Sullivan Hué (27 years old, 02/06/1994)

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Research interests:
Primary: Financial Econometrics,
Systemic risk, Financial regulation,
Risk measurement.
Secondary: Machine Learning,
Data Science.

Employment

2021 - **Post-Doctoral Fellow**, Aix-Marseille School of Economics (AMSE)

2020 - 2021 **Post-Doctoral Fellow**, ANR CaLiBank (ANR-19-CE26-0002-02)
The CaLiBank project aims to provide a rigorous investigation into the expected responses of banks to the tightening of bank capital rules mandated by Basel III, as well as to highlight the particular response of systemically important banks to the changes in capital requirements in presence of the new regulatory liquidity constraints.
CaLiBank gathers researchers from two french research centers: LAPE (University of Limoges) and LEO (University of Orléans).

Education

2017 -2020 **Ph.D. in Econometrics and Finance**
Laboratoire d'Economie d'Orléans
Title: "Four Essays on Financial Risk Measurement"
Supervisors: Sessi Tokpavi (LEO), Elena Dumitrescu (EconomiX)
Committee: Bertrand Candelon (Université catholique de Louvain), Olivier Darne (LEMNA), Sébastien Laurent (AMSE), Grégory Levieuge (Banque de France), Valérie Mignon (EconomiX), Jean-Paul Renne (HEC Lausanne)
Defense: December 11, 2020

2015 -2017 **Master in Econometrics and Applied Statistics**
University of Orléans

2012 - 2015 **Bachelor in Economic and Management**
University of Orléans

Grants

2017 - 2020 **Ph.D. Scholarship**
French Ministry of Education and Scientific Research

References

Sessi Tokpavi
Professor, University of Orléans
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Christophe Hurlin
Professor, University of Orléans
christophe.hurlin@univ-orleans.fr

Jean-Paul Renne
Professor, HEC Lausanne
jean-paul.renne@unil.ch

Bertrand Candelon
Professor, Université Catholique de Louvain
candelonb@gmail.com

Research Work

Abstracts are on pages 5, 6 and 7.

Publications

Measuring Network Systemic Risk Contributions: A Leave-one-out Approach, *Journal of Economic Dynamics and Control, 100, 86–114* (Rank 1 CNRS, Rank A HCERES),
joint with Yannick Lucotte (LEO) and Sessi Tokpavi (LEO)

Machine Learning for Credit Scoring: Improving Logistic Regression with Non-Linear Decision-Tree Effects,
Forthcoming in *European Journal of Operational Research* (Rank 1 CNRS, Rank A HCERES),
joint with Elena Dumitrescu (EconomiX), Chrisotphe Hurlin (LEO) and Sessi Tokpavi (LEO)

Working Papers

Latent Factor Model for Default Tail Risk: an Integrated Approach to Systemic Risk Evaluation

Granger-Causality in Conditional Quantiles and Financial Interconnectedness,
joint with Jérémy Leymarie (EDHEC Business School)

Seminars and Conferences

1 **Séminaire interne**
Online, June 2021

69th Annual Meeting of the French Economic Association (AFSE)
Online, June 2021

37th Annual Conference of the French Finance Association (AFFI)
Online, May 2021

2021 AAP/ANR CaLiBank Workshop
Online, May 2021

Workshop ANR MultiRisk 2019
Villa Finaly, Florence, Italy, April 2019

XXVII Rome International Conference on Money, Banking and Finance
LUISS University, Rome, Italy, December 2018

3rd Panorisk Conference: Risk, Markets, and the Real Economy
Audencia Business School, Nantes, November 2018

17ème Journée d'Econométrie : Développements récents de l'économétrie appliquée à la finance
University Paris Ouest - Nanterre La Défense, November 2018

12th International Workshop of Methods in International Finance Network (MIFN)
University of Louvain-la-Neuve, Belgium, November 2018

6th Applied Macroeconometric Workshop
MSH Paris Nord, October 2018

Financial Econometrics Conference: Market Microstructure, Limit Order Books and Derivative Markets
Lancaster University Management School, UK, September 2018

International Association for Applied Econometrics (IAAE)
UQAM, Canada, June 2018

35th Annual Conference of the French Finance Association (AFFI)
ESCP Europe, Paris, May 2018

7th PhD Student Conference in International Macroeconomics and Financial Econometrics
University Paris Ouest - Nanterre La Défense, March 2018

Séminaire interne
University of Orléans, February 2018

16ème Journée d'Econométrie : Développements récents de l'économétrie appliquée à la finance
University Paris Ouest - Nanterre La Défense, November 2017

Teaching

Big Data with SAS — Graduate School of Orléans Numérique, first and second years
The GSON is a university degree proposed to students of different masters from the University of Orléans
Lecture of 16H, from 2017 to 2020

Mathematical Statistics — Master Econometrics and Applied Statistics, first year
DEG, University of Orléans
Tutorial of 15H (×2), from 2017 to 2020

Advanced Linear Econometrics — Undergraduate (Economic and Management), third year
DEG, University of Orléans
Tutorial of 15H, from 2017 to 2020

Personal and Professional Project — Undergraduate (Economic and Management), second year
DEG, University of Orléans
Tutorial of 8H, 2017

Refereeing activities

Referee for the reviews: (Publons profile) International Economics, Journal of Economic Dynamics and Control, Economics Bulletin, Journal of Financial Stability, Computational Economics, Journal of Banking and Finance, Revue Économique

Organization of conferences

Member of the local organisation committee of the AFSE, University of Orléans, June 2019

Participation in Funded Research Projects

ANR MultiRisk 2017-2020 (ANR-16-CE26-0015-01) — Project: Econometric Methods for the Modelling of Multiple Risks
Coordinators: Christophe Hurlin (University of Orleans), Gaëlle LeFol (University Paris Dauphine), Jean-Michel Zakoian (CREST)

ANR CaLiBank 2020-2023 (ANR-19-CE26-0002-02) — Project: The Post-Crisis Banking Industry: How will banks respond to tighter regulatory constraints ?
Coordinator: Amine Tarazi (LAPE)

APR-IA RedFlag 2020-2022 (Convention: 2019-00134941) — Project: Fraud detection and anti-money laundering
Coordinators: Denisa Banulescu-Radu (LEO), Sandie Lacroix-De Sousa (CRJP)

Other

Econometric Game contest, Online, 8-9 April, 2021. Captain of University of Orléans' team.

Languages and Computer Skills

Languages: French (native), English

Computer: Matlab, R, Stata, SAS, Python

Research Work - Abstract

Measuring Network Systemic Risk Contributions: A Leave-one-out Approach,

The aim of this paper is to propose a new network measure of systemic risk contributions that combines the pair-wise Granger causality approach with the leave-one-out concept. This measure is based on a conditional Granger causality test and consists of measuring how far the proportion of statistically significant connections in the system breaks down when a given financial institution is excluded. We analyse the performance of our measure of systemic risk by considering a sample of the largest banks worldwide over the 2003–2018 period. We obtain three important results. First, we show that our measure is able to identify a large number of banks classified as global systemically important banks (G-SIBs) by the Financial Stability Board (FSB). Second, we find that our measure is a robust and statistically significant early-warning indicator of downside returns during the last financial crisis. Finally, we investigate the potential determinants of our measure of systemic risk and find similar results to the existing literature. In particular, our empirical results suggest that the size and the business model of banks are significant drivers of systemic risk.

Machine learning for credit scoring: Improving logistic regression with non-linear decision-tree effects,

In the context of credit scoring, ensemble methods based on decision trees, such as the random for- est method, provide better classification performance than standard logistic regression models. However, logistic regression remains the benchmark in the credit risk industry mainly because the lack of inter- pretability of ensemble methods is incompatible with the requirements of financial regulators. In this paper, we propose a high-performance and interpretable credit scoring method called penalised logistic tree regression (PLTR), which uses information from decision trees to improve the performance of logistic regression. Formally, rules extracted from various short-depth decision trees built with original predic- tive variables are used as predictors in a penalised logistic regression model. PLTR allows us to capture non-linear effects that can arise in credit scoring data while preserving the intrinsic interpretability of the logistic regression model. Monte Carlo simulations and empirical applications using four real credit default datasets show that PLTR

predicts credit risk significantly more accurately than logistic regression and compares competitively to the random forest method.

Latent Factor Model for Default Tail Risk: an Integrated Approach to Systemic,

This paper proposes an integrated approach for the evaluation of systemic risk, that provides the global level of systemic risk in a given financial system, as well as the individual contributions of each institution in the system. We measure the global level of systemic risk by the variability of the leading latent factor that drives the cross-sectional variations of tail risk of financial institutions' asset returns. Using US data, we find that this measure is reliable, as its value increases prior and during financial crisis, matches major financial institutions' collapses, and appears as a robust early warning indicator of severe economic downturns. As a by product, this global measure can be allocated across financial institutions, providing measures of systemic risk contribution. This individual measure of systemic risk is appealing as it provides a ranking of systemically important financial institutions that is consistent with historical institutions' instabilities, major collapses and the appointment of Global Systemically Important Banks, as well as being a significant early warning indicator of realised losses. Lastly, we study the role of the size and profitability of financial institutions on their probability of being systemic. The results suggest that the size is a significant driver of systemic risk, while the profitability reduces the probability of belonging to the category of systemic institutions.

Granger-Causality in Conditional Quantiles and Financial Interconnectedness,

This article develops a conditional quantile statistical framework to measuring financial interconnectedness. In contrast to analysis of contagion applied to conditional mean (Billio et al., 2012), we give assessment of contagion from a different location of the loss distribution of financial institutions. We consider the quantile autoregression model of Koenker and Xiao (2006) and set up a statistical test for Granger-causality in conditional quantiles that completes the Granger analysis in conditional mean (Granger, 1969). We compute several econometric measures of connectedness deduced from our statistical test. We apply our methodology to a panel of 113 US and European financial institutions over the period 2003-2019. Our econometric measures allow the identification of additional sources of financial contagion compared to the traditional measures computed in the mean. This suggests that quantile-type measures may throw new light on financial interconnectdness. Finally, we illustrate the predictive advantage of our approach as an early-warning indicator of the 2007-2009 financial crisis.