ALESSANDRO CASINI

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EDUCATION

Ph.D., Economics, Boston University, Boston MA, May 2019 (expected)
Dissertation Title: *Improved Methods for Statistical Inference in the Context of Various Types of Parameter Variation*
Main advisor: Pierre Perron
Dissertation Committee: Pierre Perron, Zhongjun Qu and Hiroaki Kaido

M.S., Economics, Barcelona GSE/Universitat Pompeu Fabra, Barcelona, 2012

Laura Specialistica, Economics *(Summa Cum Laude)*, University of Siena, Siena, 2011

Laura Triennale, Economics *(Summa Cum Laude)*, University of Siena, Siena, 2008

FIELDS OF INTEREST

Econometrics, Time Series Econometrics, Financial Econometrics

PUBLICATIONS AND SUBMITTED PAPERS

Alessandro Casini and Pierre Perron (2018) "Generalized Laplace Inference in Multiple Change-Points Models," under revision for resubmission to *Annals of Statistics.*

Alessandro Casini and Pierre Perron (2017) "Continuous Record Laplace-Based Inference in Structural Change Models," under revision for resubmission to *Journal of Econometrics.*

Alessandro Casini and Pierre Perron (2018) "Structural Breaks in Time Series," *Oxford Research Encyclopedias of Economics and Finance*, forthcoming.

Alessandro Casini (2013) "Reconsidering non-Keynesian Effects of Fiscal Consolidation over the Business Cycle," *Rivista di Politica Economica*, 4: 11-45 (Received Angelo Costa Award for best thesis in Economics, Italy, 2011).

WORKING PAPERS

"Theory of Evolutionary Spectra for Heteroskedasticity and Autocorrelation Robust Inference in Possibly Misspecified and Nonstationary Models," (Job Market Paper), October 2018.

"Testing for Forecast Instability and Forecast Failure under a Continuous Record Asymptotic Framework," January 2018.

"Continuous Record Asymtptotics for Structural Change Models," (with Pierre Perron) November 2017.

WORK IN PROGRESS

"A Useful Invariance Principle for Frequency Domain Statistics and Change-Point Analysis of Time Series with Evolutionary Spectra"

"On the Relationship between Span, Sample Size, Sampling Frequency and Break Magnitudes in Structural Change Models" (joint with Pierre Perron)

PRESENTATIONS

NBER/NSF Time Series Conference, San Diego, CA, 2018

11th Annual Meeting of the Society for Financial Econometrics (SoFiE), Lugano, 2018

FELLOWSHIPS AND AWARDS

Department Fellowship, Boston University, Department of Economics, 2015 to present

Best Second Year Paper Award, Boston University, Department of Economics, 2015

Summer Research Grant, Boston University, Department of Economics, Summer 2015 and Summer 2017

B. Stringher Scholarship, Bank of Italy, 2013-2015.

Angelo Costa Award from Rivista di Politica Economica (Best BA Thesis in Economics, Italy, 2011)

Fondazione Luigi Einaudi Scholarship, 2012-2013

ESRC WT DTC +3 Scholarship, 2012-2015 (declined)

Italian Government Scholarship for studying abroad, 2011-2012

Barcelona Graduate School of Economics Fellowship, 2011-2012

REFEREE EXPERIENCE

Journal of Business and Economic Statistics

TEACHING EXPERIENCE

Teaching Assistant, Advanced Econometrics I (EC708), Department of Economics, Boston University, Spring 2016 and Spring 2017

Teaching Assistant, Statistics for Economists (EC507), Department of Economics, Boston University, Fall 2015

LANGUAGES

Fluent in English and Italian

COMPUTER SKILLS: STATA, MATLAB, LaTeX

CITIZENSHIP/VISA STATUS: Italian/F1

REFERENCES

Professor Pierre Perron
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ALESSANDRO CASINI

Theory of Evolutionary Spectra for Heterosckedasticity and Autocorrelation Robust Inference in Possibly Misspecified and Nonstationary Models (Job Market Paper)

We develop a theory of evolutionary spectra for heteroskedasticity- and autocorrelation-robust (HAR) inference when the data may not satisfy second-order stationary. Nonstationarity is a common feature of economic time series which may arise either from model misspecification or from parameter variation. In such a context, the theory that supports classical heteroskedasticity and autocorrelation consistent (HAC) estimators is not applicable. *F*- and *t*-tests standardized by classical HAC estimators then may display undesirable properties such little or no power. We introduce a class of nonstationary stochastic processes that have a time-varying spectral representation which evolves continuously except at a finite number of time points and presents a new positive semidefinite HAC estimator that is consistent for the covariance matrix of any time series which enters such class. The HAC estimator applies two smoothing procedures. One is over the autocovariance lag order---akin to classical HAC estimators---and the other is over time. The latter element is not shared by the classical HAC estimators but it is crucial because the covariance structure of economic time series can evolve over time. We show the consistency of the estimator and obtain an optimal HAC estimator under mean-squared error (MSE) criterion. The optimal HAC estimator uses the Quadratic Spectral (QS) kernel for smoothing over autocovariance lag order and a quadratic-type kernel for smoothing over time. We propose a data-dependent procedure based on a "plug-in" approach that determines the bandwidth parameters for a given kernel and a given sample size. Overall, *F*- and *t*-tests standardized by the proposed HAC estimator control the statistical size well and have good power. In those empirically relevant situations in which test statistics standardized by classical HAC estimators have little or no statistical power, the proposed HAC estimator leads to test statistics that have good power so that HAR inference is then interpretable.

Continuous Record Asymptotics for Structural Change Models *(with Pierre Perron)*

For a partial structural change in a linear regression model with a single break, we develop a continuous record asymptotic framework to build inference methods for the break date. We have T observations with a sampling frequency h over a fixed time horizon $[0, N]$, and let $T \to \infty$ with $h \downarrow 0$ while keeping the time span N fixed. We impose very mild regularity conditions on an underlying continuous-time model assumed to generate the data. We consider the least-squares estimate of the break date and establish consistency and convergence rate. We provide a limit theory for shrinking magnitudes of shifts and locally increasing variances. The asymptotic distribution corresponds to the location of the extremum of a function of the quadratic variation of the regressors and of a Gaussian centered martingale process over a certain time interval. We can account for the asymmetric informational content provided by the pre- and post-break regimes and show how the location of the break and shift magnitude are key ingredients in shaping the distribution. We consider a feasible version based on plug-in estimates, which provides a very good approximation to the finite sample distribution. We use the concept of Highest Density Region to construct confidence sets. Overall, our method is reliable and delivers accurate coverage probabilities and relatively short average length of the confidence sets. Importantly, it does so irrespective of the size of the break.