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Central Banking in Transition Countries

I. Introduction

“Central banking, more than any other branch of economics, is a uniquely complex amalgam of ideas, traditions, institutions, techniques, and operations which does not yield a corpus of settled unambiguous conclusions” (Chandavarkar 1996: 240). This conclusion of a recent book on central banking in developing countries refers not only to developing countries but also to so-called highly developed countries.¹ Jürg Niehans writes: “Economists should be under no illusion that central banking will ever become a science . . . However far monetary theory may progress, central banking is likely to remain an art” (1978: 294). These hypotheses may be questioned as general characterizations, but they certainly adequately describe central banking in formerly centrally planned economies that are trying to implement the transition to market-oriented financial systems, a complex process that involves not merely the issuing of new currencies and the creation of independent central banks but also far-reaching financial reforms and a radical reconstruction of the basic financial infrastructure. Nevertheless, it is the task of academic researchers to come as close as possible to a scientific approach to central banking.

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Central banks usually perform a variety of functions. Among them are:

- determining market interest rates through their control over the monetary base;

- managing the payments system;
- managing foreign exchange reserves;
- promoting the stability of the financial system by supervising the banks and by serving as lender of last resort;
- acting as the government's banker; and
- determining the exchange rate, in full or joint responsibility.

The establishment of all these functions demands a huge effort from central banks and governments, especially in the transition countries, because many of the necessary institutional preconditions have not been available there before or are still in an infant stage.

In this article I take only a narrow perspective on central banking by concentrating on the essential central bank function, that is, monetary policy: the management of the supply of credit and money and thus of money market interest rates.² The purpose of this article is to work out decisive aspects of successful central banking, defined as disinflating and then guaranteeing low inflation with a minimum of output or unemployment costs.

The central problem in the transition countries has proved to be the controlling of inflation.³ High inflation can be regarded as a hindrance to economic growth and development.⁴ Inflation in Central and Eastern Europe (CEE) and the Newly Independent States (NIS) has broadly followed three stages, each corresponding to a phase of reform.⁵

The first, during the early months of liberalization, involved the release of the monetary overhang (excess money supply) that had accumulated under central planning. The second, spanning years two and three of liberalization (in some cases longer), has been linked mostly to the speed with which subsidies to enterprises were phased out and prices not previously freed were decontrolled.⁶ The third stage, usually reached once inflation has fallen below 40 percent per year, concerns mainly the more advanced reformers and involves exchange rate policy and capital flows.⁷ The essence of the inflation story in most CEE countries and NIS is that free market reforms first turned high, repressed inflation into high, open inflation, and then further liberalization and tight financial policies brought inflation down by containing persistent domestic subsidy pressures. (World Bank 1996: 35)

In part II, I shall first analyze the functional or institutional conditions

for establishing successful central banking, that is, sustaining relatively low inflation, in a transition economy, in this case a market-oriented former state economy. In part III, I will investigate the operational conditions, in particular which monetary policy strategies or nominal anchors might be appropriate for different types of transition countries to be successful in the above sense. I shall argue that the appropriate anchor is dependent upon the stage of establishment of institutional conditions. In part IV, I shall draw some conclusions.

II. Institutional Conditions of Establishing Successful Central Banking in Transition Countries

There has been wide consensus among economists that many institutional requirements must be satisfied simultaneously in order to transform successfully a former state economy into a market economy. A catalogue of these requirements will often also include an autonomous central bank. The argument, which is derived from the modern theory of monetary policy, usually runs as follows: Owing to lack of credibility, governments favor inflationary policies. This inflation bias can be mitigated by delegating monetary policy to an independent central bank.⁸ Creating an autonomous central bank is the only way to make money supply exogenous, at least in the long term, thereby creating the central bank's credibility and thus reducing the private sector's inflationary expectations, which determine wage and price contracts and thereby also the exchange rate. We may conclude from this that each transition country should develop its central bank into an institution that formulates and conducts monetary policy independently. If this is done, it is claimed that the monetary authority will be protected from the influence of the fiscal authority and other political interest groups, and, as a result, can prevent high inflation more easily.

In centrally planned economies, monetary policy typically had to play a mainly passive role. Under the regime of "soft budget constraints," it provided the financial assets required to finance the real sector transactions prescribed by the central plan. During the process of transforming such centrally planned economies into market-oriented economies, and thereby trying to use monetary policy as an instrument for macroeconomic stabilization, monetary policy has to undergo a fundamental change in character, a switch from a completely accommodating policy to a

nonaccommodating policy. This, in turn, implies some institutional and functional changes. The elements of such changes may be divided into (1) aspects that concern central banking as such, and (2) aspects that concern the general economic, legal, and political environment in transition countries.

1. Institutional Central Bank Design

Two aspects are important here. The first is a technical precondition and the second describes the control of autonomous central banks that may be necessary. A brief description of these aspects follows.

1.1 A Two-tier Banking System

A “technical” requirement of autonomous central banking is the transition to a two-tier banking system. This means that the previous “monobank” system must be turned into one based on a central bank and a large number of competitive commercial banks. This reform step toward a “two-tier” banking system was initiated in most transition countries between 1987 and 1989. In Yugoslavia it had already taken place in 1965, whereas in the former USSR it was decided upon or scheduled only in 1990. The first commercial banks emerged for the most part from the separation and partial privatization of different functional areas of the State Bank and specialized financial institutions.⁹ In short, this institutional innovation has been implemented in all CEE and NIS transition countries.

1.2 Control Mechanisms on the Central Bank

An autonomous central bank can mean an independent central bank such as, for example, the Bundesbank or the European Central Bank. By establishing such an independent central bank the inflation bias in the economy is supposed to be lower, since the aversion to inflation of the independent central bank can be expected to be lower than that of the government or the median voter (Rogoff 1985; for more details, see Appendix I, 1). Simply establishing or changing central bank law may be insufficient to guarantee structurally low(er) levels of inflation. There are at least two major problems, one of which stems from central bank-

ers' incentives.¹⁰ Monetary and financial stability can be achieved only if laws as well as the authorities are stable and trustworthy. The delegation of authority by the government to the central bank may help to stabilize an economy and to overcome the inflation bias problem with respect to the time inconsistency of optimal monetary policy, because it can be regarded as an act of partial commitment. For various reasons, central bankers are often more conservative or averse to inflation and have a longer time horizon than government ministers. However, delegating monetary authority (as proposed in Rogoff 1985, see Appendix I, 1) or choosing, in addition, an appropriate type of central banker with the "correct" desired inflation level or target (as proposed in Svensson 1997b, see Appendix I, 2) may not be enough, and may simply not be possible. Political principals may not be able to identify *ex ante* the levels of inflation that potential candidates for central bank management may desire. And even if one could be sure that central bankers are more averse to inflation than the median voter or the government, respectively, this may imply higher output fluctuations than in the discretionary case (see Appendix I, 1).

Hence, there should be a control mechanism that gives the central banker an incentive to attain the goal of price level stabilization and simultaneously sustains the flexibility of monetary policy that is necessary in the transition process. Recent work appears to have discovered an optimal way to create such an incentive and ensure the necessary flexibility. Instead of delegating monetary policy authority to an agent with different preferences, as in the mentioned Rogoff proposal, government, understood here as "the social planner," is supposed to draw up a contract with an agent with undistorted preferences. This contract specifies a penalty if a certain preset inflation goal is not attained. The contract will also include the following aspects as its essential contents. The central banker must pay a linear tax for any inflation result that lies above the inflation goal preset in the contract. However, a linear reward is paid if the inflation result lies below the target. Beyond this, the central bank has absolute discretion or freedom. It can manage its policy in a totally free and variable manner. In other words, it has full instrument independence. What is important is that the predetermined goal is achieved. It has been shown that there is a well-specified contract that erases the inflation bias perfectly without restricting the potential of the central banker regarding stabilization policy (see, e.g., Walsh 1995; see also appendix I, 3). However, there

are some problems regarding such a proposal, in particular, if applied to transition countries. The main problems are:

(i) Nobody knows the exact optimal rate of inflation. The main reason is the uncertain and changing condition of financing the government's budget. This tends to make any such contract time inconsistent and incredible. If there is no clear signal for an exact optimal rate of inflation, governments in transition countries may be inclined to observe actual outcomes and renegotiate contracts after a while, especially if subsequent disinflation costs prove to be higher than expected. This renders any contract time-inconsistent, and hence, if anticipated or recognized, not credible.¹¹

(ii) In general, it should be noted that, in designing the institutions of monetary policy, it is not enough to consider the incentives that the institutions induce for fully informed, optimizing individuals. It is also important to take into account the limitations of knowledge.¹² For example, even if the optimal inflation rate is known, the transmission mechanism may not be known in (early) transition countries. As a result, there may *ex post* be an incentive for the government to renegotiate. Therefore, the government will not be able to commit credibly to implement or enforce such a contract, because the government will *ex post* be interested in conducting a dynamically inconsistent or time-inconsistent policy. The public should be able to recognize this incentive so that the time-inconsistency problem will not be resolved but only shifted from the central bank (the agent) to the government (the principal).

In addition, Walsh's proposal (1995) assumes that there is a social planner oriented toward the social welfare. But reality does not correspond to this assumption, instead revealing the existence of politicians oriented toward their own benefit and pursuing the interests of special groups relevant to their own reelection. In transition societies in particular, the intermingling of private and public interests dominates. Setting up and enforcing a Walsh-type contract within such a political environment, with governments oriented toward their own benefit and usually changing after a few years, seems to be nearly impossible. Moreover, for the simple form of the Walsh-type contract, it is important that the inflation bias in the Barro-Gordon-type of game is not contingent. If it is contingent, the inflation tax also has to be contingent. Setting up and enforcing such a contract, however, appears to be even more difficult. Hence, one could conclude that a Walsh-type contract is not likely to

be implementable in most societies because they include contingent inflation biases.

This means there must be a different control mechanism on the central bank. This should refer not only directly to the nonattainment of a final target but also to adherence to an appropriate intermediate target. This will be explained in the following sections, in particular, section 3. In any case, the above arguments show that the applicability of contract solutions or other institutional elements of central bank design have to be considered within the respective economic, sociocultural, and political framework. The following paragraph concerns elements of this general background during the process of transition.

2. Reform of Environment

The well-known analyses of central banking in the literature usually assume the conditions of fully market-based, mature Western economies, whereas the conditions of transition give rise to further restrictions on central banking. Even if one assumes arrangements of “optimal” central banking that may avoid credibility problems in the West, these arrangements might fail due to technical impediments in a transitional economy and give rise to other kinds of credibility problems. To eliminate such impediments, major reforms are necessary, especially in the following areas:¹³

- thorough restructuring of the banking system;
- a stable legal and administrative framework;
- the establishment of control mechanisms on the fiscal authority; and
- the institutionalization of control mechanisms on the groups or partners responsible for negotiating wages and setting prices.

2.1 Thorough Restructuring of the Banking System

A main precondition for the efficient conduct of monetary policy is a well-functioning, market-based banking system. It is not enough to commercialize specialized state-owned banks, to assign them new tasks, and, in addition, to let a number of new private banks emerge, as has been done in all transition countries. In order to enable commercial banks to function effectively under market conditions, practically the entire institutional and operational framework has to be overhauled or changed.

Especially in many NIS countries, shortcomings in legislation, prudential norms, and accounting frameworks, and a general lack of adequate supervisory capacity are still acute.¹⁴ In addition, many banks have accumulated significant amounts of nonperforming loans in the early years of transition. This bad loan problem distorts credit allocation, thus impeding structural adjustment.¹⁵

In general, weaknesses in the banking system complicate the conduct of monetary policy: they distort the transmission mechanism of monetary policy because unsound banks that are not able to control their balance sheets are less responsive to changes in reserve money or interest rates. In addition, the central bank may be pressured to create credit for bailing out ailing banks and to loosen monetary conditions, thereby undermining monetary control.

There is yet another problem with unsound banks. Among economists, there is a general consensus that indirect instruments of monetary policy are more effective than direct instruments and that they promote more efficient financial intermediation.¹⁶ In the presence of unsound banks the introduction of indirect instruments, such as a credit auction or similar market-based facilities, may induce adverse selection and moral hazard effects because unsound banks may be willing to borrow at any cost to avoid illiquidity. What is needed are institutional innovations, such as collateralized transactions, as well as the careful design and sequencing of specific supervisory policies and bank restructuring schemes.¹⁷ As emphasized above, many transition countries, especially in the former Soviet Union, are still in substantial need of reforms in this area.

2.2 A Stable Legal and Administrative Framework

The classical Soviet-type system operated in the virtual absence of economic legality.¹⁸ Economic legality is a prerequisite to a successful monetary policy, and, beyond that, to a successful transition to a market economy. In the absence of legality, it will not be able to implement a credible commitment to private property rights or any effective market incentive mechanism.¹⁹

The construction of a legal system usually takes time. During this period of time, the investment process in the real sector, as well as in the financial sector, is hampered by great uncertainty. As long as a stable legal framework has not been established, socially necessary

private investments are regarded as very risky by potential investors. Thus, private domestic investments tend to be very low, and urgently needed foreign investments are delayed. This has been experienced in all transition countries.

A stable legal framework is also decisive for the attainment of financial stability.²⁰ In East Germany, for example, the existence of a rigid banking law and of a strict bankruptcy law and bankruptcy proceedings adopted from West Germany helped to avoid the problem of uncontrolled credit expansion in "informal credit markets."²¹ This problem is widely known in the transition countries and consists of a complex web of interfirm credit that links the fortunes of efficient and inefficient enterprises. This, together with the imperfect information structure in these countries,²² has presented a major obstacle to a successful transformation process in the transition countries. As Calvo and Frenkel (1991) have emphasized, it may result in a "bad" equilibrium in which socially profitable long-term investments are crowded out by socially less profitable short-term investments. Moreover, such informal credit markets prevent the newly built central banks in these countries from controlling the money supply that is necessary for a stable currency (see also in point 1.2 above).

It is not only the legal environment that counts, the administrative and the "psychological" environment are also important.²³ Administrative inefficiency and corruption impose essential restrictions on the feasibility of projected monetary policy, rendering the assessment of a central bank's performance very difficult, no matter how independent and credible it may be.

Possibly even more important is the fact substantiated by wide evidence that only a central bank that can count on broad public support for its autonomy and its anti-inflationary policy can succeed in attaining its final targets. So each society gets the central bank it deserves. This implies that merely to establish or change laws governing the central bank is insufficient for price stabilization. Inflation can only be effectively reduced and kept at a low level within an environment of widespread and overwhelming support for anti-inflation policy pursued by the independent central bank. The success story of the German Bundesbank as compared to other central banks that were formally no less independent tends to prove this.

In CEE, and especially in NIS countries, public support appears to be not yet sufficiently anchored.

2.3 Establishment of Control Mechanisms on the Fiscal Authority

Central banks are more or less permanently under the pressure of fiscal authorities to ease their restrictive (dis- or anti-inflationary) monetary policy under adverse circumstances. This has been explained in the literature in various ways. In the still most prominent, “older” public-choice view, central banks are regarded as being exposed to strong political pressures to behave in accordance with the government’s preferences.²⁴ The point is that restrictive monetary policy aggravates the government’s budgetary position. Because a (temporary) slowdown of economic activity induced by restrictive monetary or disinflation policy reduces tax income and receipts from seigniorage, and because a (short-term) increase in interest rates means a burden on public debt that worsens the deficit, the government may prefer “easy money,” thus gaining public support to push the central bank in this direction. Some evidence exists that even the relatively independent U.S. Federal Reserve has often complied with such pressures.²⁵ Therefore, it seems very likely that the relatively less independent central banks in transition countries will be unable to withstand such pressure for a longer term.

A second argument for a control mechanism on fiscal authorities, first put forward by Sargent and Wallace (1981), distinguishes between fiscal and monetary authorities. The inflation rate here depends upon whether monetary or fiscal authority is dominant. If fiscal policy is dominant, meaning that the central bank cannot influence the size of the government’s budget deficit, then money supply becomes endogenous. If the public is no longer able or willing to absorb additional government debt, the central bank will be forced to finance the deficit by creating money (seigniorage), as follows from the government budget constraint. On the other hand, if monetary policy is dominant, the fiscal authority will be forced to reduce the deficit or repudiate part of the debt. The relative dominance of monetary or fiscal authority can be influenced by guaranteeing independence to the central bank. As emphasized above, this does not eliminate the likelihood that the fiscal authority can exert a strong enough pressure on the central bank by gaining the support of the public in recessionary or stagflationary situations.

There are several signs indicating that fiscal dominance is still relatively high in transition countries. The most important sign is probably the relative size of seigniorage (see Figure 1 in Appendix II, 1).

Such pressures from the fiscal policy side can make a central bank's commitment to follow a steady anti-inflationary course incredible because the sustainability of such a course is doubtful. This has also been the reason for supplementing the Maastricht Treaty by the so-called Stability and Growth Pact, agreed upon in Dublin in December 1996 and confirmed at the Amsterdam summit in May 1997. This pact provides a framework for maintaining and enforcing the Maastricht fiscal criteria after the European Monetary Union has begun. It restates the commitment to a maximum budget deficit of 3 percent of GDP, and, except in special circumstances, applies sanctions to countries with deficits exceeding this level. Similar regulations could be conceivable in transition countries, for example, between different regions. Other proposals, such as independent fiscal boards and constitutional restrictions on state indebtedness, are described in section 3 below.

2.4 Institutionalization of Control Mechanisms on Wage-Negotiating and Price-Setting groups

A principal problem of the high costs of disinflation, seen empirically in transition countries that want to push inflation into the one-digit range, is inflation inertia based on coordination problems among different social or distributional groups. This is well known from many empirical studies on disinflation, especially in developing countries.²⁶ Orthodox stabilization programs—based only on restrictive monetary and fiscal policy—usually lead to high real interest rates that drive many debtors into bankruptcy, thus producing high unemployment. Here, incomes policy could help to avoid such a process and reduce the sacrifice ratio accordingly. Prompt stabilization with the aid of incomes policy would avoid a deep recession, at least for the moment, thereby giving governments that are willing to reform a breathing space during which the structural adjustments necessary for the reform could be successfully started.

As is well known, incomes policy measures tend to be the more effective in the short run the “stricter” or more market adverse they are, for example, wage and price controls. There are often objections to these “strict” measures on the basis of apparent microeconomic distortions. While this objection may be appropriate in developed market economies with inflation rates that are already low, it is less relevant in the case of transition economies where inflation rates are still high and where market mechanisms still function insufficiently anyway. Furthermore, a

strong argument in favor of implementing incomes policy in transition countries is that firms tend to pay out excessive amounts to workers and other stakeholders as long as the ownership of enterprises is ambiguous. Incomes policy would help a government committed to controlling inflation to avoid such wage-cost pressures and induced price increases within government-owned firms. Nevertheless, it would be better to create some "softer" forms of incomes policy with fewer microeconomic distortions. Such "softer" forms include tax-based incomes policies, such as those implemented in several transition countries, for instance, Poland and the Czech Republic. Some studies have also found that the incomes policy in Poland did inhibit pay increases, although wages beyond the ceiling were paid. Without question, the best form of incomes policy would be the creation of an institutionalized concerted action, whereby the government, trade unions, and enterprise managers would meet regularly to discuss and consent to sectorally and macroeconomically acceptable wage and price increases. The main function of incomes policy here would be to provide a focal point for inflationary expectations in the economy by leading to a simultaneous conclusion of nominal contracts for a longer period of time.²⁷ If "concerted action" of this nature were possible, and this is questionable, given the incentives to opportunistic or free-rider behavior, inadequate stable homogeneous bargaining groups/partners, and the like, which may prevent credible commitment, "stricter" or distorting forms of incomes policy such as direct price or wage controls would not be required.

3. Implementation Problems and Potential Solutions

In a perfect world, all of the above institutional changes could be implemented instantly. But with each reform element having its own preconditions that require different periods of time for implementation,²⁸ the points in time when the central bank reforms should be introduced must be carefully chosen because they depend crucially on the general circumstances. This means that the evaluation of central banking and the prescriptions for successful banking depend on what central banks may be able to achieve in the respective stages of transition in order to protect the new central banks from being blamed for damage beyond their control.

It is a major problem that only the transition to a two-tier banking

system and the formal establishment of an independent central bank can be implemented in a short period of time, whereas the restructuring of the banking system and the establishment of a stable legal and administrative environment takes much longer. And even the implementation of workable control mechanisms, that is, the implementation of institutional preconditions, takes quite a while. The question therefore arises whether it is wise to establish an independent central bank before the other conditions described are fulfilled. Nevertheless, the majority of transition countries, including most countries in Central and Eastern Europe, Estonia, Russia, and most other countries of the former Soviet Union have followed this path, that is, they have established a “formally” autonomous or independent central bank without simultaneously having been able to implement the other institutional preconditions that are necessary to make this central bank effective or successful with respect to inducing sustained disinflationary effects.

Recently enacted laws have brought central bank independence to countries that had lagged behind, including Romania and Georgia. Only the central banks in Belarus, Tajikistan, Turkmenistan, and Uzbekistan remain obligated to provide directed credits to finance fiscal deficits.²⁹ In Bulgaria, Estonia, and Lithuania, currency boards tie the hands of the monetary authorities.

This does not mean that these countries, in having given autonomy³⁰ to their central banks without sufficiently implementing the other requirements, have failed to bring down inflation. This is not the point here. Evidence from transition economies appears to confirm the worldwide finding that greater central bank independence, including the right not to finance the government and to set interest rates without government intervention, is correlated with lower inflation and more effective monetary policy. There is, however, no proof with respect to a causal relationship. Furthermore, to date, there has been no convincing proof that central-bank independence enhances economic growth or reduces the costs of disinflation.³¹ From a theoretical point of view, the problem lies in the fact that simply giving central banks independence may be counterproductive insofar as it is an easy way for the government or fiscal authority, as well as for particular interest groups, to shift the responsibility for not attaining certain inflation targets to the central bank, which is *de facto* still powerless. Under asymmetric information and contract-bound decisions, this may turn into a socially ineffective redistribution game in which the “independent” central bank is blamed for

missing social targets. In other words, by itself, the central bank is too weak to attain the disinflation target or to stabilize the economy, but it must bear the responsibility for missing the target because of its formally independent status. This means formal independence may be a necessary element in the transformation process of a prior state to a modern market economy, although, without the simultaneous implementation of other necessary elements it may prove ineffective or even counterproductive.

It would therefore be desirable to implement all reform elements at once. But this is wishful thinking. The problems of sequencing³² and of making a wrong decision in the sequence of reform steps cannot be surmounted. Whether the decision of most of the transition countries to give their central banks (formal) independence has been right or wrong is an open question (see also Mas 1995). It is also not worthwhile to analyze it here in detail because the decision has already been made, and reversing the decision may be very problematic with respect to the credibility of the announcement of future disinflation policy. Now the only thing possible is to think about institutional and operational requirements that may help to minimize the damage of a higher than necessary inflation bias or to maximize the positive, disinflation-inducing, effects, if the decision was correct, of having formally independent central banks without sufficient institutional support. In order to strengthen the position of the central bank and to enhance the credibility of its announcements, there are two ways to improve the situation:

- One way is to implement appropriate institutional control mechanisms in order to control the inflation-driving authorities or groups, such as the fiscal authority and wage- and price-setting groups. Independent fiscal boards are conceivable here, for example, in the role of the IMF (Mas 1995: 1649),³³ or the introduction of constitutional restrictions on government debt (such as in the German Constitution, Art. 115).

- The other way is to choose an appropriate nominal anchor in order to conduct monetary policy successfully, that is, to induce a (locally) maximum disinflationary effect. The question of nominal anchors is important because the credibility of the monetary policy strategy eventually determines the success of the central bank, in this case the attained inflation rate. Credibility, however, is dependent not only upon the classical time-inconsistency aspects, namely, the incentives of the central bank to deviate from its goal or announcement *ex post*, but also upon the expected implementability of the strategy that is a function of the reform stage.

Under this aspect it may be claimed, for example, that, during the early stages of transition, controlling central banks by establishing a Walsh-type contract or a special selection mechanism of central bankers (Rogoff, Svensson) is not an adequate way of gaining credibility. It appears to be better to install an indirect control mechanism by setting a consensually chosen intermediate target and by controlling whether the central bank adheres to its commonly accepted intermediate target or not. Choosing the "correct" intermediate target poses a question very similar to that of the timing of central bank independence: it must be asked whether the intermediate target is controllable conditionally on the respective transition or development stage and whether it is credible (because implementable). This will be discussed in part III, where I shall conclude that, in order to tame inflation:

- exchange rate or monetary targeting is to be preferred for non-advanced transition countries;
 - crawling pegs (bands) are better for advanced transition countries;
- and
- inflation targeting or even nominal income targeting should be considered for very advanced transition countries.

III. The Role of Nominal Anchors

In part II, I argued that the implementation of certain institutional innovations or fundamental changes is a necessary precondition for successful central banking in transition countries, that is, in order to sustain low inflation policies. However, implementation of even a few institutional reforms takes some time, and one may ask what the central banks can do in the meantime to support a disinflation or stabilization process. In other words, what are their operational choices? Two operational lines are important: one is the choice of nominal anchor(s), and the other is the choice of monetary instruments. Here I shall concentrate on the comparison of various nominal anchors. For a discussion of monetary instruments, especially direct versus indirect instruments, see, for example, Alexander, Balino, and Enoch (1995), DeMelo and Denizer (1997), and Begg (1996: 44–56).

The conventional wisdom in 1990 among Western economists resulted in the suggestion of multiple anchors, attaching primacy if possible to an exchange rate. Besides an exchange-rate peg, money and/or credit ceilings, wage, and possibly also price, controls were also proposed. Seven

years later we can state that the experiences or advantages of exchange-rate-based stabilization were not overwhelming. On the other hand, the success of money-based stabilization is also usually assessed to be very uncertain for theoretical as well as empirical reasons. Consequently, other nominal anchors, including inflation targeting and even nominal income targeting, have recently been discussed as possible alternatives for transition countries, or at least for the most advanced of them.

I shall discuss and compare these various nominal anchors in general and with respect to their appropriateness for transition countries where the circumstances and the achieved progress of individual transition countries must be taken into consideration. Disappointments and hopes with respect to specific nominal anchors can be explained only in the context of institutional restrictions. This is also the reason that, in part II of this article, I first analyzed the necessary institutional changes to which I will refer frequently in part III.

Most transition countries in Central and Eastern Europe initially, or after a while, chose an exchange rate target as their nominal anchor. They often fixed the exchange rate against the deutschemark or a basket of currencies including the deutschemark and the dollar. Estonia used a currency board arrangement from the beginning of its transition in 1992, while Bulgaria entered into such a system in July of 1997. Countries with smaller foreign exchange reserves, and thus less confidence in their ability to maintain a fixed exchange rate, have generally chosen money-based stabilizations, although often with an informal management of the exchange rate. Russia, Latvia, Lithuania, and other countries of the former Soviet Union followed flexible exchange rate strategies during their initial stabilization attempts. In 1994, however, Lithuania adopted a currency board, and Latvia introduced a *de facto* peg against the SDR. For the currently adopted exchange rate regimes in the individual transition countries see Table 1 in Appendix II, 2. For the history of exchange rate regimes in selected transition countries see Table 2 in the same appendix.

1. Exchange Rate Targeting

Exchange rate targeting is usually associated with expectations regarding the following effects:

- (a) a signaling effect;
- (b) a disciplinary effect; and
- (c) a nominal anchor effect.

Signaling effect. The announcement of a nominal exchange rate target for the domestic currency is expected to provide the private sector with very transparent information about the future inflation rate, at least in the short run.³⁴ If the respective foreign currency is already used as an implicit unit of account in the domestic country, as is the case in many transition countries, the signaling properties of an exchange rate target are especially high. The announcement of a stable foreign exchange rate is then seen to be almost identical with stable domestic prices.³⁵ At least in comparison with a central bank's commitment to a monetary target, an exchange rate target may reflect a stronger commitment to macro-economic stabilization because it can be controlled by the public daily and without any delay. Moreover, the exchange rate is regarded to be "a more visible and 'saleable' target vis-à-vis the wage-setters in the economy."³⁶

Disciplinary effect. Moreover, fixed exchange rates are expected to exert a disciplinary effect on both monetary and fiscal policy.³⁷ If the domestic country has a higher inflation rate than the country to which its currency is pegged, real appreciation evolves. This reduces the demand for domestically produced goods and increases the demand for imports, which leads to recessionary effects in the domestic country and tends to lower the price level or its rate of increase. Ultimately, the pegging country must adopt the same low inflation rate as the foreign partner country. However, this is only combined with disciplinary effects on monetary policy if no coordinated monetary expansion takes place. Furthermore, fixed exchange rates may even induce procyclical and thus destabilizing monetary policy, as has recently been proposed.³⁸ With respect to the expected disciplinary effect of fixed exchange rates on fiscal policy, the common argument runs as follows: in a fixed exchange rate system, expansionary fiscal policies induce a balance of payments deficit that will eventually force the government to abandon the peg. Because this may lead to high costs for the government, it deters it from pursuing lax fiscal policies in the first place.³⁹ Regarding recent theoretical and empirical work on fixed exchange rate regimes as a whole, the disciplinary effect of fixed exchange rates remains ambiguous. The main body of knowledge on both fixed and flexible exchange rate regimes suggests that the ultimate objective of price stability can be achieved only through credible economic policies, which, in turn, are a function of adequate fiscal policies that must be compatible with the inflation target and supported by institutional factors related to monetary policy (i.e., central

bank autonomy) and wage policy (i.e., labor market flexibility).

Nominal anchor effect. Many developing and transition countries have used a fixed exchange rate system in order to reduce inflation. A nominal exchange rate system makes their inflation rate exogenous insofar as the price increases of tradables are brought down to the world market inflation rate. This will stabilize inflation in the long term only if it exerts a stabilizing effect on price increases of nontradables as well. As theoretical work by Calvo and Végh and others has shown, there may be an initial output increase as a result of the implementation of the stabilization efforts, which, however, eventually fuels inflation of nontradables, thus leading to real appreciation of the domestic currency. Once the boom fades, it becomes increasingly difficult to sustain the peg. The loss of competitiveness in the tradable goods sector and a possible loss in foreign reserves can eventually create a credibility problem, and a currency crisis may develop.

It may be questioned whether this process, which was originally derived for high-inflation developing countries, has played a substantial role so far for transition countries. Here the role of rapid “dollarization” may have been more important. If the foreign currency is widely used as an implicit unit of account in the domestic economy, as apparently is the case during the first stages of the transformation process,⁴⁰ the implementation of exchange rate pegging immediately reduces inflation because the inflationary effects of devaluation of the domestic currency are erased. In this regard, a question arises as to how long such a nominal anchor can be sustained.

Even with a deep initial devaluation and the start of productivity growth, nominal exchange rate targeting has the disadvantage that stabilization to annual inflation rates of, say, 10–40 percent will normally imply the eventual erosion of competitiveness because a continued inflation higher than that of the trading partners implies an appreciation of the real exchange rate. The resulting export sector difficulties often induce calls for depreciation that can lead to the very inflation the peg was designed to prevent. Consequently, the main issue for transition countries may not be whether the exchange rate peg should be abandoned but at what stage it should be replaced, and with what.⁴¹ In this case, a crawling peg is likely to be preferred to *ad hoc* devaluations, particularly because it provides guidelines for prices and wages. I shall return to this variant in section 5 below.

Once macroeconomic stability has been achieved, additional exchange

rate flexibility exhibits some advantages: it allows the authorities to use the exchange rate as a policy indicator; in addition, the exchange rate can be used as a signal to take corrective actions in monetary and fiscal policy before imbalances lead to crisis. Furthermore, a more flexible exchange rate regime facilitates the management of capital inflows because inflows lead to an exchange rate appreciation that stabilizes their volume. Under a pegged exchange rate regime, however, capital inflows tend to lead to a growth in monetary aggregates and higher inflation. Moreover, they may threaten the soundness of the financial system insofar as they may lead to an increase in bank deposits, thus inducing an unwarranted expansion of bank credit.

Beginning in 1993, when macroeconomic stabilization was being consolidated, several countries in Central and Eastern Europe and the Baltic began to receive substantial capital inflows (see Table 3 in Appendix II, 3). These inflows peaked in 1995 at around 7 percent of GDP for the region as a whole, with particularly large inflows into Hungary and the Czech Republic. While monetary authorities in countries less advanced in transition have allowed capital inflows to increase the money supply, those in many countries more advanced in transition, such as Croatia, the Czech and Slovak Republics, Hungary, and Poland, have carried out sizable sterilization operations in response to the capital inflows. These operations have involved substantial fiscal costs because of the wide differentials between the interest paid on monetary authorities' domestic debt and the yields earned on foreign reserves. Moreover, they were only partially effective in restricting monetary expansion, with the effectiveness eroding as the sterilization continued.

To sum up, we can state that the main danger of exchange rate pegging lies in sustaining this strategy for too long a time, that is, in missing the right point of departure. As experience has shown, this usually results in deep currency crises, and, especially with respect to currency boards, deep bank crises. The less coordinated monetary and fiscal (and wage) policies are and the smaller the international reserves of a country, the sooner the correct point of departure will come.

2. Monetary Targeting

The analysis in the foregoing section has indicated that exchange rate pegging is not an appropriate strategy if a country suffers from (1) insufficient international reserves, and (2) insufficiently tight fiscal policy or

fiscal dominance. Both aspects make disinflation and/or stability policy announcements incredible and the life expectancy of any nominal exchange rate peg brief. Many transition countries suffer from these two hindrances, especially the fiscal dominance syndrome, as has been emphasized in part II above. The problem of insufficient reserves could be overcome for the most part by the help of international agencies such as the IMF. Nevertheless, this has apparently been the reason that some countries with smaller reserves, and thus less confidence in their ability to maintain a fixed exchange rate, have chosen money-based stabilization, although often with informal management of the exchange rate (see Table 2 in Appendix II, 2).

Despite some apparent successes with money-based stabilization (see below), most economists doubt the adequacy of monetary targeting in transition countries. These doubts are based mainly on two arguments: the inevitable instability of money demand during transition, particularly as a result of the ongoing processes of financial market deregulation and financial innovations in transition countries as well as common dollarization,⁴² and the possibility of exchange rate overshooting during money-based stabilization.⁴³ Moreover, given that transparency and credibility are the most important conditions for the success of any stabilization program,⁴⁴ money-based stabilizations do not provide good chances for rapid disinflation. Targets for the NDA and the money stock suffer under a lack of transparency because monetary targets, even if published, do not provide an easily understood message to the public about what monetary authorities intend to do and what inflation outcome can be expected. Furthermore, restrictive monetary targets usually cause high costs,⁴⁵ as shown by related experience from developing countries.⁴⁶ In contrast to exchange rate pegging, these costs occur immediately, in particular, when the money-based stabilization program is credible. When disinflation is expected, the demand for real-money balances increases for a given real interest rate. If, in a money-based stabilization program, nominal money supply remains unchanged and domestic prices are sticky downward for some reason, real money supply cannot increase sufficiently so that the real interest rate will rise. This, in turn, will reduce real output. These costs, if expected, may weaken credibility by raising expectations that actual policies will soon be relaxed.

Given these widespread objections, the obvious success of money-based stabilizations in countries as diverse as Albania, Croatia, Slovenia, Latvia, and Lithuania may have surprised many academic observers.

This "success," however, possibly reflects only the following. First, some officially money-based stabilizations in fact paid considerable attention to the exchange rate as well. Second, when nominal targets were set at incorrect levels, they were simply adjusted *ex post*. Third, perhaps this apparent success proves the hypothesis referred to sometimes as stating that, whatever the nominal anchor, fiscal stance is responsible for the ultimate success.⁴⁷ In other words, tough announcements about exchange rate as well as monetary targets have an effect only if other components of the policy package support them. Otherwise, if an inappropriate mix forces the abandonment of the announced target, whether exchange rate or monetary, tough announcements may indeed be counterproductive.⁴⁸ In particular, if *ad hoc* adjustments become routine accommodations of past shocks, nominal anchoring will soon lose its effectiveness. Given these problems, new forms of nominal anchor regimes have recently been discussed. These will be analyzed in the following two sections.

3. Inflation Targeting

In the past few years several countries, including New Zealand, Canada, the United Kingdom, Sweden, Finland, Australia, and Spain, have adopted a new monetary policy strategy that has become known as "inflation targeting." In most cases, the adoption of this framework was a practical response to difficulties with the use of an exchange rate peg or some monetary aggregate as the main intermediate target.⁴⁹ The most important characteristic of inflation targeting is an explicit, quantitative (low) inflation target and the primacy of this inflation target based on the hypothesis that monetary policy has no enduring real effects but only affects the price level and the inflation rate in the long term. Merely prescribing an inflation target is not enough.⁵⁰ Inflation reacts to changes of monetary policy only with long and variable time lags. This makes simple inflation targeting, that is, without an intermediate target, difficult. Not only inflation control but also controllability of monetary policy and accountability of the central bank would then be very imperfect. This would restrict the credibility of the central bank. This problem can be overcome by implementing a specific operating procedure called "inflation-forecast targeting."⁵¹ In this case, the central bank acts as follows. It uses its internal conditional inflation forecast as an intermediate target and as an indicator variable, and sets its instruments so that deviations of its conditional inflation forecast from the inflation target are

erased or diminished. Suppose that interest rate i is the policy instrument; then we have the following endogenous instrument rule or reaction function: $\Delta i_t = q(E_t \pi_{t+j} - \pi^*)$, where π_s describes the inflation rate in period s , E_t is the expectations operator conditional on information at the end of period t , q denotes a feedback parameter, and j is the number of periods it lasts until the policy instrument exerts its maximum effect on inflation. If q is ∞ , we call this operating procedure "strict" inflation targeting; if, however, $q < \infty$, we call it "flexible" inflation targeting.

In particular in transition countries, adopting "strict" inflation targeting would probably be unwise. During transition, a government will sometimes already be at the limit of the fiscal austerity that is politically feasible. Further raising of interest rates may then not be appropriate. Inflation targeting, understood as a "rule," would require that these circumstances in which letting inflation slip is regarded to be the optimal response are—as far as possible—predetermined. The credibility problem arising from such escape clauses could be diminished with a high degree of transparency of the central bank's inflation forecast and its reasons for referring to escape clauses. Such a high degree of transparency is seen, in general, as a precondition of successful (credible and implementable) inflation targeting.

In particular, three positive aspects of inflation targeting are expected:

- Inflation targeting provides a nominal anchor for monetary policy and inflation expectations. This is supported by the good "visibility" and the easy controllability of the inflation target, and, if there is transparency, of the inflation forecast as well.
- Inflation targeting raises the transparency of the policy procedure and the accountability of the monetary authorities.
- Inflation targeting explicitly considers the role of time lags of monetary policy when setting the instruments.
- The most ambitious expectation with respect to inflation targeting is the solution of the time inconsistency problem.⁵² An adequate choice of the inflation target is sometimes supposed to be not only superior to the Rogoff solution of an independent conservative central bank but also to provide the first-best solution (for the "proof" see Appendix I, 2). This aspect earns special consideration in the light of the central relevance of the time-inconsistency problem for the theory of monetary policy over the past fifteen years.

The first-best solution derived in the appendix can nevertheless be questioned on the following grounds. The target to be prescribed and

announced corresponds to the socially optimal inflation rate minus the inflation bias from discretion. It is not easy to imagine a central bank's actual targeting of an inflation rate that it will, on average, never achieve.⁵³ Targeting such a rate would be stable only if the steady overshooting of the target had no influence on the expectations of the private agents. This will be the case only if the public recognizes the relationship between realized and target inflation rates and therefore accepts the systematic overshooting. If they do not recognize this relationship, the target becomes incredible and the announcement of the target rate loses its inflation-dampening effect. Moreover, after inflation expectations are fixed, there will be an incentive for a government that is not bound by the fixed target to set new targets and to announce that it will not be imposing sanctions if the target is not reached. In the end, the problem of time inconsistency is merely passed to the government.

In general, it seems sensible to consider the adoption of inflation targeting only if the following institutional requirements are satisfied.⁵⁴

- The central bank must be capable of conducting an independent monetary policy. In order to comply with this requirement, it is not sufficient to have instrument independence. The main precondition is that a country does not show any symptoms of "fiscal dominance." As was argued above in part II, this is not the case in the present transition countries, that is, at their present stages of development or transition. There is always the real danger that the conduct of domestic monetary policy will be dictated by fiscal developments in the country, for example, its indebtedness.

- The central bank must have a clear inflation target precept and must not be committed to simultaneously maintaining the nominal exchange rate at any prespecified level or range. If such a mixture of commitments exists, the government and the central bank would very quickly come into a priority conflict when the margin of the exchange rate band is reached. As argued above, however, many transition countries have followed such mixed, discretionary strategies.

- The monetary authorities must possess the technical and institutional capacity to model and forecast domestic inflation.⁵⁵ Moreover, they need some knowledge or estimate of the time lags and the transmission mechanism of monetary policy. In other words, the effectiveness of inflation targeting depends upon the ability of the central bank to forecast accurately and to control future inflation. It is doubtful that the infrastructural conditions for this are already in place in the present transition countries of Central and Eastern Europe.

4. Nominal Income Targeting

One may argue that not only inflation targeting but also nominal income targeting might be an appropriate alternative nominal anchor for at least the more advanced and corporatistically structured transition countries.

Nominal income targeting means that the central bank chooses a nominal income level or growth rate as its intermediate target and decides on its monetary policy actions solely on the basis of comparisons between the target and actual developments of the nominal income level or growth rate. The advantage of nominal income targeting may be seen in its responses to a deeper cause of inflation neglected in other strategies. Consequently, one may state that the “spirit” of nominal income targeting is different from, say, direct inflation targeting and monetary targeting. Many proponents of nominal income targeting actually see the cause of the inflation problem less in a lack of discipline on the part of the central bank and more in a general coordination problem.⁵⁶ In a general way, the inflation process can be represented as follows:

$$\pi = \pi_{-1} + a(e - \pi) + b(s - \pi) + c(\Delta y),$$

where π is the current inflation rate, e is the depreciation rate, s the rate of increase of public sector prices, and Δy the output gap; a , b , and c are parameters.

Here inflation today is what it was yesterday—through formal or implicit indexation or “inertia” (π_{-1})—except for the accelerating influence of real depreciation ($e - \pi$), increasing real public sector prices ($s - \pi$), or overheating of the economy (Δy). Disinflation then requires a real appreciation of the exchange rate creating trade deficit risks, a reduced inflation in the public sector, which produces budget deficit risks, and/or a recession resulting in unemployment. This may, or should, be accompanied by an incomes policy that may help to coordinate the disinflation. Inflation reduction here does not come automatically by announcing an inflation target. Several actors—monetary politicians and fiscal politicians, as well as unions and employers—have to contribute in a coordinated way in order to disinflate with minimal costs.

From the standpoint of game theory, inflation as well as unemployment may be described as the result of a noncooperative interaction between main societal groups such as unions, the central bank, the government (state authorities), and entrepreneurs in the form of a game

with several players. Each player has several strategies at hand. For example, let us take the following two-player/two-strategy game with the central bank and the unions as the two players. The policy of the central bank may be expansive or restrictive, and the negotiation strategy of the unions can be cooperative or aggressive. Let us further suppose that the central bank follows the target "price level stability" and the unions have the target "full employment." The targets "price level stability" and "full employment" are supposed to be valued differently by the central bank and by the unions. This game has a typical prisoner's dilemma structure. Only the noncooperative equilibrium solution that is not optimal for either player can be realized. Because of the uncertainty of expectations associated with business fluctuations and the complexity of organizational behavior, we cannot expect to be able to find a stable cooperative solution to this game.

The structure of the above two-player/two-strategy game is too simple. In reality, we have a multi-participant/multi-strategy game, in which a central role is also played by entrepreneurs (strategies of high/low investment, etc.) and the government⁵⁷ (expansive versus restrictive fiscal policy, for example, or prospects of reelection). Therefore, a cooperative solution is even more unlikely.

The question that arises here is how to change the rules of the game so that the result becomes more satisfying. Proponents of nominal income targeting argue that this can be attained, for example, if the government credibly commits to supply a monetary frame large enough to "finance" a certain yearly nominal income growth corresponding to the expected growth of full-employment output plus an "unavoidable" inflation rate over a medium to long term. Splitting this long-term nominal income into a nominal component (price level, inflation) and a real component (real output, employment) would be left to the market forces and to the wage- and price-setting agents. The game would thus lose its prisoner's dilemma structure. The credible announcement of a supply of sufficient money to finance full employment output at zero or low inflation would force wage- and price-setting negotiation partners to coordinate and adjust their behavior patterns leading, among other things, to more flexible wages and prices.

In contrast to the direct inflation targeting solution, this would be a nearly pure market solution of the stagflation problem. In contrast to the monetary targeting solution, for example, the Friedman rule of fixing the growth rate of money supply over a long term, which is also a mar-

ket solution directed to the inflation problem, this would not only try to solve the inflation problem in a free-market manner but would regard the inflation problem as politico-economically associated with solving the unemployment problem. The latter is what we mean when we refer to what has been described as the stagflation problem.

However, there are serious problems with nominal income targeting. The two main objections are: first, the central bank would find it difficult to control nominal income because of the long and variable, and indeed different, time lags for the effects of monetary policy on price level and real output, and transition countries are likely to have serious problems with this task; second, nominal income would be subject to substantial data revisions that are again different for price level and real output. In transition countries, in particular, such revisions are likely to be substantial. This may be the main objection against recommending nominal income targeting to transition countries, at least to those that are not very advanced. Moreover, there are two additional critical points:⁵⁸ nominal income targeting may lead to misinterpretation of the ultimate goal of the central bank or government. This can be largely avoided if monetary policy is transparent enough. Second, nominal income targeting might lead to an indeterminate price/volume division in the short run, thus creating uncertainty about the inflation performance of the economy. The latter point does not sound very convincing because this indeterminate division may even be considered an advantage because it forces the wage- and price-setting partners to greater coordination efforts.⁵⁹ The question arises as to how strong this incentive to coordinate is and whether some kind of incomes policy that fulfills the same function would not be easier to implement. In general, the above arguments⁶⁰ lead to the admission that nominal income targeting is only recommendable for corporatist and rather advanced countries. Consequently, it can hardly be considered a practical alternative for today's transition countries.

5. Crawling Exchange-rate Bands

As we have seen, there are some fundamental problems with monetary targeting, at least for early transition countries with unstable money demand. In these countries, exchange rate pegging may be the only reasonable choice of nominal anchor of monetary policy during early disinflation. However, exchange rate pegging tends to create increasing

undesired effects as transition proceeds. During later stages of transition, productivity growth and emerging investment opportunities render adherence to a narrow exchange rate target not only inappropriate but also unsustainable. A powerful argument against the credibility, and, thus, the sustainability, of fixed exchange rate systems is the fact that structural changes in the economies require real exchange rate changes. In other words, robust regimes require more exchange rate flexibility. Inflation targeting, however, is not an alternative for the present transition countries because these countries do not yet satisfy the institutional requirements for the adoption of this monetary policy strategy. And nominal income targeting should be adopted, if at all, only in very advanced and simultaneously corporatistically structured countries. Consequently, we may ask which nominal anchor transition countries should choose until they are advanced or "mature" enough for those more ambitious nominal anchors.

The most plausible solution seems to be crawling exchange rate bands, which have become popular in moderate-inflation, middle-income countries such as Chile, Colombia, Israel, and Mexico, as well as in some transition countries such as Hungary, Poland, and Russia. These countries, especially those that have opted for a forward looking crawling parity, have been trying to combine some nominal anchoring with sufficient flexibility to rule out enduring appreciation of the real exchange rate. If disinflation and structural adjustment continue, it is intended that the rate of announced crawl be reduced.

After initial stabilization, such crawling bands may be useful in other transition countries as well.⁶¹ The band width should not be too narrow, because uncertainties remain high, the scope for fiscal responses to shocks is usually small, and capital inflows may occur. Those countries that have adopted crawling bands have typically chosen to widen the band over time, partly in response to such pressures. In addition, a band requires efforts to defend its edges. This may evoke sterilization, changes in interest rates through changes in fiscal policy or unsterilized intervention, or tightening of controls on capital flows. Though bands must be supported by appropriate fiscal policies, sufficiently rapid changes in fiscal policy cannot be relied upon. Inconsistencies between announced bands and fiscal stance are likely to induce exchange-market crises.

Implementation as soon as possible of the required institutional reforms discussed above in part II would appear to be the obvious consequence of these difficulties. Central banks in transition countries could

then switch over to more elaborate nominal anchors like inflation targeting, which seems to be the most promising future anchor to be favored.

IV. Résumé

For successful central banking in transition countries, the choice of the appropriate nominal anchor is important, as I have tried to make clear in this article. More important in this regard, is the rapid implementation of the institutional requirements for successful central banking discussed in part II. Only then will the positive effects of central bank independence, which have been widely discussed in the literature for many years now, become fruitful. And only then will central banks be able successfully to adopt elaborate nominal anchors, such as inflation targeting, or even nominal income targeting.

Besides establishing potentially successful central banks, controlling these banks should also play an important role for transition countries. Central banks there are too weak to attain specific price level or inflation level goals unless certain favorable conditions are fulfilled with regard to fiscal policies and other political-social-legal environments, and they will remain too weak as long as these conditions remain unfulfilled. Merely announcing a stable price level or a low inflation target is not credible. And backing up this announcement by means of a contract or a central bank selection mechanism will not be successful either. The public will naturally expect that the central bank will be unable to adhere to its announced targets, and that daily pressure from groups setting wages and prices and from fiscal policy will soon lead to the abandonment of the published or contractual policy. Even if the central bank in fact succeeds against the odds in adhering to its (announced) target, the sacrifice ratio would probably be so great that a broad wave of public opposition could be expected. As a result, both the program and the respective contract are unlikely to be credible.

This means that, especially in transition countries, where pressure from the fiscal policy side is usually very high and where the political-social-legal environment is very uncertain and unstable, direct control of central banks is not an adequate path. Direct inflation targeting is therefore not a recommendable strategy of monetary policy for present transition countries either, because central banks there cannot commit themselves with any credibility to attaining final price level or inflation targets. The control mechanism must therefore be indirect, controlling a

monetary policy strategy based on an intermediate target, that is, controlling whether or not the central bank adheres to its published and commonly accepted target. The question is then raised as to which intermediate target can be recommended. In the beginning, exchange rate pegging may be a reasonable choice because it will "import" low foreign inflation and remonetize the economy, and because it is easily controllable and least dependent on institutional conditions. After a while, the adherence to a narrow exchange rate target becomes inappropriate and unsustainable because of the problems of creeping overvaluation. As long as the institutional requirements for adopting more elaborate nominal anchors, such as inflation targeting, or perhaps even nominal income targeting, are not satisfied, crawling exchange rate bands appear to be the appropriate solution for advanced, but not yet very advanced, transition countries. Very advanced transition countries, and only those, may eventually try to adopt more ambitious nominal anchors, such as inflation targeting.

APPENDIX I

Institutional Solutions to the Inflation Bias Problem

In this Appendix, I shall briefly present the approaches to solving the time inconsistency or inflation bias problem discussed above, namely, delegating monetary authority to an independent central bank (Rogoff 1985), prescribing a specific inflation target to the central bank (Svensson 1997b), and setting up a contract between the government and the central bank (Walsh 1995). The results will then be compared with the discretionary and the optimal rule results.

1. Central Bank Independence as a Solution to the Inflation Bias

The general problem to be solved is as follows:

Minimize the following loss function

$$L = E[a\pi^2 + b(U - kU^m)^2] \quad (1)$$

with $a, b > 0$

subject to the constraint

$$U = U^n - c(\pi - \pi^e) - \varepsilon \tag{2}$$

with $c > 0$,

where $L = \text{loss}$, $E = \text{expectations operator}$, $U = \text{rate of unemployment}$, $U^n = \text{natural rate of unemployment}$, $k < 1$, $\pi^e = \text{inflation expectation}$; ε is a transitory supply shock with mean 0 and variance σ_ε^2 . We assume rational expectations:

$$\pi^e = E\pi \tag{3}$$

Optimal Rule

Optimal rule here is a rule that is credible and enforceable and explicitly describes conditional policy measures for all contingencies. Though not realizable in practice, it will be presented for reasons of comparison with other solution variants.

(2) in (1) implies the Lagrange function

$$V(\pi, \pi^e, \theta) = E\{a\pi^2 + b[(1 - k)U^n - c(\pi - \pi^e) - \varepsilon]^2\} + \theta(E\pi - \pi^e) \tag{4}$$

where θ is the Lagrange multiplier.

The necessary conditions are:

$$\frac{dV}{d\pi} = 2a\pi_0 - 2bc[(1 - k)U^n - c(\pi_0 - \pi_0^e) - \varepsilon] + \theta = 0 \tag{5}$$

$$\frac{dV}{d\pi^e} = 2bcE[(1 - k)U^n - c(\pi_0 - \pi_0^e) - \varepsilon] - \theta = 0 \tag{6}$$

$$\frac{dV}{d\theta} = E\pi_0 - \pi_0^e = 0. \tag{7}$$

Solving (6) for q and inserting into (5) implies:

$$2a\pi_0 - 2bc[(1 - k)U^n - c(\pi_0 - \pi_0^e) - \varepsilon] +$$

$$2bcE[(1-k)U^n - c(\pi_0 - \pi_0^e) - \varepsilon] = 0 \quad (8)$$

By using (7) we get:

$$\pi_0^e = 0. \quad (9)$$

Inserted into (8) and solved for π_0 we get the optimal inflation rate

$$\pi_0 = -\frac{bc}{a + bc^2} \varepsilon. \quad (10)$$

If there is a positive supply shock, the inflation rate declines

$$\left(\frac{d\pi_0}{d\varepsilon} = -\frac{bc}{a + bc^2} < 0\right).$$

By inserting into (1) and (2), the unemployment rate and the expectations value of the loss function can be calculated as:

$$U_o = U^n - \frac{a}{a + bc^2} \varepsilon \quad (11)$$

$$L_o = E\left\{\frac{ab^2c^2}{(a + bc^2)^2} \varepsilon^2 + b[(1-k)U^n - \frac{a}{a + bc^2} \varepsilon]^2\right\} = b[(1-k)U^n]^2 + \frac{ab}{a + bc^2} \sigma^2. \quad (12)$$

The expected inflation rate corresponds to the target value, and the expected unemployment rate to the natural rate of unemployment. Inflation falls if there is a positive supply shock in order to limit the variability of the unemployment rate (see (2)).

Discretionary Solution

By inserting the Phillips curve (2) into the loss function (1) and solving for π we get the necessary condition for a minimum:

$$\frac{dL}{d\pi} = 2a\pi_D - 2bc[(1 - k)U^n - c(\pi_D - \pi_D^e) - \varepsilon] = 0. \quad (13)$$

Forming the expectations value and inserting it into (13) implies the discretionary inflation rate:

$$\pi_D = - \frac{bc}{a + bc^2} \varepsilon + \frac{bc(1 - k)U^n}{a} \quad (14)$$

The unemployment rate with discretionary behavior of the central bank and the corresponding expected loss are:

$$U_D = U^n - \frac{a}{a + bc^2} \varepsilon \quad (15)$$

$$\begin{aligned} L_D &= E\left\{ a\left[- \frac{bc}{a + bc^2} \varepsilon + \frac{bc(1 - k)U^n}{a}\right]^2 + \right. \\ & b\left[(1 - k)U^n - \frac{a}{a + bc^2} \varepsilon\right]^2 \left. \right\} = \frac{ab}{a + bc^2} \sigma^2 + \\ & b[(1 - k)U^n]^2 + \frac{[(1 - k)U^n]^2 b^2 c^2}{a}. \end{aligned} \quad (16)$$

When we compare this with the above optimal rule, we see that the unemployment rate is the same, but now there is an inflation bias of

$$\frac{bc(1 - k)U^n}{a}.$$

Delegation Solution

This solution proposal implies that the government delegates its monetary authority to a “conservative” independent central bank (manager). “Conservative” here means that the relative inflation aversion, expressed by the quotient “a/b” in the loss function (1) of the independent central bank is larger than that of the government. Then the loss function is as follows:

$$L^*_{Del} = E[a\pi^2 + b^x(U - kU^n)^2], \quad (1a)$$

with $b^x < b$. The central bank minimizes this function for π and gets:

$$\pi_{Del} = -\frac{b^x c}{a + b^x c^2} \varepsilon + \frac{b^x c(1-k)U^n}{a} \quad (17)$$

$$U_{Del} = U^n - \frac{a}{a + b^x c^2} \varepsilon \quad (18)$$

Inserting these values into the loss function (1) implies:

$$\begin{aligned} L_{Del} = E\{a[-\frac{b^x c}{a + b^x c^2} \varepsilon + \frac{b^x c(1-k)U^n}{a}]^2 + b[(1-k)U^n - \\ \frac{a}{a + b^x c^2} \varepsilon]^2\} = b[(1-k)U^n]^2 + \frac{[b^x c(1-k)U^n]^2}{a} + \\ \frac{a[(b^x c)^2 + ab]}{(a + b^x c^2)^2} \sigma^2. \end{aligned} \quad (19)$$

From (17) we see that the inflation bias has declined compared to the discretionary solution above. However, the inflation bias cannot be perfectly erased as long as $b^x > 0$.⁶² Moreover, the reaction to an unemployment shock ε is suboptimal. The inflation reaction to an unemployment shock is too low (compare (10) to (17)), whereas the unemployment rate now fluctuates more than optimally (compare (11) to (18)). While delegating monetary authority to a conservative independent central bank reduces the inflation bias, it increases the unemployment variability. The value of the loss function L_{Del} therefore is higher than at the optimal rule, and lower than at discretion [compare (12), (16) with (19)].

2. Prescribing a Specific Inflation Target to the Central Bank

The central bank here is assigned a specific objective function by the government, which it then has to minimize. As a result, the independence of the central bank is restricted. The question arises as to which objective function or inflation target the government should prescribe to the central bank. It can be shown that an inflation target π^* that corresponds to the socially optimal inflation rate⁶³ minus the inflation bias leads to a result approaching that of the optimal rule.

The assigned loss function is as follows:⁶⁴

$$L^*_z = E[a(\pi - \pi^+)^2 + b(U - kU^n)^2]. \tag{1b}$$

The corresponding inflation rate realized by the central bank is:

$$\pi_z = \pi^+ - \frac{bc}{a + bc^2} \varepsilon + \frac{bc(1 - k)U^n}{a}. \tag{20}$$

If the target inflation rate is set equal to the negative value of the inflation bias at discretion, which is:

$$\pi^+ = - \frac{bc(1 - k)U^n}{a} < 0 \tag{21}$$

then the inflation rate, the output, and the value of the loss function are equal to those of the above optimal rule:

$$\pi_z = - \frac{bc}{a + bc^2} \varepsilon = \pi_0 \tag{22}$$

$$U_z = U^n - \frac{a}{a + bc^2} \varepsilon = U_0 \tag{23}$$

$$L_z = E\left\{ \frac{ab^2c^2}{(a + bc^2)^2} \varepsilon^2 + b[(1 - k)U^n - \frac{a}{a + bc^2} \varepsilon]^2 \right\} = b[(1 - k)U^n]^2 + \frac{ab}{a + bc^2} \sigma^2 = L_o. \tag{24}$$

3. Contract Solution

It can be shown that there is a clearly specified contract between government (principal) and central bank (agent) that perfectly cancels the inflation bias without restricting the stabilization policy capabilities of the central bank.

This can be deduced again by using the above stochastic model structure. However, a linear tax f on the rate of inflation is now included in the loss function of the central banker:

$$L^*_c = E[a\pi^2 + b(U - kU^n)^2] + f\pi \tag{1c}$$

with $f > 0$.

By minimizing this loss function for the inflation rate π , using the same calculation steps as before we get:

$$\pi_c = -\frac{bc}{a+bc^2}\varepsilon + \frac{bc(1-k)U^n}{a} - \frac{f}{2a}. \quad (25)$$

A tax can now be imposed so that the central bank has an incentive to produce the optimal inflation rate, which the central bank is assumed to be able to produce. With

$$f = 2bc(1-k)U^n > 0 \quad (26)$$

we get the following inflation rate, unemployment rate, and loss function:

$$\pi_c = -\frac{bc}{a+bc^2}\varepsilon = \pi_o \quad (27)$$

$$U_c = U^n - \frac{a}{a+bc^2}\varepsilon = U_o \quad (28)$$

$$L_c = E\left\{ \frac{ab^2c^2}{(a+bc^2)^2}\varepsilon^2 + b[(1-k)U^n - \right.$$

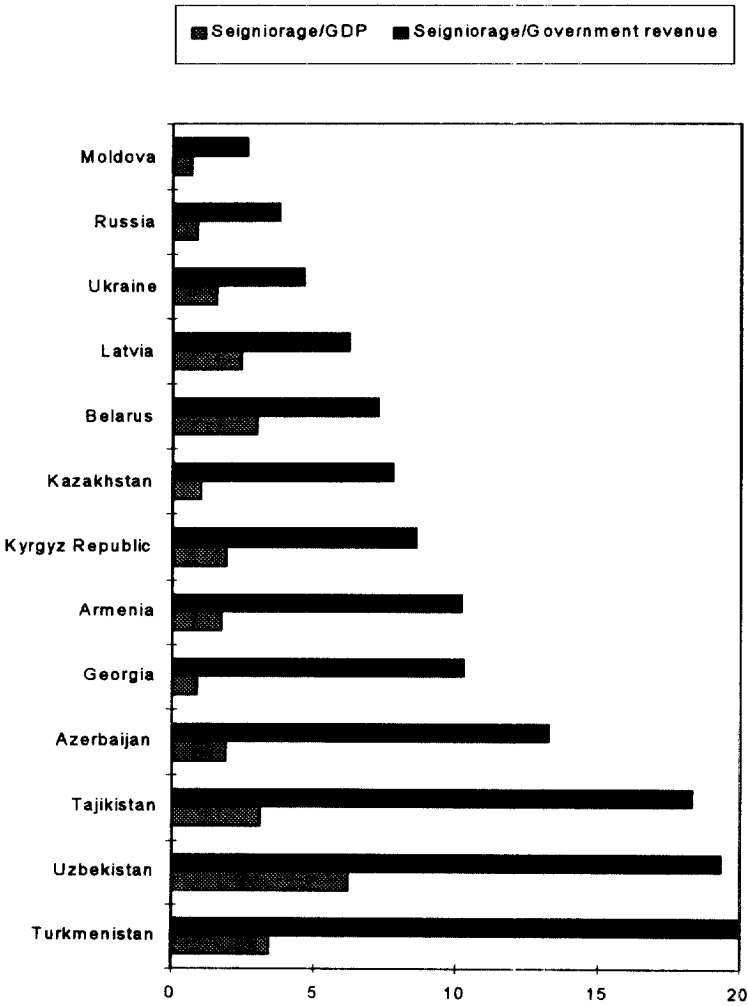
$$\left. \frac{a}{a+bc^2}\varepsilon \right]^2\} = b[(1-k)U^n]^2 + \frac{ab}{a+bc^2}\sigma^2 = L_o. \quad (29)$$

A comparison with the optimal rule [compare with (10) to (12)] shows that an optimal contract can produce the same results.

Appendix II

1. Seigniorage

Figure 1. Importance of Seigniorage in Selected Transition Countries, 1996 (as percent)



Source: International Monetary Fund, *World Economic Outlook* (Washington, DC: 1997), p. 116.

2. Exchange Rate Regimes

Table 1

Exchange Rate Regimes in Transition Countries in August 1997

Exchange rate regime	Focus of exchange rate policy	Monetary framework
Currency board		
Bosnia and Herzegovina	Deutschemark	Currency board
Bulgaria	Deutschemark	Currency board
Estonia	Deutschemark	Currency board
Lithuania	Dollar	Currency board
Targeted exchange rate		
Croatia	<i>De facto</i> target band <i>vis-à-vis</i> deutschemark	Exchange rate target
Hungary	Crawling band <i>vis-à-vis</i> dollar–deutschemark basket, 2.25 percent	Exchange rate target
Latvia	Peg to SDR	Exchange rate target
Macedonia, former Yugoslav Republic	<i>De facto</i> peg to deutschemark	Exchange rate target
Poland	Crawling band <i>vis-à-vis</i> currency basket, 7 percent	Exchange rate target, monitoring of credit expansion and money growth
Russia	Crawling band <i>vis-à-vis</i> dollar, 5 percent	Exchange rate target
Slovak Republic	Target band <i>vis-à-vis</i> dollar–deutschemark basket, 7 percent	Exchange rate target
Ukraine	Target band of 1.7 to 1.9 hryvnia <i>vis-à-vis</i> the dollar	Exchange rate target

Managed floating rate			
Belarus	<i>Ad hoc</i> pegs to various currencies	Monitoring inflation and exchange rates	Money growth target
Czech Republic	<i>Ad hoc</i> intervention to limit fluctuations against the deutschemark	Broad stability <i>vis-à-vis</i> dollar	Monitoring of credit growth
Georgia	<i>Ad hoc</i> peg to the dollar	<i>Ad hoc</i> intervention	Monitoring of money growth
Kirgiz Republic	Multiple rates	Multiple rates	Reserve money target
Slovenia	Multiple rates	Multiple rates	Liquidity targets
Turkmenistan			Monitoring of money growth
Uzbekistan			
Floating rate			
Albania	—		Money growth target
Armenia	—		Money growth target
Azerbaijan	—		Money growth target
Kazakhstan	—		Reserve money target
Moldova	—		Reserve money target
Mongolia	—		Real interest rate target
Romania	—		Money growth target
Tajikistan	—		Bank credit ceilings

Source: International Monetary Fund, *World Economic Outlook* (Washington, DC: October 1997), p. 99.

Table 2

History of exchange rate regimes in selected transition countries, 1990-95

Date	Regime	Reason
Poland		
January 1990	Fixed peg (after devaluation)	Nominal anchor plus initial competitiveness
May 1991	Fixed peg (devalued 17 percent)	Restore competitiveness
October 1991	Preamnounced crawl (1.8 percent per month)	Combine anchoring and inflation adjustment
February 1992	Devalue 11 percent; crawl unaltered	Restore competitiveness
August 1993	Devalue 7 percent; crawl now 1.6 percent	Correct the level; toughen expected rate of change
February 1995	Reduce crawl to 1.2 percent	Tougher anti-inflation stance
May 1995	Wide band (± 7 percent); same crawl	Cope with capital inflows; greater flexibility; reconcile upward float within band and preservation of past exchange rate commitments
Hungary		
1991	Managed float/frequently adjusted peg two devaluations, 21 percent in total	Conflict between need for nominal anchor but lax fiscal policy; no commitment to rapid stabilization; concern for real exchange rate
1992	Three devaluations, 6 percent in total	
1993	Five devaluations, 15 percent in total	
1994	Seven devaluations, 17 percent in total	
Jan.-Feb. 1995	Two devaluations, 3 percent in total	
March 1995	Devalue 8 percent and move to preannounced crawl; 1.9 percent monthly declining to 1.3 percent by end of 1995	Increasing emphasis on real exchange rate target Despite need for nominal anchor Renewed effort at nominal anchor, coupled with fiscal austerity; correct initial competitiveness; regime more robust to the surge of capital inflows experienced at start of 1995

Czech Republic January 1991	Devalue and fix exchange rate	Nominal anchor, maintained unchanged throughout CSFR and to date in CR
April 1995	Tax on banks forex dealings with Central Bank	Capital controls as sand in the wheels
July 1995	Quantitative limits on banks liabilities in foreign currency	Further capital controls on short-term borrowing by banks to try to stem capital inflows
Slovak Republic 1991-1992	As above for Czech Republic	
July 1993	Ten percent devaluation of peg six months after CSFR breakup	Concerns about competitiveness; exchange rate peg maintained thereafter, no capital controls; as yet no strong pressure from capital inflows though current account surplus large in 1994
Slovenia 1991	Managed float	Monetary targets the principal nominal anchor, nevertheless, concern about real exchange rate, which was reasonably constant in 1992-94, prior to large capital inflows and large current accounts surplus, despite which real exchange rate has appreciated since 1994 and monetary policy also relaxed
February 1995	Controls on inward capital flows, under five years maturity	
Croatia 1993 1994	Managed float	Though with strong emphasis on keeping the kuna within a narrow band of the deutschemark forced appreciate in response to forex inflows
Albania June 1992 1994-95	Devalue and float	Absence of reserves and credible track record forex inflows allowed to increase money supply and appreciate the exchange rate

Sources: International Monetary Fund; D.K. H. Begg, "Monetary Policy in Central and Eastern Europe: Lessons After Half a Decade of Transition," IMF Working Paper 96/108 (Washington, DC: 1996), p. 74.

3. Capital flows

Table 3

Net Capital Flows Into Selected Transition Countries* (as percent of GDP)

Country	1992	1993	1994	1995	1996
Bulgaria	-5.7	-2.5	1.1	3.9	-8.9
Croatia	—	1.1	2.2	9.9	8.8
Czech Republic	-1.3	6.8	6.1	17.8	6.6
Estonia	5.0	13.4	7.6	7.1	13.3
Hungary	1.2	15.7	8.2	17.3	0.5
Kazakhstan	—	—	—	3.8	4.0
Latvia	5.6	8.6	7.5	1.7	8.0
Lithuania	4.8	7.5	3.6	4.7	3.3
Poland	-1.7	-0.9	-0.6	4.1	2.3
Romania	—	5.8	4.3	3.7	4.3
Russia ^b	—	—	-5.9	0.2	-2.6
Slovak Republic	-5.0	2.0	7.4	6.7	7.4
Slovenia	-2.4	-0.7	0.7	1.5	3.0
Ukraine	—	—	0.4	-10.8	5.3

Source: International Monetary Fund, *World Economic Outlook* (Washington, DC: October 1997), p. 113.

*Net capital flows are defined as the balance on financial account in the balance of payments, excluding changes in international reserves, plus net errors and omissions.

^bOn a cash basis, excluding the impact of debt rescheduling.

Notes

1. A first draft of this article was written in June and July 1997 when I was a Visiting Scholar at the Research Department of the IMF. I would like to thank the numerous people at the IMF with whom I discussed this work during that time and who gave me their personal assessments of specific research topics.

2. The function of lender of last resort typically cannot be separated from this responsibility. In addition, the management of the exchange rate and foreign reserves is difficult to divorce from the determination of interest rates.

3. Cf. Aslund, Boone, and Johnson (1996: 217).

4. See, for example, Fischer (1994). While the most recent empirical studies show that double-digit inflation is bad for economic growth, the results leave the nature of the relationship at lower rates uncertain. Bruno and Easterly (1996), for instance, show that 40 percent annual inflation is the threshold above which a country is likely to go into a high-inflation, low-growth crisis. Their results also

show that high inflation is bad for growth, and that stabilization to below 40 percent is good for growth, but they do not establish the nature of the *ceteris paribus* relationship between inflation and growth at lower inflation rates. Sarel (1996) finds a breakpoint in the estimated nonlinear inflation-growth relationship at about 8 percent inflation. The relationship is found to be zero (or slightly positive) at lower inflation rates, and negative at higher inflation rates. See also Gosh (1997).

5. CEE is the acronym for Central and Eastern Europe(an); NIS is the acronym for the Newly Independent States, that is, the former Soviet Union without the Baltics, and is synonymous with CIS, the Commonwealth of Independent States.

6. The main reason for prolonged high inflation was rapid monetary expansion. While slow reformers permitted rapid growth in the money supply, thus ending up with the highest inflation rates, the more advanced reformers had the smallest money supply growth and hence recorded the lowest rates of inflation. In order to ease budget pressures, many governments mandated the banking system to undertake quasi-fiscal activities, mostly by extending highly subsidized credits to state enterprises. Since it was not easy to finance these fiscal and quasi-fiscal deficits in a noninflationary manner, most ended up being funded through seigniorage, that is, by printing money. In order to bring inflation under control, a sustained reduction in the growth of the money supply was required. Especially in the NIS, tightening monetary policy meant that banks could not transfer net resources to the enterprise sector over a longer period of time. Tight monetary policy had to be supported by sharp cuts in subsidies, in particular those subsidies provided to enterprises through cheap central bank credits. This, in turn, required a strengthening of the liberalization process in order to eliminate the losses due to price controls and other governmental interventions and to break up the close link between governments and enterprises.

7. A major obstacle to bringing inflation down further has been incomplete price reform.

8. For more details, see the enormous amount of literature on the time inconsistency of optimal policies and on credibility building.

9. For an analysis of the special case of East Germany, see Wagner (1993).

10. The other one is the result of pressures from the fiscal policy side and from other interest groups. On this, see sections 2.3 and 2.4 below.

11. Here one should emphasize that there is also a problem of precommitment in the case of independent central banks because, especially in countries in the early stages of transition, there is a fear that the formal independence granted to the central bank may be withdrawn in a very shaky and uncertain political environment.

12. See also Romer and Romer (1997).

13. Besides, nearly all the reforms usually listed as necessary for a successful transformation process are also relevant to a greater or lesser extent for the success of central banking in transition countries, in this case, for sustainable low-inflation. (See, e.g., Wagner 1996; World Bank 1996).

14. Cf. Sundararajan, Petersen, and Sensenbrenner (1997), and IMF (1997a).

15. See, for example, Begg (1996), 24ff.

16. See, for example, Alexander, Balino, and Enoch (1995), or DeMelo and Denizer (1997).

17. See Enoch and Green (1997).

18. The term "economic legality" refers to laws in the economic sphere, especially contract, tax, and bankruptcy laws.

19. See, for example, Litwack (1991).

20. This also refers to point 2.1 above.

21. Cf. Wagner (1993).

22. In centrally planned economies, there were no incentives to accumulate information about the creditworthiness of investments. Losses of enterprises were automatically financed and the government, as a "lender of last resort," provided extensive insurance without charging the appropriate premium.

23. Cf. World Bank (1996, Ch. 5), Freyhold, Gessner, Vial, and Wagner (eds. 1995), and Wagner (1997).

24. See, for example, Buchanan and Wagner (1977).

25. See, for example, Akhtar and Howe (1991), Havrilesky (1995). See also Allen (1986) and Alesina (1988).

26. See, for example, Dornbusch, Sturzenegger, and Wolf (1990).

27. As Simonsen (1988: 261) has pointed out: "Governments should play the role of the Walrasian auctioneer, speeding up the location of the Nash equilibrium, namely, using the visible hand to achieve what rational expectations models assume to be the immediate performance of the invisible hand. As such, the central function of incomes policies is not to constrain individual decision making but to tell each actor how others will play."

28. Because of democratic procedures, traditional attitudes, and the like.

29. Cf. International Monetary Fund, *World Economic Outlook* (October 1997), p. 117.

30. The terms "independence" and "autonomy" are not precise, as Fischer (1994) has emphasized. It may, therefore, be useful to draw a distinction between "goal independence" and "instrument independence," as Fischer has done.

31. Cf. Eijffinger and De Haan (1996).

32. The literature on sequencing of reform steps of transition will not be discussed here because the focus of this article is the meaning of transition for central banking.

33. Such an independent fiscal board could be set up analogously to an independent central bank. Its mandate could be devised in a number of ways. For example, it could "determine only the size of the budget deficit and the government would decide the overall level and composition of revenues and expenditures subject to the budget deficit constraint" (Mas 1995: 1649).

34. Cf. Agénor (1993).

35. Cf. Dornbusch (1990: 27).

36. Bruno (1993: 135).

37. Cf. Obstfeld (1985).

38. Cf. Giavazzi and Spaventa (1990).

39. Cf. Frenkel et al. (1991).

40. Cf. Sahay and Végh (1995b).

41. Missing the correct point in time to get rid of an exchange rate peg usually results in a currency crisis. The same applies to a currency board, although the crisis there will reveal itself more as a banking crisis. A currency board rules out the lender-of-last-resort function of the central bank and thus may allow the onset of banking panics in fragile circumstances.

42. For an analysis of the velocity of money in transition countries, see, for example, De Broeck, Krajinyak, and Lorie (1997).

43. An additional factor that has undermined the use of money as an anchor in the early phase of transition is the lack of instruments of monetary control.

44. A fully transparent and credible stabilization program could, in principle, lead immediately to a downward revision of inflation expectations so that in all new contracts prices would be set on the basis of the targeted inflation rate (Bruno 1993).

45. The likely costly way inflation can be reduced in transition countries runs as follows. The monetary authority has to generate a "credit crunch" (see Calvo and Végh 1992) with high nominal and real interest rates. This reduces demand in the entire economy, thereby exerting a dampening influence on price and wage increases. This, in turn, will also reduce inflation expectations. The "sacrifice ratio" of such a stabilization program is dependent upon the interest elasticity of credit demand and the price elasticity of aggregate supply. In transition countries both elasticities tend to be very low because of the high share of state-owned enterprises there. A dampening effect on prices then requires large interest rate variations and large output declines.

46. "In contrast to exchange-based programs . . . money-based programs appear to cause a sharp, though short-lived, contraction in economic activity and a sharp initial rise in real interest rates." (Sahay and Végh 1995a: 37).

47. In my view, this appears to be somewhat too extreme. Not only fiscal policy matters but also wage policy and the credibility of the monetary policy strategy (see below).

48. See Drazen and Masson (1994) or Sachs, Tornell, and Velasco (1996). The main idea here is that the ability to peg the exchange rate depends not only on government's desire but also on given external circumstances. It may even be possible that a devaluation improves the credibility of stabilization policies.

49. Cf. Leiderman and Svensson (1995).

50. Although this is sometimes already interpreted as "inflation targeting."

51. See Svensson (1997a).

52. See Svensson (1997b).

53. See also Green (1996).

54. See also Masson, Savastano, and Sharma (1997).

55. See also Cecchetti (1998).

56. In other words, inflation here is not just the result of time inconsistency on the side of government or central bank acting. This means that further requirements are needed, insofar as not only the government or central bank must be subjected to institutional discipline. This has been worked out in part II above.

57. In a democracy, the agent "government" splits into a complex body with a variety of authorities with different, and sometimes conflicting, interests.

58. In addition, it has recently been argued that nominal income targeting would lead to instability of the final target variables, namely, price level and real output (see Ball 1997, and also Svensson 1997c). It has, however, been shown that this Ball-Svensson instability result stems principally from the Phillips curve specification used in their analyses (McCallum 1997). Its replacement with theoretically more attractive alternatives leads to a reversal of their finding. For a comparison of nominal income targeting and monetary targeting, see Asako and Wagner (1992).

59. See, for example, Weizsäcker (1978). See also Wagner (1989).

60. Recently, these arguments have also been used by the European Monetary Institute as substantiation for its exclusion of nominal income targeting from the menu of monetary policy strategies offered to the subsequent European central bank. The main political reason was probably "the fact that nominal income targeting is not used at present in any EU Member State" (EMI 1997: 1).

61. For this, see also Rosati (1996). In general, however, the literature on crawling exchange-rate bands is still rather scarce.

62. One can show that the value of b^* , for which (19) is minimum, lies between 0 and b . This means that it makes sense to determine an inflation-averse central bank, but its inflation aversion should not be too high, that is, $b^* > 0$.

63. The socially optimal inflation rate has by now been assumed to be zero. Hence, it could be neglected in previous calculations.

64. The inflation aversion of the central bank here corresponds to that of the government, that is, the parameter b remains unchanged.

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