Benoît Cœuré: Which models do we need in times of crisis?

Speech by Mr Benoît Cœuré, Member of the Executive Board of the European Central Bank, at the Bank of France, CEPREMAP, Federal Reserve Bank of Atlanta and Centre d'Analyse Stratégique international conference on "Macroeconomic modeling in times of crisis", Paris, 26 October 2012.

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Ladies and Gentlemen,

I would like to thank the organisers for inviting me to this conference.

We are living in extraordinary times. Unprecedented challenges call for bold policy action, but the bolder we are, the more we need solid, principle-based policy analysis. This is all the more challenging as the crisis has also exposed weaknesses in our existing tools. This conference gives us a chance to reflect on the lessons that can be learnt and on how we can proceed. Let me share a few ideas based on the ECB's experience.

Prominent economists – Akerlof and Shiller, Buiter, Krugman and Mankiw,[1] as well as popular opinion[2] – have concluded (from different perspectives) that the current generation of micro-founded theory-based models have somehow taken a wrong turning. Others – among them Kocherlakota, Lucas and Woodford[3] – have reached a more positive assessment. Others still (such as John Taylor) point less to models and more to policy: specifically, the failure to adhere to the policy rules derived from those same models.[4] The truth probably lies somewhere in between. Thus, I take the view that while we should acknowledge the contribution of our models, we must likewise acknowledge their limitations and make improvements.

It's worth reminding ourselves where we are and what's been achieved. Policy interventions by the ECB, the Federal Reserve System and other central banks – lowering policy rates to historic lows and employing non-standard measures such as infinitely-elastic liquidity provision or the ECB's new "Outright Monetary Transactions" – have certainly eased financial market pressures. Although we are still grappling with tensions in credit and sovereign debt markets, and with the painful adjustment of our economies, the financial system is recovering and we are working hard to strengthen that process. In addition, banks are replenishing their capital buffers and the institutional foundations of the euro are being strengthened, e.g.

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1 References: Buiter. W. (2009): "The unfortunate uselessness of most 'state of the art' academic monetary economics", Financial Times, 3 March 2009; Akerlof, G. and Shiller, R. (2009): "Animal Spirits: How Human Psychology Drives the Economy, and Why It Matters for Global Capitalism", Princeton University Press; Krugman, P. (2010): "The International Finance Multiplier". New York Times, 22 March. Mankiw, N. Gregory (2006): "The Macroeconomist as Scientist and Engineer", The Journal of Economic Perspectives 20 (4): 29-46.23.

2 Kay, J. (2011): "The Map is Not the Territory: An Essay on the State of Economics", available at http://www.johnkay.com/2011/10/04/the-map-is-not-the-territory-an-essay-on-the-state-of-economics.

3 For example, see Woodford's recent essay "What's Wrong with Economic Models?", Institute for New Economic Thinking, Research Note 9, 2012. Lucas, R. (2009): "In defence of the dismal science", Economics Focus Section, Economist 6 Aug. Kocherlakota, Narayana (May 2010): "Modern Macroeconomic Models as Tools for Economic Policy", Banking and Policy Issues Magazine. Federal Reserve Bank of Minneapolis. http://www.minneapolisfed.org/publications_papers/pub_display.cfm?id=4428.

4 John Taylor has argued that protracted departures from well-known normative policy prescriptions based on consensus macroeconomic models (such as those based on the "Taylor rule") have contributed to the crisis. Taylor, J. (2009): "Getting Off Track: How Government Actions and Interventions Caused, Prolonged, and Worsened the Financial Crisis", Hoover Institution Press Publication.

through the Fiscal Compact and the forthcoming banking union, together with improved regulatory frameworks.

These decisions have not been taken in an intellectual vacuum. The notion that the Great Recession would have exposed fundamental flaws in economic theory can be firmly dispelled. It is my conviction that more than ever – and here I quote John Maynard Keynes – "madmen in authority…are distilling their frenzy from some academic scribbler from a few years back".[5] Economic theories, some of them dating back to the 1930s,[6] have helped us to incorporate financial insights tractably into our models – think of the financial accelerator, the debt deflation channel, the credit channel, the modelling of collateral-constrained and credit-constrained agents, to name but a few. Therefore, saying that models had nothing to teach us about the crisis (before or after) is just not right. It's true that we did not avoid the Great Recession, but if we, around the world, were able to prevent a much more damaging depression, we owe much of it to the science of economics.

Nevertheless, it is also true that our models did not predict the crisis and provided only limited policy guidance when it struck. Can we identify their weaknesses? Well, there are the usual suspects: linearity, rational expectations, complete markets, limited agent heterogeneity and financial imperfections. *Ex ante*, these choices may be defended as reflecting the need for parsimony, logical consistency and tractability in model building; perhaps also the view that financial crises were rare. Clearly, those views need revising.

Certainly, structural models were not very successful at forecasting the crisis. But I'm not certain that there were other tools out there which did better. Non-linear models are outwardly attractive – think of the strong pro-cyclical features of the current euro area crisis, such as the market impact of credit downgrades or the feedback loop between sovereign and bank creditworthiness. But they do not necessarily deliver substantive gains in real time.[7] Meta models or models which markedly over-fit the data are unlikely to help policy deliberations. Arguably of more importance is the better identification of those (currently under-developed) financial factors that matter for our short-term assessment.

Let me now bring the ECB's experience into the discussion. I would first like to emphasise the valuable contribution that the current generation of DSGE models have made to the policy-making process. The ECB has been at the frontier of developing and estimating structural models for policy analysis. Models such as Smets-Wouters[8] and the New Area-Wide Model[9] (NAWM) have played an important role in policy analysis (for example, in policy-making under the zero lower bound for nominal interest rates and the effectiveness of

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5 Keynes J.M. (1936): The General Theory of Unemployment, Interest and Money, Chapter 24, paragraph 5.

6 Seminal contributions include: Fisher, I. (1933): The Debt-Deflation Theory of Great Depressions, Econometrica; Bernanke, B. and Gertler, M. (1989): Agency costs, Net Worth, and Business Fluctuations, American Economic Review, vol. 79, 1; Kiyotaki, N. and Moore, J. (1997): Credit Cycles, Journal of Political Economy, vol. 105; and Bernanke, B., Gertler, M. and Gilchrist, S. (1999): "The Financial Accelerator in a Quantitative Business Cycle Framework", Handbook of Macroeconomics, North Holland.

7 The literature still debates the usefulness of non-linear forecasting methods, with so far mixed evidence (Stock and Watson 1999). The financial crisis has revived this debate. However, the currently available non-linear models do not systematically beat linear models in point forecasting or in real-time terms, as was shown at the recent 7th ECB workshop on forecasting techniques (e.g., Barnett et al., 2012 and Elliot, 2012). See http://www.ecb.int/events/conferences/html/ft_workshop2011.en.html, and Stock, J. H. and M. W. Watson (1999): "Forecasting inflation", Journal of Monetary Economics, 44(2), 293–335.

8 Smets, F. and Wouters, R. (2003): "An estimated Stochastic Dynamic General Equilibrium Model of the Euro Area" Journal of the European Economic Association, 1(5), 1123–1175.

9 Christoffel, K., Coenen, G. and Warne, A. (2008): "The New Area-Wide Model of the Euro Area: A Micro-Founded Open-Economy Model for Forecasting and Policy Analysis", ECB Working Paper No 944.

fiscal policy). Similarly, the Christiano-Motto-Rostagno[10] model represents a valuable extension of the canonical framework to explore and interpret financial linkages.

In recent years, at the ECB and comparable institutions, *country* modelling has risen in prominence. Smaller countries, and in particular the EU/IMF programme countries, whose impact has usually been small relative to euro area developments, have extensively contributed to increased area-wide volatility.

But in building and extending our models, we should be aware that there are other perspectives. Behavioural economics and behavioural finance spring to mind: yes, animal spirits and herd behaviour influence market dynamics. Loss aversion, rule-of-thumb, over-confidence, lumpy decision-making and pattern-seeking are characteristics long understood by behaviourists that can, with due care, illuminate many puzzling market outcomes.[11] A more serious treatment of expectations is also high on the agenda. After all, information is costly both to store and to process. Hence, the cost of forming expectations has to be taken into account.

"The macroeconomics of the future", as Michael Woodford puts it, "will still make use of general-equilibrium models in which the behavior of households and firms is derived from considerations of inter-temporal optimality, but in which the optimization is relative to the evolving beliefs of those actors about the future, which need not perfectly coincide with the predictions of the economist's model".[12] That said, for the behavioural research agenda to migrate into the mainstream of policy analysis, one still needs a sense of concrete and novel macro policy implications.[13]

So what's on our modelling wish-list? Models need to incorporate at least some of the key aspects of, and key players in, the financial crisis: financial factors and intermediaries, the shadow banking sector, the interaction between sovereign and banking solvency risks and financial interconnectedness. In order to draw the full lessons from the previous crises, it would be important to include elements such as housing markets and mortgage finance, heterogeneous agents (borrowers versus lenders), richer flow of funds analysis and asset and liability structure, as well as to develop good theories of maturity transformation. More generally, models should acknowledge the evolving role of money in the economy, including the determinants of inside money creation (e.g. within financial markets and in the shadow banking system) and how it interacts with central bank money.

But the wish-list extends beyond financial matters: a more vigorous role for fiscal policy and a more serious treatment of expectations. The stronger role for fiscal policy could include distortionary taxes, as well as complementarities between private and public consumption and investment expenditures. Deeper research into expectations could comprise the use of bounded rather than rational expectations, where agents learn only about economic shocks very gradually, or, more exotically, "rational inattention", which formally recognizes the limits to agents' information processing abilities. These points are clearly high on the agenda as

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[10] Christiano, L., Motto, R. and Rostagno, M. (2003): "The Great Depression and the Friedman-Schwartz Hypothesis", Journal of Money, Credit and Banking, 35(6), 1119–1197.

[11] Major contributions include: Benartzi, S.; Thaler, R. H. (1995): "Myopic Loss Aversion and the Equity Premium Puzzle". Quarterly Journal of Economics, 110 (1): 73–92; Daniel, K., Hirshleifer, D. and Subrahmanyam, A. (1998). "Investor Psychology and Security Market Under- and Overreactions". Journal of Finance, 53 (6); Hogarth, R. M.; and Reder, M. W. (1987). Rational Choice: The Contrast between Economics and Psychology. Chicago: University of Chicago Press; Kahneman, D. and Diener, E. (2003). Well-being: The foundations of hedonic psychology. Russell Sage Foundation.

[12] Woodford M. (op. cit.).

[13] For instance, a notable policy recommendation arising from Akerlof and Shiller's book "Animal Spirits" was to set targets for credit growth. And yet, credit developments already are an important input into the ECB's monetary analysis.

well. But what we don't want on our wish-list is to include all these features in a single big model as was done in the 1960s and 1970s. That would be a recipe for utter complexity and obscurity.

It is also evident to me, as a policy-maker, that policy decisions are shaped by interactions between actors or interest groups. Take the question of euro area adjustment. Who will bear the cost of the much-needed sovereign and private deleveraging? To what extent will the social cost of the crisis bear on political outcomes, and thus on economic policy decisions? How much fiscal risk-sharing can be accepted by the people of Europe, and what should be the optimal combination of inter-temporal risk-sharing through balanced budget rules, "horizontal" risk-sharing between countries (such as through the ESM), and "vertical" risk-sharing through a common fiscal capacity? To answer such crucial questions, we would need to plug a political economy model into a rich description of the euro area economy and financial sector, disaggregated at country level. We don't have this in our toolbox.

Yet, exciting new work is already arriving – some of it presented here at this conference. My hope is that these extensions will help us to understand the interaction between the balance sheets of central banks, on the one hand, and those of the private and public sectors, on the other hand. But they will also help us to grasp the determinants of inside money creation, to shed light on spillovers between residential and non-residential sectors, macro-prudential issues, and to quantify trade-offs in different policy strategies. The ECB's most recent contribution was the establishment in 2010 of the Macro-Prudential Research Network (MaRS for short) to develop frameworks and tools to improve macro-prudential supervision in the European Union. Specifically, progress has been made on models linking financial stability and economic performance; early warning systems and systemic risk indicators; and on assessing contagion risks. The view from MaRS, already distilled through a large number of papers and conferences, should constitute a critical input to those matters in the coming years.

In expanding our modelling frameworks, let me insist on the merits of pragmatism. As Paul Krugman once said, "economists as a group mistook beauty, clad in impressive-looking mathematics, for truth".[14] Let's not be too easily seduced by beauty. The search, for example, for micro-foundations shouldn't be dogmatic. As an illustration, what made Christiano, Eichenbaum and Evans (2005) and Smets and Wouters (2003) so important is that, whilst motivated by theory, they didn't sacrifice the empirical side. Short cuts were taken: habits in consumption, investment adjustment costs, indexation etc. Such frictions have and can be micro-founded but the crucial, not to say bold, step was to incorporate them in the first place.

One might say the same of "financial frictions". In times of crisis, the search for micro-foundations shouldn't paralyse us or hinder fresh thinking. For instance, though rightly famous, it's unclear if the Bernanke-Gertler-Gilchrist framework (op. cit.) correctly depicted recent events. The financial crisis looks as much like a sudden breakdown in financial intermediation which then spilled over to, and exacerbated, sovereign debt tensions, as a crisis sparked by risky corporate leverage or banks being less efficient in monitoring investment projects.

In effect, we should find out and emphasise what works. Do some interest-rate spread definitions work better than others? Does that information content change over time? Do frameworks predicated on one country translate to another? Can we understand the dynamics at play behind the fragmentation of the euro area financial system, and what it would take to reverse this trend?

[14] Krugman P. (2009), How Did Economists Get It So Wrong?, The New York Times, 6 September.

I conclude. For both model-building and policy-making, the agenda is formidable. But conferences like this highlight that some of the best minds in the profession are pursuing that agenda, and pursuing it vigorously.

Even though the models at our disposal proved to be relatively inadequate to deal with the complexity of the crisis, still it is the economic framework developed so far that has guided our policy decisions. To put it differently, economic models have shown severe limitations, but without them, policy-makers around the world would have been condemned to complete inaction or blatantly erroneous actions. Models are devices to help structure, organise and discipline our beliefs. They help identify the key assumptions on which any policy recommendation rests, and provide an essential framework for general-equilibrium policy analysis. In economics, as in other sciences, they highlight channels of interest and abstract from other factors. They can (and should) be tested against data, bringing our dismal science, economics, one step closer to Popperian refutability. They also encourage the building of new data sets and decisions upon appropriate data concepts. Ultimately, they help us to learn from past errors and provide safeguards against political adventurism.

As General Eisenhower once said: “In preparing for battle I have always found that plans are useless, but planning is indispensable”. When combating the crisis, models are sometimes useless, but modelling is indispensable.

I thank you for your attention.