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Macroeconomic Adjustment and Growth

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Inflation and Growth in the Transition from Socialism

The Case of Bulgaria

Andrés Solimano

A fragile political-macroeconomic equilibrium is bound to result in high inflation in the transition from socialism. The collapse of growth in Bulgaria is the result of cuts in oil deliveries from the Soviet Union and Iraq, domestic dislocation in the supply of inputs following the dismantling of central planning, and the contraction of the Soviet market.

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This paper — a product of the Macroeconomic Adjustment and Growth Division, Country Economics Department — is part of a larger effort in PRE to conduct research on reforming socialist economies. Copies are available free from the World Bank, 1818 H Street NW, Washington, DC 20433. Please contact Emily Khine, room N11-067, extension 37471 (51 pages, with tables).

Bulgaria's shaky macroeconomic situation is a serious obstacle for a smooth transition from central planning to markets. It has to correct large current account deficits with the convertible currency area. It also has to eliminate inflationary pressures and large price distortions. And it has to get into a path of sustainable growth.

The links between inflation, money velocity, the money overhang, and the fiscal deficit are crucial for assessing probable inflationary trends in Bulgaria. Solimano shows that with controlled prices and financial repression, low velocity keeps inflation at an artificially low level despite large fiscal deficits. But as prices are deregulated and the financial sector is reformed, velocity can be expected to increase — due to expectations of higher inflation and financial innovation.

Solimano uses cost-determined price equations to explore the effects on domestic prices of a devaluation of the leva and an increase in the price of foreign inputs imported from the Soviet Union and other CMEA countries. The input price shock has a bigger effect on internal prices than does an equivalent devaluation.

The supply response to changes in relative prices and market incentives is likely to face at least two major problems at a micro level. First, the rules of operation for firms in the productive sphere are still dominated by enterprises operating under soft budget constraints — with little price responsiveness. Second, in a setting of monopolistic competition, where individual firms have considerable market power, full price deregulation may reduce output.

Bulgaria's moves toward a market economy are likely to affect growth through several channels. The correction of macroeconomic imbalances — cutting imports and cooling aggregate demand to dampen inflationary pressures — will contract aggregate economic activity. Reforms of the incentive structure will make part of the capital stock economically obsolete, hampering productive capacity in the short run. The response of private investment to the new incentives will be highly sensitive to macroeconomic stability and the perceived probability that the reform process will last and consolidate. Otherwise, private investors will wait before acting, delaying the resumption of growth. Given these impediments, external support in the form of new financing and direct investment will play a major role in consolidating the reform and in the resumption of growth.

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1. Introduction

The transition from central planning to a market-based economy in Bulgaria will be a complex process. On top of the structural problems inherited from decades of running the economy over strictly orthodox central planning lines, the economy faces now also severe macroeconomic imbalances, a feature that obviously complicates the transition. Economic growth in Bulgaria has decelerated sharply in the last four years and started to turn negative in 1989 turning to a definite collapse in 1990 with an additional drop in output of the order of -10%. External debt is a serious problem as Bulgaria more than doubled its foreign debt in a few years (1985-1989) and currently its servicing is suspended for both principal and interest payments; moreover, the economy is in a critical need of foreign exchange to keep it running, let alone the servicing of its foreign debt. Domestic inflation started to accelerate in 1990 as prices are being deregulated, though near 85 percent of prices remain still under government control. In last May the domestic currency -- the leva -- was devalued and a two tier exchange rate system was established for current account transactions. The fiscal situation is bound to deteriorate significantly as a consequence of the devaluation of the leva besides of the effect of pending increases in current spending. Furthermore, on the external front, Bulgaria is expected to face a deterioration in its terms of trade particularly with the Soviet Union -- Bulgaria's main trade partner -- as by January 1991 the subsidies given to oil and other products that the USSR exports to Bulgaria (and other CMEA countries) will be eliminated.

The paper is organized as follows. Section 2 provides a background on the structural features of the Bulgarian economy and its current macroeconomic situation. In section 3 we provide a simple framework to link fiscal

deficits, the money overhang, inflation and the real exchange rate in the process of restoring internal and external balance and eliminating repressed inflation. Section 3.1 provides a numerical exercise related to the monetization of fiscal deficits, money velocity and the rate of inflation in a context where prices are being decontrolled. The sensitivity of inflation to different degrees of velocity is examined as well as the issue of setting fiscal targets for anti-inflationary purposes. There we caution on the impact of financial deregulation on money-velocity during disinflation. Then in section 4 we look at the inflationary process from the cost side and assess the impact of two shocks on domestic prices: a devaluation of the leva and an increase in the price of inputs imported from the CMEA zone (particularly from the Soviet Union). For that purpose a cost-based model of price determination is constructed and subsequently parameterized using the information provided by an input-output table available for 1987. The simulation of the price effects of those shocks is carried out under alternative assumptions regarding the degrees of (formal or informal) wage indexation.

Section 5 discusses the determinants of growth in the 1980s in Bulgaria looking both at supply (factor accumulation) and demand factors. Furthermore, we deal with the issue of the level and efficiency of investment and provide also a decomposition of growth from the demand side. Moreover, the factors behind the huge drop in output during 1990 are spelled-out. Then the discussion turns to the issue of supply response to incentives at micro level highlighting the role of the enforcement of budget constraints and the market structure in getting supply response from changes in incentives. The section ends-up discussing the impact on economic growth of supply shocks, demand restraint, private investment response, resource reallocation and external

financing during the transition from socialism. The paper concludes in section 6.

2. The Bulgarian Economy: A Brief Background

The Bulgarian economy is in a process of transformation from central-planning, the system adopted after World-War II following the lines of the Soviet model. From an agrarian economy until the World War II[1] Bulgaria industrialized under strong prominence of heavy industry. The pattern of industrialization was defined according to the needs of the Soviet Union and some criteria of "comparative advantages" within the CMEA zone.[2] The importance of the industrial sector is clearly dominant. In the 1980s over 60% of GDP, on average, was generated in industry. The agricultural sector, dominant before socialism, shrunk sharply in relative terms under the socialist system: its share in GDP went down from 63% in the late 1930s to 13% in 1989. Public property is overwhelming in Bulgaria and near 97 percent of GDP is generated in the socialist sector. The allocation of resources under socialism was carried out through quantity targets and direct inputs allocation. Central planning involved a complex interaction of planning bodies, holdings of firms and economic councils. The Bulgarian economy was able to sustain a high rate of growth of the Net Material Product, NMP, of the order of 7-8 percent per year between 1945 and 1975, according to the official statistics. This growth record was heavily concentrated in industry, mostly

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[1] See Solimano 1990(b) for a historical account of the economies of Eastern Europe before socialism.

[2] Import competition from the West was completely curtailed through prohibitive tariffs.

producing capital goods; in addition, the sector of consumption durable and services-related activities lagged well behind the capital goods sector. Central planners -- as in other socialist economies -- seemed to have followed a policy of maximizing the rate of growth of output through maintaining a very high investment rate (over 35 percent of GDP in Bulgaria). Drawing welfare implications from the growth strategy followed in Bulgaria is not easy, though it is apparent that keeping such high investment ratios tends to depress the growth rate of per-capita consumption thus preventing further improvement in the standard of living of the population. Also the problem of the quality of the goods produced -- particularly in the production of consumption durable -- is certainly not captured in the figures on GDP or NMP growth. However, regarding social sectors Bulgaria shows indicators of high birth expectancy, low infant mortality, access to and completion of general education that are among the highest of Eastern Europe.

Table 1 Bulgaria -- Selected Macroeconomic Indicators

	GDP (growth rate, %)	Investment (% of GDP)	Inflation (rate of change, %)	Money Supply (M1, %	Current Account (conv. curr. of GDP)	External Debt Millions of U.S dollars)
1981	4.90	35.40	2.82	38.41[a]		
1985	2.70	32.20	0.24	36.38	49.00	3940.00
1986	4.20	35.90	1.34	39.67	-715.00	5218.00
1987	6.10	32.90	0.07	43.74	-773.00	7082.00
1988	2.60	34.80	2.29	45.59	-840.00	8892.00
1989	-1.90	29.50	4.41	47.66	-1306.00	10223.00
1990 e/	-10.00		70.00			

Source: The World Bank.

notes: e/ preliminary estimates. Inflation is measured by the rate of change in the GDP deflator.The current account and external debt is with the convertible currency area. [a]:1982.

The macroeconomic performance of Bulgaria deteriorated since the mid-1980s. GDP growth slowed down, turning negative in 1989, and the estimates for 1990 are even worse than for 1989. Open inflation was very low, though shortages in goods and inputs markets, provides indication of the existence of repressed inflation in the system. Since 1989 signs of an acceleration of inflation started to appear and that tendency got sharper in 1990 (see next two sections). On the monetary side the data show very high --and increasing -- ratios of M1 over GDP; in 1988-89 that ratio hovered around 45-50 percent

of GDP, a number exceedingly high for the standards of non-socialist economies. However, this is consistent with the alleged existence of a money overhang. It is also worth noting that in the last five years the ratio of M1 over GDP has grown. Money has grown faster than output in this period due to money financing of widening fiscal deficits. On the external sector, one important development of the last five years is the increase in the current account deficit with the convertible currency area reflecting growing trade deficits and increased interest payments on foreign debt.[3] Those deficits were financed, mainly, by an increase in external borrowing. In fact, the external debt of Bulgaria increased 2.5 times between 1985 and 1989. This impressive increase in external liabilities concentrated mainly with commercial banks in West Germany, Japan, the United Kingdom and Austria.

Finally, by mid-1990 the macroeconomic situation severely worsened. GDP is expected to fall this year by 10 percent, and open inflation is accelerating. The government devalued the Leva in May 1990 and the fiscal situation -- including the Quasi-Fiscal deficit of the Foreign Trade Bank and the National Bank of Bulgaria -- deteriorated sharply (on an accrual basis) as a consequence of the adjustments in the exchange and in other outstanding expenditures. Furthermore, on the servicing of external debt, the country is in arrears of both principal and interests since April and its level of international reserves is meager.

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[3] The foreign trade of Bulgaria with the convertible currency area amounts near 25 percent of its total external trade.

3. Macroeconomic Imbalances and Stabilization in the Transition From Socialism: A Framework

The transition from central planning to a market based economy may involve hard policy choices on the macro side in an economy starting the transition with large macroeconomic imbalances. In the case of Bulgaria at least three macro imbalances need urgent correction:

- The deficit in the current account with the convertible currency area has to be reduced.
- The fiscal deficit is too high, near 5.5 percent of GDP in 1990; in addition, the quasi-fiscal deficit was of the order of 4% in that year.
- There is still repressed inflation and a large money overhang.

A reduction in the current acccunt deficit is needed to adjust the economy to the level of external financing available for Bulgaria on a more sustained basis. Moreover, further adverse external shocks are looming. Starting in January 1991, the Soviet Union will charge its deliveries of oil, natural gas, and raw materials to Bulgaria in hard currency and at international prices. In addition, currently, oil prices are soaring because of the Gulf crisis. Fiscal adjustment is required for several reasons: to improve the current account of the balance of payments, to reduce inflationary pressures and to release resources to the traded goods sector that need to expand. The latter is important, if the external constraint facing Bulgaria is to be relaxed on a more permanent basis.

An important part of the adjustment process in the transition from a centrally planned economy, is the deregulation of controlled prices. Price deregulation is further complicated because of the existence of a money overhang resulting from chronic shortages in the goods market and repressed

financial markets. From a macroeconomic perspective a basic concern is how to avoid an acceleration of inflation that may be of a big magnitude and protracted when prices are deregulated. Let us present a simple formal setting to deal with these issues[4]. The goods market equilibrium can be written as the equality of full capacity output, YP, and aggregate demand, AD, where AD is a function of the real exchange rate, er, and the ratio of fiscal deficit over GDP, d.

(1) $YP = AD(er, d)$

The current account of the balance of payments, CA, is a function of the real exchange rate, the fiscal deficit ratio and a vector, f, of "foreign" variables like external terms of trade, foreign real interest rates, and net capital inflows.

(2) $CA = CA(er, d, f)$

The rate of inflation is assumed to depend on the ratio of fiscal deficit to GDP and on velocity of circulation of money, V. This relationship is obtained from the assumption that all the fiscal deficit is financed from the inflation tax. In a stationary equilibrium (zero growth):

(3) $\pi(M/P) = dY$

where π is the rate of inflation, and M/P is the stock of real balances (the nominal stock of money, M, divided by the price level, P). Solving for the rate of inflation, equation (3) can be expressed as:

(4) $\pi = V\,d$

where V (= PY/M) is money-velocity. The system provided by (1), and (2) is represented in figure 1 in the plane real exchange rate and fiscal deficit

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[4] This model is adapted from Dornbusch (1982) and Solimano (1984) for the case of an economy with price controls and repressed inflation.

ratio. The upward sloping schedule CA represents combinations of er and d that are consistent with equilibrium in the current account.[5] An increase in the fiscal deficit ratio increases domestic demand and imports. In order to restore equilibrium in the current account the real exchange rate must depreciate, giving rise to an upward sloping schedule. The downward sloping locus GG represent goods market equilibrium: a real depreciation of the exchange rate generates an increase in net exports that require a reduction in absorption -- through a cut in d -- in order to equilibrate aggregate demand with full capacity output.

Figure 2 represents a positive, non-linear, relationship between fiscal deficits and inflation, given money velocity [equation (4)]. Here a distinction is made between "virtual" inflation (that is, the rate of inflation ruling in the absence of generalized price controls) and "observed" (official) inflation represented by the horizontal line in Figure 2: the rate of inflation observed when generalized price controls are binding.[6] In turn, the difference between "virtual" inflation -- the non-linear schedule -- and the rate of inflation under price controls is termed as the degree of "repressed" inflation in the system. It is worth noting also that changes in velocity of circulation will shift the "virtual" inflation schedule, and given a set of price controls will change the degree of repressed inflation in the system.

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[5] External balance could be redefined also as a certain (financeable) positive deficit in the current account rather than as a zero deficit.

[6] The rate of inflation need not be necessarily zero since not all prices are controlled and fixed.

Point A in figure 1 denotes an initial position where equilibrium in the goods market takes place along with a deficit in the current account deficit (internal and external balance is at E). In this case the restoration of external and internal balance, moving the economy from A to E, requires a combination of reduction in the fiscal deficit along with a real depreciation of the exchange rate. In Figure 2 the fiscal adjustment required to restore macro equilibrium will reduce "virtual" inflation in the medium run. Besides as the system of price controls at excess demand levels is relaxed (as part of the transition to a market economy), inflation will go up. Prices will increase due to the validation of repressed inflation, hence eliminating the gap between virtual and observed inflation.

The adjustment process may get a further inflationary bias due to the behavior of money-velocity. A reduction in the demand for money (increase in velocity) may take place for two reasons: first, the public may anticipate an increase in inflation as a consequence of the abandoning of the system of price controls at excess demand levels[7]. Second, it can be expected that as part of the reforms to the market economy a wider menu of financial assets will be available as capital market start to be developed. Hence financial innovation will shift the demand for money and increase velocity. Nonetheless, the inflationary impact of an increase in velocity is basically a transitional problem: in the medium-run, the rate of inflation will be determined by the level of the fiscal deficit and the (sustainable) level of the demand for money (inverse of velocity).

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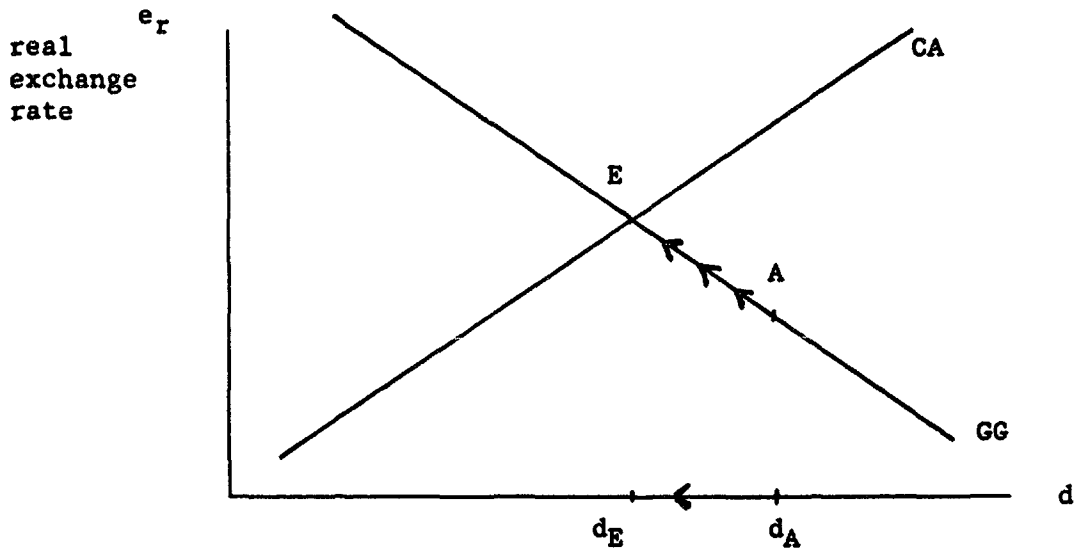
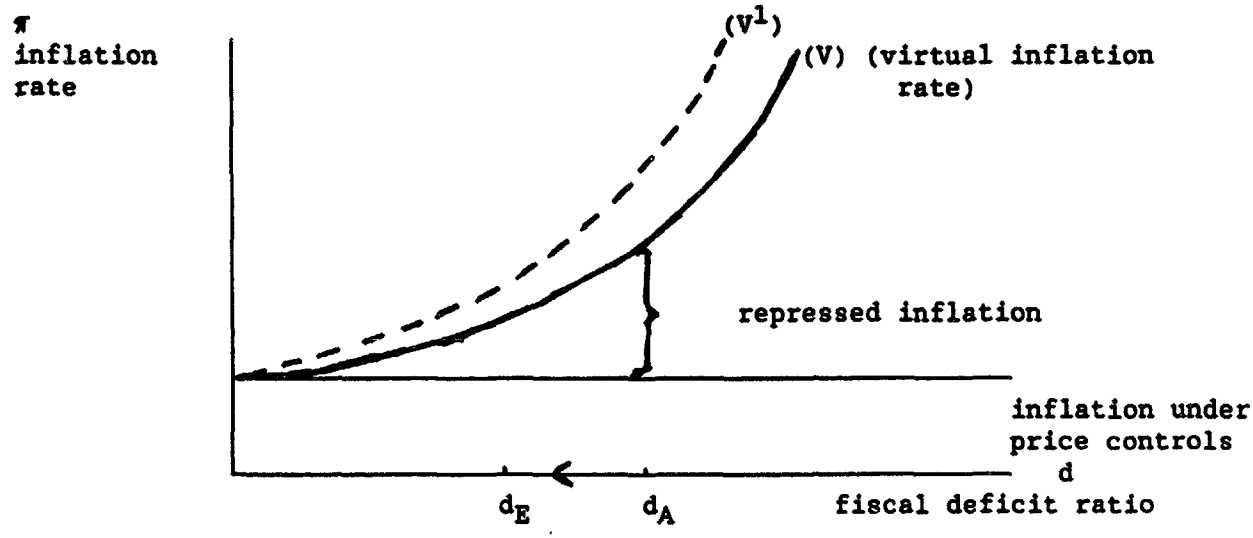
[7] Formally we may assume perfect foresight and make velocity a positive function of actual inflation, $V=V(\pi)$, $V'>0$.

Figure 1. Internal and External Balance



Inflation, Fiscal Deficit, and Price Controls



goods market equilibrium GG: $y = AD(d, e_r)$
current account CA: $CA = CA(d, e_r, f)$
('virtual') inflation rate $\pi = \exp\{V, d\}$

3.1 Inflation, Fiscal Deficit and Velocity: A Numerical Example

In this section we illustrate the conceptual framework. The exercise aims to provide a quantitative sense of the sensitivity of inflation to changes in the fiscal deficit ratio and the ratio of base money to GDP. As we shall see below the exercise suggests that a slide into very high inflation rates following price decontrol is not an unlikely outcome in an economy with a high fiscal deficit ratio of GDP and with changing velocity:

Table 2. Annual inflation rate under different velocity assumptions.High fiscal deficit case
(fiscal deficit ratio, FD/GDP= 0.10)

Ratio of base money to GDP, % (velocity is under parenthesis)	rate of inflation (%)
50.0 (2.00)	22.14
40.0 (2.5)	28.40
20.0 (5.0)	64.87
10.0 (10)	171.83
5.0 (20)	638.91

Note: The approximation π=Vd for the rate of inflation will lead to misleading results at moderate and high rates of inflation. Thus the continuous time formulation π= exp{Vd} is used to generate Tables 2 and 3.

Assuming that, initially, the deficit financed by printing money is 10 percent of GDP and that velocity is 2.0 (associated with a ratio of M1 to GDP of 50 percent a number relevant for Bulgaria, see Table 1). For these values of the parameters -- velocity and the fiscal deficit ratio -- the rate of inflation would be 22.14 percent per year. That number looks "low" provided a fiscal deficit of 10% of GDP fully financed by printing money. Clearly the impact of the deficit on inflation is dampened by a low level of velocity (associated with a high money GDP ratio). However, this situation is bound to change (for the reasons given above) as price controls are lifted. Table 2 shows that the rate of inflation is highly sensitive to reductions in the demand for money or increases in velocity. In particular, as the ratio of money to output declines (velocity increases) inflation goes up sharply. Incidentally, inflation will reach three digits levels when the ratio of M1 over GDP falls below 15% given a fiscal deficit ratio of 10%. Two important conclusions for designing stabilization policies emerge: first, the increase in velocity may greatly complicate the task of stabilization and price decontrol and second, the fiscal deficit needs to be sharply reduced if a low, (virtual) inflation equilibrium is to be achieved in an economy with deregulated prices[8].

Table 3 performs the same exercise but assuming that the fiscal deficit is reduced to 3 percent of GDP.

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[8] Of course some prices may still be regulated by the state in a market economy: typically, the price of public utilities, minimum wages and very often the nominal exchange rate.

Table 3 Annual rate of inflation under different velocity assumptions. Lower fiscal deficit case (fiscal deficit ratio, FD/GDP = 0.03)

ratio of base money to GDP,% (velocity is under parenthesis)	rate of inflation (%)
50.00 (2.00)	6.18
40.00 (2.5)	7.79
20.00 (5.0)	16.18
10.00 (10.0)	34.99
5.00 (20.0)	82.21

This second exercise shows that the reduction of the fiscal deficit from 10 % to 3% of GDP reduces sharply the (virtual) rate of inflation for a given level of velocity. Thus, fiscal adjustment is certainly a necessary condition for getting inflation down. However, as it could be anticipated, inflationary expectations and credibility are of key importance to decelerate actual inflation. In terms of our exercises a low confidence scenario would be associated with high velocity; conversely a high confidence scenario is associated with relatively low velocity.

Besides, we mentioned before it is important to have in mind that velocity and the structure of the demand for money will depend also on the reforms being implemented in financial markets as part of the structural reforms towards the market economy. Particularly, there is need for caution in the speed and timing of liberalization of capital markets and the rate at

which new assets, substitutes of money, are introduced in the system. The results here show that changes in velocity--resulting greatly from "financial innovation" -- can seriously jeopardize the stabilization effort. Deep financial liberalization in the wake of a stabilization effort could produce undesirable results. Better stabilize first.

Another issue that deserve some discussion is that of defining the required fiscal adjustment, particularly the setting of the target fiscal deficit. That target will depend on: (i) the level of inflation that the authorities consider tolerable on efficiency and stability grounds and (ii) the value of velocity and the level of the demand for money (as a ratio of GDP) that is expected to prevail in the medium-run. The international evidence might be relevant at this point. In chronic inflation countries (typically Latin America and Israel), a rate of inflation in the threshold of 15-20 percent per year is often, implicitly, considered as "tolerable" by the authorities; moreover, below that levels the cost of reducing an extra percentage point of inflation, in terms of lower output, may be too large for governments to find worth trying that additional disinflation. On the other hand, in East Asia and in OECD countries, inflation tends to be in the one digit range. What is going to be the long-run rate of inflation in former socialist economies is still an open question.

3.2 The Monetary Overhang

The problem of the monetary overhang has to be tackled in some way. The risk of an explosion in prices following deregulation of price in conditions of excessive liquidity is a real risk. The alternatives to soak excessive liquidity are: i) a monetary reform that reduces the stock of nominal

balances, 2) let prices to get rid of excessive real balances, 3) the issuance of a bond to reduce liquidity and 4) privatization. The alternative of letting prices to go up an wipe-out excess liquidity runs the risk of not stopping in a once and for all increase in the price level. In practice a protracted period of inflation because of monetary accommodation and/or indexation may follow an initial jump in prices. In general, the less the social support to a stabilization program, the more likely government will avoid paying the cost of a fall in activity levels associated with non-accommodative policies, and therefore the more likely a slide into protracted inflation.

The issuance of a government bond to absorb liquidity has the difficulty that the real interest rate to be paid to induce asset holders to acquire the bond may be very high in a context of uncertainty and lack of credibility. In addition, if the size of the money overhang is large the debt burden for the government will be large. Besides, it is unclear that the government should start stabilization with additional public debt that will strain public finances as prospective primary surpluses will have to be generated to serve interest payments on the bond.

The alternative of privatization is attractive as it serves the purpose of reducing the role of the state in the production process and also to eliminate excessive liquidity. However, privatization will be necessarily a slow process and the money overhang is a pressing problem whose solution can not be postponed over time.

Finally, the alternative of monetary reform may take different modalities in practice. A crucial issue is that its implementation requires political support as it will entail a tax on part of the wealth of the

population.[9]

4. Exchange Rate Adjustment and Foreign Price Shocks: Impact on Domestic Prices

This section extends the analysis on the effects of macro policies and external shocks on domestic prices. The focus now is on the cost side of the economy. The Bulgarian economy in 1990 devalued the exchange rate (the leva price of the US dollar increased substantially in early May) and its full impact on domestic prices seems have not yet occurred. In addition, Bulgaria faces the increase in oil prices related to the Gulf crises and the realignment of prices towards international levels in the CMEA countries, particularly in the Soviet Union. Thus, currency devaluation and the increase in the price of imported raw materials and intermediate inputs are likely to have an impact on domestic prices whose magnitude is worth exploring.

For that purpose we construct cost determined price equations in terms of direct and indirect value added and imported inputs from the convertible and non-convertible currency areas. Moreover, the simulation of the impact on domestic prices of currency devaluation and the increase in the price of imported inputs are carried-out under different assumptions regarding wage indexation. Let us provide analytical background for these calculations by starting with a production function F(.) where the level of output, Y [=F(.)], is produced with domestic value added, VA, and two kinds of imported inputs which are not perfect substitutes and therefore cannot be aggregated into a single composite. Those inputs are: M_1, namely inputs from the convertible

[9] See Gurley (1953) and Dornbusch and Wolf (1990) for analysis on the historical experience on monetary reform in post-world war II Europe.

currency zone and M_2, inputs from the CEMA area.

$$(1) \qquad Y = F(VA, M_1, M_2)$$

We will assume positive first partial derivatives and negative second partial derivatives with respect to variable inputs. Unitary costs, c(.), will be a function of the price of value added, P_v, the local price of input imported from the convertible currency area, P_{m1}, where P_{m1} is equal to the exchange rate (units of leva per dollar) times the international price of M_1 in dollars, P_{m1}^*, adjusted by tariffs (1+t), $P_{m1}=eP^*_{m1}(1+t)$. The local price of the imported input from the non-convertible currency area will be P_{m2}. Assuming that domestic prices are set as a constant mark-up, over unitary costs we can write down the price equation as:[10]

$$(2) \qquad P = P(P_v, P_{m1}, P_{m2})$$

Let us assume a Cobb-Douglas production function

$$(1)' \qquad Y = VA^{sv}M_1^{sm1}M_2^{sm2}$$

where s_v is the share of value added in output, s_{m1} is the share of input M_1 in output and s_{m2} is the share of input 2 in output. In addition, $s_v + s_{m1} + s_{m2} = 1$. Now the price equation can be written as a Cobb-Douglas index

$$(2)' \qquad P = P_v^{sv}P_{m1}^{sm1}P_{m2}^{sm2}$$

This expression shows that the effect (in percentage changes) of a currency devaluation on domestic prices will be proportional to the share of M_1 in output, s_{m1}. In turn, the impact of an increase in the international price of the input brought from the CMEA zone will be proportional to s_{m2}. As we show below those effects may be enlarged if the price of value added -- say

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[10] The mark-up is not explicitly included in the price equation since, by assumption, is a constant.

wages -- is indexed to prices.

The empirical base for obtaining the direct and indirect cost components of prices is an input-output matrix of Bulgaria for 1987. The methodology and the algebra of the construction of the price equations from the input-output table are provided in the appendix.

We shall focus on four price indexes: the price of food products, the price of non-food goods, the consumption deflator and the output deflator. Starting with the price of food and non-food products. The Price of food, P_1 is:

$$(3) \qquad P_1 = P_v^{0.762}\ P_{m1}^{0.086}\ P_{m2}^{0.151}$$

Price of non-food, P_2:

$$(4) \qquad P_2 = P_v^{0.628}\ P_{m1}^{0.061}\ P_{m2}^{0.31}$$

Notice that the direct and indirect intensity of imported inputs from the CMEA zone is higher -twice as large-in the production of non-food goods than in the production of food; on the other hand, the production of food is relatively more intensive in the use of imported inputs from the convertible currency area.

To compute the consumption deflator, P_c,we use the shares of food and non-food spending in total consumption, derived from the input-output table. The consumption deflator expressed in terms of value added and imported inputs is:

$$(5) \qquad P_c = [P_v^{0.762}\ P_{m1}^{0.086}\ P_{m2}^{0.151}]^{0.29}[P_v^{0.628}P_{m1}^{0.061}P_{m2}^{0.31}]^{0.71}$$

In a more compact form:

$$(6) \qquad P_c = P_v^{0.666}P_{m1}^{0.068}P_{m2}^{0.264}$$

Aggregating the input -output table into one sector and following the same procedure used to compute P_1 and P_2, we can obtain an equation for the

output deflator, P, (the net material product in this case). The expression is

$$(7) \quad P = P_v^{0.68} P_{m1}^{0.066} P_{m2}^{0.252}$$

It is interesting to note that the relative intensities of value added and imported inputs from both the convertible currency area and the CMEA zone are quite similar for the consumption deflator as well as for the NMP deflator.

Table 4, summarizes the relative shares of the different cost components for the different price indexes.[11]

Table 4. Bulgaria. Value Added and Imported Inputs Shares in Unitary Costs (percentages)

	Value added	Imports of Intermediate goods from convertible currency area	Imports of Intermediate goods from non-convertible currency area
Food Sector	76.2	8.6	15.1
Non-Food Sector	62.8	6.7	31.0
Consumption Deflator	66.6	6.8	26.4
NMP deflator	68.0	6.6	25.2

[11] The concept of output implicit in the construction of the price indexes from the input-output matrix is the net material product. Since the NMP excludes some services activities like education, health and other government services and these activities are relatively labor-intensive, the economy-wide share of labor in GDP would tend to be greater than the share of labor in NMP.

4.1 Effects of Currency Devaluation

The need to correct the external imbalances of the Bulgarian economy led the authorities to devalue the exchange rate with respect to the US dollar. The exchange rate was adjusted in May 1990 from 2.5 leva per US dollar to 7 leva per dollar for the "auctioning rate", and 3 leva per US dollar for imports of basic necessities from this area. Estimates of the effect of a nominal devaluation of the leva of 20% on domestic prices is provided in Table 5 below, under the assumption of a fixed price of value added. This amounts, basically, to assume that the price of the variable factor -- labor -- is held constant e.g., a constant nominal wages.[12] In this case, the impact-effect of a 20% devaluation on prices is rather small, in the order of 1.2 to 1.7 percent, depending upon the price index used. This clearly reflects the small share of imported inputs from the convertible currency area in the production structure of Bulgaria. Turning to wage adjustment, it is not unrealistic to assume that workers will demand some increase in nominal wages in compensation for an increase in the price level following a devaluation of the currency. Moreover, if a process of sustained inflation is set in motion, either because of accommodative monetary policy (or increases in the fiscal deficit financed by printing money), there will be pressures to establish some sort of wage indexation mechanisms in Bulgaria.[13]

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[12] Implicitly we assume that the remuneration of capital is constant. That assumption will remain thereof.

[13] It is not a necessary condition that formal wage indexation be established for a dynamic of indexation be observed, since informal wage indexation may also take place in a process of sustained inflation.

Typically, wage indexation is tied to a consumer price index.[14]

The impact of a 20% currency devaluation under different degrees of wage indexation is shown in the third and fourth columns of Table 5. The algebra of indexation is as follows. Let us first denote the rate of change in the variable x as $g_x = \delta x/x$, and the relative share in unitary costs of the factor j in sector i as s_{ji} (see Table 4). Equation (11), shows the rate of change in the price of good i as the weighted average of the rate of change in the price of value added and the rate of change in the price of imported inputs from both trade areas.

$$(8) \qquad g_{pi} = s_{vi}g_{pv} + s_{m1i}g_{pm1} + s_{m2i}g_{pm2}$$

The wage indexation rule tied to the consumption deflator (equation 6) yields:

$$(9) \quad g_w = \lambda g_{pc} = \lambda(0.666\ g_w + 0.068 g_{pm1} + 0.264 g_{pm2})$$

where λ is the degree of wage indexation. Special cases are: no-indexation e.g., fix nominal wages, $\lambda=0$ and full-wage indexation, $\lambda=1$; partial indexation implies $0 < \lambda < 1$. Further assumptions are: (a) the rate of change in the price of value added is equal to the rate of change in nominal wages, $g_{pv} = g_w$, (b) the rate of change in the domestic price of imported inputs from the convertible currency area is equal to the rate of devaluation $g_{pm1} = g_e$, (implicitly we are assuming both constant dollar prices from the convertible currency area and fix tariffs), (c) the domestic price of imported inputs from the CMEA zone is fixed, $g_{pm2}=0$. Under these assumptions, we obtain the

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[14] For simplicity we assume that wages are indexed to the consumption deflator of the same period. Other modalities of indexation are lagged indexation (tied to the price index of previous periods) or forward-looking indexation, tied to an estimate of future consumer prices.

following expression for the effect of a devaluation of g_e percent on the rate of change in the price of the (composite) good i, g_{pi}:

(10) $$g_{pi} = [\ 0.068\lambda s_{vi}/(1- 0.666\lambda) + s_{Pm1i}\ ]\ g_e$$

Notice that when nominal wages are fixed, $\lambda = 0$, the effect of the devaluation on the price index of (the composite) good i will be given by the share of imported inputs from the convertible currency area in unitary costs of producing the good i, the coefficient s_{Pm1i}. Moreover the inflationary impact of the devaluation will be larger the higher the degree of wage indexation. In fact columns three and four of Table 5 show that the impact on prices of the devaluation of the leva is highly sensitive to the degree of wage indexation. Take for example the consumption deflator: while a 20 percent devaluation produces an increase in P_c of 1.365 percent in the absence of wage indexation, the corresponding price increase goes up to 2.04 percent with a coefficient of wage indexation of 50%, ($\lambda = 0.5$), and up again to 3.4 percent with 90 % of indexation, ($\lambda = 0.9$). Similar results hold for the other price indexes.

Table 5. Bulgaria. Effect of a 20% Devaluation of the Exchange Rate (percentages)

Degree of Wage Indexation	No Indexation ($\lambda = 0$)	Intermediate Indexation ($\lambda = 0.5$)	High Indexation ($\lambda = 0.9$)
Effect on:			
Price of Food P_1	1.72	2.49	4.04
Price of Non-food P_2	1.22	1.86	3.14
Consumption Deflator, P_c	1.36	2.04	3.40
Consumer Price Index *	1.41	2.09	3.48
NMP Deflator, P	1.32	2.01	3.39

Note: * In the consumption deflator obtained from the input -output table the share of food is 0.29 and the share of non-food is 0.71. In the household expenditures survey, HES, of Bulgaria the share of food, that includes a larger range of goods, is 0.38 and the share of non-food is 0.62 (for 1989). Assuming that the rate of change in the price of the food and non-food items of the HES, are equal to the rate of change in the price of food and non-food of the I-O table, and using the shares of the HES, we can calculate the effect of the devaluation on a consumer price index based in the HES. In general, the effect of the devaluation on the consumption deflator and the consumer price index differ very little.

Two main conclusions emerge from this exercise: First, given the relatively low share of imported inputs from the convertible currency area in the unitary costs of the Bulgarian economy, the effect of a currency devaluation on prices, -- as determined by costs of production -- may be not very large; in particular, under the assumption of fixed wages. Second, the introduction of wage indexation schemes will increase the inflationary effect of a nominal devaluation and hence reduce its effect on the real exchange rate, because the second round effects from increased wages as a response to the devaluation.

4.2 Effects of an increase in the price of imported inputs from the CMEA Zone

As mentioned above Bulgaria will face an increase in the price of the goods imported from the CMEA zone, particularly from the Soviet Union. Thus, the price of oil, natural gas, coal and other raw materials that Bulgaria imports from the Soviet Union are the most likely candidates to increase. A similar methodology used for computing the effects of a devaluation on internal prices will be used to asses the effects of an increase in the price of imported inputs from the CMEA area. The only new assumption is that domestic prices of imported inputs from the convertible currency area will remain unchanged, $g_{P_{m1}}=0$ (this implies that the nominal exchange rate, international prices in the convertible currency area and import tariffs will remain fix).

An expression that gives the effect on the price index of the good i of a percentage increase in the price of imported inputs from the CMEA zone is given by

$$(11) \quad g_{Pi} = [\, 0.264\lambda s_{vi}/(1-0.666\lambda) + s_{Pm2}]g_{Pm2}$$

The magnitude of the effect of an increase in P_{m2} on P_i will depend, basically, on the share of imports of intermediate goods from the CMEA zone in the unitary costs of production of the good i and the degree of wage indexation in the economy. Table 6 provides the estimates of the effect of a 20% increase in P_{m2} on various price indexes under different degrees of wage indexation to the consumer price index.

Table 6 Bulgaria--Effects of a 20% increase in the price of imported inputs from the CMEA area

Degree of Wage Indexation / Effect on:	No Indexation ($\lambda = 0$)	Intermediate Indexation ($\lambda = 0.5$)	High Indexation ($\lambda=0.9$)
Price of Food P_1	3.02	6.033	12.05
Price of Non-food P_2	6.20	8.67	13.61
Consumption Deflator, P_c	5.27	7.90	13.15
Consumer Price Index *	4.99	7.66	13.01
Deflator NMP, P	5.04	7.27	13.08

Note: * see footnote in Table 3.

From Table 6 follows that the domestic inflationary effect of a 20 % increase in the domestic price of imported inputs from the CMEA is between two and three times higher than the effect of an equivalent devaluation of the leva with respect to the dollar, for a given degree of wage indexation. This results stems directly from the much higher intensity of inputs and raw materials imported from the CMEA area as compared to the share of inputs imported from the convertible currency area. Remember that around 75 percent of total trade of Bulgaria is conducted with the CMEA, a proportion that also seems to be observed for imports of intermediate goods. Furthermore, the sensitivity of these results to the degree of wage indexation, is high. In particular in the case of high wage indexation, λ=0.9, a 20 percent increase in P_{m2} will come along with an increase in domestic prices in a range between 12 and 13.5 percent, certainly a sizeable effect on internal prices.

5. The Determinants of Growth in the 1980s, the Collapse of 1990, and the Transition to a Market Economy

The transition to a market economy will ultimately succeed if the reforms bring sustainable growth and an improvement in the standard of living of the population. Economic growth under socialism was historically rapid (according to the official statistics) and it relied in the extensive use of natural resources, was capital intensive and a concern for efficiency of resource use and high-quality goods was replaced by a drive to meet quantity targets. This section first reviews the growth performance of Bulgaria in the 1980s disentangling supply and demand factors in the explanation of observed growth rates.

Then the issue of the effects on growth of the transition to capitalism is dealt highlighting micro and macro factors deemed to be important in this regard.

5.1 Determinants of Growth in the 1980s

The contribution of capital accumulation and labor growth to output growth is assessed as well as the contribution of consumption, investment and exports on growth on the demand side. In addition, the efficiency of investment is reviewed. Finally, the impact of short term stabilization and the structural reforms towards a market economy on growth is discussed.[15]

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[15] The system of material balances in Centrally -Planned economies calculates the Net Material Product (NMP) which is net output generated in "material" activities. Transport, commerce and communication are included in productive activities but health, education and most services are generally excluded from the material sphere for calculating NMP. To convert NMP figures into Gross Domestic Product (GDP) the following adjustments have to be made:(i) the value added created in the non-material sphere is added to NMP, (ii) the value of non-material output consumed in the material sphere is subtracted to avoid double-counting, (iii) depreciation exclusive of capital repair, is added the latter being considered a current expenditure in the system of national accounts but a capital expenditure in the system of material balances. Typically, GDP to NMP ratios are in the order of 1.15 to 1.53 and tend to rise over time with the relative expansion of the service sector.

Table 7. Economic Growth in Bulgaria
(rate of growth, percentages)

	GDP	Agriculture	Industry	Services
1981	4.90	4.47	5.47	4.10
1982	2.30	5.79	9.3	- 12.66
1983	3.40	- 16.34	7.64	7.28
1984	3.40	11.68	6.13	- 7.44
1985	2.70	- 20.62	5.09	11.35
1986	4.20	22.04	5.19	- 6.50
1987	6.10	- 14.04	5.37	20.48
1988	2.60	- 1.71	2.43	4.92
1989	- 1.90	- 2.36	0.33	- 5.44
1990*	-10.0			
annual averages	3.07	- 1.29	5.22	1.78

Source: World Bank.
* Estimate.

Table 7 shows that during the 1980s GDP decelerated its rate of growth. On average the annual rate of growth of GDP (1981-89) was 3.07; over one percentage point less than the 4.3 percent growth of GNP in the period 1971-80. At a sectoral level, the driving sector behind growth was industry -- a sector with a share in GDP of 61 percent -- with an annual average rate of growth of 5.22 % in the period 1981-89. The performance of agriculture in that period was dismal with negative average annual growth. The growth record of the service sector in the 1980s has been rather modest: its growth rate

fell below the growth rate of industry (and GDP) but it was above that of agriculture.

To gain a better understanding on the sources of growth in Bulgaria let us calculate the contribution of labor and capital to measured growth. The following equation for the rate of GDP growth is useful in this respect:

$$\delta y/y = h\ \delta K/K + (1-h)\ \delta L/L + \epsilon$$

where, h is the share of capital in value added and 1-h is the share of labor, $0<h<1$. The rate of growth of GDP is denoted by $\delta y/y$, the rate of growth of capital is given by $\delta K/K$ and the rate of growth of labor is $\delta L/L$. The term ϵ represents the residual, namely the rate of growth of output that is not explained by capital accumulation and employment growth. This term is often imputed as technical progress but it could also reflect measurements problems both in the aggregation of output and in the quality of the factors of production.

Table 8. Economic Growth in the 1980s: the Role of Labor and Capital Accumulation[16]
(annual averages,percentages)

rate of growth of capital	2.370
rate of growth of labor	0.295
contribution of capital accumulation:	
percentage points	1.232
percent of total	40.93
contribution of labor growth :	
percentage points	0.141
percent of total	4.70
residual	1.63
rate of growth of GDP	3.07

Note: the share of capital is 0.52 and that of labor is 0.48. They were obtained from the input-output table.

The results show several interesting results regarding the sources of growth in Bulgaria in the 1980s. First, it is clear the overwhelming relative importance of capital accumulation, as compared to labor growth, in explaining GDP growth in this period. Around 40% of GDP growth is explained by capital

[16] The rate of growth of capital was calculated as the product of average net investment ratio over GDP divided by the capital-output ratio. The rate of growth of labor corresponds to the rate of growth of total employment.

accumulation. Second, the very low contribution of labor growth to total growth is due mainly to the very low rate of growth of employment , 0.295 percent per year (the annual rate of growth of population in Bulgaria is around 0.4 percent).[17] Third, the size of the unexplained residual, 1.63% per year, as a percentage of output growth explained near a half of real growth.[18] However, we have to be careful in inferring that the rate of technical change is large in Bulgaria from this value of the residual. As mentioned before the residual could be substantially reduced if factor inputs could be measured more precisely. In particular the measure of aggregate capital conceal different vintages of capital equipment that may have different marginal productivities. Another extension of the analysis would be to distinguish between human capital and unskilled labor. Furthermore, the data on output may reflect index numbers problems since prices do not reflect relative scarcities of goods and productive factors.

Given the importance of capital accumulation in the growth process it seems useful to examine some features of investment and particularly assess, in a first approximation, the efficiency of investment.

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[17] In the methodology of sources of growth another cause of low contribution of labor, besides a slow rate of growth of employment, would be a low marginal productivity of labor. However in a socialist economy, real wages can not be assumed to be equal to the marginal productivity of labor so this effect is hard to measure.

[18] Empirical studies using the sources of growth methodology in non-socialist developing countries, have found that, on average, technical progress accounts between 1/2 and 1/3 of real growth.

Table 9. Bulgaria Investment rates 1979-88

(share of GDP, percentages)

Net Fixed Capital Formation	10.80
Depreciation	13.90
Unfinished Construction	2.20
Gross Fixed Capital Formation	26.90
Changes in Inventories	6.80
Gross Investment	33.70
(Index)	
Incremental Capital-Output Ratio	3.51
Average Capital-Output Ratio	4.47

Note: the incremental -output ratio is calculated as the quotient between net investment and GDP growth.

Table 9 illustrates some interesting features of the investment process in Bulgaria. Gross investment is very high, (33.7 percent on average for the period 1981-89 and it was even higher in previous periods), to sustain a rate of growth of GDP of around 3 percent[19]. Computing both ICOR's -- the ratio of net investment over the rate of growth of GDP -- and the capital-output ratio -- the inverse of average capital productivity -- both ratios yield high values, at least for the standards of non-socialist economies. This supports the notion of a rather low level of investment efficiency in Bulgaria. Moreover, it is interesting to mention the very high inventory accumulation

[19] These high investment ratios are by no means unusual in socialist economies, see Solimano (1990a).

purported by the data. On average for a period of 9 years the accumulation of inventories represented near 7 percent of GDP. This needs to be explained. A possible explanation lies in the production of defects or low quality goods that cannot be sold in the market; it also may represent delays into putting capital goods in the production process. Given the rigidities of the planning system any self correcting mechanism to reduce the degree of inventory accumulation will operate in a weak way.

To sum-up, discrepancies between investment expenditure and additions to the capital stock, an important factor behind poor investment efficiency, develop as many investment projects are never completed, new equipment is not brought into operation, and remains as inventories and imports of capital goods from the West do not represent the most up-to-date equipment (see CEPR, 1990).

Table 10. Economic Growth in the 1980s: A Demand Decomposition
(average annual rates of growth, percentages)

	1981-1989
Total Consumption	3.29
-Private Consumption	2.40
-Public Consumption	5.10
Gross Investment	2.79
Total Exports	6.28
-to convertible area	5.25
-to non convertible area	6.86
Total Imports	5.44
-from convertible area	7.83
-from non-convertible area	2.02
GDP	3.07

On the demand side public consumption and exports to the non-convertible currency area drove growth in the 1980s. Investment grew at a slower pace than GDP leading to a reduction in the investment share, (though it is still very high). Imports, in dollars have been growing at a higher rate than GDP and exports thus enlarging the (convertible currency) trade deficit. Regarding trade with socialist countries, exports to that area grew almost three times more rapid than imports.

5.2 Transitional Issues:

A key objective in the transition from central planning is to make relative prices and decentralized markets to play a major role in supply

decisions. At a macro level, getting output response from changes in relative prices is particularly useful as it would ease the costs of the transition. Two complications for a sizeable supply response are likely to arise at a microeconomic and sectoral level: the first is that just a (very small) fraction of firms operate in a regime of binding budget constraints and their objective function is to maximize profits --or minimize costs -- so that we can expect their supply decisions to be price-dependent. The second complication refers to the fact that price deregulation may lead to a drop in output when the market structure is characterized by firms which have market power e.g., monopolistic competition.[20]

The coexistence of hard budget constrained (optimizing) firms with soft budget constrained firms.

In Bulgaria large segments of the enterprise sector still operates under a regime of soft budget constraint in the socialized sector. In the regime of soft budget constraints, if the firm requires more inputs (including credit) to meet the targets of physical production, the firms will get those inputs at no extra cost (e.g., firms are not budget constrained). Thus, the level of output of the traditional socialist firm can be expected to be largely insensitive to changes in relative prices or in market profitability.

On the other hand, private (or public) firms that maximize profits (or minimize costs) subject to a hard budget constraint are expected to react to prices.[21] Formally, the aggregate level of output, y, will be a function of

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[20] I owe this point to Paul Krugman.

[21] The price-elasticity of supply depends on technological parameters, the time period of the production process and in a context of uncertainty on the mean and variance of the distribution of relative prices faced by the firm.

the level of output produced by the set of optimizing-budget constrained firms, y_o, whose supply function can be written as $y_o = p^a$ where the coefficient a denotes the price elasticity of supply. In turn, the (aggregate) level of output of the set of soft-budget constrained firms is denoted by ys and is independent of p.

Then, $y = \phi(y_o, y_s)$

Assuming that the function ϕ is Cobb-Douglas with shares b and 1-b, we can write the aggregate supply function of the economy as

$$y=(p^a)^b(y_s)^{1-b} \quad \text{where} \quad 0 < b < 1.$$

The price elasticity of aggregate supply is -

$$\delta \log y / \delta \log p = ba$$

Then the output response to a change in relative prices in the aggregate depends on two parameters:(i) the share of sectors in the economy that are subject to a binding budget constraint and optimize an objective function, the coefficient b, and (ii) the price elasticity of the aggregate supply of the hard budget constraint sectors. Clearly, the rules of operations of public enterprises and the relative importance of the private sector as producers (in Bulgaria nowadays the private sector contributes just to 3 percent of GDP) are important elements behind the supply response to changes in relatives prices. Furthermore, it is worth to keep in mind that privatization has an important role to play in introducing market discipline to enterprises.

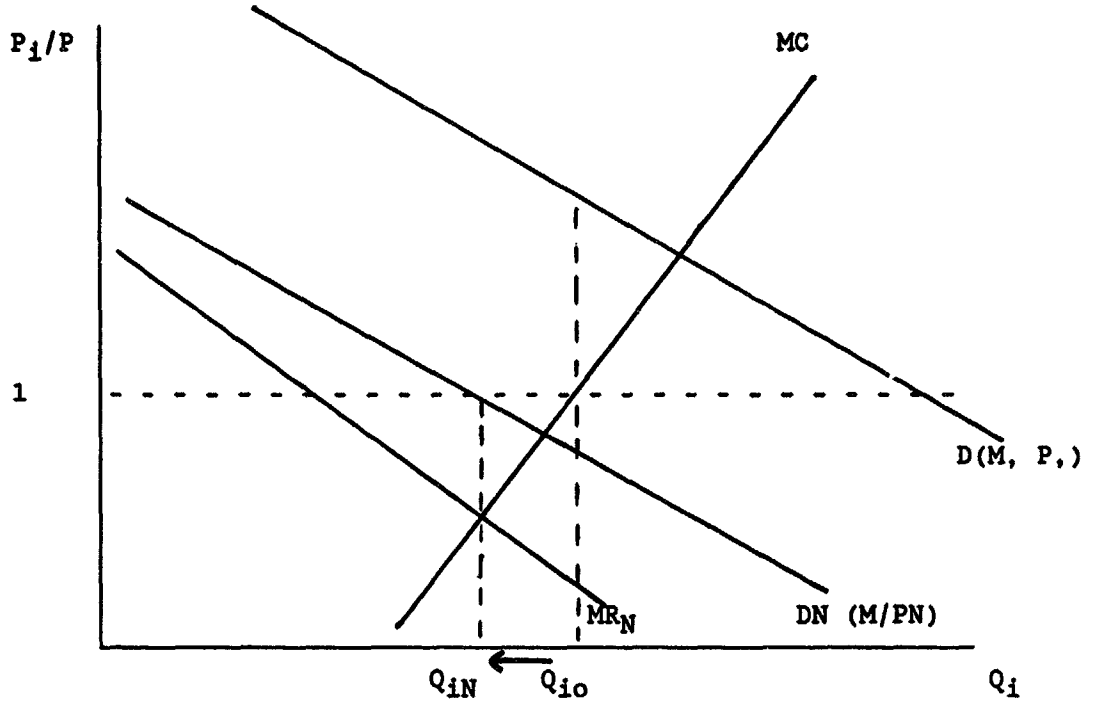
Deregulating Prices in a Monopolistic Setting

The market structure is also important for the output response to changes in relative prices. In centrally-planned economies the most frequent disequilibrium in the goods market is excess demand. Then the standard recipe is price liberalization supplemented by tight demand policies. Let examine the case in which price deregulation takes place in a setting of monopolistic competition, where every firm enjoys some market power. The market equilibrium is represented in Figure 3 where on the vertical axis we have the relative price P_i/P which represents the ratio between the price P^i the monopolistic producer charges over average prices P. In symmetric equilibrium $P^i = P$. On the horizontal axis we have the quantity of the good, Q_i. The downward demand curve facing producer i is given by $D(P^i/P, M/P)$ where M/P denotes the stock of real balances. The upward sloping curve MC is the marginal cost schedule of producer i and the negatively sloped schedule MR is the marginal revenue. The "old" equilibrium will be associated with a price $P_i/P = 1$ where firms cannot raise their prices. In turn, at that price ratio firms produces at Q_{io}, with excess demand, $(Q_{id} > Q_c)$, generating a black market premium and rents.

Now as part of the liberalization program, prices are deregulated and firms are allowed to rise their prices. The increase in the price level will reduce the stock of real balances shifting the demand curve down to the point where the firm setting its optimal price ends up charging P. Therefore at the new equilibrium -- under deregulated prices -- the new level of output Q_{in} (given by the intersection of MC with the new marginal revenue schedule associated to D_n) which is lower than the initial level of output under

regulated prices. Of course, the point must be not overstated since there were shortages at the "old" equilibrium and consumers paid an additional implicit price in terms of searching costs to get the goods they desire besides the "unproductive" rent-seeking involved in the initial situation characterized by shortages. Anyway a main message from this exercise is that free prices under monopolistic competition might not be welfare improving.

Figure 3. Price Deregulation under Monopolistic Competition



5.3 The Collapse of Economic Activity in 1990 and other Transitional Effects on Growth

The large contraction in economic activity developed in 1990 was closely related to supply shocks like: (i) the disruption of deliveries of oil from the Soviet Union and Iraq; (ii) the shortages of domestic inputs because of the breakdown of distribution networks associated with the collapse of central planning; and (iii) the loss of export markets in the Middle-East and the contraction of the Soviet and CMEA Markets. Regarding the effects of the transition from central planning on the rate of growth in the short to medium run, several effects are relevant. A first channel is linked to the correction of large macroeconomic imbalances observed in Bulgaria. The running of large deficits in the current account with the convertible currency

area and the existence of serious inflationary pressures call for tight demand policies that may decelerate growth in the short run (since 1989 GDP growth is negative). Cooling down growth in aggregate spending tends to ease the inflationary pressures on the demand side.[22] Then, the system is likely to pass from being supply constrained to become demand constrained.

A second channel through which the transition from central planning may affect growth is through changes in relative prices and incentives that make part of the existing capital stock (and skills of the labor force) economically obsolete. Then if Bulgaria under the CMEA arrangements was concentrated in producing, say, machinery for heavy industry and computers to be sold in the Soviet Union in exchange for oil and raw materials, now it will have to concentrate in developing the production with an outlet in western markets, e.g., wine, fruit and light industry. During the transition period it is clear that part of the capital stock used to produce the "old" goods will be inappropriate to produce the "new" goods. That will adversely affect the level of output and perhaps its rate of growth in the short-term.[23]

A third set of factors relates with the response of investment to the new structure of incentives that is expected to emerge from the reform process. The basic argument for expecting an initial weak investment response in the aggregate stems in two elements: first, the process of reform is characterized by systemic uncertainty as the final fate of the reform process

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[22] This should be qualified, however, since a reduction in real growth may worsen the fiscal deficit by reducing seigniorage. This can be an inflationary shock.

[23] The improvement in efficiency of resource use may counteract part of this effect. The composition of investment may become more efficient and that may speed up growth in the medium term (see Easterly, 1990).

is unknown. Under these conditions, the rational investor has large incentives to wait or delay its investment decisions until the level of perceived uncertainty is reduced. A second element for a quantitatively small investment response in the aggregate is the fact that the private sector in Bulgaria is extremely small and probably inexperienced in the rules of operation of a market economy, something that can be reversed with privatization over the medium run. Additional complications for an adequate investment response relate to: (i) the lack of a legal setting that define and protect property rights, (ii) the absence of well-developed capital markets that provide adequate financing for profitable investment opportunities, and (iii) the lack of modern infrastructure in terms of roads and telecommunications.

Last, but not least, Bulgaria needs additional external financing to support sound investment and modernize its productive structure. A major obstacle in this regard is the foreign debt overhang. Then a solution to the foreign debt problem and the possibilities of getting new external financing are closely linked issues. Finally, direct foreign investment could be amply welcomed as it would bring new technologies and managerial capabilities and access to new external markets.

6. Final Remarks

The shaky macroeconomic situation of Bulgaria is a serious obstacle for a smooth transition from central planning to a market based economy. The correction of large current account deficits with the convertible currency area, the elimination of inflationary pressures and large price distortions and a resumption of sustainable growth in the context of structural change are

the key issues in the policy agenda for Bulgaria.

This paper examined both analytically and empirically several issues associated with stabilization and growth in the transition from socialism in Bulgaria.

The links between inflation, money velocity the money overhang and the fiscal deficit are of crucial importance for assessing probable inflationary trends in Bulgaria. It is shown that in a context of controlled prices and financial repression, low velocity contributes to maintain inflation at an artificially low level in spite of large fiscal deficits. However as prices are deregulated and the financial sector is reformed, velocity may be expected to increase due to both expectations of increased inflation and/or financial innovation. In that context the rate of inflation may jump to high levels and perhaps a protracted process of inflation set-in with monetary accommodation, wage indexation and lack of fiscal adjustment in the background. Stabilization and the setting of fiscal targets consistent with low inflation becomes a complex task provided the instability of the demand for money in a context of uncertain stabilization and financial innovation.

Using empirical, cost-determined, price equations we explore the effects on domestic prices of a devaluation of the leva and an increase in the price of foreign inputs imported from the Soviet Union and other CMEA countries, two price shocks underway (besides also the impact of the Gulf crisis on oil prices in international markets). The empirical results show, that the input price shock has a more important quantitative effect on internal prices than an (equivalent) devaluation. This result arise from the greater (relative) reliance on inputs imported from the CMEA zone than from the convertible currency area. The introduction of wage indexation in the wake of price

adjustment measures is shown to exacerbate sharply the effects on domestic prices from devaluation and/or the external price shocks.

The supply response to changes in relative prices and the introduction of market incentives is likely to face at least two major problems at a micro level. First, the rules of operation of firms in the productive sphere is still largely dominated by the socialized sector of enterprises operating under a regime of soft budget constraints, with the ensuing little price responsiveness. Second, it is shown that in a setting of monopolistic competition, where individual firms have considerable market power, full price deregulation may bring about a drop in output.

Economic growth in Bulgaria decelerated sharply in the 1980s and completely collapsed in 1990. A factor decomposition exercise shows that GDP growth was explained mainly by capital accumulation (40 percent) and the residual (53 percent) with a very little contribution of labor growth. From the demand side, growth has been driven mainly by public consumption and exports to the non-convertible currency area. Moreover, the collapse of economic activity in 1990 is closely related to the cut in oil deliveries from the Soviet Union and Iraq, the interruptions in the supply of intermediate and capital goods associated with the dismantling of central planning and the loss in export markets in the Middle-East and the contraction of the Soviet market.

The transition to a market economy is likely to affect growth through several channels. The correction of macroeconomic imbalances -- involving a cut in imports and a cooling down of aggregate demand to dampen inflationary pressures -- tends to generate a contraction in aggregate economic activity.

The structural reforms that will alter the incentive structure will render part of the existing capital stock -- shaped by the economic structure

of central planning and the division of labor imposed by the CMEA trade arrangements -- as economically obsolete therefore hampering productive capacity in the short run. The response of private investment to the new incentives will be highly sensitive to the degree of macroeconomic stability and the perceived probability that the reform process will last and consolidate. Otherwise it becomes rational for the private investor to wait -- an option with a high premium in an unstable environment -- therefore delaying the resumption of growth. Finally, external support in the form of new financing and direct investment will necessarily play also a major role in helping consolidate the reform process and help in the resumption of growth.

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APPENDIX

Construction of Price Equations from the Input-Output Table

As it is well known the input -output table provides a breakdown of both the intermediate and final demands for the goods produced by each sector of economic activity as well as the cost structure in terms of purchases of intermediate goods, value added and imports of intermediate goods used in each sector's production.[24]

Table A.1. provides an input-output, I-O, table for Bulgaria at millions of 1987 leva (the local currency). The sectors of economic activity are aggregated in two: the "food sector" and the "non-food sector". The food sector corresponds to industry 017 of food, beverages and tobacco; the non-food sector corresponds to the rest. In terms of demand for final consumption the food sector comprises 29 percent of total consumption expenditure in the economy. With this share (and that of non-food) we can construct a deflator for consumption. In turn an output deflator (for Net Material Product) will be also computed in terms of its cost components from the input-output table.

Reading across a row in the I-O table we can obtain the following material balances linking output supply with intermediate and final demands. In matrix form:

$$(1) \qquad X = AX + F$$

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[24] The underlying technology in the input-output table is that of fix-proportions. This is not an overly restrictive assumption for Bulgaria, still a centrally planned economy -though starting a period of transformation- and where the response of the factor mix to changes in factor prices is very weak if it does exist at all.

The column vector X denotes the level of production for the two sectors: the food sector X_1 and the non-food sector X_2 , the a_{ij} elements of the square matrix A (of order 2x2) are the input-output coefficients showing the intermediate sales from sector i to sector j for i,j ={1,2}. The components F_1 and F_2 are the final demands (consumption, investment and net exports) for food and non-food output.

Reading across a column we can obtain the following decomposition of cost per unit of output in sector i:

$$(2) \quad P_i = \sum_j a_{ji} P_j + v_i P_v + m_{m1i} P_{m1} + m_{m2i} P_{m2}$$

The variable P_i is the cost determined output price in sector i, Pv is the price of value added , P_{m1} is the price in local currency (leva) of intermediate goods imported from the convertible currency area. This price can be written as $P_{m1} = eP^*(1+t)$ where e is the exchange rate (units of leva per US dollar), P^* is the international price, in dollars, of inputs imported from the convertible currency area and t is the ad-valorem tariff rate. The price P_{m2} is the domestic price of foreign inputs purchased in the CMEA zone. The coefficient v_i is the amount of value added required to produce one unit of good i, the coefficient m_{1i} is the amount of intermediate imports from the convertible currency area required to produce one unit of good i, and m_{2i} is the amount of inputs imported from the CMEA zone required to produce one unit of good i.

TABLE A.2.
BULGARIA

INPUT-OUTPUT COEFFICIENTS

	Food	Non-Food
Food	a_{11}	a_{12}
	(0.247)	(0.118)
Non-Food	a_{21}	a_{22}
	(0.069)	(0.461)
Value Added	v_1	v_2
	(0.183)	(0.303)
imports from Convertible currency area	m_{11}	m_{12}
	(0.0210)	(0.029)
imports from Non-Convertible Currency Area	m_{21}	m_{22}
	(0.028)	(0.120)

Table A.2. provides the input-output coefficients required to parameterize equation (2) with the information provided by the input-output table.

Equation (2) as it stands, shows direct unitary costs in terms of value added and imported inputs (from both trade areas), and the costs of intermediate purchases, of producing a unit of the composite good i. To obtain the direct and indirect unitary costs in terms of primary factors and imported inputs we need some transformations. Restating equation (2) in matrix form, we get (see Taylor, 1979):

$$(3)\quad P^T(I-A) = P_v v^T + P_{m1} m_1{}^T + P_{m2} m_2{}^T$$

The term P^T is a row vector of the price of food and non-food output e.g., $P^T=[P_1\ P_2]$; v^T, $m_1{}^T$, and $m_2{}^T$ are row vectors of coefficients of value added-output and imported inputs-output. Inverting the matrix (I-A), the so-called Leontieff inverse, we obtain:[25]

$$(4)\quad P^T = [P_v v^T + P_{m1} m_1{}^T + P_{m2} m_2{}^T][I-A]^{-1}$$

Equation (4) shows the direct and indirect cost per unit of output of both sectors (food and non-food) in terms of value added and imported inputs from both the convertible currency area and the non-convertible currency zone. For example, in the case of food production, it adds-up the content of value added and imported inputs used directly in the production of one unit of food and the content of value added and imported inputs used in the production of domestic goods that enter as intermediate goods in the production of food (indirect component).

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[25] P^T is conformable of order 1x2, the first right hand side row vector in (4) is of order 1x2 , and the matrix [I-A] is of order 2x2.

Using the coefficients calculated in table 2, and inverting the matrix [I-A] we can apply equation (4) and write the price of food and non-food just as a function of P_v and P_{m1} and P_{m2} (direct and indirect unitary costs). Then the price of food is :

(5) $P_1 = 0.301\ P_v + 0.034\ P_{m1} + 0.06\ P_{m2}$

The price of non-food is

(6) $P_2 = 0.628\ P_v + 0.061\ P_{m1} + 0.31\ P_{m2}$

Nevertheless, the parameters of P_v and the P_{mi} are inputs-outputs coefficients and therefore they are not unit -free. To get the relative shares of each cost component we adopt the normalization $P_v = P_{m1} = P_{m2} = 1$, then compute the sum of unitary costs and get the corresponding relative shares. Note that the resulting relative shares will be completely independent of the units at which factor prices, P_v and P_{mi} are measured in the normalization.

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