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Price Liberalization, Money Growth, and Inflation During the Transition to a Market Economy

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Abstract

This paper examines the influence of economic liberalization and monetary growth on inflation during the transition from central plan to market. It concludes that price decontrol had a substantial, one-time effect on the price level but no lasting effect on inflation; that economic liberalization broadly defined may have helped dampen price increases; and that monetary expansion has been the fundamental determinant of inflation in the region. The paper also finds that the intensity of liberalization has been related to geographic proximity to market economies, to the size of the underground economy, and to the degree of political freedom.

Contents

I. INTRODUCTION

This paper examines the behavior of consumer prices during the transition from plan to market in the countries of Central and Eastern Europe and the former Soviet Union from 1990 to 1996. It focuses on the influence of two key explanatory variables: economic liberalization and monetary growth, both across countries of the region and over time. This topic has been a controversial one. During the early stages of the transition in Eastern Europe and the former Soviet Union many who opposed reforms, and some who favored a gradual approach to reform, objected to rapid decontrol of prices on the grounds that it would be disruptive and would trigger an inflationary process. Critics of price liberalization were particularly vocal following the freeing of most prices in Russia by the government of Egor Gaidar in January 1992. The issue also has been a controversial one in the current debate about future reform in Cuba.[1]

On the basis of a simple model estimated for 26 countries over the period 1990–96, the paper concludes that:

▸   price decontrol had a substantial, albeit temporary effect on the price level, particularly in those countries where the inflation had been severely repressed towards the end of the period of central planning;

▸   in some countries, the initial jump in price *level* associated with price decontrol was quite large, but decontrol had no *lasting* adverse effect on the rate of inflation. Indeed, there are indications that measures to liberalize the economy (other than price decontrol) may have helped to reduce the price level below what it otherwise would have been;

▸   there is strong evidence that monetary expansion has been the fundamental determinant of inflation in the transition countries.[2]

The final section of the paper seeks to explain the behavior of several indicators of liberalization in the former centrally planned economies. It presents empirical results that suggest that, in general, the level of political freedom, the proximity to a thriving market economy, and the size of the underground sector tend to be associated with a rapid process of liberalization. Conversely, membership in the ruble area and the number of years a country had lived under a communist regime had a negative effect on liberalization.

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[1]See Carranza, Gutierrez, and Monreal (1997) and Hernández-Catá (1997) for two different views on this issue.

[2]This also has been controversial at times. For example, echoing a common view, Petrakov (1994) claimed that inflation in Russia was due not to monetary factors but to "structural deficiencies".

II. PRICES, MONEY AND LIBERALIZATION DURING THE TRANSITION

A number of recent studies have examined the behavior of inflation during the transition, but very few have analyzed simultaneously the effects of both economic liberalization and monetary growth, distinguishing between the effects of price decontrol and those of other forms of liberalization. The early--and essentially empirical--studies by Åslund, Boone, and Johnson (1996) and de Melo, Denizer, and Gelb (1996b) found a cross-sectional *negative* correlation between inflation and a cumulative index of liberalization.[3] However, a subsequent study by de Melo and Gelb (1997) also recognized that there was a *positive* relation between inflation and liberalization in the early stages of transition, a result they correctly attributed to the initial effects of price decontrol. Finally, the important paper by de Melo, Denizer, Gelb, and Tenev (1998) detected a shift in the relationship between price liberalization and inflation from positive in the short run (one year) to negative in the longer run, although no theoretical explanation was provided for this empirical result.[4]

None of the studies cited above provided a direct examination of the link between prices and money--or between inflation and money supply growth--during the transition process.[5] Fischer, Sahay, and Vegh (1996) did include the fiscal deficit in their panel regressions and found that it was positively related to the rate of inflation in transition countries. Cottarelli, Griffiths, and Moghadam (1998) report a similar result in a larger sample including both transition and industrial countries. There is no doubt that fiscal deficits have been an important determinant of monetary expansion—and therefore of inflation—in transition countries as well as in many other economies. For various reasons, however, the fiscal deficit has not been a good proxy for the rate of monetary expansion in the transition countries[6]: first, because at various times the governments' financing requirements were satisfied not only by resorting to the printing press, but also by selling assets, by borrowing from abroad, or by issuing domestic interest-bearing securities; and second, because in many countries, particularly in the former Soviet Union, support for a number of key regions, sectors and enterprises in the early stages

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[3]Unless otherwise noted, the liberalization indexes used in this paper is the one constructed by a team of World Bank economists and explained in de Melo, Denizer, and Gelb (1996a). See also Section III, below.

[4]That paper also contains an extensive investigation of the role of initial conditions in explaining growth and inflation in the transition countries.

[5]A few studies have focused on this angle of the problem, but they are unconcerned with the link between inflation and liberalization. See De Broeck, Krajnyak and Lorie (1997) and, in the Russian context, Koen and Marrese (1995).

[6]The regression results presented in Annex 2 indicate that, while fiscal deficits have had a significant influence on rates of monetary expansion in the transition countries, they explain only a small fraction of the variation in these rates.

of transition was provided not through the budget, but via central bank credits, often at heavily subsidized interest rates.[7]

The model estimated in this paper provides a simple explanation for the fact that, in most transition countries, inflation appears to be *positively* related to liberalization in the early stages of the transition, particularly in those countries where the liberalization effort was early and strong, while over the medium term the correlation between inflation and liberalization is negative and statistically significant. The paper differs from previous studies in that (a) it introduces explicitly the money supply as a key variable rather than relying on its proximate determinants such as the fiscal deficit; and (b) it examines separately the role of price decontrol and other aspects of economic liberalization such as privatization and trade liberalization.

III. THE MODEL

The model combines two basic equations: (1) a demand for money function; and (2) a definition of price liberalization:

$$M = P^* \ Q \ / \ V \tag{1}$$

$$D = P \ / \ P^* \tag{2}$$

where M = money supply
Q = output
V = velocity
D = a measure of price decontrol $(0 < D \leq 1)$
P = the actual level of consumer prices, and
P^* = the equilibrium level of consumer prices.

If prices are fully decontrolled, P is equal to P^* and D takes on its maximum value of 1. If prices are fully controlled at a level $\bar{P}$, then $D = \bar{P}/P^* > 0$. In words, D is inversely related to the gap between controlled and equilibrium prices, and therefore to the monetary overhang.[8]

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[7]Examples are the support provided by the Central Bank of Russia to the far North and to the agricultural sector in 1992–93. See Hernández-Catá (1995).

[8]Consider an economy where a fraction w of all goods is sold at market-clearing prices (P^*) and a fraction *(1-w)* is sold at controlled prices *(P̄)*. The ratio of actual to equilibrium prices

The equilibrium price level P^*—i.e., the hypothetical price level at which the existing money supply would be willingly held—is unobservable, except in the limiting case where prices are fully decontrolled. However, since measures of price liberalization are available for all the countries covered in this paper, a quantifiable relation between the actual level of prices, the demand for money and the degree of price liberalization can be derived by combining equations (1) and (2):

$$P = D \, M \, V \, / \, Q \qquad (3)$$

The interpretation of equation (3) is straightforward. If prices are fully liberalized ($D=1$) the actual price level is equal to the equilibrium price level, and therefore is fully determined by the money supply, income and the determinants of velocity. If prices are fully controlled, these variables become irrelevant and equation (3) takes on the limiting form $P = \bar{P}$. As the economy is liberalized and D takes on values between zero and one, the money stock and other determinants of the demand for money play an increasingly important role in explaining the level of prices.

In quantifying equation (3), the price decontrol variable could be approximated by the de Melo-Denizer-Gelb price liberalization variable (L_{price}).[9] However, that variable is allowed to take zero values (indeed, it is equal to zero for most of the countries of the former Soviet Union in the period 1989-90). This raises two practical problems: first, it makes it impossible to rely on a logarithmic transformation of equation (3); and second, it is inconsistent with the definition of the price decontrol variable D used in this paper, which must always be positive, even when all prices are fully controlled. To circumvent these difficulties, we define a new variable $\tilde{D}$ as a linear transformation of the de Melo-Denizer-Gelb price liberalization variable, and assume the following relation:

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[8](...continued)
will be proportional to the ratio of controlled to equilibrium prices, i.e.: $P/P^* = w \, (\bar{P}/P^*)$. The ratio $\bar{P}/P^*$ itself is inversely related to the gap between actual and desired levels of the money stock—i.e., to the excess supply of money, or 'monetary overhang'. It may be noted that the variable V is the *structural* velocity of circulation of money and is *not* equal to the ratio of nominal GDP to money except when prices are fully liberalized, as is clear from equation (3).

[9]This is one of the three sub-components of the aggregate liberalization variable constructed by the authors. The other two are for *external markets* (including currency convertibility and liberalization of foreign trade through the elimination of export controls and taxes and the substitution of low to moderate import duties for import quotas and high import tariffs); and for *private sector entry* (including privatization of small scale and large scale enterprises and banking sector reform).

$$D = \tilde{D}^{\theta} = [\beta + (1-\beta) \, L_{price}]^{\theta} \tag{4}$$

where β must be positive but smaller than one. In this formulation, D is always positive and ranges between a fractional positive value β when $L_{price}=0$ and unity when $L_{price} = 1$.

Taking natural logarithms on both sides of equations (3) and (4) and substituting for D yields:

$$p_{it} = m_{it} - q_{it} + \theta \tilde{d}_{it} + v_{it} \tag{5}$$

where i and t are subscripts referring to countries and years, respectively, and all other lower-case Latin letters refer to the natural logarithm of the corresponding variables.[10]

Finally, velocity is assumed to have two components. The first is an exogenous component v^0 that reflects the influence of starting conditions and other structural characteristics that may differ from country to country and possibly over time. These are captured by a number of dummy variable explained below in Section IV. The second component assumes that, other things equal, the higher the degree of economic liberalization (other than price decontrol) the lower the price level, because factors such as freedom of entry in domestic markets and openness to external trade should be expected to enhance price competition. Replacing v by its two components yields an expression that can be estimated by linear least squares on the basis of observable variables:

$$p_{it} = m_{it} - q_{it} + \theta \tilde{d}_{it} + v_{it}^0 + \lambda l_{it} \tag{6}$$

The (non-price) liberalization variable L was approximated by a simple arithmetic average of the de Melo-Denizer-Gelb sub-indexes for: (i) non-price internal liberalization (including market entry and privatization); and (ii) external liberalization. L does not include zero values in the period 1990–96 and therefore it can be included in the regressions in logarithmic form (l_{it}) without need for transformation.

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[10]In estimating the equations, the value of the parameter β was set arbitrarily at 0.1. Experimentation with alternative values in the range of 0.05 to 0.5 resulted in higher standard errors.

IV. EMPIRICAL RESULTS

Equation (5) was estimated using data for 26 transition countries in Eastern Europe, the Baltic Region, Russia and other countries of the former Soviet Union, and Mongolia for the period 1990–96 (182 observations). To take into account the endogeneity of the two price liberalization variables D and L, the equations were estimated by two stage least squares, using as instruments the predetermined variables listed in Table II. The regression results are presented in Table I and detailed definitions and sources of variables are provided in Annex 1.

In equation I.1, the estimated coefficients have the expected sign and are significantly different from zero.[11] Moreover, the estimated elasticities of consumer prices with respect to the money/output ratio $(m - q)$ is not significantly different form unity, which is in line with the model's basic specification, and the coefficient of the price decontrol variable d is positive. The coefficient of the non-price liberalization variable is significantly negative as expected, suggesting that liberalization in general tends to act as a restraining force on prices through enhanced competition and efficiency gains.

Equation I.2 adds a number of dummy variables. *Location*—a variable proposed by de Melo, Denizer and Gelb and Tenev (1997)—has a value of 1 when the country is located in the proximity of a "thriving" market economy; and a value of zero otherwise. Its coefficient is expected to be negative, as the existence of efficient markets and institutions in neighboring countries should help to improve competition and put downward pressure on profit margins and prices. The *age of the communist regime* is defined for each transition country as the number of years from the beginning of communist rule to the beginning of the sample period (1990). It is expected to have a positive sign because the longer the period, the more ingrained are command and control mechanisms likely to be, and therefore the longer it would take for formal price liberalization to affect behavior. Finally, the variable *fixed exchange rate* has a value of one when a country is under a fixed exchange rate system and a value of zero otherwise. This variable, proposed by Fischer, Sahay and Vegh (1996 and 1998), is intended to capture the favorable confidence effects of nominal exchange rate anchors on velocity, and its coefficient is therefore expected to be negative. The coefficients of location and the length of the communist period are significantly different from zero with the expected signs, but the coefficient of the fixed rate dummy has the wrong sign.

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[11]Tests about whether a coefficient differs significantly from zero in the expected direction are based on one tailed t-tests and a 1 percent confidence interval which, for an infinite number of degrees of freedom, involves an absolute value of t greater than 2.33.

Table 1. Regression Results for Consumer Prices in 26 Transition Countries, 1990-96

Two Stage Least Squares Estimates

		I.1	I.2	I.3	I.4
Constant		2.4*	1.56*	0.70	1.71*
		(4.7)	(3.1)	(1.3)	(3.8)
Broad money/real GDP	$m - q$	1.07*	0.93*	0.92*	1.07*
		(33.9)	(24.6)	(21.9)	(25.4)
Price decontrol variable	d	1.10*	1.68*	1.59*	1.04*
		(4.5)	(5.6)	(5.4)	(4.6)
Non-price liberalization variable	l	-2.81*	-2.80*	-1.72*	-1.76*
		(4.5)	(4.4)	(2.71)	(3.9)
Dummy variables:					
Location		--	-0.44*	-0.47*	--
			(2.9)	(2.5)	
Age of communist regime		--	0.03*	0.03*	--
			(4.0)	(3.2)	
Fixed exchange rate		--	0.27	-0.08	--
			(1.5)	(0.4)	
Former Soviet Union		--	--	1.26*	--
				(4.57)	
Former Yugoslav Republics		--	--	-0.26	--
				(0.8)	
Central & Eastern Europe		--	--	0.70*	--
				(2.6)	
Adjusted R^2		0.933	0.940	0.947	0.974

The dependent variable in all equations is the natural logarithm of the consumer price index. Stars indicate that the coefficient is significantly larger or smaller than zero, as appropriate, at the 1 percent confidence level. Equation I.4 is estimated using 25 individual country dummies (results not shown).

Numbers in parenthesis are t-ratios based on heteroskedasticity-adjusted standard errors.

Equation I.3. adds three regional dummy variables: one for the Baltics, Russia and the other countries of the former Soviet Union; one for three of the former Yugoslav Republics (Croatia, Macedonia and Slovenia) and one for the other countries of Central and Eastern Europe.[12] The results suggest that velocity tends to be relatively high in the former Soviet Union and relatively low in the former Yugoslav Republics. Other results, however, suggest these regional coefficients lack robustness. Finally, equation I.4 provides a test of the fixed effects model by introducing a set of 25 individual country dummies.

The estimates presented in Table I suggests that in general the results are fairly robust with respect to changes in specification. In particular, the elasticities with respect to the money/output ratio are insignificantly different from one in most equations. The coefficient of the liberalization variables d and l are always significant and correctly signed, although their range of variation across equations is wider. However, the coefficients of the regional dummy variables are quite sensitive to changes in specification. The coefficient of the fixed exchange rate dummy was unstable and insignificantly different from zero, suggesting that the exchange rate regime does not have a significant effect on velocity. Other results, however, suggest that the fixed exchange rate variable has an influence on the rate of expansion of the money supply and thus, indirectly, on the rate of inflation. (See Annex 2). In general the results presented in Table I do not differ greatly from those obtained by ordinary least squares except that, in equations I.2 and I.3, the two stage least squares coefficients for the price decontrol variable are significantly larger. When a lagged dependent variable was introduced on the right-hand side of the equations, the estimated proportion of the adjustment completed in the first year ranged from 45 percent to 65 percent.

Equation (5) was also estimated in first difference form with the following results:

$$\Delta p = -5.43 + 1.16 \, \Delta \, (m\text{-}q) + 0.62 \, \Delta \tilde{d} - 27.68 \, \Delta l$$
$$\quad (0.57) \quad (16.9) \qquad\quad (3.2) \qquad\quad (0.3)$$

$$\overline{R}^2 = 0.777$$

Again, the results are fully consistent with the view that monetary expansion is the fundamental determinant of inflation and that price decontrol has a temporary effect on inflation. However, the coefficient of change in the non-price liberalization variable is insignificantly different from zero. Most of the dummy variables listed in Table 1 are not time-dependent and therefore drop off in first difference form.

The role of monetary expansion and price liberalization in explaining price movements during the transition is illustrated by Figures 1 and 2. Each chart shows the actual level of consumer

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[12]Attempts to introduce separate regional dummies for the Visegrad countries (the Czech and Slovak Republics, Hungary and Poland) and for the other countries of Central and Eastern Europe did not reveal any significant differences.

price inflation and the level predicted using the estimated coefficients of equation I.1. It also disaggregates predicted inflation into three components that reflect the impact of: (a) monetary expansion; (b) price decontrol; and (c) changes in non-price liberalization. Figure 1 illustrates the case of two countries that adopted a bold approach to liberalization and also succeeded in bringing down inflation rapidly. In Poland, the liberalization of most prices was achieved in 1990 which, coupled with the impact of relatively rapid monetary expansion in that year caused inflation to rise into the triple digit range. However, as the effect of price decontrol tapered off in the next few years and the growth of money was gradually reduced, inflation declined steadily to relatively low levels. Throughout the period, non-price liberalization had a significant dampening effect on inflation. Price liberalization in Lithuania also occurred at an early stage, and its initial effect on prices was even stronger than in Poland—partly because in 1990 prices were more rigidly controlled in Lithuania than in Poland, were some liberalization had already taken place. In Lithuania, however, both the surge of inflation in 1992 and its sharp decline subsequently reflected mostly the evolution of money growth.

Figure 2 compares developments in two countries that allowed inflation to rise to very high levels but that differed sharply in their approach to liberalization: Russia decontrolled most prices in early 1992 while in Turkmenistan prices were liberalized very gradually. In both countries inflation surged in 1992, mainly because of a sharp increase in money growth, although price decontrol also played a role a significant role, particularly in Russia. After that, however, inflation declined steadily in Russia while it remained very high in Turkmenistan, reflecting a considerable difference in the stance of monetary policy and, to a lesser extent, a faster pace of liberalization in Russia.

V. ACCOUNTING FOR LIBERALIZATION

The previous sections have examined the impact of economic liberalization, including price decontrol, on the behavior of prices during the transition. This section asks a different question: why have the speed and intensity of liberalization differed so markedly among transition countries? Table II shows the main results of an attempt to answer this question by relating the de Melo-Denizer-Gelb price and non-price liberalization[13] indexes to a number of economic, political and regional variables.

Separate equations were estimated for the price and non-price liberalization variables, although most of the explanatory variables are included in both sets of equations. These variables include the *age of the communist regime* and the *location* dummies, both defined in

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[13]Separate equations were also estimated for the *external* and *market entry* components of the non-price liberalization variables; the results were very similar to those obtained using the average of those two components.

Figure 1. Components of Inflation
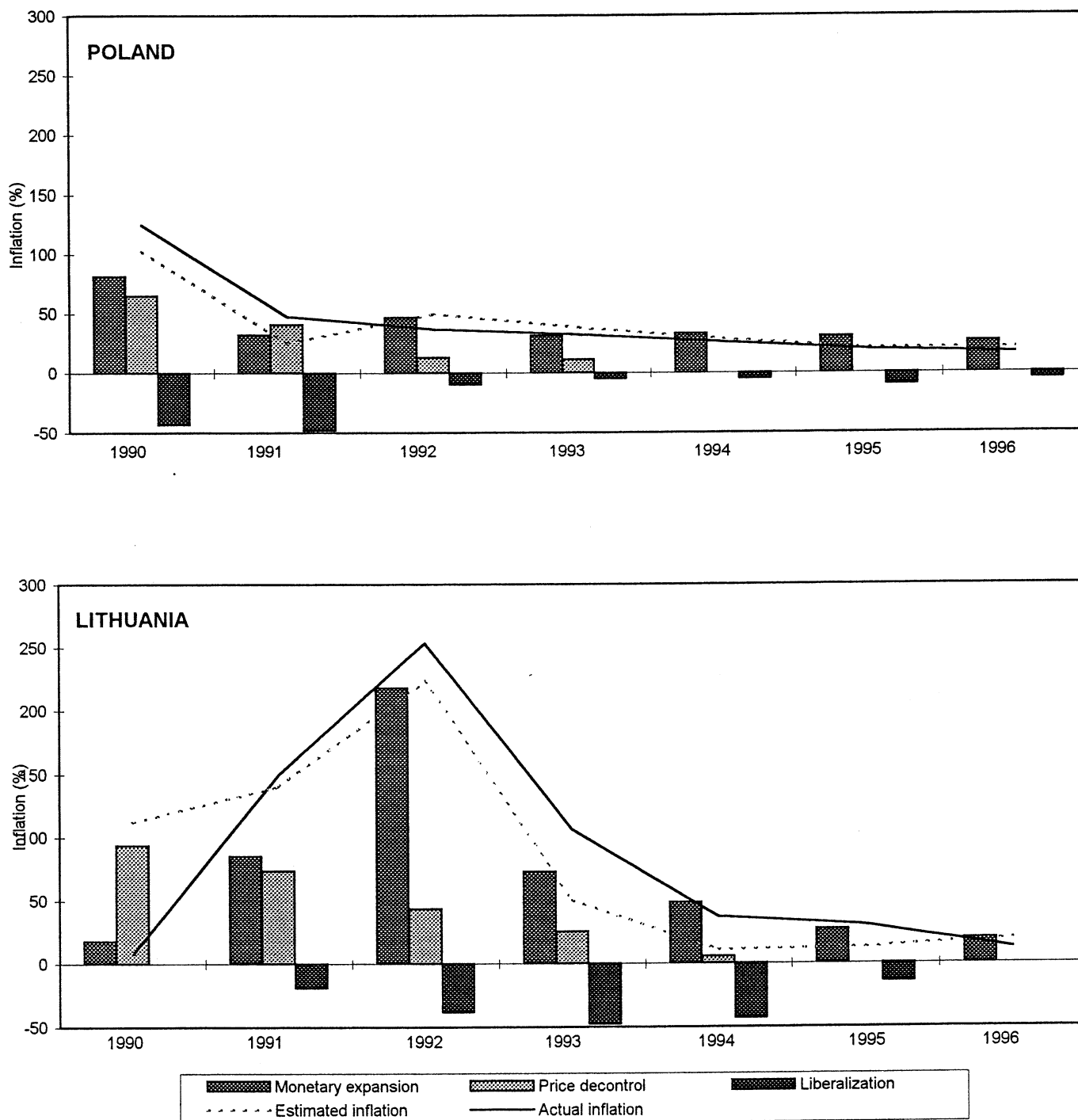
Source: Equation I.1. Inflation is measured as the change in the natural logarithm of consumer prices, expressed in percent.

Figure 2. Components of Inflation
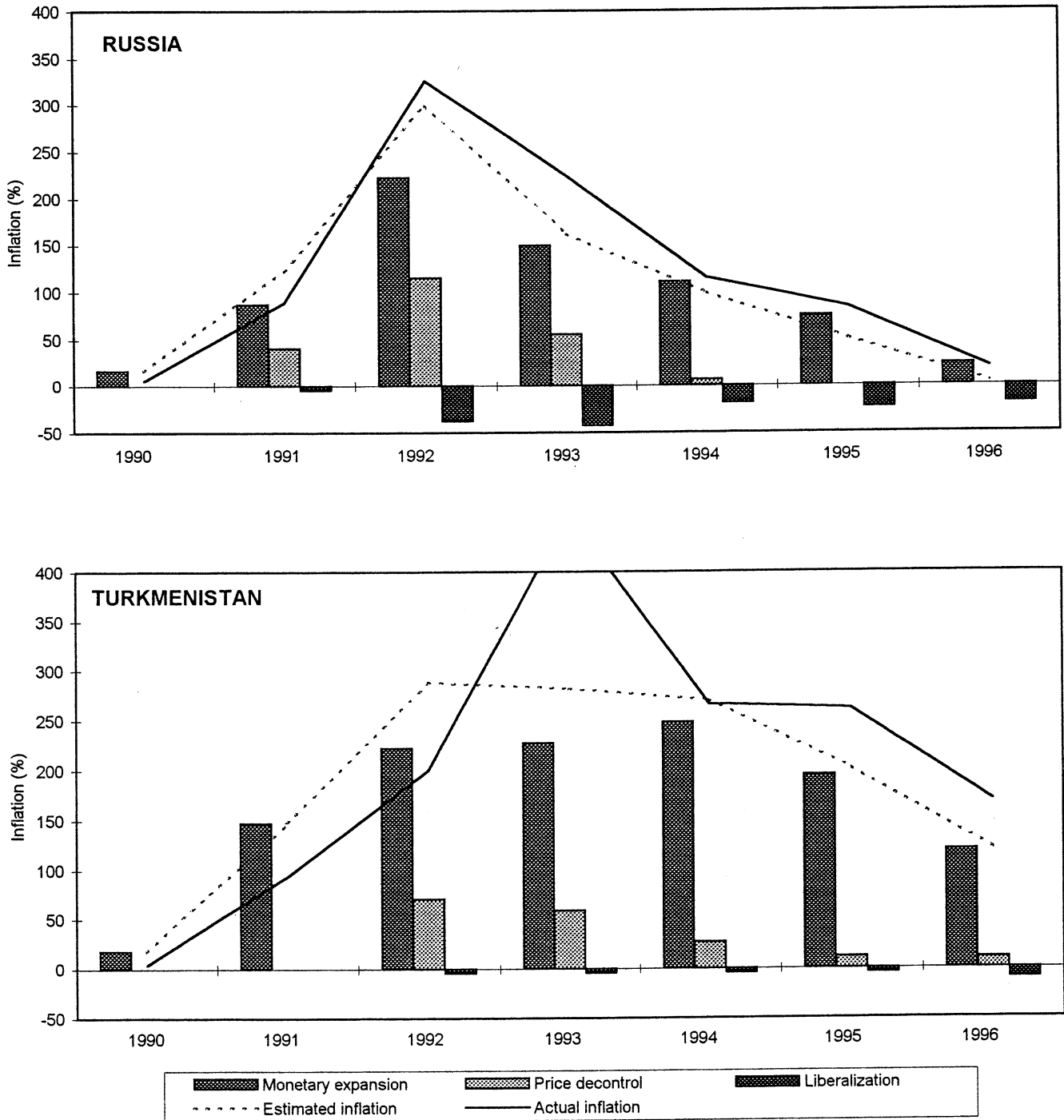
Source: Equation I.1. Inflation is measured as the change in the natural logarithm of consumer price index, expressed in percent.

Table 2. Regressions for Liberalization Variables in 26 Transition Countries, 1990-96

Explanatory variables:	II.1	II.2	II.3	II.4
	Dependent variable:			
	price liberalization variable:		non-price liberalization variable:	
Constant	38.8*	50.3*	21.4*	40.5*
	(3.8)	(3.7)	(3.0)	(3.6)
Political freedom index	1.37*	3.54*	1.37*	4.37*
	(3.3)	(7.2)	(4.4)	(10.8)
Age of communist regime	-0.32*	-0.25	-0.01	0.05
	(2.3)	(1.4)	(0.1)	(0.4)
Location	9.01*	10.6*	7.79*	13.2*
	(3.0)	(2.7)	(4.0)	(4.2)
Ruble area	-13.2*	-35.9*	-14.6*	-33.0*
	(4.0)	(10.0)	(6.8)	(11.3)
Underground economy proxy	0.34*	0.69*	0.14*	0.24*
	(4.0)	(6.8)	(2.6)	(2.8)
Price liberalization gap with Russia	26.5*	2.29	--	--
	(4.6)	(0.3)		
Lagged dependent variable	0.57*	--	0.64*	--
	(11.5)		(16.5)	
Former Soviet Union	3.49	18.5*	2.48	9.18
	(0.6)	(2.6)	(0.7)	(1.6)
Former Yugoslav Republics	6.72	22.8*	0.20	15.0
	(1.0)	(2.7)	(0.1)	(2.2)
Central & Eastern Europe	2.23	9.9	-1.02	3.14
	(0.4)	(1.3)	(0.3)	(0.5)
Adjusted R^2	0.845	0.710	0.913	0.777

Numbers in parenthesis are t-ratios based on heteroskedasticity-adjusted standard errors. Stars indicate that the coefficient is significantly greater or smaller than zero, as appropriate, at the 1 percent confidence level.

the previous section. The longer the period of communist rule the more ingrained the institutions of a command economy and thus the greater the resistance to liberalization. In contrast, proximity to a free market economy should favor privatization and liberalization in general, by increasing familiarity with markets and markets-related institutions and by providing a demonstration effect. In addition, both sets of equations include a *political freedom index*, defined to range between -7 for a highly repressive political system to +6 for a free society with the guarantees for individual rights and the institutions normally associated with a modern democracy. It is assumed that the higher political freedom index the greater the popular pressure for reform.

In addition to these political variables, the equations include a proxy for the share of the *underground economy*, defined as one minus the ratio of officially measured real GDP to electrical power consumption.[14] A large underground economy is expected to be associated with a relatively low resistance to price decontrol—and to economic liberalization more generally—because it indicates that a large share of the economy *de facto* has already been liberalized and that a large fraction of the population is interested in the ultimate success of a free economy. Finally, all the equations in Table II include a *Ruble area* dummy equal to one in those years in which a country is a member of the ruble area, and to zero otherwise. The coefficient of this variable is expected to be negative inasmuch as membership in the ruble area often was associated with political interest groups that wished to retain some of the interrepublican ties that existed under the Union and that often opposed reforms.

The equations for price liberalization also include a *price liberalization gap with Russia*, defined, for each country, as the difference between the Russian and the domestic level of the price liberalization. The larger this gap, the wider the difference between relatively free prices in Russia and controlled prices in other countries, and the more intense the pressures on those countries to decontrol prices so as to eliminate the shortages resulting from legal exports or smuggling. Finally, equations II.1 and II.3 report estimation results including lagged dependent variables as regressors to capture the adjustment costs perceived to be associated with liberalization.

Turning to Table II, all the estimated coefficients have the right signs and are significantly different from zero, except for most of the regional dummies and for the variable measuring the length of the communist period.[15] Also, the price liberalization gap with Russia was vulnerable to the omission of the lagged dependent variable from the regression. The

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[14]Power consumption is used as a proxy for *true* GDP, and the difference between real GDP (as imperfectly measured in the national accounts) and power consumption is therefore interpreted as a measure of unrecorded output.

[15]In the equations reported in Table II, and also in Figures 3 and 4, the liberalization variables have been multiplied by 100 for ease of interpretation. These variables thus range between zero and 100 while the original de Melo-Denizer-Gelb indexes range between 0 and 1.

estimated coefficients for the latter variable are around 0.6, suggesting a speed of adjustment of approximately 40 percent in the first year. The long-term coefficients in the equations with lagged dependent variables (II.1 and II.3) can be obtained by dividing the reported (short-run) coefficients by the speed of adjustment, i.e, by 0.4. On that basis, and with the exceptions noted above, the estimated parameters in Table II appear to be reasonably robust.

Some of the key implications of the analysis are illustrated in Figures 3 and 4.[16] Figure 3 compares two countries that have achieved a high degree of liberalization. The Czech Republic benefitted from favorable location--outside the former Soviet Union and in the proximity of free market economies like Austria--and therefore the value of its (non-price) liberalization index was already relatively high in 1990, at the beginning of the sample period. Moreover, an already high degree of political freedom in 1990 increased further during the 1990s, and by 1996 the Czech Republic had attained the highest level of liberalization

(95 percent) among the 26 former communist countries included in this study. By contrast, in 1990 Latvia still belonged to the ruble area—and, under duress, to the USSR—fared poorly in terms of political freedom, and scored only 5 percent in the liberalization scale. Over the next six years, however, Latvia's liberalization index increased rapidly (to 85 percent in 1996) as the country left the ruble area in 1992, political freedom increased considerably, and the underground economy expanded.

Figure 4 illustrates the case of two economies where liberalization has made little progress. In the early 1990s, both Belarus and Turkmenistan belonged to the Soviet Union and to the ruble area, they were not geographically close to market economies, and they ranked poorly in terms of political freedom. Not surprisingly, they recorded a low level of liberalization (5 percent, like Latvia) in 1990. Unlike Latvia, however, the indicators of political freedom in Belarus and Turkmenistan remained very low (actually they improved a little in the early years of the transition and then deteriorated), and the underground economy remained quite small. By 1996, the non-price liberalization indexes in these two countries had reached only 40 percent and 35 percent, respectively.

<p style="text-align:center">* * *</p>

On the basis of the results reported in this paper, the fear that price liberalization could lead to an inflationary process appear to be unjustified. Price decontrol will push up the average price level, but it will not have a lasting effect on inflation. In the transition countries, as anywhere

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[16] The estimates underlying the figures relate to the evolution of non-price liberalization and are based on equation II.4.
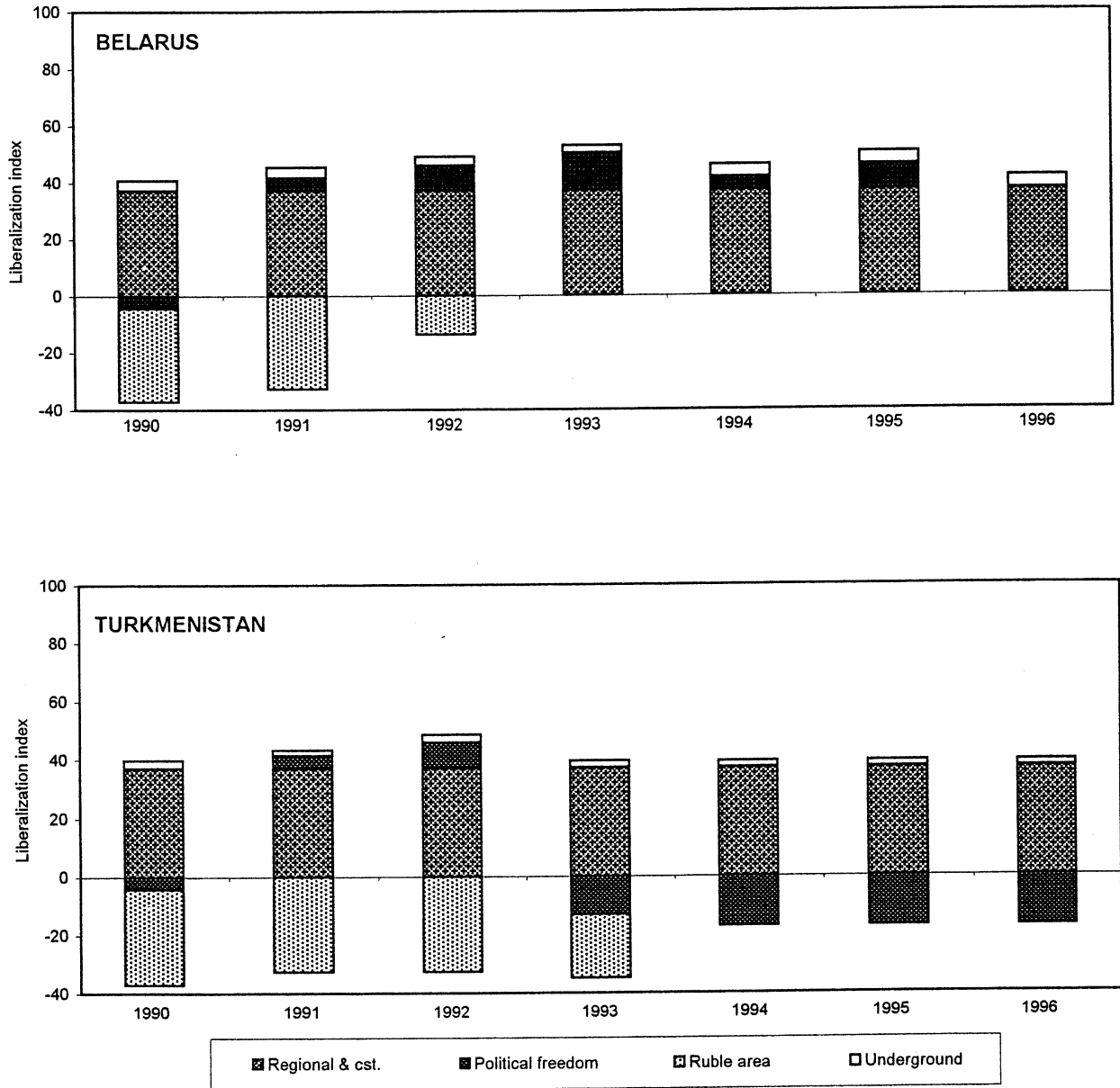
Figure 3. Accounting for Liberalization
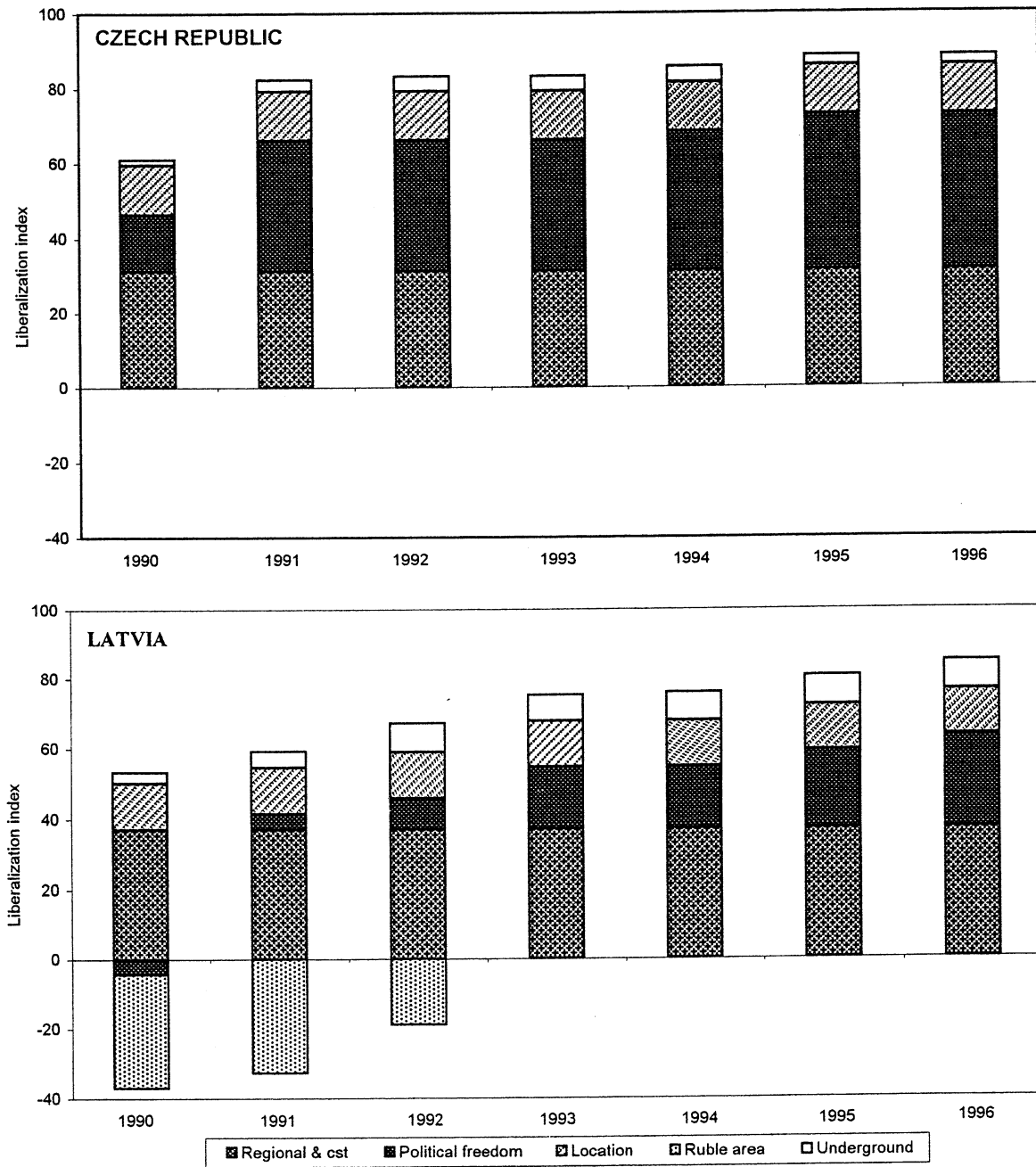
Source: Equation II.4. The original de Melo-Denizer-Gelb liberalization indexes are multiplied by 100.

Figure 4. Acocunting for Liberalization

Source: Equation II.4. The original de Melo-Denizer-Gelb liberalization indexes are multiplied by 100.

else, high inflation results essentially from excessive monetary expansion. To be sure, the once-and-for-all adjustment in prices associated with decontrol can be very large, particularly if prices had been severely repressed below their equilibrium levels—but that is the unavoidable cost of past distortions. Thus, there are no good reasons not to liberalize quickly, and there are very good reasons to do so: to do away with rationing and queues, and to allow relative prices to provide undistorted signals to market participants, and thus to allocate resources efficiently. But good reasons do not seem to trigger good policies unless there is enough political freedom to allow reason to prevail.

Definitions and Sources of Variables

D = price decontrol variable; linear transformation of L_{price} as defined in equation (4); two year moving average.

F = index of political freedom; from Raymond D. Gastil, *Freedom in the World, Political Rights and Civil Liberties*, various years (Freedom House). The author provides two scales for each country, one for *political rights*, the other for *civil liberties*. For each scale, a rating of 1 is freest, a rating of 7 is least free. Adding the two scales provides a *combined freedom rating* that ranges between 1 and 14. The freedom variable used in this paper is obtained by subtracting Gastil's combined freedom rating from eight. It thus ranges between -7 (least free) to +6 (freest).

$L_{price}, L_{int}, L_{ext}$ = indexes for domestic price, non-price internal and external liberalization, respectively. From de Melo, Denizer and Gelb (1996a). Updated variables through 1996 were kindly provided by Stoyan Tenev.

L = non-price liberalization index; two year moving average of a simple arithmetic average of L_{int} and L_{ext}.

M = broad money (local currency M2), end of year. From IMF, World Economic Outlook database.

P = consumer price index, end of period. Derived form end of year percentage changes from EBRD, *Transition Report*, 1997.

Q = real GDP index, 1989=1. Derived from growth rates published in IMF, *World Economic Outlook*, 1998; and EBRD, *Transition Report*, various issues.

U = proxy for the size of the underground economy. Calculated as 1 minus the ratio of an index of official real GDP to an index of power consumption. For a full description of the construction of this variable, see Hernández-Catá (1997), Appendix II.

Dummy variables:

Fixed exchange rate = equal to one when a country is on a fixed exchange rate regime, and to zero otherwise (prorated by the number of months in which the country is on a fixed rate.) Based on information provided by Fischer, Sahay and Vegh (1998), Table 4.

Location = equal to one when a country borders on a thriving market economy, equal to zero otherwise. From de Melo, Denizer, Gelb, and Tenev (1997).

Ruble area = equal to one when a country uses the Russian ruble as a legal tender, equal to zero otherwise, i.e., when it uses a national currency or a generalized coupon (prorated by the number of months in which the country used the ruble.)

Age of communism = number of years during which a country was under communist rule. Equal to the difference between 1990 and the following years: 1948 for Bulgaria, the Czech and Slovak Republics, Hungary, Poland and Romania; 1946 for Albania; 1945 for the former Yugoslav republics, Moldova and the Baltic countries; 1924 for Mongolia; and 1918 for the other countries of the former Soviet Union.

Price liberalization Gap with Russia: For each country, the difference between the price liberalization variable for Russia and the price liberalization variable for that country.

FSU: The Baltic Countries, Russia, and other countries of the Former Soviet Union.

Former Yugoslav Republics: Croatia, Slovenia and Macedonia

Other Central and Eastern Europe: the Czech and Slovak Republics, Hungary, Poland, Albania, Bulgaria and Romania.

The following money supply function was estimated by ordinary least squares for the 26 transition countries listed in section 4 for the period 1990-96. T ratios are based on White's heteroskedasticity adjusted standard errors.

$$\Delta M/Y = 10.15 - 0.54\ B/Y + 16.42\ Ruble\ area - 8.64\ Fixed\ rate + 1.34\ F \qquad \overline{R}^2 = 0.285$$
$$\qquad\qquad (2.3) \qquad (3.9) \qquad\qquad (3.1) \qquad\qquad (2.9)$$

where: $\Delta M/Y$ is the change in the stock of broad money (local currency M2) in percent of GDP;

B/Y is the general government fiscal balance (surplus +) in percent of GDP;

$Ruble\ area$ is a dummy variable for countries using the Russian ruble as legal tender;

$Fixed\ rate$ is a dummy variable for countries on a fixed exchange rate; and

F is a political freedom variable (More detailed definitions are given in Annex 1)

The equation also included 25 country dummies.

The results indicate that, *ceteris paribus,* monetary growth rates were relatively high in members of the ruble area. They also suggest that countries under a fixed nominal exchange rate tend to have a lower rate of monetary expansion. This does not necessarily indicate causality, however. Rather, it may reflect the fact that only those countries where the authorities are determined to pursue an anti-inflationary monetary policy, and therefore a disciplined fiscal policy, can afford to sustain a fixed exchange rate. More surprisingly, greater political freedom appears to be associated with higher rates of money growth, perhaps because it makes it relatively difficult to take the sometimes drastic adjustment measures required to avoid monetary financing of politically powerful sectors and enterprises during the early stages of reform.

The results confirm that fiscal deficits are correlated with monetary growth. As indicated by the adjusted R-squared, however, the explanatory power of the equation is low, even with the inclusion of all the other variables.

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