Post-crisis policy challenges and implications for macro modelling

Key findings from a conference jointly organised by SUERF and Bank of Finland

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Conference Report

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Bank of Finland and SUERF held their 9th joint event in Helsinki on 19 September 2019. The aim of the conference was to discuss current and future challenges in the key policy areas of central banking and seek the views of leading researchers in these fields, many of whom work in central banks and other policy institutions.

Tuomas Välimäki, member of the Bank of Finland's executive board, noted in his welcoming remarks for the pre-conference dinner that policy challenges indeed remained, alluding also to the public discussions surrounding the recent monetary policy decisions. He also asked rhetorically, whether we really are already "post-crisis", referring to the conference title. As a lesson from the recent crises he pointed out that it is important to consider different policy areas at same time, combining both micro and macro perspectives, as otherwise the big picture and thereby risks can be missed.

The SUERF president, Professor **Jakob de Haan** opened the conference day. He acknowledged his critical views of the so-called structural macro models, much used in policy analyses particularly in central banks, but stressed at the same time that it would be a disaster to dismiss them. Central banks need to have a command of them.

The first keynote and the subsequent session considered in a highly illuminating manner the current boundaries of the use of these often large structural macro models, and ways how to improve their usefulness. These presentations focused mainly on modelling challenges in the context of monetary policy.

The **keynote speaker Frank Schorfheide** of University of Pennsylvania gave an excellent **overview of the central class of structural models**, the so called Dynamic Stochastic General Equilibrium (DSGE) models. He focused particularly on their empirical estimation in which he is one of the pioneers.

He stressed that the researcher or a policy analyst first needs to know what purpose model is for in order to determine its scale and complexity. He illustrated this with a picture of a traditional country house: all towers and extensions make the house as we know it but one should always ask whether and when these elements are needed from the functional viewpoint.

Regarding the general theme of the conference, post-crisis policy challenges and their implications for macro modelling, Schorfheide offered the following set of issues: First, low (or zero, or even negative) interest rates have generated constraints on traditional monetary policy instruments. Therefore, models need to incorporate zero (or more generally, "effective") lower bound constraints. Second, below-target inflation rates (and expectations) raise questions about central banks' ability to control inflation. In response, we need models with multiple equilibria. Third, policy makers have become more concerned about inequality, whether measured by consumption, income, or wealth, and the distributional effects of their policy interventions. To analyze these, the so-called Heterogeneous Agent New Keynesian (HANK) models are needed.

He reminded that good modeling and measurement is a genuinely difficult task. Despite decades of research on the effects of unanticipated monetary policy shocks we have been left with much uncertainty about their accurate measurement. Moreover, there is still limited experience with modelling the effects of policies such as central bank asset purchase programs, forward guidance, and macroprudential policies.

In the subsequent session **Fabio Canova**, professor at the Norwegian Business School and a research fellow at the Bank of Finland, continued with similar themes as Prof. Schorfheide, as both speakers are central figures in the estimation literature of the structural models.

Canova opened his presentation by recognizing that policy makers and academics are all somewhat dissatisfied with the current state of models, for various reasons: lack of flexibility, lack of forecasting accuracy, or lack of appropriate resulting narratives. To prepare his proposal for a new type of practically oriented economic models, prof. Canova recalled the history of macroeconomic modelling.[i]

As a potential solution to the aforementioned challenges, he argued for "practical DSGE models". This type of models use more data for estimation and analysis, can exploit institutional information, and use time series blocks to account for missing features of the existing models. More specifically, he then elaborated on his latest work which builds on the work of Biovin and Giannoni (2006) and Del Negro and Schorfheide (2012). While the "practical DSGE models" are more flexible and reduce forecast uncertainty, they may, on the other hand, suffer from over-parameterization and may be quite difficult to solve.

The monetary policy related session also included a research paper "Inflation dynamics in slumps", presented by Jesper Linde, former head of research of the Bank of Sweden, who is now at the IMF. The paper focuses on resolving the "missing deflation" puzzle, an observation made in the context of the Great Recession. The model can also explain the post-crisis subdued inflationary pressures in response to central banks' efforts to raise inflation by providing forward guidance. The model generates nonlinear Phillips curves and achieves this by incorporating nonlinearities in the price and wage-setting mechanisms. The key mechanism in the model is that demand elasticity depends on the state of the economy. As a result, firms' ability to increase demand by cutting prices is limited in a recession as large price cuts would result in lower profits because demand would increase only by little. Hence, firms have little incentive to cut prices by much.

The second policy area under the conference theme, macroprudential policy, comprised of Stijn Claessens's (Head of financial Stability Policy & Deputy Head, Monetary and Economic Department at the BIS) keynote and presentations by Caterina Mendicino (ECB) and Kasper Roszbach (Head of Research, Bank of Norway).

Claessens talked about "Moving forward with macroprudential frameworks" and he covered a list of central topics under that title that need closer attention in the future. To start with he emphasized that the new framework for thinking about macroprudential policies departs from the "Tinbergen separation" principle of "one policy goal – one instrument". Instead it recognizes the many spillovers and interactions between monetary policy, micro and macroprudential policies.

First, the effectiveness and feasibility of macroprudential policies is influenced by country characteristics. For instance, the structure of the financial system makes a difference: bank based financial systems react differently than market based ones, and a large shadow banking system facilitates circumvention of macroprudential policies.

Second, as macroprudential policies are being used, empirical evidence on what works is accumulating. There are e.g. indications that borrower-based measures (loan to value ratios, debt to income ratios) work for real estate, are harder to circumvent, but can be politically costly. As a third topic, Claessens also considered an interesting special question whether regional house price booms call for macroprudential action.

Fourth, he discussed how macroprudential measures and monetary policy interact and how they might be coordinated. Obviously, monetary policy has effects on financial stability through various channels, including through asset prices, leverage and risk taking.

Fifth, Claessens addressed the question of how to apply macroprudential policies in a globalized world. And sixth, there is the issue of how to address risks from non-banks. The Financial Stability Board monitors and analyses financial stability risks from non-bank financial intermediation and identifies suitable regulatory measures. Should we generally extend regulators' mandates to include non-bank system oversight?

His seventh topic was whether macroprudential policy should aim for a "preferred" financial structure. This question is all the more relevant e.g. in Europe where there are initiatives towards a more market based financial system (cf. the Capital Markets Union initiative). Empirical estimates show that recessions with credit crunches last longer and are deeper in bank-based than in market-based systems. At the same time, volatility and procyclicality are more pronounced in market-based systems. In a longer perspective, regulation is focusing less on structure and conduct, while putting more emphasis on disclosure and capital. Ideally, the design of financial regulation should adopt a dynamic system view, asking what delivers less systemic risks and procyclicality while fostering productivity growth.

Finally, macroprudential policies also raise new challenges in terms of communication and political economy. Regarding external communication with the financial industry, consumers and politicians, financial stability is hard to communicate and verify, while macroprudential measures may be more invasive than monetary policy.

In the Q&A part Claessens acknowledged that there is also a challenge regarding complexity of regulation, given the number of instruments introduced or discussed. The fewer (instruments) the better, he concluded.

Jesper Lindé, Sveriges Riksbank

Caterina Mendicino, ECB

Kasper Roszbach, Norges Bank

Claessens's keynote was followed by a research paper **"Bank capital in the short and in the long run"** presented by **Caterina Mendicino** (ECB). It was a contribution in the extensive research agenda she is part of on macroprudential policies and bank capital regulation more generally, developed around the so called "3D model" (3D referring to the fact that the modelling framework incorporates the possibility of defaults by households, firms, and banks) under the auspices of the ECB.

The main insights from the paper were that an increase in bank capital requirements affects the economy very much like a demand shock. Output growth would be reduced and inflation would undershoot the central bank's target. These transitional costs resulting from increased capital requirements would offset even 25% of the welfare gains from the long-run optimal increase in capital requirements. Overall, larger increases in bank capital requirements lead to larger financial stability gains in the long run, but the implied transition costs are also larger.

She also briefly described the ECB task force "to foster cooperation between research and policy departments to produce new frameworks of analysis on the interaction of monetary policy, macroprudential policy and financial stability".

In the second research paper of the macroprudential session, "Bad times, good credit", **Kasper Roszbach** presented empirical evidence using rather unique micro level data from an anonymous bank regarding the role of information collection in the credit allocation process. The paper starts with the question whether "assessing borrower quality (is)

harder or easier for banks in bad times than … in good times". The research finds e.g. that the role of "soft" information about the credit customers varies over the cycle. One policy implication is that the countercyclical capital buffers are useful as they tighten in booms when riskiness of new credits can be increasing.

The last session of the conference included two presentations that dealt with short-term economic forecasting, specifically the so-called nowcasting models developed and used in the ECB and the Bank of Finland.

In her presentation, **Marta Banbura** (ECB) noted that at least up until the Global Financial Crisis, nowcasting models and more generally, many practical forecasting models relied heavily on dynamic factor models. However, during the crisis their forecasting ability was weak and post-crisis, structural changes such declining share of industrial production and a decline in the GDP trend development have further weakened the performance of factor models. Simpler models such as so-called bridge-models have partly replaced the former ones. The factor models have also become more parsimonious in terms of the number of included variables. According to her, nowcasting models have a significant role in the ECB and they add value to economists' forecasts over short horizons. Their performance ability should however be constantly monitored.

Juha Kilponen (Head of the Monetary policy and research department at the Bank of Finland) told in his presentation of the Bank of Finland's nowcasting and forecasting models, and the user experiences with them. He stressed his view of the importance of using

structural models in the forecasting process. Forecasting is not only about reaching high forecasting accuracy, it is important to be able to support the numbers with a coherent economic interpretation. To that aim, structural macro models are invaluable.

The Bank has a long history of model-based economic forecasting. It's current large-scale DSGE model (known as "Aino") is one of the first (if not the first) of its kind to have been used in regular economic forecasting by a central bank. It is also important to analyze the past forecast errors systematically and learn from possible biases.

The Bank of Finland nowcasting model generates updated nowcasts and creates a Power BI report to the Bank's web page. The "robot economist" also generates an automatic tweet of the nowcast updates (see https://twitter.com/SPNowCast).

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[i] First generation models (Tinbergen, 1936, 1939, Klein, 1970) were constructed from national account identities. They specified demand relationships with delay adjustments, but they lacked the supply side, and had no capital stock and no expectations. They focused on multiplier effects of exogenous fiscal-monetary changes.

Second generation models (e.g. Ando and Modigliani, 1964, Brayton and Tinsley, 1996) added a supply side, describe dynamic adjustments of today's value to long run (equilibrium) targets, and introduced inflation dynamics as well as (adaptive) expectations and financial assets (Tobin's Q). They still suffered from problems of inconsistencies between dynamics and expectations as they relied on partial adjustments, introduced equation by equation. Hence, they also suffered from stock-flow inconsistencies.

Third generation models (e.g. Daguay and Langworth, 1998, McKibbin and Sachs, 1989, BEQAM, 2003) constructed a steady state from static optimization problems, calibrated it to the data and added dynamics if needed. They introduced "deep parameters" and used policy rules. They focus on the effects of shocks. They suffer from arbitrary dynamic adjustments, lack long-run dynamics, and still exhibit stock-flow inconsistencies.

Fourth generation models (e.g. AINO, 2004, NEMO, 2006, SIGMA, 2006, RAMSES, 2007, MAS, 2007, NEWM, 2008) use dynamic optimization to develop decision rules. They use frictions to create slow adjustments to shocks. They are disaggregated, have sectors, allow for an open economy, and cater to some heterogeneities (e.g. Calvo pricing). They analyze the general equilibrium and achieve stock-flow consistency. They centrally rely on Euler equations and Phillips curves. They consider long-run and short-run fluctuations jointly. They are useful for "telling stories". However, they have a problematic forecasting performance, and they are a very tight corset and do not readily accommodate institutional knowledge or non-rational behavior.

There is a large heterogeneity of views on the latest, fifth generation models. Prof. Canova identified three strands of these developments: a) semi-structural, elaborated versions of the third-generation models (LENS, 206, ECB-BASE, 2019); b) stripped down versions of fourth generation models non-structural or ad hoc features (COMPASS, 2013, MAJA, 2019); and c) various alternatives currently being developed such as HANKs, agent-based models, new-economic thinking models and post-Keynesian DSGEs (see Farmer, 2017).