

ECONOMIC POLICY FORUM

MONETARY POLICY
IN A WORLD OF UNCERTAINTY¹

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ABSTRACT. Dealing with uncertainty is the daily bread of central bankers and has been a central theme for the ECB since its inception. Central banks like other economic operators are continuously confronted with conflicting data as well as competing and evolving interpretations of the working of the economy. In an ever-changing economic environment central banks cannot afford to commit to a mechanical “rule for action” but only set out a “framework for analysis” guiding monetary policy in the pursuit of its mandate. The ECB’s two-pillar strategy epitomises the quest for a robust basis for monetary policy in a world of uncertainty. Under conditions of incomplete and uncertain knowledge monetary policy must focus on providing a firm anchor for expectations over the medium term. Being clear about what monetary policy can do and what it cannot achieve is key for credibility, for successful communication with the markets and for winning the trust of the wider public.

JEL Classification: E51; E52; E58; E32; E31.

Keywords: Uncertainty; Economic Conditions; Expectations; Monetary Aggregates; Financial markets.

RÉSUMÉ. Gérer l’incertitude est le pain quotidien des banquiers centraux et un thème essentiel de réflexion pour la BCE depuis ses débuts. Comme tous les opérateurs économiques, les banques centrales sont constamment confrontées à des données contradictoires, ainsi qu’à des interprétations de l’évolution de l’économie qui se concurrencent et évoluent tout le temps. Dans un environnement économique instable, les banques centrales ne peuvent se permettre de s’engager sur une “règle d’action” mécanique, mais elles peuvent seulement indiquer un “cadre d’analyse” qui orientera la politique monétaire au cours de l’exercice de leur mandat. La stratégie à deux piliers de la BCE incarne la recherche d’une base solide à laquelle adosser la politique monétaire dans un monde d’incertitude. Dans des conditions de connaissance incomplète et incertaine, la politique monétaire doit s’attacher à

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fournir une ancre stable pour les anticipations à moyen terme. Être clair sur ce que la politique monétaire peut faire ou ne pas faire est essentiel pour la crédibilité, pour une communication réussie avec les marchés et pour gagner la confiance d'un plus large public.

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Mots-clefs: Incertitude; conditions économiques; anticipations; agrégats monétaires; marchés financiers.

It is a great honour for me to be invited to deliver the second of a series of speeches at the new Economic Policy Forum under the joint auspices of Foundation Banque de France, Centre d'Etudes Prospectives et d'Informations Internationales, and Université d'Aix-Marseille.

It was no surprise to me, but rather an encouraging sign that Mervyn King devoted the opening speech of this series to the special role of money in central banking. Indeed, it was more than an intellectual exercise when the Deputy Governor of the Bank of England – the father of its Inflation Targeting Strategy – stressed the importance of money.

For this speech I have chosen the apparently harmless title "Monetary Policy in a World of Uncertainty". But beware! This will lead me to discuss what I view as one of the challenges most relevant to past, present and future central bankers, and still not fully explored by the academic world. As a central banker directly involved in monetary policy-making, I have been dealing with uncertainty and its consequences for a large part of my professional life. This included the challenges posed by German reunification and the turbulence surrounding the ERM crises, the introduction of the euro and the birth of the single monetary policy, and more recently, the stock market bubble and a series of terrorist attacks, which followed the string of crises that have struck a number of emerging countries over the last years. It is therefore clear to me that central bankers often have to face largely unexpected and difficult-to-model situations in which their reactions are nevertheless central to the final outcome.

Anyway, knowing my background, if I had chosen the title "No Money, No Inflation – The Importance of Money in the Economy", you might well have yawned, thinking: not again, can't he speak at least once of something else? But, of course, the issue of uncertainty will nevertheless allow me to come back to the role of money. In fact, I will do that after reviewing the possible forms of uncertainty, the responses of monetary policy and the associated communication and credibility challenges.

■ THE FORMS OF UNCERTAINTY

Economists hardly need any reminding that central bankers have to make decisions in a world of pervasive uncertainty. However, while the academic profession has made tremendous progress in analysing risk in well-defined stochastic economies, the "Knightian" uncer-

tainty that confronts central bankers and sometimes markets is of an altogether different dimension. Let me distinguish three broad categories or levels of uncertainty, going from the more common to the more complex and, hence, "Knightian" ones.

Uncertainty about the state of the economy

A challenge that faces all central banks when preparing monetary policy decisions is to assess accurately the prevailing economic conditions, which are sometimes referred to as the state of the economy. Uncertainty surrounding this analysis arises at three levels.

First, the information that underlies this analysis is often imperfect. The availability and the quality of data, including their timeliness and reliability, vary. Some data, such as some financial market prices, are available on a continuous and timely basis and are normally not revised. However, most economic and financial data are only available with some delay and can be revised following their initial release, implying a trade-off between timeliness and reliability.

Second, data on monetary, financial and other economic indicators can be distinguished from unobservable "synthetic" indicator variables, like the output gap, equilibrium real interest rates, equilibrium exchange rates and various measures of excess liquidity conditions, that have been proposed as a way of structuring and summarising a large amount of observable data. The uncertainty surrounding such indicator variables may be expected to be significantly greater than for observable information, since these indicators have to be estimated. For instance, Orphanides and van Norden (1999) and several authors after them have conducted comparative studies of alternative methods for estimating the output gap in real time. They show that, at least for the U.S., taking into account the sizeable measurement error derived from these real-time estimates may lead to a significant deterioration of feasible policy outcomes.

Third, in order to interpret the state of the economy and its implications for future price stability, central banks need to identify the nature and persistence of the particular shocks that are driving observed economic developments. Whether shocks occur on the demand or supply side of the economy, whether they originate from domestic or foreign sources, and whether they are judged to be transitory or long-lasting will all have a bearing on the assessment of the state of the economy and the appropriate monetary policy response. Econometric theory has spent decades devising sophisticated identifying restrictions to isolate different types of shocks from the tangle that appears in the data. But nothing close to a consensus view has emerged. In fact, inference is often non-robust across various identification schemes (Christiano, 1999; Galí, 1999).

Uncertainty about the structure of the economy

In addition to, and intimately linked with, the uncertainty about the state of the economy, central banks also have limited knowledge about the structure and functioning of the economy. Uncertainty about the structure of the economy itself arises from two sources.

First, there is fundamental uncertainty about which models provide suitable descriptions of the structural relationships in the economy. While various models have helped to deepen our understanding of the economy, none has yet provided a fully satisfactory, unified and uncontroversial description of the transmission process. Since each model *per se* constitutes a simplification which abstracts from relevant aspects of reality, central banks always face the problem of deciding which model is most suitable to use given the prevailing economic circumstances. As a result, central banks cannot afford to rely on one single model of the economy, but need to have a number of alternative modelling tools available.

For example, there is widespread consensus that inflation is a monetary phenomenon in the long run. At the same time, there are a multiplicity of different approaches to modelling the inflation process at short and medium-term horizons. One approach, based on the quantitative theory of money, assigns an important role to monetary developments in determining future inflation. In other models, such as Phillips curve models, excess demand in goods and labour markets is the main driving force behind changes in prices and wages in combination with possible frictions.

Second, even if there were consensus on a suitable model of the economy, considerable uncertainty would remain regarding the strength of the structural relationships within that particular model. This form of uncertainty relates to the parameters of the structural relationships. Inevitably, available parameter estimates are affected by data imperfections and by the particular econometric techniques that are employed for estimation. An even more fundamental problem is that parameters may vary over time as a result of structural change in the economy.

Uncertainty about parameters confronts all central banks, but is particularly relevant for empirical models of the euro area, since their estimation has to rely on historical back data which stem from the period prior to the formation of Economic and Monetary Union (EMU), when the member countries experienced different monetary policy regimes within different institutional settings. Moreover, data for the member countries may, in some cases, not be sufficiently harmonised for proper aggregation, while structural relationships, which may differ across countries, could result in complex, possibly non-linear aggregated relationships at the euro area level.

Strategic uncertainty: the interaction of private agents and policy-makers

A third broad category of uncertainty facing central banks is sometimes referred to as strategic uncertainty. This form of uncertainty relates to the interaction between private agents and policy-makers and, in particular, to the role of expectations, which may crucially influence the transmission of monetary policy as well as the assessment of prevailing economic conditions.

The central bank, while generally anticipating the broad pattern of agents's reactions on the basis of available models, is confronted with some degree of uncertainty about the reaction

of economic agents and financial markets to its own policy decisions and announcements. Conversely, economic agents may be unsure about the precise motivations, actions and intentions of central banks and other economic agents. This is always the case, even if market developments are fairly close to what would be expected on the basis of fundamentals.

However, the degree of strategic uncertainty may in some cases become especially pervasive. This appears when some of the uncertainties mentioned above increase, combine and are amplified by deeper or more widely spread doubts on the side of market participants about the stability of economic relationships, thus leading to what some call "fundamental uncertainty". Such developments are relatively limited in developed countries, as their central banks usually prevent their appearance through the very success of their policies. But their potential occurrence needs to be taken into account by central banks in order to avoid them.

Large-scale institutional changes, for instance, may have such impacts and be sufficiently severe to impart a profound discontinuity in the data-generating process. Times of institutional change are times in which the signal extraction problem for central banks is most acute. Structural change may be associated with a widely dispersed range of expectations. These, in turn, may behave erratically and fail to co-ordinate on a focal point.

I am happy however to mention that the ECB has been able to avoid such phenomena even though it did preside over a monumental transition in January 1999. This transition affected the money market of course, but also the payment systems and the capital markets. More importantly, the creation of the euro area itself implied a major regime shift. In some sense, we were studying the evolution of a moving object, which was changing for the very reason that it was being observed, as in the famous Heisenberg paradox. Yet, the transition was smooth and the abrupt switch in structural relations, which many observers had seen in the offing, did not materialise after all. Thanks to the detailed and progressive preparation of this transition, the favourable macroeconomic and financial context and the credibility inherited from national central banks, markets immediately recognised the new rules of the game in their expectations. They adjusted swiftly to the new monetary policy environment.

However, even in the absence of large institutional changes, it is not impossible that economic agents enter phases where their expectations have difficulties to form and focalise around reasonable levels and the rules of the game become unclear. In general, such phenomena are directly reflected and sometimes amplified by asset prices, and culminate in so-called "bubbles".

As an example, take the debate on a possible emergence of a "New Economy" over the last years. Such developments had the potential to change the economy's productive capacity either permanently or for a sustained period, but were intrinsically difficult to identify on the basis of historical information. Indeed, it can never be fully ascertained nor excluded whether developments in asset markets are associated with bubbles and may thereby create dynamics which, by eventually testing the financial soundness of the economy, might amplify uncertainty in the economy more fundamentally. Uncertainty develops with a speculative

bubble, as its clear identification is close to impossible in real time. But central bankers also face uncertainty when a bubble bursts, potentially affecting the functioning of normal economic relationships.

More generally, the risk of such amplification phenomena is particularly apparent when a very high level of uncertainty on economic developments makes markets move away from or back to the levels usually associated with fundamentals in a disorderly manner. This is often the case when markets all of a sudden become aware of previously ignored policy failures. In such situations, mechanisms which usually tend to re-establish equilibria, like active market-making by large traders or financial institutions, might lose their efficiency as market-makers become increasingly reluctant to hold large net positions, thereby giving way to bandwagon behaviour (Aglietta and Orlean, 2002). The usual preferences of economic agents then become less stable and less well-defined, as agents lose their usual references and are influenced by the dynamics of their respective opinions rather than by traditional equilibrium concepts. They may also be influenced by borrowing constraints and by localised or social interactions (see for example a set of papers by Scheinkman, my discussant, and some co-authors).

Such developments, which may explain why the volatility of asset markets often exceeds the volatility of fundamentals, may in most cases be limited to specific markets. Exchange rates are often prone to such movements but usually move back towards their fundamental levels eventually as shown by the exchange rate of the euro over the last years. Various other asset markets may also exhibit erratic short-term movements, in which their liquidity diminishes drastically and price decreases become self-fulfilling.

■ THE RESPONSE OF MONETARY POLICY TO UNCERTAINTY

How should monetary policy respond to the various forms of uncertainty discussed so far? The implications of uncertainty for the optimal setting of monetary policy instruments have been recognised in the economic literature for at least half a century. However, the debate about these implications has gradually deepened, moving recently from the discussion of the optimal degree of activism, which mainly addresses the first two forms of uncertainty, to the issue of the robustness of rules, which also addresses strategic uncertainty.

The debate on activism

Already in the late 1940s and the 1950s it was recognised that reliable information about the long and variable lags in the transmission of monetary policy is typically not available. This led a number of academic economists to warn strongly against the implementation of policies that aim at fine-tuning economic activity. Prominent among them was Milton Friedman (Friedman, 1956).

Academic research in the 1960s deepened this analysis. One important finding of this research is that the prescriptions for setting a particular policy instrument should not take

into account unforeseen shocks if uncertainty affects the economy in particularly simple ways. Different implications arise, however, if uncertainty enters the economic structure in more complex (and more realistic) ways. For example, uncertainty about key parameters describing the transmission of monetary policy provides a rationale for an "attenuated" approach to monetary policy-making, in the sense of reacting less vigorously to incoming information than would be optimal if such uncertainty did not exist. This result, which is known as "Brainard's conservatism principle", has been used as one explanation of the commonly observed central bankers' practice of moving interest rates in a gradualist fashion which means acting in smaller steps and/or taking more time for the assessment underlying monetary policy decisions.

Recently, research has shown also that central banks should moderate the responsiveness of the policy instrument when underlying data are expected to be subject to measurement error. The reason is that, when a measurement error occurs, a strong policy response to mis-measured data will induce unnecessary fluctuations in the economy. In addition, central banks should use the whole set of available information to cross-check the imperfect data and gauge the extent to which the data may be subject to measurement error. The weight given to the individual information variables should depend on how precisely those variables are measured. This is especially applicable to variables such as potential output and the output gap.

Concerning parameter and model uncertainty, more recent literature has also emphasised circumstances in which parameter uncertainty should lead policy-makers to vary the policy instrument more than would be optimal in the absence of such uncertainty. For example, uncertainty about the persistence of the inflation process can lead policy-makers to adjust interest rates more vigorously, since this can reduce uncertainty about the future development of inflation (Woodford, 2002). Similarly, when such uncertainty arises from imperfect credibility, policy-makers may be well-advised to act more decisively.

However, also in this field, we are far from having reached any consensus. Policy-making under parameter uncertainty is typically studied by relying on probabilistic knowledge of a well-defined range of alternative parameter values and employing the well-known laws from probability theory. However, uncertainty about model parameters or, more generally, about model structures can be so complex that this approach is very difficult to justify. A number of studies have therefore started expressing model uncertainty in the form of a variety of alternative models, which can be considered by the policy-maker to represent alternative, possibly rival descriptions of the actual economic structure. In this context, the problem can be cast in terms of ensuring "robustness" of monetary policies across models, in the sense of being capable of delivering good policy outcomes under alternative structures. This approach has considerable intuitive appeal, since central banks normally avail themselves of a suite of alternative quantitative models of the economy as opposed to relying on a single all-encompassing one.

The debate on rules

The analysis of strategic uncertainty is directly related to the debate on the role of rules. It has first focused on the way monetary "surprises" aimed at boosting output in the short run could become ingrained in expectations over time. More recently, it has focused on the recognition that a predictable and systematic monetary policy should stabilise expectations over time.

Traditionally, central banks and academics have tended to seek *simple policy rules* in order to reduce discretion and foster credibility. Simple unconditional rules, like the gold standard or the constant money growth rule advocated by Milton Friedman, were seen as a safeguard against overly ambitious policies. However, in many circumstances the self-balancing forces in the economy which underlie the rationale of such rules may not operate to a sufficient degree or at an acceptable speed and lead to undesirably high volatility in prices and output. As a consequence, such rules have not, in practice, been applied in their strict form.

Somewhat more elaborate contingency rules linking a policy instrument to a limited set of indicators have therefore been proposed. Main examples of such rules are Taylor-type rules (Taylor, 1993), which have become rather popular both in the academic literature and among professional central bank watchers in recent years. Indeed, it is a principle of good policy management in stability-oriented central banks that evidence of an incipient departure of key macroeconomic indicators from the values considered compatible with the objectives should make central banks vigilant and ready to act. This may partly account for the apparent success of some of these simple rules in loosely tracking past policy moves by central banks (Clarida, Galí and Gertler, 1998).

However, it would be misleading to interpret these empirical findings as providing normative guidance or inference about the actual motives behind central banks' conduct of policy. It should be noted that a number of monetary strategies, including the pursuit of a broad money growth target, if successful in maintaining the purchasing power of the currency, may – over a long sample period – be empirically indistinguishable from a policy wedded to the Taylor rule. Moreover, these results, in general, appear to depend on whether real-time or, alternatively, successively revised time series for output gaps are used (Orphanides, 2000).

In addition, different sources of shocks call for very different policy responses. For instance, in the case of a demand shock, the change in the real interest rate suggested by the rule tends to have an equilibrating impact on both prices and output. By contrast, a supply shock has to be assessed primarily on the basis of labour and goods market information that cannot be adequately processed using the Taylor formula. In short, driving forces of different natures, possibly associated with the same inflation outturn or forecast, require offsetting actions of varying intensity and duration, as they set in motion quite different dynamics and are associated with possibly opposite tendencies in the evolution of real variables. Other variables, such as monetary and credit aggregates, fluctuations in exchange rates, stock valuations, fiscal indicators, variations in international commodity prices and wage agreements,

are highly indicative of macroeconomic developments and thus help to interpret the current economic situation. Much of the daily work conducted in central banks is devoted to tackling this information problem.

Finally, the stabilising properties of Taylor-type rules can also be questioned. The criticism has two dimensions. In the first place, Taylor rules are usually based on the assumption of a constant equilibrium interest rate which is, in fact, very difficult to estimate. In the second place, they are often formulated in a forecast-based fashion. Indeed, Taylor rules of this sort can exacerbate the tendency of economic systems to be excessively sensitive to arbitrary revisions of expectations.

Partly as a reflection of the above observations, decision-making bodies in central banks cannot mechanically apply the Taylor-type rules assumed in the theory. The informational basis upon which they are designed to function is simply too narrow to be of practical assistance in conducting policy.

Another popular approach to modelling economic policy in the past decades has been to derive the *optimal rule* by starting from a specification of the objective function and a model describing the functioning of the economy. This approach rests on the assumption that there is a model of the economy in which policy-relevant variables such as inflation and output respond to policy measures according to a known pattern of reactions. Central banks should thus implement the optimal time path of the policy instrument derived from the model, namely the time path of the short-term interest rate, which minimises a “loss function” representing the objectives mandated to the central bank. That path would yield a macroeconomic outcome which, by construction, would be preferable to any alternative policy scenario. In its most recent version, the rule-like element of this approach is represented by the central bank’s commitment to an inflation target and to an optimising procedure which has to be employed in the actual pursuit of the target (Svensson, 1999).

The prescriptions for virtuous central banking embodied in optimising rules address some of the criticisms of simple rules discussed previously. Optimising rules of this type can embody a resolutely forward-looking orientation of policy, while avoiding some of the drawbacks associated with a policy reacting mechanically to a specific inflation forecast (as under a forecast-based Taylor rule). In principle, such a procedure could use state-of-the-art economic modelling to process information and inform policy decisions. In addition – at least theoretically – it may ensure that the information set upon which decisions are based is much broader than would be the case under simple rules.

However, the kind of optimising rules described above – if taken literally and applied mechanically – remain too restrictive for policy purposes in several respects. First, the optimising procedure, as proposed, seems to underrate the need for judgement in the use and interpretation of any economic model. Second, optimising rules mandating central banks to pursue targets at predetermined horizons unduly restrict the relevant time frame for policy. Given that the transmission lag is variable, it is difficult to determine the relevant horizon

for the projection path. Restricting attention to a specific projection horizon may, in such circumstances, induce short-sighted and time-inconsistent reactions, the effects of which may have to be counteracted at a later date, with associated costs in terms of instability. This is especially relevant when an economy experiences a series of unexpected and lasting shocks.

More generally, any such optimising rules or procedures are likely to remain too restrictive if the design of policy is conditional on the structure of any single model used. A sequence of policy moves which may be considered optimal on the basis of one model of the economy may often turn out to be associated with bad policy outcomes if simulated on the basis of a different model, representing alternative views about the workings of the transmission mechanism. Therefore, a variety of models need to be used for different purposes within central banks, and various – more or less formal – ways of interpreting data and economic developments need to coexist. As a consequence, if a suite of models and other indicators are used and if they are complemented by and combined with judgement, it becomes less clear how the proposed optimising rule could still be implemented as a strictly codified procedure. Moreover, any resulting projection path, taken by itself, will only contain very limited information. In such circumstances, it is more important to understand the factors underlying such a projection and to convey the judgement that motivates one particular view of the world rather than another.

For all these reasons, optimising rules as proposed in the academic literature, while feasible in principle, remain insufficient for practical use in the strict sense of a monetary policy rule. In this context, the ECB's monetary policy strategy provides one illustration of a commitment to a procedural framework, which may overcome some of the limitations and risks associated with an over-reliance on more narrowly defined monetary policy rules. This framework can nevertheless be interpreted as being rule-based. First, the strategy includes a clear commitment to the goal variable, i.e. the primary objective of price stability. Second, the strategy sets out a "framework for analysis" in the form of a procedural rule. This entails a prior commitment to conduct analysis and explain policy in a systematic and structured way. Third, the use of benchmarks and "prompters" for further analysis is to some extent present in the ECB's strategy. This pertains, in particular, to the function of the monetary reference value within the broader analysis conducted under the first pillar.

Moreover, the two-pillar structure of the ECB's monetary policy strategy takes explicit account of the need for robustness in monetary policy-making (ECB, 2000). Recognising different existing models of the structure of the economy and the nature of the monetary transmission mechanism, the ECB has chosen to organise its analysis into two pillars. The first pillar represents a group of models and analytical frameworks which embody a view of price level determination that accords an important role to money. The second pillar encompasses a range of alternative models of the inflation process, predominantly those which emphasise the interplay between supply and demand in the goods and labour markets.

The two-pillar structure reduces the scope for discretion, as it makes it more difficult for policy-makers to disregard or gloss over contradictory evidence (as may happen with a single summary device, such as a single inflation forecast). The two pillars of the strategy represent a commitment to always consider and base monetary policy decisions on a careful analysis of a wide range of information variables under both pillars of the strategy. In addition, if several plausible models (or, more broadly, modelling approaches) of the economy exist, taking this fact into account is likely to be superior to picking any particular "optimising" policy suggested by a specific modelling approach in isolation.

■ **UNCERTAINTY, MONETARY POLICY AND FINANCIAL MARKETS**

At this point however, you might think: Yes, we have heard some detailed answers concerning the best way to face uncertainties on the state of the economy, on the structures and models of this economy as well as on some aspects of strategic uncertainty. But is that all?

No, it is not. Of course, availing of a monetary policy strategy aimed at price stability over the medium term and thus avoiding both inflation and deflation is a "sine qua non". Also, monetary policy needs a consistent and coherent framework. However, in order to face uncertainty adequately, two further challenges remain for the central bank: the challenge of communication with markets and the challenge of credibility.

The challenge of communication, i.e. advancing the understanding of what monetary policy sets out to do and how it goes about achieving its objective – among professional central bank watchers of all sorts, market participants and, not least, among the general public – is paramount for any modern central bank. It is crucially important for a young institution lacking a long track record like the ECB and facing a multi-cultural – and especially a multi-lingual – environment. More generally, due to the increasing role of expectations and financial markets in the transmission process of monetary policy, most central banks increasingly recognise that successful communication helps them work in tandem with financial markets and will, in general, contribute to achieving policy objectives more effectively. Finally, a culture of openness and dialogue should help central banks earn the trust of the wider public, which is particularly important for independent central banks. There are thus legitimate demands for transparency in monetary policy-making. Indeed, promoting transparency is in general in a central bank's own interest. However, the following points have to be kept in mind.

First, there are limits to the degree of transparency that central banks can realistically be expected to supply. In our understanding, a monetary policy strategy is primarily a framework for organising and structuring analysis for the purpose of internal decision-making and, at the same time, for providing a vehicle for external communication. It is nothing more and nothing less. Hence, it cannot supply full predictability and certainty over the medium term in a world that is anything but clear, predictable and certain. Indeed, pretending that the

world is simpler and more certain than it actually is does not make for a good recipe for monetary policy.

Second, the monetary authority should lead the financial markets and not follow them. To explain why I would like to quote Alan S. Blinder (Blinder, 1998), who puts the argument very succinctly:

"...Following the markets may be a nice way to avoid unsettling financial surprises, which is a legitimate end in itself. But I fear it may produce rather poor monetary policy, for several reasons. One is that speculative markets tend to run in herds and to overreact to almost everything. Central bankers need to be more cautious and prudent. Another is that financial markets seem extremely susceptible to fads and speculative bubbles which sometimes stray far from fundamentals. Central bankers must inoculate themselves against whimsy and keep their eyes on the fundamentals. Finally, traders in financial markets – even those for long-term instruments – often behave as if they have ludicrously short time horizons, whereas maintaining a long time horizon is the essence of proper central banking."

Third, it is nevertheless desirable for policy to be broadly predictable in order to reduce uncertainty and volatility in financial markets. There can be no interest in the monetary authority deliberately aiming to surprise the financial markets. Our experience is that the ECB policy moves have been fairly well anticipated by the market (Gaspar, Perez-Quiros and Sicilia, 2001).

■ UNCERTAINTY AND CREDIBILITY

All of this leads me to the critical challenge of credibility and, as I promised you earlier, to the special role of money in this context.

Indeed, credibility tends to induce a virtuous circle, which is inherently related both to the stability of money and to avoiding the development of fundamental uncertainty. Indeed, no matter what specific medium of exchange a society might wish to adopt, the efficiency of money in facilitating economic transactions *via* the price mechanism depends on its stability as a unit of account, i.e. as a common financial denominator, for the economy. In order to hold and accept money, economic agents must not only be confident that money remains accepted as a medium for exchange, but also that money will retain its value over time, thereby ensuring that price signals can provide accurate guidance for markets to function efficiently.

In contrast, if money loses or acquires value excessively, this also undermines its usefulness for exchange. Indeed, in periods of very high inflation, currency tends to be replaced, for example, by cigarettes or other goods – or, perhaps, “bads” – in everyday transactions. An inflationary currency will simply cease to be accepted in transactions notwithstanding any legal tender provisions. I am old enough to remember such a period in post-war Germany,

before the currency reform of 1948. Similarly, in periods of prolonged deflation, the financial soundness of the banking sector and of economic agents becomes highly uncertain, with exchanges of goods and assets guided by precautionary motives which are inconsistent with long-term equilibrium.

Hence money is deeply connected to trust and, under special circumstances, to distrust in a society. For this reason, it is essential that the central bank gives special attention to the two components of credibility, as the standard dictionary definition suggests: "the ability to have one's statements accepted as factual or one's professed motives accepted as the true ones". That is, credibility is critically dependent on the quality of the central bank's analysis and its ability to track and describe facts and reality over the medium term, including macroeconomic, microeconomic, market and financial stability developments. It also depends on the central bank's ability to make good on its commitments.

In this context, it is especially important to note that monetary aggregates and their counterparts (Borio, 2002) are especially helpful in reflecting such trust and distrust movements, given that they are based on the balance sheets of financial intermediaries. Indeed, the latter reflect not only the flow of transactions taking place but also the borrowing constraints and the financial tensions that arise in periods where fundamental uncertainty develops. As such, these statistics help build a link between micro and macroeconomic tensions and reflect the depth of the link between monetary analysis and financial stability.

This also explains both the usefulness of evaluating monetary aggregates in relation to a reference value, and the fact that short-term deviations from this reference value can be substantial. For the demand for money reflects both transaction motives that are directly connected to other macroeconomic variables, including prices, and precautionary motives. The latter can be related to fundamental uncertainty and are thus difficult to model. While transaction motives can be the basis for a definition of a reference value for the growth of a monetary aggregate, M3 in the case of the ECB, the existence and reversibility of precautionary motives explain that this reference value cannot be a target and that it is useful to monitor and explain any divergence from it on a continuous basis. Hence money is an essential, although not exclusive, element of the central banker's response to uncertainty.

CONCLUSION

Let me now come to a conclusion. Stable money, stable prices: these are the very foundations of a well-functioning market economy and the best way for a central bank to face uncertainty. There is a strong economic case for price stability, which today is – again – widely accepted. However, the case for price stability goes beyond the purely economic sphere. Price stability, the ability to rely on stable money, is the basis for trust in the interaction among economic agents, trust in property rights, trust in society and trust in the future more generally. Trust in stable money is also the basis for a free society, the ability of people to take decisions and plan their future for themselves. Conversely, a loss of such confidence

inevitably leads to calls on the state to step in and provide for the future collectively. Inflation and deflation undermine trust in money and in property rights more generally.

This mechanism was apparently recognised by Lenin, who allegedly remarked that the “most effective way to destroy civil society is to destroy its money”. From this one could establish not just an economic case but an ethical obligation to maintain price stability. Indeed, as far back as the Middle Ages - and I am very happy to conclude this speech in Paris with a reference to a famous French author - Nicolas Oresme has argued in favour of stable money as a principle of natural law and denounced the debasing of currency by the state as worse than usury and equivalent to robbery and exploitation. This basic idea is still valid today even if uncertainty may take different shapes³.

O. I.

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