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EDUCATION	Ph.D. in Economics, McGill University , Montréal, QC, Canada M.Sc. in Financial engineering, Temple University , Philadelphia, PA, USA B.Sc. in Finance, University of Kansas , Lawrence, KS, USA		2019 - 2025 (expected) 2016 2015
RESEARCH FIELDS	Econometrics, Monetary Macroeconomics, Dynamic Causality, High Dimensional Time Series		
DISSERTATION	<i>Essays on generalized impulse responses, causality, and policy intervention in dynamic models</i> Committee: Prof. Jean-Marie Dufour (Chair), Prof. Victoria Zinde-Walsh (co-supervisor), Prof. Russell Davidson		
JOB MARKET PAPER	“Structural counterfactual analysis in macroeconomics: theory and inference.” <i>sole author</i> , September 2024, 78 pages. Abstract: We propose a structural model-free methodology to analyze two types of macroeconomic counterfactuals related to policy path deviation: hypothetical trajectory and policy intervention. Our model-free approach is built on a structural vector moving-average (SVMA) model that relies solely on the identification of policy shocks, thereby eliminating the need to specify an entire structural model. Analytical solutions are derived for the counterfactual parameters, and statistical inference for these parameter estimates is provided using the Delta method. By utilizing external instruments, we introduce a projection-based method for the identification, estimation, and inference of these parameters. This approach connects our counterfactual analysis with the Local Projection literature. A simulation-based approach with nonlinear model is provided to add in addressing Lucas’ critique. The innovative model-free methodology is applied in three counterfactual studies on the U.S. monetary policy: (1) a historical scenario analysis for a hypothetical interest rate path in the post-pandemic era, (2) a future scenario analysis under either hawkish or dovish interest rate policy, and (3) an evaluation of the policy intervention effect of an oil price shock by zeroing out the systematic responses of the interest rate.		
RESEARCH STATEMENT	I am an econometrician with a strong interest in macroeconomics, high-dimensionality, and dynamic models. My current research focuses on developing empirical methodologies and exploring innovative estimation method and statistical inference to reveal dynamic causal mechanisms, potentially in a rich data set. My research agenda addresses the following key areas: (i) empirical structural methods for conducting macroeconomic counterfactuals to explore the causal mechanism of policy interventions; (ii) effective estimation methods and statistical inference for high-dimensional time series; and (iii) "HAC-free" statistical inference for multi-horizon linear projection.		
OTHER RESEARCH PAPERS	<ul style="list-style-type: none">“Simple robust two-stage estimation and inference for generalized impulse responses and multiple-horizon causality” with Jean-Marie Dufour (McGill University). September 2024, 106 pages. (submitted)“Inference in high-dimensional linear projections: multi-horizon Granger causality and network connectedness” with Eugène Dettaa (Université de Montréal). September 2024, 57 pages.		

	<ul style="list-style-type: none"> • “Causal mechanism and mediation analysis for macroeconomics dynamics” with Jean-Marie Du-four (McGill University). April 2024, 32 pages.
WORK-IN-PROGRESS	<ul style="list-style-type: none"> • “Estimation and inference on time-varying impulse responses in high dimensional state-dependent VAR.” June 2024. • “Generic identification and practical specification for multivariate time series.” October 2023. • “The (mis)-identification and estimation of structural impulse responses in sub-space VAR model.” May 2023.
TEACHING EXPERIENCE	<p>McGill University (Instructor)</p> <p>ECON 662D2, Econometrics, Winter 2023 (Graduate level, half term, 19 students) ECON 742, Empirical Microeconomics, Winter 2023 (Graduate level, half term, 4 students)</p> <p>McGill University (Teaching Assistant)</p> <p>ECON 209, Intro to Macroeconomics, Winter 2024 (213 students) ECON 661, Applied Time Series & Forecast, Fall 2023 (29 students) ECON 661, Applied Time Series & Forecast, Winter 2023 (9 students) ECON 664, Applied Cross-sectional Methods, Winter 2023 (11 students) ECON 337, Introduction to Econometrics, Fall 2022 (69 students) ECON 257, Economic Statistics (honour), Winter 2022 (77 students) ECON 227, Economic Statistics, Fall 2020, Winter 2021, Fall 2021 (127, 85, 141 students) ECON 209, Intro to Macroeconomics, Winter 2020 (135 students) ECON 208, Intro to Microeconomics, Fall 2019 (314 students)</p>
FELLOWSHIPS AND AWARDS	<p>The Fonds de recherche du Québec - Société et culture (FRQSC) 2022 - 2025 (CAD \$54,333, <i>File: 316191, Rank: 3/19, Project title: Inférence statistique analytique pour l'autorégression à horizons multiples avec un processus VAR (MA) éventuellement cointégré</i>) GREAT Travel Award, McGill University, 2024 Grad Excellence Award, McGill University, 2019 - 2020, 2021 - 2024 The International Association for Applied Econometrics (IAAE) Travel Grant Clifford Wong Fellowship, McGill University, 2019 - 2020 Dean Certificate of Excellence, Temple University, 2016 The Distinguished Scholar Awarded, Temple University, 2016 Dean's Tuition Scholarship, Temple University, 2015 The Chartered Financial Analyst (CFA) Scholarship, University of Kansas, 2015 University Honors Society, University of Kansas, 2013 - 2015</p>
PAPERS PRESENTED IN SEMINARS AND CONFERENCES (* BY CO-AUTHOR)	<ul style="list-style-type: none"> • “Structural counterfactual analysis in macroeconomics: theory and inference” <i>sole author</i> (Job Market Paper) <ul style="list-style-type: none"> – 2025 ES-NAWM, San Francisco, CA, 5-January 2025 (<i>scheduled</i>) – CIREQ-McGill Lunch Seminar, Montreal, QC, 12-November 2024 (<i>scheduled</i>) – 2024 Canadian Econometric Study Group Meeting, Toronto, ON, 25-October 2024 (<i>scheduled</i>) – Dagenais seminar at the Université de Montréal, Montreal, QC, 24-October 2024 (<i>scheduled</i>) – CIREQ-McGill Lunch Seminar, Montréal, QC, 09-July 2024 – CESG-CEA annual conference, Toronto, ON, 01-June 2024 – Graduate Student Poster at CEA annual conference, Toronto, ON, 30-May 2024 – 19th CIREQ PhD Students' Conference, Montréal, QC, 23-May 2024

- “Causal mechanism and mediation analysis for macroeconomics dynamics” with Jean-Marie Dufour (McGill University)
 - 2024 ES-NAWM, San Antonio, TX, 07-January 2024
 - Canadian Econometrics Study Group*, Hamilton, ON, 28-October 2023
 - NBER-NFS Time Series conference*, Montréal, QC, 23-September 2023
- “Simple robust two-stage estimation and inference for generalized impulse responses and multiple-horizon causality” with Jean-Marie Dufour (McGill University)
 - 2024 ES-NASM, Nashville, TN, 13-June 2024
 - CIREQ-McGill Lunch Seminar, Montréal, QC, 27-February 2024
 - Joint Statistical Meetings, Toronto, ON, 09-August 2023
 - IAAE, Oslo, Norway, 29-July 2023
 - Asia Meeting of the Econometric Society, virtual, 30-June, 2023
 - CEA annual Conference, Winnipeg, MB, 03-June 2023
 - CIREQ Colloquium on Econometrics, Montréal, QC, 05-May 2023
 - CMS-CFE conference, virtual, 17-December 2022
 - IWH-CIREQ-GW Macroeconometric Workshop*, Halle, Germany, 28-November 2022
 - NBER-NFS Time Series conference, Boston, MA, 24-September 2022
 - CIREQ-McGill Lunch Seminar, Montréal, QC, 5-July 2022
 - 17th CIREQ PhD Students’ Conference, Montréal, QC, 07-June 2022
- “Inference in high-dimensional linear projections: multi-horizon Granger causality and network connectedness” with Eugène Detta (Université de Montréal)
 - Dagenais seminar at the Université de Montréal*, Montreal, QC, 17-October 2024 (*scheduled*)
 - NBER-NFS Time Series conference*, Philadelphia, PA, 21-September 2024
 - CIREQ-CMP Econometrics Conference in Honor of Eric Ghysels, Montréal, QC, 11-May 2024
- “Generic identification and practical specification for multivariate time series.”
 - 18th CIREQ PhD Students’ Conference, Montréal, QC, 18-May 2023

SERVICES Chair, Session on Forecasting II in ES-NASM, Nashville, TN, 2024.
 Chair, Session on Time Series and Financial Econometrics in ES-NAWM, San Antonio, TX, 2024.

CERTIFICATE Passed CFA (Chartered Financial Analysts) Level III Exam

REFEREE International Statistical Review.

LANGUAGES Mandarin (native), English (fluent).

SKILLS R, Matlab, Python, Stata, \LaTeX

CITIZENSHIP China

REFERENCES

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ABSTRACT OF OTHER
RESEARCH PAPERS

- **“Simple robust two-stage estimation and inference for generalized impulse responses and multiple horizon causality”** with Jean-Marie Dufour (McGill University). September 2024, 106 pages.

This paper introduces a novel two-stage estimation and inference procedure for *generalized impulse responses* (GIRs). GIRs encompass all coefficients in a multi-horizon linear projection model of future outcomes of y on lagged values (Dufour and Renault, 1998). The conventional use of Least Squares (LS) with heteroskedasticity- and autocorrelation-consistent covariance estimation often results in unreliable finite sample tests, further complicated by the selection of bandwidth and kernel functions. Our two-stage method surpasses the LS approach in terms of estimation efficiency and robustness in finite-sample tests. The robustness stems from our proposed covariance matrix estimates, which eliminate the need to correct for serial correlation in the multi-horizon projection residuals. Additionally, our method accommodates non-stationary data and allows the projection horizon to grow with sample size. Monte Carlo simulations demonstrate our two-stage method outperforms the LS method. We apply the two-stage method to investigate the multi-horizon Granger causality of economic uncertainty and find that economic uncertainty exerts both short-run (1-3 months) and long-run (30 months) effects on economic activity.

- **“Inference in high-dimensional linear projections: multi-horizon Granger causality and network connectedness”** with Eugène Dettaa (Université de Montréal). September 2024, 57 pages

This paper presents a Wald test for multi-horizon Granger causality within a high-dimensional sparse Vector Autoregression (VAR) framework. The null hypothesis focuses on the causal coefficients of interest in a local projection (LP) at a given horizon. Nevertheless, the post-double-selection method on LP may not be applicable in this context, as a sparse VAR model does not necessarily imply a sparse LP for horizon $h > 1$. To validate the proposed test, we develop two types of de-biased estimators for the causal coefficients of interest. The first estimator is derived from the Least Squares method, while the second is obtained through a two-stage approach that offers potential efficiency gains. We further derive heteroskedasticity- and autocorrelation-consistent (HAC) inference for each estimator. Additionally, we propose a robust inference method for the two-stage estimator, eliminating the need to correct for serial correlation in the projection residuals. Monte Carlo simulations show that the two-stage estimator with robust inference outperforms the Least Squares method, particularly for longer projection horizons. We apply our methodology to test both short-run and long-run Granger causality between country-level economic uncertainty measures and to visualize network connectedness across horizons. Our empirical findings reveal that the U.S. Granger-causes China in the short run (1 and 3 months), while China influences the U.S. in the long run (9 and 12 months).

- **“Causal mechanism and mediation analysis for macroeconomics dynamics”** with Jean-Marie Dufour (McGill University). September 2024, 32 pages.

In macroeconomic dynamics, a primary objective is to disentangle the contribution of individual variables in the causal transmission of exogenous interventions across multiple horizons. This pa-

per introduces an innovative index that quantitatively measures the weighted contribution of variables during the propagation of a structural shock over time, offering researchers a perspicuous understanding of the causal transmission mechanisms. The index is based on the novel concept of ‘impulse response decomposition,’ which shows that the impulse response is attributed to the systematic responses of endogenous variables influenced by the initial shock. We employ a counterfactual exercise to evaluate the index under the scenario that the variable of interest has no mediation effect on the output variable in the shock propagation. We apply our channel index to quantify the dynamic contribution of each variable in an inflation shock transmission, thereby illuminating the causal mechanism of inflation on output.

ABSTRACT OF
WORK-IN-PROGRESS
PAPERS

- **“Estimation and inference on time-varying impulse responses in high dimensional state dependent VAR”** with Rosnel Sessinou (Erasmus University Rotterdam)

This paper introduces a novel estimation method and derives asymptotic inferences for time-varying impulse responses within a high-dimensional (HD) state-dependent VAR model. Existing approaches based on HD Local Projection (HDLP) methods often lack a robust theoretical foundation, particularly due to potential discrepancies in impulse response estimands between VAR and Local Projection techniques in nonlinear contexts. In contrast, our approach is rigorously rooted in the state-dependent VAR framework. We further address the challenge of asymptotic bias in impulse response estimation in high-dimensional settings, thus filling a critical gap in the literature on state-dependent impulse response in HD framework. Additionally, our work complements existing research on impulse response estimation in HD linear VAR models. The effectiveness of the methodology is supported through Monte Carlo simulations, and we illustrate its practical application in two macroeconomic contexts: monetary policy and government spending.

- **“Generic identification and practical specification for multivariate time series”**

This paper introduces a novel identification condition for vector autoregressive moving-average (VARMA) processes based on the second moments of the explanatory variables. The proposed condition supports a wide range of commonly used VARMA representations, including the Echelon form, Scalar Component model, and Diagonal (final) equation form. We also present an identified VARMA representation alongside a specification procedure that is both practical and user-friendly. Compared to traditional methods such as the Echelon form, our representation offers greater structural flexibility, enhanced computational efficiency in estimation, and better integration with the structural VARMA framework. The paper features Monte Carlo simulations, a comparison of VARMA and VAR models in terms of impulse response estimation, and an empirical analysis of the dynamic causal effects of monetary policy shocks.

- **“The (mis)-identification and estimation of impulse responses in sub-space VAR model”**

This paper compares the identification and estimation of impulse responses under a sub-space Vector Autoregression (VAR) framework using Structural VAR (SVAR) and Local Projection (LP) methods with external instruments. A sub-space VAR refers to a situation where the model is selected from a larger VAR system with omitted variables, a well-known issue in microeconometrics but often overlooked in macroeconometrics. Our study contributes to the literature on external instrumental variable estimation of impulse responses by: (1) examining the bias-variance trade-off between SVAR and LP impulse response estimates under a sub-space VAR model; (2) establishing the necessary and sufficient conditions for the equivalence of SVAR and LP impulse response estimands; and (3) proposing a specification test for the validity of external instruments in proxy-SVAR analysis.