Mario Draghi: The interdependence of research and policymaking

Speech by Mr Mario Draghi, President of the European Central Bank, at the Lindau Nobel Laureate Meeting, Lindau, 23 August 2017.

* * *

I am especially thankful to Professor Hellwig for inviting me to address this conference. All of you Nobel laureates share the extraordinary ability to explain parts of our everyday reality that have not been understood before, or were previously seen from a different, and less informative, perspective. You are the builders of a science that is also a guide to policymaking. Your discoveries have contributed to the way we think, the way we do policy, the way we affect the welfare of millions of individuals.

This year marks the 200th anniversary of David Ricardo's Theory of Comparative Advantage[1] – in the words of Paul Samuelson, one of the few counter-intuitive fundamental ideas in economics, which moved the world away from mercantilism. And when we look at other giants in the history of economic thought, Adam Smith, who laid down the foundations of capitalism; Keynes, who drove us into policy activism and away from *laissez-faire*; until the founders of econometric model building in post-war time, we cannot but conclude that there is little in economics that does not have policy implications and that the interaction between research and its policy application is continuously evolving in an ever expanding universe.

Let me review the most recent development of those interactions and in so doing, I will focus on monetary policy and financial regulation.

The pre-crisis macroeconomic framework

The breakdown in the ability of post-war macroeconomic models to accurately forecast the economic developments of the 1970s and the early 1980s opened up space for further advances in research. Advances that, by and large, provided the foundation of the pre-crisis consensus that inspired central banks in their monetary policy and governments in their stance on financial regulation and supervision.

In a very stylised fashion, the range of views that formed this consensus shared three general features. Dominant was the emphasis placed on the interactions between policies and economic agents' behaviour under rational expectations. Price and wage rigidities were often the only types of rigidity considered in the economy. Finally, financial markets and intermediaries – their regulation, their imperfections, and their supervision – played only a minor role, or were even entirely neglected in macroeconomic models.

It would be a mistake to look back at this considerable body of theory and evidence only with today's disenchanted, post-crisis eyes and to underestimate the profound changes that it produced in policymaking and institutions.

In the 1970s governments attempted to maximise social welfare, in the form of low unemployment and inflation, by trying to exploit the short-run trade-off between the two. They engineered surprise booms "just once" before promising to revert to a policy of low inflation in future, especially when motivated by the electoral cycle. The insights of a number of Nobel laureates showed how these policies were bound to fail and why they were time inconsistent.[2] The same incentive to renege remains in the future, and promises to do otherwise lack credibility. Rational wage and price setters will not believe in a policy that policymakers will find it optimal to renege on, making it difficult for policymakers to achieve price stability without a recession.

It is hard to overestimate the enormous impact that the Lucas critique and the problem of time

inconsistency have had on the conduct of monetary policy over the past 40 years. In the 1970s, most central banks were under political control and obliged to follow more or less short-term oriented policies. During the 1990s and 2000s, the importance of credibility was increasingly appreciated and evidence mounted that operationally independent central banks with a clear mandate to maintain price stability delivered much better economic outcomes than those under direct government control.

The result was a revolution in central banking. Today, most countries' central banks are independent, but subject to a mandate drawn up by the legislators, who in turn hold the central bank to account. As a result of independence and of greater accountability, communication of monetary policy has become much more transparent.

The second dominant feature of the paradigm prevailing before the crisis was its focus on nominal wage and price rigidities. Models including these rigidities had greater explanatory power than previous models and were more in line with monetary policy practices at that time. Price stability emerged in both central bank mandates and macroeconomic models as the overriding objective that central banks should pursue in order to maximise social welfare. In the words of an influential article, one could see a "science of monetary policy" developing next to the traditional "art" of monetary policy.[3]

But there was a notable absence of a role for banking and finance in these models. Wage and price rigidities, together with a few other frictions, appeared to be sufficient to provide a realistic characterisation of the transmission mechanism of monetary policy in the main macroeconomic models. Financial sector developments did not seem to affect this mechanism, because financial intermediation was assumed to be fully efficient. And generally, the interest rates faced by households and businesses typically moved in line with movements in central bank policy rates.

True, there were some models that incorporated financial frictions into macroeconomics.[4] Central banks themselves were also aware of the role of monetary and financial markets in the monetary policy transmission mechanism. The first Eurosystem Research Network at the ECB studied the so-called bank lending channel, which maintains that banks play a crucial role in the transmission of monetary policy. But the impact of financial frictions was generally estimated to be small in developed countries and these frictions were therefore absent from the canonical models used for monetary policy analysis.

Financial economists of course studied banks and financial markets much more closely, but they used predominantly partial equilibrium models and showed less interest in the way the financial system interacted with the wider economy.

In fact, the pre-crisis paradigm in macroeconomics predicted neither the onset nor the severity of the crisis in any meaningful fashion for the conduct of policy. Unconditional trust in the self-repairing capacities of financial markets, or simple neglect, had led to deregulation and lax supervision in the years preceding the crisis. Low quality capital with little loss-absorbing capacity, underestimation of asset risk, excessive and overlooked leverage, ignorance of the interconnections, disregard for the liquidity buffers, low resilience of the funding markets, and pervasive fraud, especially in the sub-prime sector were just a few of the factors that produced the most severe financial crisis since the Great Depression.

The evolution of the financial and sovereign debt crises

As the crisis unfolded, the interbank funding market dried up and credit availability contracted sharply. Annual credit growth to the private sector fell from 9.3% in 2007 Q4 to –2.1% in 2009 Q3 in the United States and from 8.5% to 0.7% in the euro area over the same period. The effect on economic activity was sudden and significant. Between 2008 Q3 and 2009 Q2, GDP declined by

3.6% in the United States and by 4.9% in the euro area.

Though the initial effect of credit contraction was similar in the United States and the European Union (EU), its propagation was considerably different owing to the EU's predominantly bank-based system of financing. The first banks to be hit in 2007 were obviously the ones that invested the most in related financial products that had by then lost much of their value. These banks were mostly located in Germany, France and Netherlands, countries with comparably strong fiscal positions. Then, starting in 2008, it was the turn of several Spanish and Irish banks, which were overexposed to the collapsing domestic real estate market.

Governments across the globe stepped in to shore up their banking systems. The European Commission estimates that in the EU, public sector aid provided in 2008 was around 5% and in 2009 around 9% of EU GDP.[5] The direct net fiscal costs of financial sector support in the United States between 2007 and 2009 are estimated to be at around 5% of GDP.[6]

Up until that point, sovereign debt had been considered as effectively risk free, regardless of the rating of the sovereign. The Greek crisis destroyed that illusion, and induced a general repricing of risk in the EU. This repricing of sovereign and other risks, combined with the drying up of funding markets, in turn affected other countries' banks which, having little exposure to either toxic financial products or to real estate, had been immune up until that point. Banks in, for example, Italy and Portugal were overly exposed to their fragile sovereigns. The banking crisis morphed into a sovereign debt crisis. In these countries credit contracted even further, aggravating the ongoing recession and further weakening the banking system in a vicious circle.

Fears of potential sovereign default, with likely catastrophic impact on domestic banking sectors, caused interbank lending between countries to dry up and funding markets in the euro area became fragmented along national lines. This threatened the even transmission of monetary policy across the euro area. The interest rates faced by businesses and households – and indeed sovereigns – became increasingly divorced from movements in short-term central bank rates. The crisis that had started as a global crisis was now becoming the crisis of the euro.

The financial sector played a significant role in not only *propagating* but also *originating* negative shocks to the economy. Financial frictions – largely absent from both the pre-crisis experience of developed economies and the canonical macroeconomic models – had become major drivers of the recession. The resulting crisis prompted academics to reassess existing economic paradigms and policymakers to adjust their frameworks. The rediscovery of the notion that policy may have a role in coordinating private expectations at times of severe uncertainty played a major part in the transition to today's post-crisis world.

The evolution of economic theory in response to the crisis

A number of significant academic contributions during the 1980s had focused on the way optimal individual behaviour could change depending on what individuals expect other private agents to do.[7]

The presence of this interdependence between agents, or as it is called, strategic complementarity, leads to multiple outcomes. Each of these outcomes is a rational equilibrium, but ones that differ in their implications for social welfare. Panic-based bank runs and panic-based sovereign debt crises are examples of policy intervention being needed to avert "bad" outcomes during a financial crisis.

To an extent this is not a new idea for policymakers – central banks have been acting to stave off panic-based runs on banks for centuries. But the financial crisis has shown that severe financial frictions can exacerbate strategic complementarities. Moreover, the financial sector nowadays is much more sizeable relative to the economy, and runs are correspondingly more costly.

Advances in the literature have made strides in incorporating these ideas into macroeconomic models, thus to providing a clearer theoretical framework for these types of interventions.[8]

Economic research has also evolved in its thinking of how central banks should respond to an emerging crisis, particularly when their standard monetary policy instrument, typically a short-term interest rate, reaches its effective lower bound. At the lower bound, monetary accommodation cannot be provided through further reductions in short-term interest rates and policy must become non-standard.

One option is to rely on forward guidance, i.e. to promise to keep interest rates low for longer in the future. Such commitments, if credible, lower longer-term interest rates and provide economic stimulus even if the current interest rate remains unchanged.[9] While forward guidance is a useful instrument, recent research has highlighted that its effectiveness can be improved if combined with other non-standard monetary policies.[10] Research in both academia and in central banks has therefore re-examined alternative monetary policy tools, including so-called quantitative easing (QE) policies. And here the newly developed models with financial frictions have been useful.[11]

Earlier studies based on the assumption of frictionless financial markets had concluded that QE is completely ineffective. The renewed focus on financial frictions clarified that this conclusion is unwarranted, once it is recognised that financial intermediaries are subject to leverage constraints.[12] Large-scale asset purchases can ease these constraints and increase investors' risk-bearing capacity, leading to a portfolio rebalancing towards risky assets and to strengthened lending activity for banks.

All in all, research has confirmed that central banks are not powerless at the effective lower bound. Provided they are willing to explore non-standard policy avenues, they can continue pursuing their price stability mandates even in the most adverse circumstances.

The evolution of policymaking

The policy response by central banks and governments has evolved along the two main lines suggested by research. As short-term interest rates approached the effective lower bound, central banks on both sides of the Atlantic undertook a number of unconventional measures aimed at influencing the whole constellation of rates that are important for the financial decisions taken by households and businesses.

Forward guidance helped guide market expectations of future short-term rates. QE involved direct intervention by central banks in markets through large scale asset purchases to influence the yield curve beyond the very short term. A large body of empirical research has substantiated the success of these policies in supporting the economy and inflation, both in the euro area and in the United States.[13]

But central bank policy moves extended beyond just measures to counteract the impairment of the transmission mechanism caused by financial frictions. The ECB also acted in various ways to prevent self-fulfilling expectations from delivering socially undesirable outcomes by co-ordinating expectations onto "good" outcomes.

One such policy initiative was our lender-of-last-resort intervention during the financial crisis. Revisiting the Bagehot principles set out a century and a half ago in the light of the ongoing crisis,[14] the ECB lent freely to solvent financial institutions against sound collateral, penalised by a haircut. We did so in multiple ways: our liquidity operations moved to a fixed rate full allotment basis with unprecedented maturity of four years, and we widened the eligible collateral accepted in our operations.

The second occasion came later in 2012 when we had to prevent a self-fulfilling bad outcome that threatened to occur as a result of the sovereign debt crisis. Investors had begun pricing redenomination risk into sovereign debt and interbank markets, as they worried about the possible break-up of the euro area.

However, as I said earlier, the pricing of such risk led to a breakdown of money markets, a fragmentation of banking systems along national lines and threatened the unity of monetary policy transmission across the euro area. Moreover, expectations fuelled a vicious cycle. Tightening monetary conditions in countries affected by perceptions of redenomination risk put downward pressure on economic activity, exacerbating the perceived risk. Such moves are a classic example of expectations leading towards an outcome that is non-optimal for social welfare.

This is why we announced Outright Monetary Transactions (OMTs) as an instrument that can support our monetary policy. The idea was for the ECB to purchase the sovereign bonds of countries affected by panic-based redenomination risk. By breaking the link between perceptions and downward pressure on economic activity, OMTs would aid in restoring the proper transmission of monetary policy across the whole euro area and support the recovery.

OMTs were not used. That the ECB had the tool at its disposal was sufficient to anchor expectations at the "good" outcome. Once unwarranted fears of redenomination were removed, sovereign spreads fell and banks were once again able to raise debt and equity funding. This played a vital role in fostering the euro area recovery that is currently under way.

Financial sector policies

The greater awareness of the costs of financial instability and of financial frictions has also resulted in a revamp of financial sector policies.

First, financial sector regulation and supervision are much stricter. The quality of regulatory capital has improved and its quantity has increased. In the euro area, banks have materially bolstered their capital positions, with the average common equity Tier 1 ratio of significant institutions rising to 13.5% by end-2016 from 7% in 2008.

The establishment of a new stress testing framework lends a further quantitative dimension to the process of ensuring that, even in a pre-defined "stressed scenario", financial institutions should remain well capitalised and able to continue lending to creditworthy borrowers.

Second, policymakers have acquired new macroprudential tools to mitigate the effect of financial cycles on the economy. Across the globe, authorities have imposed measures such as loan-to-value and loan-to-income ratios, to reduce the endogenous link between credit and house prices. This new *macroprudential* approach to regulation aims to safeguard not just the solvency of individual banks but also the systemic integrity of the banking system and its ability to continue providing finance to the non-bank private sector.

In addition to the overall global move to stricter regulation, there have been also a number of institutional improvements. In the euro area, banking supervision is now carried out by the Single Supervisory Mechanism, composed of the ECB and the national competent authorities. This has unified the basis on which supervision is carried out. The largest and most significant banks are now supervised directly from Frankfurt, in close partnership with the national authorities. The euro area has also set up the Single Resolution Mechanism to ensure the orderly resolution of failing banks, while at the same time reducing the impact on the taxpayer.

Conclusion

This account of how policymakers and researchers have interacted in the past ten years shows

how indebted the former are to the latter. From my point of view, one can draw five lessons for policymakers.

First, sudden shocks often make visible the flaws in our policy frameworks and challenge the explanatory power of existing theories in ways that have been previously overlooked. But analysis conducted by researchers and embraced by policymakers remains essential in designing the policy response.

Second, a policy response that has its foundation in rigorous research is less prone to being impaired by political compromise and easier to explain to the general public.

Third, Keynes is often quoted as saying, "When the facts change, I change my mind. What do you do, sir?" Well, for policymakers, it is not that simple, and research helps us to decide whether a change in the facts deserves a policy response or, as we say, we should look through it.

Fourth, when the world changes as it did ten years ago, policies, especially monetary policy, need to be adjusted. Such an adjustment, never easy, requires unprejudiced, honest assessment of the new realities with clear eyes, unencumbered by the defence of previously held paradigms that have lost any explanatory power.

Fifth, we must be aware of the gaps that still remain in our knowledge. Our mainstream macroeconomic models still have little to say, for instance, about the non-linear propagation of shocks, the distributional impacts of policies, or how endogenous firm entry and exit can affect economic performance.[15] Policy actions undertaken in the last ten years in monetary policy and in regulation and supervision have made the world more resilient. But we should continue preparing for new challenges.

The changes that we have discussed, profound as they are, often hinge on one fundamental idea. A natural question to ask is whether such an idea sprang out as a response to a specific policy problem or was rather conceived previously in an entirely different, unrelated intellectual environment, perhaps addressing a different set of problems. It is a question that is especially relevant in economics, when previously held consensus views change. But it is a question that is unlikely to have a precise answer.

Let me rather use the 1939 words of Abraham Flexner, the first director of the Princeton Institute for Advanced Study: "Almost every discovery has a long precarious history. Someone finds a bit here, another a bit there. A third step succeeds later, and thus onward till a genius pieces the bits together and makes the decisive contribution."[16]

Today, I have had the privilege of addressing such people – geniuses who have pieced the bits together and made decisive contributions.

---

1 Ricardo, D. (1817), *On the Principles of Political Economy and Taxation*, London: John Murray.

2 Sargent, T. & Wallace, N. (1976), "Rational Expectations and the Theory of Economic Policy", *Journal of Monetary Economics*, 2(2): 169–83; Lucas, R., (1976), "Econometric policy evaluation: A critique", Carnegie-Rochester Conference Series on Public Policy, 1: 19–46; Kydland, F. and Prescott, E. (1977), "Rules rather than discretion: the time inconsistency of optimal plans", *Journal of Political Economy,* 85(3): 473–491. These models also provided the ground for structural econometrics, which allowed for policy analysis and the study of counterfactuals. See Hansen, L. P. (2013), "Uncertainty outside and inside models", Lecture on receipt of the Sveriges Riksbank Prize in Economic Sciences in Memory of Alfred Nobel, 8 December; and Sims, C. (1980), "Macroeconomics and Reality", *Econometrica,* 48(1): 1–48.

3 Clarida, R., Gali, J. and Gertler, M. (1999), "The Science of Monetary Policy: A New Keynesian Perspective", *Journal of Economic Literature*, 37(4): 1661–1707.

[4] Notably Kiyotaki, N. and Moore, J. (1997), "Credit Cycles", *Journal of Political Economy,* 105(2):211–248 and Bernanke, B., Gertler, M. and Gilchrist, S. (1999), "The Financial Accelerator in a Quantitative Business Cycle Framework", Chapter 21, *Handbook of Macroeconomics*.

[5] This includes recapitalisation measures, asset relief interventions, liquidity measures and guarantees. For 2009, the numbers as a percentage of GDP are around 12 % for Netherlands, 8 % for Germany, 5.4 % for Spain and 5 % for France. See Financial Crisis Aid amounts for a more detailed breakdown.

[6] Laeven, L. and F. Valencia (2013), "Systematic banking crisis database", *IMF Economic Review,* 61(2): 225–270.

[7] E.g. Diamond, D. and P. Dybvig (1983), Bank runs, deposit insurance and liquidity", *Journal of Political Economy,* 91(3): 401–419*;* Cooper, R. and A. John (1988), "Coordinating coordination failures in Keynesian models", *Quarterly Journal of Economics,* 103(3): 441–463; Calvo, G. (1988), "Servicing the public debt: the role of expectations", *American Economic Review,* 78(4):647–661. The search and matching literature also exhibits multiple equilibria, e.g. Diamond, P. (1982), "Aggregate demand management in search equilibrium", *Journal of Political Economy,* 90(5): 881–894.

[8] Gertler, M. and N. Kiyotaki (2015), "Banking, liquidity and bank runs in an infinite horizon economy," *American Economic Review,* 105(7): 2011–2043.

[9] Eggertsson, G. and M. Woodford (2003), "The zero bound on interest rates and optimal monetary policy", *Brookings Papers on Economic Activity,* 34(1): 139–235; Woodford (2012) "Methods of Policy Accommodation at the Interest-Rate Lower Bound," presented at the Jackson Hole symposium, August.; Nakov, A. (2008), "Optimal and simple monetary policy rules with zero floor on the nominal interest rate", *International Journal of Central Banking,* 4(2): 73–127.

[10] Campbell, J. R., C. L. Evans, J. D. M. Fisher, and A. Justiniano (2012), "Macroeconomic effects of Federal Reserve forward guidance," *Brookings Papers on Economic Activity*, 43(1): 1–54 and Del Negro, M., Giannoni, M. and C. Patterson (2015) "The Forward Guidance Puzzle," *Federal Reserve Bank of New York Staff Reports*, no. 574.

[11] Notable contributions include Del Negro, M., Eggertson, G., Ferrero, A. and Kiyotaki, N. (2017), "The Great Escape: a quantitative evaluation of the Fed's liquidity facilities", *American Economic Review,* 107(3): 824–857; Gertler, M. and Karadi, P. (2011), "A model of unconventional monetary policy", *Journal of Monetary Economics*, 58 (1): 17–34; Gertler, M. and Kiyotaki, N. (2015), *op. cit.*; Suarez, J. and Martinez-Miera, D. (2014), "Banks' endogenous systemic risk-taking", mimeo; Brunnermeier, M. and Sannikov, Y. (2014), "A macroeconomic model with a financial sector", *American Economic Review,* 104(2): 379–421.

[12] Curdia, V. and M. Woodford (2011), "The Central-Bank Balance Sheet as an Instrument of Monetary Policy," *Journal of Monetary Economics*.; Gertler, M. and Karadi, P. (2011), *ibid.*

[13] Krishnamurthy, A. and A. Vissing-Jorgensson (2013), "The ins and outs of LSAPs," Federal Reserve Bank of Kansas City Jackson Hole Symposium; Gertler, M. and Karadi, P. (2013), "QE1 vs. 2 vs. 3: A Framework to Analyze Large Scale Asset Purchases as a Monetary Policy Tool", *International Journal of Central Banking*, 9(S1): 5-53; Altavilla, C., Carboni, G. and R. Motto (2015) "Asset Purchase Programmes and Financial Markets: Evidence from the Euro Area," *ECB Working Paper,* no.1864; Andrade, P. *et al*. (2016), "The ECB's asset purchase programme: an early assessment" *ECB Working Paper*, no. 1956.

[14] Bagehot, W. (1873), *Lombard Street: A Description of the Money Market*, London: H.S. King.

[15] Some move in this direction is presented in e.g. Bilbiie, F., Fujiwara, I. and F. Ghironi (2014), "Optimal Monetary Policy with Endogenous Entry and Product Variety", *Journal of Monetary Economics,* 64: 1-20.

[16] Abraham Flexner (1939), *The Usefulness of Useless Knowledge*, Princeton University Press.