



**International Monetary Fund  
Monetary and Capital Markets Department  
(MCM)**



**Bulgarian National Bank (BNB)**

**Workshop on:**

**MODEL BASED FORECASTING AND POLICY ANALYSIS  
SYSTEMS  
WITH MACRO-FINANCIAL LINKAGES**

**Sofia, Bulgaria  
Park-hotel Vitosha  
November 24–29, 2008**

**WORKSHOP MAIN FEATURES**

- Practical modeling and forecasting techniques. The workshop will focus on how to conduct various experiments using the model and code forecast information quickly, without going into the details of academic debates on various ways of modeling the issue.
- Experiments on a stylized but flexible DSGE model with a banking sector and actual country data.
- Sharing experience with DSGE and financial sector modeling. The participants will present on their own research and model building activities throughout the workshop.
- Individual hands-on work. The workshop program will mostly consist of guided hands-on computer tutorial and exercises, and individual assignments.
- The IRIS Toolbox. The workshop will be exclusively conducted in this state-of-the-art modeling and forecasting Matlab based package. Full codes will be provided.

**PRELIMINARY PROGRAM**

**Workshop Team:**

Jaromir Benes (International Monetary Fund, formerly Reserve Bank of New Zealand )

Inci Ötker-Robe (Deputy Division Chief, IMF/MCM)

David Vávra (Advisor, Czech National Bank; formerly Advisor to National Banks of Serbia and Ukraine)

**Day 1  
(Monday, Nov. 24)  
Conceptual Issues: Dynamic Stochastic General Equilibrium (DSGE) Models, Financial and Real Sector Linkages, Policy and Implementation Challenges**

9:00 a.m.–9:30 a.m.	Opening Remarks	BNB
9:30 a.m.–10:00 a.m.	Technical assistance on Modeling, Policy Analysis Systems, workshop objectives, program	Inci Ötker-Robe
10:00 a.m.–11:15 p.m.	Developing a structured forecasting and policy analysis system (FPAS)—Role of core models and other models in FPAS	Jaromir Benes David Vávra
	What is FPAS; Elements of an FPAS; What are the uses of an FPAS; Role of the core model and other models in the FPAS; Creating a baseline forecast and risk assessments for the economy.	
11:30 a.m.–12:30 p.m.	DSGE Models: Description and Uses of DSGE Models for Forecasting and Policy Analysis for Monetary Policy Making	Jaromir Benes David Vávra
	The roles of DSGE Models in informing policy; their linkages to other elements of FPAS; the types of questions they could address, etc.	
<b>Lunch</b>		
12:30 p.m.–2:00 p.m.		
2:00 p.m.–4:00 p.m.	Why Develop a Model Based Forecasting and Policy Analysis System with Financial Intermediation—Our Main Objective	Inci Ötker-Robe
	Challenges for monetary policy making in emerging market countries in Europe; why are we interested in a DSGE Model with a financial sector? What are the main stylized facts of these economies that we want to represent with the model?	
4:15 p.m.–5:45 p.m.	Overview of theoretical and empirical issues in modeling real and financial sector linkages/Overview of forecasting models with macro-financial linkages/Financial and real sector linkages in IMF model suite	Jaromir Benes Inci Ötker-Robe David Vávra
7:00 p.m.–9:00 p.m.	<b>Welcoming Reception. The Reception will be held in Vitoshka Park Hotel Restaurant</b>	

<b>Day 2</b> <b>Theoretical Underpinnings of Model with Financial Sector Linkages and its Coding in IRIS</b> <i>(Tuesday, Nov. 25)</i>		
9:00 a.m.–11:00 a.m.	<p>SMURF: A Small Model for Understanding Real and Financial linkages</p> <p>Description of the equations, sectors, variables, and workings of the general equilibrium model with real-financial linkages to be used for the workshop</p>	Jaromir Benes David Vávra
11:00 a.m.–12:30 p.m.	<p>Coding SMURF in IRIS.</p> <p>Assigning steady state and transitory parameters. Reading model and its attributes.</p>	Workshop Team and participants
<p><b>Lunch</b> 12:30 p.m.–2:00 p.m.</p>		
2:00 a.m.–3:00 a.m.	<p>Country Experiences with Policy Analysis and Incorporating Financial Sector Issues into Policy Analysis Systems</p> <p>Brief informal presentations/discussions on the FPAS used in policy making; how financial sector issues are incorporated (through the model or satellite models or ad hoc assumptions, etc); how the systems evolved over time; difficulties encountered in building and implementing the models; challenges in contributing to policy making, etc. (max 20 minutes per country)</p>	<p>Workshop participants</p> <p>Croatia Turkey Romania</p>
3:15 a.m.–5:15 p.m.	<p>Coding SMURF in IRIS, continued</p> <p>Introduction to time series and data analysis.</p>	Workshop Team and participants
5:15 p.m.–6:00 p.m.	<p>Basic model experiments with SMURF</p> <p>Model calibration, steady state, deterministic and stochastic properties</p>	Workshop Team and participants
<b>Day 3</b> <b>Using Models in Monetary Policy Making: Oil Price Shock</b> <i>(Wednesday, Nov. 26)</i>		
9:00 a.m.–9:30 a.m.	<p>Incorporating analysis, models, and forecasts in monetary policy decision making</p>	David Vávra
9:30 a.m.–12:30 p.m.	<p>Model Properties under different policy regimes</p> <p>The participants will examine</p> <ul style="list-style-type: none"> <li>- Model responses to temporary shocks under different policy regimes</li> <li>- Model responses to permanent shocks (such as a</li> </ul>	Workshop team and participants

- productivity level change)
- Disinflation under IT or an exchange rate peg
- Importance of the banking sector in the cost channel and model stabilization
- Balance sheet effects

**Lunch**

12:30 p.m.–2:00 p.m.

2:00 p.m.–3:00 p.m.

Country Experiences with Policy Analysis and Incorporating Financial Sector Issues into Policy Analysis Systems (cont.)

Workshop Participants:

Brief informal presentations/discussions on the FPAS used in policy making; how financial sector issues are incorporated (through the model or satellite models or ad hoc assumptions, etc); how the systems evolved over time; difficulties encountered in building and implementing the models; challenges in contributing to policy making, etc. (max 20 minutes per country)

Czech Republic  
Hungary  
UK

3:00 p.m. – 4:30 p.m.

Overview of the empirical experience with oil and food price shock and country policy responses

Inci Ötker-Robe

4:45 p.m. – 6:00 p.m.

Oil price shock experiments

Workshop team and participants

The participants will investigate

- Effects of permanent vs. temporary shocks
- Effects of real wage and other rigidities,
- Implications of policy responses to rising inflation and falling output in different monetary regimes
- Implications of imperfect credibility under IT

**Reception**

7:30 p.m. –9:30 p.m.

**Day 4**

**Using Models in Monetary Policy Analysis: Administrative Measures and Financial Crisis Contagion**

*(Thursday, Nov 27)*

9:00 a.m.–10:00 a.m.

Oil price shock experiments, continued

Workshop team and participants

10:00 a.m.–10:45 a.m.

Overview of the use of direct instruments in dealing with financial sector issues

Inci Ötker-Robe

11:00 a.m.–12:30 p.m.

Banking sector regulation experiments.

Workshop team and participants

The participants will investigate

- The effects of such instruments (reserve requirements on bank foreign borrowing and/or bank deposits, etc)
- The effects of credit controls
- The impact of direct measures on private sector behavior

and circumvention

**Lunch**

12:30 p.m.–2:00 p.m.

2:00 p.m.–2:30 p.m.

Country Experiences with Policy Analysis and Incorporating Financial Sector Issues into Policy Analysis Systems (cont.)

Workshop Participants:

Brief informal presentations/discussions on the FPAS used in policy making; how financial sector issues are incorporated (through the model or satellite models or ad hoc assumptions, etc); how the systems evolved over time; difficulties encountered in building and implementing the models; challenges in contributing to policy making, etc. (max 20 minutes per country)

Bulgaria  
Estonia, Lithuania, or  
Latvia

2:30 p.m. – 3:00 p.m.

Overview of stylized facts on financial crisis contagion

Inci Ötker-Robe

3:00 p.m. – 6:00 p.m.

Credit crunch/financial contagion experiments

Workshop team and participants

The participants will investigate

- the transmission of increasing foreign interest rates on financial and real sectors
- the interactions with reserve requirements and credit control regulations
- policy responses in different regimes and under varying policy concerns about inflation and output growth.

**Day 5**

**Using Models for Policy Analysis and Forecasting**

*(Friday, Nov 28)*

9:00 a.m.–10:00 a.m.

Financial sector experiments, continued

Workshop team and participants

10:00 a.m.–12:30 p.m.

Using SMURF for Forecasting  
Create a forecast, risk assessments, simulations, and forecast presentation, uncertainty bands, etc.

Workshop Team and Participants

**Lunch**

12:30 p.m.–2:00 p.m.

2:00 p.m.–6:00 p.m.

Using the SMURF for Forecasting and Policy Analysis for Hypothetical Policy and Shock Experiments

Workshop Team and Participants

The workshop participants will divide into 4-5 groups, each doing a particular policy experiment or analysis of an exogenous shock or a forecast using SMURF. The objective is to conduct the experiment, and prepare analytical documents for communication to senior management as input into monetary policy making

**Day 6**                      **Group Presentations and Wrap up**  
*(Saturday, Nov. 29)*

9:00 a.m.–12:00 a.m.	Wrap up/Discussions: Summary and implications of country experiences with respect to challenges in modeling, using the models for informing monetary policy, responses to challenges, tips from experienced central banks, and lessons from group exercises.	Workshop Team and Participants
Lunch 12:00 p.m.–13:30 p.m.		
2:00 p.m.- 6.00 p.m.	Social event (Sofia - sightseeing)	