Hermann Remsperger: Money in an uncertain world

Speech by Dr Hermann Remsperger, Member of the Executive Board of the Deutsche Bundesbank, at a dinner speech, Bundesbank and University of Bonn Workshop, Eltville, 27-28 October 2005.

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Ladies and Gentleman, it is a pleasure for me to speak to you this evening on the role of money in an uncertain world.

Of course, the challenge of making decisions under different forms of uncertainties does not only apply to the conduct of monetary policy. On the contrary, model and parameter uncertainty, data uncertainty and shock uncertainty are present in many areas of our everyday life.

As an example, take medical science. On the one side you could argue that doctors know more about the working of the human body than economists know about the functioning of the economy. But on the other side there is also no doubt that certain health problems are not entirely understood.

At least it is a fact that you very often get different opinions about how certain health problems ought to be treated.

Uncertainty and monetary policy decision making

Well, before I become too much involved in health care, let me get back to those uncertainties with which we are confronted as central bankers. Here, the package insert or the instructions at our disposal is the stock of economic research.

All the different types of uncertainty have been picked up by academic literature. However, while the literature usually focuses on only one sort of uncertainty at a time, we face all of them simultaneously. I will focus on two of them, one is model uncertainty and the other data uncertainty.

Given the overall topic of this work-shop, I would like to convey the key message of my talk without any further delay: The analysis of monetary aggregates can play and should play an important role to cope with these two challenges.

Model uncertainty and money

As central bankers we need models to structure our thoughts and to estimate the impact of our decisions. However, there is no consensus about which model is the appropriate representation of the real world. As a consequence, most central banks – including the ECB – use a wide range of models.

But with such a variety of models, the problem of setting the appropriate monetary policy stance becomes a very difficult task. I think that Ben McCallum is perfectly right in that the preferred policy rule should be one that works 'reasonably well in a variety of plausible quantitative models'.[1]

By the way, this approach can also be applied to the discussion whether monetary policy decisions should be made by a committee or not:[2] The variety of views on the functioning of the economy should be larger in a committee. If the committee members agree on a decision that is acceptable for all of the different prevailing assumptions of the transmission mechanism, this could prevent monetary policy decisions which are optimal only in one specific model, but lead to negative results if another mechanism prevails.

In order to determine such a robust policy rule, we have to take two decisions: The first is on the set of models which should be taken into account. And the second is how to weigh the results these models

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[1]   McCalllum, B. (1997) „Comment" in : Bernanke, B.S. and Rotemberg, J.J. (Eds.), NBER Macroeconomics Annual, 1997. The MIT Press.

[2]   See p. 946 in Levin, A.T. and Williams, J.C. (2003) „Robust Monetary Policy with Competing Reference Models", Journal of Monetary Economics (50), pp. 945-975.

present under the range of possible decision rules. There are no definite answers to both of these questions.

As concerns the weighting problem, some argue that minimizing the maximum loss across models is appropriate. This would prevent extremely bad results. However, others argue that this method may give too much weight to implausible scenarios. They propose to weigh the different results of the models according to probabilities over which one has to decide in advance.

The decision about which set of models to include in this decision process and which models to exclude also turns out to be highly important but difficult. The inclusion of an additional model, even if it has a low probability, may strongly influence the resulting decisions.

Concerning the models to be regarded in the decision making process, I think that at least one from the New-Keynesian school, which currently is employed as a kind of "work-horse" in monetary economics, should be included. These models are designed to capture short-run fluctuations in output and inflation and consist of an IS curve which represents the economy´s demand side and a (New-Keynesian) Phillips curve which represents aggregate supply.

Depending on the exact model specification, money can play an explicit role in the determination of output and inflation.[3] However, it usually plays only a passive role (if it plays a role at all): Money demand is determined by the other variables of the model but money has no effect on *them*.[4]

Given this more or less unimportant role for money in New-Keynesian models, some observers already see money leaving the stage of the academic discussion on monetary policy. However, I think that a few qualifications are essential.

First of all, I would argue that there is an implicit key role for money in the basic New Keynesian Model.[5] For instance, implementing a certain path of the short-term interest rate is only possible if the central bank can control the corresponding supply of base money.

Second, taking New Keynesian Models with a minor role for money on board must not mean that we should leave aside other models with a key role for money. On the contrary: The well-established fact that there is a strong relationship between money and inflation at low frequencies urges us not to exclude information from money.

By the way: Even the Bank of England – which since the switch to inflation targeting has been very critical with respect to the usefulness of monetary indicators – now confirms this strong money/inflation relationship.

Models that capture this long-run relationship between monetary developments and inflation or that exploit the predictive power of monetary aggregates are – as I see it – the natural complements to models of short-run fluctuations in the toolbox of policy makers.[6] Those models are an essential device for judging the medium- to long-term risks to price stability.

For all these reasons we are well advised to integrate monetary developments into our decision making process.

Data uncertainty and money

After my brief remarks on model uncertainty I now want to make some comments on the role of money against the background of data uncertainty.

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[3] See, e.g., Kremer, J., Lombardo, G. and Werner, T. (2003) „Money in a New-Keynesian Model Estimated with German Data", Deutsche Bundesbank , Discussion Paper No. 15.

[4] See Carlstrom, C.T, and Fuerst, T.S. (2004) „Thinking about Monetary Policy without Money", International Finance (7), pp. 325-347, for a discussion.

[5] See McCallum, B.T. (2001) „Monetary Policy Analysis in Models without Money", Federal Reserve Bank of St. Louis Review, Juli/August 2001, pp. 145-160.

[6] See, e.g., Nicoletti Altimari, S. (2001) „Does Money Lead Inflation in the Euro Area?", ECB Working Paper No. 63, and Greiber, C. and Neumann, M.J.M. (2004) „Inflation and Core Money Growth in the Euro Area", Deutsche Bundesbank, Discussion Paper No. 36.

One dimension of data uncertainty refers to the problem of measuring well-defined economic aggregates. This problem occurs for example if variables cannot be measured precisely and are therefore subject to revisions after they have been published for the first time.

The problem of measurement errors in real-time is most severe in case of "real economy variables", where revisions can be very large. The gross domestic product is an important example.

Due to these real-time measurement problems we are left with a huge amount of uncertainty. And this is not only true for the current state of the economy, but also for our expectations of future developments. Forecasts are conditional on real-time data, which may be revised at some later stage.

Against this background it is crucial to emphasize that monetary and financial data are far less affected by such measurement problems than data from the real economy. Monetary data are available very quickly. And they are available with a much smaller measurement error than other key variables. Therefore, money may serve as an important indicator of current economic activity.

On a microeconomic level, private agents´ real money holdings depend amongst other determinants on their individual real income which is known to them.[7] If agents are able to quickly adapt their money holdings, changes in their real income will quickly translate into changes in their money holding.

As a consequence, changes in *aggregate* real income quickly lead to changes in *aggregate* money. Money, therefore, adequately aggregates the individual information on real income development up to the macroeconomic level.

Measurement problems become even more severe if certain model variables are unobservable as such. Important examples include the output gap and the natural rate of interest. With such variables one is faced with another severe *problem*: The theoretical construct has to be translated into a statistical concept.

And that is exactly the point where the problems of data and model uncertainty are closely connected: An empirical quantification of the output gap, for instance, is often based on more or less detailed assumptions about an underlying model structure.

If in turn a policy reaction function depends crucially on such unobservable variables, errors in assessing the size of those variables may lead to large deviations from optimal policy. As empirical studies show, this applies in particular to a policy rule of the Taylor type, which places a relatively large weight on the output gap.

Orphanides and others have shown that in the seventies and eighties, estimates of the US output gap have been subject to large and persistent measurement errors.[8] On average, there has been a downward bias of this measure of economic activity which in turn led to a monetary policy of the Fed that - with hindsight - must be judged as too expansionary. As a consequence, the late 1970s and the early 1980s have been characterized by high inflation rates in the USA.

I believe that the Bundesbank managed to prevent this kind of problems. Our research has shown that the Bundesbank did not assign an important role to the level of the output gap which is especially prone to the real-time data problem. Instead, we focused on deviations of money growth from target, on deviations of the inflation rate from the price norm and on deviations of the growth rate of real output from the growth rate of potential output.[9] This approach is much less subject to measurement errors than one that uses the level of the output gap.

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[7] See Coenen, G., Levin, A. and Wieland, V. (2005) „Data Uncertainty and the Role of Money as an Information Variable for Monetary Policy", European Economic Review (49), pp. 975-1006.

[8] For the USA, see e.g. Orphanides, A. (2003), The Quest for Prosperity without Inflation, Journal of Monetary Economics, 50 (3), S. 633 – 663. For the UK, see e.g. Nelson, E. and Nikolov, K. (2003), UK Inflation in the 1970s and 1980s: The Role of Output Gap Mismeasurement, Journal of Economics and Business, 55, S. 353 – 370. For Germany, see Gerberding, C., Seitz, F. and Worms, A. (2005), How the Bundesbank really conducted Monetary Policy: An Analysis based on Real-Time Data; North American Journal of Economics and Finance (forthcoming).

[9] See Gerberding, C., Seitz, F. and Worms, A. (2005), How the Bundesbank really conducted Monetary Policy: An Analysis based on Real-Time Data; North American Journal of Economics and Finance (forthcoming).

Based on our previous research on "How the Bundesbank really conducted Monetary Policy" we have set up a new project on "Taylor Rules vs. Growth Rate Targeting" by Christina Gerberding, Michael Scharnagl, Franz Seitz and Andreas Worms. This follow-up project intends to answer the question whether, and if so why, responding to the inflation gap, to the change in the output gap and to monetary developments instead of putting a strong weight on the level of the output gap can be welfare improving in the presence of data uncertainty.

Our discussion paper "Money Demand and Macroeconomic Uncertainty" by Claus Greiber and Wolfgang Lemke which will be presented tomorrow provides another example of a measurement problem. This paper uses a variable labelled "macroeconomic uncertainty" to capture factors different from the traditional determinants of money demand.

The authors try to filter out uncertainty from observable developments in financial markets and data on economic sentiment. This measure turns out to help establishing a long-run money demand relationship that is able to account for recent monetary developments in the euro area.

At the same time the study can be put into the perspective of model uncertainty as it explores whether there (still) exists a stable link between money and prices in the form of a money demand function. It is therefore an example for the need to improve the models used for monetary policy analysis. Or to put it in a nutshell: Models that capture the long-run relationship between money and inflation are always central to central bankers.

Concluding remarks

To close my remarks, let me stress that I think that if there is anything we can be certain about, then it is the fact that uncertainty will remain a key characteristic of monetary policy making. It is therefore worth-while to intensify our research efforts on the role of uncertainty for monetary policy and to refine monetary policy analysis along these lines.

This will eventually put us in a position to make better judgements concerning the state of the economy and give us a better under-standing of "risks and side effects" that accompany every monetary policy measure. I am certain that this workshop will help us to make some progress in this direction.