

# Jozef BARUNÍK

VITAE 2015 (UPDATED DECEMBER)

INSTITUTE OF ECONOMIC STUDIES, CHARLES  
UNIVERSITY IN PRAGUE, OPLETALOVA 21,  
PRAGUE, CZECH REPUBLIC 110 00  
PHONE: +420 776 259273  
EMAIL: [barunik@fsv.cuni.cz](mailto:barunik@fsv.cuni.cz)  
WEB: <http://ies.fsv.cuni.cz/cs/staff/barunik>

INSTITUTE OF INFORMATION THEORY AND AU-  
TOMATION, ASCR, POD VODARENSKOU VEZI 4,  
PRAGUE, CZECH REPUBLIC 182 08  
PHONE: +420 776 259273  
EMAIL: [barunik@utia.cas.cz](mailto:barunik@utia.cas.cz)  
WEB: <http://staff.utia.cas.cz/barunik/>

## RESEARCH INTERESTS

---

MAIN FIELDS            Quantitative Finance, Financial Econometrics, Applied  
Econometrics

SUB-FIELDS            (Multivariate) Volatility, Long Memory, Big Data,  
Wavelets, Stochastic Catastrophe Theory, Multifractal  
models, Neural Networks.

FULL LIST OF PUBLICATIONS CAN BE FOUND [HERE](#)

## EDUCATION

---

2007 – 2011 (Sept.)    PhD in Economics, CHARLES UNIVERSITY, Prague  
Institute of Economic Studies  
2004 – 2006            Mgr. (MSc. equivalent) in Economics, PhDr., CHARLES UNIVERSITY, Prague  
Institute of Economic Studies  
2001 – 2004            Bc. (BSc. equivalent) in Economics, CHARLES UNIVERSITY, Prague  
Institute of Economic Studies

## ACADEMIC EXPERIENCE

---

2013 – CURRENT      Research Fellow (Deputy Head of the Department from  
2014) at ACADEMY OF SCIENCES OF THE CR  
*Institute of Information Theory and Automation*  
Department of Econometrics  
2011 – 2012            PostDoc at ACADEMY OF SCIENCES OF THE CR  
*Institute of Information Theory and Automation*  
Department of Econometrics  
2007 – 2011            Research Assistant at ACADEMY OF SCIENCES OF THE CR  
*Institute of Information Theory and Automation*  
Department of Econometrics  
2011 – CURRENT      Assistant Professor at CHARLES UNIVERSITY in Prague,  
*Institute of Economic Studies*  
Department of Macroeconomics and Econometrics, Re-  
searcher, Lecturer (Advanced Econometrics, Econometrics  
II, Quantitative Finance I, Quantitative Finance II, Ap-  
plied Econometrics)

## PUBLICATIONS

---

CITATIONS (SCOPUS): 158,

H-INDEX (SCOPUS): 5

CITATIONS (GOOGLE SCHOLAR): 349,

H-INDEX (GOOGLE SCHOLAR): 8

### SELECTED RESEARCH PUBLICATIONS

1. Asymmetric connectedness of stocks: How does bad and good volatility spill over the U.S. stock market? (with E. Kocenda and L.Vacha) *Journal of Financial Markets* (forthcoming) [DOWNLOAD](#)
2. Modeling and Forecasting Persistent Financial Durations (with F.Zikes and N.Shenai) *Econometric Reviews* (forthcoming) [DOWNLOAD](#)
3. Semiparametric Conditional Quantile Models for Financial Returns and Realized Volatility, (with F.Zikes) *Journal of Financial Econometrics* (forthcoming) [DOWNLOAD](#)
4. How does bad and good volatility spill over across petroleum markets? (with E. Kocenda, and L. Vacha) *The Energy Journal*, 36(3), 309–329, (2015) [DOWNLOAD](#)
5. Realized wavelet-based estimation of integrated variance and jumps in the presence of noise, (with L. Vacha) *Quantitative Finance* 15 (8), pp. 1347-1364, (2015) [DOWNLOAD](#)
6. Realizing stock market crashes: stochastic cusp catastrophe model of returns under the time-varying volatility, (with J. Kukacka) *Quantitative Finance* 15 (6), pp. 959-973, (2015) [DOWNLOAD](#)
7. Are benefits from oil – stocks diversification gone? A new evidence from a dynamic copulas and high frequency data, (with K. Avdulaj) *Energy Economics* , 51, pp. 31–44, (2015) [DOWNLOAD](#)
8. Forecasting the term structure of crude oil futures prices with neural networks, (with B.Malinska) *Applied Energy*, (forthcoming) [DOWNLOAD](#)
9. Modeling and forecasting exchange rate volatility in time-frequency domain, (with T.Krehlik and L.Vacha) *European Journal of Operational Research*, (forthcoming) [DOWNLOAD](#)
10. Are Bayesian Fan Charts Useful for Central Banks? Uncertainty, Forecasting and Financial Stability Stress Tests, (with M. Franta, R. Horvath, K. Smidkova) *International Journal of Central Banking* 10 (1), pp.159–187 (2014) [DOWNLOAD](#)
11. Comovement of energy commodities revisited: Evidence from wavelet coherence analysis, (with L. Vacha) *Energy Economics*, 34(1), pp. 241–247, (2012) [DOWNLOAD](#)
12. Can a stochastic cusp catastrophe model explain stock market crashes? (with M.Vosvrda) *Journal of Economic Dynamics and Control* 33, pp. 1824–1836 (2009) [DOWNLOAD](#)

### OTHER RESEARCH PUBLICATIONS (INCLUDING CZECH REFEREED JOURNALS)

13. Gold, Oil, and Stocks (with E. Kocenda, and L. Vacha) *International Review of Economics and Finance* (forthcoming) ([DOWNLOAD](#))
14. An Empirical Model Of Fractionally Cointegrated Daily High And Low Stock Market Prices (with S.Dvorakova) *Economic Modelling*, 45, pp. 193–206, (2015)
15. Can we still benefit from international diversification? The case of the Czech and German stock markets (with K.Avdulaj) *Czech Journal of Economics and Finance*, 63(5):425-442 (2013) ([DOWNLOAD](#))

16. Contagion among Central and Eastern European stock markets during the financial crisis (with L.Vacha) *Czech Journal of Economics and Finance*, 63(5):443-453 (2013) ([DOWNLOAD](#))
17. How do skilled traders change the structure of the market (with L. Vacha, and M. Vosvrda) *International Review of Financial Analysis*, 23, pp. 66-71, (2012) ([DOWNLOAD](#))
18. Neural Networks as Semiparametric Option Pricing Tool (with M. Barunikova) *Bulletin of the Czech Econometric Society, Czech Econometric Society*, 18(28), pp. 66-83 (2011) ([DOWNLOAD](#))
19. Tail Behavior of the Central European Stock Markets During the Financial Crisis (with L. Vacha, and M. Vosvrda) *AUCO Czech Economic Review* 3 4(3) pp. 281-294 (2010) ([DOWNLOAD](#))
20. Vplyv roznych foriem vlastnictva na efektivitu Ceskych a Slovenskych bank: Pristup analyzy stochastickych hranic (with B. Sotak) *Politicka Ekonomie* 2, pp. 207-224 (IF=0.65)
21. Barunik J., Vacha L., Vosvrda M. (2009): Smart Predictors in the Heterogeneous Agent Model, *Journal of Economic Interaction and Coordination*, vol. 4(2), pp. 163-172, Springer ([DOWNLOAD](#)) (IF=0.759)
22. Sentiment Patterns in the Heterogeneous Agent Model (with L. Vacha, and M. Vosvrda) *Prague Economic Papers* 3, pp. 209-219 (2009) ([DOWNLOAD](#)) (IF=0.39)
23. How Do Neural Networks Enhance the Predictability of Central European Stock Returns? , *Finance a uver-Czech Journal of Economics and Finance* 58, pp. 359-376 (2008) ([DOWNLOAD](#))
24. Modelovani Krachu na kapitalovych trzich: Aplikace teorie stochastickych katastrof (with M. Vosvrda) *Politicka ekonomie* 6, pp. 759-771 (2008)

#### MULTIDISCIPLINARY RESEARCH PUBLICATIONS

25. Behavioural breaks in the heterogeneous agent model: the impact of herding, overconfidence, and market sentiment, (with J.Kukacka) *Physica A*, 392 (23), pp. 5920–5938, (2013) ([DOWNLOAD](#))
26. Understanding the source of multifractality in financial markets (with T. Aste, T. Di Matteo and R. Liu) *Physica A* 391 (17), pp. 4234–4251, (2012) ([DOWNLOAD](#))
27. On Hurst exponent estimation under heavy-tailed distributions (with L. Kristoufek) *Physica A* 389 (18), pp. 3844-3855, (2010) ([DOWNLOAD](#))
28. Monte Carlo-based tail exponent estimator (with L. Vacha) *Physica A* 389 (21), pp. 4863-4874 (2010) ([DOWNLOAD](#))

#### CHAPTER IN BOOK

29. Wavelet-Based Correlation Analysis of the Key Traded Assets (with E. Kocenda, and L. Vacha) in *Wavelet Applications in Economics and Finance*. Springer International Publishing, pp. 157-183, (2014) ([DOWNLOAD](#))

#### SUBMISSIONS / IN PREPARATION

30. Quantile Cross-Spectral Measures of Dependence between Economic Variables (with T.Kley) (SUBMITTED [DOWNLOAD](#))

31. Measuring the frequency dynamics of financial and macroeconomic connectedness (with T.Krehlik) (SUBMITTED [DOWNLOAD](#))
32. Coupling high-frequency data with nonlinear models in multiple-step-ahead forecasting of energy markets' volatility (with T.Krehlik) (SUBMITTED [DOWNLOAD](#))
33. Estimation of Long Memory in Volatility Using Wavelets (with L.Kraicova) (SUBMITTED)
34. On the modelling and forecasting multivariate realized volatility: Generalized Heterogeneous Autoregressive (GHAR) model (with F.Cech) (SUBMITTED)
35. Realized wavelet-based estimation of integrated covariance and co-jumps in the presence of noise (with L.Vacha) (SUBMITTED)
36. Revisiting the fractional cointegrating dynamics of implied-realized volatility relation with wavelet band spectrum regression (with M.Hlinkova), (SUBMITTED [DOWNLOAD](#))
37. Semiparametric nonlinear quantile regression model for financial returns (with K.Avdulaj), (SUBMITTED)

## GRANT SUPPORT (*main researcher only*)

---

- 2016 – 2018 (*Principal Investigator*) Grant Agency of the Czech Republic (GA CR)  
New measures of dependence between economic variables
- 2016 – 2018 (*Investigator, joint with L.Vacha*) Grant Agency of the Czech Republic (GA CR)  
Measurement of frequency-dependent financial risk factors
- 2014 – 2016 (*Local Coordinator*) of the collaborative project under the 7th FP for EU research  
Financial Distortions and Macroeconomic Performance:  
Expectations, Constraints and Interaction of Agents
- 2014 – 2016 (*Principal Investigator, (joint with E.Kočenda from CERGE-EI)*)  
Grant Agency of the Czech Republic (GA CR)  
Dynamic correlations and financial market risk
- 2013 – 2015 (*Principal Investigator*) Grant Agency of the Czech Republic (GA CR)  
Multivariate spectral analysis of financial markets
- 2013 – 2015 (*Investigator, joint with L.Vacha*) Grant Agency of the Czech Republic (GA CR)  
Wavelet analysis of nonstationary and long memory economic time series.
- 2008 – 2010 (*Principal Investigator*) Grant Agency of Charles University (GA UK)  
New Nonlinear Capital Markets Theories: Fractal, Bifurcational & Behavioral Approach

## TEACHING EXPERIENCE

---

INSTITUTE OF ECONOMIC STUDIES, CHARLES UNIVERSITY IN PRAGUE

2013 – CURRENT	ADVANCED ECONOMETRICS – <i>Lectures</i>	(Masters)
2011 – 2013	ECONOMETRICS II – <i>Lectures</i>	(Bachelors)
2007 – CURRENT	APPLIED ECONOMETRICS – <i>Lectures / Seminars</i>	(Masters)
2007 – CURRENT	QUANTITATIVE FINANCE I – <i>Lectures / Seminars</i>	(Masters)
2007 – CURRENT	QUANTITATIVE FINANCE II – <i>Lectures / Seminars</i>	(Masters)
2007 – 2011	ADVANCED ECONOMETRICS – <i>Seminars</i>	(Masters)

My lectures and seminars consecutively rank among “BEST COURSES TAUGHT AT THE IES” in years 2010 – 2015, see [AWARDS](#) section for details.

## RESEARCH VISITS

---

FEBRUARY 2015 Ruhr-Universitaet Bochum, Department of Mathematics, Institute of Statistics

FEBRUARY 2012 (INVITED) ECARES - Solvay Brussels School of Economics and Management,  
SEPTEMBER 2013 Université libre de Bruxelles (prof. D.Veredas)

APRIL 2009 CENDEF - Center for Nonlinear Dynamics in Economics and Finance,  
Department of Quantitative Economics, University of Amsterdam  
(prof. C. Hommes)

## PROFESSIONAL SERVICES

---

COMMITTEES Grant Agency of the Czech Republic, Evaluation Committee (Member)  
REFEREING (approximately 60 times)  
Selected list of journals: Annals of Finance, Computational Statistics &  
Data Analysis, Energy Economics, International Journal of Forecasting,  
Journal of Econometrics, Journal of Economic Behavior & Organization,  
Journal of Economic Dynamics and Control, Journal of International Money  
and Finance, Neural Network World, Physica A, Quantitative Finance,  
Studies in Nonlinear Dynamics & Econometrics, The Energy Journal  
EDITOR The Czech Economic Review  
EDITOR Bulletin of the Czech Econometric Society  
EDITORIAL BOARD Czech Journal of Economics and Finance

## AWARDS

---

- 2015 “ENERGY ECONOMICS CONTEST AWARD”  
1st place in the Energy Economics Contest (with B.Malinska)
- 2015 “GOLDEN COURSE TAUGHT AT THE FSV”  
for Quantitative Finance I Lectures
- 2015 “BEST COURSES TAUGHT AT THE IES”  
for Advanced Econometrics and Quantitative Finance I Lectures
- 2014 “BEST COURSES TAUGHT AT THE IES”  
for Applied Econometrics Lectures
- 2014 “ECONOMIC RESEARCH AWARD” (CZECH NATIONAL BANK)  
for the work “Are Bayesian Fan Charts Useful for Central Banks?  
Uncertainty, Forecasting, and Financial Stability Stress Tests”
- 2014 “BEST COURSES TAUGHT AT THE IES”  
for Advanced Econometrics Lectures
- 2013 “ENERGY ECONOMICS CONTEST AWARD”  
1st place in the Energy Economics Contest (with K.Avdulaj)
- 2013 “BEST COURSES TAUGHT AT THE IES”  
for Quantitative Finance I Lectures
- 2012 “GOLDEN COURSE TAUGHT AT THE FSV”  
for Applied Econometrics Lectures
- 2012 “OTTO WICHTERLE AWARD BY THE ACADEMY OF SCIENCES OF THE CZECH REPUBLIC”
- 2012 “ČEZ CORPORATE CHAIR HOLDER (2012+) ”
- 2012 “BEST COURSES TAUGHT AT THE IES”  
for Quantitative Finance I Lectures
- 2011 “ENERGY ECONOMICS CONTEST AWARD”  
1st place in the Energy Economics Contest (with L.Vacha)
- 2011 “CZECH ECONOMETRIC SOCIETY AWARD”  
1st place in the Competition for the Best Student Paper in Theoretical Economics
- 2011 “BEST COURSES TAUGHT AT THE IES”  
for Advanced Econometrics seminars and Quantitative Finance I Lectures
- 2010 “BEST COURSES TAUGHT AT THE IES”  
for Applied Econometrics and Quantitative Finance I Lectures
- 2010 “CZECH ECONOMETRIC SOCIETY AWARD”  
3rd place in the Competition for the Best Student Paper in Theoretical Economics

## CONFERENCE PRESENTATIONS (SELECTED)

---

### KEYNOTE LECTURES

International Scientific Conference, European Integration of S.E.E. Countries EQREM ÇABEJ  
UNIVERSITY OF GJIROKASTRA (ALBANIA) · *Multivariate Stock Market Volatility*

### INVITED

Non- and Semiparametric Volatility and Correlation Models, (PADERBORN)  
· *Semiparametric Conditional Quantile Models for Financial Returns and Realized Volatility*  
ECARES - Solvay Brussels School of Economics and Management, Université libre de Bruxelles, (BRUXELLES)  
· *Wavelet-based realized covariation theory*  
International Conference on Computational and Financial Econometrics, (LONDON)  
· *Wavelet-based realized covariation theory*

### REGULAR

International Conference on Computational and Financial Econometrics, (LONDON)  
· *Wavelet-based realized variance estimator*

Econophysics Colloquium (TAIPEI, TAIWAN)  
 · *Distinguishing between types of multifractality: Evidence from high-frequency data*  
 The 2010 International Symposium on Econometric Theory and Applications (SINGAPORE)  
 · *Monte Carlo-based tail exponent estimator*  
 Workshop on Optimal Control, Dynamic Games and Nonlinear Dynamics (AMSTERDAM)  
 · *How do skilled traders change the structure of the market*  
 Eastern Economic Association Annual Conference (NEW YORK, USA)  
 · *Dynamic Strategies in the Heterogeneous Agent Model*  
 9th Asia-Pacific Complex Systems Conference (TOKYO, JAPAN)  
 · *Smart Traders with Memory in Heterogeneous Agent Model*  
 International Symposium on Stochastic Systems Theory and Its Applications (KOBE, JAPAN)  
 · *Wavelet Analysis of Stock Markets During the Financial Crisis*  
 · *Smart Traders with Memory in Heterogeneous Agent Model*  
 14th international Conference on Computing in Economics and Finance, (PARIS, FRANCE)  
 · *Stochastic Cusp Catastrophe Application to Stock Market Crashes Modeling*  
 · *Sentiment Patterns in the Heterogeneous Agent Model*  
 ESHIA/WEHIA, (WARSAW, POLAND)  
 · *Smart Predictors in the Heterogeneous Agent Model*  
 International Mathematica User Conference, (CHAMPAIGN, ILLINOIS, USA)  
 · *Stock-Market Crash Modeling: Cusp Catastrophes by Mathematica*  
 Winter WEHIA, (TAIPEI, TAIWAN)  
 · *Sentiment in the Heterogeneous Agent Model*

## LANGUAGES

---

SLOVAK: Mother tongue  
 CZECH: Mother tongue  
 ENGLISH: Fluent (English Language State Certificate, 2000)  
 ITALIAN: Basics  
 GERMAN: Basics

## COMPUTER SKILLS

---

Basic Knowledge: E-views, C++, HTML, PHP, MySQL  
 Intermediate Knowledge:  $\LaTeX$ , Mathematica, MATLAB, R, Ox, Excel, Word, PowerPoint

## INTERESTS AND ACTIVITIES

---

Technology, Programming, Econometrics  
 Road Cycling, Swimming, Cross-country Skiing, Jazz, Food, and Wine