€ABCN

Euro Area Business Cycle Network

2019 ANNUAL REPORT
1 OCTOBER 2018 – 30 SEPTEMBER 2019

EURO-AREA BUSINESS CYCLE NETWORK
33 Great Sutton Street, London, EC1V 0DX

For the **Annual Steering Committee Meeting** 2019

Hosted by the European Central Bank, Frankfurt

1. INTRODUCTION

The Euro Area Business Cycle Network (EABCN) provides a forum for the better understanding of the business cycle in the euro-area, by linking academics and researchers in central banks and other policy institutions involved in its empirical analysis. The network was launched officially on 1 April 2002. The first EABCN Steering Committee meeting, hosted by Banca d'Italia in September 2002, ratified the network's organisational structure and approved its ability to spend network funds. The network currently consists of 23 institutional members and over 1,700 individual members.

Its organisational structure consists of an Executive Group, a Scientific Committee and a Steering Committee.

EXECUTIVE GROUP

The Executive Group consists of the Chair of the Steering Committee, the Chair of the Scientific Committee and a senior representative of CEPR. The Executive Committee reports to the Steering Committee and approves deviations from the budget during the year. Major changes to the budget are communicated to the Steering Committee and approved by written procedure. The CEPR President is its representative on the Executive Group; the Chief Executive Officer of CEPR stands in for the President when she is not available.

THE SCIENTIFIC COMMITTEE

The Scientific Committee consists of the Chair, Vice-Chair and the EABCN Network Coordinator.

Klaus Adam is Chair of the Scientific Committee. He is Professor of Economics at Nuffield College, University of Oxford, Research Professor at the Deutsche Bundesbank, a CEPR Research Fellow and an Associate Editor of the Journal of Monetary Economics. Prior to joining Oxford he held a Chair at Mannheim and was Principal Economist at the Monetary Policy Research Division of the ECB. Klaus obtained his Ph.D. from the European University Institute in Florence and has held Assistant Professorships at the University of Salerno and Goethe University in Frankfurt.

Barbara Rossi is Vice-Chair of the Scientific Committee. She is an ICREA Professor of Economics at UPF and Barcelona GSE Affiliated Professor. She was previously Associate Professor with tenure at the Department of Economics at Duke University, after earning her PhD from Princeton University. She is a CEPR Research Fellow and a Director of the International Association of Applied Econometrics.

The Network Coordinator, **Elisa Faraglia**, works in collaboration with the Chair and Vice-Chair of the Scientific Committee and the relevant CEPR staff to facilitate planned network activities. The Network Coordinator works to ensure activities occur on schedule and to a high scientific standard. Dr Faraglia is a lecturer at the University of Cambridge, a fellow at King's College and a CEPR Research Affiliate.

In January 2020 Barbara Rossi will become Chair of the Scientific Committee, while Klaus Adam will become Vice-Chair. Elisa Faraglia is stepping down from her position at the end of 2019 and Eleonora Granziera (Norges Bank) will take on this role.

THE STEERING COMMITTEE

The Steering Committee consists of representatives of all institutional members and meets annually to approve the EABCN budget and discuss the annual report.

Luc Laeven is the Chair of the Steering Committee. Dr Laeven is Director-General of DG Research at the ECB and has previously worked for the IMF and World Bank. He obtained his Ph.D. in Economics from the University of Amsterdam. His fields of interest are Macro-Finance, International Finance, Corporate Finance and Financial Intermediation.

EABCN INSTITUTIONAL MEMBERS

EABCN currently has 23 institutional members. The two newest members who joined in 2019 are Danmarks Nationalbank and National Bank of Ukraine. Each member has a single representative on the EABCN Steering Committee.

Banca d'Italia Francesco Zollino	**De Nederlandsche Bank** Peter van Els
Banco de España Eva Ortega	**Deutsche Bundesbank** Emanuel Moench
Banco de Portugal António Antunes	**DG ECFIN** Werner Roeger
Bank of England Stephen Millard	**European Central Bank** Luc Laeven
Bank of Finland Juha Kilponen	**Magyar Nemzeti Bank** Adam Reiff
Bank of Slovenia Martin Wagner	**National Bank of Poland** Tomasz Łyziak
Banque Centrale du Luxembourg Paolo Guarda	**National Bank of Ukraine** Mihnea Constantinescu
Banque de France Yannick Kalantzis	**Norges Bank** Knut Are Aastveit
Banque Nationale de Belgique Hugues Fameree	**Oesterreichische Nationalbank** Doris Ritzberger-Gruenwald

Central Bank & FSA of Ireland
Fiona Farrelly

Schweizerische Nationalbank
Marcel Savioz

Czech National Bank
Jan Brůha

Sveriges Riksbank
Ulf Söderström

Danmarks Nationalbank
Federico Ravenna

NETWORK CO-ORDINATOR
CENTRE FOR ECONOMIC POLICY RESEARCH (CEPR)

The Centre for Economic Policy Research acts as the Network's secretariat by handling administrative tasks such as receiving and dispersing funds; organising meetings; processing expense claims; and maintaining the website. Some of these tasks are done in cooperation with the Network Coordinator. CEPR also produces the Annual Report which is circulated in advance of the annual Steering Committee Meeting. It reports on events, members, finances, the website and feedback.

The point of contact at CEPR for EABCN inquiries is **Monika Tsvetkova,** Senior Projects Officer (mtsvetkova@cepr.org), unless stated otherwise (for example in relation to a specific conference or training school).

EURO AREA BUSINESS CYCLE DATING COMMITTEE (EABCDC)

CEPR and EABCN have partnered to jointly support and expand the activities of the Euro Area Business Cycle Dating Committee (EABCDC). The Committee will pursue its dating of the troughs and peaks of euro area business cycles and will also launch a series of research initiatives destined to monitor and better understand aggregate economic developments in the euro area.

EACBDC, which is composed of five CEPR researchers, establishes the chronology of recessions and expansions of the eleven-original euro-area member countries plus Greece for 1970-1998, and of the entire euro area from 1999 onwards.

CURRENT COMMITTEE MEMBERS

- o Philippe Weil, (Chair, 2012-), 2003- , ULB and CEPR
- o Refet Gürkaynak, (Vice Chair, 2019-) 2012- , Bilkent University and CEPR
- o John Fernald, 2019-, INSEAD, Federal Reserve Bank of San Francisco and CEPR
- o Evi Pappa, 2019-, Universidad Carlos III de Madrid and CEPR
- o Antonella Trigari, 2019-, Bocconi University and CEPR

2. RECENT EVENTS

This report covers events that took place in the period 1 October 2018 – 30 September 2019.

During this period the Network organised three major research conferences and two training schools. Information on these events is provided below. Feedback from the training schools can be found in Section 6 and the programmes of all events are available at the end of this report.

CONFERENCES

"CHALLENGES IN UNDERSTANDING THE MONETARY TRANSMISSION MECHANISM"

NATIONAL BANK OF POLAND

WARSAW, 21-22 MARCH 2019

The conference covered a broad range of themes related to challenges and advancements in understanding the monetary transmission mechanism. It brought together recent contributions in this area of research, including studies with a strong theoretical basis, as well as empirical papers.

The conference topics included:

- o The role of uncertainty, asymmetries, globalisation, country characteristics, zero lower-bound and housing on the transmission mechanism of monetary policy;
- o The effects of unconventional monetary policy;
- o New approaches to identification of the monetary transmission mechanism;
- o The role of heterogeneity for the transmission of monetary policy;
- o Recent inflation dynamics and monetary policy;
- o Demographic trends and the monetary transmission mechanism;
- o Granular and big data in the analysis of the monetary transmission mechanism.

Among the speakers were **Olivier Coibion** (University of Texas and NBER), **Jordi Gali** (CREI, CEPR and NBER) and **Ricardo Reis** (London School of Economics, CEPR and NBER).

Applications: 165
Attendees: 142

"ADVANCES IN BUSINESS CYCLE ANALYSIS"

BANCO DE ESPAÑA,

MADRID, 30-31 MAY 2019

The conference covered a broad range of themes related to empirical aspects of business cycles – in particular novel methodologies for dating business cycles and their effects on the economy. Topics of the conference included:

- o Dating Business Cycles;
- o Empirical Estimation of Business Cycles;
- o Monetary and Fiscal Policies and their empirical effects on Business Cycles;
- o Forecasting Business Cycles;
- o Big Data in Business Cycle Analysis.

Among the speakers were **Marc Giannoni** (Federal Reserve Bank of Dallas and CEPR), and **Lucrezia Reichlin** (London Business School and CEPR).

Applications: 167
Attendees: 38

"NEW APPROACHES FOR UNDERSTANDING BUSINESS CYCLES"

UNIVERSITY OF MANNHEIM

MANNHEIM, 30-31 AUGUST 2019

The conference covered a broad range of themes related to challenges and advancements in understanding business cycle behaviour. It brought together recent contributions in this area of research, including studies with strong theoretical basis and empirical papers.

A non-exclusive list of examples of relevant topics included:

- o Alternative sources for demand-like and supply-like aggregate disturbances;
- o The role of uncertainty, asymmetries, country characteristics, and asset markets for the behaviour of business cycles;
- o New empirical facts characterizing business cycle fluctuations;
- o The role of medium or long-run trends (globalization, digitalization, automation, etc.) in shaping business cycle outcomes;
- o The role of firm and consumer heterogeneity for business cycles behaviour.

George-Marios Angeletos (MIT and NBER), **Nir Jaimovich** (University of Zurich and CEPR) and **Franck Portier** (University College London and CEPR) were among the speakers.

Applications: 133

Attendees: 37

TRAINING SCHOOLS

INFERENCE IN MACRO MODELS: FROM BIG DATA TO STRUCTURAL ANALYSIS

UNIVERSIDAD POMPEU FABRA
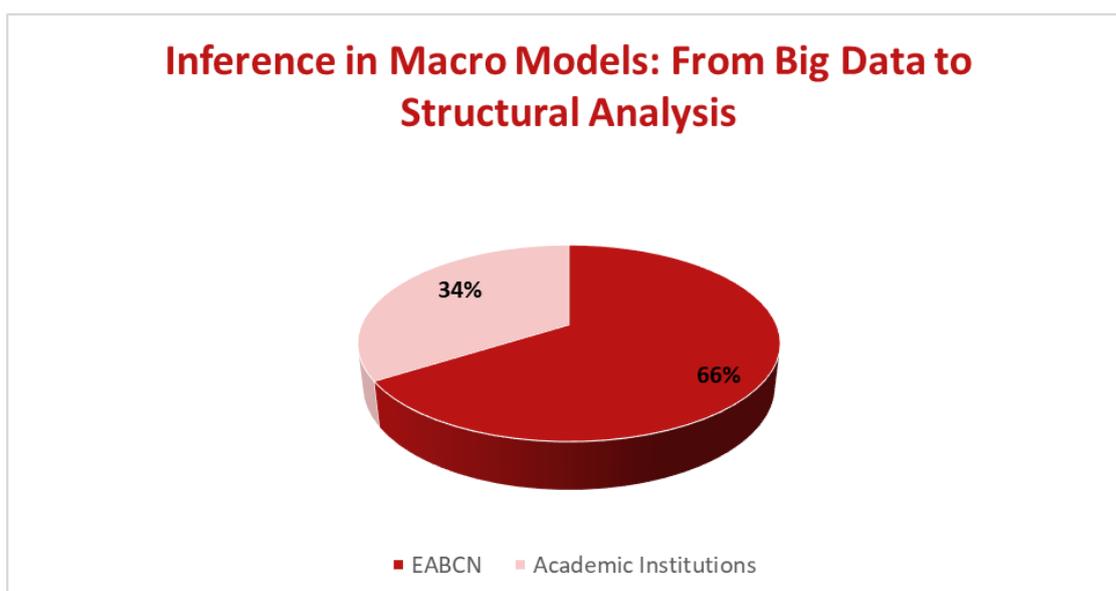
BARCELONA, 5-7 JUNE 2019

The 3-day training school was taught by **Domenico Giannone** (Federal Reserve Bank of New York & CEPR) and **Giorgio Primiceri** (Northwestern Universiry & CEPR).

The course covered methods designed to deal with prediction with "big data" in macroeconomics, and to conduct structural analysis. The main subjects of the course were: (i) predictive regressions with big data; (ii) Bayesian VARs, as a popular example of big data multivariate models, which also represent a bridge between reduced-form and structural models; (iii) DSGE models, which have become the most popular tool for structural and policy analysis.

Several other topics were also discussed, such as state-space models, Monte Carlo methods, model comparison and model choice. Discussions during the school included applications to forecasting economic activity with large datasets, potential output and the natural rate of interest, scenario and counterfactual analysis.

Applications: 67

Attendees: 50

Inference in Macro Models: From Big Data to Structural Analysis

34%

66%

■ EABCN ■ Academic Institutions

8

SOLUTION METHODS FOR DISCRETE TIME HETEROGENEOUS AGENT MODELS AND MARKOV SWITCHING LINEAR MODELS

BANK OF ENGLAND

LONDON, 16-18 SEPTEMBER 2019

This EABCN training school was led by **Wouter den Haan** (London School of Economics & CEPR) and **Pontus Rendahl** (University of Cambridge and CEPR).
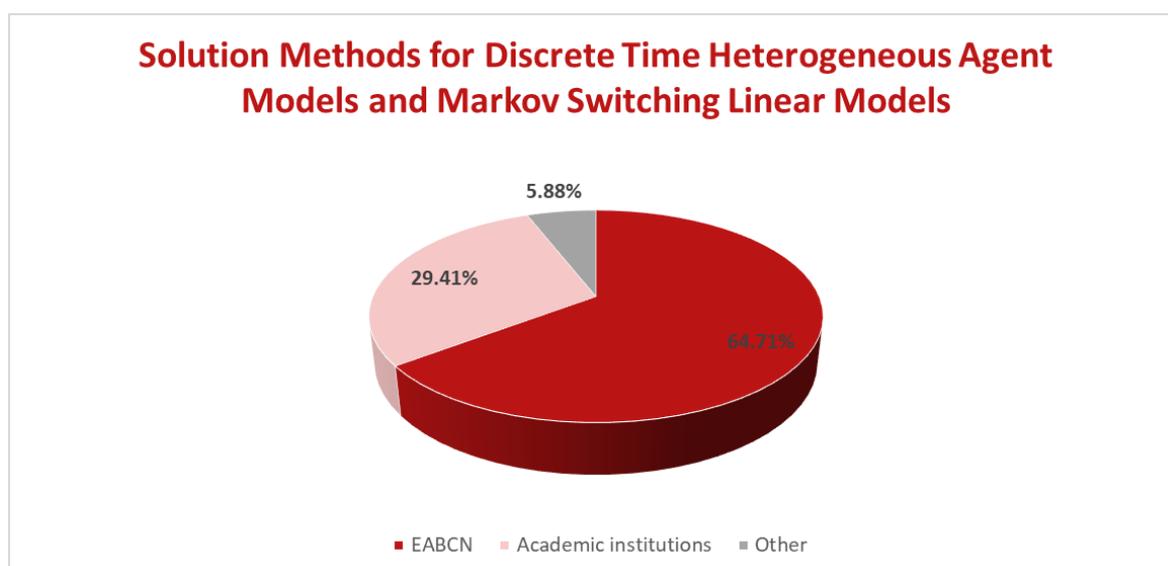
This course was divided in to two parts, both directed to numerical solution methods of macroeconomic models.

In the first part, the focus was on regime switching linear(ized) models. These entail models that display significant nonlinearities across different regimes but are otherwise well approximated linearly within a regime. Examples of such frameworks are models that can be in and out of a liquidity trap/the zero-lower bound (ZLB), or models that otherwise face occasionally binding constraints. The day focused on appropriate solution methods that are both fast and versatile.

In the second part (day two and three), the focus was on heterogeneous agent models (also known as incomplete markets models). The equilibrium of such models contains a full, endogenous, distribution of agents across income and wealth status, which (can) make them cumbersome to solve and analyse. While the first day focused on such models absent of any aggregate disturbances, the second included the challenges involved when aggregate shocks perturb the economy.

Applications: 55
Attendees: 36

Solution Methods for Discrete Time Heterogeneous Agent Models and Markov Switching Linear Models

5.88%

29.41%

64.71%

■ EABCN   ■ Academic institutions   ■ Other

3. FUTURE EVENTS

The Network is planning two conferences and three training schools for the 2019-2020 period. Further details on future events is given below and will be available on the EABCN website in due course.

CONFERENCES

INTERNATIONAL RESEARCH FORUM ON MONETARY POLICY

EUROPEAN CENTRAL BANK

FRANKFURT, 26-27 MARCH 2020

The International Research Forum on Monetary Policy (IRFMP) meets biennially alternatively at the Federal Reserve Board or at the ECB. This 11th conference will be held at the European Central Bank (ECB) in Frankfurt on 26 and 27 March 2020. The purpose of the IRFMP is to promote the discussion of innovative research on theoretical and empirical macroeconomic issues with relevance for monetary policy.

The conference will feature a keynote speech by **Athanasios Orphanides** (MIT Sloan School of Management & CEPR) and a policy panel, including **Philip R. Lane** (Member of the ECB's Executive Board and CEPR Research Fellow) and **Loretta Mester** (President and CEO of the Federal Reserve Bank of Cleveland).

EMPIRICAL ADVANCES IN MONETARY POLICY

BANK OF FRANCE

PARIS, 6-7 MAY 2020

Invited speakers for this event are **Simon Gilchrist** (NYU) and **Stephanie Schmitt-Grohé** (Columbia University & CEPR). More information on this conference will be available soon.

TRAINING SCHOOLS

FISCAL POLICY: ESTIMATING CAUSAL EVIDENCE AND POSITIVE THEORY

UNIVERSITY OF MANNHEIM

MANNHEIM, 20-21 APRIL 2020

This training school will be taught by **Morten O. Ravn** (University College London & CEPR).

Since the Global Financial Crisis, there has been a resurgence of interest in fiscal policy amongst both academics and policy makers. A question of central interest is the causal impact of fiscal policy shocks and, in particular, the dynamic causal effects. As with monetary policy, the main obstacle to producing such evidence is that changes in fiscal policy instruments are to a large extent endogenous. This course look into methods available for confronting such endogeneity and discuss applications. We will also examine how to confront issues such as anticipation effects, heterogeneity (across the population), and state dependence (time permitting). The course will also connect the results to economic theory and look into positive theories of fiscal policy.

RECENT DEVELOPMENTS IN FORECASTING

BANK OF ITALY

ROME, 3-5 JUNE 2020

The school will be led by **Graham Elliott** (University of California San Diego) and **Allan Timmermann** (University of California San Diego & CEPR)

The course will introduce participants to a variety of advanced topics and recent developments in economic forecasting. The course will examine the forecasting problem in general, showing that point forecasting is parameter estimation with a conditional model of the outcome and density forecasting is estimation of a conditional density. We will clarify what we mean by optimal forecasts and relate classical and Bayesian approaches. Understanding these issues provides an understanding that gives a foundation for subsequent forecasting problems.

Additionally, the training school will look at the large number of potential predictors. Much work has been undertaken in econometrics, statistics and computer science in recent years. We will provide a framework for thinking about methods as well as explain how some of the popular methods work and their properties.

The course will also cover forecast evaluation, forecast comparisons, and monitoring of forecasting performance.

DEEP LEARNING APPROACHES FOR SOLVING HETEROGENEOUS AGENT MODELS

2020, LOCATION TBA

This training school will be thought by **Jesus Fernandes-Villaverde** (University of Pennsylvania & CEPR). More details will follow soon.

OTHER EVENTS

ANNUAL EABCN STEERING COMMITTEE MEETING

EUROPEAN CENTRAL BANK,

FRANKFURT, DECEMBER 2020

The annual Steering Committee for the EABCN network will be held at the ECB. Institutional members will discuss the previous year's activities and how to move forward in the next year.

EABCDC CONFERENCE
FINDING THE GAP: OUTPUT GAP MEASUREMENT IN THE EURO AREA

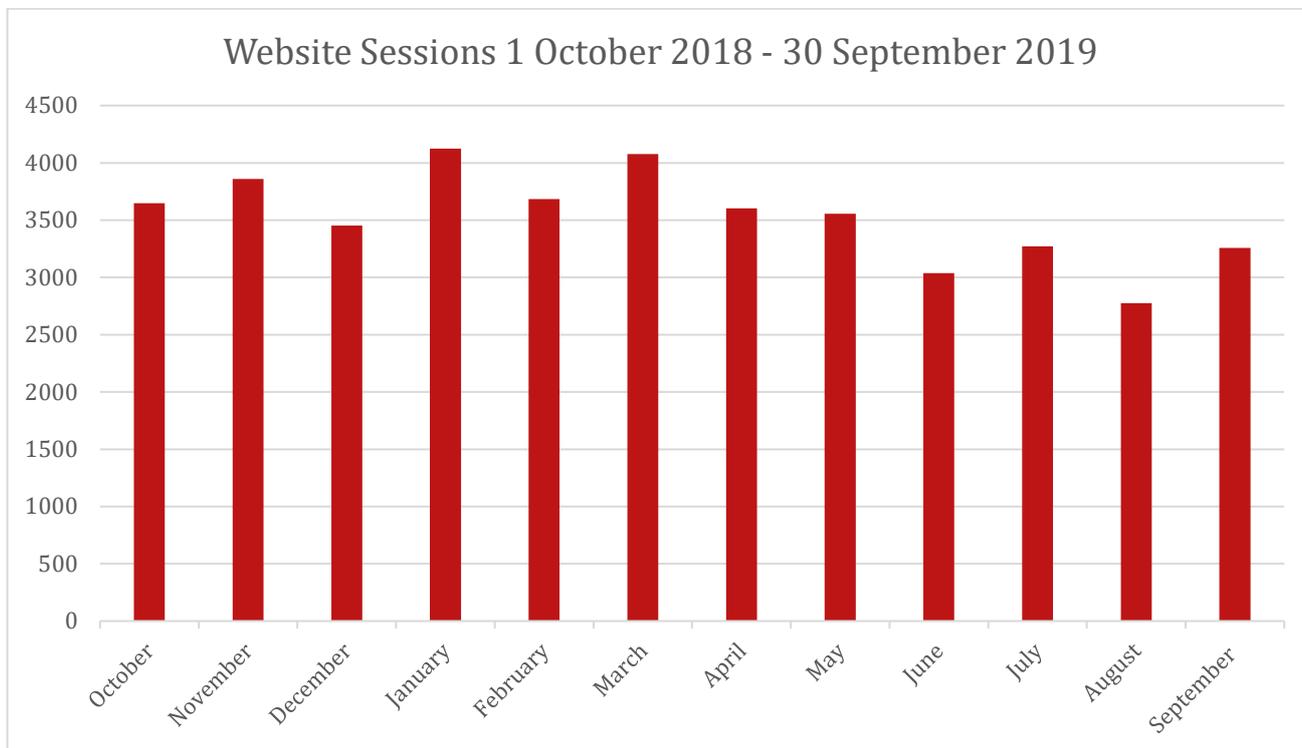### EUROPEAN UNIVERSITY INSTITUTE, FLORENCE

17 APRIL 2020

Potential output and the output gap play an essential role - both in theory and in practice - in evaluating the state of an economy as well as in forming and assessing macroeconomic policies. For example, the output gap is often considered a measure of inflationary pressures in the economy. And potential output and the output gap help observers assess whether the source of economic growth is a change in long-run trends or is, instead, due to cyclical factors. Despite its importance as a measure of aggregate macroeconomic conditions and inflationary pressures, the output gap is unobservable, which forces researchers and policy-makers to depend on estimates. The tools available to extract unobservable variables are typically statistical and, hence, may correspond imperfectly with the concept of gaps in the economic models that are used to interpret them.

The Euro Area Business Cycle Dating Committee is organising a conference on potential output and output gap measurement in April 2020. The organisers are particularly interested in papers that can shed light on how theoretical and statistical concepts of potential output and the output gap relate and how to measure them in practice. The focus is the Euro Area – either taken as a whole or, possibly, for different constituent countries. It would also be of great interest to the Dating Committee to have estimates on the relationship between cyclical fluctuations extracted with different methods and gaps.

5. EABCN WEBSITE

Data on the number and length of visits to the EABCN website is provided below. The data is gathered from EABCN's Google Analytics account and represents the period 1 October 2018 – 30 September 2019.

Website Sessions 1 October 2018 - 30 September 2019

A bar chart showing monthly website sessions from October 2018 to September 2019. The y-axis ranges from 0 to 4500. Approximate values: October ~3650, November ~3850, December ~3450, January ~4120, February ~3680, March ~4080, April ~3600, May ~3550, June ~3030, July ~3270, August ~2780, September ~3260.

One 'session' is recorded as someone visiting the website regardless of the number of pages they view:

Total sessions 2018-19: 42,341

The total visits in the period 2017-18 was 43,096 for a period of 15 months (2,873 average per month). The monthly average has increased to 3,528 sessions in 2018-19.

<u>Key statistics</u>

- Average visit length: 1 minute, 4 seconds
- Average pages per visit: 1.8
- Total visits: 42,341

The great majority of website visits come from search engines like Google and Bing (33,378). The direct visits (a user typing the EABCN domain address) were 6,896.

The following diagram represents the top seven additional sources of traffic for the EABCN website.

Sources of traffic for EABCN Website 2018 - 2019

Uni Bocconi	16
	Facebook
	Wikipedia
	Twitter
	Mailchimp
	OECD
	Econbiz....
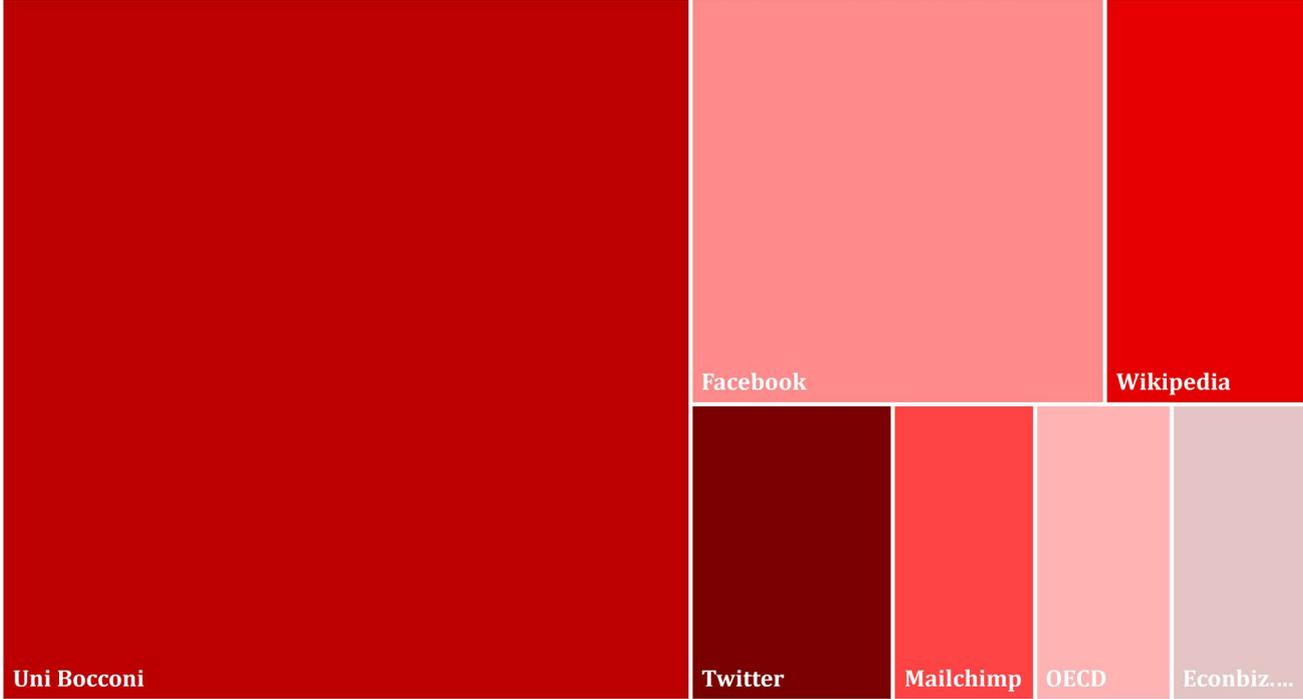
6. FEEDBACK ON TRAINING SCHOOLS

Solution Methods for Discrete Time Heterogeneous Agent Models and Markov Switching Linear Models – Bank of England, September 2019

A summary of the participants' answers is provided below.

1. Below you will find a list of items related to the organisation of the course and the location/venue where the course took place. Please rate the following on a scale from Very poor to Excellent:

More Details

■ Very poor ■ Poor ■ Fair ■ Good ■ Excellent

	Very poor	Poor	Fair	Good	Excellent
Pre-meeting organisation			7.1%	35.7%	57.1%
Local information provided		13.3%	6.7%	20% / 60%	
Meeting venue		14.3%	21.4%	28.6%	35.7%
Accommodation		10%	20%	60%	10%
Meals provided		13.3%	20%	60%	6.7%
Local organisation	14.3%	7.1%	14.3%	14.3%	50%
Overall			21.4%	42.9%	35.7%

100% 0% 100%
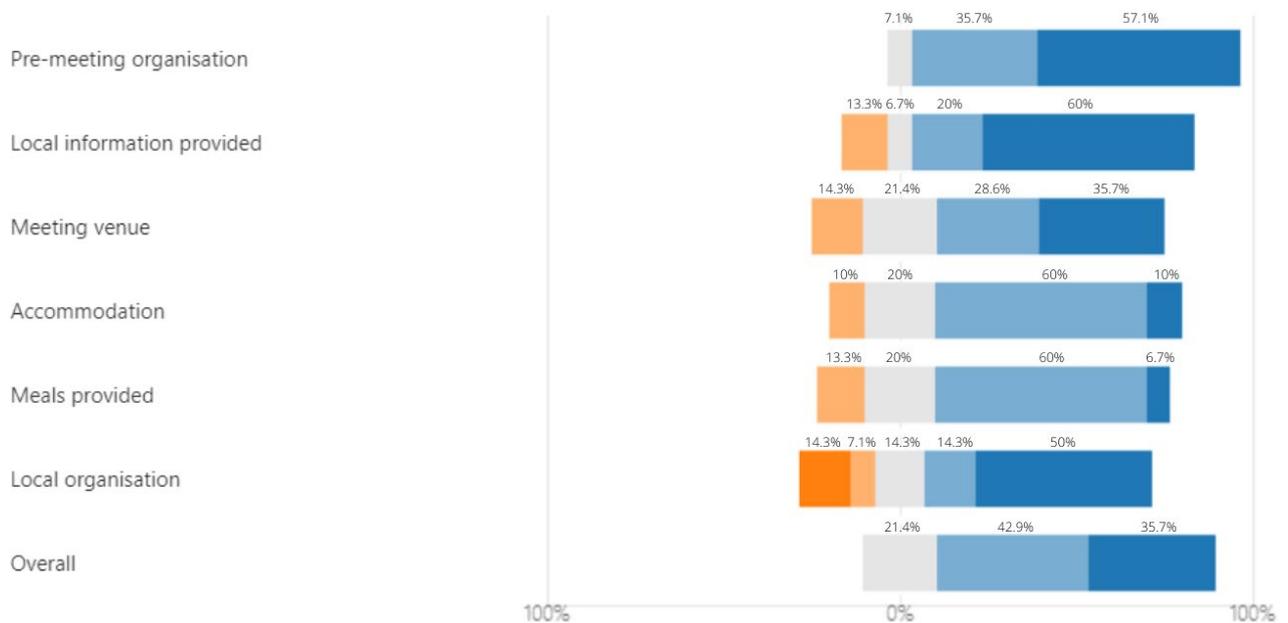
2. Did you receive sufficient information about the contents of the event from the EABCN website?

More Details

● Yes	15
● No	0
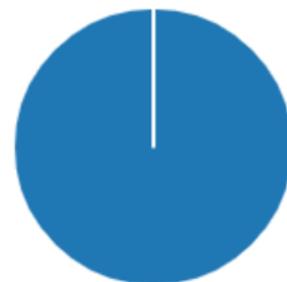
3. Please rate the following items related to the training course on a scale from Very low to Very high:
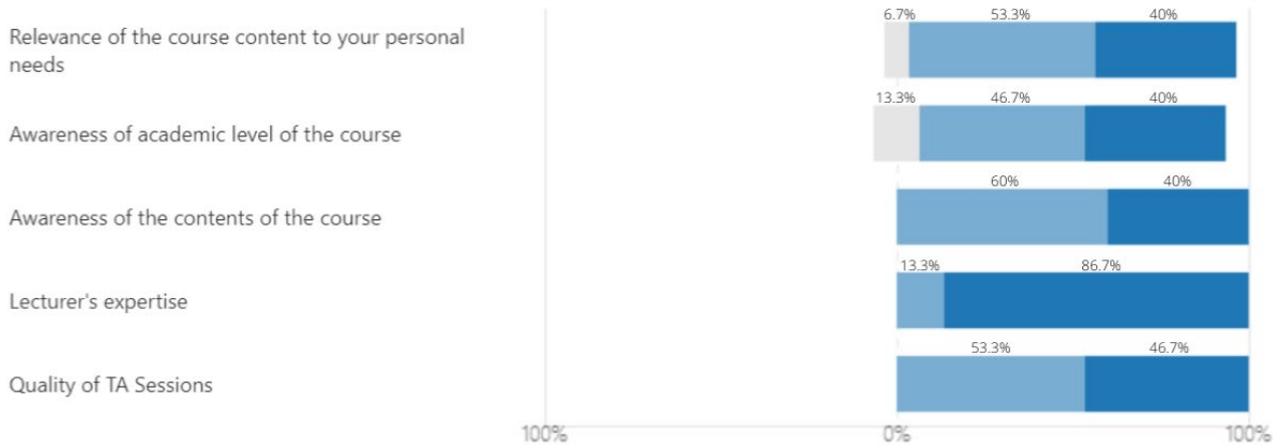
More Details

■ Very low ■ Low ■ Neutral ■ High ■ Very high

Item	Neutral	High	Very high
Relevance of the course content to your personal needs	6.7%	53.3%	40%
Awareness of academic level of the course	13.3%	46.7%	40%
Awareness of the contents of the course		60%	40%
Lecturer's expertise		13.3%	86.7%
Quality of TA Sessions		53.3%	46.7%

100%   0%   100%

4. Please rank the following items by how useful they were to you:

More Details

Rank	Options
1	Course material
2	Knowledge exchange with pe...
3	Networking

First choice ■ ■ ■ Last choice

	First choice		Last choice
Course material	78.6%		21.4%
Knowledge exchange	21.4%	57.1%	21.4%
Networking	21.4%		78.6%
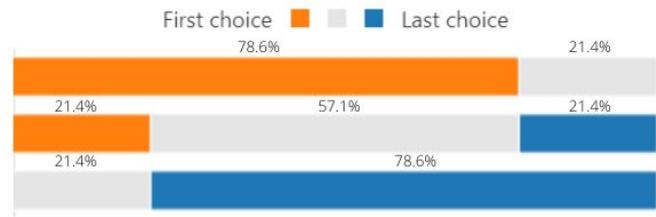
5. What further features would you like to see included in future EABCN training schools?

2 Responses

ID ↑	Name	Language	Responses
1	anonymous		Ideally desks should be provided during lectures for convenience of taking notes and using laptops.
2	anonymous		Maybe a 5-day training course, because three days with such subjects is quite intense.

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7. Considering the time after the training school, please rate the following:

■ Very low   ■ Low   ■ Neutral   ■ High   ■ Very high

Likelihood of using the course material in the future	60%	40%
Likelihood of attending further training schools	13.3% 66.7%	20%
Likelihood of attending other EABCN events	13.3% 53.3%	33.3%

100%   0%   100%

6. What subject areas do you think should be covered in the future in these training schools?

3 Responses

ID ↑	Name	Language	Responses
1	anonymous		Term structure and shadow rate modeling
2	anonymous		Big data and machine learning maybe?
3	anonymous		Theoretical and empirical analyses to micro- and macroeconomic policy

7. Considering the time after the training school, please rate the following:

■ Very low   ■ Low   ■ Neutral   ■ High   ■ Very high

Likelihood of using the course material in the future	60%	40%
Likelihood of attending further training schools	13.3% 66.7%	20%
Likelihood of attending other EABCN events	13.3% 53.3%	33.3%

100%   0%   100%

8. If you have selected "Neutral" or lower to any part of the above, please comment on your reasons to help us improve:

2 Responses

ID ↑	Name	Language	Responses
1	anonymous		Depends on the subject area of training school and relevance of events so that I can decide on taking the course or not.
2	anonymous		Neutral just in the sense that I rarely go on these types of events, not as a reflection on this course. I.e., no critique.

9. If there is anything else you would like to comment on, please do so below.

6 Responses

ID ↑	Name	Language	Responses
1	anonymous		The catering (quality and variety of food, in particular non-meat/ fish options) was poor.
2	anonymous		I'd have been more convenient if the room had tables during the lecture
3	anonymous		Overall a very informative and well organised course. highly recommended.
4	anonymous		I want to stress a feature that I liked in this course - the TA sessions were very well related to the lectures. It should be always like this (was not the case in a previous EABCN course that I participated in)
5	anonymous		Excellent course, one of the best I've attended - in terms of (material * clarity / time spent)
6	anonymous		Local organization was terrible.

7. EVENT PROGRAMMES

The programmes of the Network conferences and training schools that took place in the period 1 October 2018 – 30 September 2019 are attached below.

Warsaw, 21-22 March 2019

Challenges in Understanding the Monetary Transmission Mechanism

Programme

21 March 2019 (Thursday)

8.15 – 8.45 Registration and welcome coffee

8.45 – 9.00 **Welcome address**
Anna Trzecińska, Narodowy Bank Polski

9.00 – 10.00 **Keynote speech**
Inflation Expectations as a Policy Tool?
Olivier Coibion, UT Austin

10.00 – 10.30 Coffee break

10.30 – 12.30 **Plenary session I**
- *The Long-Run Information Effect of Central Bank Communication*
  Michael McMahon, University of Oxford and CEPR
- *Heterogeneity in inflation expectations and personal experience*
  Cristina Angelico, Bank of Italy
- *On the Limits of Monetary Policy*
  Bruce Preston, University of Melbourne

12.30 – 13.30 Lunch

13.30 – 14.10 **Poster session**
- *Do zero and sign restricted SVARs identify unconventional monetary policy shocks in the euro area?*
  Adam Elbourne, CPB Netherlands Bureau for Economic Policy
- *Time-Varying Structural Vector Autoregressions: Some New Perspective*
  Andrzej Kocięcki, Narodowy Bank Polski
- *Monetary-Fiscal Interactions and Household Heterogeneity: an Analytical Characterization*
  Paweł Kopiec, Narodowy Bank Polski
- *The Misallocation Channel of Monetary Policy*
  Matthias Meier, University of Mannheim
- *Monetary Policy and the Cost of Heterogenous Wage Rigidity: Evidence from the Stock Market*
  Vincenzo Pezone, Goethe University
- *Imperfect Pass-Through to Deposit Rates and Monetary Policy Transmission*
  Alberto Polo, New York University
- *The Money Multiplier in the Financial Crisis: a Quantitative Evaluation*
  Tobias Schuler, European Central Bank

14.10 – 15.30 **Plenary session II**
- *A Model of the Fed's View on Inflation*
  Giovanni Ricco, University of Warwick and CEPR
- *Resolving the Missing Deflation Puzzle*
  Jesper Lindé, Sveriges Riksbank and CEPR

15.30 – 16.00 Coffee break

16.00 – 17.00 **Keynote speech**
The people versus the markets: long-run inflation and monetary policy
Ricardo Reis, London School of Economics and CEPR

NBP Narodowy Bank Polski

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Euro Area Business Cycle Network

22 March 2019 (Friday)

8.15 – 8.45	Registration and welcome coffee

8.45 – 10.45   **Plenary session III**
- *Quantitative Easing*
  Wei Cui, University College London
- *Risk-taking Channel – Does it Operate in the Polish Banking Sector?*
  Tomasz Chmielewski, Narodowy Bank Polski
- *How does monetary policy affect income and wealth inequality? Evidence from quantitative easing in the euro area*
  Michele Lenza, European Central Bank

10.45 – 11.15   Coffee break

11.15 – 12.30   **Policy panel**
New Perspectives on the Monetary Transmission Mechanism
Chair:
Klaus Adam, University of Oxford, EABCN and CEPR
Panellists:
- **Ryszard Kokoszczyński,** Narodowy Bank Polski
- **Yves Mersch,** European Central Bank
- **Benoît Mojon,** Bank for International Settlements

12.30 – 13.30   Lunch

13.30 – 14.30   **Keynote speech**
On the Empirical (Ir)Relevance of the Zero Lower Bound Constraint
Jordi Galí, CREI and CEPR

14.30 – 14.50   Coffee break

14.50 – 16.10   **Plenary session IV**
- *Can more public information raise uncertainty? The international evidence on forward guidance*
  Georg Strasser, European Central Bank
- *Forward Guidance, Monetary Policy Uncertainty, and the Term Premium*
  Brent Bundick, Federal Reserve Bank of Kansas City

16.10 – 16.20   **Concluding remarks**
Klaus Adam, University of Oxford, EABCN and CEPR

Venue:

Narodowy Bank Polski
ul. Świętokrzyska 11/21
00-919 Warszawa
Poland

Conference organisers:

Klaus Adam, University of Oxford, EABCN and CEPR
Elisa Faraglia, University of Cambridge, EABCN and CEPR
Marcin Kolasa, Narodowy Bank Polski
Tomasz Łyziak, Narodowy Bank Polski

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Economic Research Department
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EURO AREA BUSINESS CYCLE NETWORK (EABCN)

Conference on
"Advances in Business Cycle Analysis"

Madrid, 30-31 May 2019
Hosted by Banco de España, Madrid

Organisers:
Gergely Ganics (Banco de España)
Marc Giannoni (Federal Reserve Bank of Dallas)
Gabriel Perez-Quiros (European Central Bank and CEPR)
Barbara Rossi (ICREA-Pompeu Fabra University, Barcelona GSE, CREI and CEPR)

Programme

Thursday 30 May 2019

08:15-08:45   *Registration*

08:45-09:00   **Opening Remarks, Óscar Arce (Banco de España)**

                Session 1 (Chair: Gabriel Perez-Quiros) - Structural models

09:00-09:50   **Invited talk: Lucrezia Reichlin (London Business School and CEPR): Modelling Inflation**

09:50-10:20   **Mind the gap! Stylized dynamic facts and structural models**
                * Filippo Ferroni (Federal Reserve Bank of Chicago)
                Joint with Fabio Canova (Norwegian Business School, CAMP and CEPR)

10:20-10:50   **Structural Scenario Analysis with SVARs**
                *Ivan Petrella (University of Warwick)
                Joint with Juan Antolín-Díaz (London Business School) and Juan F. Rubio-Ramírez (Emory University, Federal Reserve Bank of Atlanta)

10:50-11:20   *Coffee Break*

                Session 2 (Chair: Esther Ruiz) - Macroeconomic uncertainty

11:20-11:50   **The Economic Drivers of Volatility and Uncertainty**
                *Massimiliano Marcellino (Bocconi University, IGIER, BAFFI-CAREFIN and CEPR)
                Joint with Andrea Carriero (Queen Mary, University of London) and Francesco Corsello (Bank of Italy)

11:50-12:20   **Monetary Policy Uncertainty: A Tale of Two Tails**
                *Tatevik Sekhposyan (Texas A&M University)
                Joint with Tatjana Dahlhaus (Bank of Canada)

12:20-12:50   **Ex-Ante Uncertainty and the Euro Area Business Cycle**
                *Cecilia Melo Fernandes (University of Amsterdam, EIOPA)
                Joint with Geoff Kenny (European Central Bank)

| 12:50-14:30 | *Lunch and Poster session 1* |

Session 3 (Chair: Gergely Ganics) - Macroeconomic forecasting

14:30-15:00 **Improved Methods for Combining Point Forecasts for an Asymmetrically Distributed Variable**
*Shaun Vahey (University of Warwick and CAMA)
Joint with Özer Karagedikli (SEACEN and CAMA) and Elizabeth C. Wakerly (Economic Prediction Systems)

15:00-15:30 **How is Machine Learning Useful for Macroeconomic Forecasting?**
*Dalibor Stevanovic (Université du Québec à Montréal)
Joint with Philippe Goulet Coulombe (University of Pennsylvania), Maxime Leroux (Université du Québec à Montréal) and Stéphane Surprenant (Université du Québec à Montréal)

15:30-16:00 **Monetary Policy and the Predictability of Nominal Exchange Rate**
*Benjamin K. Johannsen (Federal Reserve Board)
Joint with Martin Eichenbaum and Sergio Rebelo (both Northwestern University)

16:00-16:30 *Coffee Break*

Session 4 (Chair: Marc Giannoni) - Regime switching, non-linearities and business/financial cycles

16:30-17:00 **Estimating Macroeconomic Models of Financial Crises: An Endogenous Regime Switching Approach**
*Christopher Otrok (University of Missouri and Federal Reserve Bank of St. Louis)
Joint with Gianluca Benigno (London School of Economics and CEPR), Andrew Foerster (Federal Reserve Bank of San Francisco) and Alessandro Rebucci (Johns Hopkins University and NBER)

17:00-17:30 **Forecasting and stress testing macro-financial linkages**
*Simone Manganelli (European Central Bank)
Joint with Sulkhan Chavleishvili (European Central Bank)

17:30-18:00 **Quantile Factor Models**
*Juan J. Dolado (Universidad Carlos III de Madrid)
Joint with Liang Chen (Shanghai University of Finance and Economics) and Jesús Gonzalo (Universidad Carlos III de Madrid)

18:00-18:30 **Contagious Switching**
*Michael T. Owyang (Federal Reserve Bank of St. Louis)
Joint with Jeremy Piger (University of Oregon) and Daniel Soques (University of North Carolina Wilmington)

Friday 31 May 2019

Session 5 (Chair: Barbara Rossi) - Business cycles and New Keynesian models

08:40-9:30 **Invited Talk: Marc Giannoni (Federal Reserve Bank of Dallas): Global Trends in Interest Rates and r***

09:30-10:00 **Putting the Cycle Back into Business Cycle Analysis**
*Dana Galizia (Carleton University)
Joint with Paul Beaudry (Bank of Canada and NBER) and Franck Portier (University College London and CEPR)

10:00-10:30 **Sticky prices and the transmission mechanism of monetary policy: A minimal test of New Keynesian models**
*Guido Ascari (University of Oxford)
Joint with Timo Haber (University of Cambridge)

10:30-11:00	*Coffee Break*

Session 6 (Chair: Evi Pappa) - Micro-level data, macro-level fluctuations, and business cycle dating

11:00-11:30	**Sentimental Business Cycles**
	*Evi Pappa (European University Institute, Universidad Carlos III de Madrid, CEPR)
	Joint with Andresa Lagerborg (European University Institute) and Morten O. Ravn (University College London, CEPR and ESRC Centre for Macroeconomics)

11:30-12:00	**Monetary Policy, Corporate Finance and Investment**
	*Clodomiro Ferreira (Banco de España)
	Joint with James Cloyne (University of California Davis, NBER and CEPR), Maren Froemel (London Business School) and Paolo Surico (London Business School, Bank of England and CEPR)

12:00-12:30	**Monetary Policy and Production Networks: an Empirical Investigation**
	*Mishel Ghassibe (University of Oxford)

12:30-13:00	**A new approach to dating the reference cycle**
	*Ana Gómez Loscos (Banco de España)
	Join with Maximo Camacho (University of Murcia) and María Dolores Gadea Rivas (University of Zaragoza)

13:00-14:30	*Lunch and Poster session 2*

Session 7 (Chair: Elmar Mertens) - Lessons from the Great Recession

14:30-15:00	**A Time Series Model of Interest Rates With the Effective Lower Bound**
	*Elmar Mertens (Deutsche Bundesbank)
	Joint with Benjamin K. Johannsen (Federal Reserve Board)

15:00-15:30	**Euro Area and U.S. External Adjustment: The Role of Commodity Prices and Emerging Market Shocks**
	*Robert Kollmann (ECARES, Université Libre de Bruxelles and CEPR)
	Joint with Massimo Giovannini (European Commission, JRC), Stefan Hohberger (European Commission, JRC), Marco Ratto (European Commission, JRC), Werner Roeger (European Commission, DG ECFIN) and Lukas Vogel (European Commission, DG ECFIN)

15:30-16:00	**Public Expenditure Multipliers in Recessions. Evidence from the Eurozone**
	*Salvatore Perdichizzi (University of Bologna)
	Joint with Andrea Boitani (Catholic University of Sacred Heart)

16:00	Closing remarks

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* Indicates the presenter.

Invited talks are divided into 45 minutes for the presenter and 5 minutes for general discussion.
Other presentations are 25 minutes for the presenter and 5 minutes for general discussion.

Poster Session 1 (12:50 – 14:30 Thursday 30 May)

Survey-Based Multivariate Density Forecasts
*Florens Odendahl (Banque de France)

The Real-Time Information Content of Financial Stress on European Business Cycles
*Thomas Theobald (Macroeconomic Policy Institute IMK)
Joint with Jakob Fiedler (University Duisburg-Essen and Deutsche Apotheker- und Ärztebank)

Is euro area lowflation here to stay? Insights from a time-varying parameter model with survey data
*Joris Wauters (National Bank of Belgium and Ghent University)
Joint with Arnoud Stevens (National Bank of Belgium)

Poster Session 2 (13:00 – 14:30 Friday 31 May)

Is there News in Inventories?
*Christoph Gortz (University of Birmingham)
Joint with Christopher Gunn (Carleton University) and Thomas Lubik (Federal Reserve Bank of Richmond)

Monetary policy communication shocks and the macroeconomy
*Benedikt Kolb (European University Institute and Deutsche Bundesbank)
Joint with Robert Goodhead (European University Institute and Central Bank of Ireland)

Heterogeneous Effects of Single Monetary Policy on Unemployment Rates in the Largest EMU Economies
*Alexander Mihailov (University of Reading)
Joint with Giovanni Razzu and Zhe Wang (both University of Reading)

State-Dependent Monetary Policy Regimes
*Shayan Zakipour-Saber (Central Bank of Ireland)

University of Mannheim, CRC Transregio 224 and Euro Area Business Cycle Network

Conference on

"New Approaches for Understanding Business Cycles"

Mannheim, Germany, August 30 – 31, 2019

Venue: University of Mannheim, Palace, conference room SO 418

Organisers:
Klaus Adam (University of Mannheim, CEPR and EABCN)
Elisa Faraglia (Cambridge University, CEPR and EABCN)
Isabel Schnabel (University of Bonn, CEPR)

Friday, August 30

08:30-08:50   *Registration and Welcome Coffee*

08:50-09:30   *"Shocks and Frictions in Business Cycles with Heterogeneous Agents"*
Christian Bayer (University of Bonn and CEPR) joint with Ralph Luetticke, Benjamin Born

09:30-10:10   *"Bottom-up Markup Fluctuations"*
Basile Grassi (Bocconi University) joint with Vasco Carvalho, Ariel Tomas Burstein

10:10-10:30   *Coffee Break*

10:30-12:10   *"Production Network Dynamics and the Propagation of Shocks"*
Federico Huneeus (Yale University and Central Bank of Chile)

12:10-11:50   *"From Micro to Macro: A Methodology to Discriminate Among Models"*
Raphael Schoenle (Brandeis University and CEPR) joint with Ernesto Pasten, Gee Hee Hong, Matthew Klepacz

11:50-12:10   *Coffee Break*

12:10-13:10   ***Keynote talk 1: "Tale of Two Workers: The Macroeconomics of Automation"***
Nir Jaimovich (University of Zurich and CEPR) joint with Itay Saporta-Eksten, Henry Siu and Yedid-Levi

13:10-14:00   *Buffet Lunch*

14:00-14:40	*"Automation, Globalization and Vanishing Jobs: A Labor Market Sorting View"*
	Ester Faia (Goethe University Frankfurt and CEPR) joint with Sebastien Laffitte, Max Mayer, Gianmarco Ottaviano

14:40-15:20	*"Mind the gap! Stylized facts and structural models"*
	Fabio Canova (Norwegian Business School, UC3M and CEPR) joint with Filippo Ferroni

15:20-16:30	*Poster Session and Coffee*

Andrey Alexandrov:	*"Trends and Business Cycle Asymmetry"*
Fabian Greimel:	*"Falling Behind: Has Rising Inequality Fueled the American Debt Boom?"*
Elmar Mertens:	*"A Time Series Model of Interest Rates with the Effective Lower Bound"*
Joonseok Oh:	*"Macro Uncertainty and Unemployment Risk"*
Kenza Benhima:	*"Does demand noise matter? Identification and implications"*
Timo Reinelt:	*"Monetary Policy, Markup Dispersion, and Aggregate TFP"*

16:30-17:30	***Keynote talk 2: "Putting the Cycle Back into Business Cycle Analysis"***
	Franck Portier (University College London and CEPR)

19:30	*Dinner (by invitation only)*

Saturday, August 31

09:00-10:00	***Keynote talk 3: "Myopia and Anchoring"***
	George-Marios Angeletos (MIT and NBER), joint with Zhen Huo

10:00-10:30	*Coffee Break*

10:30-11:10	*"Sectoral Media Focus and Aggregate Fluctuations"*
	Kris Nimark (Cornell University and CEPR) joint with Ryan Chahrour and Stefan Pitschner

11:10-11:50	*"Sticky prices and the transmission mechanism of monetary policy: A minimal test of New Keynesian model"*
	Guido Ascari (University of Oxford and Pavia) joint with Timo Haber

11:50-12:30	*"Real effects of Relaxing Financial Constraints for Homeowners: Evidence from Danish Firms"*
	Alessia De Stefani (Danmarks Nationalbank) joint with Julia Moertel

12:30-13:30	*Buffet Lunch*

13:30-14:10	*"Monetary policy communication and private sector expectations"*
	Oreste Tristani (European Central Bank and CEPR) joint with David Vestin

14:10-14:50	*"Monetary Policy Communications and their effects on Household Inflation Expectations"*
	Michael Weber (Booth School of Business, University of Chicago) joint with Olivier Coibion and Yuriy Gorodnichenko

16:00	*Wine-tasting excursion and dinner in the Palatinate (by invitation only)*

Presentations are divided into 30 minutes for the presenter and 10 minutes for general discussion.
Keynote presentations are divided into 50 minutes for presenter and 10 minutes for general discussion.

Inference in Macro Models: From Big Data to Structural Analysis

BARCELONA, JUNE 5 – 7, 2019

Instructors: **Domenico Giannone; Giorgio Primiceri**
Affiliation: New York Fed and CEPR; Northwestern, CEPR and NBER
Email: dgiannon2@gmail.com; g-primiceri@northwestern.edu

1. General description of the course

This course covers methods designed to deal with prediction with "big data" in macroeconomics, and to conduct structural analysis. The three main subjects of the course are: (i) predictive regressions with big data; (ii) Bayesian Vector Autoregressions (BVARs), as a popular example of big data multivariate models, which also represent a bridge between reduced-form and structural models; (iii) Dynamic Stochastic General Equilibrium (DSGE) models, which have become the most popular tool for structural and policy analysis. We will also touch upon several other topics, such as state-space models, Monte Carlo methods, model comparison and model choice. Along the way, we will discuss applications to forecasting economic activity with large datasets, scenario and counterfactual analysis, estimation of potential output, the natural rate of interest and unemployment. In the practical sessions, we will provide and go over Matlab codes for inference in predictive regressions with big data, BVARs and DSGE models.

2. Plan of the course: **Day 1**

Lecture 1: Big data and the curse of dimensionality in macroeconomics: Sympthoms and cures.

Lecture 2: Bayesian inference, priors and their connection with regularization and shrinkage techniques.

Practical session: Forecasting economic activity with big data.

Some references for day 1: Leamer (1973); Tibshirani (1996); Hastie et al. (2001); Stock and Watson (2002); De Mol et al. (2008); Park and Casella (2008); Hastie et al. (2015); Carrasco and Rossi (2016).

3. Plan of the course: Day 2

Lecture 3: Selection of the informativeness of the priors and the degree of shrinkage.

Lecture 4: Multivariate models: VARs and Bayesian VARs.

Practical session: Using BVARs for unconditional and conditional forecasts, and scenario analysis.

Some references for day 2: Gelman et al. (2004); Geweke (2005); Hamilton (1994); Doan et al. (1984); Sims and Zha (1998); Banbura et al. (2010); Del Negro and Schorfheide (2011); Karlsson (2013); Giannone et al. (2015); Bańbura et al. (2015); Johannsen and Mertens (2016); Wu and Xia (2016).

4. Plan of the course: Day 3

Lecture 5 and 6: Inference in DSGE models: filtering, posterior simulation and smoothing.

Practical session: Using DSGE models to estimate the "stars" (potential output, natural rate of interest and unemployment).

Some references for day 3: DeJong and Dave (2011); Herbst and Schorfheide (2015); Carter and Kohn (1994); Smets and Wouters (2007); Cogley et al. (2010); Justiniano and Primiceri (2010); Justiniano et al. (2013); Del Negro et al. (2017); Crump et al. (2019).

References

Bańbura, M., D. Giannone, and M. Lenza (2015): "Conditional forecasts and scenario analysis with vector autoregressions for large cross-sections," *International Journal of Forecasting*, 31, 739–756.

Banbura, M., D. Giannone, and L. Reichlin (2010): "Large Bayesian VARs," *Journal of Applied Econometrics*, 25(1), 71–92.

Carrasco, M. and B. Rossi (2016): "In-Sample Inference and Forecasting in Misspecified Factor Models," *Journal of Business & Economic Statistics*, 34, 313–338.

Carter, C. K. and R. J. Kohn (1994): "On Gibbs Sampling for State Space Models," *Biometrika*, 81(3), 541–553.

Cogley, T., G. E. Primiceri, and T. J. Sargent (2010): "Inflation-Gap Persistence in the US," *American Economic Journal: Macroeconomics*, 2(1), 43–69.

Crump, R., M. Giannoni, S. Eusepi, and A. Sahin (2019): "A Unified Approach to Measuring u*," *Brookings Papers on Economic Activity*, forthcoming.

DE MOL, C., D. GIANNONE, AND L. REICHLIN (2008): "Forecasting using a large number of predictors: Is Bayesian shrinkage a valid alternative to principal components?" *Journal of Econometrics*, 146, 318–328.

DEJONG, D. N. AND C. DAVE (2011): *Structural Macroeconometrics*, Princeton, N.J.: Princeton University Press.

DEL NEGRO, M., D. GIANNONE, M. P. GIANNONI, AND A. TAMBALOTTI (2017): "Safety, Liquidity, and the Natural Rate of Interest," *Brookings Papers on Economic Activity*, 48, 235–316.

DEL NEGRO, M. AND F. SCHORFHEIDE (2011): *Bayesian Macroeconometrics*, 293–389.

DOAN, T., R. LITTERMAN, AND C. SIMS (1984): "Forecasting and conditional projection using realistic prior distributions," *Econometric Reviews*, 3, 1–100.

GELMAN, A., J. B. CARLIN, H. S. STERN, AND D. B. RUBIN (2004): *Bayesian Data Analysis*, London: Chapman and Hall.

GEWEKE, J. F. (2005): *Contemporary Bayesian Econometrics and Statistics*, New York: Wiley.

GIANNONE, D., M. LENZA, AND G. E. PRIMICERI (2015): "Prior Selection for Vector Autoregressions," *Review of Economics and Statistics*, 97(2), 412–435.

HAMILTON, J. D. (1994): *Time Series Analysis*, Princeton, New Jersey: Princeton University Press.

HASTIE, T., R. TIBSHIRANI, AND J. FRIEDMAN (2001): *The Elements of Statistical Learning*, Springer Series in Statistics, New York, NY, USA: Springer New York Inc.

HASTIE, T., R. TIBSHIRANI, AND M. WAINWRIGHT (2015): *Statistical learning with sparsity*, CRC press.

HERBST, E. AND F. SCHORFHEIDE (2015): *Bayesian Estimation of DSGE Models*, Princeton University Press.

JOHANNSEN, B. K. AND E. MERTENS (2016): "A Time Series Model of Interest Rates With the Effective Lower Bound," Finance and Economics Discussion Series 2016-033, Board of Governors of the Federal Reserve System (U.S.).

JUSTINIANO, A. AND G. E. PRIMICERI (2010): "Measuring the equilibrium real interest rate," *Economic Perspectives*, 14–27.

JUSTINIANO, A., G. E. PRIMICERI, AND A. TAMBALOTTI (2013): "Is There a Trade-Off between Inflation and Output Stabilization?" *American Economic Journal: Macroeconomics*, 5, 1–31.

KARLSSON, S. (2013): "Forecasting with Bayesian Vector Autoregressions," in *Handbook of Economic Forecasting*, ed. by G. Ellit and A. Timmermann, Elsevier, vol. 2 of *Handbook of Econometrics*, chap. 15, 791–897.

LEAMER, E. E. (1973): "Multicollinearity: A Bayesian Interpretation," *The Review of Economics and Statistics*, 55, 371–380.

PARK, T. AND G. CASELLA (2008): "The Bayesian Lasso," *Journal of the American Statistical Association*, 103, 681–686.

SIMS, C. A. AND T. ZHA (1998): "Bayesian Methods for Dynamic Multivariate Models," *International Economic Review*, 39(4), 949–968.

SMETS, F. AND R. WOUTERS (2007): "Shocks and Frictions in US Business Cycles: A Bayesian Approach," *American Economic Review*, 97(3), 586–606.

STOCK, J. H. AND M. W. WATSON (2002): "Forecasting Using Principal Components from a Large Number of Predictors," *Journal of the American Statistical Association*, 97, 147–162.

TIBSHIRANI, R. (1996): "Regression shrinkage and selection via the lasso," *Journal of the Royal Statistical Society. Series B (Methodological)*, 267–288.

WU, J. C. AND F. D. XIA (2016): "Measuring the Macroeconomic Impact of Monetary Policy at the Zero Lower Bound," *Journal of Money, Credit and Banking*, 48, 253–291.

Euro Area Business Cycle Network Training School

Solution Methods for Discrete Time Heterogeneous Agent Models and Markov Switching Linear Models

By

Wouter den Haan (London School of Economics and CEPR)
Pontus Rendahl (University of Cambridge and CEPR)

Hosted by: Bank of England,
16-18 September 2019

Plan of the course

MONDAY 16 SEPTEMBER

Day 1: Heterogeneous agents in discrete time -- models and solution methods.
The day will be devoted to canonical models of heterogeneous agents in discrete time, such as the model by Huggett (1993) and Aiyagari (1994), and the associated solution methods. Moreover, we will discuss how to calculate transitional dynamics and impulse response function to unanticipated event.

Readings:

- Huggett, M. The risk-free rate in heterogeneous-agent incomplete-insurance economies, Journal of economic Dynamics and Control 17 (5-6), 953-969, 1993.
- Aiyagari, R. Uninsured Idiosyncratic Risk and Aggregate Saving, The Quarterly Journal of Economics 109 (3), 659-684, 1994.

TUESDAY 17 SEPTEMBER

Day 2: Heterogeneous agents and aggregate risk. This day will focus on how to incorporate aggregate shocks into the models explored in Day 1.
Time will devoted to the most commonly applied algorithms, such as Krusell and Smith (1998), and more recent innovations such as Reiter (2009), Boppart, Mitman and Krusell (2018).

Readings:

- Krusell, P. and Smith A. Income and Wealth Heterogeneity in the Macroeconomy, Journal of Political Economy, 106(5), pages 867-896, 1998.
- Boppart, T., Mitman, K. and Krusell, P. Exploiting MIT Shocks in Heterogeneous-Agent Economies: The Impulse Response as a Numerical Derivative, Journal of Economic Dynamics and Control 2018, Vol 89, Pages 68-92
- Reiter, M. Solving heterogeneous-agent models by projection and perturbation. Journal of Economic Dynamics and Control, 33(3):649–665, 2009

Day 3: The last day focuses on regime switching linear(ized) models. These entails models that display significant nonlinearities across different regimes, but are otherwise well approximated linearly within a regime. Examples of such frameworks are models that can be in and out of a liquidity trap/the zero lower bound (ZLB), or models that otherwise face occasionally binding constraints. The day will focus on appropriate solution methods that are both fast and versatile. The lecture will also contain a discussion on relatively simple global approximation methods that do not rely on any linearization approximation.

Readings:

- Holden, T.D., 2016, Computation of solutions to Dynamic Models with Occastionally Binding Constraints, available at http://www.tholden.org/papers/
- Guerrieri, L. and M. Iacoviello, 2015, Occbin: A Toolkit for Solving Dynamic MOdels with Occasionally Binding Constraints Easily, Journal of Monetary Economics 70, 22-38.
- Rendahl, P., 2017, Linear Time Iteration, available at https://sites.google.com/site/pontusrendahl/Research

ABOUT THE INSTRUCTOR

Wouter den Haan is a Professor at London School of Economics. He holds a PhD from Carnegie-Mellon University, and has previously worked for universities such as UC San Diego and London Business School. He is a programme director of CEPR, and Co-director of the Centre for Macroeconomics. His research interests are business cycles, frictions in financial and labour markets, and numerical methods to solve models with a large number of heterogeneous agents.

Pontus Rendahl is a Reader ("Associate Professor") at the University of Cambridge. He holds a PhD from the European University institute, and has previously worked for universities such as UC Davis, and Paris School of Economics. He is a research affiliate at CEPR and the Centre for Macroeconomics. His research interest lies primarily in understanding the relationship between the labour market and the aggregate economy, and how these components interact; as well as numerical methods used to solve nonlinear economic models.

Both Prof. den Haan and Dr. Rendahl have for many years taught the very popular summer school at the LSE on computational methods in Economics and have a long experience when it comes to computation.