

On the theory of interest rate policy^{*}

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1. Introduction

Some years ago, John B. Taylor (1993) found out that U.S. monetary policy since the 1980s could be explained by a simple and stable interest rate rule: rates were raised when inflation accelerated, and were lowered when growth fainted. This discovery might not appear noteworthy as central banks in public opinion are supposed to react to inflation and unemployment. But modern theory of monetary policy taught that central banks should refrain from responding to missed targets in a discretionary style; moreover, linking the change of policy instruments to current macro variables might involve the risk of destabilizing the market system because of time lags in the transmission process. Taylor however recommended such an interest rate rule as a reasonable behaviour of monetary authorities, and the impressive performance of the U.S. economy lent support to this suggested strategy.

The subsequent debate on the issue of interest rate policies indicates strong signs of reconciliation between the art and the science of monetary policy. Both 'branches' often had gone separate ways in preceding decades: whereas it was a matter of course for practitioners affiliated to monetary authorities that the variation of short-term interest rates is the main tool of central banking, monetarist and (at least some) Keynesian writers took a short cut of the transmission process

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and – by following different intentions – gave the impression that central banks controlled the quantity of money or even macro aggregates directly. Section 2 of the paper touches upon some general consequences of the emerging consensus in the theory of monetary policy making, which has rendered obsolete former debates on the endogeneity of money and on time inconsistency. Interest rate changes exert a much less precise impact on goods or labour market targets, compared to the control of the exchange rate as the classical object of monetary policy.

Taylor's interest rate rule appears as an alternative to money-supply or inflation targeting. But in spite of significant differences with regard to their formal 'architecture' and their theoretical foundation, these three concepts lead to rather similar central-bank reaction functions. Section 3 argues that there is neither the possibility nor the necessity to choose one of the three concepts as 'the best'; central banks only need to rely on *any* concept which serves as a 'language' to organize its process of decision making and to communicate with the markets.

Whereas the latter consideration might call for the ideal of a conduct of monetary policy, which is perfectly predictable and in line with market beliefs, the possible emergence of multiple equilibria in an uncertain economic world requires central banks to deliver 'leadership' by unexpected decisions. Section 4 deals with this strategic choice, but shows that the different concepts of interest rate policy, pursued by the Fed, the Bank of England and the ECB, do not suffer from such a trade-off between flexibility and commitment to some sort of 'rule'.

Beyond these formal similarities, however, the Fed and the ECB differ in their behaviour towards macroeconomic risks. The final Section 5 argues that – due to the peculiarities of controlling goods and labour markets dynamics by means of interest rate changes – central banks cannot avoid the risk of causing welfare losses with respect to inflation *and* employment even if they claim responsibility only for the goal of price stability.

2. Means and ends in the history of monetary-policy schools of thought

According to the new consensus in the theory of monetary policy, it is now widely acknowledged that central banks mainly use interest rates as instruments; the theory of monetary policy thus has taken a big step towards the practice of central banks (Goodhart 1999, Allsopp and Vines 2000). The old debate, stoked up by Post-Keynesians time and again, on the topic whether the quantity of money should be conceived as being exogenous or endogenous, has become obsolete.¹ Actually, this controversy has been obsolete already for a long time; even the Bundesbank as the leading representative of money supply policies always emphasized that the quantity of money is not a direct policy instrument. Monetarists do not deny that money is endogenous on the level of central bank technique. But the new consensus does not (necessarily) embrace – as it has been argued by Lucas – “a rejection of the quantity theory” (Alvarez *et al.* 2001, p. 219); the endogeneity of money does not rule out the possibility that monetary aggregates might be used as intermediate targets.

The important advantage of the modern view is the emphasis put on the dynamic structure of the macro-market interaction and of the transmission process. The theory of monetary policy thus came off the Barro-Gordon approach that had dominated since the 1980s. Here central bankers were supposed to favour surprise inflation in order to increase employment beyond the market equilibrium. This line of thought had its merits in initiating institutional reforms in some

¹ The fiction of regarding the money supply as a policy tool has its rationale though in practical didactics: integrating the banking sector into macro theory requires a further equation, which depicts the interaction between the central bank and the commercial banks, and the inclusion of the term structure of interest rates, which presumes that the capital market rate for reasons of arbitrage depends on the series of expected future short rates. Therefore conjectures on the future stance of monetary policy have to be stated already when basic market relations are formulated and the topic of aims and strategies of the central banks are not yet touched on. In the literature these difficulties are often circumvented by eliminating the capital market rate from the model and linking goods demand to the short-term rate of interest (Romer 2000). This might find some empirical support, but it is hard to legitimize analytically. The gain in realism when modelling the money supply process is thus attained by weakening the treatment of investment behaviour. If for didactic reasons small and simple models are preferred (Krugman 2000), it is by no means clear that IS-LM is a bad choice.

countries where this appeared advisable; the time inconsistency argument pointed to a solution, which embraced political independence of monetary authorities and the supremacy of rule-bound decisions.

But on the other hand the adherence to the Barro-Gordon approach hardly speaks well for the economic profession because it flagrantly ignored time lags in monetary policy making. The game-theoretic conflict that is outlined within the model can hardly be found under realistic market conditions. If – what seems to be the case – the terms of wage contracts have a shorter duration than the transmission process between interest rate changes and their impact on inflation, unions can pursue ‘central bank watching’ and are able to adjust wages when new interest rate decisions are observed. They thus can avoid surprise real wage losses. The time inconsistency argument, i.e. the central bank’s incentive to deceive the markets, vanishes. It is remarkable that it took 15 years to spread this critique in the literature, which “for reasons of simplification” had taken the rate of inflation as the direct policy instrument.²

The new consensus attaches a high, if not overriding, rating to price stability. This may be seen as a response to the failure of Keynesianism in post-war economics. Keynes’ theory prompted the idea of a historically given price level, which could be taken as an exogenous variable. In a way, the gold standard as the market system’s nominal anchor had been replaced by a wage standard. As long as the wage level could be stabilized by means of income policies, governments were able to run full-employment policies. But in the 1970s they had to learn that nominal wages are endogenous variables that cannot be controlled against market forces. The market system was on the verge of losing its nominal anchor and was threatened by a fundamental instability of all money values (Allsopp and Vines 2000, Rogers and

² “Game theoretic models of time inconsistency have been so popular, because we have wanted to believe them, despite these models being unrealistic in several respects. [...] They] have ignored the fact that there are long lags between monetary policy adjustments and their effect on the real economy, and that both inflation and output have persistence. But so long as wages and prices are fully flexible, such monetary policy lags would imply that the policy would be transparently observed before it affects the economy; consequently the Central Bank could not fool anybody. [...] If monetary instruments operate with a lag, than a rational public would observe them and adjust their expectations accordingly if they have not bound themselves into a contract longer than that lag. Hence the public would not be fooled, and the time inconsistency problem would vanish” (Goodhart and Huang 1998, pp. 393, 378-79; cf. Spahn 1999).

Rymes 2000). This indicates the tragic irony of the Keynesian revolution: Keynes' efforts to get away from the 'barbarous' gold standard, in order to gain the freedom for maintaining internal equilibrium, and full employment in particular, finally ended in a stabilization concept, which built on some rate of unemployment to hold inflation in check.

The modern concepts of stabilization policies may refer to Wicksell (Woodford 2001). He anticipated the replacement of the gold standard by a pure paper currency. Interest rate policy, the use of which had guaranteed the nominal anchor of a fixed gold price on the foreign exchange, now should be employed to defend the internal price level of the goods market. It is noteworthy that Wicksell in this context did not fall in line with the quantity theory. The quantity of money appeared as an endogenous variable in his credit market approach. Note that the quantity of money also in the currency school acted as a limiting force of the Bank of England's credit business, and not as an instrument variable (Spahn 2001, pp. 77-93).

Replacing the price of a single commodity (gold) by the price level of the whole goods market as a target of monetary policy has proven a long and troublesome process of learning; for a long time people were accustomed to regard the exchange rate, and not the price level, as the yardstick for the value of money.³ Nevertheless it appeared as a logical and reasonable further step. But in fact it was not a gradual, but a substantial turn of policy making:

- It was no longer the asset and foreign exchange market which prompted policy decisions, but signals emanating from the goods and labour markets. Whereas aims and means were located on the same level of market mechanisms in the traditional set-up, the modern concept of interest rate policy tried to 'control' processes on macro markets, which are located on a different level of the macro-economic hierarchy and which differ from financial markets because they organize the trade of flows and not of stocks.

³ "The pre-war system did not so much to stabilise world prices or to ward off credit cycles – with such acts of God it did not consider itself in any way concerned. But it had one great advantage – everyone knew quite clearly what principles would govern the Bank of England's actions and what they would have to expect in given circumstances. The post-war system has substituted a most efficacious 'management' for the old 'automatic' system which is all to the good; but, at present, no one knows exactly to what objects the 'management' is directed or on what principles it proceeds" (Keynes 1930, p. 207).

- In former times, also currency reserves were used in order to stabilize the exchange rate. Today, the role of this reserve in a way is transferred to the stock of unemployed workers, which is expected to contribute to the task of retaining wage inflation. But keeping this type of reserve will fail to deliver this function if unemployed persons lose their qualification and marketability during the period of their detachment from the production process; accordingly they no longer exert a dampening influence on the dynamic of wage formation (Blanchard 1991, Ball 1999).

The change of interest rates thus initiates a long transmission process; the hope of 'controlling' wages and prices in a way similar to the control of exchange rates is misplaced. It is no accident that monetarism and new classical economics suppressed the problems of monetary stabilization of goods and labour markets by immediately linking prices to the quantity of money or - even more daring - by regarding the rate of inflation as the central bank's control variable. Actually the main distinction is not between a 'Keynesian' or 'monetarist' type of policy making as both policies merely aim at a different degree of utilization on goods and labour markets; the decisive break occurred when central banks were relieved of maintaining the external balance.⁴

⁴ There is no way back into the intact world of a foreign-exchange oriented monetary policy because national currencies have lost their former nominal anchor in the transition to wage standard economies, key currency systems for various reasons no longer work, and the exchange rate as a relative price of national currencies thus is rendered indeterminate under conditions of high-volume capital movements. The interest-rate-parity condition includes only the expected rate of change, not the level of the exchange rate (Krugman 1989, De Grauwe 1996, p. 75). Classical interest rate policy was able to stabilize the exchange rate because confidence in the fixed gold price determined the expected level of exchange rates, thus eliminating the degree of freedom in the international system of nominal values. Today even the direction of the impact of interest rate changes on the exchange rate is hard to predict because its expected level is neither determined by commodity flows nor by transnational investments nor by policy commitment (Spahn 2001, pp. 179-82).

3. Interest rate strategies as communication frameworks

Given the complexities of the transmission process, it is obvious to ask which of the three well known concepts of interest rate policy is suited best to safeguard the nominal money standard. A comparison shows substantial differences:

- The Taylor rule appears to be a simple 'instrument rule' postulating a reaction of short-term interest rates to output and inflation gaps where some 'equilibrium' real rate of interest, which is assumed to be neutral with respect to the goods and labour market, is used as a benchmark.

- Inflation targeting results as an 'optimal policy rule' from a dynamic macro model, which can be solved, at a *given* short-term rate of interest, to yield today's determinants of the rate of inflation some periods ahead. Interest rate policy then is applied to equate the expected with the target rate of inflation. A reaction function shows how the interest rate responds to actual output and inflation gaps, which serve as predictors of future inflation (Svensson 1999).

- Although the ECB (2000) found it difficult to make the role of money explicit as an intermediate target in formal models of the transmission process, the Deutsche Bundesbank (1999) offered a translation of its favoured monetarist approach into an efficient interest rate rule. However, time lags between changes in the money supply and inflation that were usually emphasized are absent from this model.

In general, macro models of different theoretical origin yield reaction functions which are very similar to the Taylor rule; they all refer to current macro variables even if policy goals are located in the future (Taylor 2000). The concept of inflation targeting, however, is built on fully specified macro models and makes use of a wide range of sources of information, whereas the monetarist approach can be taken to represent an inefficient limiting case of inflation targeting since information gathering is constrained to monetary factors (King 1997, Svensson 1999). The Taylor rule itself might appear to fall behind its two competitors because of its poor theoretical foundation and its implied rather mechanical policy behaviour.

But if it is recognized that there are dozens of models, which exploit dynamic and intertemporal market mechanisms and relate future to current variables, and that the choice of the appropriate intensity of interest rate responses to these indicators is always based on empirical assessment, no matter what theory is used to 'read' the equations – why should a central bank refuse to follow some simple rule of thumb, which has proven successful in the past?

Decisions on monetary policy actions, however, are not a mere technical matter, conducted in a field where the nature of stabilization problems with respect to their origin and their consequences are understood unambiguously, where policy and market agents have a uniform view of market mechanisms, and where economists disagree only gradually on the efficiency of alternative instruments.⁵ Given this background, the demand for more transparency in monetary policy making seems to be reasonable; more information ought to fill the gaps in the knowledge of market agents. Approaching the ideal of perfect information then also implies the stepwise realization of a welfare optimum where efficient coordination is ensured without reciprocal exploitation.

This Walrasian-type of thought and the hypothesis, embedded in the rational-expectations school, of a convergence of various economic theories is ill-suited for the foundation of monetary policy strategies because the knowledge on the working of the macroeconomic system is incomplete and contradictory even among experts, and because different models coexist for heuristic purposes. Under conditions of fundamental uncertainty, economic models that deliver an idea of the role of interest rates in the transmission process are indispensable in the practice of central banks for two reasons:

– The *internal* process of gathering and assessing macro data, of preparing and implementing monetary policy decisions has to be guided analytically. “Some kind of a model, however informal, is necessary to do policy, for otherwise how can you even begin to estimate the effects in policy instruments” (Blinder 1998, p. 7).

⁵ This is the implicit common-knowledge assumption in the traditional theory of monetary policy, including the Barro-Gordon approach: everybody knows the working of the economic system; agents may suffer from imperfect information; but they understand the logic of the macroeconomic 'game'.

– A theoretical concept of policy making is useful as an *external* framework of communication. Outside the new classical fantasy world, market agents have different (or no) ideas of the macroeconomic laws of motion. The presentation of simple models is supportive to make the linkages between means and ends clear to the public. Presenting the reasons and the expected outcome of interest rate changes is also sensible if information and additional comments on monetary policy decisions are regarded as an element of their impact on market processes.

From this it follows that a strategic concept of policy making always represents a compromise since it has to fulfil different functions in the internal and the external part of the central bank's operations (Winkler 2000). Whereas the internal procedure of decision making ought to be monitored with scientific scrutiny, the public confidence in the ability of monetary authorities to safeguard the value of the currency does not necessarily depend on the condition that central banks embellish the presentation and practice of their interest rate policies with highbrow-polished theories.

A strategy of monetary control has organizational and communicative purposes. Different views on the part of central bankers, market agents and market observers have to be coordinated in order to enable a mutual understanding. A monetary strategy therefore fulfils the function of a *language*, which allows a common interpretation of economic phenomena. A mere dissemination of facts and figures does not yet produce the generally desired transparency; a supply of empirical data without the recognition-enhancing role of a theory cannot result in *understanding*. “The essence of creating transparency is not the provision of a large quantity of information, but rather the enclosed plausibility” (Remsperger 1998, p. 6; my translation). Politics and markets ought to find *any* common language – no matter which one.⁶

⁶ “Central banks seem to look at broadly similar information, while the manner in which they present and communicate this information varies to a great extent. From this perspective a monetary policy strategy is like a language. [...] First, what matters is not so much the particular language chosen, but that both sender and receiver speak the ‘same language’. Second, a language has to be learned and the coordination benefits (and public good properties) from a language derive from the consistent use of terms over time and across situations. Once learned, a monetary policy strategy economises on the need for additional explanations and at the same time

It thus might be of second order which concept is finally chosen to guide and to communicate the decision making process of a central bank. Interesting enough, the actual way of interest rate policy hardly changed in spite of major reforms of the institutional and intellectual set-up of the conduct of monetary policy (Almeida and Goodhart 1998). Nevertheless the three policy concepts may differ in their 'linguistic' efficiency:

- The Taylor rule is very simple to grasp, but its mechanical scheme of stimulus and reaction provides only a poor common understanding of the background forces that guide the interaction of macro markets.

- On the other hand only experts can gauge the complexity and bewildering variety of technical models, which may be used for inflation targeting.

- Money supply control therefore might appear as a middle-of-the-road concept that can rely on some popular version of the quantity theory, which is shared among the public at large.⁷

The information-theoretic interpretation of monetary strategies elucidates that policy concepts may exhibit substantial inertia. These concepts are no simple tool boxes; in that case central banks were free alternately to make use of different strategies or simply deviate from some rule, i.e. to practice a non-concept, without being afraid of any impending disadvantages. But such behaviour is apt to stir up traditional reservations against discretionary policies. Central banks do not like to be accused of deviating from 'principles' or of opportunisti-

lends coherence to these explanations. It is clear that there are considerable switching and learning costs involved in adopting a new language" (Winkler 2000, pp. 23-24).

⁷ "No one can really believe that the wide range of monetary policy can be reduced to a short-term observation of a single statistical variable. [...]Nevertheless, I considered even the dogmatic monetarists as valuable support if it was necessary to make monetary policy clear to the broad public" (Emminger 1986, p. 439; my translation). If the public accepts the money-inflation nexus as plausible, it is puzzling that the Bundesbank's poor performance in reaching its money supply targets did not add to volatility of inflation expectations. Maybe agents on goods and labour markets do not fully comprehend or do not even take notice of the concept of intermediate targets, whereas 'informed' agents on financial markets know that money-supply or demand shocks do not have a long-run impact. When money growth is 'too high' they do not expect a rise in inflation but offsetting interest rate changes, at least if they guess that the central bank will not simply ignore its failure.

cally swaying between various strategies in the conduct of monetary policy. The confidence in the professional qualification of monetary authorities can be expected to suffer if 'scientifically based' strategies are replaced due to some new evidence too often.

The ideal of a perfect communication between policies and markets could be seen in a state where central bank decisions are made totally in line with private expectations. In this case interest rate changes would not come as a surprise; they were already incorporated in market prices as private agents and policy makers employ the same theory to 'read' the market news and assess them in the same way. By making use of the generally known reaction function the next step of the central bank could easily be calculated and predicted. Volatility of prices on capital markets and the foreign exchange would shrink; the stability of the macroeconomy could be expected to be enhanced, as private-sector decisions would be oriented to interest rate policies in a forward-looking way. "With a predictable reaction function, private-sector reactions can be expected to do much of the monetary authority's work" (Allsopp and Vines 2000, pp. 22-23). The success of the policy concept then would imply that its practice would become boring for the media (King 1997).

But this picture of 'communicative' interest rate policies remains incomplete. It is true that central bankers at times make reference to the calm on the markets after decisions that already had been anticipated, and thus take the opportunity to legitimize these decisions as 'obviously reasonable'. However, on the other hand, it also happens that decisions, which had been widely expected, fail to realize and that central banks deliberately leave the public in the dark about future steps. Why do monetary authorities want to be 'incalculable'?

4. Uncertainty, rules and freedom of action

According to a traditional doctrine monetary policy should adhere to transparent principles, if not strict rules. But the monetarist call for rules had been derived from simple models where only random shocks occur, which do not restrain self-stabilizing forces, and where a unique equilibrium was known from real-economic fundamentals.

Today the possibility of multiple equilibria – due to hysteresis on goods and labour markets – is widely acknowledged. Contrary to the theory of rational expectations the future is not yet determined stochastically, market agents do not *discover* but *create* it by their own decisions (Davidson 1988).

Under conditions of evolutionary uncertainty individuals might judge monetary policy not (only) by ‘rationally’ anticipating the consequences of theoretically based control concepts but (also) by the outcome of past policies. The reputation of a central bank then depends on its proven capability of attaining good macroeconomic results, irrespective of how they have been reached. Its credibility can hardly be tied to the question whether it strictly clings to a once established rule because there is no optimal rule for all contingencies; unpredictable events may turn up, structural change may modify the working of the macro system, and new scientific findings are spread. Otherwise new rules had to be installed time and again – and rules which control the replacement of rules (King 1997).

Central bank behaviour should not be linked to a mechanical reaction function; the predictability of decisions on interest rate changes is not indispensable:

- The professional quality of the internal sequence of operations might be impaired if the procedure of decision making appears to be ‘automatic’ and predetermined by its external way of presentation.

- The norm of being in accordance with private expectations runs the risk of tolerating or even magnifying ‘speculative bubbles’. The central bank ought to be able to surprise the markets and thus to demonstrate its independence from markets’ beliefs.⁸

- Marginal deviations from a previous, general trend will cause more unrest in the markets if this is accompanied by officially abandoning some ruling reaction function. Hence, it appears advisable to choose a not too precise ‘language’ when communicating with the

⁸ “While I never saw a single case of a central banker succumbing to the temptation that so worried Kydland and Prescott, I often witnessed central bankers sorely tempted to deliver the policy that the markets expected or demanded. [...] It is just as important for a central bank to be independent of markets as it is to be independent of politics” (Blinder 1997, p. 15; cf. Bernanke and Woodford 1997).

markets in order to avoid superfluous public debates (Winkler 2000). In the extreme case, a central bank might prefer to forgo a consensus-enhancing 'strategy' of interest rate policy, if the aim is not to become dependent from the formal constraints implied by that concept.

It is conspicuous that there are 'emergency exits' in all three policy concepts, which enlarge the scope of the central bank's actions. Taylor himself recommended his rule only as a guiding principle that did not in the least exclude deviations. The policy pursued by the Fed can be interpreted as an intelligent variant of a *Taylor strategy*: on the one hand, the Fed not only takes the liberty of deviating from some basic rule, as did the Bundesbank in former times, but publicly emphasizes not to follow any rule at all. But on the other hand, it is by no means inconvenient for the Fed that the Taylor formula describes its behaviour quite well *ex post* and on average, and that this fact is known to science, politics and media. Thus the Fed escapes the accusation of running purely discretionary policies, without being nailed down to a rigid reaction function.

Inflation targeting at first sight appears as a very strict concept, which prescribes every step in its procedure inclusive of the publication of minutes and forecasts. But this concept also allows great latitude by means of the multitude of theories that can be drawn on. Depending on the assessment of data and on the choice of models and of econometric methods, different inflation forecasts may ensue, and it is hardly discernible on the part of non-informed outsiders, how relative probabilities of alternative scenarios have been chosen. Possible inflation figures usually are announced in a large range (e.g. in a fan chart in the Bank of England's inflation report), which leaves considerably more freedom of action, as compared to the simple case of a one-model approach. From this point of view inflation targeting recommends itself as a consistent strategy that enables a flexible interest rate policy in a rule-based framework. This approach allows and requires the discretionary use of all relevant information; theoretical arguments that legitimize the inclusion of any new aspect can easily be provided. Hence the central bank is enabled to adjust its behaviour to ever changing market conditions by executing a decision making framework which is presented as a rule-bound procedure in the public.

Money supply control has always been handled very flexible on the part of the Bundesbank. Its interest rate policies mostly were oriented at current and expected inflation, even if money supply data would have required interest rate changes of different sign (Bernanke and Mihov 1997). Just because of this behaviour the Bundesbank has been accused of having pursued 'inflation targeting in disguise' (Svensson 1999); the rhetoric of the monetary policy strategy was inconsistent with its practised contents. Strict money supply targeting may be convincing with regard to the clarity of the rule, but it is not necessarily efficient in case of shocks; a flexible monetary control might yield better results, but has weak points when presented in the public.

Therefore, it came as a surprise that the ECB did not abandon this double-track concept but rather advanced it to a *two-pillar strategy*. This has been criticized as non-transparent (Buiter 1999); from a communication-theory point of view the central bank speaks 'with a forked tongue'. The ECB (2000, 2001a; cf. Issing 1999) defended its concept by arguing that the knowledge of the true determinants of inflation was still incomplete. Two main ways of understanding could be distinguished though: in the first, inflation is explained by the money growth; in the second, by excess demand on goods and labour markets.⁹ As both approaches could not easily be integrated analytically, they should be applied separately as two 'pillars'. Furthermore it was argued that monetary policy operates under conditions of macroeconomic uncertainty; therefore, the central bank is dependent also on the use of contradictory information stemming from different theoretical sources. Hence receiving opposing signals should not be assessed as a drawback of the two-pillar strategy, but rather as an evidence of its particular robustness with respect to an efficient processing of information.

Speaking of two qualitatively different pillars in the decision-making process seems to be exaggerated though. It creates possible and unnecessary contradictions within the policy concept; inflation targeting may also incorporate theories of opposing character. Hence, the path of monetary aggregates could be included in the 'fund' of data and explanations that are used to work out a (bundle of) inflation

⁹ This is a somewhat strange dichotomy because, in the first approach, excess real balances also fuel excess demand on these two markets.

forecast(s). A weak point in the presentation of the ECB's strategy thus could be repaired.¹⁰

However, sticking to the disputed two-pillar strategy can be interpreted as an attempt to preserve some leeway of central bank's independence *vis-à-vis* market agents and observers. In the wide field of economic models and information-providing systems, which can be used to assess the actual state of the economy and to design policy responses, one sector is selected in which the central bank 'naturally' has some informational advantage and a professional 'monopoly': the money markets and the banking system. The modest confession that "central banks have also limited knowledge about the structure and functioning of the economy" (ECB 2001a, p. 46) is a misleading understatement, given the enormous appropriate human capital that is concentrated at the central banks' offices.

Drawing upon the tradition and reputation of the Bundesbank, the ECB presents itself as an institution, which is particularly qualified for monitoring and controlling the financial sector. Therefore the monetarist part of the ECB's two-pillar strategy deliberately is not presented as a mere input into an integrated procedure of information gathering, but rather as a distinct element that "constitutes a visible and public commitment to undertake monetary analysis and present its implications for monetary policy to the public" (Pill 2001, p. 27). The impression conveyed to the public is that processes within the monetary sector are 'understood' by the central bank faster and more competent, as compared to observers and research units on the outside. Therefore central banks are seen in a legitimate position to lay claim to 'have the final say' in the debate and to put a veto on recommendations for interest rate changes, which are mainly derived from an analysis of the state of goods and labour markets.

Particularly the threat of uncertainty, which is emphasized by the ECB in a conspicuous way, advances central banks to become strongholds of the hope for stability. These expectations on the part of the public and the media, whether they are wishful thinking or not, vest monetary authorities with competence that can be turned into the safeguarding of their independence. Reputation thus evolves as an

¹⁰ Contrary to previous apprehensions that monetary relations within the EMU were too unstable or too unreliable so that a policy strategy needed more than just one 'pillar', Hagen and Brückner (2001) argue that the assessment of new data even seems to allow a return to a pure money targeting approach.

instrument of monetary policy.¹¹ The establishment of an independent monetary pillar in the decision making process expresses the claim to a 'retreat position' which can be taken up discretionary; it serves as a protective shield against the threat – as seen from the point of view of monetary authorities – that decisions on interest rates might evolve as 'technical' results in a competition between econometric models.

5. Inertia and risks of interest rate policies

The provisional result of the analysis so far is that contemporary strategies pursued by leading central banks meet both the basic demands: allowing a flexible pattern of monetary policy making without exposing central banks to the reproach of acting in a discretionary manner. Monetary authorities quickly learned in recent years to reshape the procedure and 'layout' of their decision-making process, in order to adapt to modern scientific standards. But the problem of imperfect knowledge with regard to market mechanisms and to the influence of policy tools is a real one, not just a tactical argument in the debate on the strength of alternative policy concepts. Macroeconomic fundamental uncertainty results in three types of information gaps from the point of view of central banks (ECB 2001a):

- Empirical data are incomplete or available only late. Indicators derived from these data, e.g. the output gap, may therefore be distorted.

- The 'true' theory of the economy – necessarily – is unknown. Macroeconomic risks cannot adequately be analyzed by including stochastic shocks in some macro model (additive uncertainty). The functional relationship between macroeconomic variables may be unstable or not clear (parameter or model uncertainty). Permanently it has to be checked whether changes of consumer behaviour or of

¹¹ "Credibility with respect to a well-understood objective helps to provide a clear and reliable anchor for expectations and can thus be seen as reducing strategic uncertainty in the economy" (ECB 2001b, p. 50).

money demand, new patterns of productivity growth or of wage formation, not to speak of the degree of goods demand reaction to high-volatile asset prices, and the like, might cause structural breaks in the working of the market system.

– Finally, the response of market agents to current and expected actions taken by central banks cannot be predicted with certainty.

Under these conditions there is no reliable knowledge of the impact of policy actions on the economy. A traditional principle therefore calls for gradual changes of instruments where the consequences of each decision ought to be clear before the next step is taken, in order to prevent a macroeconomic destabilization (Brainard 1967). The recommended pattern of gradualism appears to be incorporated in interest rate policies. Successful econometric tests of Taylor equations in most cases include also the interest rate of the previous period. This might be simply explained by a pattern of deviations from basic target values, which in itself exhibit serial correlation – the typical experience of booms and depressions; this implies that the series of adequate interest rate responses shows persistence. But econometric studies indicate that, even after taking account of the trade-cycle argument, the actual path of interest rates is less volatile compared to the hypothetical optimal path.

Central banks thus appear to pursue ‘interest rate smoothing’ (Goodhart 1997 and 1999). The optimal adjustment of interest rates – which might be deduced from a welfare-theoretic decision model – is not immediately applied, but only reached after several steps. This type of policy behaviour seems also to be reasonable if frequent alterations of the *direction* of interest rate changes, even if adequate from an economic point of view, are difficult to justify in the public; policy observers might get the impression that the central bank acts haphazardly or is incompetent.

Furthermore, interest rate smoothing appears to be appropriate in the context of macro theory. Goods demand depends on the real long-term capital market rate, but the central bank controls the short-term money market rate. Both interest rates are interdependent by way of arbitrage. According to the term-structure theory, the capital market rate is determined by the expected series of future short-term rates. Therefore the impact of a change of the actual money market

rate on the long-term rate depends on guesses how the central bank might modify short-term rates in the future.¹²

– If central banks respond to a perceived disequilibrium or shock with a sharp change of interest rates, so that market disturbances appears to be neutralized, expectations with regard to future monetary policy steps are undetermined. If expected rates remain unchanged, current interest rate policies are able to exert a desired, albeit weak, influence on capital markets. But then further decisions are expected to follow the same random walk pattern that governs the occurrence of shocks. This might imply that monetary policy loses its control over the capital market rate of interest.

– Conversely, a moderate policy which reacts in a subdued manner to a market disequilibrium, but intimates further steps of adjustment in the same direction, will have a substantial leverage effect on the long rate because of the induced expectations with respect to future short rates. “This [...] enables the central bank to stabilize the economy with relatively modest movements of the short rate” (Clarida *et al.* 1999, pp. 1689-90, cf. Goodfriend 1991).

However, a systematic and perfect control of the capital market rate and of the macroeconomy by small or delayed changes of money market rates is out of reach: first, the Brainard principle is not optimal if market forces need clear and strong policy signals in times where prospects are vague and uncertain. Second, central bankers – aiming to maintain their independence as to future actions – at least sometimes take pains not to disclose the type of the next period’s interest rate step when they comment on an actual decision.¹³ Finally, profit expectations and propensities to spend might also be affected by small interest rate changes in an adverse way. Investment will slacken if firms anticipating a further rate cut in the near future do not react to an actual lowering of central bank rates. The interaction of ‘strategic’

¹² “Central bank interest rates should be lowered only if authorities see the possibility of two cuts. One option for a further cut should always be kept as a reserve. A lowering of interest rates which the markets perceive to be the ‘last one’ is already equal – in its impact on long-term interest rates – to the first rise of central bank rates” (Sievert 1995, p. 5; my translation).

¹³ On the occasion of a rate cut in August 2001, ECB president Duisenberg emphasized: “I cannot forecast when another move will come, or in what direction it might be” (ECB 2001b).

interest rate and investment decisions thus might end up in sub-optimal equilibria (Caplin and Leahy 1996).

The conclusion is simply that interest rate policies cannot exert a perfect and reliable control of goods and labour markets. The 'optimal' central bank rate at times might be unknown; the current state of information at most indicates the direction of interest rate changes, which should be executed with care. Moreover, multipliers in the transmission process cannot be assumed to be constant. The relationship between the application of policy instruments and the economy's response is not linear. Macroeconomic activity is characterized by strong auto-regressive forces, i.e. positive feedback mechanisms between macro variables (e.g. profit expectations, investment and realized profits). The change of output (y) therefore depends on its own dynamic in the past. At the same time, lagged interest rate policies (i) as an opposing factor and random shocks (e) play a part:

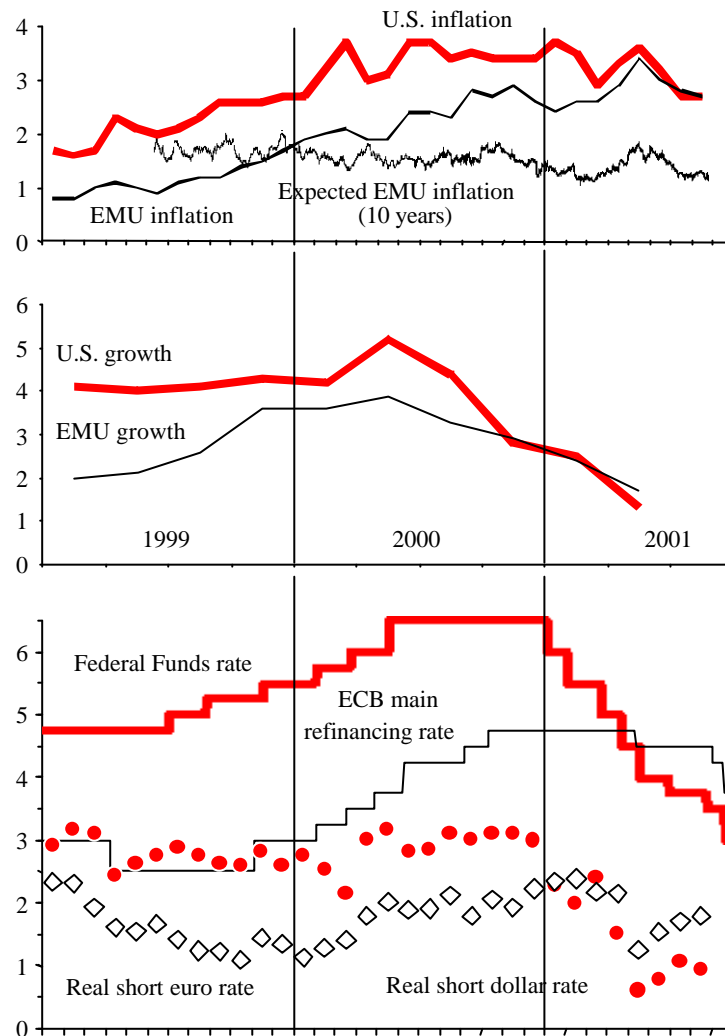
$$\Delta y_t = \lambda \Delta y_{t-1} - \beta \Delta i_{t-1} + \Delta \epsilon_t.$$

It is a stylized fact of the trade cycle that the coefficient I for a long time dominates the policy effect, captured by b ; but then random 'marginal' events in the field of markets or politics cause a regime change where all of a sudden I shrinks and b rises. This marks the turning point of a boom; but the instant of switching cannot be predicted.

This knife-edge-type problem of maintaining macroeconomic stability can be demonstrated in the light of the quite similar pattern of the Fed's and the ECB's interest rate policies (Figure 1). Both central banks raise their rates stepwise in a boom accompanied by moderately increasing inflation. But whereas the Fed stops its restriction after growth has reached its turning point, the ECB waits until there are signs of inflation losing momentum. Critics of the ECB's 'too cautious' policy stance might point to the low long-term expected inflation (gauged by the yield of French indexed bonds), which despite a steady rise of actual inflation fluctuated in the range of 1-2%. This may be read as a proof of investors' firm confidence in the ECB's stabilization preferences. It also may have indicated that the ECB's resistance against mainly supply-side driven inflation was overdone, even if a long-term expectation of low inflation on assets markets does not necessarily preclude next month's higher wage demands due to oil-price reduced real wages. In any case the Fed's stronger growth orientation shows in the fast process of lowering interest rates in 2001.

FIGURE 1

INFLATION, GROWTH AND INTEREST POLICIES IN THE U.S. AND EUROPE
(data from ECB, *Monthly Report*, various issues)



The assessment of *risks* is crucial in all decisions on interest rates. It is obvious that the Fed weighs up the risks of inflation *and* unemployment. From this point of view the lacking commitment of U.S. monetary policy to a strict rule is a noticeable fact. Only by neglecting current estimates of the NAIRU it was possible to support the

long-lasting prosperity of the 1990s. These estimates *at each point of time* would have called for a monetary restriction, although the NAIRU as the basic supply-side constraint was revised downward step by step afterwards (Stiglitz 1997). Undoubtedly this was a risky policy with respect to a possible threat of accelerating inflation; after all, the U.S. inflation of the 1970s has been explained by an overestimation of the frontier of possible production (Orphanides 2000). But the *ex post* welfare gain of the 1990 policy course, compared to a more anxious way of assessing the scope for stable growth, has been enormous.

The ECB, by contrast, concentrates upon the inflation risk only. The crucial question then is whether a cautious policy stance, which on average might lead to low inflation in the long run, provides a 'free lunch'. This view might be justified by referring to the theoretical idea of neutral money. But the fact of real effects of monetary policy in the short and medium run can hardly be ignored (Mankiw 2001). Interest rate policies exert a gradual and stepwise impact on goods and labour market processes, and microeconomic reasoning and empirical experience show that quantities respond faster than prices.

Moreover, there are clear signs of the NAIRU varying in both directions with effective demand because of various kinds of hysteresis. This finding too is no surprise since standard economic theory provides ample links between changes in the degree of utilization of factors of production and their rate of reproduction; the stock of human and productive capital is thus an endogenous variable in the macroeconomic process. Countries where disinflation policies were pursued for a long time ended up with high rates of 'structural' unemployment; but sharp monetary easing after recessions helped to restore the previous growth path of output and employment. This implies that a demand-side reduction of unemployment not necessarily brings about a permanently accelerating inflation. "The long-run aggregate supply curve may be vertical, but its location is endogenous to macroeconomic policy. [...] Any unemployment rate can be the neutral rate, if only it persists long enough" (Solow 1998, pp. 11 and 13; cf. Ball 1999, Leon-Ledesma and Thirlwall 2000).

Fighting inflation may have long-run costs in terms of growth and employment; this trade-off looks particularly disadvantageous in cases of temporary supply-side price hikes. A central bank can avoid welfare losses if it decides to wait out and to refrain from raising in-

terest rates. But surely the ECB in its period of apprenticeship was in no mood to gamble.

6. A final summing up

The emerging consensus in the theory of monetary policy emphasizes the pivotal role of short-term interest rates as main policy instruments. Of course this was well acknowledged in former times when central banks were charged with the task of defending a fixed exchange rate; but the scientific focus shifted onto the quantity of money when the stabilization of the internal equilibrium advanced to the top of the monetary policy agenda. The operation of interest rate policy is hampered by lags in the transmission process and uncertainty about the working of the economy. The idea of varying the quantity of money as an exogenous macro variable – let alone a direct choice of the rate of inflation – in a Barro-Gordon ‘game’ against the market sector thus appears to be ill conceived.

The Taylor rule, inflation targeting and money supply targeting differ widely in their theoretical backing. But interest rate policies are performed in a similar manner below the surface of different strategic concepts: rates are slowly changed in response to a predicted path of macro variables, in order to induce a return to their more or less publicly announced target values over the medium run. Because of the vagueness of any forecast and because of the dynamic structure of macroeconomic interdependence, trends of actual values of macro variables have a large weight in policy decisions, so that central banks often seem to follow a simple Taylor rule. But of course they use all available information and employ a wide range of macroeconomic models.

The strategic components of interest rate setting arise from the interdependence of expectation formation in the fields of markets and politics. The choice of a ‘concept’ of interest rate policy ought to meet two basic demands – of possibly contradictory character. On the one hand, the use of any such concept serves as a common language which is necessary to organize the internal monitoring process within monetary authorities, to coordinate different visions on market mecha-

nisms held by policy makers and private agents, and to communicate decisions to the public.

Whereas here the aim is to create mutually consistent beliefs, central banks ought to preserve freedom and flexibility to act contrary to private expectations if the market system is in need of guidance. Despite some scepticism uttered from academia, the public accepts and even expects autonomous central bank actions: uncertainty and instability on the world markets urge monetary authorities to fulfil a stabilizing role, hence they are able to exploit their attributed status of professional agents in the financial system for the justification of surprising decisions. If each step of a central bank were in line with common wisdom and private beliefs, they would lose much of their nimbus. The required policy rule thus, on the other hand, should allow a discretionary monetary management – to be distinguished from a discretionary use of rules, which raises the suspicion that the central bank behaves opportunistically or lacks competence.

Each of the policy concepts pursued in practice, more or less, meets the criterion of allowing a rule-bound flexibility; insofar, there is no ‘best’ strategy. The Fed discloses neither its precise targets nor the ‘model’ of its decision process, but nevertheless gives the impression that its policy stance aims at a general stabilization of the macro system, where in ‘normal’ times besides a low rate of inflation monetary policy also has an eye on growth and an orderly state of financial markets. On the surface, both the Bank of England and the ECB enjoy less room for manoeuvre, but the ambiguities of model uncertainty and data assessment leave interest setting as a policy decision. The principle of a rule-based discretionary policy making is particularly obvious with regard to the ECB’s strategy where the choice of the relative importance of the ‘two pillars’ in each case is made *within* the policy concept.

Whatever concepts and formal procedures of interest rate policies are chosen, they do not predetermine the weight given to different aspects of the stabilization problem, even if the central bank’s mandate only refers to the goal of price stability. Monetary policy can only exert an imprecise control over goods and labour markets. Non-linearities and variable multipliers in the transmission process require a gradualist course where the maintenance of macroeconomic stability becomes a knife-edge problem of swaying between booms and recessions. There is not much support for the idea of money neutrality;

prices and quantities are not detached from each other even in the medium run. Thus interest rate policies aiming to supervise the dynamics of goods and labour markets cannot escape sharing the responsibility for the path of prices *and* quantities on these markets.

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