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Interest Rate Policy in Central and Eastern Europe: The Influence of Monetary Overhangs and Weak Enterprise Discipline

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Abstract

Interest rate policy in the newly reforming Central and Eastern European countries has generally been geared toward establishing positive real interest rates and defending the exchange rate. The principal instrument for this task has been administrative increases in controlled interest rates. This paper examines the effect of these adjustments on inflation, the real interest rate and the exchange rate. It points out the risk that when financial discipline over enterprises is weak raising nominal interest rates may do little more than raise credit growth, the rate of depreciation and ultimately inflation. Simulations attempt to shed light on the importance of these linkages.

JEL Classification Numbers:
E52, E61, E65

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Summary

The principal problem addressed in this paper is the effect of raising interest rates in previously centrally planned economies where a large portion of the state industrial sector is not viable but is to remain in operation for the immediate future. When nominal interest rates are raised, the government has no option but to finance the resulting increase in the debt service of these nonviable enterprises. This can be done explicitly through budget subsidies or, as is more common, through bank credit to enterprises. In these circumstances, higher interest rates carry the seeds of higher credit growth and ultimately higher inflation. Moreover, when such a link between interest rates, credit, and inflation is important, the scope for higher interest rates to support the exchange rate is also reduced; if higher interest rates do generate higher inflation, the value of the domestic currency will depreciate.

These observations on interest rate policy are difficult to use operationally in any formulaic or mechanical way. Establishing positive real interest rates is clearly desirable. And to do so when inflation rises, nominal interest rates must be raised. This paper simply argues that this process should not be pursued without careful consideration of the possible side effects on inflation itself. To make a judgement about how far up nominal interest rates should be pushed requires some knowledge of the structure of the economy--specifically, the share of state enterprises that would require financial support if interest rates were raised and the interest sensitivity of the demand for money. The larger the burden of nonviable enterprises and the lower the interest elasticity of the demand for broad money, the greater is the potential for higher interest rates to fuel inflation. By contrast, to the extent that enterprises can be closed down or the government deficit reduced, the raising of interest rates can help reduce inflation through its conventionally recognized role. These considerations are essential to determining the appropriate balance between pushing up interest rates and the longer-term fight against inflation.

The paper spells out the relevant relationships among interest rates, enterprise debt, and inflation and illustrates the effects of raising interest rates by simulations based on plausible parameter values.

Introduction

The question addressed in this paper is what was the contribution of the large increases in interest rates during 1990-91 in the Central and Eastern European countries in meeting the objectives of both domestic stabilization (lowering inflation) and external sector stabilization (in the setting of generally low official reserves, reducing downward pressure on the exchange rate). As in most countries undertaking adjustment programs, the broad aim of the Central and Eastern European countries has been to achieve positive real interest rates so as to promote allocative efficiency, restrain domestic demand, and prevent or reverse capital flight. Policy-makers, however, control nominal, not real, interest rates; the major tool for reaching positive real interest rates, therefore, has been raising nominal interest rates--whether directly through administrative controls or indirectly by pushing up the refinance rate of the central bank.

The principle thesis of this paper is that the speed and even feasibility of reaching positive real interest rates through increases in nominal interest rates has been affected by two special features of the previously centrally planned economies: the legacy of large monetary and debt overhangs; and the weak financial positions of banks and heavily indebted enterprises. When these underlying problems are not addressed, an increase in nominal interest rates may lead to official accommodation of the resulting increase in public sector debt servicing costs. This can be done explicitly through budget subsidies or (the more prevalent case) through bank credit. In these circumstances, increases in nominal interest rates may carry the seeds of higher credit growth and, ultimately, higher inflation. Moreover, when such a link between interest rates, credit, and inflation is important, the effectiveness of higher interest rates in supporting the exchange rate is also reduced.

This paper has much in common with Calvo (1992) which makes some of the same points in a general framework. 1/ The contribution of the present paper is to put these points in a framework that captures the key institutional aspects of the Central and Eastern European countries that determine the effectiveness of interest rate policy--specifically, the presence of monetary overhangs and the degree to which public enterprises can service debt with internally generated resources. This facilitates a pinpointing of the mechanisms by which the objectives for interest rate policy could be thwarted and to perform some illustrative scenarios.

This paper contains five sections. Section I gives a brief overview of interest rate policies in four Central and Eastern European countries. Section II looks at the effects of increases in interest rates when monetary and/or debt overhangs are large. Section III then turns to the constraints on the effectiveness of interest rate policy when the monetary overhang has

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1/ We became aware of this paper only after completing a first draft of the present one.

been eliminated but debt overhangs and weak financial discipline over enterprises persist. Section IV reviews the effect on the external constraint of raising nominal interest rates. Section V provides concluding observations.

I. How Different Were Nominal Interest Rate Policies in Central and Eastern European Countries?

This section provides a brief description of the nominal interest rate policies pursued in four Central and Eastern European countries--Bulgaria, Czechoslovakia, Poland, and Romania--during the period from the beginning of their adjustment programs with the Fund until end-1991. 1/ The main aspects of these experiences are summarized in Charts 1 and 2 and in the following points.

--The degree of administrative control over interest rates following reform covered a wide spectrum. In most of the countries, banks in principle were freed to set deposit and lending rates while the Central Bank raised its own refinance rate as a signal and to raise the marginal cost of funds. Banks' leeway to raise lending rates, however, was often limited by explicit or implicit controls on the spread over the average cost of funds--the latter being dominated by the refinance rate and rates set by state-owned savings banks. There were variations on this pattern. At one end of the spectrum, Romania not only freed deposit and lending rates but also attempted to subject the National Bank's refinance rate to market influences. Czechoslovakia, at the other end, imposed ceilings on lending rates but had no controls on deposit rates or spreads.

--It was expected that positive real interest rates would be achieved only after an initial period when very large price increases would burn off monetary overhangs. The expected length of this period ranged from a few weeks in Poland to a few months in Bulgaria and Czechoslovakia.

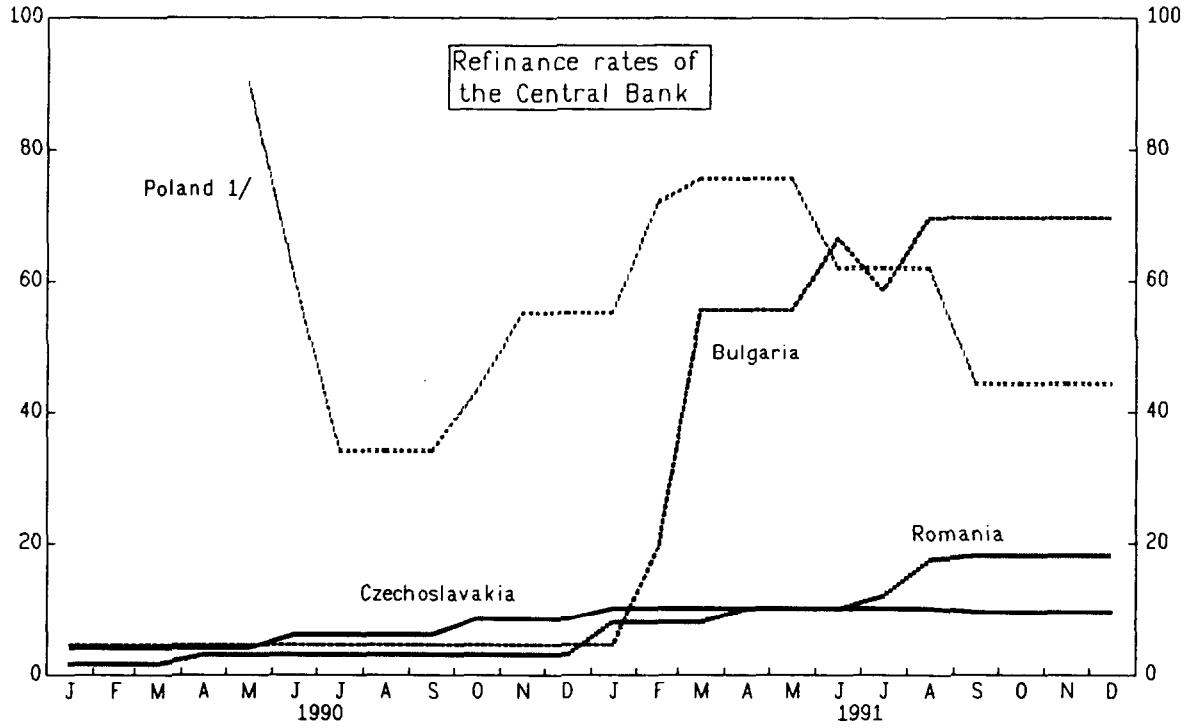
--The level of targeted real interest rates, or more specifically refinance rates, varied enormously. Programs did not explicitly identify targeted real interest rates, but the difference between the refinance rate and targeted inflation suggests an implicit objective. To compare targets we look at the 6 month period after real interest rates were expected to reach positive levels--that is 1-4 months after the beginning of the programs in Bulgaria, Czechoslovakia and Poland. These implicit targets ranged from an average of 5 percent per month during February-September 1990 in Poland to approximately zero in Czechoslovakia.

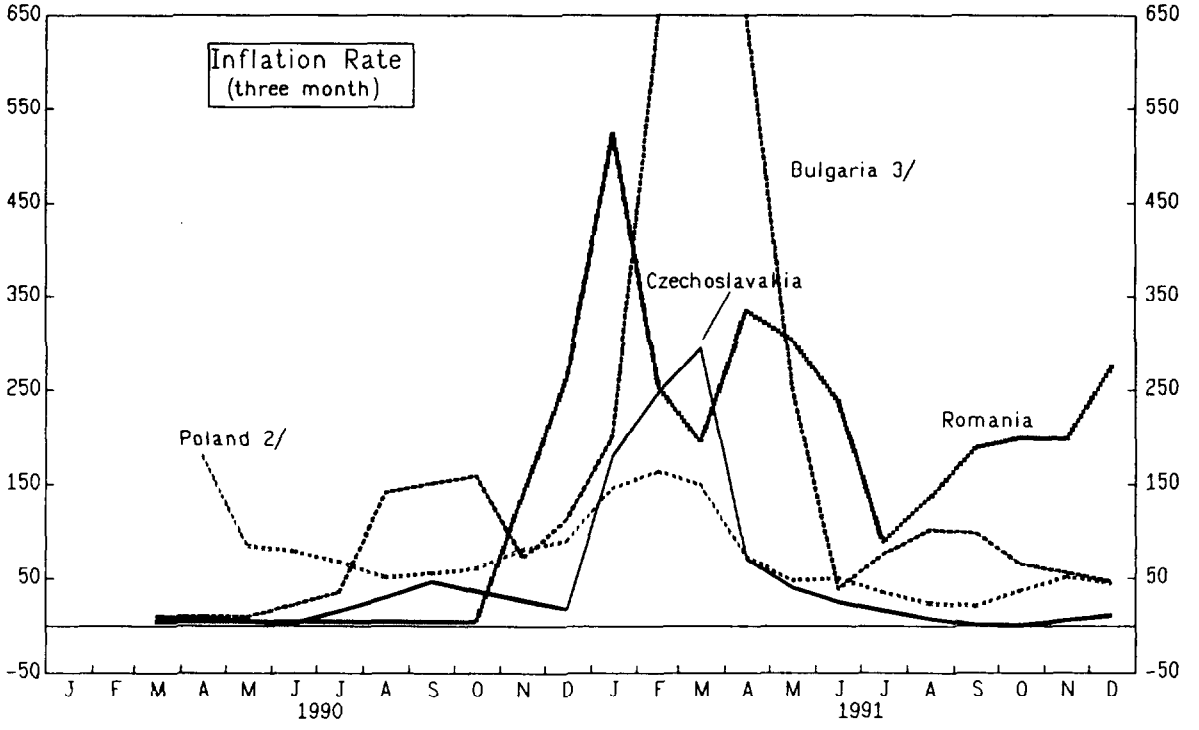
--In all the countries, ex post real refinance rates were far lower than the targets because of a significant under-prediction of inflation.

1/ For Poland, January 1990-December 1991, and for Bulgaria, Czechoslovakia, and Romania, January-December, 1991.

CHART 1

CENTRAL AND EASTERN EUROPE
NOMINAL INTEREST RATES AND INFLATION, 1990-91
(In percent per annum)



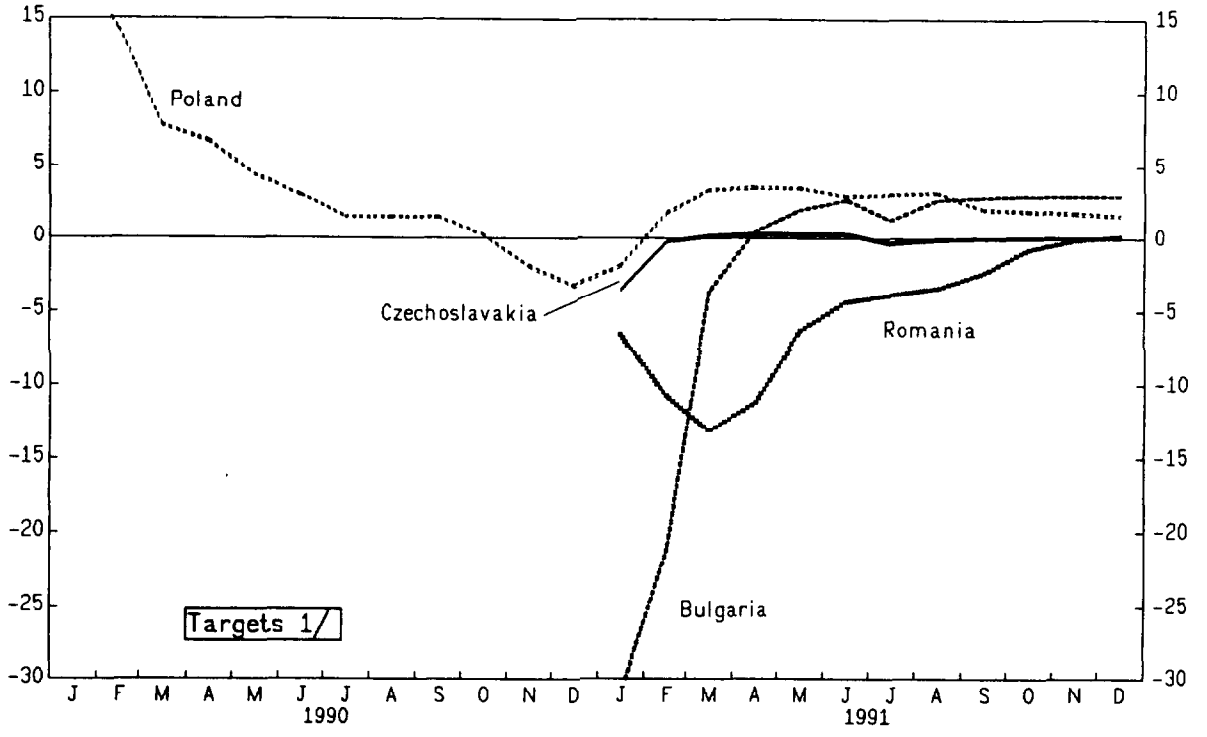


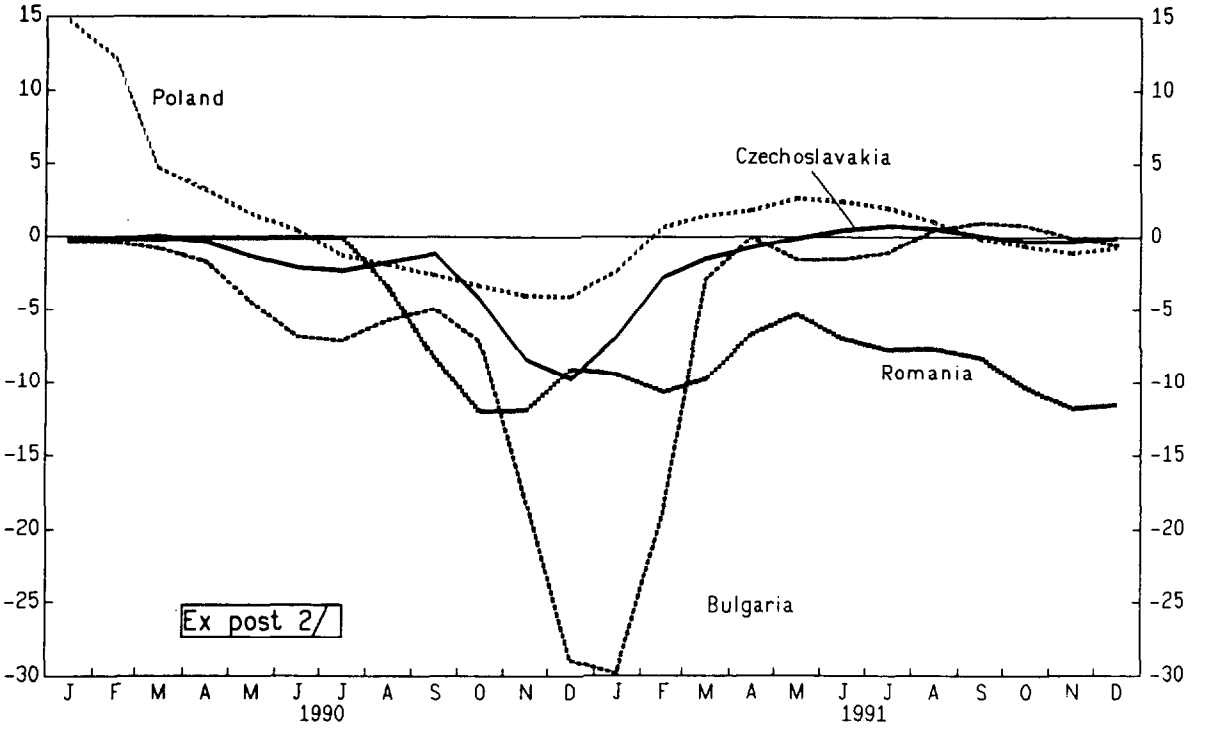
1/ Nominal interest rate for Poland was 3900, 790, 214, 152 percent for January, February, March, April 1990 respectively at an annual rate.
2/ The annualized rate of inflation in the first three months of 1990 was 2000 percent.
3/ The annualized rate of inflation for Bulgaria was 5000, 20,000 and 13,000 percent in February, March and April 1990 respectively.

CHART 2

CENTRAL AND EASTERN EUROPE
REAL INTEREST RATES

(In percent per month)





1/ The real interest rate target is calculated as the actual refinance rate of the Central Bank less the targeted rate of inflation over the ensuing three months. For 1991, inflation targets were updated according to program review documents where applicable (except in Poland).
2/ The ex post real interest rate is calculated as the actual refinance rate of the Central Bank less the actual rate of inflation over the ensuing three months, all expressed as a monthly rate.

Poland achieved positive real interest rates on schedule, but they were much lower than targeted. Real interest rates in Czechoslovakia turned positive several months later than targeted. In Bulgaria real interest rates did not turn positive until late in 1991. In Romania, real interest rates never reached positive levels.

II. Interest Rate Policy and the Monetary and Debt Overhangs

At the outset of reforms, interest rate policy had to be formulated to varying degrees as part of the process of addressing large monetary and debt overhangs. The origins of these overhangs were intrinsically related. In simplified terms, banks had for many years extended credit primarily to enterprises and, to a lesser extent, to the government. The expansion of credit, however, had not been matched by an increase in output, and price controls prevented a rise in official prices. Instead, individuals accumulated excessive money balances--the monetary overhang--while the public sector, particularly enterprises, built up large stocks of debt. The excess of the present value of interest payments due on debt over the present value of prospective enterprise profits and primary surpluses of the government represented a debt overhang.

Table 1 provides some indicators of the monetary and debt positions of the four countries under review and suggests the following points.

--At the beginning of the reform programs--end-1989 for Poland and end-1990 for Bulgaria, Czechoslovakia, and Romania--monetary liabilities ranged from 61 to 127 percent of GDP against an average of 50 percent in middle income developing countries.

--Currency equalled about 10 percent of GDP except in Bulgaria where it was 17 percent. This meant that the base for an inflation tax was somewhat larger than in other middle income countries where currency averages about 7 percent of GDP.

--Most banking system credit was to public enterprises. At the beginning of the program periods, credit to enterprises was well over 100 percent of GDP in Bulgaria (domestic and foreign currency), 60-80 percent in Czechoslovakia and Romania, and 30 percent in Poland. In the 3-4 years before the programs, these ratios had been steady at about these levels in Bulgaria and Czechoslovakia. However, they had been reduced in Romania owing to the government's assumption of a sizable share of enterprise debt and in Poland owing to the erosion through negative real interest rates.

--The government's domestic debt was significant only in Bulgaria where by end-1990 it had risen to over 20 percent of GDP. In Romania, the government was a net creditor.

Table 1. Indicators of Debt and Monetary Overhangs in Central and Eastern Europe

(In percent of GDP)

	Bulgaria			Czechoslovakia			Poland			Romania		
	1989	1990	1991	1989	1990	1991	1989	1990	1991	1989	1990	1991 1/
Public sector domestic debt	124	166	118	71	71	75	38	16	16	65	73	42
Local currency	116	110	58	71	71	75	36	15	15	62	70	39
General government (net) 2/	11	22	15	1	7	7	6	-2	3	-37 3/	-8 3/	-4
Public enterprises	105	88	43	70	64	68	30	17	14	99	78	43
Foreign currency 4/	8	56	60	--	--	--	2	1	1	3	3	3
Monetary aggregates												
Broad money 4/	109	127	78	72	67	73	89	33	29	55	61	41
Domestic currency denominated	105	97	48	72	64	54	27	23	22	54	59	39
Currency	15	17	10	9	9	9	8	6	10	9	11	8

Sources: Data provided by the respective country authorities.

1/ Calculated as of November, to avoid distortions resulting from a large scale extension of credit by the banking system in December 1991 to finance the clearance of interenterprise arrears.

2/ Includes debt on which arrears incurred on interest payments.

3/ Credit to non-government (including private sector which traditionally has been small).

4/ Foreign currency component valued at commercial exchange rates. In Bulgaria 7 leva/$ at end-1990 and 22 leva/$ at end-1991.

The higher than average ratios of broad money to income are prima facie indications of a monetary overhang, although Borenstein and Montiel (1991) have disputed even this. Less clear, in view of the uncertainty about future enterprise profits, is whether these data reflect a debt overhang. Notwithstanding these questions, the common presumption is that sizeable money and debt overhangs existed at the beginning of the reform programs.

What were the implications of these overhangs for interest rate policy? In the initial stage of the reform programs, when large increases in prices took place to eliminate the monetary overhangs, the increases in nominal interest rates in most of the Eastern European countries were justified on two grounds: first, by increasing the demand for bank deposits, they would help absorb some of the monetary overhang and lessen the needed price adjustment; and second, they would signal the determination of the authorities to stabilize their economies and defend their currencies as the sharp increase in prices took place. While these are valid considerations, they do not address the central requirement for eliminating monetary and debt overhangs. Specifically, insofar as the monetary overhangs were accompanied by debt overhangs, a transfer of real wealth from depositors to indebted enterprises was essential and increases in nominal interest actually impeded this process. The transfer from individuals to banks would of course take place on the base of non-interest bearing deposits and cash which was reasonably large in these countries. This, in itself, was helpful insofar as a large share of non-performing loans in bank's portfolios, in essence, had shifted some of the burden of the debt overhang onto banks. However, to bring about a transfer from individuals to enterprises, a period of negative real interest rates was unescapable. Increases in nominal interest rates before the monetary overhang had been burnt off through inflation, therefore, are likely to have resulted in a combination of higher inflation during the burn off and an asymmetry between the erosion of monetary and debt overhangs.

III. Interest Rate Policy and Unserviceable Debt of Enterprises

The second stage for interest rate policy started once the initial monetary overhang had been eliminated--early in 1990 for Poland and in the course of 1991 for the other three countries. In many respects, interest rate policy at this stage could be driven by the same considerations as in other countries facing sizeable stabilization problems. However, distinguishing features of the Eastern European countries were the likelihood that the burning off of the monetary overhang had not fully eliminated the debt overhang and that the continuing operation of nonviable enterprises would lead to a rapid reaccumulation of unserviceable debt. In this setting, increases in nominal interest rates might simply add to enterprises' financing requirements, leading to more rapid credit growth and

inflation with little effect on real interest rates. 1/ The remainder of this section attempts to formalize this possibility and assess its potential importance in the Central and Eastern European countries.

1. Analytical framework

The link between interest rates and inflation is best seen in a simple characterization of money supply and demand.

(1) $\ln\left(\frac{M}{Y}\right) = \alpha \ln \frac{(1+i)}{(1+\pi)} + \beta$ Demand for broad money

(2) $\Delta D = iD_{t-1} - S$ Public sector budget constraint

(3) $M=D$ Balance Sheet identity

The ratio of broad money (M) to nominal income (Y) is a positive function of the real interest rate $[(1+i)/(1+\pi)]$; the change in net domestic assets (ΔD) is equivalent to the deficit--interest payments (iD_{t-1}) less the primary surplus (S)--of the public sector, defined as government plus public enterprises and broad money is assumed to be fully backed by net domestic assets. 2/ It is assumed that the nominal interest rate is set (either through direct controls or by reference to the refinance rate) and that over a 1-3 year time horizon real GDP is exogenous.

Next we assume that the public sector is able to generate a primary surplus equal to only a proportion $(1-\gamma)$ of its interest obligations plus some underlying primary surplus, k. 3/

1/ Similar conclusions are reached in a similar framework in Calvo and Coricelli (1991), although the emphasis there is on the possible existence of a credit crunch and its supply side effects.

2/ While this is approximately true in the Central and Eastern European countries, it is not essential to this framework. The conclusions to be derived would also hold if net foreign assets were constant in foreign currency terms (that is the country operated a floating exchange rate) and purchasing power parity held at all times after the price liberalization. We have not explicitly included "other items net", although implicitly a significant part of it--capitalization of interest--is captured.

3/ It would perhaps be more realistic to make the share of debt service obligations met with internal resources $(1-\gamma)$ a function of the real stock of debt or profits. Experiments with this approach indicated that it did not change the thrust of the conclusions but did tighten the perverse link between increases in interest rates and inflation.

$$(4)\quad S = (1-\gamma)iD_{t-1} + k$$

In order to concentrate on the impact of changes in interest rates, k is set to zero in what follows. The implications of a non-zero k are considered later. The parameter γ reflects the ability of public sector entities to service their debt without recourse to bank financing. It can range from unity, which denotes no internally financed servicing of debt, to zero, which represents fully internally financed servicing. As such, it can be seen, in the language of Sargent and Wallace (1981), as a fiscal policy subordination parameter--full subordination of fiscal policy to monetary policy is equivalent to setting γ to zero.

Expected inflation (π) is assumed to equal the sustained rate of inflation that would result from a steady money growth rate. Substituting and rearranging terms in equations (1)-(4) results in an expression for the increase in the money supply as a function of the nominal interest rate.

$$(5)\quad \frac{\Delta M}{M_{t-1}} = \gamma i$$

Substituting (5) into (1), expressed in rate of change terms, gives expected inflation as a function of the nominal interest rate and real GDP (y).

$$(6)\quad \pi = \gamma i - \Delta \ln y$$

With this simple framework, the effect of changes in the nominal interest rate on prices and the real interest rate can be derived.

Turning first to the effect on prices, equation (1), inverted and utilizing an exponential approximation, is a relationship between the price level, money and the nominal interest rate.

$$(7)\quad \ln P \simeq \ln M - \alpha i + \alpha\pi - \ln y + \beta$$

Assuming that the growth rate is exogenous and differentiating with respect to the nominal interest rate results in the impact effect of a change in the nominal interest rate on the rate of inflation.

$$(8)\quad \frac{\partial \ln P}{\partial i} \simeq \frac{(\partial P_t/P_t - 1)}{\partial i} = \gamma - \alpha + \alpha\gamma \qquad \text{(Impact effect)}$$

This incorporates two conflicting forces: (i) a deflationary effect from an increase in money demand on account of higher (real) interest rates, and (ii) an inflationary effect from more rapid credit expansion to meet the higher, unserviceable component of interest payments due from the public sector. The net effect is ambiguous. However, on a sustained basis--once

the real interest rate has stabilized--the increase in the nominal interest rate unambiguously raises inflation for $\gamma>0$.

$$(9)\quad \frac{\partial \pi}{\partial i} = \gamma \qquad \text{(Sustained Effect)}$$

These two relationships are illustrated in the top panel of Chart 3, which shows that the effect of a rise in nominal interest rates on the price level in the first period is ambiguous, but thereafter, unless γ is zero, prices will trend upwards relative to their base path.

In view of this inflationary effect of raising nominal interest rates, the real interest rate will not rise commensurately with the nominal interest rate. Defining the real interest rate (r) as the nominal interest rate less expected inflation and differentiating with respect to the nominal interest rate gives the effect of a change in the nominal interest rate on the real interest rate.

$$(10)\quad \partial r = (1-\gamma)\partial i$$

As long as some debt is serviceable ($\gamma<1$), neither the impact nor sustained rise in inflation will be as large as the increase in nominal interest rates because some enterprises will finance higher interest payments without recourse to credit. Consequently, real interest rates will normally rise, but by less the higher is γ. If no debt were serviceable ($\gamma=1$), so all interest payments were financed through credit creation, the increase in inflation, both on impact and on a sustained basis, would exactly match the increase in interest rates.

Parallels between this framework and the "unpleasant arithmetic" of Sargent and Wallace (1981) are clear. Their "unpleasant arithmetic" derives from the assumption that fiscal policy "dominates" monetary policy--that is that the fiscal deficit is fixed despite a tightening of credit policy. In our framework, this is equivalent to assuming that no debt can be serviced without recourse to credit ($\gamma=1$). Thus their conclusion, that with a dominating fiscal policy tighter money (in our framework higher nominal interest rates) fails to reduce or even raises inflation, is similar to that from our framework.

a. Non-interest bearing money

The introduction of non-interest bearing money and the scope for seignorage modifies the relationships somewhat, but does not alter the fundamental conclusions. Non-interest bearing money is assumed to be held in some proportion to broad money depending negatively on the nominal interest rate. Transparency dictates the precise specification chosen here, but other specifications would generate broadly similar, if less readily tractable, results.

$$(11)\quad \frac{M1}{M} = \frac{1}{(1+\phi i)}$$

This equation has the property that narrow money demand (M1) is never zero nor more than broad money (M). If we treat the banking system as an extension of the public sector, then we can take the public sector's non-interest bearing liabilities to be M1. To incorporate equation (11) in the model, equations (2) and (4) must be modified as follows.

$$(12)\quad \Delta M = i(M - M1)_{t-1} - S$$

$$(13)\quad S = (1-\gamma)i(M - M1)_{t-1}$$

Substituting as we did in the version without M1, an expression for the expected rate of inflation can be derived.

$$(14)\quad \pi = \gamma i\left[1 - \frac{1}{1+\phi i}\right] - \Delta \ln y$$

Now the expressions can be derived for the effect of a change in nominal interest rates on prices, both on impact and on a sustained basis. Recall that expected inflation and the sustained inflation rate are taken to be equivalent.

$$(15)\quad \frac{\partial \ln P}{\partial i} = \gamma(1+\alpha)\left[\frac{\phi i}{1+\phi i}\right]\left[2-\frac{\phi i}{1+\phi i}\right] - \alpha \qquad \text{(Impact effect)}$$

$$(16)\quad \frac{\partial \pi}{\partial i} = \gamma\left[\frac{\phi i}{1+\phi i}\right]\left[2 - \frac{\phi i}{1+\phi i}\right] \qquad \text{(Sustained effect)}$$

These equations point to the importance, once non-interest bearing money is introduced, of the <u>level</u> of the nominal interest rate in determining the effect of a change in nominal interest rates on prices. As interest rates tend toward infinity, these expressions tend toward their form as derived in the absence of non-interest bearing money. As interest rates tend toward zero, the expressions also tend toward zero. This results from the fact that, at higher interest rates, narrow money comprises a smaller share of broad money, so that its existence has an ever smaller effect. On the other hand, at lower interest rates, more money is held in non-interest bearing form so that the interest burden of any given level of outstanding debt, and, by extension the potential inflationary effect of raising interest rates, declines.

The relationship between sustained inflation and the rate of interest is illustrated in the lower part of Chart 3. In a world without non-interest bearing money, the relationship between π and i is linear. Where

γ=1--that is no debt is serviceable without recourse to financing--the relationship follows a forty-five degree line through the axis. For lower values of γ, the relationship follows a diagonal to the right of the forty-five degree line. The introduction of non-interest bearing money renders this relationship non-linear. For any given value of γ, the relationship falls below that occurring in the absence of non-interest bearing money. As interest rates rise the slope approaches that which would prevail without non-interest bearing money. For any given nominal interest rate, the real interest rate is higher when non-interest bearing money exists than when it does not. But as nominal interest rates rise, the real interest rate tends toward the value that would occur without non-interest bearing money. Thus, the easing of the debt service burden that seignorage affords allows the public sector to sustain a higher real interest rate than would be possible without non-interest bearing money.

b. The underlying surplus (k)

So far we have focussed on the debt servicing component of the public sector deficit. There may also be an underlying primary surplus/deficit represented by k. This is important to consider because it generates the underlying rate of deflation/inflation with respect to which the results derived above are deviations. As such, it determines the very feasibility of achieving a given "target" for real interest rates.

Suppose that k, the underlying primary surplus, is some fixed percentage (ω) of national income:

$$(17) \quad k = \omega Y$$

To demonstrate the role of ω, it is convenient to set α to zero in equation (1), so that the demand for money is insensitive to real interest rates:

$$(18) \quad \ln\left(\frac{M}{Y}\right) = \beta$$

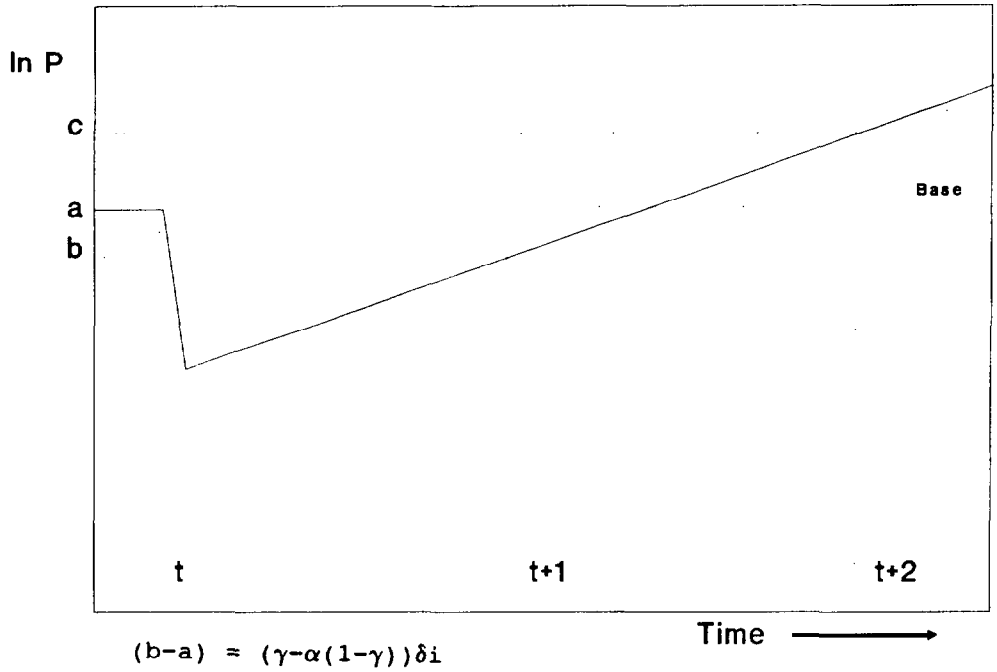
Incorporating (17) and (18) into the expression (14) for the sustained rate of inflation gives

$$(19) \quad \pi = \gamma i\left[1-\frac{1}{1+\phi i}\right] - \omega \exp(-\beta) - \Delta \ln y$$

Thus the rate of inflation in the long run reflects two effects: the inflationary finance of debt service; and credit growth determined by the underlying surplus/deficit, both relative to the growth of real GDP. The real interest rate can therefore be either positive or negative, depending upon the choice of the nominal interest rate and the underlying primary

Chart 3 - Inflation and the Rate of Interest

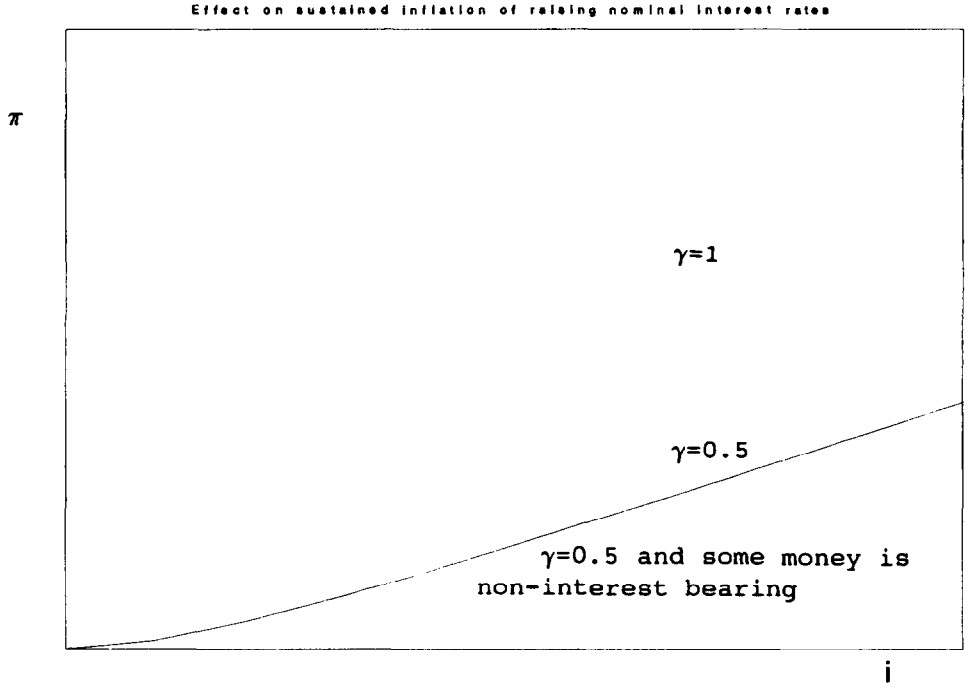
Effect on prices of raising nominal interest rates



$(b-a) = (\gamma-\alpha(1-\gamma))\delta i$

$(c-b) = \gamma\delta i$

Effect on sustained inflation of raising nominal interest rates



position. The effect on inflation of enlarging the underlying surplus is clearly negative:

$$(20) \quad \frac{\partial \pi}{\partial \omega} = - \exp(-\beta)$$

If money demand were sensitive to real interest rates, so that α was positive, the effect of changes in the underlying primary position on sustained inflation would also depend upon the level of ω. Specifically, as the primary deficit rose, further increases would have a progressively larger effect on sustained inflation because higher primary deficits would push down the real interest rate so that the equilibrium of the ratio of money to GDP--the base to which newly created money is added--would be lower.

From this framework it is evident that there may be values of k that prevent the achievement of positive real interest rates, whatever the level of nominal rates. This occurs because the seignorage earned on non-interest bearing money may not be sufficient to cover the fiscal deficit; for any given nominal interest rate selected by the authorities, the equilibrium rate of inflation that emerges will always be higher, because the tax base represented by non-interest bearing money is too small and must be extended to interest bearing money. This implies negative real interest rates. If the monetary authorities attempt to chase the rate of inflation with the nominal rate of interest, seeking to achieve positive real interest rates, they will simply generate accelerating inflation.

2. The experience in Central and Eastern Europe

While it is helpful analytically to view interest rate policy in transition economies in two stages--the first while the monetary overhang is being burnt off and the second during the period before financial discipline has been established in the public enterprise sector--in practice, these stages are hard to distinguish. Interest rate policy in the Central and Eastern Europe must be viewed against the simultaneous objectives of burning off the monetary and debt overhangs and minimizing inflation in the face of large financing demands from non-viable enterprises. The remainder of this section examines developments in the four countries under review from the point of view, first, of how the inflationary burnoff of the monetary overhang affected the real value of public sector debt and, second, the inflationary effects of the increases in nominal interest rates.

The inflationary burnoff of the monetary overhang did in fact significantly reduce the real value of debt during the first year of the reform programs in each of the countries except Czechoslovakia. These reductions derived entirely from the fact that increases in inflation (and therefore nominal GDP) far exceeded increases in nominal interest rates. Chart 4 shows the change in the ratios of public (government and public enterprises) debt to GDP and decomposes them into the influences of nominal interest rates, the increase in nominal GDP growth, and the primary position

of the public sector. 1/ Because consolidated accounts of the public sector are not available, the primary position was calculated as a residual.

The chart illustrates three main developments.

--The change in the ratio of debt to GDP ranged from a drop of 53 percentage points (a drop of over 50 percent) in Bulgaria to an increase of around 5 percentage points (an increase of 6 percent) in Czechoslovakia.

--The excesses of nominal GDP growth over nominal interest rates had large negative effects on the debt ratios. However, these effects were partially (fully in Czechoslovakia) offset by small primary deficits.

--The influence of rising nominal GDP was largest in Bulgaria and Poland where nominal interest rates were raised to the highest levels.

This last point leads directly to the question of how much the large increases in nominal interest rates contributed to either a slower erosion of debt (that is, higher real interest rates) or higher inflation. The exercise reported in Table 2 attempts to establish the effect on inflation and real interest rates of smaller increases in nominal interest rates than actually occurred. These are at best broad orders of magnitude insofar as estimates of the demand for money and information on the share of non-viable credit are not available.

Using the monetary framework developed above, the table compares the outcome of scenarios with two different interest rate policies: a hypothetical low nominal interest rate policy--where nominal interest rates are assumed to be two thirds of the actual level--and the actual interest rate policy. In the actual policy case, it is assumed that the nominal interest rate during the first year of the adjustment programs (compounded actual monthly rates) is maintained in the second year. For three of the countries--Bulgaria, Czechoslovakia, and Romania--this assumption broadly bears out actual experience. For Poland, however, where the nominal interest rate in 1991 was about half of that in 1990, the assumption imparts an upward bias in the difference between the simulated and actual results. A separate exercise is therefore also shown comparing the actual interest rate policy in 1991 and a policy of setting interest rates at two thirds of the actual level.

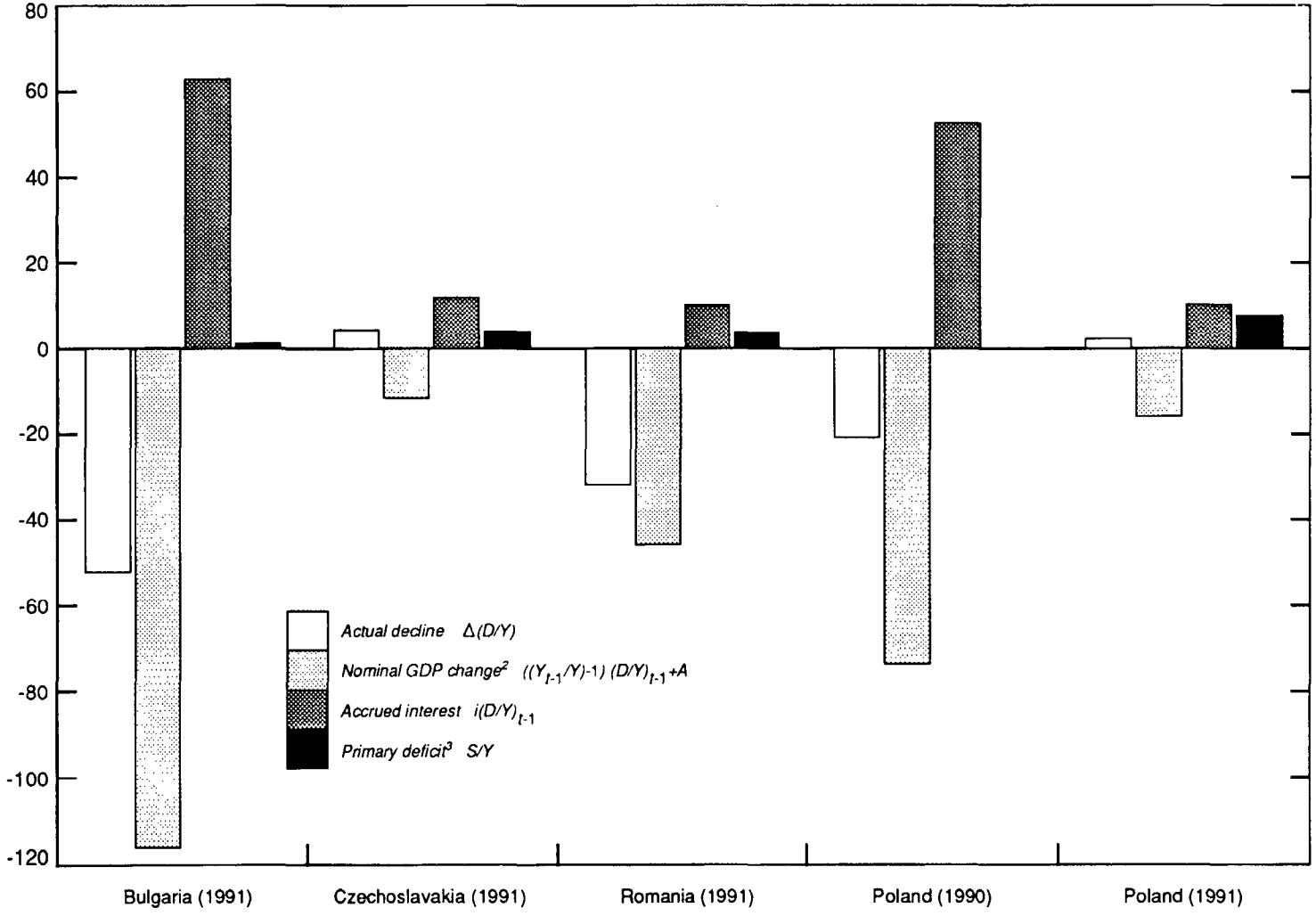
1/ These components derive from the expression for the change in the public debt ratio.

$$\frac{D}{Y} = \frac{(1+i)}{1+(\Delta Y/Y_{t-1})} \cdot \frac{D_{t-1}}{Y_{t-1}} - \frac{S}{Y}$$

Chart 4

Changes in Debt Ratios and Contributory Effects[1]

(In percentage points of GDP)



[1] Domestic, local currency denominated debt of the public sector.

[2] This includes an adjustment factor (A) to make the contributions add up to the net change.

[3] Computed as residual. This amount can be viewed as the ratio to GDP of the sum of the primary deficit of general government, the primary deficit of public enterprises, and the change in bank deposits of enterprises, less accrued interest on enterprise deposits. A positive number in the chart indicates a deficit.

Table 2. Illustrative effects of interest rates one-third lower than actually occured, under alternative assumptions

(Simulations minus actual in percentage points)

	Bulgaria (1991)		Czechoslovakia (1991)		Poland (1990)		Poland (1991)		Romania (1991)	
Share of viable enterprise debt 1/2/	High	Low	High	Low	High	Low	High	Low	High	Low
Nominal interest rate	-20	-20	-3	-3	-60	-60	-21	-21	-5	-5
First year effects:										
Inflation	47	-15	11	3	61	-27	32	-3	24	8
Real interest rate 3/	-8	-3	-9	-5	-29	-13	-28	-12	-7	-6
Second year effects										
Inflation	-6	-13	-1	-3	-10	-27	-5	-14	-1	-2
Real interest rate 3/	-10	-4	-5	-3	-34	-12	-14	-4	-4	-2
Memorandum item (in percent)										
Share of net government debt in total	20		9		17		-11		--	
Actual interest rate 3/	58		17		178		62		14	
Actual Inflation	339		54		226		60		222	

1/ All interest payments on government debt are assumed to be financed by bank credit.

2/ High viability denotes assumption that only 20 percent of loans to enterprises are nonperforming, low viability denotes assumption that 60 percent of loans to enterprises are nonperforming.

3/ Ex poste. Note that this differs from the definition used in the model which is exante.

The simulation results are derived from equations (15) and (16) using assumed values for the elasticity of money demand with respect to the real interest rate (α), the share of non-viable debt in total (γ), and the effect of changes in the interest rate on the share of non-interest bearing money in broad money (ϕ). For each country, α is assumed to be 2--a value that seems reasonable in light of estimates for some other countries. The parameter ϕ was set at 10, a level intended to give a generous role to seignorage. At this level, narrow money would represent 50 percent of broad money at interest rates of 10 percent. Shares observed in the four countries under review would be generated by interest rates close to 50 percent. The share of nonviable debt is harder to assume with any degree of confidence. Consequently, Table 2 shows outcomes for a higher viability case (γ=.2) and a lower viability case (γ=.6) for each country. Preliminary indications suggest that the lower viability case may approximate Bulgaria and Poland (at the beginning of 1990), while Czechoslovakia and Poland (at the beginning of 1991) are better approximated by the higher viability case. 1/ In Romania, banking system data suggest that 25 percent of outstanding credit was nonperforming at end 1990. However, anecdotal evidence suggests that the proximity to the high viability case may be misleading.

The results of the simulations cover a wide range for three main reasons: the considerable inter-country variation in the absolute difference between actual nominal interest rates and those assumed in the simulations; differing shares of government debt in the total (the government's primary surplus is assumed to be invariant to changes in its debt servicing burden); and differing initial levels of public sector debt. Several aspects of the results are noteworthy.

--First year effects on inflation of the hypothetical lower interest rate policy vary enormously. In the high viability cases, the effect is always positive: a lower interest rate would have lowered money demand by more than the reduction in credit required to finance the interest payments of nonviable enterprises, so that inflation would have been higher than it actually was. In the low viability cases, however, the effects on the first year inflation rates are mixed: in Bulgaria and Poland--where the shares of government debt, which are assumed to be financed in full by credit, are highest and the assumed reductions in interest rates are largest--lower interest rates actually reduce first year inflation; in Czechoslovakia and Romania, on the other hand, where actual nominal interest rates were not much higher than in the simulation, the effects are negligible.

--By the second year, when the demand for money has fully adjusted to lower real interest rates, inflation is always lower in the lower interest rate scenario. Recall that the second year effects in Poland must be interpreted with care because nominal interest rates are assumed to remain at their average 1990 level when in fact they fell substantially. Thus, the

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1/ See International Monetary Fund, March 1992.

second year effects of the interest rate policy on the 1991 program show a much smaller effect on inflation than those of the 1990 program.

--Notwithstanding the variety of responses of inflation to the lowering of nominal interest rates, real expost interest rates in all cases, are lower in the simulated lower interest scenarios than they were actually. This reflects the fact that with $\gamma<1$ there is always some leverage from nominal interest rates to real interest rates. Lowering nominal rates therefore always lowers real rates but by less then the reduction in nominal rates.

IV. Interest Rate Policy and the External Constraint

The analysis thus far has focused on domestic considerations in setting interest rates. In fact interest rate policies in Central and Eastern Europe were also influenced by the severity of the external constraint facing each country. To varying degrees, large actual or prospective current account deficits, capital flight, and currency substitution were depleting or likely to deplete countries' official reserves. Large depreciations early in each program were geared toward improving the external position, but it was feared that excessive reliance on depreciation could lead to exchange rate/price spirals. This raised the obvious role for increases in interest rates to contain pressures on the exchange rate by moderating domestic demand and increasing the attractiveness of holding domestic currency. However, just as aggressive interest rate policy in the context of a large amount of nonviable debt may fail to achieve the inflation objective, so it may fail to contain pressure on the exchange rate. Unless higher interest costs are financed through a corresponding improvement in the primary public sector surplus, resulting credit creation will undermine the effect on the external position.

With two extensions, the framework developed above can be used to show the effects of adjustments in nominal interest rates on the exchange rate. 1/ The first extension is to include the choice between holding domestic and foreign currency in the money demand equation (1) above.

$$(21)\quad \ln\left(\frac{M}{Y}\right) = \alpha \ln\frac{(1+i)}{(1+\pi)} + \mu \ln\frac{(1+i)}{(1+i_f)} + \beta$$

1/ Here we assume flexible exchange rates which, of course, is formally accurate only for Bulgaria and Romania. However, each of the countries devalued by a large amount at the beginning of its reform program in anticipation of the pressure on its exchange rate and its inability, without large reserves, to resist it. Indeed Poland, after a little over a year, abandoned its peg.

Here i_f is the foreign interest rate (i^*) adjusted for the expected appreciation of domestic currency (ϵ).

$$(22)\quad 1+i_f = \frac{(1+i^*)}{(1+\epsilon)}$$

Where the expected appreciation is a function of the difference between the actual and sustainable exchange rate ($\epsilon = \lambda(\ln\bar{E} - \ln E)$, where E is the foreign currency price of domestic currency and $\bar{E}$ is the sustainable exchange rate. Expected inflation (π) is similarly a function of the difference between the sustainable and actual price levels.

$$(23)\quad \pi = \psi(\ln\bar{P} - \ln P)$$

The behavior of the exchange rate is distinct from that of the price level in that the former is flexible but the latter is sticky.

This extension of the basic framework leads to the conclusion that as a monetary overhang is burnt off through inflation, the nominal exchange rate to likely to overshoot its longer term sustainable level. To see this, equation (21) can be rearranged and approximated by

$$(24)\quad \ln P \simeq \ln M - \alpha i + \alpha\pi - \mu i + \mu i^* - \mu\epsilon - \ln y - \beta$$

Assume that at the outset, P is fixed (because prices are sticky), as are real GDP and domestic and foreign interest rates. For presentation it is convenient to characterize a monetary overhang as a once and for all increase in money (equivalent in equation (25) to dlnM). Substituting the expression for ϵ and π and taking total differentials

$$(25)\quad d\ln E = d\ln\bar{E} - \frac{1}{(\mu\lambda)}\,(d\ln M + \alpha\psi d\ln\bar{P})$$

Equating the change in the equilibrium price level ($d\ln\bar{P}$), the monetary overhang (dlnM) and the change in the equilibrium exchange rate (dlnE), we get the impact effect on the exchange rate of the announcement of price liberalization. 1/

1/ If ϵ and π represent expectations for the full period and adjustment is complete by the end of the period than both λ and Ψ would equal unity and equation (26) is correspondingly simplified.

$$(26)\quad d\ln E = -\left(1+\frac{1+\alpha\psi}{\mu\lambda}\right)d\ln M = -(1+\sigma)d\ln M$$

The change has two components: the change in the equilibrium exchange rate (dlnM) and the overshoot (σdlnM). This behavior of the exchange rate is shown by the solid line in the top panel of Chart 5. Upon the announcement that prices are to be liberalized, the expected rate of inflation rises reducing the real interest rate and the demand for money. Because prices are sticky and the domestic interest rate is fixed, the only mechanism for equating the supply and demand for money is an adjustment in the expected return on foreign assets. Thus, the value of domestic currency must fall below its long run equilibrium in order to create the expectation of an appreciation. As time passes, the price level gradually rises eroding the monetary overhang and allowing the exchange rate to rise. This process continues until the increase in prices has fully eliminated the monetary overhang and the exchange rate reaches a sustainable level. The size of the depreciation from the initial value will depend on the change in prices needed to eliminate the monetary overhang and the extent of any initial disequilibrium in the real exchange rate.

If increases in nominal interest rates in the Central and Eastern European countries were aimed even partially at reducing the overshooting or subsequent depreciation, how effective might they have been? To answer this question we differentiate equation (24) by the nominal interest rate, recalling the relationship between money growth and the interest rate given in equation (5). 1/ This results in an expression for the overshoot (σ) as a function of the change in the nominal interest rate.

$$(27)\quad \frac{\partial\sigma}{\partial i} = \frac{(\mu+\alpha(1-\gamma)-\gamma)}{\mu\lambda}$$

If γ=0, so that there is no unserviceable debt, raising i must reduce the overshoot as well as the long run depreciation:

$$(28)\quad \frac{\partial\sigma}{\partial i} = \frac{(\mu+\alpha)}{\mu\lambda}$$

If γ=1, so that all debt is unserviceable, the result is ambiguous:

$$(29)\quad \frac{\partial\sigma}{\partial i} = \frac{(\mu-1)}{\mu\lambda}$$

If the demand for money is inelastic to the relative rate of return on foreign assets--that is μ small--the above expression is negative; not only

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1/ For simplicity, we revert here to the version of the model without non-interest bearing money.

will raising interest rates lower the sustainable external value of domestic currency, but the overshooting will be larger than it would have been without the increase in interest rates. This is because the credit creation effects of higher interest rates outweigh the increase in money demand stemming from higher domestic interest rates. If the demand for money is elastic with respect to relative interest rates, the expression in (29) is positive. Raising nominal interest rates tends to reduce the overshoot stemming from price liberalization because the boost to the demand for money from higher interest rates more than outweighs the credit creation effects.

To summarize, raising domestic interest rates when $\gamma=0$ will always both reduce the overshoot of the exchange rate consequent to a monetary overhang and diminish the long-run drop in the exchange rate. However, when $\gamma=1$, raising interest rates will always push down the sustainable exchange rate but may or may not enlarge the initial drop. These results are summarized in Chart 5.

To what extent was this pattern of exchange rate adjustment evident in Central and Eastern Europe during the first years of the adjustment programs? Chart 6 shows exchange rates for the four currencies during 1991. 1/ In three of the countries--Czechoslovakia, Poland, and Romania--the pattern described above is not evident. Several factors account for this. In Czechoslovakia, the exchange rate was fixed throughout the period, and, in any event, the initial debt and monetary overhangs were perceived to be small. In Poland, the monetary overhang had arguably already been eliminated by the beginning of 1991. However, the need to abandon the fixed exchange rate in May suggests that the depreciating trend characterized in the bottom panel of Chart 5 had caught up with the initial large devaluation at the beginning of the 1990 program. In Romania, the presence of a dual exchange rate system blurs any assessment of a single level of the exchange rate. For Bulgaria, however, where a single floating exchange rate was in effect throughout the period, the path of the exchange rate closely resembles those in Chart 5. The initial depreciation in February was partially reversed in the following few months, whereupon a more gradual depreciation began.

V. Conclusion

The central point of this paper is that unless increases in interest rates are supported by a tightening of credit and public sector financial policies, they will not achieve the fundamental objectives of controlling inflation, achieving positive real interest rates or supporting the domestic currency. This is true whether such increases take the form of an increase in the structure of interest rates or in the refinance rate of the central bank. It is not a point relevant only to previously centrally-planned economies. It is, however, particularly important for these countries

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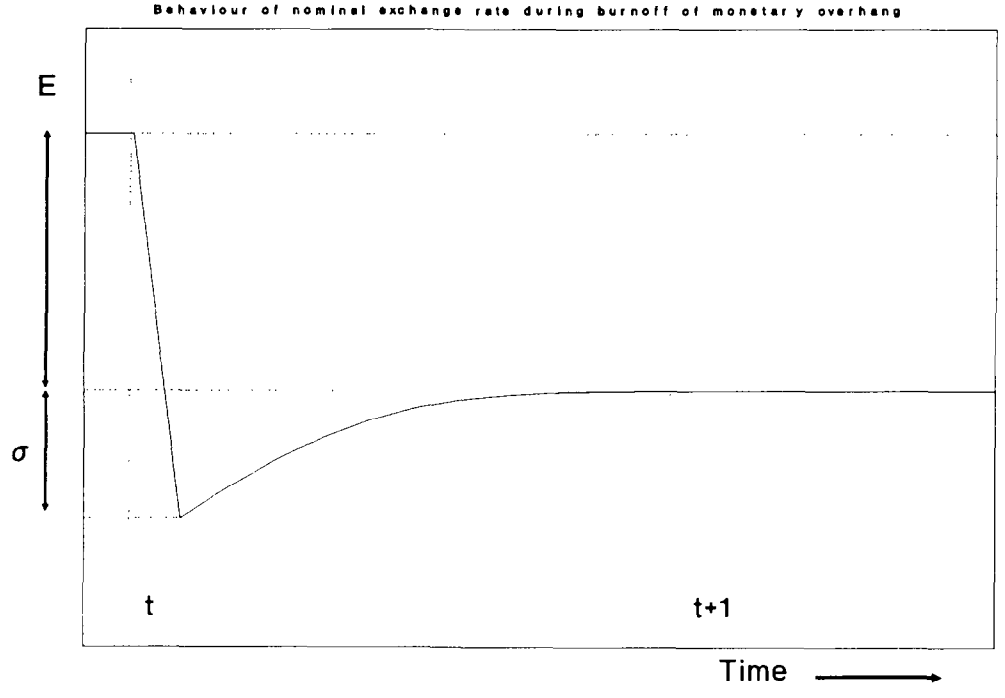
1/ In Poland the exchange rate was held constant throughout 1990.

Chart 5 - The Exchange Rate, Debt Viability and the Relative Rate of Return



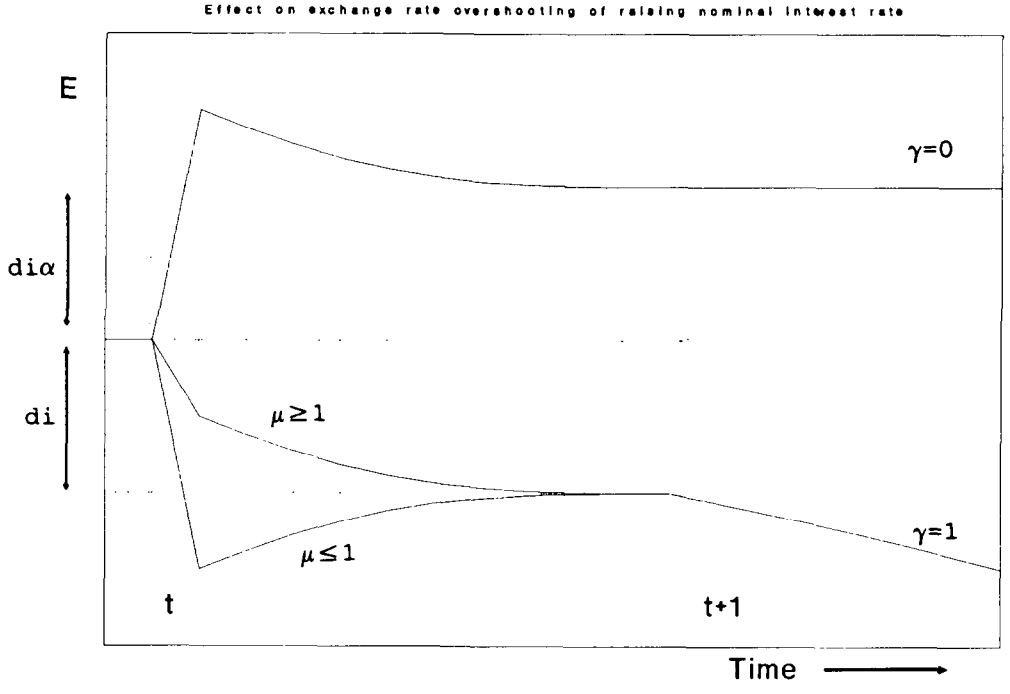
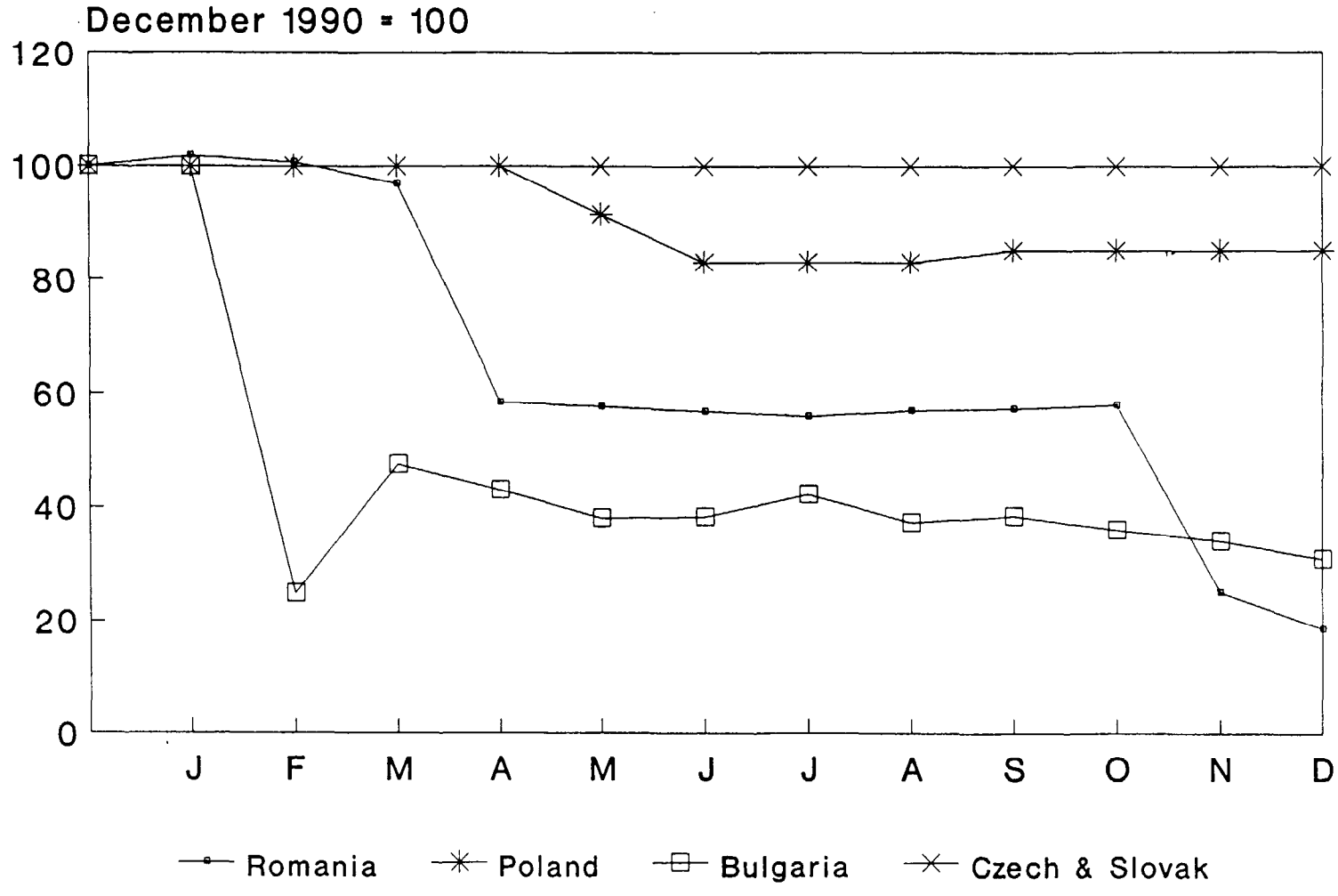


Chart 6 - Exchange rates in Central and Eastern Europe, 1991

(US dollar per unit of local currency)



because in their institutional and political systems there are actually channels that may result in an easing of credit policy or increase in inflation when interest rates are raised.

Two such channels have been described in this paper. First, most of the previously centrally planned economies embarking on reform have had large monetary overhangs. When these overhangs are to be eroded through price increases, real interest rates will almost always have to be negative for a shift in wealth from depositors to borrowers to take place. Increases in nominal interest rates during this period may therefore raise the needed increase in prices. Second, after the monetary overhang has been eliminated, there often remains a sizable amount of nonviable debt or a large burden of financing for weak enterprises. In these circumstances it may prove impossible to subordinate the public sector financing requirement to a restrictive credit policy. In this case, large increases in nominal interest rates, instead of tightening monetary conditions, will increase the credit needs of enterprises and may lead to more rapid credit growth and inflation.

What are the operational conclusions to be drawn from these observations? We would emphasize in the strongest terms that this paper does not argue for the acceptance of negative real interest rates or the view that interest rate policy is in any sense unimportant. Positive real interest rates are essential to the efficient allocation of resources and the maintenance of a sound and useable currency. What this paper does say is that it is critical to recognize the constraints on the effectiveness of interest rate policy when public sector finances cannot be subordinated to a restrictive credit policy. We conclude by suggesting some directions for interest rate policy in light of the constraints on their effectiveness in many previously centrally-planned economies.

- During erosion of the monetary overhang there is little economic value in raising nominal interest rates. It may be that an increase in nominal interest rates is desired as a signal of an intended change in policy. However, this signal is achieved at the cost of a larger price increase to eliminate the monetary overhang.

- When the financial burden of nonviable enterprises is large, the possibility that raising nominal interest rates will increase credit growth and inflation should be considered. In these circumstances, it is not possible to rely on a high interest rate policy to achieve credit restraint. Rather, the focus needs to be on setting interest rates against a realistic target for inflation.

- Third, and most fundamentally, credit policy will remain subordinate to the public sector financing requirement until the problem of nonviable debt and nonviable enterprises is addressed. This requires that unserviceable debt accumulated during the

central planning era by potentially viable enterprises be written off, nonviable enterprises be closed, and governments commit themselves to covering interest payments, both on their own debt and on debt they have assumed through debt restructuring, with primary surpluses. Without such reforms, it may well prove impossible not only to improve the structure of production but also to reduce inflation to targeted levels.

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