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Inflation and Stabilization in Transition Economies: A Comparison  
with Market Economies 1/

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Abstract

A simple model is developed to understand inflationary pressures and stabilization in nonmarket economies. In light of the model, the paper reviews the inflation and stabilization experiences of several transition economies in Eastern Europe and the former Soviet Union. These experiences are then compared to those of high inflation market economies. The paper concludes that, despite significant differences in the economic structure and institutional framework, the inflation and stabilization experiences in transition and market economies are similar in many respects. In particular, monetary accommodation and lack of fiscal discipline are critical in sustaining inflation, and exchange rate-based anchors seem more successful than money anchors in bringing down inflation. On the other hand, wage policies appear to be more critical in reigning inflation in transition economies than in market economies.

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### Summary

This paper examines inflationary pressures and stabilization in transition economies, and compares them with the experience of high-inflation market economies. A basic message of the paper is that to understand the inflationary pressures experienced on the road to a market economy, it is essential to analyze the inherent nominal instabilities of planned economies. To that effect, the paper develops a simple monetary model to provide insights into the sources of inflationary pressures in planned economies. It is argued that the use of two nominal anchors (prices and wages) leads to an "overdetermination" of the system. As a result, a *temporary* increase in nominal wages relative to their planned values generates a *permanent* increase in the money supply and a *permanent* monetary overhang. Analogously, a *permanent* increase in the level of nominal wages causes an *ever-increasing* money supply and, therefore, an *ever-increasing* monetary overhang. The model also suggests that if prices are freed, the price level will overshoot its new equilibrium level.

Bearing in mind the themes suggested by the analytical model, the paper then discusses the evidence on inflation and stabilization in transition economies during 1990-93. The analysis makes clear that, in the transition to a market economy, centralized wage controls that had provided a nominal anchor in the past ceased to perform that function. At the same time, transition economies inherited the state enterprises' soft budget constraints and lacked the indirect monetary instruments necessary to control the money supply effectively. In essence, therefore, one can think of the inflationary problems experienced by transition economies as resulting from their having abandoned the two nominal anchors of the previous regime (prices and wages) without being able to implement a monetary anchor. Under these circumstances, and provided enough international reserves are available, countries that have resorted to an exchange rate anchor have fared better on the inflation front.

The paper concludes that, despite significant differences in economic structures and institutional frameworks, the inflation and stabilization experiences of transition and market economies are similar in many respects. In particular, monetary accommodation and lack of fiscal discipline are critical in sustaining inflation, and exchange-rate-based anchors seem more successful than money anchors in bringing down inflation. However, wage policies appear to be more critical in reigning in inflation in transition economies than in market economies.

## I. Introduction

*Stability of the system of prices [in a centrally-planned economy] is assured by the unified and centralized plan for economic development.*

*N.T. Glushkov (1983, p. 24)*

*Inflation is always and everywhere a monetary phenomenon.*

*Milton Friedman (1968, p.39)*

The pursuit of price stability was a central goal of centrally planned economies. In fact, socialist writers would point to the absence of inflation, together with the presence of full employment, as unquestionable evidence of the superiority of the planned system over the capitalist system. Hence, the recognition of open inflation would have been tantamount to acknowledging that a basic tenet of the command economy model did not hold. In theory, the system was so designed that the emergence of inflationary pressures was simply not possible. In practice, however, a simpler tenet would come back to haunt Soviet-type planners over and over again: too much money chasing too few goods leads to (open or repressed) inflation. As it turns out, this simple dictum would not discriminate between economic systems.

When planned economies began their arduous journey towards a market system in the late 1980s and early 1990s, the accumulated monetary disequilibrium manifested itself in large price increases upon price liberalization, followed in many cases by relatively high inflation (Table 1). Since, by necessity, even radical structural reforms can only proceed so fast, many transition economies found themselves with the same old monetary and inflationary problems--now out of the closet--but still without the institutional and economic infrastructure to resort to Western-style macroeconomic management.

The breath-taking events of recent years in Eastern Europe and the former Soviet Union have both fascinated and confounded Western economists who, with notable exceptions, were largely unfamiliar with the workings and problems of planned economies. As a result, a large literature has emerged analyzing the transition economies, with Poland probably receiving the most attention early on and Russia now taking center stage. <sup>1/</sup> Rather than focusing on particular experiences, the purpose of this paper is to go back to basics and let a simple monetary model of nonmarket economies guide us in reviewing the inflationary and stabilization experiences of selected transition economies. The ultimate purpose of the exercise is to compare such experiences with those of high-inflation market economies.

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<sup>1/</sup> See, among many others, Lipton and Sachs (1990), Commander (1991), Kiguel and Liviatan (1991), Calvo and Coricelli (1992), Fischer (1992), and Bruno (1993).

Table 1. Inflation in Selected Economies in Transition  
(Official consumer prices, in percent per year)

	1956-60	1961-70	1971-80	1981-85	1986-88	1989	1990	1991	1992	1993
Bulgaria	-2.0	0.6	0.0	2.2	2.6	6.4	23.9	333.5	82.0	72.8
Former Czechoslovak	-1.8	1.1	0.8	2.0	0.2	1.4	10.8	59.0	11.0	20.7
Hungary	0.3	0.7	4.2	6.7	9.7	17.0	28.9	36.4	23.0	22.5
Poland	2.3	1.3	8.3	31.5	33.2	251.1	585.8	70.3	43.0	35.3
Romania	0.6	0.1	0.9	4.5	1.5	0.9	4.7	161.1	210.3	256.0
Former Yugoslavia <u>1/</u>	5.4	12.0	19.1	48.4	132.3	1257.7	584.0	270.0	6146.6	5608.3
Estonia	0.1	0.0	0.2	0.9	0.6	2.0	17.2	210.6	1069.0	89.0
Latvia	0.1	0.0	0.2	0.9	0.6	4.7	10.5	124.4	951.2	109.0
Russia	0.1	0.0	0.2	0.8	0.6	2.4	5.6	92.7	1353.0	895.9

Sources: Portes (1977), International Financial Statistics (IMF), and Fund staff estimates.

1/ 1992-1993 excludes Slovenia.

To understand the basic issues underlying the post-reform inflationary experiences of transition economies, it is important--if not essential--to have a good grasp of the monetary workings of these economies in their pre-reform days. Even those economies that adhered most rigidly to the planned system (for instance, the former Soviet Union) went through early periods of open inflation that clearly illustrate the inherent nominal instability of planned economies. These problems became increasingly evident in economies that began to reform early, such as Poland and Yugoslavia.

The paper first develops a very simple monetary model of a planned economy to illustrate the source of inflationary pressures. The model reveals two key weaknesses of the Soviet-type command economy in the monetary realm: the money supply is endogenous and the system is overdetermined (i.e., both prices and wages are set by the planners). Since the key to monetary stability is the equality between the wage bill and consumption goods valued at official prices, any deviation of actual wages or consumption goods from their planned values would generate inflationary pressures. Furthermore, since the wage bill essentially determines the money supply, wage increases above their planned values would be fully accommodated. Put differently, money printing would automatically finance all revenues shortfalls of the government-cum-enterprises sector, which could result from either higher wages or fewer goods available for sale to the public.

The overdetermination of the system is responsible for what one may call the system's "higher-order" response to shocks. Specifically, assuming that goods in short supply are simply rationed, a temporary increase in nominal wages relative to their planned values generates a permanent increase in the money supply and a permanent monetary overhang. Analogously, a permanent increase in the level of nominal wages causes an ever-increasing money supply and, therefore, an ever-increasing monetary overhang. The intuition is that, since consumers cannot spend all of their wage income, a temporary increase in wages leads to a once-and-for-all increase in the money supply. The excess of money balances over spending is "absorbed" by a permanent monetary overhang. When the wage increase is permanent, firms must repeatedly ask for newly printed money to pay for the higher wage bill. The full monetary accommodation of such wage demands results in a rising monetary overhang.

The model also serves to illustrate the typical stabilization package in planned economies (of which the 1947 Soviet program is a classic example): a monetary reform (i.e., a reduction in the stock of money) combined with increases in official prices eliminates the monetary overhang. Such measures, together with tighter wage policies, did bring monetary stability to much of the Soviet block after the mid-1950s, as is suggested by the analytical model.

The model is then used to examine the effects of a price liberalization, and thus serves to illustrate the nature of the monetary problems faced by transition economies. In the model, provided that nominal

wages remain as a nominal anchor, a price liberalization after a period of repressed inflation leads to a price level overshooting, followed by price stability. Alternatively, if both wages and prices are liberalized, the overshooting of the price level would be followed by price stability, provided that a money anchor (or an exchange rate anchor) is established. If, however, prices and wages are liberalized, but nothing else changes from the previous regime (i.e, money remains essentially accommodating), then the system is left with no nominal anchor.

The paper then proceeds to discuss in some detail the evidence on inflation and stabilization in transition economies during 1990-93 bearing in mind the themes suggested by the analytical model. <sup>1/</sup> We emphasize the fact that, in the transition to a market economy, centralized wage controls that had provided a nominal anchor in the past ceased to perform that function. At the same time, transition economies inherited the state enterprises' soft budget constraints and lacked the indirect monetary instruments necessary to achieve an effective control over the money supply. In essence, therefore, one can think of the inflationary problems during the transition as resulting from having abandoned the two nominal anchors of the previous regime (prices and wages) without having being able to implement a monetary anchor. Under these circumstances, and provided enough international reserves are available, countries that have resorted to an exchange rate anchor have fared better on the inflation front.

After briefly reviewing the main features of inflation and stabilization in high-inflation market economies, the paper draws some lessons from comparing the experiences of market and nonmarket economies. First, monetary accommodation is key in sustaining inflationary pressures in both market and nonmarket economies, even though the specific mechanisms may differ. Second, wage policies are more critical in stabilization programs in transition (or planned economies in the pre-reform period) than in market economies. This is so because it is through higher wage bills (either directly through bank credit or indirectly through state subsidies) that most of the money supply makes its way into socialized economies. Third, the exchange rate appears more successful in bringing down inflation in both transition and high inflation market economies, although problems of inflation inertia and lack of credibility may make the transition to low inflation quite difficult. Fourth, the presence of well-developed market-based institutions is not essential for reducing inflation, as the cases of Estonia and Latvia suggest.

The paper proceeds as follows. Section II presents the theoretical model. Section III analyzes the sources of inflationary pressures in transition economies. Section IV discusses the evidence on inflation in transition economies, while Section V focuses on the stabilization attempts.

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<sup>1/</sup> The analysis focuses on Bulgaria, Croatia, Czechoslovakia (later the Czech Republic and the Slovak Republic), Hungary, Poland, Romania and Slovenia in Eastern Europe, and Estonia, Latvia, and Russia in the former Soviet Union.



After briefly reviewing in Section VI the experience with inflation and stabilization in high-inflation market economies, Section VII compares the experiences of transition and market economies. Section VIII concludes.

## II. A Simple Monetary Model for Planned and Transition Economies

Since transition economies inherited many of the (often repressed) inflationary problems of centrally-planned economies, it is important to understand the sources of monetary disequilibria in planned economies. To that effect, this section develops a very simple model to analyze the main monetary aspects of planned economies and, after price liberalization, of transition economies. Before proceeding to the model, we briefly review the role of money and credit in centrally-planned economies.

### 1. Money and credit in centrally-planned economies

The core of centrally-planned economies is the "plan" which sets output goals for each sector, given the available capital stock and labor force. After having "set" the real equilibrium, money and credit are adjusted passively so as to achieve these real targets. In principle, there is no role for money and credit to affect the real equilibrium as in market economies. Money and credit are simply viewed as the means to implementing the "real equilibrium" set by the planners.

In terms of monetary flows, the economy is segmented into two separate circuits: a cash and a noncash sector. Cash is used almost exclusively by households. Enterprises and collective farms pay workers with cash, which is then used to buy goods. In contrast, all inter-enterprise transactions--except wage payments--are settled by debiting and crediting accounts at the state bank, and thus involve no cash. Enterprises are allowed to draw cash from their accounts only to meet payrolls.

### 2. The Model

Consider an economy inhabited by a large number of consumers. 1/ Each consumer supplies a constant amount of labor (normalized to unity) in each period. The only asset available is money (M). Consumers' aggregate budget constraint is given by (with all quantities being expressed in per-capita terms):

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1/ This framework abstracts from many important considerations in planned economies which, in our view, are not essential for understanding the underlying monetary mechanisms. More general, micro-founded models of planned economies can be found in Muellbauer and Portes (1978), Osband (1992) and, closest in spirit to our model, Lin (1993). See also Milesi-Ferretti (1993).

$$M_{t+1} = M_t + W_t - P_t c_t, \quad (1)$$

where  $M_t$  denotes money holdings at the beginning of period  $t$ ;  $P_t$  is the price level in period  $t$ ;  $c_t$  is consumption in period  $t$ ; and  $W_t$  is the nominal wage in period  $t$ . Equation (1) says that money accumulation will result from the difference between wage income and consumption expenditures.

Consumers must use money to purchase goods (i.e., they face a cash-in-advance constraint). Formally,

$$M_t = P_t c_t + L_t, \quad (2)$$

where  $L_t (\geq 0)$ , which denotes unspent money balances during time  $t$ , provides a measure of monetary overhang (sometimes also referred to as "forced savings"). In contrast to typical cash-in-advance models, one must allow for the possibility that the cash-in-advance constraint may not be binding; that is,  $L_t > 0$ , for some  $t \geq 0$ . 1/ Substituting equation (2) into (1), it follows that

$$M_{t+1} = L_t + W_t, \quad (3)$$

which indicates that the money supply at the beginning of period  $t+1$  is the sum of the wage bill plus the unspent money balances during time  $t$ . 2/

We now turn to the supply side of the model. Given the available labor force and productivity estimates, planners set a target level of output: 3/

$$y^P = f(n), \quad (4)$$

where  $f(.)$  denotes the production function,  $n$  refers to the (per-capita) labor supply (equal to unity), and a superscript "p" refers to planned quantities. The planners then decide how much output should be devoted to nonconsumption expenditures, g. 4/ The rest is available for household consumption, c: 5/

1/ We take  $t = 0$  to be the initial period in this economy.

2/ Since (per capita) labor supply has been normalized to unity,  $W_t$  will also be referred to as the (per capita) wage bill.

3/ For the sake of simplicity, the model abstracts from capital accumulation.

4/ These may include defense spending, intermediate inputs, and, in a more general model, investment.

5/ We ignore the foreign sector, which is irrelevant for the issues being discussed here.

$$c^P = y^P - g^P. \quad (5)$$

Given planned production, the representative firm's profits, denoted by  $z$ , are given by

$$z_t = P_t y^P - W_t. \quad (6)$$

In a typical planned economy, the government's owns all firms. Hence, the government taxes away all of the firms' profits and finances the profits' losses, reflecting the soft budget constraint faced by firms (see Kornai (1986)). The government's deficit,  $D$ , is thus

$$D_t = P_t g_t - z_t. \quad (7)$$

The deficit, in turn, is financed by money printing:

$$M_{t+1} - M_t = D_t. \quad (8)$$

Combining equations (6) through (8) yields the nonconsumer sector's (i.e., the firms-cum-government's) budget constraint: 1/

$$M_{t+1} - M_t + P_t y^P = W_t + P_t g^P. \quad (9)$$

Equation (9) then says that the firm-cum-government sector's resources, seigniorage and output (left-hand side), will be used as government spending and wages payments to consumers (right-hand side).

To close the model, we need to specify what are the nominal anchors and how is their time path set. There are three nominal variables in the model which could act as nominal anchors: money, prices, and wages. In contrast to market economies where the (only) nominal anchor would typically be the money supply (or the exchange rate in an open economy), the main nominal anchor in a centrally-planned economy is the price level,  $P$ . Wages, however, also act as a nominal anchor in planned economies since they are

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1/ It should be noted that equation (9)--and hence equations (6) through (8)--are not independent from the rest of model. In effect, substituting the economy's resource constraint (equation (5)) into the consumer's budget constraint (equation (1)) also yields equation (9), which is simply Walras' Law. Formally, then, the model will be solved below using equations (1) through (5). Equations (6) through (9), however, will still be useful for conceptual purposes.

centrally-set by the planners. <sup>1/</sup> As will become clear below, setting these two nominal anchors at their "correct" levels ensures monetary stability even if the system is overdetermined. In other cases, however, there will be permanent monetary disequilibria.

### 3. Macroeconomic stability

In this benchmark case, the policy rules for  $P$  and  $W$  are the following. Given the initial money supply at time 0 ( $M_0$ ), the (constant) price level,  $\bar{P}$ , is set so as to ensure that nominal expenditure equates the initial money supply:

$$P_t = \frac{M_0}{cP} \equiv \bar{P}, \quad t \geq 0. \quad (10)$$

Nominal wages are set such that the wage bill equates the planned output of consumption goods at the fixed price level:

$$W_t = \bar{P}cP \equiv WP, \quad t \geq 0. \quad (11)$$

Given the constant level of consumption,  $cP$  (determined by (4) and (5)), the price level, nominal wages, and the initial money supply at time 0 ( $M_0$ ), equations (1) and (2) fully describe the consumer sector by determining the time paths of  $M$  and  $L$ .

We are now ready to show the first result:

Proposition 1. Given policy rules (10) and (11), macroeconomic stability is achieved; that is, there is no monetary overhang.

Proof. Substituting equation (11) into the consumers' budget constraint (equation 1) indicates that  $M_{t+1} = M_t$ , so that the money supply is constant over time. Hence,  $M_t = M_0$  for all  $t$ . The latter, together with equation (10), implies that  $M_0 = \bar{P}cP$  for all  $t$ . Therefore, from equation (2), it follows that  $L_t = 0$  for all  $t$ ||

The result highlighted in Proposition 1 illustrates how the centrally-planned system was designed to work. Money would simply help in achieving the real equilibrium "set" by planners, which would be consistent with price stability. Even under the best-case scenario described in Proposition 1, however, two potential problems are already apparent, which would lie at the core of the monetary disequilibria suffered by centrally-planned economies.

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<sup>1/</sup> Note, therefore, that  $M$  and  $L$  are the only endogenous variables in this model.

The first key feature is that the money supply is endogenous to the system. In the scenario described by Proposition 1, it follows from equation (3) (noting that  $L_t = 0$  for all  $t$ ) that  $M_{t+1} = W^P$ . In other words, next period's money supply is determined by this period's economy-wide wage bill. If all works according to the plan (i.e., if the wage bill does not exceed its planned value or goods available for consumption do not fall short of planned), then the money supply will be that which is consistent with the fixed price level; that is  $M_t = \bar{P}c^P$ . 1/

The institutional framework that underlies the endogeneity of the money supply is akin to the "real bills" doctrine (Holzman (1960)). The state bank grants short-term credits to enterprises--by crediting their accounts--for various working capital needs over and above the planned allocations. As long as new credits are not used for wage payments (i.e., cash transactions), the money supply and hence consumer prices will not be affected. 2/ However, if an enterprise wishes to use the newly available credit to pay wages, then the state bank will allow it to draw cash on its account, thus automatically increasing the money supply. Formally, this is captured in the firm-cum-government's budget constraint (equation (9)) by the fact that  $M_{t+1}$  is the only endogenous variable (note that  $M_t$  is given from last period), and thus accommodates any deficit of the firm-cum-government sector. 3/

The second key feature of the system is that it is overdetermined in the sense that planners are fixing two nominal variables (prices and wages). Since there is a unique level of  $W$  which is consistent with the main nominal anchor,  $\bar{P}$  (as is evident in equation (11)), any deviation of nominal wages or goods available from consumption from their "equilibrium" (i.e., planned) value will throw the system into a permanent disequilibrium.

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1/ This simple model thus captures Nuti's (1989, p. 103) characterization of a centrally-planned economy as a "monetarist paradise where the quantity theory of money applies in its strictest traditional form, but where there is no scope for monetary policy because the quantity of money is automatically adjusted by monetary authorities to planned physical flows (given planned prices) ...". In a similar vein, Portes (1983, pp. 154-55) argues that "monetarism as a theory might work better in centrally-planned-economy circumstances, with Soviet-style financial institutions, than it does in our developed market economies."

2/ Producer prices, however, may be affected. Repressed inflation at the producer level will show as inventory hoarding, also a widespread phenomenon in planned economies.

3/ Equation (9) is what in market economies would be referred to as the overall public sector budget constraint (which includes state enterprises). Naturally, in planned economies this terminology would make little sense because everything belongs to the "public sector."

#### 4. Temporary increase in wages

A first source of inflationary pressures in planned economies is the rise in nominal wages over and above the planned levels. Although nominal wages were set by the government, there were various means of paying higher wages, through illegitimate use of bonuses and widespread upgrading (Holzman (1955), Chapter 2). 1/ To analyze the effects of a temporary increase in wages, suppose that, up to time T, wages have been as planned. At time T, they are set at a higher level. In T + 1, wages return to their planned level. 2/ Formally,

$$\begin{aligned} W_t &= W^P, & 0 \leq t < T, \\ W_t &= W^a, & t = T, \\ W_t &= W^P, & t > T, \end{aligned} \tag{12}$$

where  $W^a > W^P$  and the superscript "a" stands for "actual." The time path of nominal wages given by (12) is illustrated in Figure 1. 3/ The effects of such a path of nominal wages are summarized in Proposition 2.

Proposition 2. Suppose that the economy is initially in the equilibrium described in Proposition 1. Then, the temporary increase in nominal wages at time T described in (12) causes a permanent increase in the money supply and a permanent monetary overhang.

Proof. The time path described in (12) implies that at time T the wage bill exceeds consumption at official prices; that is,  $W^a > \bar{P}c^P$ . Hence, it follows from (1) that  $M_{T+1} > M_T = M_0$ . Let  $M_{T+1} \equiv M'$ . Since  $W_t = W^P$  for  $t \geq T + 1$ , equation (1) indicates that  $M_t = M'$  for all  $t \geq T + 1$ . Given the

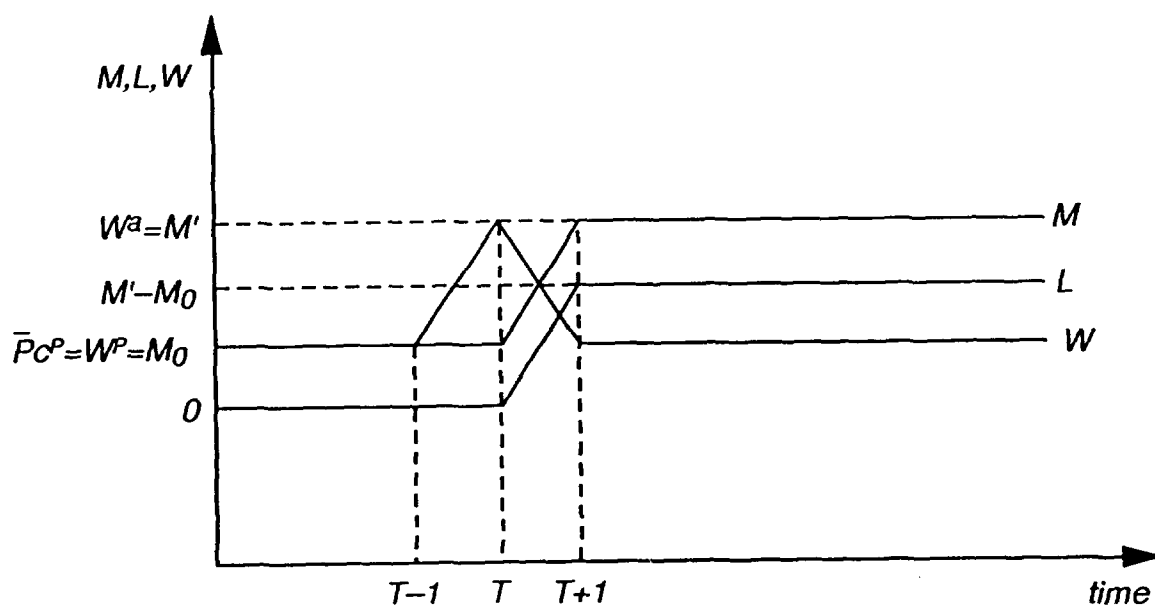
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1/ At times, enterprises could compete for workers, thus bidding up nominal wages. Also, since output targets were often set at unrealistically high levels, enterprises could often justify receiving more cash for wage payments by arguing that it was essential for the plan to be fulfilled. The actual wage bill could thus exceed the planned one, and money would be issued by the state bank to pay for these additional wage payments. In principle, there were various mechanisms designed to prevent enterprises from exceeding their planned wage bill. In practice, however, the fulfillment of output targets invariably took precedence and the planners would accede to enterprises' requests for cash.

2/ Although we have in mind an unexpected wage increase at time T, it does not make any formal difference because expectations do not play any role in this model.

3/ Following common practice, figures 1-5 are drawn with continuous lines joining the discrete values of the different variables. Also, in all analytical figures, it will be assumed that  $c^P = 1$ , so that consumption expenditure can be identified with P.

Figure 1  
Temporary Increase in Wages







time path of  $M$ , it follows from equation (2) that  $L_T = 0$  and  $L_t = M' - M_0$  for all  $t \geq T + 1$ . This proves the claim<sup>1/</sup>

Figure 1 illustrates the time paths of  $M$  and  $L$  (the monetary overhang) derived in Proposition 2. Intuitively, at time  $T$  the wage bill exceeds the public's nominal consumption expenditure. Hence, the money stock at the beginning of period  $T + 1$  reflects the increase in the wage bill. In other words, the money supply fully accommodates the increase in the wage bill. To see this, note that it follows from equation (3) (recalling that  $L_T = 0$ )

$$M_{T+1} = W^a. \quad (13)$$

In period  $T + 1$ , and due to the higher wage bill in the previous period, the public has  $M'$  to spend. Since consumption valued at official prices equals  $M_0$ , however, there is a monetary overhang (i.e., unspent money balances) of  $M' - M_0$ . The reason why the monetary overhang remains constant thereafter is that the wage bill reverts back to its initial level in  $T + 1$ . In fact, it follows, from (3) and the fact that  $L_t = M' - M_0$  for all  $t \geq T + 1$ , that  $M_0 = W^p$  for all  $t \geq T + 1$ . Hence, the monetary overhang absorbs the excess money balances on a permanent basis and the "circulating" money remains at  $M_0$ .

This simple exercise illustrates a key feature of planned economies: shocks to the system result in "higher-order responses." By this we mean that temporary shocks cause permanent changes and, as discussed below, permanent shocks cause an ever-increasing monetary imbalance. In this case, a temporary increase in wages leads to permanent monetary disequilibrium. This is naturally unique to centrally planned economies. If this were a market economy using a single nominal anchor, say  $M$ , then a temporary increase in wages would lead to a temporary increase in the price level. It is important to note that the source of this "higher-order response" to shocks lies in the overdetermination of the system (i.e., both  $P$  and  $W$  are set). If the economy had a single nominal anchor, say  $W$ , then a temporary rise in  $W$  would induce only a temporary increase in  $P$  and  $M$ .

##### 5. Permanent increase in wages

Suppose that the economy is initially in the equilibrium described in Proposition 1 and that there is a permanent increase in wages at time  $T$  (Figure 2). Formally,

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<sup>1/</sup> For the sake of formal completeness, note that since  $L$  is non-negative, this exercise cannot be symmetric. In other words, a temporary reduction in  $W$  cannot lead to a negative  $L$ . In the case of a temporary fall in wages, only a fraction of consumption goods would be sold so that there would be a permanent excess supply of goods.

$$\begin{aligned} W_t &= W^P, & 0 \leq t < T, \\ W_t &= W^a, & t \geq T. \end{aligned} \quad (14)$$

This wage path leads to the outcome described in the following proposition:

Proposition 3. Suppose that the economy is initially in the equilibrium described in Proposition 1. Then, the permanent increase in nominal wages at time T described in (14) causes an ever-increasing path of the money supply and an ever-increasing monetary overhang.

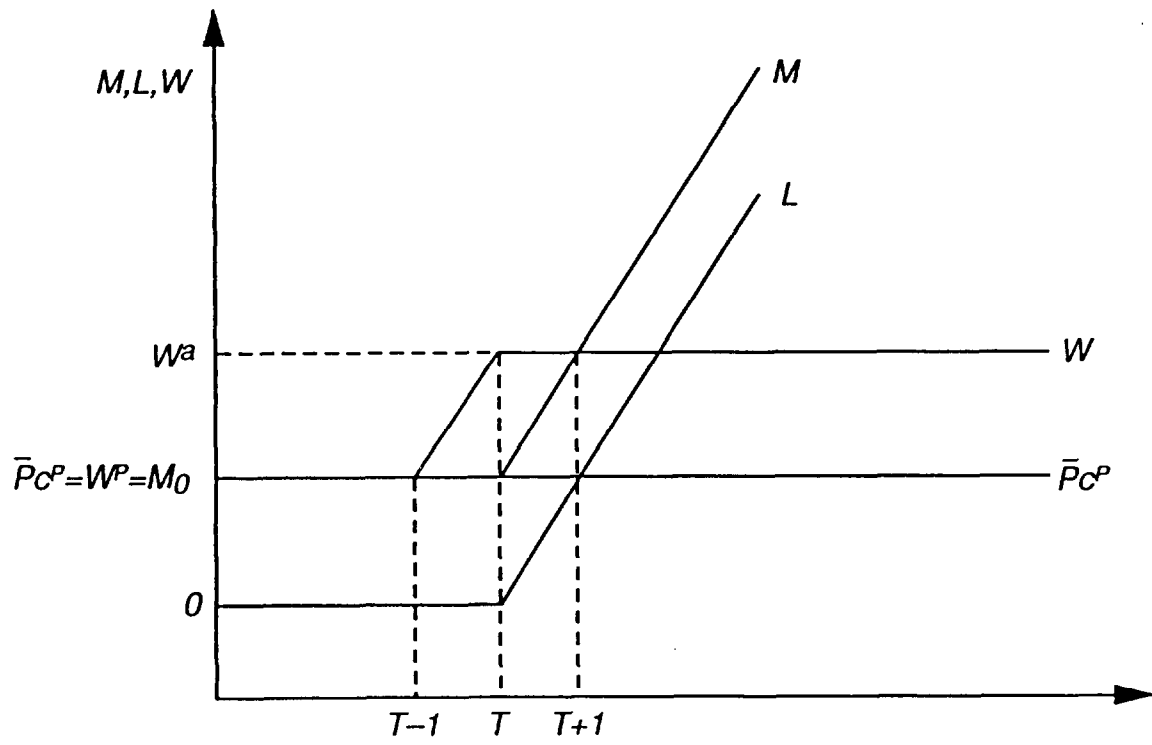
Proof. The time path described in (14) implies that for all  $t \geq T$  the wage bill exceeds consumption at official prices; that is,  $W^a > \bar{P}c^P$ . Hence, it follows from (1) that  $M_{t+1} > M_t$  for all  $t \geq T$ . Furthermore, money increases at a constant rate of change given by  $M_{t+1} - M_t = W^a - \bar{P}c^P$  for all  $t \geq T$ . From the path of M and (3), it follows that  $L_T = 0$  and  $L_{t+1} - L_t = M_{t+1} - M_t$  for all  $t \geq T$  ||

Figure 2 shows the paths of M and L, which increase at the same rate. Intuitively, as in the temporary case, the higher wage bill at time T increases next period's money supply, which cannot be fully spent at official prices, thus generating a monetary overhang. During  $T + 1$ , the public still receives the higher wages, which means that the money supply in the following period will be even higher, and will get reflected in a higher monetary overhang. This process continues indefinitely fueled by the permanent gap between the wage bill and consumption expenditures at official prices. Hence, reflecting the planned-economies' "higher-order" response to shocks, a once-and-for-all increase in the level of nominal wages leads to an ever-increasing monetary overhang.

As suggested above, a second source of inflationary pressures in planned economies was the consistent failure to achieve consumption goods targets. There were several reasons for this. First, if exogenous shocks or planning errors prevented the fulfillment of the plan, producer-goods targets would take precedent and consumer-goods production would be curtailed. Second, over-ambitious investment plans (including defense) also tended to crowd out consumption goods production. As a rule, the consumer goods sector acted as a "buffer" and resources would be shifted away from it when needed (Portes (1977)).

In terms of our model, this would be captured by an "unplanned" increase in nonconsumption expenditures ( $g^P$ ) in equation (5), which would imply that  $c^a < c^P$ . All the results described above would apply to this shock, as it would also get reflected in an excess of the nominal wage bill over nominal consumption expenditures at official prices; that is,  $W^P > \bar{P}c^a$ .

Figure 2  
Permanent Increase in Wages





## 6. Relieving inflationary pressures

The ever-increasing monetary overhang described in Proposition 2 is sustainable over the long haul. In practice, it generates increasing rationing (repressed inflation) which translates into longer and longer queues and black market transactions. To alleviate some of these pressures, it was common in centrally-planned economies to establish a dual price system as a way of dealing with monetary (or goods) disequilibria (Spulber (1957)). Typically, one price would be established for a rationed portion of some goods while the remaining supply could be sold at free markets (mainly at the so-called "collective farms"). This would allow some absorption of the excess purchasing power. Eventually, as supply improved or the entire rationing system collapsed because consumer goods would not be forthcoming at the rationed price, rationing would be eliminated, and prices would be unified at a level between the rationed price and the free price.

To capture such a feature in our model, suppose that a fraction  $\alpha$  of consumption goods are sold at state shops at official prices, while  $1 - \alpha$  are allowed to be sold at free markets. In the presence of free markets, assume that free prices take up all the monetary slack. <sup>1/</sup> Hence,  $L_t = 0$  for all  $t$ . The cash-in-advance constraint (equation (2)) will now read:

$$M_t = P_t c P, \quad (15)$$

where  $P$ , a price index, is given by

$$P_t = (1 - \alpha) P_t^m + \alpha \bar{P}, \quad (16)$$

where  $P^m$  denotes market (or free) prices. In terms of a permanent increase in wages, the implication of the presence of free markets is the following:

Proposition 4. Suppose that the economy is initially in the equilibrium described in Proposition 1. Further, assume that when monetary imbalances occur, a fraction  $1 - \alpha$  of available consumption goods can be sold at free market prices. Then, the permanent increase in nominal wages at time  $T$  described in (14) causes a permanent increase in the money supply and in the level of free market prices.

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<sup>1/</sup> Note that this is a natural assumption to make. Given the stationary nature of the model, reflected in the flat path of consumption goods, there is no reason for the public to engage in voluntary saving. Hence, free prices should bear all the burden of the public's attempt to purchase goods.

Proof. Since  $L_t = 0$  for all  $t$ , it follows from (5) that  $M_t = W^a$  for all  $t \geq T + 1$ . It also follows that  $M_{T+1} - M_T = W^a - W^P$ . The latter, together with (15) and (16), imply that

$$P_{t+1}^m - P_t^m = \frac{1}{1-\alpha} \frac{M_{t+1} - M_t}{cP}, \quad (17)$$

whence it follows, given the path of  $M$ , that  $P_{T+1}^m > P_T^m$  and that  $P_t^m$  is constant for  $t \geq T + 1$ ||

Figure 3 illustrates the paths of the main variables. Proposition 4 tells us that the presence of free markets prevents the ever-increasing monetary instability described in Proposition 3 from occurring. The key reason is that the public is able to spend all of its money, which is received by the enterprises. As a result, the state bank does not need to print additional money next period to pay for the higher wages. Proposition 4 thus provides a rationale for the use of legal free markets in centrally-planned economies.

The assumption that these free prices occur in legally-sanctioned markets is critical. If these were black markets, the money spent in them would not get back to the state system to pay for next period's wages. As a result, the state bank would need to print additional money each period, which would lead to an ever-increasing path of black market prices. In this sense, legally-sanctioned free markets contribute to monetary stability. In practice, of course, it may well be the case that, for some reason (say, some costs associated with transacting in free markets), the public may not be willing to spend all of its "idle" money balances in the free markets. In such a case, there would be a (smaller) monetary overhang (compared to a situation of no free markets), but it would be still increasing over time.

## 7. Stabilization

Given the passive role of money and credit in planned-economies and the lack of alternative financial assets, the traditional tools of inflation stabilization available in market economies (higher interest rates on money substitutes, open market operations, increases in reserves requirements, fixed exchange rates, etc.) are not available in centrally-planned economies. Since planners have only direct (i.e., quantitative) control over money and credit, there are only a limited set of tools available to them. In principle, stabilization tools include (i) control over the money supply through the socialized banking system, (ii) wage and price controls to balance consumer's monetary income and expenditure, and (iii) the ability to manipulate and stabilize traded goods prices through external price equalization accounts.

A key component of stabilization packages in planned economies was the use of monetary reforms. Figure 4 illustrates the effects of a monetary reform in the context of an economy which, as described in Proposition 3,

Figure 3  
Permanent Increase in Wages with Free Prices

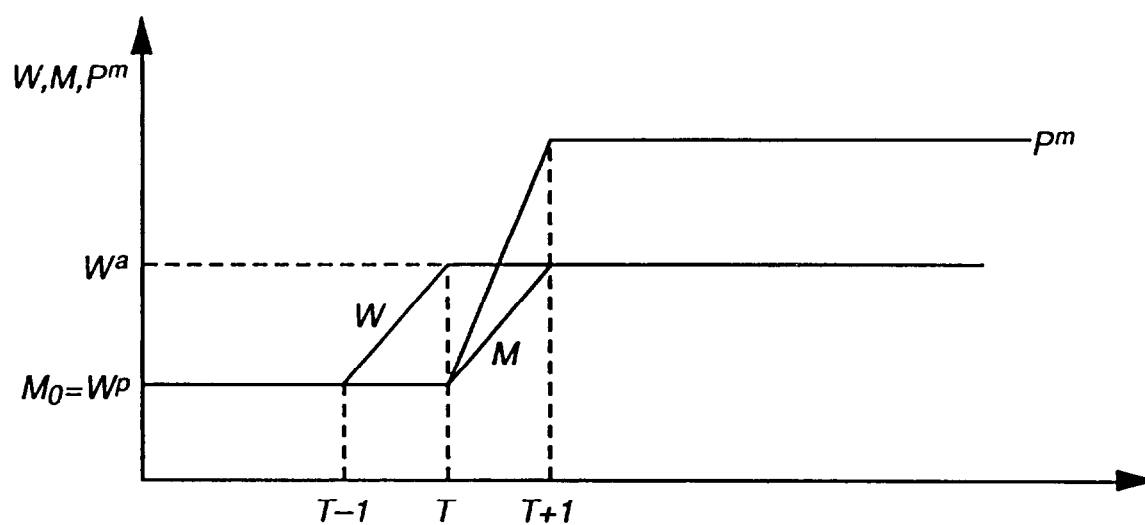
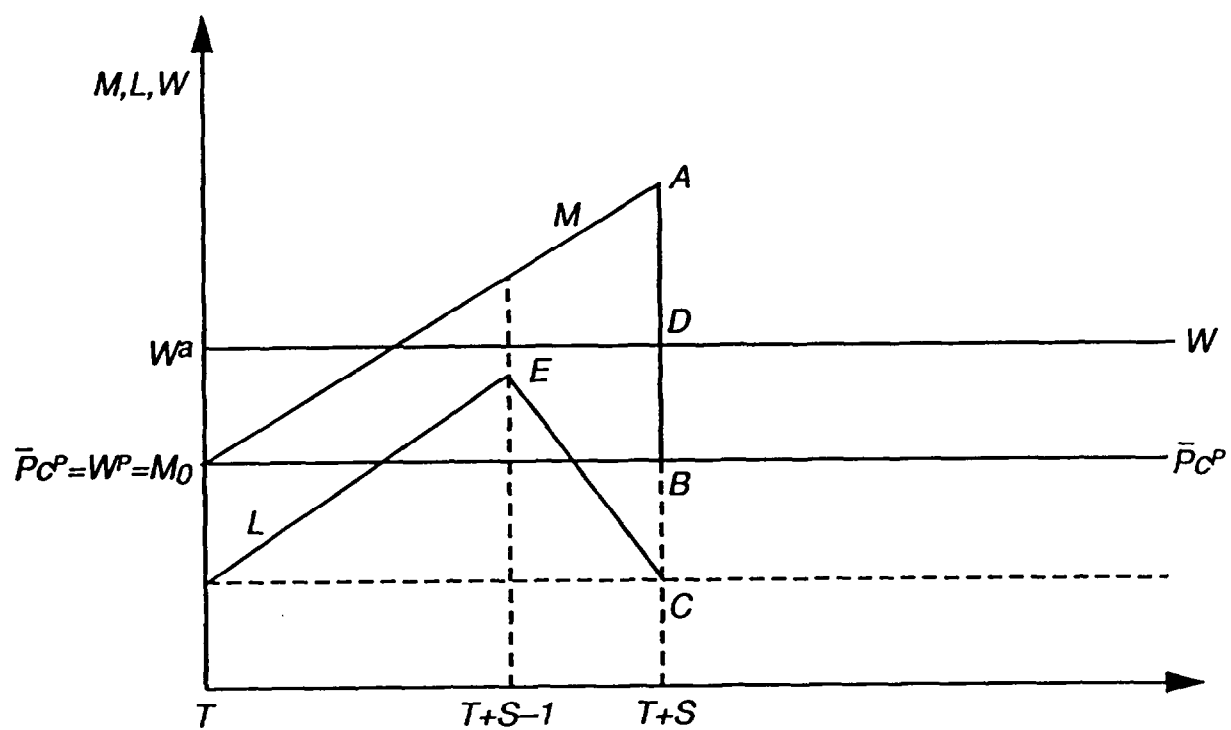


Figure 4  
Stabilization Policies





has been suffering from an ever-increasing monetary overhang since time  $T$ . At time  $T + S$ , a monetary reform is carried out (by, say, exchanging old notes for new notes at a rate of 20 to 1) that reduces  $M_{T+S}$  from point A to B. In other words, the money stock is brought back to its level previous to the wage increase ( $M_0$ ). By equation (2) and the fact that  $\bar{P}c^P = M_0$ ,  $L_{T+S} = 0$ ; that is, the monetary overhang disappears ( $L$  changes from E to C in Figure 4).

The monetary reform thus takes immediate care of the monetary overhang. If no further measures are taken, however, the fact that the flow problem persists (i.e.,  $W^a > \bar{P}c^P$ ) implies that the unstable process described in Proposition (3) will begin anew. To address both the stock problem (the monetary overhang) and the flow problem at the same time--and thus bring back the economy to the situation of monetary stability described in Proposition 1--two courses of action are feasible: (i) reduce  $M$  from A to B and simultaneously reduce  $W$  from  $W^a$  to  $W^P$  (i.e., from point D to point B in Figure 4), and (ii) reduce  $M$  from A to D in Figure 4 and simultaneously increase  $\bar{P}$  from B to D. The second option was the most common in centrally-planned economies, where stabilization usually involved a monetary reform together with an increase in official prices, as in the 1947 Soviet stabilization reviewed below.

#### 8. Price liberalization

To illustrate the monetary problems faced by centrally-planned economies in their transition to market economies, let us analyze the effects of a price liberalization. Suppose that initially the economy is in the unstable situation described in Proposition 3. At the beginning of period  $T + S$ , prices are liberalized (without any further structural change). However, wages remain set by policymakers. Under these circumstances, the economy's adjustment is illustrated in Figure 5. The price liberalization implies that the monetary overhang is immediately eliminated ( $L$  falls from D to B). The money supply at  $T + S$  is predetermined from the past period and remains at point A. Hence, the (now free) price level must jump to a point like A to absorb all the monetary overhang. 1/ In the following period, the money supply falls. To see this, note that since the monetary overhang has been eliminated, it follows from equation (3) that  $M_{T+S+1} = W^a\bar{P}$ . Hence,  $M$  falls from A to C. Intuitively, during period  $T + S$ , the enterprise sector (i.e., the state) receives more money from consumption expenditures than it has to pay in wages (i.e.,  $W^a < P_{T+S}c^P$ ). This implies a reduction in the money supply because in next period enterprises pay only  $W^a$  in terms of wages. 2/ The fall in the money supply implies that the price level falls from A to C.

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1/ Since, for graphical simplicity, we are assuming that  $c^P = 1$ ,  $P$  jumps to the same level as the money supply (point A) because  $M_{T+S} = P_{T+S}$ .

2/ As mentioned before, enterprises' excess money balances would end up as deposits in the state bank, thus reducing the outstanding money supply (Holzman, 1960).

In sum, we have shown that the price level overshoots its equilibrium value in response to a price liberalization when wages remain as a nominal anchor. It is precisely the fact that wages remain as a nominal anchor that allows the economy to achieve macroeconomic stability immediately. Suppose, however, that both prices and wages were liberalized. Then, if M (or the exchange rate in an open-economy version of this model) were used as a nominal anchor, the economy would also adjust instantaneously. In terms of Figure 5, both P and W would jump to point A, which would imply a reduction in real wages.

Suppose, however, that both prices and wages are liberalized but that the instruments necessary to establish an effective monetary control do not yet exist (i.e., the money supply cannot be effectively used as an anchor). Then, this full liberalization would throw the economy into a total nominal indeterminacy since the economy would be left with no nominal anchors. In this context, if wages acted as a de-facto anchor (determined by enterprises which are seeking to maximize workers' income), then both P and M would fully accommodate any wage increases. The economy would thus be highly unstable.

9. A case study: Inflation in the Soviet Union  
and the 1947 stabilization

The early inflationary history of the Soviet Union and the 1947 stabilization provide a textbook example of the factors analyzed above. The Soviet economy suffered from high and sustained inflation during the pre-war period. From 1928 to 1940, the average annual increase in prices was 23.3 percent in state stores and 31.5 percent in collective farms (Figure 6). <sup>1/</sup> Holzman (1960) attributes this protracted rise in prices to two factors. First, labor markets were relatively free at this time and enterprises competed for workers to fulfill their output targets, which led to an average annual increase of 15.8 percent in nominal wages (Table 2). Not surprisingly, the money supply is estimated to have increased at an annual rate of 15.4 percent during the same period, thus fully accommodating the higher nominal wages. The second inflationary factor was a general upward trend in nonconsumption expenditure of the government (investment, education, health, and military), which rose from 1928 to 1936, declined slightly in 1937 and 1938, and then rose again beginning in 1939 as World War II approached.

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<sup>1/</sup> The collective farms markets were (legal) free markets where peasants and collective farms would bring their surplus production for sale or barter. During the same period, industrial goods rose by only 7.9 percent per year. While there was an excess demand, strict controls and rationing prevented producer prices from rising nearly as much as consumer prices. Due to the rapid rise in wages, large subsidies needed to be granted because many enterprises were selling at below cost.

Figure 5  
Price Liberalization

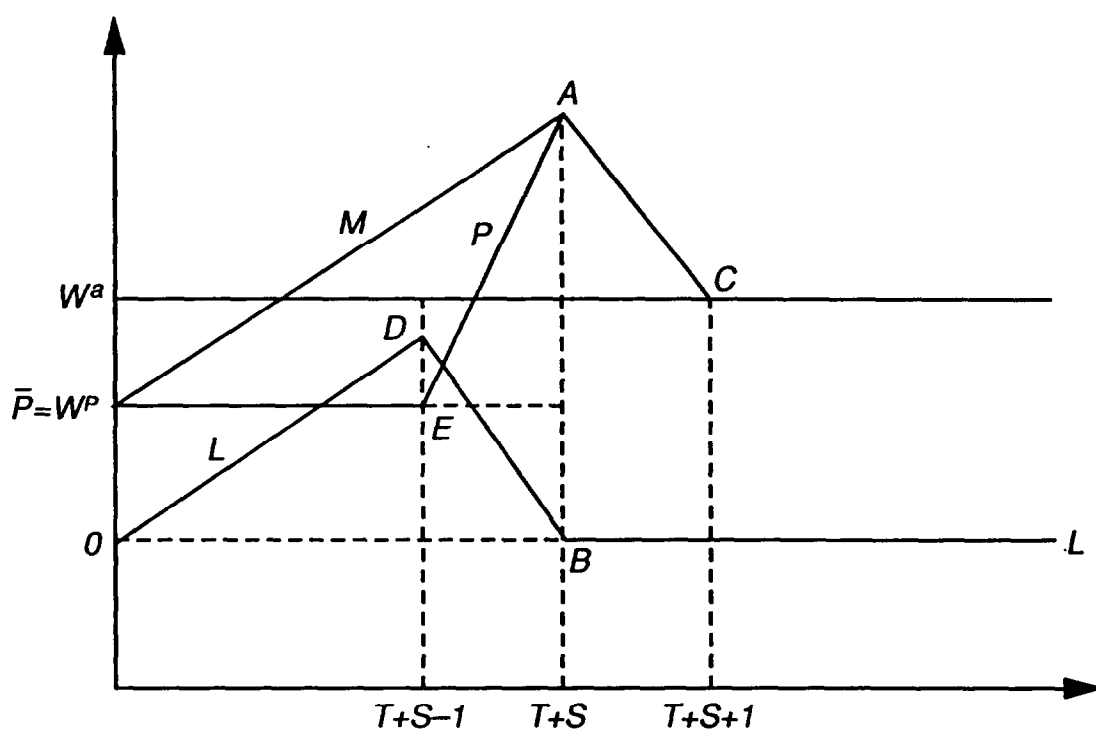


Figure 6. Soviet Union: Prices and Wages, 1928-57

(1928 = 100)

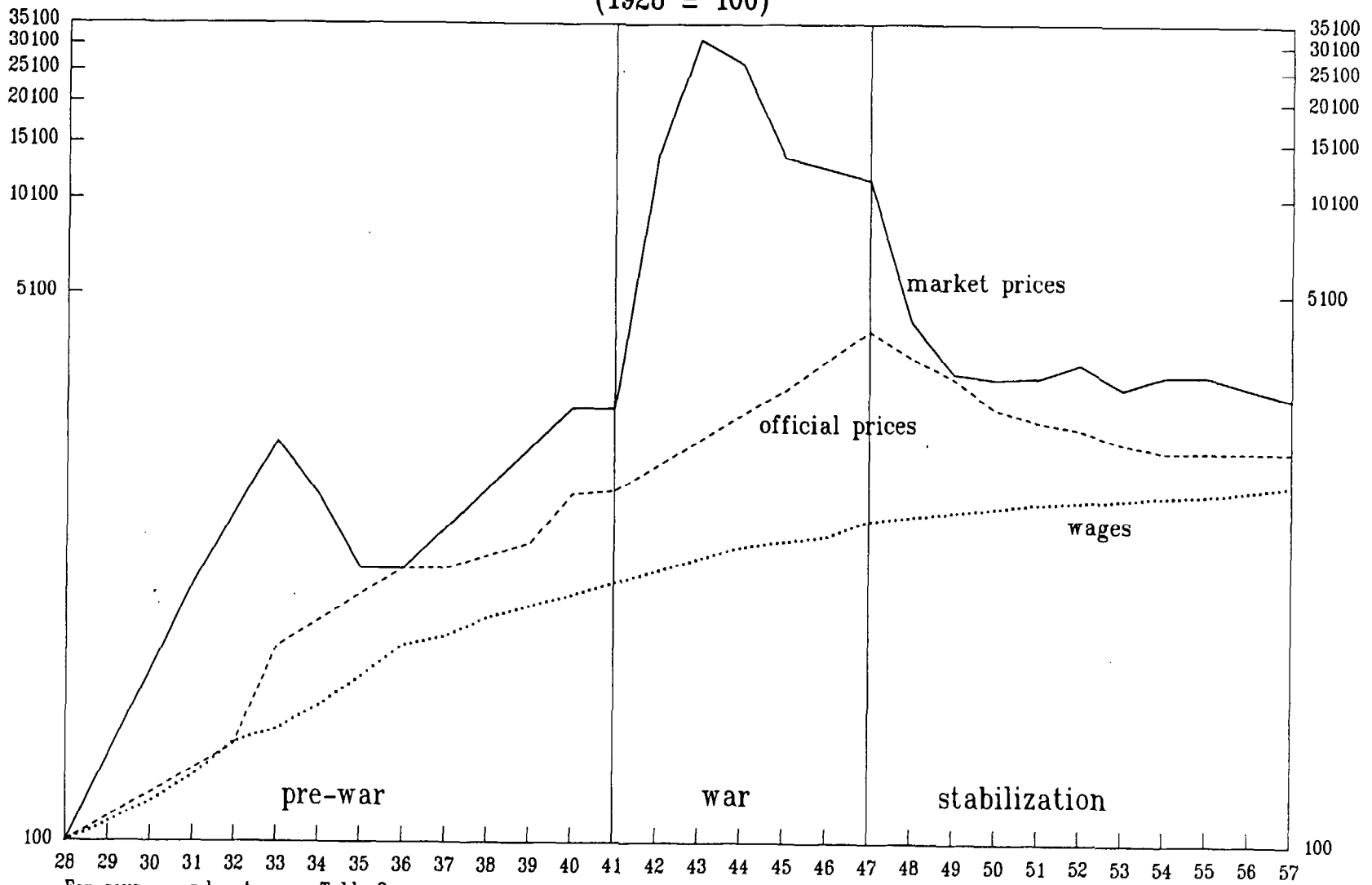


Table 2. Prices and Wages in the Soviet Union, 1928-89

	Retail Prices <u>1/</u>	Market Prices <u>2/</u>	Wages
1929-40	23.2	31.5	15.8
1941-47	18.0	23.2	8.0
1948-55	-10.2	-16.0	2.5
1956-60	0.1	..	2.1
1961-65	0.2	..	3.4
1966-70	-0.1	..	4.4
1971-75	-0.1	4.8	3.6
1976-80	0.7	6.4	3.0
1981-85	1.1	2.0	2.4
1986-89	1.5	2.7	6.0

Sources: Adam (1979), Holtzman (1960), Portes (1977), IMF et.al. (1991).

1/ Retail price indices for goods sold in state and cooperative trade network.

2/ Collective farm market prices.

During the war, official prices actually rose by less than during the period 1929-1940. This was due in part to a much stricter control over payroll over-expenditures and labor immobility during the war. The key inflationary factor during the war, which clearly shows in the early explosive behavior of free prices, was the sharp reduction in consumption goods. The value of goods offered at state stores roughly halved between 1940 and 1942 (Holzman (1960)), leading to an inflation peak in 1943 (Figure 6). From 1944 to 1946, the volume of consumption goods sold at state stores increased rapidly which contributed to a fall in collective farm market prices.

By 1947, however, market prices were almost three times as high as state store prices. The authorities' view was that high commercial prices survived because there was an excess of money in circulation. It was decided, therefore, that the termination of rationing--which had been imposed at the outbreak of the war--had to be accompanied by a monetary reform. Thus, in December 1947, a currency reform was implemented in the Soviet Union, along the lines of the successful 1923 reform (see Siklos (1993)). This monetary reform was based on a drastic reduction of liquid assets. 1/ All cash in possession of individuals was exchanged at the rate of 10 to 1. Bank deposits below 3,000 rubles, however, were exchanged at par, with lower rates applying for larger deposits. 2/ Incomes in nominal terms remain unchanged. The monetary reform was successful to the extent that, on the whole, free market prices by 1949 were roughly in line with prices in state shops (Figure 6).

In addition to attacking the stock problem, the authorities also dealt with the flow problem through a much stricter control over the growth of nominal wages, which grew by only 2.5 percent per year during 1948-55 (Table 2). A 1954 decree substantially strengthened bank controls in a number of ways (Holzman (1960)), including the requirement that enterprises that exceeded their wage funds should make good the overexpenditures in the following three- to five-month period. In fact, it is believed that banks' greater control over enterprise credit play a key role in ensuring the post-war price stability. Given the slow rise in wages, the authorities were able to cut official prices every spring from 1948 to 1954. These reductions, however, may have gone too far since free market prices, which had remained basically stable since 1949, stood 60 percent above official prices in 1953. From 1955 onwards, there was a long period of price stability, with little repressed inflation, as suggested by Table 2. By the mid-1980's, however, inflationary pressures had resurfaced (see Cotarelli and Blejer (1992)).

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1/ This is in contrast to other European monetary reforms during the same period which were based primarily on blocking liquid assets so as to prevent the public from spending them. All in all, there were 24 monetary reforms in Europe between 1944 and 1952 (see Gurley (1953)).

2/ Deposits between 3,001 and 10,000 rubles were exchanged at 3 to 2 and those above 10,000 at 2 to 1.

### III. Sources of Inflationary Pressures in Transition Economies

The primary impetus to inflation in transition economies continues to emerge from the enterprise sector. As under central planning, these pressures are still manifested in large budget deficits and loose monetary policies. Specifically, to the extent that (i) taxes from sources other than state enterprises are difficult to implement and are currently negligible, and (ii) the treasury continues to resort to central banks, the budget constraint of what would now be called the "overall public sector" continues to be given by an equation such as (9). Thus, as this section argues, planned and transition economies do not differ much on the sources of inflationary pressures, but rather on the fact that in transition economies such pressures have led to open, rather than repressed, inflation. 1/

Slow reforms on the structural front have severely impaired the effectiveness of monetary and fiscal policy in controlling inflation. In fact, one could even argue that once such constraints have been removed, the "transition" to a market economy will have been completed. Undoubtedly, the pace of reforms has varied across countries but the emerging picture allows us to make some generalizations. 2/ To understand the forces at work, we will focus on the evolving incentive mechanisms in the financial and enterprise sector and their interaction with the government sector.

#### 1. The enterprise sector

The freeing of prices and wages and the liberalization of the trade and exchange rate regime worsened the enterprises' internal and external environment in several ways. Output demand was no longer guaranteed and enterprises became vulnerable to exogenous shocks. Although the freeing of prices allowed for some monopolistic pricing, external competition rapidly eroded the temporary gains that enterprises may have enjoyed.

The wage-setting framework also changed rapidly: wages were no longer centrally fixed and the state's blessings to receive cash from state banks for wage payments was not guaranteed automatically. In most countries, the bargaining strength of managers, which was earlier derived from a central authority, weakened considerably. In the wake of large scale price increases, enterprises typically faced strong wage pressures. These

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1/ Tables 3 and 4 contain selected economic variables for the transition economies under study, while Tables 5 and 6 summarize the initial conditions, programs, and outcomes.

2/ At the start of the 1990s, the existing institutions in Hungary, the former Yugoslavia, and Poland were more market-oriented than those in other countries in our study. During the 1990s, structural reforms have progressed at a rapid pace in Hungary, Poland, the Czech Republic, and the Slovak Republic; at a moderate pace in Slovenia, Latvia, and Estonia; and a slow pace in Bulgaria, Romania, and Russia.

Table 3. Real GDP and Inflation in Selected Transition Economies, 1989-93  
(Annual percentage change)

	1989	1990	1991	1992	Est. 1993
Real GDP growth					
Bulgaria	-0.5	-9.1	-11.7	-5.6	-4.2
Czechoslovakia	5.0	-0.4	-15.9	..	..
Czech Republic	4.5	-1.2	-14.2	-7.1	-0.3
Slovak Republic	..	..	-14.5	-7.0	-4.1
Hungary	0.7	-3.5	-11.9	-4.4	-2.3
Poland	0.2	-11.6	-7.6	2.6	3.8
Romania	-5.8	-7.4	-15.1	-13.6	..
Croatia	-1.5	-8.5	-14.4	-9.0	-3.2
Slovenia	-1.9	-4.7	-9.3	-6.0	1.0
Estonia	..	-3.6	-11.9	17.0	-2.1
Latvia	..	..	-8.3	-33.8	-12.0
Russia	..	0.4	-12.9	-18.5	-11.5
Inflation rate (period average)					
Bulgaria	6.4	23.9	333.5	82.0	72.8
Czechoslovakia	1.4	10.8	59.0	..	..
Czech Republic	..	..	56.5	11.1	20.8
Slovak Republic	..	..	61.2	10.0	23.2
Hungary	17.0	28.9	35.0	23.0	22.5
Poland	251.1	585.8	70.3	43.0	35.3
Romania	0.9	4.7	161.1	210.3	256.0
Croatia	..	609.9	122.6	663.6	1,516.6
Slovenia	1,306.0	549.7	117.7	201.3	32.3
Estonia	..	..	..	1,069.0	89.0
Latvia	..	..	124.4	951.2	109.0
Russia	2.4	5.6	92.7	1,353.0	896.0
Inflation rate (period end)					
Bulgaria	10.0	72.5	338.9	79.4	63.9
Czechoslovakia	..	19.2	52.1	..	..
Czech Republic	..	..	..	12.7	18.2
Slovak Republic	..	..	..	9.1	25.0
Hungary	18.9	33.4	32.2	21.6	21.1
Poland	639.7	249.3	60.4	44.4	37.6
Romania	..	..	222.8	198.5	295.0
Croatia	..	..	249.5	937.3	1,149.7
Slovenia	..	..	247.1	92.9	22.9
Estonia	..	..	303.1	942.9	35.7
Latvia	..	..	262.4	958.1	34.8
Russia	..	..	144.0	2,322.0	842.0

Sources: National authorities and IMF staff estimates.



Table 4. Real Wages and Fiscal Balance in Selected Transition Economies, 1989-93

	1989	1990	1991	1992	Est. 1993
Real wages (annual average percentage change)					
Bulgaria	..	..	-38.7	12.0	-8.0
Czechoslovakia <u>1/</u>	2.3	3.7	..	..	..
Czech Republic <u>1/</u>	..	..	-17.5	6.1	2.6
Slovak Republic <u>1/</u>	..	..	-46.0	10.0	-4.0
Hungary	-2.0	-1.7	-1.1	1.4	-0.4
Poland <u>1/</u>	-22.6	-25.6	-4.2	-2.4	-2.4
Romania	3.1	5.6	-14.2	-14.9	-14.0
Croatia <u>1/</u>	-3.6	10.0	-21.3	-50.8	-9.6
Slovenia	15.6	-25.9	-10.9	-8.9	16.4
Estonia	..	1.1	..	-38.5	6.0
Latvia	..	..	-16.3	-15.7	0.6
Russia	..	..	..	..	..
Fiscal balance (in percent of GDP) <u>2/</u>					
Bulgaria	-1.4	-12.7	-15.1	-14.8	-18.5
Czechoslovakia	-3.1	-0.4	-2.0	-3.6	..
Czech Republic <u>3/</u>	..	..	..	0.4	0.5
Slovak Republic	..	..	..	-13.1	-7.5
Hungary	-1.3	0.5	-2.5	-8.0	-6.9
Poland <u>4/</u>	-7.4	3.1	-6.5	-6.6	-2.9
Romania <u>3/</u>	8.8	1.2	0.6	-4.6	-0.1
Croatia <u>3/</u> <u>5/</u>	..	-5.8	-4.6	-0.6	-0.8
Slovenia	..	..	2.7	0.2	0.5
Estonia	..	..	4.6	0.8	2.3
Latvia	..	..	6.3	-0.8	0.6
Russia <u>3/</u>	..	..	-16.0	-6.9	-5.7

Sources: National authorities and IMF staff estimates.

1/ End of period.

2/ General government on a commitment basis.

3/ Cash basis.

4/ External interest which is on a cash basis.

5/ Central government.

Table 5. Transition Economies--Initial Conditions in 1990

Countries	Macroeconomic conditions	Growth in late 1980s	Industry, external trade, external debt	Enterprise sector	Key financial sector problems
Bulgaria	imbalanced: large price jump	low positive-stagnant, varied (0-5%)	large heavy industry, CMEA (60-70%), debt high	central control, strong labor	too many banks, bad loans (25% of GDP in 1992) and arrears increasing
Croatia	imbalanced: three digit inflation	negative (1-4%)	balanced industry, west (50-70%), debt high	self-managed, strong labor	moral hazard due to enterprise ownership
Czech Republic and Slovak Republic	balanced: small price jump	low but positive (1-3%)	heavy industry, increasing west orientation (45% by end 80s), debt low	central control, weak labor	bad loans and arrears
Estonia	imbalanced: large price jump	stagnant	mainly light and food, NA but within FSU, mainly Russia, debt low	central control, weak(?) labor	bad loans and arrears
Hungary	balanced: low inflation	low but positive	balanced industry, CMEA and west balanced, latter increasing, debt high	self-managed, weak labor	no major problems
Latvia	imbalanced: large price jump	low or stagnant	mainly manufacturing, NA but within FSU, mainly Russia, debt low	central control, weak(?) labor	arrears
Poland	imbalanced: high inflation and large jump	low but positive (2-4%)	light industry, CMEA and west balanced, latter increasing, debt high	self-managed, strong labor	slowly progressive reforms
Romania	imbalanced: several large jumps	steadily declining (0-6%)	industry (50%), CMEA (60-80%), debt low	central control, strong labor	major arrears problem
Russia	imbalanced: largest price jump	low or stagnant	heavy industry, CMEA and west balanced, debt low but rising	central control, strong labor	arrears and bad loans
Slovenia	imbalanced: three digit inflation	stagnant (-3 to 3%), declining over time	balanced, mostly west (more than 60%), debt low	self-managed, strong labor	moral hazard due to enterprise ownership

Table 6. Transition Economies--Stabilization Programs: Policies and Outcome, 1990-93

Country: stabilization program	Nominal anchors	Wage-setting: ceilings on Wage bill(WB) or Average Wages(AW)	Inflation outcome	Output outcome	Structural reforms outcome
Bulgaria: started in early 1991, continuing	credit ceilings, wage policy	ceiling on WB, tax-based, projected inflation,	at 60-80 percent annual, inertia exists	still negative though at declining rate	slow on all fronts,
Croatia: started in early 1991 <sup>1/</sup>	base money, wage policy	ceiling on WB, penalty tax	three-digit levels (annual) and rising until October 1993	very large and negative	initial good start slowed due to war
Czech Republic, Slovak Republic: started in early 1991	pegged exchange rate, wage policy	ceiling on AW, based on projected inflation, penalty tax	fairly low (20-30% annual)	growth resumed from large drops in 1991	rapid progress in privatization and financial sector
Estonia: started in mid-1992	currency board, wage policy	ceiling on AW, penalty tax	rapidly declining, reached 35% annual by end Dec93	appears to have bottomed out by mid 1993	slow progress
Hungary: started in 1991	pegged exchange rate, temporary wage policy	ceiling until 1991 on WB, penalty tax; now tripartite discussions	low and slowly declining; between 20-30% annual)	growth resuming slowly	gradual pace of reforms continues
Latvia: started in mid-1992	credit ceilings, wage policy	ceiling on WB, penalty tax	rapidly declining; reached 35% 12- month at end Dec93	appears to have bottomed out in mid-1993	rapid privatization of small scale
Poland: started in early 1990, succeeded in 1993	credit ceilings being replaced by indirect control, wage policy	ceiling on both, partial backward indexation, penalty tax,	declining slowly since 1990, reaching 35% in 1993	relatively impressive growth resumed in 1992	progress on all fronts
Romania: started in early 1991, continuing	central bank credit, wage policy	ceiling on AW, partial backward indexation, penalty tax	very volatile, remains very high (250% annual in 1993)	still negative though decelerating	agriculture privatized, others slow progress
Russia: started in early 1992, continuing	central bank credit, wage policy	ceiling on WB, based on multiple of minimum wages, low penalty tax	very volatile, remains very high (nearly 900%) for the second year in 1993	large and very negative for past 3 years (10-20%)	privatization (2/3 of small scale), rest very slow
Slovenia: started in early 1991	base money, wage policy	collective bargaining; "Intervention Law"	rapidly declining, reached about 23% in 1993	growth marginally resumed in 1993	progressing, especially in financial sector

<sup>1/</sup> A stabilization program started in October 1993, with the (implicit) fixing of the exchange rate. Inflation rates have rapidly declined since then.

pressures became stronger when inflation persisted and when administered prices of essential goods were raised from time to time.

It was hoped that the early introduction of bankruptcy laws and rapid privatization would impose hard budget constraints, enable the closing down of inefficient state enterprises, and elicit a quicker supply response in the economies. However, implementation of bankruptcy procedures and privatization of the erstwhile state enterprises in the industrial and agricultural sector has proved more difficult than anticipated. 1/ Thus, most large enterprises are still state-owned, and in the absence of full financial accountability and bankruptcy proceedings, soft budget constraints remain. Furthermore, under such circumstances, even a policy not to subsidize loss-making enterprises is likely to lack credibility (Hardy (1992)).

State firms have little incentive to maximize profits or save for investment purposes. While some have argued that under certain conditions state firms could behave like private firms (see Pinto et al (1993)), it is questionable how this behavior can be sustained in the absence of privatization in the near future. Thus, state firms' main objective during this transition period has been to maximize wage income and/or minimize the social costs of unemployment. Backward wage indexation has been observed in countries like Poland, Romania, and the former Yugoslavia and, in other cases like Bulgaria, Croatia, and Russia, wage compensations linked to past inflation have been given on an ad hoc basis. This can partly be explained by the fact that workers enjoyed a high degree of autonomy in Poland and the former Yugoslavia since the planning days while they appear to have acquired political power during the reform process in Bulgaria, Romania, and Russia. 2/

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1/ While several countries have some form of bankruptcy laws in the books, bankruptcy proceedings have been more the exception than the rule, with the notable exception of Hungary. Progress in privatizing state enterprises is apparent only in the Czech Republic, the Slovak Republic, Hungary, Poland, and Russia. On the other hand, there appears to have been a quick, albeit limited, response from small-scale new private activity in the services sector in practically all countries.

2/ In contrast, in Hungary the incentives structures at the firm level evolved so as to limit wage increases that were not linked to productivity. The emphasis on managerial autonomy and responsibility, on the other hand, helped in establishing a market-type incentive structure at the firm level. In the former Czechoslovakia, wage pressures have been less, partly due to low inflation since the reforms.

## 2. The interplay between the enterprise and financial sectors

Given the limited reforms in the financial sector, credit allocation remains quite inefficient. 1/ Although private banks are emerging, the banking system is still dominated by state-owned banks, which often hold large portfolios of nonperforming loans. Lending to insolvent state enterprises may even be rational if the expectation is that the government will bail them out as part of a larger rescue operation. In many countries (for example, Croatia and Slovenia), state enterprises still hold large shares of banks, which has created moral hazard problems. In other countries, credit has often been allocated on the basis of "political connections" and past client relationships. This has inevitably created credit shortages for probably the more deserving new private activities, particularly in an environment where governments are attempting to stabilize their economies by tightening credit.

Under the central planning system, the state bank performed an important administrative function: it withheld enterprises' tax liabilities to be transferred to the budget. 2/ With the regime change, the onus for paying taxes has shifted to enterprises. Thus, the transition economies found themselves involved in the time-consuming process of implementing new taxes and building a tax administration system from scratch.

An important development in these economies has been the rapid growth of enterprise arrears--to other enterprises, banks and the state budget. 3/ Interenterprise and other arrears can be expected to contribute to current inflation if there is an expectation that banks will be authorized to extend credit in the near future to clear these arrears, with Romania (see Clifton and Khan (1993)) and Russia (in mid-1992) being excellent examples of this phenomenon. 4/

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1/ Varying degrees of progress have been made in financial sector reforms. Financial sector reforms are more advanced in Hungary, Poland and the former Yugoslavia and are progressing much faster in Hungary, Poland, and Czechoslovakia than in other countries. In all transition economies, however, the monobank from the central planning days has been abandoned and a two-tier system established by separating the central and commercial banking functions.

2/ These included profit and turnover taxes, which accounted for virtually all revenues from domestic sources for the state budget.

3/ While a limited extent of interenterprise credit is observed in practically all countries (including industrial ones), the magnitude and rapid growth of such credit in several transition economies has proved to be major source of concern for policymakers.

4/ To address the problem of burgeoning interenterprise arrears in Romania, net arrears under the global compensation scheme in end-1991 were eliminated but, since the flow problem was not addressed, arrears quickly reemerged. A similar scheme was implemented in Russia in mid-1992 but new arrears have surfaced since then.

### 3. Effects of slow structural reforms at the macroeconomic level

There are two main reasons why limited financial and enterprise sector reforms have undermined the effectiveness of monetary and fiscal policy in controlling inflation: first, state-owned banks continue to lend to inefficient firms that may use these loans merely to pay wages and, second, the burden of state enterprises' poor economic performance is directly reflected in the state budget.

The state budget has come under intense pressure on different fronts (Sahay (1992)). Revenues have declined because (i) taxation reforms have usually involved sharp reductions in enterprise taxation rates, (ii) output and profits of enterprises have fallen, and (iii) banks' loan loss provisions are reducing profit taxes from commercial banks. <sup>1/</sup> The introduction of rudimentary tax administration in place of automatic confiscation by the state has reduced the transparency of the system and allowed for tax evasion. Moreover, with the liberalization of the foreign exchange regime, several economies have become rapidly dollarized (Sahay and Végh (1994)), which has reduced the inflationary tax base.

On the expenditure side, although direct subsidies have been mostly eliminated, large quasi-fiscal deficits remain and additional spending has been undertaken aimed at financing the restructuring of banks and enterprises and building a social safety net. These reforms typically have long gestation lags between the time expenditures are incurred and the moment in which an efficient system is in place. In the absence of nonbank sources of financing and limited external sources, the resulting widening of the budget deficit has generally been bridged by money creation. In sum, as far as sources of inflationary pressures are concerned, the situation with respect to the planning days has changed little due to the slow pace of structural reforms.

## IV. Inflation in Transition Economies

For at least a whole generation in Bulgaria, the former Czechoslovakia, Romania, and the former Soviet Union, open inflation in the late 1980s and early 1990s was a stunningly new phenomenon. Open inflation in these countries began as an anticipated (though largely underestimated) economy-wide jump in prices which was, in many cases, followed by sustained high inflation. In contrast, other countries like Poland and the former Yugoslavia inherited high inflation from the socialist days. This section examines the initial price jump and the subsequent inflationary pattern during 1990-93.

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<sup>1/</sup> In Bulgaria, for example, a significant share of profit revenues (more than 80 percent in 1992-93) comes from the banking system. With increasing loan-loss provisioning in the period ahead, the government's tax revenues can be expected to decline in real terms.

1. Price jump and inherited inflation at the start of the 1990s

As the model of Section II would predict, the jump in the price level upon price liberalization in the transition economies seems to have been larger the larger was the initial monetary overhang and the less prices had been freed in the old regime (see below). Furthermore, the model also suggests that, as long as wages remain in check, there will be a price level overshooting following price liberalization. As a matter of fact, all countries had imposed a lid on wage growth at the same time that prices were freed and, while policymakers had anticipated a price jump, the extent of the jump was consistently underestimated (Bruno (1993)). The model thus offers one possible rationale for this underestimation based on the need for the price to overshoot if wages remain controlled. 1/

The largest measured price jumps were observed in the more tightly-controlled economies. In Russia (Figure 7), prices jumped by nearly 300 percent in January 1992. In contrast, the price jump in the other former republics of the Soviet Union, Estonia and Latvia, was less than 100 percent, largely reflecting geographical price dispersion, local monopoly power, and local tax subsidy schemes (Koen and Phillips (1993)). Also, the freeing of some prices before the large-scale liberalization had been more widespread in the Baltic states than in Russia.

In Bulgaria, the price jump in February 1991 was over 100 percent, reflecting the past rigid system of prices, the monetary overhang, and the supply shocks. Given Romania's initial conditions at the start of the reforms (see Demekas and Khan (1991) and Table 4), a large jump in prices would have been expected. By design, however, the price reform in Romania was stretched between November 1990 and May 1993 due to socio-political factors. 2/ The most notable price hike (or rather the lack of it) was in the former Czechoslovakia (about 50 percent in January 1991), which reflects prudent macroeconomic policies in the past (See Aghevli et al. (1992)).

Among the countries with relatively free prices (Poland, the former Yugoslavia, and Hungary), the former Yugoslavia had experienced high inflation rates for the longest period (Table 1). The legacy of double-digit inflation rates for every month since mid-1988--with inflation peaking at nearly 60 percent at end-1989--was passed on to Croatia and Slovenia as they became independent states in the first half of 1990. In an environment of open inflation (ranging from 10 to 55 percent per month) in the previous six months, Poland freed the remaining controlled prices

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1/ Two additional factors that may have accounted for larger than expected price increases in virtually all countries were the supply shocks from unanticipated output declines and monopolistic pricing of state enterprises.

2/ The Romania's experience of gradually freeing prices and frequent adjustment of administered prices in the 1990s is similar to that of Poland in the 1980s.

(with a 50 percent weight in the CPI) in January 1990. The inflation rate jumped from less than 20 percent in December 1989 to nearly 80 percent in January 1990. Hungary had freed prices gradually since 1968 (see Boote and Somogyi (1991)), and inflation rates had been modest until the 1990s. In the past few years, however, annual inflation has risen to two-digit levels, peaking at 33 percent in 1990. Thus, in economies where prices had been partially adjusted to accommodate external shocks (Poland) or largely freed (the former Yugoslavia and Hungary), macroeconomic imbalances had been reflected in open, rather than repressed, inflation, which implied smaller price jumps.

## 2. Open inflation during 1990-93

Following price liberalization, inflation rates were fairly high in virtually all countries (Figure 8 and Table 3), with the notable exceptions of Czechoslovakia (and the Czech Republic and the Slovak Republic) and Hungary. However, a relatively sharp decline in the annual trend becomes visible by 1993 in Estonia, Latvia, Poland, and Slovenia.

In Hungary and Czechoslovakia, annual inflation rates during 1990-93 have been relatively low and falling (Table 3). The four-quarter inflation rates during this period (Figure 9) show some variability that appears to be related to structural measures (such as the implementation of the VAT) rather than to loose macroeconomic policies. <sup>1/</sup> Both countries have progressed at a relatively fast pace in implementing structural reform measures (such as privatization) that have helped in containing the build-up of inflationary pressures discussed in Section III. Moreover, in neither country have wage pressures been important. In Hungary, a history of strong managerial autonomy may have helped in instilling a sense of financial restraint in the enterprise sector, while in Czechoslovakia low open inflation may have prevented a wage-price spiral.

In contrast to Czechoslovakia, the price jump in Bulgaria, Romania, and Russia was followed by open and sustained inflation (Figure 8). It is noteworthy that in all these countries periodic attempts at controlling monetary growth have been made (Figure 10), particularly in Bulgaria during 1991-92. Inflation, however, appears to have persisted due to de-facto wage indexation, real exchange rate targeting, and limited structural reforms, particularly in the areas of nonperforming loans and interenterprise arrears.

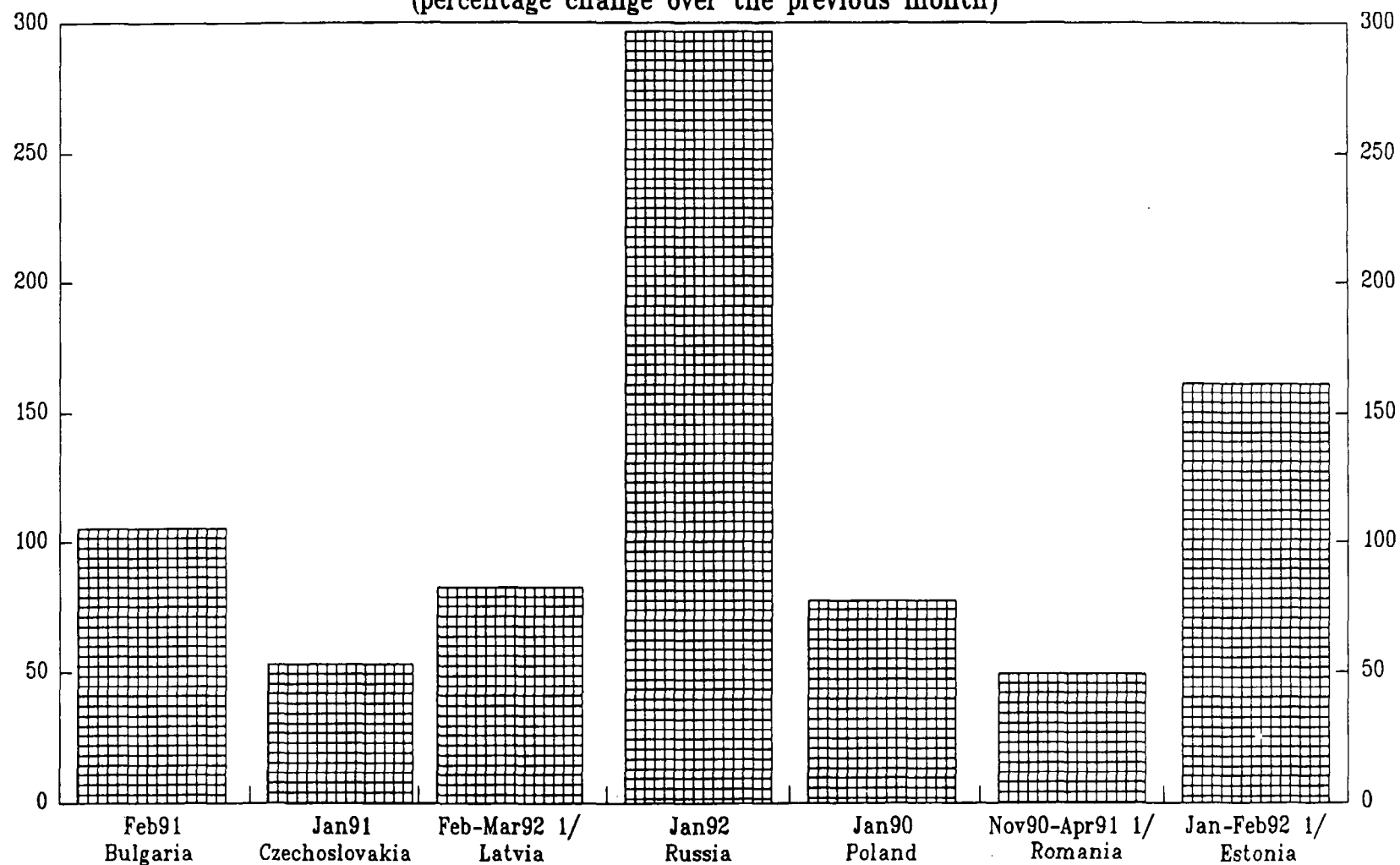
Following the price jump in Estonia and Latvia in early-1992, inflation rates have declined very rapidly (Figure 9). The large declines appear to be related to rapid currency reforms and strong fiscal measures

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<sup>1/</sup> Some have argued that macroeconomic policies in Hungary have been "loose" during 1992-93, given high budget deficits, high external debt, and double-digit annual inflation. Inflation, however, has been falling since 1991 and is so far among the lowest in the region.



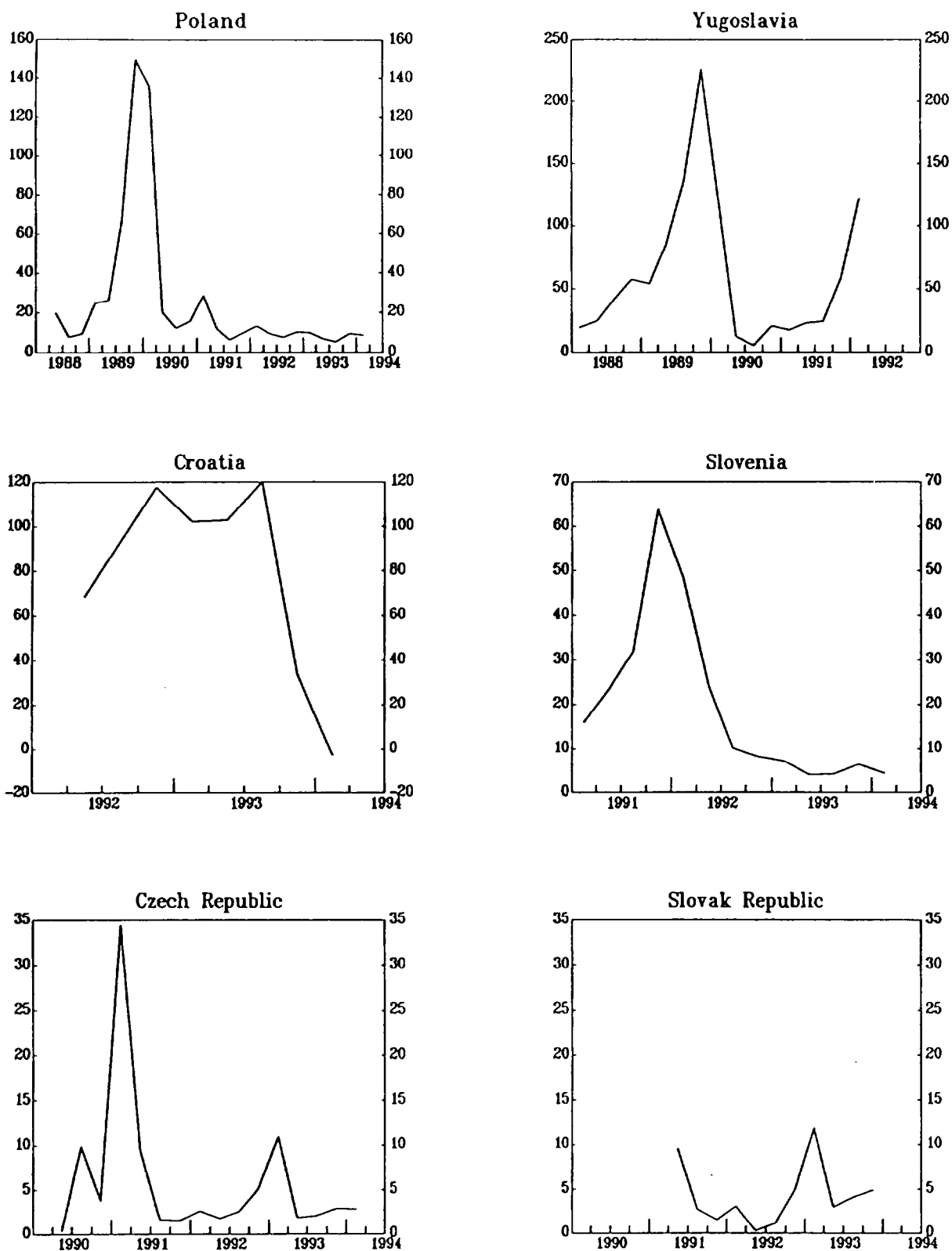
Figure 7. Price Jump(s) in Selected Transition Economies  
(percentage change over the previous month)



Sources: National authorities and IMF staff estimates.

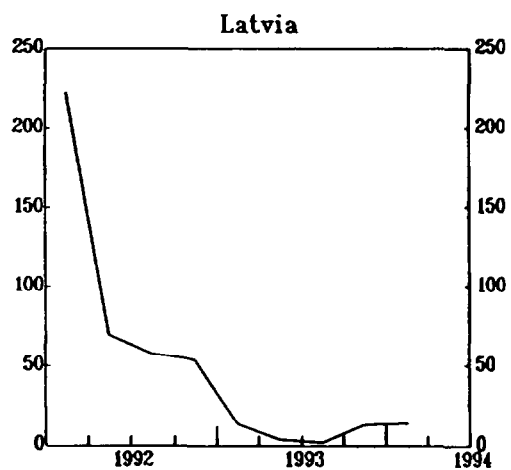
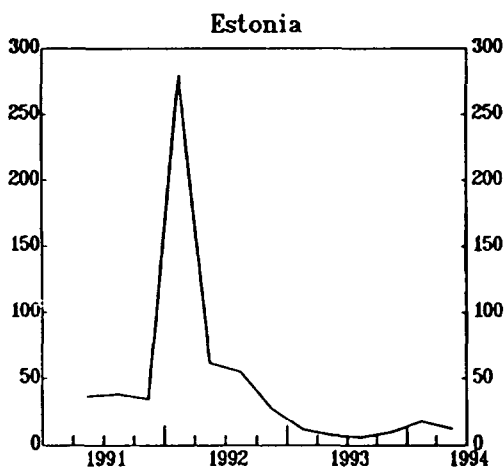
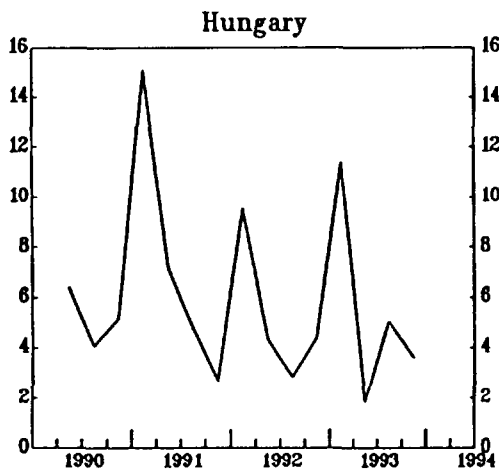
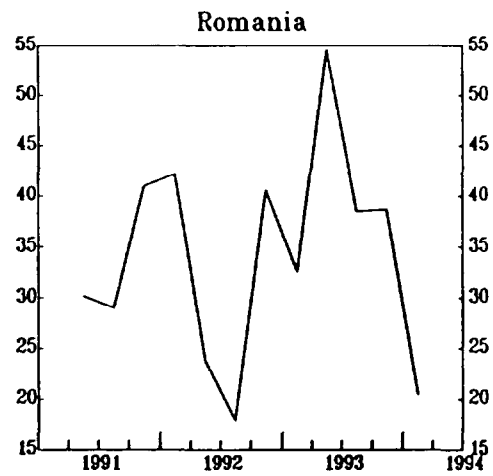
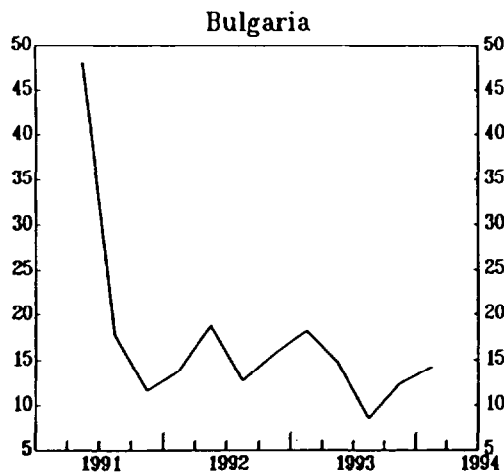
1/ In Estonia and Latvia large price jumps were observed over two successive months. In Romania, prices were gradually liberalized and the two main jumps were observed in Nov 91 and April 91.

Figure 8. Inflation in Selected Transition Economies  
(quarterly percent changes)



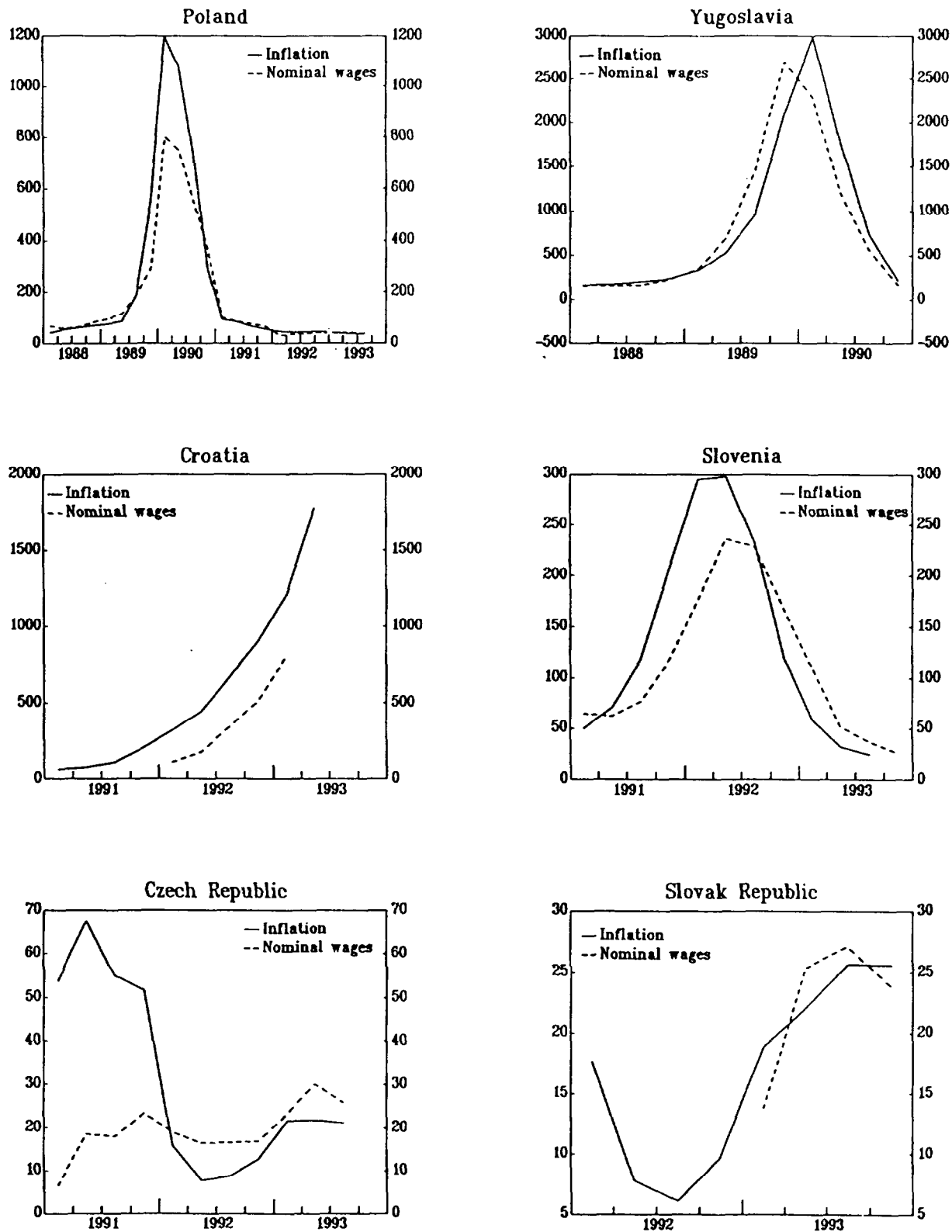
Sources: National authorities and IMF staff estimates.

Figure 8(Concluded). Inflation in Selected Transition Economies  
(quarterly percent changes)



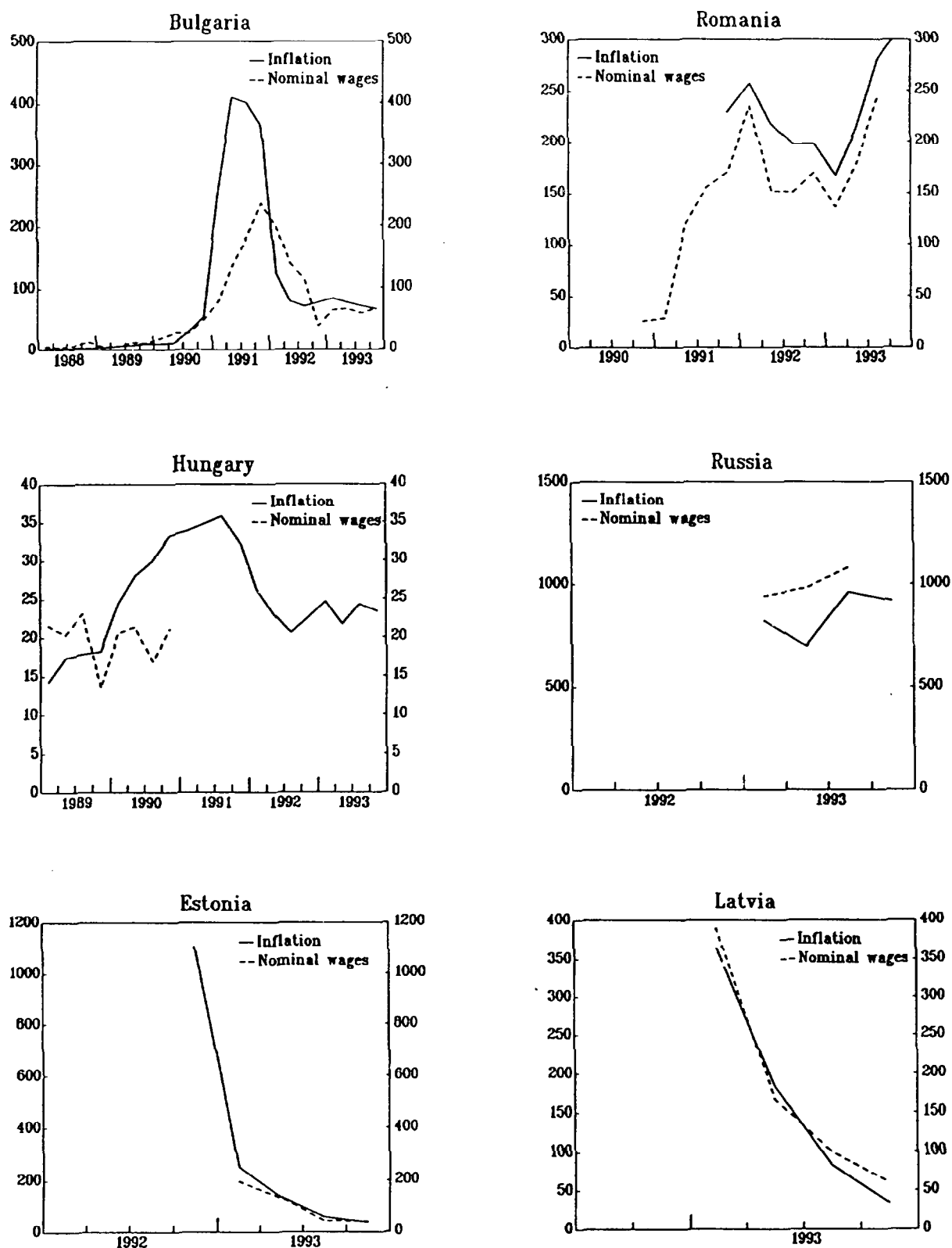
Sources: National authorities and IMF staff estimates.

Figure 9. Inflation and Nominal Wages in Selected Transition Economies  
(4-quarter percentage change)



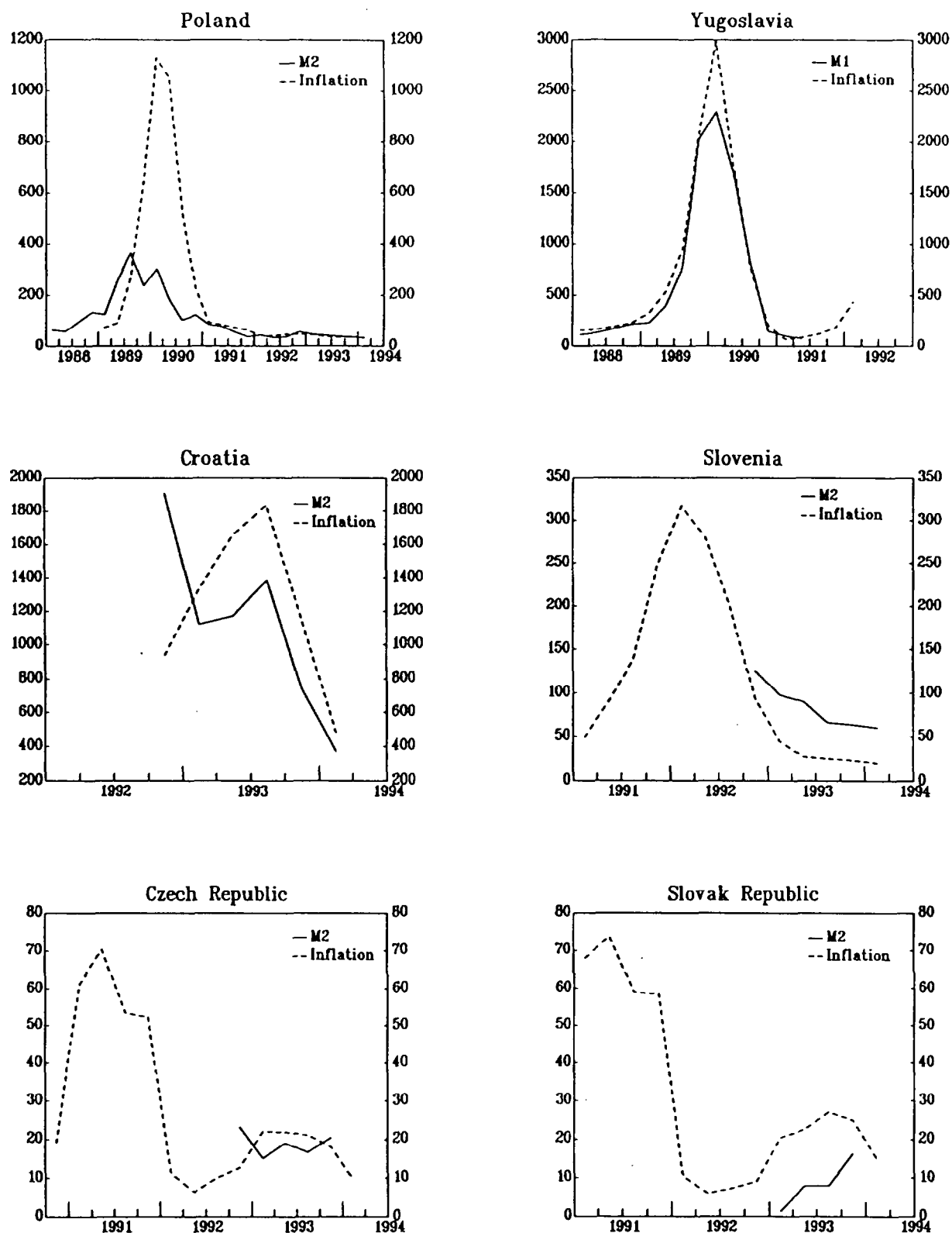
Sources: National authorities and IMF staff estimates.

Figure 9 (Concl.). Inflation and Nominal Wages in Selected Transition Economies  
(4-quarter percentage change)



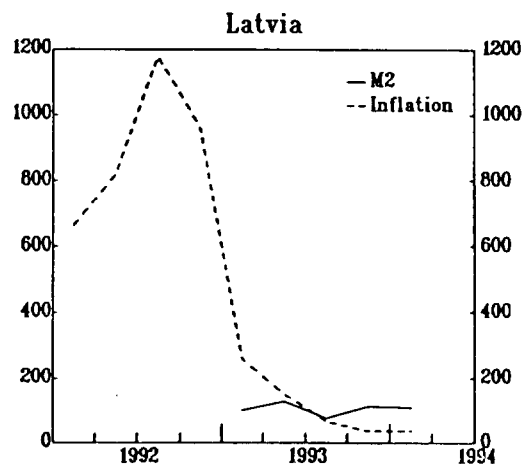
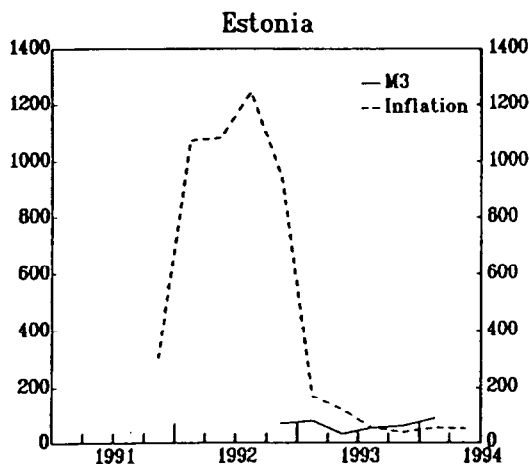
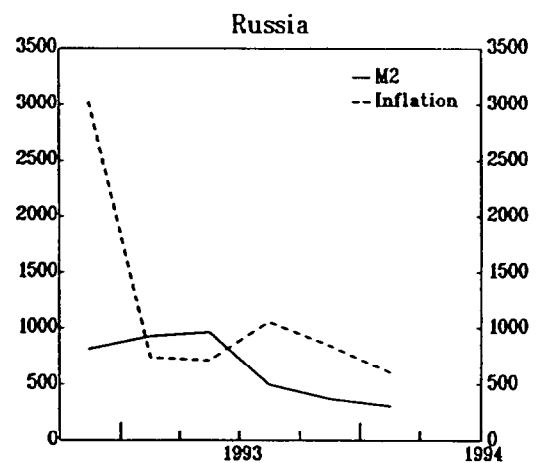
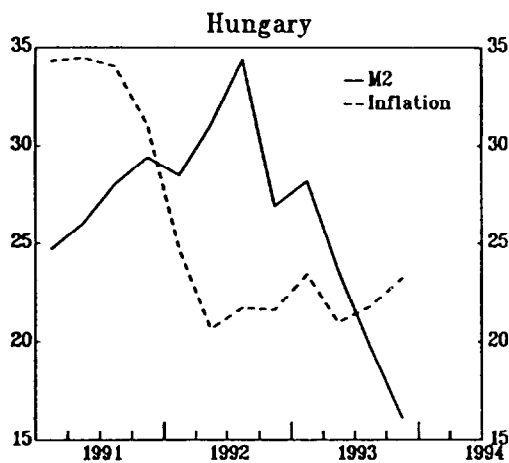
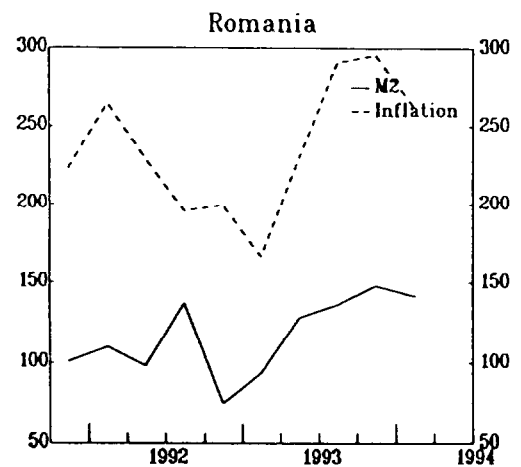
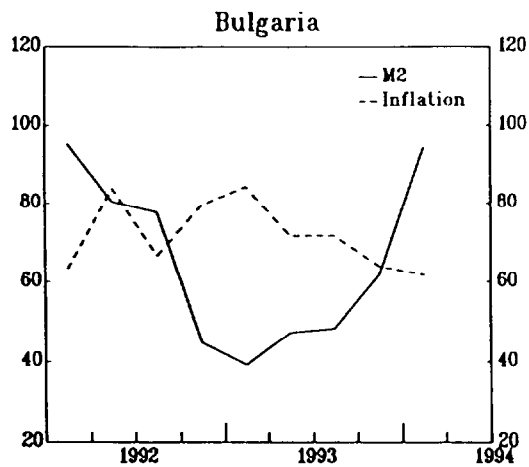
Sources: National authorities and IMF staff estimates.

Figure 10. Money and Inflation in Selected Transition Economies  
(4-quarter percentage change)



Sources: National authorities and IMF staff estimates.

Figure 10 (Concluded). Money and Inflation in Selected Transition Economies  
(4-quarter percentage change)



Sources: National authorities and IMF staff estimates





taken in both countries (see Table 4), in the context of stabilization programs reviewed in the next section. The progress report on other structural reforms is so far mixed in these two countries.

Among the countries that inherited high inflation (Poland, Croatia, and Slovenia), Poland and Slovenia appear to have successfully stabilized by end-1993 (Figure 9). In contrast, inflation continued to rise in Croatia until the third quarter of 1993. <sup>1/</sup> Although all three countries faced wage pressures from strong labor unions, the existence of a large private sector and the continuation of market-oriented reforms that began before the 1990s appear to have established the structural preconditions for a sustained stabilization effort. Consequently, the implementation of strong macroeconomic policies in Poland and Slovenia, particularly in 1992-1993, helped in sharply reducing inflation.

In sum, the general picture that emerges is that sound macroeconomic policies have been successful in containing inflation when institutional or structural reforms have gone hand in hand. On the other hand, in countries where structural rigidities inherited from the planning era still exist, inflation has been sustained by accommodative/exchange rate policies.

#### V. Inflation Stabilization in Transition Economies

The experience of most transition economies has been truly singular in one respect: stabilization policies have gone hand in hand with large scale liberalization of macroeconomic variables and initiation of structural reform measures. The exceptions in this respect have been Hungary, which continued its gradual reforms, and Slovenia and Croatia, which inherited the relatively advanced market-based institutions of the former Yugoslavia. The simultaneous occurrence of structural and macroeconomic developments makes it difficult to disentangle the effects of specific policies. With this caveat in mind, this section discusses primarily the effects on inflation of stabilization programs during 1990-93 based on the different nominal anchors which were used (see Table 6).

Countries that relied on a money anchor include Bulgaria, Croatia, Latvia, Romania, Russia, and Slovenia. In contrast, the former Czechoslovakia (and the Czech Republic and the Slovak Republic), Estonia, Hungary, the former Yugoslavia, and Poland resorted to an exchange rate anchor. Irrespective of the initial conditions at the start of their comprehensive reform programs, and regardless of whether money or the exchange rate was used as the main nominal anchor, wage policies were an integral part of all stabilization packages. Hence, most programs relied

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<sup>1/</sup> With the introduction of (an implicit) fixed exchange rate regime in Croatia in October 1993, inflation rates have declined very rapidly reaching low single digit monthly rates (sometimes negative) in the first half of 1994.

on two nominal anchors: (public sector) wages and money or the exchange rate.

1. Wage policies

All countries felt compelled to adopt public sector wage policies to prevent wage-price spirals until enterprise governance was put in place or privatization occurred. As illustrated in the model of Section II, the simultaneous liberalization of wages and prices in a command economy has the potential of leaving the economy without any nominal anchors. In this light, it is not surprising that establishing some control over wages in the overall public sector--which still constituted most of the economy--was viewed as an essential tool in controlling inflation. 1/

Wage policies in virtually all countries were based on a penalty tax on excess wages in the public sector. The wage norm was defined either in terms of average wages (Czechoslovakia, the Czech Republic, the Slovak Republic until end-1992, Estonia, Poland since 1991, and Romania) or the wage bill (Bulgaria, Croatia during a limited period, Hungary until end-1991, Latvia, Poland until 1990, and Russia). 2/

Wage policies were abolished in the Czech Republic and the Slovak Republic in 1993, but were reinstated in the Czech Republic in the second half of 1993, and in the Slovak Republic in 1994. In Slovenia during 1989-92 wages were set by collective bargaining between worker unions and employer's association and an "Intervention Law" was passed limiting wage growth. At end-1991, the excess wage tax policy in Hungary was abolished and replaced by tripartite discussions.

Interestingly enough, the tax-based incomes policy did generate revenues in several countries including Bulgaria, Latvia, Russia, and, particularly, in Poland, albeit with decreasing importance. 3/ Despite adverse conditions (such as high inflation and strong labor unions), ceilings at the aggregate level were met in Bulgaria during 1991 and 1992. In contrast, Poland (in 1990) and Romania (in 1991 and 1992) exceeded these ceilings by large margins. Although in most cases the growth in the wage norm was based on projected inflation, in some cases ad hoc compensation for past inflation was given from time to time (Bulgaria and Romania).

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1/ An interesting feature was that none of the countries opted to freeze wages to stabilize the economy, with the exception of the former Yugoslavia where wages were frozen for a short period in 1989.

2/ Latvia (during 1991) and Poland adopted partial indexation of wages based on past inflation.

3/ During 1991-93, revenues from excess wage tax in Poland accounted for 3, 1.5, and less than one percent of GDP, respectively.

## 2. Money-based programs

Uncertainty regarding the "equilibrium" exchange rate and inadequate foreign exchange reserves were two factors that persuaded some countries to adopt money as the key nominal anchor in the program (in addition to wage policies). As a consequence, several countries--Bulgaria, Croatia (until October 1993), Latvia, Romania, Russia, and Slovenia--adopted a "flexible" exchange rate system, in most cases a managed float. <sup>1/</sup>

Money-based programs have generally not been successful in reducing inflation on a sustained basis, with the notable exception of Latvia and Slovenia (see Figure 8). There are two main reasons why money-based programs may have failed in Bulgaria, Romania, and Russia. First, for reasons discussed below, money could not be effectively used as an anchor, and, second, each of these countries had made little headway in reforming the old structures and institutions, which contributed to sustaining the inflationary process. <sup>2/</sup> The case of Croatia, a country with more advanced market-based institutions, is different in that the government appears to have been unable to launch a credible stabilization program due to the ongoing war until end-1993.

The main factors that appear to have undermined the use of money as an anchor are (i) unpredictability in the velocity of money, (ii) lack of instruments of monetary control, (iii) rapid dollarization, and (iv) setting targets on variables (such as reserves and real exchange rates) that may have been inconsistent with monetary targets. Specifically:

(i) As in any uncertain macroeconomic environment, it has not been easy to predict the behavior of the velocity of money. The usual problem--which also applies to market economies--is that, although one can expect velocity to decline as the economy stabilizes, it is difficult to predict a priori the magnitude of the decline, especially when stopping high inflation. In addition, there is a complication which is rather unique to the transition economies. Specifically, one would expect to see an important increase in the number of market transactions as economies free their economic regimes, which should lead to an increase in money demand (or a decline in velocity), independently of the effects of the stabilization program. If targets on money are set by taking into account only the effects of the stabilization program, there would be a tendency

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<sup>1/</sup> As of October 1993, Croatia has informally pegged its exchange rate, and inflation has rapidly declined and even been negative during some months in 1994. It should also be mentioned that during 1994 Latvia appears to be pegging its currency to the SDR (Hansson and Sachs (1994)).

<sup>2/</sup> Sachs (1994) discusses several institutional factors that are contributing to the current financial crisis in Russia, and espouses using the exchange rate as a nominal anchor. The co-existence of soft budget constraints and rapid and large scale privatization in Russia appears surprising, but can be explained by the fact that, in practice, these firms continue to behave as state firms with the state's blessings.

to underpredict the decline in velocity. Thus, programs with money anchors may have failed because targets on money were too tight to begin with and could not be sustained. 1/

(ii) One of the major drawbacks for the transition economies that adopted money as their nominal anchor in stabilization programs was that the monetary policy tools available to policy-makers were limited: open market operations were not an option in most countries and reserve requirements were not effective enough by themselves. The most common approach has been to set bank-by-bank credits ceilings, a practice that is fraught with moral hazard problems if the banking system is dominated by state-owned banks that were previously branches of the central bank. 2/

(iii) In most cases, monetary control has also been hindered by the rapid pace of dollarization (or a rise in the share of the foreign component of money supply). Evidence on dollarization ratios (defined as the ratio of foreign currency deposits to broad money including foreign currency deposits) indicates that the range has varied from 0 to 10 percent at the start of the reform program, to 30-70 percent by end-1993 (Sahay and Végh (1994)). If inflation is mainly determined by broad money (inclusive of foreign currency deposits)--which is likely to be the case in a highly dollarized economy--then the effectiveness of monetary policy in reducing inflation may be severely impaired by the presence of dollarization. 3/

(iv) In several instances, monetary control was hampered by large-scale intervention in foreign exchange markets aimed at smoothing out exchange rate fluctuations, ensuring sufficient foreign exchange reserves with the monetary authorities, and targeting the real exchange rate. In Russia, for example, the exchange rate policy pursued during the second-half of 1993 could arguably be described as a flexible target zone policy (Koen and Meyermans (1994)). In Bulgaria and Romania, there has also been intermittent intervention to prevent rapid depreciation of the domestic currency. In other cases, like Croatia, real exchange rate targeting rules have been in effect, which are known to introduce an inflationary bias (see Calvo, Reinhart, and Végh (1994)).

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1/ Periods of tight monetary policy have been observed during the initial stages of reform in countries which have not yet stabilized, like Bulgaria, Romania, and Russia (see Figure 10).

2/ In some countries (Croatia and Slovenia), however, where indirect instruments of monetary control were fairly well developed, targets on base money were set.

3/ This notion is supported by the evidence for Uruguay--a highly dollarized economy--presented in Hoffmaister and Végh (1994). They find that the monetary aggregate that policymakers can control (i.e., narrow money) has little effect on inflation compared to using the exchange rate as an anchor.

As indicated below, money-based stabilization appears to have succeeded in reducing inflation in Latvia and Slovenia. A key factor behind these programs was a drastic fiscal reform, with both countries having fiscal surpluses during 1991-93. In Latvia, two transitional measures that may have helped in balancing the budget were (i) the reduction of enterprise tax arrears (four percent of GDP) by government confiscation of inventories and the introduction of insolvency proceedings against enterprises in arrears, and (ii) the June 1992 measures aimed at improving the inter-enterprise payments system through the banks and the introduction of pre-payment before delivery. However, Latvia is still lagging behind in several areas of structural reforms in the enterprise and financial sector that may undermine the fiscal reforms in the future. Therefore, the progress on Latvia needs to be carefully watched since the stabilization process may be difficult to sustain if fundamental reforms are not instituted at the enterprise level.

As mentioned earlier, Slovenia already had reasonably advanced market-based institutions, including indirect instruments of monetary control. A key institutional change was the curtailment and subsequent elimination of automatic access to central bank credit to finance budget deficits in late 1991-early 1992, an important factor in building credibility. It had also inherited an excellent payments system that could prevent repeated defaults on loans and arrest the growth of arrears (interenterprise or otherwise). The efficiency of the financial sector also increased with the changes in the ownership structure of banks due to large-scale foreign participation.

In all countries, output collapsed during the stabilization program. In the two successful cases (Latvia and Slovenia), output fell markedly but the decline is decelerating in Latvia and appears to have bottomed out in Slovenia by end-1993 (see Table 3). However, due to the large negative supply shocks experienced by all transition economies, it is difficult to assess to what extent the output fall was related to the monetary contraction.

### 3. Exchange rate-based stabilization

So far all exchange-rate based stabilization programs in transition economies appear to have been successful in reigning in inflation, even when the fiscal adjustment was initiated but not completed (as in Hungary, Poland, and the Slovak Republic), and regardless of the starting market-based institutions (Table 4 and Figure 8). Czechoslovakia (and later the Czech Republic and the Slovak Republic) and Estonia were among the most rigidly-controlled planned economies, while Poland, Hungary, and the former Yugoslavia had instituted some market-based reforms in the 1980s (or even earlier as in the case of Hungary). Naturally, an important precondition to adopt the exchange rate as an anchor has been the availability of adequate foreign exchange reserves to support the exchange rate.

The two earliest exchange rate based programs were that of the former Yugoslavia (December 1989) and Poland (January 1990). <sup>1/</sup> In both cases, the exchange rate was frozen after an initial devaluation (Figure 11). During the initial stages of both programs, output declined sharply, the real exchange rate appreciated, and inflation came down sharply. Both programs used wages as an additional nominal anchor. In Yugoslavia, wages were in principle frozen for six months as part of the stabilization package, but this measure was not actually implemented because the federal government was unable to keep republican authorities' from granting exceptions. In Poland, a tax-based wage policies was adopted, as discussed in the previous section. The wage ceilings, however, were breached by large amounts in 1990 and marginally in 1991. The Yugoslav program got rapidly off track as enterprises continued to run losses and wages ceilings were violated. In the Polish case, the exchange rate policy eventually switched to a crawling peg in October 1991. The program has been successful in that the 12-month inflation rate has been reduced to around 30 percent by end-1993.

It can be argued that Hungary and the former Czechoslovakia (and later the Czech Republic and the Slovak Republic) never really had an inflation stabilization program in a conventional sense because of past balanced macroeconomic policies. Soon after Czechoslovakia split in early 1993, the Slovak Republic did experience a temporary loss of confidence as the budget deficit widened considerably (due to the cessation of transfers from Czech lands) and external reserves were depleted to very low levels. In response, a fairly tight credit policy was imposed and the exchange rate continued to be used as an anchor (after a one-time devaluation when the break-up took place), which helped in containing inflation and reboosting confidence. In general, these countries were able to sustain such policies, partly due to the faster pace of structural reforms and wage restraints discussed above.

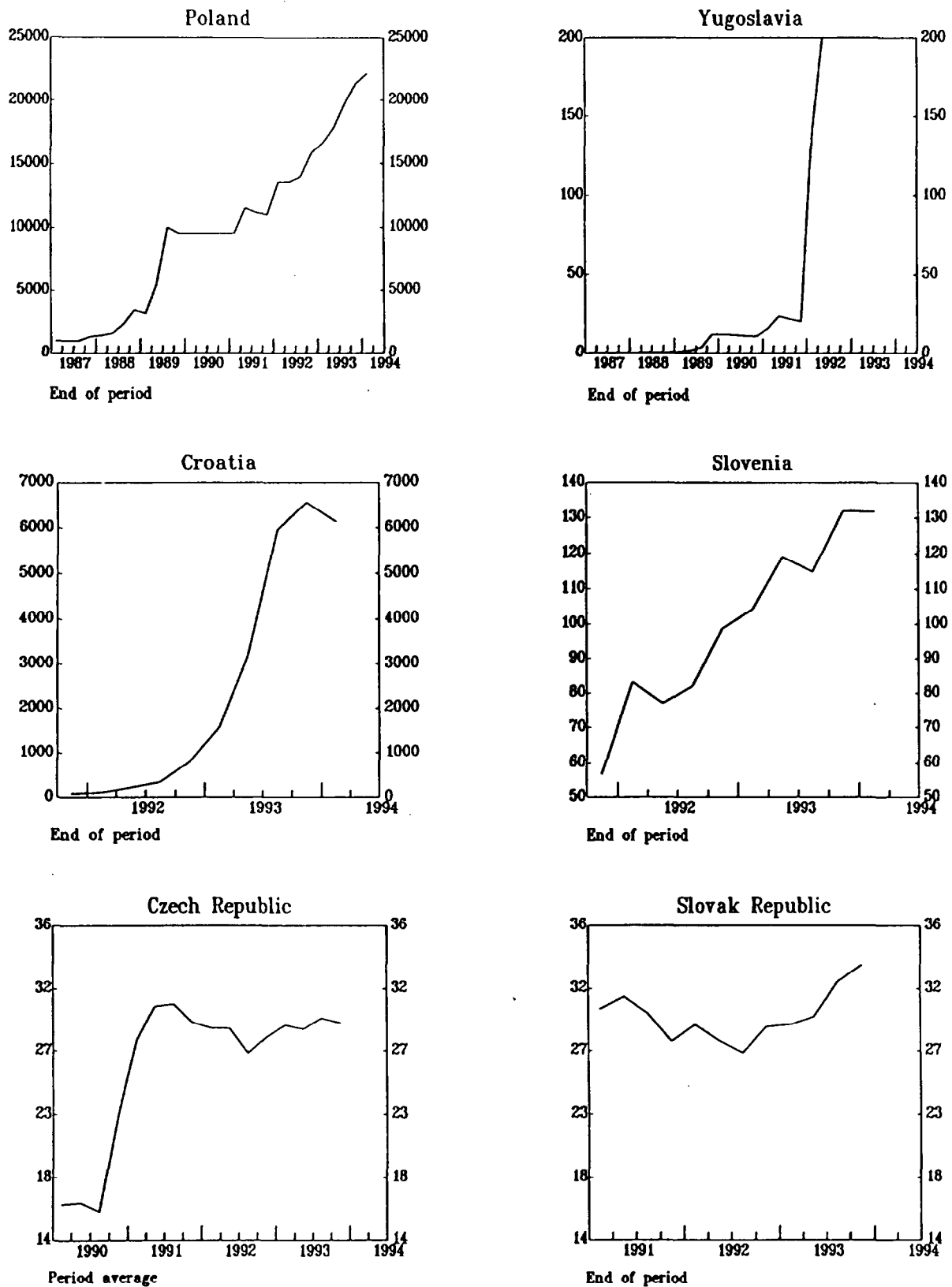
Perhaps the most radical exchange rate-based program in transition economies has been the one adopted in Estonia in June 1992 (see Bennett (1992) and Hansson and Sachs (1994)). A currency board was set up with the full backing of kroon notes and banks' reserve deposits and convertibility into deutsche marks at a fixed exchange rate. Such a move immediately arrested the inflation imported from Russia. Annual inflation declined from over a 1,000 percent at the time the plan was implemented to 35 percent by end-1993. Output began to recover by mid-1993. The absence of strong labor unions appears to have kept a check on wage increases.

In all cases, output has fallen sharply during the stabilization programs. It is very difficult, however, to disentangle the different causes behind the output decline. As reviewed in the next section, exchange rate-based stabilizations in high inflation market economies have tended to produce an initial boom followed by a later recession. In transition economies, however, it is likely that the output effects of stabilization per se may be minor compared to those which stem from

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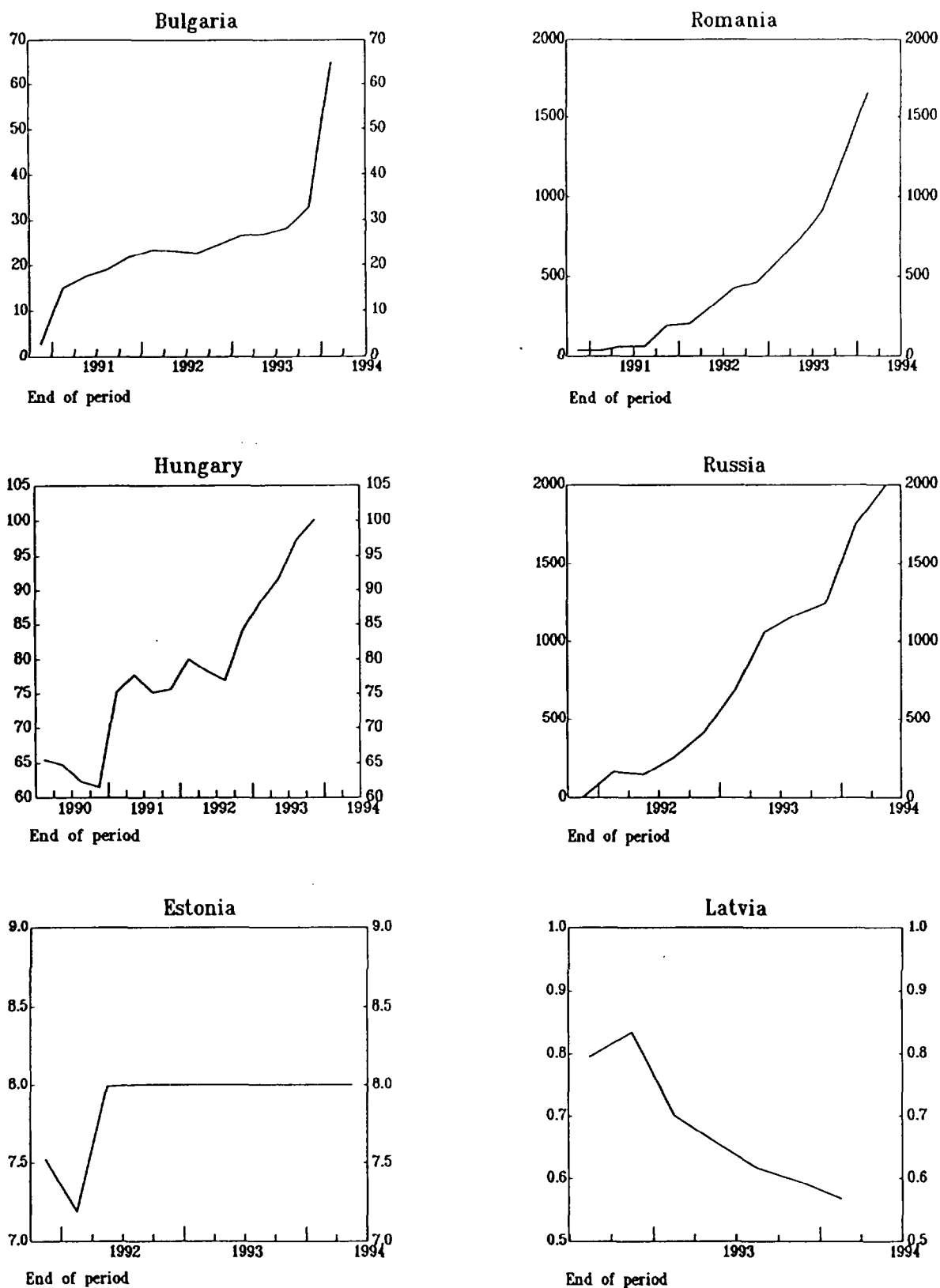
<sup>1/</sup> For a detailed discussion, Kiguel and Liviatan (1991).

Figure 11. Exchange Rates in Selected Transition Economies  
(Local Currency/US\$)



Sources: National authorities and IMF staff estimates.

Figure 11 (Concluded). Exchange Rates in Selected Transition Economies  
(Local Currency/US\$)



Sources: National authorities and IMF staff estimates.

1/ Except for Estonia where the exchange rate is expressed in local currency per deutsche mark.



structural reasons, but this should still be considered an open empirical question. 1/

In sum, the exchange rate anchor appears to have led to a sustained fall in inflation even when the fiscal deficit has been brought down only gradually (as in Poland and the Slovak Republic) or when structural reforms have proceeded rather slowly (as in Estonia), which suggests that the exchange rate has provided a more effective anchor in the transition to a market economy. Naturally, this is not to say that money-based programs cannot succeed under any circumstances, as the cases of Latvia and Slovenia illustrate. It may still be the case, however, that an exchange rate anchor would have been more effective (as argued by Hansson and Sachs (1994) for the case of Latvia) in the sense that the costs of stabilization would have been smaller. 2/ Finally, if tying the hands of policymakers with a pegged exchange rate induces fiscal discipline (which under conditions of high inflation may well be the case), or if immediately stabilizing prices increases tax collection through a reverse Tanzi effect, then there would be an additional advantage in using the exchange rate as an anchor in cases of high inflation.

## VI. Inflation and Stabilization in High Inflation Market Economies

This section briefly reviews what are, in our view, the salient features of inflation and stabilization in high inflation market economies, in order to draw a comparison with the transition economies in the final section.

### 1. Hyperinflation

A key distinction regarding the inflationary processes in market economies--which goes back to Pazos (1972)--is that between hyperinflation and chronic inflation. Hyperinflation refers to sudden and explosive outbursts of high inflation which tend to occur in the aftermath of domestic or external wars. War-related expenditures and heavy reparations payments lead to large budget deficits which are mostly financed by printing money. Most hyperinflations took place in European countries in the wake of the two world wars. 3/ During hyperinflation, the rate of inflation oscillates freely for around one or two years, before accelerating

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1/ For the cases of Bulgaria and Czechoslovakia, Borensztein, Demekas, and Ostry (1993) conclude that supply shocks seem to have dominated over demand shocks in explaining the output decline. In contrast, Calvo and Coricelli (1992) emphasize the role of tight credit.

2/ It is fair to say that the literature still provides little insights into the relative welfare costs of money- versus exchange rate-based stabilization. For a first attempt in this direction, see Uribe (1994).

3/ The convention is to define a hyperinflation as beginning when the monthly rate of inflation surpasses 50 percent.

exponentially in the last six months or so. Such enormous rates of inflation wipe out virtually all nominal contracts, and prices are quoted--and often transactions carried out--in a foreign currency.

By adopting drastic fiscal measures and establishing convertibility of the currency at a fixed exchange rate, stabilization from hyperinflation has often occurred virtually overnight with small output costs related to the stabilization per se (see Sargent (1982) and Végh (1992)). Given the lack of inflation inertia and the de-facto indexation of all prices to the exchange rate, inflation falls immediately essentially because stabilizing the exchange rate is tantamount to stabilizing prices. Furthermore, fiscally-sound programs aimed at stopping hyperinflation usually enjoy high credibility because the public perceives that the chaotic state of affairs is clearly unsustainable. The combination of high credibility and lack of inflation inertia explain the small output costs.

## 2. Chronic inflation

In the late 1940s several Latin American countries began to endure high--relative to industrial countries--and persistent rates of inflation which, in many cases, have lasted until today (Figure 12). 1/ Uruguay, for instance, has been suffering from chronic inflation for more than 40 years. The same is true of Brazil where, unlike Uruguay, inflation has reached extremely high levels in the last five years. Repeated attempts to stop chronic inflation have failed and inflation has come back with a vengeance. However, several countries--most notably, Chile, Israel, Mexico, and more recently, Argentina--have managed to reduce inflation to around 10 percent per year.

Chronic inflation has several distinguishing characteristics. First, it may last for long periods for time (i.e., several decades). Second, chronic inflation has a tendency to perpetuate itself through the creation of various indexation mechanisms in both labor and financial markets. 2/ Third, there is a process of "shocks and accommodation" (Bruno (1993)), whereby monetary and exchange rate policies ultimately validate whatever shocks may hit the economy. 3/ This process of shocks and accommodation introduces a "unit root" into the inflationary process, which means that temporary shocks may have a permanent impact on the inflation rate.

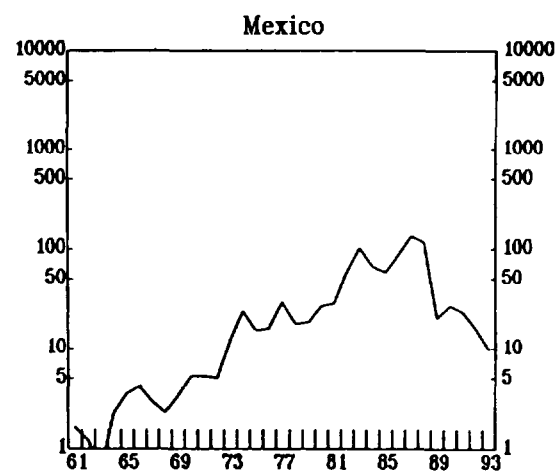
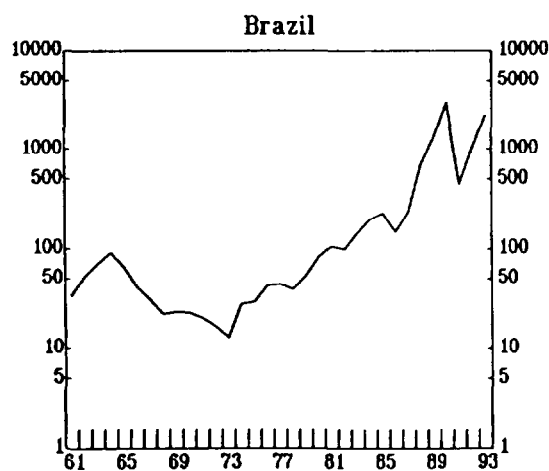
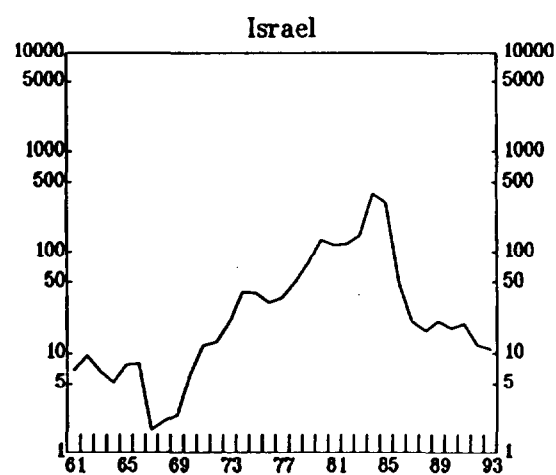
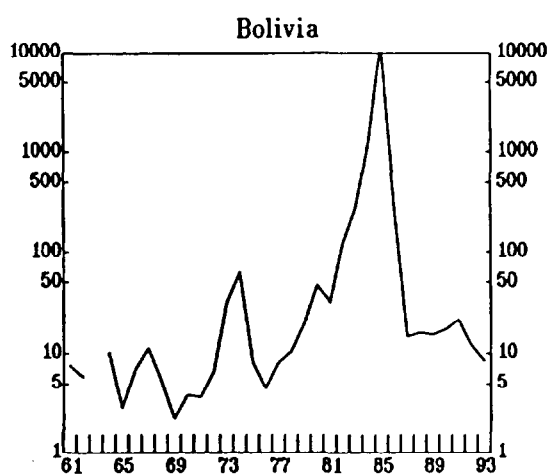
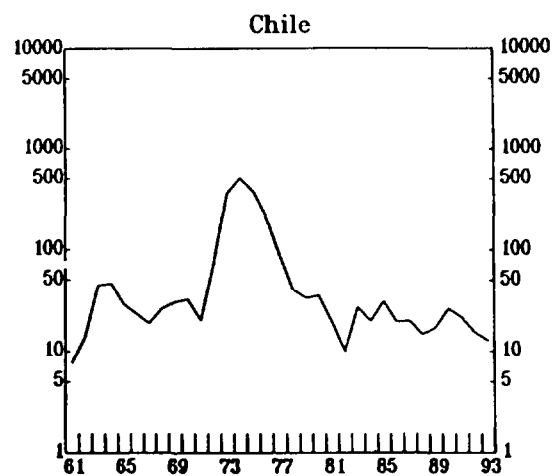
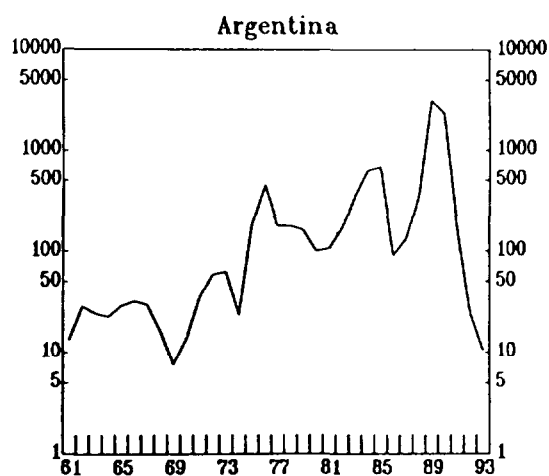
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1/ Figure 12 includes the United States as a benchmark.

2/ A typical financial indexation mechanism is the creation of a unit of account, tied to past inflation, which is used for a wide array of financial instruments (Chile) or mainly for mortgage loans (Uruguay). This "real unit of account" is often used to index all class of contracts and services. In labor markets, the typical indexation mechanism is backward-looking indexation of wages.

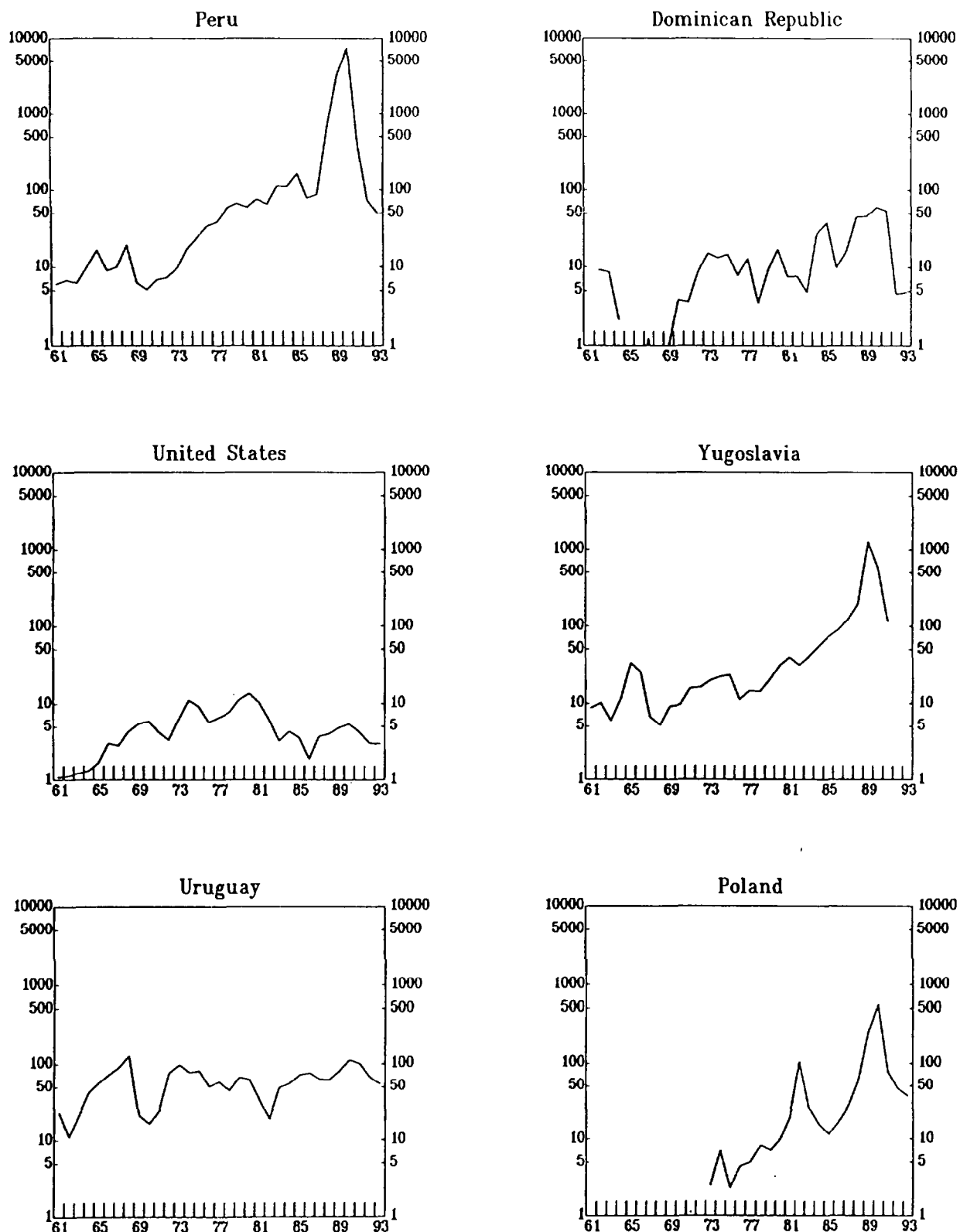
3/ This process sometimes takes the form of real exchange rate targeting, which has a long tradition in Latin America (see Williamson (1981)). For an empirical analysis of the inflationary consequences of real exchange rate targeting, see Calvo, Reinhart, and Végh (1995).

Figure 12. Inflation Rate in Selected Countries, 1961-93  
(Percent per year, logarithmic scale)



Sources: National authorities and IMF staff estimates.

Figure 12 (Concluded). Inflation Rate in Selected Countries, 1961-93  
(Percent per year, logarithmic scale)



Sources: National authorities and IMF staff estimates.

Fourth, the short-term correlation between fiscal deficits and inflation is rather unclear and has often contributed to the view that reducing the fiscal deficit will not help in bringing down inflation.

Reducing chronic inflation has often proved harder than stopping hyperinflation for two main reasons. First, even when the fiscal situation is brought under control, the high degree of inflation persistence implies that inflation responds only gradually to a tight nominal anchor. Second, a rich history of failed stabilization attempts makes the public doubt any claim that inflation will be quickly brought down to industrial country levels. Hence, attempts at stopping chronic inflation usually suffer from lack of credibility.

The exchange rate has been the most common nominal anchor in programs designed to stop chronic inflation. A detailed review of the evidence (see Calvo and Végh (1994)) suggests that an exchange rate-based stabilization leads to (i) a slow convergence of inflation to the rate of devaluation; (ii) a real appreciation of the domestic currency; (iii) a deterioration of the trade balance and the current account; (iv) an initial increase in economic activity followed by a later contraction; and (v) an ambiguous response of real interest rates, which seem to fall initially in orthodox programs but rise in heterodox programs.

In the relatively few money-based programs carried out in chronic inflation programs, (i) and (ii) above (i.e., the slow fall of inflation and the real appreciation) have also been observed. In contrast to exchange rate-based programs, however, money-based programs appear to cause a sharp, though short-lived, contraction in economic activity and a sharp initial rise in real interest rates. The response of the trade and current account is not clear cut. If anything, there appears to be a short-run improvement in the external accounts that accompanies the initial contraction in economic activity.

### 3. Multiple anchors

The high degree of inflation persistence that was observed in the stabilization programs in Argentina, Chile, and Uruguay in the late 1970s convinced many that it was necessary to adopt a multiple-anchor approach and supplement the use of the exchange rate with price and wage controls (see, for instance, Bruno (1993)). <sup>1/</sup> The Israeli (July 1985) and Mexican (December 1987) plans included such heterodox elements and were highly successful. The jury is still out, however, regarding the need for incomes policies. The recent success of the April 1991 Convertibility plan in

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<sup>1/</sup> Needless to say, those who advocate "heterodox" elements see it as a supplement, and not a substitute, for the necessary fiscal adjustment.

Argentina, for instance, suggests that incomes policies may not be essential. <sup>1/</sup>

## VII. Lessons from Comparing Market and Transition Economies

After a long journey through the world of inflation and stabilization in transition economies and the brief review of the same issues in market economies, the following conclusions may be extracted:

(i) Monetary and/or exchange rate accommodation is the key to sustained inflationary pressures in both market and nonmarket economies. While budget deficits in the overall public sector normally constitute the "original sin" behind the onset of inflation, long inflationary processes are usually sustained and often exacerbated through monetary and/or exchange rate accommodation. Depending on the economy's institutional structure, monetary accommodation may take different forms. In the typical Soviet-style command economy, money would essentially accommodate upwards pressures on the wage bill. In fact, as the model of Section II suggests, a permanent increase in wages may generate an ever-increasing monetary overhang and, hence, strong inflationary pressures. In socialized but decentralized economies like Yugoslavia, monetary accommodation would take the classical "real bills" form whereby nonstate IOU's would be rediscounted by the state banks. Needless to say, the inflationary consequences of the "real bills" doctrine have also been felt in market economies. In Uruguay, for instance, the "real bills" doctrine was institutionalized in the late 1930s and was responsible for the emergence of the early, private-credit propelled inflationary history of Uruguay. The process of shocks and accommodation emphasized by Bruno (1993) has also been present in both market and nonmarket economies (typical examples include Brazil, Israel, the former Yugoslavia, and Poland).

In transition economies which have relied on a monetary aggregate as the main nominal anchor, the lack of instruments to control adequately the money supply together with the emergence of quasi-monies such as interenterprise arrears implies that money may have ended up accommodating whatever pressures may have been present in the system. Also, a high degree of dollarization in both market economies (Savastano (1992)) and transition economies (Sahay and Végh (1994)) may make it difficult to reduce inflation by controlling only the domestic component of the money supply.

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<sup>1/</sup> It is important to note that, in the context of high inflation market economies, the notion of wage controls or incomes policies refers to private sector wages. Governments normally have in place a public sector wage policy, which is consistent with the monetary or exchange rate policy. In transition economies, the notion of wage policies applies to the public sector, which acquires particular importance given its size.

(ii) Wage policies are more critical for controlling inflation in transition than in market economies. Wages control always were a condition sine qua non for macroeconomic stability in planned economies, as the model of Section II and the evidence in Section III suggest. The main reason was that the planned-economy system was over-determined and money was fully accommodating. This inherent nominal weakness in the system was inherited by transition economies. The road to a market economy has in some ways worsened prevailing conditions because policymakers have even less control over nominal wages than before, while at the same time they have often not been able to establish effective alternative nominal anchors. Since in the absence of a strong nominal anchor, all nominal variables are likely to adjust to whatever levels nominal wages are set, a wage policy is key for macroeconomic stabilization. The importance of wage policies is underscored by the fact that the public sector continues to be the dominant sector in the economy.

In market economies, the importance of explicit wage policies (which are usually taken to apply to the private unionized sector) is more controversial. Heterodox programs, such as the Israeli and the Mexican ones, which have included price and wages controls have been very successful. Some have argued that incomes policies are essential to bringing down inflation in chronic inflation countries (see, for instance, Bruno (1993)). The use (and abuse) of incomes policies, however, has been quite damaging in cases like Argentina and Brazil during the mid-1980s. Furthermore, the April 1991 convertibility plan in Argentina has dramatically reduced inflation without relying on incomes policies.

(iii) An exchange rate anchor has generally been more successful than a monetary anchor in bringing down inflation in both market and transition economies. In hyperinflations, there can be little doubt about the merits of an exchange rate anchor. In chronic inflation countries, the evidence is more mixed and the use of the exchange rate anchor has faced many obstacles (inflation inertia, lack of credibility). It is still the case, however, that the more successful stabilizations in recent years (Israel, Mexico, and Argentina) have all relied on the exchange rate as the main nominal anchor. In transition economies, the successful stabilizers so far have also resorted to an exchange rate anchor (Poland, Hungary, Estonia, the former Czechoslovakia, and, more recently Croatia). A traditional argument against the use of a monetary aggregate as the main nominal anchor in high inflation countries is that, in the face of large and unpredictable shifts in velocity (often aggravated by a high degree of currency substitution), monetary targets would prove quite unreliable. In the case of transition economies, this argument is reinforced by the lack of monetary instruments.

(iv) Given that prudent macroeconomic policies are pursued, the presence of market-based institutions is not essential in reducing inflation following a large scale liberalization of macroeconomic variables. This should not come as a surprise since it is clear from the pre-reform experiences of countries such as Czechoslovakia that, under the conditions examined in Section II, macroeconomic stability is perfectly consistent with nonmarket institutions. In a similar vein, in spite of having relatively

backward market-based institutions, Estonia and Latvia have been successful in bringing down inflation. Rather, the key seems to be the direct (through structural reforms) or indirect (through wage policies) hardening of state enterprises' budget constraints aimed at bringing the overall deficit of the public sector under control, together with the establishment of a strong nominal anchor (preferably the exchange rate).

#### VIII. Final Remarks

This paper has examined inflationary pressures and stabilization in transition economies. A basic message of the paper is that to understand the inflationary pressures during the road to a market economy, it is essential to analyze the inherent nominal instabilities of planned economies. Since, by necessity, structural reforms can only proceed relatively slowly, transition economies have inherited many of these nominal instabilities. A model was developed to provide insights into the sources of inflationary pressures in planned economies. Based on both the theoretical model and a review of the evidence, it was then argued that to a large extent the same sources of inflationary pressures have remained in place in transition economies.

A recurrent theme in nonmarket economies is that of wage policies. Wage policies were critical to monetary stability in the typical Soviet-style command economy, because wage increases would typically be fully accommodated by printing money. Wage policies continued to be critical--and in some sense even more so than in the past--in the transition to a market economy, because the rigid central control over wages is no longer in place. Thus, wage and price liberalization imply that, in the absence of alternative nominal anchors, inflationary instabilities may be aggravated.

In spite of the important differences introduced by different institutional environments, inflation and stabilization in both market and transition economies share some common elements. In particular, monetary and/or exchange rate accommodation is critical in sustaining and exacerbating the inflationary process. With regard to stabilization, an exchange rate anchor appears as the most effective nominal anchor in reducing high inflation, even if it may prove risky in the presence of inflation inertia or when programs lack credibility.



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