davoodalhosseini, J. H. Jiang & Y. Zhu / Bank of Canada Staff Discussion Paper 2023-4, February 2023. [link]

Central Bank Digital Currency, Bank Intermediation and Payments / with J. Chiu / in D. Niepelt (ed.), *Central Bank Digital Currency: Considerations, Projects, Outlook*, CEPR Press, 2021. [link]

An Overview of the Bank of Canada CBDC Project / with J. Chiu / in D. Niepelt (ed.), *Central Bank Digital Currency: Considerations, Projects, Outlook*, CEPR Press, 2021. [link]

The Positive Case for a CBDC / with S. Hendry, E. Reshidi & A. Usher / Bank of Canada Staff Discussion Paper 2021-11, July 2021. [link]

Security and Convenience of a Central Bank Digital Currency / with C. M. Kahn / Bank of Canada Staff Analytical Note 2020-21, October 2020. [link]

Liquidity Usage and Payment Delay Estimates of the New Canadian High Value Payments System / with N. Zhang / Bank of Canada Staff Discussion Paper 2020-9, September 2020. [link]

CBDC and Monetary Policy / with M. Davoodalhosseini & Y. Zhu / Bank of Canada Staff Analytical Note 2020-4, February 2020. [link]

The Government of Canada Debt Securities Data Set / with J. Gao and G. Rodriguez Rondon / Bank of Canada Technical Report No. 112, 2018. [link] [data 1] [data 2]

Fintech: Is This Time Different? A Framework for Assessing Risks and Opportunities for Central Banks / with M. Aaron and S. Sohal / Bank of Canada Staff Discussion Paper 2017-10. [link]

The Canadian Dollar as a Reserve Currency / with L. Pomorski & E. Wolfe / *Bank of Canada Review* / Spring 2014. [pdf]

Modelling the Asset-Allocation and Liability Strategy for Canada's Foreign Exchange Reserves / with J. Jin, N. Bulusu & L. Pomorski / *Bank of Canada Review* / Spring 2013. [pdf]

The U.S.-Dollar Supranational Zero-Coupon Curve / Bank of Canada Discussion Paper 2012-5, June 2012. [link]

A Model of the EFA Liabilities / with O. Dissou / Bank of Canada Discussion Paper 2011-11, December 2011. [link]

Public Speaking: Selected Panel Discussions and Presentations

The Future of Money at Munk School, panel, Toronto, 2024.

CEMLA IV Meeting of the Fintech Forum, panel discussion, virtual, March 2021. [slides]

CEMLA FMI Course, "A Course on CBDC", virtual, November 2020.

Global Blockchain Week, October 2020, virtual.

CONSENSYS webinar, "CBDC & Stablecoins", virtual, 2020.

Payments Canada, Podcast on CBDC, joint with Rod Garratt, 2020. [podcast]

Treasury Management Association of Canada, Toronto, "Digital Currencies, Blockchain and their Impact on Finance", November 2019.

First Stellar Foundation Conference, panel discussion on CBDC, Mexico City, November 2019.

DECONOMY, panel discussion on blockchain and CBDC, Seoul Korea, March 2019.

American Bar Association FinTech Meetings, panel discussion, Vancouver, March 2019.

CEMLA II Meeting of the Fintech Forum, panel discussion, Mexico City, March 2019.

IMF-Georgetown IIEL Crypto Asset Research and Policy Conference, panel discussion, Washington D.C., November 2018.

Atlanta Fed Conference on the Financial Stability Implications of New Technology, October 2018.

Distributed Ledger Technologies and E-money, panel discussion at the DnB, Amsterdam, June 2017.

Selected Academic Conferences and Invited Seminar Presentations

2023: Central Bank of Brazil / UNC. **2022:** Tokenomics, Paris. **2019:** FRB Chicago Seminar / Banco de México Seminar. **2018:** 16th Bank of Finland Payment and Settlement System Simulation Seminar, Helsinki / IMF-Bank of Botswana-BoC Fintech Workshop, Gaborone, Botswana / IMF Seminar Presentation on FinTech, Washington. **2017:** Workshop on Money, Banking, Payments and Finance, Ottawa / RBNZ and University of Victoria, Wellington, New Zealand / Bank for International Settlements, Basel, Switzerland. **2016:** Economics of Payments VIII, Eltiville, Germany / Bank of Mexico. **2014:** Bank for International Settlements, Basel, Switzerland / Canadian Economics Association Meetings, Vancouver, BC. **2013:** Canadian Economics Association Meetings, Montreal, QC / HEC Winter Finance Workshop. **2012:** Midwest Economics Association Meetings, Evanston, IL / Swiss National Bank, Zurich, Switzerland. **2011:** Asian Meetings of the Econometric Society, Seoul, Korea / Society of Economic Dynamics, Ghent, Belgium / Canadian Economics Association Meetings, Ottawa / Midwest Economics Association Meetings, St. Louis MO. **2010:** Econometric Society World Congress, Shanghai / Canadian Economics Association

Meetings, Quebec City. **2009:** Federal Reserve Bank of Boston, Bank of England, BBVA, Goldman Sachs. **2005:** ITAM, Mexico City / Banco de México.

Conferences Organized

Co-organizer, **1st and 2nd Bank of Canada – Riksbank Conference on the Economics of CBDC**, September 2019 and November 2023.

Co-organizer, **5th Bank of Canada – Payments Canada Fall Payments Workshop**, September 2018.

Co-organizer, **Summer Workshop on Money, Banking, Payments and Finance**, Ottawa, August 2017.

Co-organizer, **The BIS/WB/BoC Sixth Public Investors Conference**, November 2016.

Co-organizer, **The Bank of Canada and Canadian Payments Association Workshop on the Modelling and Simulation of Payments and Other Financial System Infrastructures**, October 2016.

Co-organizer, **Foreign Reserves Management Conference**, October 2013.

Co-organizer, **Workshop on Advances in Financial Econometrics**, May 2011.

Organizer, **Funds Management visitor speaker series**, 2010–2011.

Volumes Edited

Journal of Financial Market Infrastructures, Special Issue for the Financial Market Infrastructures Conference 2, *A policy view on developments in the field of financial market infrastructures* (with B. Alexandrova-Kabadjova, E. Benos, J. Braithwaite, J. Cruz Lopez, R. Heijmans, M. Manning and D. Murphy), Vol 6, Number 2/3 2018. [link]

Advances in the Practice of Public Investment Management (with N. Bulusu, J. Coche, A. Reveiz, V. Sahakyan and G. Yanou), Palgrave, 2018. [link]