

INFLATION STABILISATION AND STATE-OWNED ENTERPRISE BEHAVIOUR IN TRANSITION ECONOMIES - THE CASE OF BULGARIA¹

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A dynamic model of persistent but converging inflation is presented, based on the assumptions concerning pricing behaviour of state-owned firms on the goods and labour markets. The trade-off between the short- and long-term inflation is investigated, appearing when the change in prices of goods and services provided by state-owned enterprises lag behind the general price dynamics.

1. Introduction

The countries in Eastern Europe started the transition from a centrally planned to a market economy by the late 1980's and early 1990's. Some basic tenets of the command economy model dwindled and open inflation and unemployment appeared as stunningly new phenomena.

In Bulgaria, former Czechoslovakia, Romania, Russia and Poland inflation outbursts came together with the liberalisation package and were explained by western economists as induced by an accumulated monetary disequilibrium (*the monetary overhang*) inherited from a planned system working with prices set at non-clearing market levels (See Sahay and Vegh, 1994).

The monetary overhang hypothesis provides a good explanation for an instantaneous price jump at the very start of the reforms. Then came a persistent inflation rate set well above international standards, common in most transition economies, that should also be explained. It seems that these rates of inflation are linked not only to fiscal and monetary facts but also to the pricing behaviour of state-owned enterprises.

The behaviour of state-owned firms in the transition period has been deeply studied by economists (See Pinto, Belka and Krajewski, 1993; Aghion and Blanchard, 1993; Commander and Coricelli, 1995; Avramov and Genov, 1994; Aoki and Kim, 1995) and some research is still in progress, but the relationship between inflation stabilisation and restructuring of firms is not clear yet. This paper presents a dynamic model of persistent, though convergent, inflation due to the losses of state-owned firms resulting from their pricing policies in goods and labour markets. The model explores the trade-off between short- and long-run inflation that appears when the change in prices of goods and services supplied by state-owned enterprises lag behind the general price level dynamics. The model has been built up on some stylised facts about the Bulgarian economy but its analytical framework is more general and may be applied to understand persistent inflation rates in other transition economies where the state sector accounts for a sizeable share of GDP.

The paper is organised as follows. The second section presents the model and the facts supporting its main assumptions based on the Bulgarian experience. The third section studies the time path of inflation rate and its steady-state properties. Conclusions and guidelines for stabilisation policies are drawn in the fourth section.

2. The model and its justification

Bulgaria started the economic restructuring reform in February 1991 with a *big bang* type of price and trade liberalisation (a detailed analysis of the reform process in Bulgaria is presented in Antonov and Avramov, 1994). Markets for goods and services, as well as the financial and the labour markets, were liberalised to a great extent making space for competition and the appearance of a private sector. A free foreign exchange market with a floating rate was established and the tax system was changed considerably.

The target of these significant institutional changes done at the onset of the reform process was to demonopolise domestic and foreign trade, and to promote competition in goods and financial markets allowing for a new private sector to appear. But even after these reforms, state-owned enterprises still accounted for most of the production of goods and services in Bulgaria (as it is also the case in Romania and the republics of the former Soviet Union- FSU). The weight of the private sector in GDP as of mid-1994, as estimated and published in Transition Report, EBRD, October 1994, was as follows: Bulgaria 40%, Romania 35%, most of the FSU republics –between 15 and 20%. The weight was even higher in Hungary: 55%, Poland: 55%, Larvia: 55% and the Czech Republic: 65%.

Reforms affected negatively the performance of state-owned enterprises. The first step undertaken in 1991 was to split the existing big state-owned companies and conglomerates into their component plants and factories. So, traditional trade and technological relations were disrupted to give economic and financial independence to the separate small and medium size enterprises. This decentralisation of the decision making process to a firm's level was a precondition for privatisation.

Deprived from the upper level administration shelter the small and medium size firms had to establish their own trade relations resorting to the new tiny private firms appearing almost instantaneously and in large numbers. A private sector interlinked with the state-owned sector was born. The state firms found themselves trapped in-between private firms that performed both as suppliers of raw materials and as distributors of final goods, ready to capture an increasing part of the rents by imposing price differentials. State firms had to accept the new rules keeping producer prices quite low and lagging behind the general price level dynamics. On the other hand, trade unions tried to keep real wages constant through indexation.

These two forces were sufficient to wipe out firms' operating profits and transform net profits into losses (see Commander and Coricelli, 1995).

The disappearance of operating profits in state-owned firms had a twofold impact on the overall performance of the economy: on one hand tax collections from state-owned enterprises fell sharply and a fiscal deficit appeared and, on the other hand, indebtedness of state-owned firms with banks increased abruptly through interest arrears which were honoured with new loans.

The Central Bank issued money to finance both the growing fiscal deficit and the rediscounting of the new loans granted to enterprises.

To capture this two fold impact, the model presented in the paper includes the losses of the state-owned enterprises into the budget constraint of the Treasury and assumes that they are covered by money creation. Price and wage setting policies of state-owned firms are explicitly considered in the model to allow for the analysis of different patterns of behaviour.

The budget deficit in period t (D_t) is defined as government expenditures (G_t) less taxes (T_t) plus losses of state-owned enterprises (E_t):

$$D_t = G_t - T_t + E_t \quad (1)$$

Assuming that nominal government expenditures and tax revenues are linear in nominal GDP (Y_t) through constants \bar{g} and \bar{h} equation (1) becomes

$$D_t = (\bar{g} - \bar{h}) Y_t + E_t \quad (2)$$

The Olivera-Tanzi effect is ignored to simplified the model. A model dealing with similar problems and including the Olivera-Tanzi effect is presented in Heymann and Canavese (1989).

The supply and demand behaviour of goods and services produced by state-owned enterprises is introduced in equations (3) and (4). Econometric estimations show that the price elasticity of demand for goods produced by state-owned enterprises is quite low (see Nenova, 1995, where it is estimated that the price elasticity of demand for goods produced by a sample of 3720 state-owned firms is -0.1) and so it is assumed that demand depends only on real income (y_t) through a constant \bar{s} .

$$\text{quantity demanded} = \bar{s} y_t \quad (3)$$

The supply side is presented by a fixed coefficient production function with only one input, labour (L)

$$\text{quantity produced} = \frac{1}{l} L_t \quad (4)$$

where l is the labour-output ratio.

It is also assumed that quantity produced by state-owned enterprises is always equal to quantity demanded. From (3) and (4), losses of state-owned enterprises can be presented in a detailed form as a function of output, employment, the labour-output ratio, prices and wages:

$$E_t = w_t L_t - p_{s,t} \bar{s} y_t = w_t l \bar{s} y_t - p_{s,t} \bar{s} y_t \quad (5)$$

where w_t and $p_{s,t}$ are wages paid and prices of goods and services produced by state-owned enterprises.

By introducing equation (5) into (2), D_t become

$$D_t = (\bar{g} - \bar{h}) Y_t + w_t l \bar{s} y_t - p_{s,t} \bar{s} y_t \quad (6)$$

The general level of prices (\mathbf{p}) is defined as a geometric mean of prices set by private firms (\mathbf{p}_i) and prices set by state-owned enterprises, hence, the rate of inflation is

$$\hat{\mathbf{p}}_t = \mathbf{a} \hat{\mathbf{p}}_{i,t} + \mathbf{b} \hat{\mathbf{p}}_{s,t} \quad (7)$$

where \mathbf{a} and \mathbf{b} are constant weights such that $\mathbf{a} + \mathbf{b} = 1$ and the hat over a variable denotes its rate of change over time.

Relative prices and real wages are introduced to analyse the impact of real changes in prices and wages on losses

$$\bar{p}_{s,t} = \frac{p_{s,t}}{\mathbf{p}_t} \quad (8)$$

and

$$\bar{w}_t = \frac{w_t}{p_t} \quad (9)$$

Since real output can be represented by nominal output Y and the general price level p ($y = Y/p$), relative prices (8) and real wages (9) can be explicitly inserted into the total deficit equation (6)

$$D_t = (\bar{g} - \bar{h})Y_t + \bar{w}_t l \bar{s} Y_t - \bar{P}_{s,t} \bar{s} Y_t \quad (10)$$

Losses of state-owned enterprises are covered by loans or by the accumulation of arrears to the commercial banks. These debts are rediscounted at the central bank and this transaction is equivalent to the direct financing of losses by issuing money.

If the total fiscal deficit is financed by printing money, the rate of growth of money supply is:

$$\frac{D_t}{M_t} = \frac{\Delta M_t}{M_t} = \hat{M}_t \quad (11)$$

where M_t is the money supply and M_{t-1}/M_t is linearly approximated by $1 - \hat{M}_t$.

To emphasise the link between the rate of inflation and the pricing behaviour of state-owned enterprises, a constant income velocity of money is assumed $v = M/Y$.

Equations (10) and (11) can be combined to get

$$\hat{M}_t = (\bar{g} - \bar{h})v + \bar{w}_t l \bar{s} v - \bar{p}_{s,t} \bar{s} v \quad (12)$$

or

$$\hat{M}_t = d + s(\bar{w}_t l - \bar{p}_{s,t}) \quad (13)$$

where

$$(\bar{g} - \bar{h})v = d \quad (14)$$

$$\bar{s}v = s \quad (15)$$

Equation (13) is the classical expression presenting inflation as the product of the fiscal deficit-to-GDP ratio and the income velocity of money. It also shows explicitly that losses of public enterprises weighted by their share in total output are a part of the deficit financed by issuing money.

The close relationship between the growth in money supply and the losses of state-owned enterprises has been introduced in equation (13). The pricing behaviour of the private sector affects the inflation rate in a different way. It is assumed that prices in the private sector are set following a mark-up rule on costs. Hence, their dynamics depend on changes in wages in the private sector and in prices set by state-owned enterprises which are inputs for private sector production. It is also assumed that they are sensitive to changes in real income as a proxy for the behaviour of demand. Equation (16) shows the rate of change of prices of goods and services produced by the private sector using as inputs labour and the goods supplied by state-owned enterprises:

$$\hat{p}_{i,t} = m_1 \hat{w}_t + m_2 \hat{p}_{s,t} + m_3 \hat{y}_t \quad (16)$$

where w is the level of wages in the private sector.

The coefficients m_1 and m_2 should add up to unity as they represent the weights in private sector costs of labour and goods produced by state-owned enterprises. The constant m_3 is a measure of the mark-up sensitivity and the flexibility of private sector prices to changes in aggregate demand.

It is also assumed that wages in the private sector are fully indexed to past inflation. The fact that the majority of private sector firms are small-scaled, organised within the members of the family, upholds this assumption. Equation (17) presents the private sector rate of wage change:

$$\hat{w}_t = \hat{p}_{t-1} \quad (17)$$

Equations (16) and (17) can be inserted in (7) to get the inflation rate

$$\hat{p}_t = am_1 \hat{p}_{t-1} + (am_2 + b) \hat{p}_{s,t} + am_3 Y_t - \hat{a}m_3 \hat{p}_t - (am_2 + b) \hat{p}_t + (am_2 + b) \hat{p}_t \quad (18)$$

where the approximation of the real growth rate $\hat{y}_t = \hat{Y}_t - \hat{p}_t$ has been used.

The constant income velocity of money assumption implies $Y_t = M_t$ and so

$$\hat{p}_t = A \hat{p}_{t-1} + B(\hat{p}_{s,t} - \hat{p}_t) + Cd + Cs(\bar{w}_t l - \bar{p}_{s,t}) \quad (19)$$

where

$$A = m_1 / (m_1 + m_3) \quad (20)$$

$$B = (am_2 + b) / a(m_1 + m_3) \quad (21)$$

$$C = m_3 / (m_1 + m_3) \quad (22)$$

Equation (19) is the reduced form of the model. It highlights the impact on inflation of the inertia due to past inflation indexation of private sector wages, the wedge between the general price level dynamics and the changes in prices set by the state-owned enterprises and the size of the fiscal deficit and the losses of state-owned enterprises.

3. The inflation path

In most of the countries in transition, state-owned enterprises, positioned between small scale private trading firms which turned out to be their suppliers and distributors, accepted to share their profits with this newly-born private sector keeping their output prices lagging behind inflation. As prices of inputs bought from private enterprises grew with inflation, losses appeared and were financed by the accumulation of a rising debt to banks and tax arrears to the budget.

This behaviour can be introduced in equation (19) by assuming that prices set by state-owned enterprises are linked to the inflation rate through a parameter h . When h is less than one, state-

owned enterprises keep a negative wedge between the evolution of their prices and both private firms prices and the overall inflation rate to share a part of their profits with the private sector. In such a case prices set by state-owned enterprises follow the rule

$$\hat{p}_{s,t} = \mathbf{h} \hat{p}_t \quad (23)$$

State-sector wages were indexed to the inflation rate just enough to keep losses constant.

$$\bar{w}_t l - \bar{p}_{s,t} = \text{constant} \quad (24)$$

Hence, real wages in state-owned enterprises depend on their pricing policy,

$$\hat{w}_t = (\bar{p}_{s,t} / l \bar{w}_t) (\mathbf{h} - 1) \hat{p}_t + \hat{p}_t \quad (25)$$

If real prices set by state-owned firms are held constant ($\mathbf{h}=1$) then real wages paid by the same enterprises remain also constant since $\mathbf{h}-1=0$. In this case the pricing policy of state-owned firms is not a determinant of the rate of inflation. But it is obvious that private sector firms can get an increasing part of the rents owned by the state enterprises before the reforms only if $\mathbf{h} < 1$. This constraint puts a ceiling to the level of state firms prices which otherwise might go to infinity. Note that in most cases the trading private firms had been established either by the directors of the corresponding state firms or indirectly by their relatives. For more details see Avramov and Genov (1994).

Equations (23) and (25) are introduced into equation (19) to get the inflation path that the economy will follow:

$$\hat{p}_t = \frac{1}{(1-\mathbf{h}) + \mathbf{a}(\mathbf{m}_3 + \mathbf{h}\mathbf{m}_1)} \{ \mathbf{a}\mathbf{m}_1 \hat{p}_{t-1} + \mathbf{a}\mathbf{m}_3 [d + s(\bar{w}_t l - \bar{p}_{s,t})] \} \quad (26)$$

The solution to difference equation (26) is

$$\hat{p}_t = \hat{p}^* + (\hat{p}_0 - \hat{p}^*) \mathbf{I}^t \quad (27)$$

where the parameter \mathbf{I} is a function of the parameter \mathbf{a} from equation (7) and the parameters \mathbf{m} and \mathbf{m} from equation (16)

$$\mathbf{I} = \frac{\mathbf{a}\mathbf{m}_1}{(1-\mathbf{h}) + \mathbf{a}(\mathbf{m}_3 + \mathbf{h}\mathbf{m}_1)} \quad (28)$$

and the steady-state inflation rate is

$$\hat{p}^* = \frac{\mathbf{a}\mathbf{m}_3}{(1-\mathbf{h}) + \mathbf{a}[\mathbf{m}_3 + (\mathbf{h}-1)\mathbf{m}_1]} [d + s(\bar{w}_t l - \bar{p}_{s,t})] \quad (29)$$

The steady-state inflation rate (\hat{p}^*) depends positively on the income velocity of money, the fiscal deficit/ GDP ratio, and the size of the state-owned enterprises losses and their weight in real income. It is negatively related to the value of the parameter \mathbf{h} and this implies that if

prices of state firms grow less than the general price level, then a lower steady-state inflation rate can be achieved.

The inflation rate may either converge to its steady-state level or go into an explosive path depending on the value of I .

The inflation rate converges to the steady-state inflation rate if I is between zero and one. Since I is smaller for higher values of m and smaller values of m convergence to the long-run inflation rate is quicker the less sticky are prices set in the private sector (the absolute value of $m > 1$) and the less inertial is the system. This is also an intuitive result which shows that if prices are more flexible the system converges faster to the steady-state inflation rate.

If I is between zero and one the parameter h satisfies the condition

$$h < \frac{1 + a(m_3 - m_1)}{(1 - am_1)} \quad (30)$$

When condition (30) is satisfied h is also less than one. So, if prices set by state-owned firms lag behind inflation, the system converges to the long run inflation rate. It is clear that this process, originated by a value of h smaller than one, implies decreasing real wages and it cannot go on forever.

If h is bigger than one, then

$$h > \frac{1 + a(m_3 - m_1)}{(1 - am_1)} \quad (31)$$

and I is greater than one. The system is on an ever-increasing inflation path. In this case state-owned enterprises keep both, real wages and losses constant.

If h equals one the real prices set by the state owned enterprises remain constant and so do real wages paid by them. The steady-state inflation rate depends on the income velocity of money, the value of the fiscal deficit, and the size of state-owned enterprises losses and their share in real income.

4. Some conclusions

The model suggests that the pricing and wage setting policy followed by state-owned enterprises has an important impact both on the short- and the long-run rates of inflation. In the short-run they can reduce inflation by deteriorating their real prices and real wages. This policy will also decrease the long-run inflation rate if losses remain constant. But society will not tolerate a continuous erosion of real wages. If real prices and wages in the state sector are kept constant the long-run inflation rate will depend on the size of the state firms losses and their share in the economy.

The model also shows that either a rise in productivity in the state sector (a decrease in l) or a reduction in the weight of state-owned firms in the economy (a decrease in s) through privatisation are structural policy tools to reduce persistent inflation in transition economies.

The experience up to now, see Commander and Coricelli (1995) and Aoki and Kim (1995), does not favour the belief that state-owned firms are able to move to a more efficient path of

operation. The firms are controlled by insiders patronising the expropriation of rents by the workers and the private trading firms. Even if a growth in labour productivity appears it may result in rising real wages and private firms profits but not in a decrease in losses.

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