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Overcoming the Inflationary Bias Through Institutional Changes – Experiences of Selected OECD Central Banks*

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Abstract

The paper analyses the institutional changes that have taken place during the 1990s at the central banks of major OECD countries. They have generally resulted in an increased degree of independence, transparency and accountability as well as in mandates more narrowly focused on the achieving and maintaining of price stability. It is argued that recent theoretical and empirical research on the institutional aspects of monetary policy are useful in interpreting these changes. The implications for the design of the European Central Bank are discussed against the background of this research and the experiences with the recent changes at national central banks.

Zusammenfassung

Wir analysieren die institutionellen Änderungen, die sich in den Zentralbanken der OECD-Lander in den 90er Jahren ergeben haben. Generell resultierten diese in einer erhöhten Unabhängigkeit, Transparenz und Rechenschaftspflicht sowie der Spezifikation der Gewährleistung von Preisstabilität als Hauptaufgabe der Zentralbanken. Das Papier arbeitet heraus, dass theoretische und empirische Untersuchungen zu den institutionellen Aspekten der Geldpolitik hilfreich sind, diese Änderungen zu erklären. Vor diesem Hintergrund und den Erfahrungen der nationalen Zentralbanken werden abschließend dle Implikationen für die Europäische Zentralbank diskutiert.

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1. Introduction

Central banking in the last two decades has been largely influenced by two developments. First, the emergence of stagflation in the early 1970s. This gradually lead most economists and policymakers to conclude that

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there is no long-run trade-off between inflation and unemployment. Concentrating on the primary goal of price stability was recognised the best way monetary policy could contribute to good economic performance over time. Second, the transformation of the financial sector which gathered momentum in the 1980s as a result of liberalisation and financial innovation, increased the mobility of capital and the sanctioning power of financial markets. This meant that market participants' concerns about the stance of monetary policy and their (mis-)readings of the objectives of individual central banks became more easily and quickly translated in interest rate or exchange rate premia for the currencies of the countries concerned.

Against this background, central banking has changed in several ways. The search for reliable external or internal nominal anchors became more difficult. On the one hand, exchange rate commitments became harder to sustain. On the other hand, the usefulness of the most popular anchors adopted in the 1970s, i.e. monetary aggregates, was gradually eroded in most countries. The responses included a reorientation of the monetary policy strategy, in some cases to a direct inflation targeting strategy (e. g. the Bank of England or the Reserve Bank of New Zealand), in others to a more flexible and pragmatic orientation of monetary policy (e. g. the Deutsche Bundesbank or the Fed). Furthermore, and maybe more fundamentally, the institutional designs of many central banks have been changed. These changes have resulted in an increased degree of independence, a more focused mandate on achieving and maintaining price stability, an increased degree of accountability and of transparency about objectives, strategies, the actual decision-making process and the intentions regarding short-term monetary policy implementation.

The present paper has two purposes. First, it describes the institutional changes that have occurred during the 1990s at the central banks of major OECD countries (for an overview see table 1). In this context, special emphasis is laid on the implications for the European Central Bank (ECB) and the Eurosystem. For this new institution these insights are important because it has no established track record. Second, the paper interprets these changes against the background of the recent theoretical and empirical literature on the institutional design of central banks.[1] It argues that this literature is useful in interpreting the reasons and consequences of the institutional changes that have occurred in practice. Although the changes that have taken place at central banks in developed countries is the focus of the descriptive analysis, the discussion of the underlying rationale is potentially of interest to central banks from developing and transformation countries

[1] For more formal oriented surveys on the institutional design of central banks see Persson / Tabellini (1999) and Prast (1996).

Table 1

Recent changes of institutional structures of central banks in selected OECD member countries

Country	Year	Summary of changes[a]
Canada	1991	(t) formal inflation target.[b]
France	1994	(o) price stability as explicit objective; (i) instrument and goal independence; (i) government cannot give instructions to the Banque de France.
Italy	1992	(i) terminating the automatic extension of central bank credit to the government.
Japan	1997	(o) price stability as explicit objective; (i) independence of the Bank of Japan in formulating and implementing monetary policy; (i) assignment of the decision making in monetary policy to a single body – the Policy Board – in which government representatives have no vote; government influence on choice of Policy Board members reduced; (i) Board members cannot be dismissed in cases of conflict with government; (t) minutes and records of the Policy Board meetings will be publicly disclosed. (t) every six months the Bank must report on its activities to the Diet.
Sweden	1989	(i) reduction of political influence on appointment of Governor; (i) lengthening of the Governor's term of office.
	1993	(t) formal inflation target is specified by the Bank of Sweden;[b] (t) inflation report.
	1998	(o) explicitly lays down price stability as objective of monetary policy; (o) some responsibility for exchange rate regime transferred to government; the government will have authority to decide, after consultation with the Riksbank, on the choice of the exchange rate regime. The Riksbank has the responsibility for the implementation of the exchange rate system adopted by the government; (i) the Bank is no longer required to consult but only to inform the government on important monetary policy decisions; (i) Governor cannot be dismissed in cases of conflict with government.
United Kingdom	1992	(t) inflation target set by Chancellor of the Exchequer and Bank of England (BoE)[b]; (i,t) BoE produces independent assessment of progress in meeting inflation targets.
	1993	(i) Bank of England is given discretion over timing of changes in interest rates.
	1994	(i,t) publication of the minutes of the meetings between the Bank of England and the Chancellor in which the former gives its independent advice to the latter.
	1997	(i) Bank of England is given authority over the setting of interest rates; (i) policy decisions are made by a new Monetary Policy Committee (MPC), the members of which will be appointed by the Governor and the Chancellor; a representative of the Treasury will attend the meetings of the MPC, but has no vote; (i) government cannot give instructions to the new committee; (o) responsibility for banking supervision will be transferred to a separate institution; (o) responsibility for debt management transferred to the Treasury.

a) Changes affecting the objectives, the degree of independence and transparency are identified by (o), (i) and (t) respectively. When an institutional change had implications for more than one of these aspects, an additional identifying character is included. For example, in October 1992 the Chancellor of the Exchequer asked the Bank of England to produce an independent assessment of progress in meeting the inflation targets (resulting in the publishing of the Inflation Report). This measure increased the Bank of England's independence and its transparency, thus identification (i,t).

b) The adoption of formal inflation targets is obviously in the first instance a choice regarding strategies. But the fact that, in practice, it has been associated with an increase in transparency, suggests to categorise it under the measures increasing transparency.

as well (see e. g. the current discussions in India, South Africa, Estonia and Bulgaria). This holds in particular as many developing countries have used the Fed or the Bundesbank as benchmark models.

The paper proceeds as follows. Section 2 explains the fundamental problem of the inflation bias inherent in non rule based monetary policy. Against this background, the remainder of the paper distinguishes between four dimensions of the institutional structure of central banks that are relevant for this bias. Section 3 discusses the changes to explicit mandates, section 4 to the degree of independence and section 5 to the degree of accountability of such institutions. And section 6 explains the changes towards more transparency about objectives, strategies and the actual decision-making process. While all these measures were motivated by a response to the time-inconsistency problem, the increase in transparency was also driven by a perceived need to provide clearer signals of central bank intentions and to avoid mis-readings of its policy by an internationally diverse group of market participants (BIS, 1997). Section 7 then draws some lessons for the ECB. Finally, section 8 concludes and summarises.

2. The 'inflation bias' in discretionary monetary policy

The fundamental problem of discretionary policy, i.e. a policy that is not based on rules, arises as a consequence of (monetary) policymakers' incentive to deviate *ex post* from *ex ante* announcements and to create surprise inflation to modify the real value of nominal contracts, for example to achieve short-term employment gains.[2] Rational agents are aware of that incentive and pre-emptively ask for higher wages to secure the desired real wage. To avoid depressing economic activity, the policymaker then has to accommodate these price expectations and create the anticipated inflation. Finally, there are no employment gains but only the additional costs in terms of higher inflation. This is inefficient because society bears the costs of higher inflation without the benefits of even a temporary increase in employment following surprise inflation.

[2] See e. g. Kydland / Prescott (1977) and Barro / Gordon (1983). The relevance of this, however, has also been questioned. For example, Blinder (1997) argues that it is a purely theoretical phenomenon because modern central bankers never try to cheat the private sector. Their only objective is achieving price stability or controlling inflation. Furthermore, McCallum (1997) claims that it is inappropriate to presume that central banks will, in the absence of any tangible precommitment technology, inevitably behave in a discretionary fashion that implies an inflationary bias and that there is no necessary trade-off between flexibility and commitment. And Romer / Romer (1997) argue that limited knowledge about how the economy operates and the effects of monetary policy has been a much more pervasive obstacle to good policy than dynamic inconsistency. On the other hand, Ireland (1999) empirically validates the long-run implications of the time-consistency problem for inflation in the US.

Besides an underlying desire for employment gains the inflation bias could reflect a number of different aspects, such as larger seigniorage revenues (Klein / Neumann, 1990, de Grauwe, 1996) or a concern about financial stability (Mankiw et al., 1987, Cukierman, 1990).[3] In practise, the seigniorage motive seems to be only of minor relevance in OECD countries because relatively efficient tax systems are generally available for tax collection (White, 1999). Also, financial problems of banks, with the notable exception of some Asian countries during the recent financial crisis, seemed to have been mainly the result of idiosyncratic shocks – which the central bank cannot noticeably influence through the creation of additional liquidity for the whole banking sector. Furthermore, most episodes of financial instability occurred during disinflationary periods that followed those of sustained inflation (Bordo / Wheelock, 1998). This suggests that control of inflation could enhance, rather than interfere with the stability of the financial system. Thus, the concern about employment gains does appear to be the most relevant motive for surprise inflation in actual practice (Walsh, 1998, ch. 8).[4]

In principle, reputation could reduce the inflation bias when the time horizons of the central bank and the public are infinite. A reputational equilibrium with low inflation can be sustained by the threat that the public will 'punish' the central bank for surprise inflation with periods of high inflation expectations (Barro / Gordon, 1983). This points to the role the public plays in supporting a credible and stability-oriented monetary policy. If the public is decidedly averse to inflation, it is difficult for monetary policy to break inflationary expectations after a surprise inflation. This would make the subsequent process of disinflation more costly and thereby effectively discourage monetary policy-makers from using the means of surprise inflation in the first place.

3. Narrowing the mandates

One important institutional change has been the narrowing of central banks' mandates to achieving and maintaining price stability. As can be

[3] The Maastricht Treaty explicitly mentions that one of the basic tasks of the European System of Central Banks (ESCB) is promoting the smooth operation of the payments system. To that extent, one could argue, the ESCB should share a concern for financial institutions' stability.

[4] A new reason why monetary policy may be subject to a persistent inflationary bias was introduced by Kasa (1999). He shows that when a central bank must balance optimisation and learning and recognises that its current actions influence its future beliefs, there is no guarantee that it will discover the true nature of the (exogenous) data-generating process of the economy. This may lead the central bank to believe that there is an exploitable relationship between inflation and unemployment, even when no such relationship exists.

seen from table 1 several countries have gone in this direction in the 1990s. Canada, Sweden and the UK adopted an inflation targeting regime, and France and Japan changed their central bank laws to incorporate price stability as the final objective of monetary policy. This goes hand in hand with the fact that explicit targets for monetary policy have become more widely used in the 1990s than at any time since the Bretton Woods era in industrial as well as in transitional and developing countries (Sterne, 1999). The narrowing of mandates to achieving and maintaining price stability was achieved through a more explicit specification of price stability as the final objective of monetary policy. In the case of the adjustment requirements implied by the Maastricht Treaty price stability has to be specified as the primary and overriding goal of monetary policy of EU central banks.[5] Examples are the legal regimes of the Banque de France and the Banco de España which have been amended to set price stability as the primary objective of monetary policy. These amendments took effect on January 1994 and June 1994. In September 1995 a new law redefined the primary objective of the Banco de Portugal to maintaining price stability. Although there are still no explicit statutory objectives in the field of monetary policy in the UK, in May 1997 the Chancellor announced that the Bank of England will have a specific monetary policy objective of delivering price stability. In the case of Sweden, maintaining price stability has become the prevailing objective of monetary policy in 1998.

Another way of narrowing the mandates to achieving and maintaining price stability consisted of the transfer of other responsibilities to different institutions altogether. For example, the objectives of maintaining price stability and financial stability may conflict with each other. Thus, the separation of the two responsibilities may imply a smaller incentive for the central bank to use monetary policy to ensure financial stability. This, in turn, could reduce the moral hazard problem commercial banks are faced with. Recently, the transfer of responsibility for financial stability from the central bank to another institution has been decided in the case of the Bank of England and discussed in the case of the Banque de France. The ECB has no supervisory responsibilities, too. Although there are still central banks that act as supervisory agencies (see table 2), the general trend seems to be towards a separation of the monetary and the supervisory function (Goodhart / Schoenmaker, 1995).[6]

An important aspect of these institutional changes is that the allocation of relative responsibilities of monetary, fiscal and other authorities within

[5] This is also true for the countries applying for membership in the EU.

[6] An exception is Finland. Although the monetary and supervisory responsibilities are officially still separated, *de facto* there has been a move towards combining the two as a reaction to the domestic banking crisis.

Table 2

Central banks acting as supervisory agency

yes	no
France	United States
Italy	Japan[2]
Australia	Germany
Greece	United Kingdom[1]
Ireland	Canada
Luxembourg	Austria
Netherlands	Belgium
New Zealand	Denmark
Portugal	Finland
Spain	Norway
	Sweden
	Switzerland

1. The responsibility for banking supervision was transferred to a new institution in 1998.
2. Although the Bank of Japan has no official supervisory function it shares some responsibility for financial stability through its mandate to ensure stability of the payment system.
3. Although in a legal / administrative sense, the Financial Supervision Authority is part of the Bank of Finland, in its actual supervisory work, i.e. in performing its own statutory duties, the Financial Supervision Authority acts as an independent administrative unit exercising public authority.

Source: Goodhart / Schoenmaker (1995), Bank of Finland (1996).

the general macroeconomic and regulatory policy mix become more clearly defined. Assigning each institution a responsibility for which it is well-suited is a precondition for holding it accountable. Otherwise the monetary, fiscal and regulatory outcomes cannot easily be attributed to the actions of the individual institutions. An explicit (and narrow) mandate for price stability makes it clear, especially for the public, that inflation is ultimately a monetary phenomenon and that the responsibility lies with that institution which has been delegated the responsibility to control the money supply.

Laying down price stability as an explicit goal, especially when specified as the primary and overriding goal, strengthens the position of the central bank. This is especially true in situations of conflict when pressure groups want the central bank to put more emphasis on other objectives, such as reducing unemployment. Of course, this does not mean that the objective of achieving and maintaining price stability should be interpreted as the sole objective of monetary policy. Even when the objectives of monetary policy are defined relatively narrowly, the need for consistency of monetary policy with other macroeconomic policies is generally recognised. But it has to be clear to the public that price stability is the overriding objective. Provided

the public is aware of a change in emphasis towards the maintaining of price stability and is convinced that it will not be easily reversed, it could help to attenuate the "inflation bias".

4. Augmenting independence

Rogoff (1985) suggested that delegating the responsibility for monetary policy to a *conservative* central banker, i.e. one that has a higher inflation aversion than society as a whole, could attenuate the inflation bias at only little costs in terms of higher output variability. This model comes closest to the general perception of independence: delegation of monetary policy to an inflation-averse central banker which can make independent use of its instruments. The interesting aspect is that when the degree of conservatism is chosen optimally, the central banker secures a welfare outcome that Pareto dominates both the case of discretion and of rules. Specifically, the central banker does not sacrifice too much flexibility in exchange for additional credibility. Using cross-section data, Alesina / Summers (1993) claim that countries with more independent central banks not only enjoy lower inflation without having to sacrifice growth, but also do not experience greater output variability.[7] In a later paper, Alesina / Gatti (1995) provide a theoretical rationale for this result. Even though the "conservative" central bank is less concerned about the stabilisation of exogenous output shocks (the original argument of Rogoff, 1985), being remote from the political sphere, it creates less policy-induced shocks. Thus, taken by itself, increasing the independence of central banks provides a 'free lunch' in the sense that average inflation is reduced with no costs in terms of higher output variability.[8]

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[7] Temple (1998) shows that the negative relationship between inflation and central bank independence vanishes for high inflation countries from the developing world. One reason for this might be that in these countries measures of central bank independence are no good indicators of institutional credibility. Campillo / Miron (1997) argue that institutional arrangements do not by themselves be of much help in achieving low inflation. Economic fundamentals such as openness, political instability, and tax policy seem to play a much larger role for developed as well as for developing countries. For a discussion of the relationship between central bank independence and inflation performance see also the special issue in the Oxford Economic Papers (1998).

[8] This is in contrast to Walsh (1995b) who shows that an increased focus on inflation objectives by the central bank can raise the degree of nominal wage rigidity (and thus lead to a flatter short-run Phillips curve) by inducing less nominal wage indexation. But if one interprets independence and conservatism as being associated with a lower target for inflation rather than a greater weight on inflation objectives, increased independence will lower average inflation without leading to an increase in the variability of output (Svensson, 2000). Tambakis (1999) derives a threshold for the initial degree of effective central bank independence below which the absolute change in inflation variability following a change in central bank independence exceeds that in output variability.

However, one should be careful not to overemphasise these correlation results. The tests applied may suffer from the problem of having omitted third variables. These may include the inflation preferences of the public (Fischer, 1995), the financial-sector opposition to inflation (Posen, 1995), the nature of the wage-bargaining process (Jenkins, 1995), unemployment persistence (Alberola et al., 1997) or the degree of openness of an economy (Fujiki, 1996). Controlling for some of those variables Temple (1998) finds that in high income countries central bank independence is associated with lower inflation. But his results are sensitive to the inclusion of "outliers". And in general and more importantly the empirical results are highly dependent on the choice of the independence index.

What defines a central bank's independence in practice? While there is no unique empirical 'independence index', the European Monetary Institute (EMI) has identified four, commonly used, aspects: institutional, personal, functional, and financial. (EMI, 1996, ch. II,2).[9] Institutional independence means that the central bank can autonomously use its instruments. Furthermore, the national authorities should have no mechanism at their disposal to ensure that their views influence decisions taken by the central banks, either through the right to interfere with any decision reached or the right to vote on decisions. Personal independence means that there is security of tenure, that the terms for members of the central banks' decision-making bodies are longer terms than current political mandates and that the Governor cannot be arbitrarily dismissed (see also the discussion in Waller/Walsh, 1996). Functional independence means that the central bank can concentrate on its principal function. The EMI's interpretation is that it has to be specified that "maintaining price stability" is the primary and overriding goal and that other tasks and functions can only be performed to the extent that they do not interfere with the former. Finally, financial independence means that the central bank does not depend on the fiscal authority and can avail itself of the means to finance its activities.

Table 3, summarising the application of the above four criteria to selected central banks, suggests that they have achieved a relatively high degree of

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[9] The first formal attempt to quantify degrees of central bank independence can be found in Bade/Parkin (1982). Grilli et al. (1991) and subsequently Cukierman (1992) and Cukierman et al. (1992) extend this index to cover a greater range of the central bank/government relationship. Eijffinger/Schaling (1994), Jenkins (1995) and Schaling (1995) compare various indices with each other. Often, an explicit distinction is made between goal independence" – the central bank setting its own goal – and instrument independence" – the central bank choosing and setting the instruments to achieve that goal – following Fischer et al. (1994). The Bank of England currently only possesses the latter, the government being responsible for setting the former. This distinction is helpful in the discussion of accountability that follows. Strictly speaking, a central bank with only goal independence cannot be formally held accountable.

Table 3

The independence and transparency of central banks

	ECB	Fed	Bank of Japan	Deutsche Bundes-bank	Banque de France	Banca d'Italia	Bank of England	Bank of Canada
A. Independence of central banks								
Institutional independence: absence of rights of 3rd parties								
– to give instructions	Y	Y	Y	Y	Y	Y	N	N
– to approve, suspend, annul or defer decisions	Y	Y	Y	Y	Y	Y	Y	Y
– to vote	Y	Y	Y	Y	Y	Y	Y	Y
– to be consulted ex ante	Y	Y	Y	Y	Y	Y	Y	Y
Personal independence (of Board members)								
– Minimum term of office five years[1]	Y	Y	Y	Y	Y	Y	N	Y
– No dismissal other than for serious misconduct or unfitness	Y	Y	Y	Y	Y	Y	Y	Y
– Conflicts of interest arising from other functions	Y	Y	Y	Y	Y	Y	Y	Y
Functional independence								
– Price stability as explicit objective	Y	Y	Y	Y	Y	Y	Y	Y
– No ambiguity as to primacy of price stability objective	Y	N	N	Y	Y	Y	Y	N
Financial independence								
Can avail itself of the appropriate material means	Y	Y	Y	Y	Y	Y	Y	Y
B. Transparency of central banks								
– Formal scheduling and publication of calendar of monetary policy decision making process	Y	Y	Y	Y	Y	N	Y	N
– Interest rate decisions taken at scheduled meetings under normal circumstances	Y	Y	Y	Y	Y	N	Y	N
– Publication of explanatory press releases at the time of each official interest rate change	Y	Y	Y	N	Y	Y	Y	Y
– Minutes or summary of meetings of monetary policy decision making body published	N	Y	Y	N	N	N	Y	N
– Voting behaviour of individual members published	N	Y	Y	N	N	N	Y	N
– Regular publication of monetary policy or inflation report	Y	Y	Y	Y	Y	Y	Y	Y
– Publication of internal forecasts for intermediate or final target variables	N	N	N	N	N	N	Y	N
– Reporting to / monitoring by the Parliament	Y	Y	Y	N	Y	Y	Y	Y

Note: Y = Yes (aspects enhancing independence / transparency are present); N = No (aspects enhancing independence / transparency are not present).

financial, institutional and personal independence.[10] The independence of central banks, measured according to these criteria, has been increased in several countries, such as France, Italy, Portugal and Spain in January 1994, in January 1992, September 1995 and June 1994, respectively (see table 1). More recently, in May 1997, the Bank of England was given (instrument) independence in the setting of interest rates to achieve the government's inflation target. Also, in May 1997, a majority in the Swedish Parliament made a proposal to strengthen the Swedish Riksbanks' independence. And the New Bank of Japan Law, which came into effect in April 1998, grants increased independence for the Bank of Japan.

5. Increasing performance through accountability

Another dimension of the central banks' institutional design is accountability. The primacy that the independence dimension has gained in the reform of the institutional structures of central banks is recently challenged by a number of authors who stress the role of accountability (see e. g. Persson / Tabellini, 1994 and Walsh, 1995a). Following the Oxford English Dictionary Briault et al. (1996) emphasise two aspects of the definition of accountability: The obligation to give an explanation of one's actions when carrying out a duty and the liability to be blamed for loss or failure. The typical approach to accountability has been a principal agent model in which the principal (the society or the legislature) has well-defined objectives and faces the task of designing a contract with the agent (the central bank) that makes the latter act in the principal's interest. Walsh (1995a) proposed to tie the central banker's personal compensation to inflation performance in order to increase the latter's incentives to deliver price stability.

In general, the challenge is to structure the contract in such a way that by trying to increase his own resources, the central banker maximises social welfare in the process. Such a contract could take a variety of forms, but essentially must have the feature that the central banker pays more attention to inflation (or less attention to output stabilisation) than society does. This again reflects Rogoff's notion of a conservative central banker. The first difference is that in Rogoff's framework, society chooses a central banker who has the right degree of "conservatism", whereas the contract approach gives any arbitrarily chosen central banker the appropriate incentives to produce

[10] Nevertheless, according to this framework, independence is still limited in some cases due to the existence of a kind of override clause" (e. g. in the case of the Bank of Canada or the Bank of England) and the fact that price stability is not unambiguously specified as the primary and overriding objective of monetary policy (Bank of Canada, Bank of England, Bank of Japan).

low inflation – "like" a "conservative" central banker. The second difference is that a conservative central bank *reduces* the inflationary bias, whereas an accountable central bank *removes* the inflationary bias (Svensson, 1997a).

All central banks are accountable in practice, but the degree of accountability differs considerably among them. The most prominent real world analogue close to such a contract is probably the institutional design of the Reserve Bank of New Zealand where the Governor is subject to possible dismissal by the government if the (inflation) target is breached. Nevertheless, this option has not been used in practice yet despite the fact that the target was breached. Another example may be the *Full Employment and Balanced Growth Act* of 1978 (*Humphrey-Hawkins Act*), specifying that the Chairman of the Federal Reserve Board has to report to the Congress every six months about the envisaged monetary and credit developments. The Fed is, however, not required to meet these targets and failure to do so does not impose any well-defined penalties. Therefore, the accountability effect of that Act is limited consisting mainly of reputation losses on the part of the institution or its head. These are more noticeable when the failure has to be officially recognised within a formalised procedure. For example, in the case of the Bank of England, a deviation from the target exceeding one percentage point requires the Bank of England to write an official letter to the Chancellor to explain the reasons for the failure.

The specification of an override clause (like in Australia, Canada and New Zealand) has also been interpreted as a device to make the central bank more accountable (Briault et al., 1995). However, its main purpose is to act as a "circuit breaker". This set-up is close to the variation of the Rogoff (1985) model proposed by Lohmann (1992). In this model responsibility is delegated to an independent central bank, but the government retains an override clause whereby it can intervene in monetary policy in situations of "large" supply shocks to secure more effective output stabilisation. So far, such an option has not been used anywhere, and it is generally understood that it would be done so only in exceptional circumstances. Moreover, in order to prevent the government from misusing this option, it has to be used in a transparent way. For example, in Canada the government would have to explain its reasons for using this option before parliament and publish its exact directive. However, despite such provisions, the existence of an override clause provides some limits to the degree of independence of the central bank from the Government since the threat of its use, even if not exercised, may influence the central bank's behaviour. To that extent, an override clause may be an example where independence and accountability, especially if specified towards the government, interfere with each other. On the other hand, democratic accountability should not necessarily be regarded as a restrictive mechanism limiting the independent position of the central

bank but can be seen as a validating mechanism legitimising independence of the central bank (Haan et al., 1999). In this sense an accountability indicator based on central bank laws alone may me misleading. It has to be supplemented by actual policy measures.

In any case, accountability does not necessarily have to be formalised. For example, the Bundesbank, for which no *formal* accountability was specified, has held itself voluntarily accountable by commenting regularly to the public on the development of monetary aggregates against the background of the announced targets. This was especially important when monetary targets were not met. Through this and the announcements of the monetary targets as such (inclusive of the determinants of the target), the Bundesbank created a benchmark against which its own performance could be judged. Persson / Tabellini (1994) argue that, even though such announcements may carry no essential information for the public, they may be important because they create a standard against which the central bank can subsequently be held accountable. Thus, the announcements may have important effects on the incentives of the central bank if its behaviour and the monetary outcomes will be judged with reference to its previous announcements. Similarly, Issing (1992) explains that through its announcements of monetary targets the Bundesbank "enters into a certain commitment vis-à-vis the public". And, as Issing (1999) stresses, it is finally accountability to the general public which is essential for a central bank, especially the ECB.

6. Revealing private information through increased transparency

Increasing transparency could be linked in part to efforts to increase accountability. Greater transparency about the strategies employed, the actual decisions and the decision-making process could improve private agents' understanding of the current stance of monetary policy. It could help them to assess whether monetary policy actions taken are a consistent means to achieve the desired objectives. Hence, transparency about central banks' strategies and their assumed transmission mechanism of monetary policy can be seen as a precondition for accountability[11].

As a general rule, increasing transparency reveals private information. The information could be about the state of the economy, such as knowledge

[11] The Governor of the Bank of Canada points out that link: The adoption of measurable targets serves to clarify the aim of monetary policy, making the Bank more accountable for its actions and helping to enhance the credibility of monetary policy." (Notes for remarks by G.G. Thiessen, Governor of the Bank of Canada, at the École des Hautes Études Commerciales in Montreal, Quebec on 9 October 1996).

of supply or money demand shocks (Canzoneri, 1985), or they could be about the monetary authorities' own preferences (Backus / Driffill, 1985). The finding of Romer / Romer (1996) that the Fed has consistently displayed superior forecasting ability with respect to inflation lends some support to the hypothesis of the existence of private information on the state of the economy. However, probably quantitatively more important is the central banks' private information about its own preferences (Briault et al., 1995), e. g. about the relative weights the central bank attaches in its reaction function to price stability on the one hand and short-term employment stabilisation on the other. In this context, revealing information on its own assessment of the inflation outlook, together with the observed measures taken provides information about the central bank's reaction function. This could allow a central bank to reveal itself as a *conservative* central bank (Begg, 1997), as less conservative central banks will find it more difficult to mimic conservative central banks under increased transparency. In this way, increasing transparency can be used by conservative central banks to distinguish themselves from "soft" central banks. This helps to achieve a separating equilibrium where the public is able to distinguish between the two types. Thus, revealing private information simplifies the agents' signal extraction problem and a lower 'inflation bias' will result.

Transparency has increased at a number of central banks (see table 3). Since their adoptions of formal inflation targets in 1992 and 1993, respectively, the Bank of England and the Swedish Riksbank each publish an Inflation Report, which even include the banks' own inflation forecasts.[12] Also, since 1994 and 1998, minutes or summary records of meetings of the monetary policy decisions making body are published in the UK (after a delay of six weeks) and Japan, together with detailed voting records.[13] As can be seen from table 3 the most transparent central banks are the Bank of England and the Fed, and, after the most recent institutional changes, the Bank of Japan.

While the Bundesbank has not undergone any major change aimed at increasing its formal transparency, Mishkin / Posen (1997, 21) note that a key element of the Bundesbank policy has always been a "strong commitment to transparency and to communication of monetary policy strategy to the pub-

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12 The adoption of inflation targets may also be judged as a further solution to the inflation bias problem in that it imposes limitations on the central bank's flexibility (Walsh, 1998, ch. 8.3). The most common such restriction is a targeting rule that requires the central bank to achieve a preset rate of inflation or imposes a cost related to deviations from this target.

13 This procedure has been criticised because then monetary policy actions often influence the economy twice. Once the actions were undertaken and the second time when the minutes were published. This may be jugded negative if at the time of the second influence this is no longer warranted.

lic."[14] Indeed, although there was no legal requirement in the Bundesbank Act or in later legislation for the Bundesbank to give a formal account of its policy to any public body, except that it may at its discretion publish the monetary and banking statistics that it collects, the Bundesbank has traditionally been making heavy use of this opportunity. This was not designed to give any detailed information about the preferences of the Bundesbank. It aimed more to give a rapid feedback about the state of monetary conditions so that general policy uncertainty was reduced. These explanations were extremely important in phases of important monetary policy challenges, such as the German unification and the EMS crises in the 1990s which were characterised by an increase in the number of speeches held by Bundesbank officials.

The move towards greater transparency has been even more widespread as regards the day-to-day implementation of policies (Borio, 1997, ch. 5). Several central banks have shifted to more explicitly signalling their intentions about the desired interest rate levels, e. g. through the choice of fixed rate tenders. For example, from the beginning of 1996 to the end of 1998 the Bundesbank, used only this tender. And the ECB exclusively applied fixed rate tenders for its main refinancing operations until June 2000. These examples have to be seen against the background of the rapid internationalisation of financial markets which has brought central banks under increased scrutiny of an internationally wider and more diverse group of market participants. The latter are often less familiar with the interpretation of statements and policy measures of individual central banks, thus increasing the probability of misinterpretations. Moreover, the actors on financial markets have the capacity to initiate large and rapid capital movements resulting in large fluctuations in interest rates and exchange rates. This has been recognised by central banks. For example, when the Federal Open Market Committee decided at its first meeting of 1994, to announce the short-term policy decision promptly after the meeting, it stated that the purpose of the announcement was to "avoid any misinterpretations of the Federal Open Market Committees' actions and its purpose" (Pakko, 1995).

Traditionally, secrecy has been a distinctive feature of central banking, and something which has always been guarded. The FOMC won a legal case in which public disclosure was at issue, claiming that public disclosure would raise the variability of interest rates and thus the risk premium to compensate for that additional variability. And this in turn would harm the commercial interests of the Treasury (Goodfriend, 1986). The theoretical rationale is well known. Any revelation of more private information – more

[14] On the other hand Faust / Svensson (1999) develop a model in which, under commitment, a sufficiently patient central bank with sufficiently low average inflation bias will always choose minimum transparency.

"news" – increases the *unconditional* variance of forward looking asset prices if they are priced rationally and efficiently. However, comparing the (unconditional) variances of interest rates around FOMC meetings before and after the shift to the new immediate disclosure regime de Vijlder / Valckx (1996) did not find evidence for a significant change. This lends some support to the proposition that the immediate public disclosure does not raise the variability of interest rates (or that no news were revealed in the FOMC meetings). In any case, as Dotsey (1987) pointed out, transparency reduces the *conditional* variance of interest rates since it increases the information available to agents and thus induces smaller and less frequent forecasting errors. Recent research at the Bank of England seem to confirm this. Haldane / Read (1999) find that bond market interest rates indeed react systematically to changes in the Bank of England official rates. But the magnitude of these reactions has fallen significantly since 1992 when the Bank of England started to increase its transparency.

7. Designing the institutional framework: The example of the ECB

While, in principle, all of the theoretical considerations discussed above apply to the ECB as well, the ECB's situation is special in at least two aspects. First, unlike in the case of existing central banks, a reputational equilibrium with price stability was not available when the ECB took up its responsibility for monetary policy in January 1999 because it did not have an own inflation track record. An environment of low inflation and low inflation expectations is an advantage for the ECB. However, for many countries participating in Stage 3 there is simply no or only very recent experience of how the private and public sector behave in an environment of sustained and credible low inflation. Nevertheless, to the extent that the ECB succeeds in being associated with those national central banks that have acquired a good reputation over a long period, it could, at least partly, take over their reputation. This can be seen as one aspect of the rationale behind the adoption of an institutional design that follows closely the example of the Bundesbank. However, this effect will at best be transitory.

Second, the ECB is not a national institution but a supranational institution charged with conducting monetary policy for (initially) eleven sovereign countries. This has further implications regarding independence, transparency and accountability. One aspect is the relationship of national wage and fiscal policies with the common monetary policy. Will these policies, still decided at the national level, take into account the new monetary environment characterising the euro area as a whole? Against this back-

ground it could be argued that the ECB has to react more flexibly than national central banks in the past to inflationary cost push and fiscal policy shocks due to the uncertainties inherent in the regime shift to EMU and the differences in the financial structure of the 11 Euro countries.

Drawing lessons from sections 2 – 6 for the ECB would be facilitated if there was a unique model of the central bank structure to which all central banks are converging. Two observations can be made in this context. First, the need for major institutional changes seemed to have differed across central banks. In the case of those central banks which had already gained a high degree of reputation there seemed to have been less need for change. Examples are the Bundesbank, the Swiss National Bank and the Federal Reserve. Elsewhere major changes in the institutional structures have occurred (see table 1). Second, the institutional structures of central banks have changed towards a model which is characterised by a high degree of independence, a narrow definition of their mandates and, albeit to a lesser extent, by an increased degree of transparency. By contrast, there does not seem to be a unique model regarding formal accountability and increases therein have been confined to only a few central banks.

Has there been an alternative to these changes? Sometimes policy has been changed so that reputation could be built up, e. g. by tolerating a temporary "stabilising recession" to signal that the central bank is more "conservative" and to regain credibility and reputation (Bofinger et al., 1996, 576 ff.). But this solution is very costly in terms of output and employment losses. Another means for the ECB to acquire the necessary reputation may be the choice of the monetary policy strategy. The chosen strategy rests on three elements. The first element ("the anchor") is the quantification of the primary objective of price stability, specifically as a year-on-year increase in the Harmonised Index of Consumer Prices (HICP) for the euro area of below 2%. This clearly states that inflation (increases beyond 2%) and deflation (negative growth rates of the HICP) are incompatible with price stability. The second element of the strategy is the prominent role assigned to money, reflecting the insight that the origins of inflation over the longer term are monetary in nature. For that purpose the ECB announced a reference value for the growth of the broad monetary aggregate M3 of $4\,^1/_2$ % for 1999 and 2000. The third element is a broadly based assessment of the outlook for price developments and the risks to price stability, using indicators ranging from output gaps to asset prices and business surveys. By placing particular emphasis on monetary aggregates in its monetary policy strategy, the ECB may be able to appropriate some of the reputation acquired by the Bundesbank – which always stressed that inflation is ultimately a monetary phenomenon. However, in supplementing this pillar with the third element the ECB signalled that it recognises the uncertainty facing a common mone-

tary policy. This is especially true for the uncertainties regarding money demand behaviour.

Another means to ensure high credibility has been the choice of a large degree of independence. According to table 3 the ECB is one of the most independent central banks in the world. The Eurosystem (the national central banks of the Euro area and the ECB) are independent from both national governments and institutions of the European Union. Its primary task is to maintain price stability, which, however, does not mean that this is the sole objective of monetary policy. But the Maastricht Treaty clearly spells out that the support of the Eurosystem for the general economic policies in the Community must be without prejudice to the objective of price stability.

Independence of central banks is not an end in itself but only a means of achieving the objective set by legislature. This implies that the central bank is to be held accountable for its decisions. Even in the absence of formal requirements this means accountability to the general public. For the ECB as a new institution accountability is a prerequisite for establishing credibility and reputation. Especially, it has to disclose and justify the progress it has made in attaining price stability, its monetary strategy and its ongoing monetary policy measures. Furthermore, the Governor of the ECB will present an annual report to the European Parliament and the members of the ECB Executive Board can be called to report before the relevant committees of the European Parliament. The ECB clearly stated that the most important aspect of accountability is the actual inflation track record. To ensure successful policy, it is essential to convey to the public a sense of reasoning behind the decisions of the Governing Council and a coherent summary of the information upon which decisions are based. For this purpose a press conference will be given every month in which a detailed analysis of the economic situation in general and especially the outlook for price developments will be presented. In addition the ECB publishes a monthly bulletin in every language of the Euro area and an annual report as well as more technical staff reports. In December 1999 the Governor of the ECB even announced to publish an inflation and growth forecast of the Bank in the near future. But, of course, transparency does not mean publishing the maximum amount of information available.[15]

As regards accountability, Jensen (1997) has shown that delegation improves suboptimal outcomes only to the extent that there are important "reappointment costs". These are the costs of changing the conditions under which monetary policy operates. As the EU Treaty can only be amended

[15] In a recent paper Buiter (1999) offers a wide-ranging critique of the institutional arrangements and operating practices governing the activities of the Eurosystem. See also the reply in Issing (1999).

unanimously by all EU member states, the costs of reappointment seem likely to be higher for the ECB than for a typical national central bank before EMU. And weight conservatism might be especially important if fully state-contingent delegation is impossible which is especially true for the Eurosystem in the first years of its existence (Herrendorf / Lockwood, 1997).

8. Summary and conclusions

Central banks of OECD countries and especially those of EU countries have undergone substantial changes in their institutional design. But the better the inflation track record the lesser these changes were. For example, the changes in the institutional framework of the Bundesbank were only minor. Regarding formal transparency, several central banks have also undergone significant changes while the Bundesbank has hardly changed in the past. Until the end of 1998 it could be characterised by a comparatively low degree of formal transparency about its actual decision making process and short-term monetary policy implementation strategies. This reflects the fact that the Bundesbank traditionally had a reputation of being a 'conservative central bank(er)' and that not much additional credibility could be 'gained' from revealing private information. It may also reflect a certain scepticism about the virtues of transparency as well as the view that more transparency about the decision-making process does not necessarily make the signal extraction problem of private agents easier (see also Issing, 1999).

This sheds new light on the recent discussion about publishing the minutes of the meetings of the ECB council. To the extent that voting behaviour of the members of the central bank council of the ECB would depend on whether the minutes are published or not, efficacy of monetary policy would be reduced. As an alternative, the Bundesbank used its strategy of monetary targeting as a method of communicating monetary policy to the public. The objectives of monetary policy were always clearly stated by the Bundesbank, thereby enhancing transparency of monetary policy and accountability of the central bank. In this sense accountability of central banks is a necessary complement to granting central banks independence. The ECB clearly stated that the most important aspect of accountability is the actual inflation track record. To ensure successful policy, it is essential to convey to the public a sense of reasoning behind the decisions of the Governing Council and a coherent summary of the information upon which decisions are based. But this does not mean publishing every information.

The changes which have taken place on the part of central banks and are reflected in the institutional design of the ECB clearly have an impact on the behaviour of the private and public sector. Especially, inflation expecta-

tions are influenced. In this sense all these changes may mark a structural break in the monetary policy transmission process. The monetary policy strategy chosen by the Eurosystem which may be interpreted as a combination of rules and discretion seems to be the right answer to this challenge. But only time will show whether the Eurosystem will be successful.

References

Alberola, E. / *Marqués,* J. M. / *Sanchís,* A. (1997): Unemployment Persistence, Central Bank Independence and Inflation Performance in the OECD Countries, Banco de España, Servizio de Estudios, Working Paper No. 9725.

Alesina, A. / *Gatti,* R. (1995): How Independent Should the Central Bank be? Independent Central Banks: Low Inflation at No Costs? American Economic Review, P&P 85, 196 – 200.

Alesina, A. / *Summers,* L. (1993): Central Bank Independence and Macroeconomic Performance: Some Comparative Evidence, Journal of Money, Credit and Banking 25, 151 – 162.

Backus, D. / *Driffill,* J. (1985): Inflation and Reputation, American Economic Review 75, 530 – 538.

Bade, R. / *Parkin,* M. (1982): Central Bank Laws and Inflation: A Comparative Analysis, Manuscript, Department of Economics, University of Western Ontario.

Bank for International Settlements (1997): The Evolution of Central Banking, chapter VIII of Annual Report No. 67, Basle, 140 – 161.

Bank of Finland (1996): Bulletin, Special Issue 1996 – Financial Markets in Finland.

Barro, R. J. / *Gordon,* D. B. (1983): A Positive Theory of Monetary Policy in a Natural Rate Model, Journal of Political Economy 91, 589 – 610.

Begg, D. (1997): The Design of EMU, IMF Working Paper No. 97 / 99.

Bisignano, J. (1995): Varieties of Monetary Policy Operating Procedures: Balancing Monetary Objectives With Market Efficiency, Paper prepared for the conference "Central and Eastern Europe: Directing Monetary Policy Toward EU-Integration", organised by the Oesterreichische Nationalbank and the Vienna Institute for Comparative Studies, Vienna, 26 – 28th November.

Blinder, A. S. (1997): Distinguished Lecture on Economics in Government: What Central Bankers Could Learn from Academics – and Vice Versa, The Journal of Economic Perspectives 11, 3 – 19.

Bofinger, P. / *Reischle,* J. / *Schaechter,* A., (1996): Geldpolitik – Ziele, Institutionen, Strategien und Instrumente, Munich.

Bordo, M. D. / *Wheelock,* D. C. (1998): Price Stability and Financial Stability: The Historical Record, Federal Reserve Bank of St. Louis Review 80, 41 – 62.

Borio, C. E. V. (1997): Monetary Policy Operating Procedures in Industrial Countries, BIS Working Paper No. 40.

Briault, C. B. / *Haldane,* A. G. / *King,* M. A. (1995): Independence and Accountability, Paper prepared for the 7th International Conference of the Institute for Monetary and Economic Studies, Bank of Japan, Tokyo, 26 – 27 October.

– (1996): Central Bank Independence and Accountability: Theory and Evidence, Bank of England Quarterly Bulletin 36, 63 – 68.

Buiter, W. H. (1999): 'Alice in Euroland', Journal of Common Market Studies 37, 181 – 209.

Campillo, M. / *Miron,* J. A. (1997): Why Does Inflation Differ Across Countries?, in: C. D. Romer / D. H. Romer (eds.), Reducing Inflation – Motivation and Strategy, Chicago / London, 335 – 357.

Canzoneri, M. B. (1985): Monetary Policy Games and the Role of Private Information, American Economic Review 75, 1056 – 1070.

Christiansen, H. / *Pigott,* C. (1997): Long-term Interest Rates in Globalised Markets, OECD Economics Department Working Paper No. 175.

Cukierman, A. (1990): Why Does the Fed Smooth Interest Rates?, in: M. Belongia (ed.), Monetary Policy on the Fed's 75th Anniversary, Federal Reserve Bank of St. Louis, Proceedings of the 14th Annual Economic Policy Conference, Norwell.

– (1992): Central Bank Strategy, Credibility and Independence: Theory and Evidence, Cambridge MA.

Cukierman, A. / *Webb,* S. / *Neyapti,* B. (1992): Measuring the Independence of Central Banks and its Effect on Policy Outcomes, World Bank Economic Review 6, 353 – 398.

De Grauwe, P. (1996): The Economics of Convergence: Towards Monetary Union in Europe, Weltwirtschaftliches Archiv 132, 1 – 27.

De Vijlder, W. / *Valckx,* N. (1996): Monetary Policy and Asset Prices: A Comparison of the Fed's Announcement Policies during 1987 – 1995, Revue de la Banque, 414 – 425.

Dotsey, M. (1987): Monetary Policy, Secrecy, and Federal Funds Rate Behavior, Journal of Monetary Economics 20, 463 – 474.

Eijffinger, S. / *Schaling,* E. (1994): Central Bank Independence: Criteria and Indices, Kredit und Kapital 27, Beihefte 13, 185 – 217.

European Monetary Institute (1995): Progress Towards Convergence, November.

– (1996): Progress Towards Convergence, November.

– (1997): Legal Convergence in the Member States of the European Union – as at August 1997, October.

Faust, J. / *Svensson,* L. E. O. (1999): The Equilibrium Degree of Transparency and Control in Monetary Policy, Board of Governors of the Federal Reserve System, International Finance Discussion papers No. 651.

Fischer, S. (1994): Modern Central Banking, in: F. Capie / C. Goodhart / N. Schnadt (eds.), The Future of Central Banking, Cambridge, 262 – 308.

– (1995): Central Bank Independence Revisited, American Economic Review, P&P 85, 201 – 206.

Fujiki, H. (1996): Central Bank Independence Indexes in Economic Analysis: A Reappraisal, Monetary and Economic Studies 14, 79 – 101.

Goodfriend, M. (1986): Monetary Mystique: Secrecy and Central Banking, Journal of Monetary Economics 17, 63 – 92.

Goodhart, C. / *Schoenmaker,* D. (1995): Should the Functions of Monetary Policy and Banking Supervision be Separated?, Oxford Economic Papers 47, 539 – 560.

Grilli, V. / *Masciandaro,* D. / *Tabellini,* G. (1991): Institutions and Policies, Economic Policy 6, 341 – 392.

Haan, J. / *Amtenbrink,* F. / *Eijffinger,* S. C. (1999): Accountability of Central Banks: Aspects and Quantification, Banca Nazionale del Lavoro Quarterly Review, No. 209, 169 – 193.

Haldane, A. G. / *Read,* V. (1999): Monetary Policy and the Yield Curve, Bank of England Quarterly Bulletin 39, 171 – 176.

Herrendorf, B. / *Lockwood,* B. (1997): Rogoff's "Conservative" Central Banker Restored, Journal of Money, Credit and Banking 29, 476 – 495.

Ireland, P. N. (1999): Does the Time-Consistency Problem Explain the Behavior of Inflation in the United States, Journal of Monetary Economics 44, 279 – 291.

Issing, O. (1992): Theoretical and Empirical Foundations of the Bundesbank's Monetary Targeting, Intereconomics 27, 289 – 300.

– (1993): Central Bank Independence and Monetary Stability, Institute of Economic Affairs, Occasional Paper 89.

– (1999): The Eurosystem: Transparent and Accountable or 'Willem in Euroland', Journal of Common Market Studies 37, 503 – 519.

Jenkins, M. A. (1995): Central Bank Independence and Inflation Performance: Panacea or Placebo?, unpublished manuscript, School of Accounting, Banking and Economics, University of Wales.

Jensen, H. (1997): Credibility of Optimal Monetary Delegation, American Economic Review 87, 911 – 920.

Kasa, K. (1999): Will the Fed Ever Learn?, Journal of Macroeconomics 21, 279 – 292.

King, M. A. (1997): The Inflation Target Five Years on, Bank of England Quarterly Bulletin 37, 434 – 442.

Klein, M. / *Neumann,* M. J. M. (1990): Seigniorage: What is it and who gets it?, Weltwirtschaftliches Archiv 126, 205 – 221.

Kydland, F. / *Prescott,* E. (1977): Rules Rather than Discretion: The Inconsistency of Optimal Plans, Journal of Political Economy 85, 473 – 492.

Lohmann, S. (1992): Optimal Commitment in Monetary Policy, American Economic Review 82, 273 – 286.

Mankiw, N. G. / *Miron,* J. A. / *Weil,* D. N. (1987): The Adjustment of Expectations to a Change in Regime: A Study of the Founding of the Federal Reserve, American Economic Review 77, 358 – 374.

McCallum, B. T. (1997): Crucial Issues Concerning Central Bank Independence, Journal of Monetary Economics 39, 99 – 112.

Mishkin F. S. / *Posen,* A. S. (1997): Inflation Targeting: Lessons from Four Countries, Federal Reserve Bank of New York Economic Policy Review 3, 9 – 110.

Pakko, M. R. (1995): The FOMC in 1993 and 1994: Monetary Policy in Transition, Federal Reserve Bank of St. Louis Review 77, No. 2, 3 – 26.

Persson, T. / *Tabellini,* G. (1994): Designing Institutions for Monetary Stability, in: T. Persson / G. Tabellini (eds.), Monetary and Fiscal Policy. Volume 1: Credibility, Cambridge / London, 279 – 310.

– (1999): Political Economics and Macroeconomic Policy, in: J.B. Taylor / M. Woodford (eds.), Handbook of Macroeconomics, Vol. 1C, Amsterdam et al., 1397 – 1482.

Posen, A. S. (1995): Central Bank Independence and Disinflationary Credibility: A Missing Link?, Federal Reserve Bank of New York Staff Reports, No. 1.

Prast, H.-M. (1996): Time Consistency, Asymmetric Information and Monetary Policy Design: An Overview, De Economist 144, 445 – 472.

Rogoff, K. (1985): The Optimal Degree of Commitment to an Intermediate Monetary Target, Quarterly Journal of Economics 100, 1169 – 1190.

Romer, C. / *Romer,* D. (1996): Federal Reserve Private Information and the Behaviour of Interest Rates, NBER Working Paper No. 5692.

– (1997): Institutions for Monetary Stability, in: C. Romer / D. Romer (eds.), Reducing Inflation – Motivation and Strategy, Chicago / London, 307 – 329.

Schaling, E. (1995): Institutions and Monetary Policy: Credibility, Flexibility and Central Bank Independence, Aldershot.

Schich, S. T. / *Kennedy,* M. / *Christiansen,* H. / *Terribile,* F. (1999): Challenges for the ECB, in: OECD (ed.), Financial Market Trends No. 72, 67 – 83.

Special Issue on "Central Bank Independence and Inflation" (1998): Oxford Economic Papers 50.

Sterne, G. (1999): The Use of Explicit Targets for Monetary Policy: Practical Experience of 91 Economies in the 1990s, Bank of England Quarterly Bulletin 39, 272 – 281.

Svensson, L. E. O. (1997a), Optimal Inflation Contracts, Conservative Central Banks and Linear Inflation Contracts, American Economic Review 87, 98 – 114.

– (1997b), Inflation Forecast Targeting: Implementing and Monitoring Inflation Targets, European Economic Review 41, 1111 – 1146.

– (2000): Open Economy Inflation Targeting, Journal of International Economics 50, 155 – 183.

Tambakis, D. N. (1999): Effective Central Bank Independence and the Inflation-Output Trade-off, Journal of Macroeconomics 21, 729 – 753.

Temple, J. (1998): Central Bank Independence and Inflation: Good News and Bad News, Economics Letters 61, 215 – 219.

Waller, C. J. / *Walsh,* C. E. (1996): Central Bank Independence, Economic Behavior, and Optimal Term Lengths, American Economic Review 86, 1139 – 1153.

Walsh, C. E. (1995a), Optimal Contracts for Central Bankers, American Economic Review 85, 150 – 167.

– (1995b), Central Bank Independence and the Short-run Output-Inflation Tradeoff in the EC, in: B. Eichengreen / J. Frieden / J.v. Hagen (eds.), Monetary and Fiscal Policy in an Integrated Europe, Berlin, 12 – 37.

– (1998): Monetary Theory and Policy, Cambridge (MA).

White, L. H. (1999): The Theory of Monetary Institutions, Malden (MA).