STATE-OWNED ENTERPRISES BEHAVIOUR
IN TRANSITION ECONOMIES AND INFLATION

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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 (Sahay R. and C. Vegh (1994)).

The monetary overhang hypothesis provides a good explanation of the instantaneous one time price jump at the very start of the reforms. Next 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 factors but also to the pricing behaviour of state-owned enterprises.

The behaviour of state-owned firms in the transition period is a subject of increasing research interest among economists\(^1\). A lot of work is in process but the relationship between inflation stabilisation and restructuring of this kind of firms is not clear yet. This paper presents a dynamic model of persistent though convergent inflation due to state-owned firms' losses originated by their pricing policy in goods and labour markets. The model unfolds that a trade-off between short- and long-run inflation rates 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 in three sections. The first section presents the model and the facts supporting its main assumptions based on the Bulgarian experience. The second section is devoted to study the time path of the inflation rate and its steady-state properties. Conclusions and guidelines for stabilisation policies are drawn in the third section.
Bulgaria started the economic restructuring reform in February 1991 with a *big bang* type of price and trade liberalisation. Markets of goods and services, as well as the financial and the labour markets were liberalised to a great extent creating space for competition and the rise of a new private sector. Prices of almost all goods and services were liberalised except fuel and some basic foodstuffs which accounted for 12-14% of the consumption basket used to measure inflation. A free foreign exchange market with a floating rate was established. The tax system was changed considerably and as far as state enterprises were concerned an uniform tax rate instead of the discretionary expropriation of profits was introduced.

The structural and institutional changes were supported by a heterodox stabilisation program based on very restrictive monetary, fiscal and incomes policies targeted at avoiding acceleration of inflation. But, in spite of this set of policy measures, inflation reached a peak of 333.5% in 1991, came down to 82.6% in 1992 and stayed over 60% in 1993. Total output dropped by 27.4% in the period 1989-1993 and officially registered unemployment grew quickly and steadily to 16.5% by the end of 1993. In 1994 inflation accelerated again reaching 95% when measured as an yearly average, output grew by 1.4% and unemployment fell down to 12.8% at the end of the year.

Significant institutional changes had been implemented at the onset of the reform process. Their purpose 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 were enacted, state-owned enterprises still account for most of the production of goods and services in Bulgaria (as it is also the case in Romania and the ex-USSR republics).

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2. There was a change in the weights used in the consumption basket at the beginning of 1993. Gradually the number of goods with prices controlled and fixed by the Government increased and in mid-1995 their weight reached 46% in the consumption basket.
3. The weight of the private sector in GDP as of mid-1994 has been estimated and published in Transition Report, EBRD, October 1994. It is as follows: Bulgaria - 40%, Romania - 35%, most of the ex-USSR republics - between 15 and 20%. The weight is a bit higher in Hungary - 55%, Poland - 55%, Latvia - 55%, Czech Republic - 65%.
Reforms affected negatively the activities of the state-owned enterprises. The first step undertaken in 1991 was to split the existing big state-owned companies and conglomerates into their building-up plants and factories. Though traditional trade and technological relations were disrupted it was argued that the disintegration process would give economic and financial independence to the separate small and medium size enterprises, decentralising decision making to a firm’s level and hence would demonopolise the state sector creating the preconditions for its privatisation.

Deprived from the upper level administration shelter the small and medium size firms had to establish their own trade relations resorting to the 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 distributors of final products, 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.

The initial price jump in February 1991 forced real wages down creating severe social unrest among employees. Though an extremely tight incomes policy was maintained at the beginning of the reforms, it was relaxed in November 1991 when the rigid wage tariff system was replaced by wage bargaining (Commander and Coricelli, 1995). Nominal wages rose by almost 60% and, although this growth was not enough to compensate the real decline due to the initial price shock, it was sufficient to wipe out firms’ operating profits and transform net profits into losses (Commander and Coricelli, 1995).

Workers and trade unions behaviour concerning wage growth in 1992 was overwhelmed by the desire to keep the level of real wages at least as high as negotiated in November 1991. Output continued to fall and the financial state of the firms worsened substantially in 1992 and 1993. The unemployment rate rose to 15.3 in 1992 and 16.4 in 1993. Trade unions changed their target in 1993 accepting lower wages but maintaining the level of employment. Even with this change in rules, operating profits on average remained constant at a zero level and net profits became negative for the period 1991-1993 as it is shown in Graphs 1 through 4.
**Distribution of Operating Profits in 1991**

Data based on a sample of 3721 state-owned firms in industry, construction, trade and services.

*Graph 1*

**Distribution of Operating Profits in 1993**

Data based on a sample of 3721 state-owned firms in industry, construction, trade and services.

*Graph 2*
**Distribution of Net Profits in 1991**

Data based on a sample of 3721 state-owned firms in industry, construction, trade and services.

Net profits equal operating profits-interest payments+financial income-taxes

*Graph 3*

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**Distribution of Net Profits in 1993**

Data based on a sample of 3721 state-owned firms in industry, construction, trade and services.

Net profits equal operating profits-interest payments+financial income-taxes

*Graph 4*
The unexpected acceleration of inflation in 1994 pushed the level of real wages down to almost the same level they had after the price jump at the start of the reform.

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 from 16% of GDP in 1990 to 2% of GDP in 1993. On the other hand, indebtedness of state-owned firms with banks increased abruptly through interest arrears which were honoured with new loans. Consequently, losses were financed directly by new bank loans granted to pay interests on old debts and indirectly by the central bank where the new loans were rediscouned.

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

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 (\( E_t \)):

\[
D_t = G_t - T_t + E_t
\]  
(1)

Assuming that nominal government expenditures and tax revenues are linear in nominal GDP (\( Y_t \)) through constants \( \bar{g} \) and \( \bar{h} \) \(^5\) equation (1) becomes

\[
D_t = (\bar{g} - \bar{h})Y_t + E_t. 
\]  
(2)

A specification of the functional forms outlining the demand for and the supply of goods and services produced by the state-owned enterprises is inserted

\(^5\) The Olivera-Tanzi effect is ignored to simplify the model. A model dealing with similar problems and including the Olivera-Tanzi effect is presented in Heymann, D. and Canavese, A. (1989).
into the model to introduce into the analysis the microeconomic framework to study the macroeconomic impact of state-owned enterprises’ losses. Econometric estimations\textsuperscript{6} display quite low price elasticity of demand for goods produced by the state-owned enterprises. It implies that, other things equal, losses might be eliminated by rising prices. To include this key feature into the model it is assumed that demand depends only on real income \( (y_t) \) through a constant \( \bar{s} \), so

\[
\text{quantity demanded} = \bar{s}y_t. \tag{3}
\]

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

\[
\text{quantity produced} = \frac{1}{l}L_t, \tag{4}
\]

where \( l \) is the labour-output ratio.

It is also assumed that the quantity produced by state-owned enterprises is always equal to the 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:

\[
E_t = w_tL_t - p_{s,t}\bar{s}y_t = w_tL\bar{s}y_t - p_{s,t}\bar{s}y_t, \tag{5}
\]

where \( w_t \) and \( p_{s,t} \) are the wage rate paid and the prices of goods and services produced by the state-owned enterprises.

Introducing \( (5) \) into \( (2) \), \( D_t \) becomes

\[
D_t = (\bar{g} - \bar{h})Y_t + w_tL\bar{s}y_t - p_{s,t}\bar{s}y_t. \tag{6}
\]

\textsuperscript{6} See Nenova M. (1995) where it is estimated that the price elasticity of demand for the goods produced by a sample of 3720 state-owned firms is -0.1.
The general level of prices ($p$) is defined as a geometric mean of prices set by private firms ($p_i$) and prices set by state-owned enterprises, hence, the rate of inflation is

$$\hat{\pi}_t = \alpha \hat{p}_{tt} + \beta \hat{p}_{st}, \quad (7)$$

where $\alpha$ and $\beta$ are constant weights such that $\alpha + \beta = 1$ and the circumflex accent over a variable denotes its rate of change over time.

Relative prices and real wages are introduced to examine the impact of real changes in prices and wages over losses. Their definitions are:

$$\overline{p}_{st} = \frac{p_{st}}{\pi_t}, \quad (8)$$

and

$$\overline{w}_t = \frac{w_t}{\pi_t}, \quad (9)$$

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)

$$D_t = (\overline{g} - \overline{h})Y_t + \overline{w}_t sY_t - \overline{p}_{st} sY_t. \quad (10)$$

Losses of state-owned enterprises are covered by loans or by an accumulation of arrears to the commercial banks. The latter can rediscount these debts at the central bank. This transaction is equivalent to the direct financing of losses by issuing money.

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

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

where $\dot{M}_t$ is the money stock and $M_{t-1} / M_t$ is linearly approximated by $1 - M_t$. 
Since the paper is aimed to stress 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

$$\dot{M}_t = (\bar{g} - \bar{h})v + \bar{w}_t s v - \bar{p}_t \dot{s} v \quad (12)$$

or

$$\dot{M}_t = d + s(\bar{w}_t - \bar{p}_t), \quad (13)$$

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/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.

Up to now the behaviour of the state-owned enterprises and its close link to the money creation process has been introduced. The pricing behaviour of the private sector also affects the inflation rate but it follows a different pattern. It is assumed that prices in the private sector are set following a mark-up rule and their dynamics depends on changes in the wages in the private sector and the prices set by the state-owned enterprises. It is also assumed that they are sensitive to changes in real income as a proxy for demand conditions. Equation (16) shows the rate of change of prices of goods and services produced by the private sector using labour and goods supplied by state-owned enterprises as inputs.

$$\dot{p}_{i,t} = \mu_1 \dot{w}'_t + \mu_2 \dot{p}_{x,t} + \mu_3 \dot{y}_t, \quad (16)$$

where $w'$ is the level of the wage rate paid by the private sector.

The coefficients $\mu_1$ and $\mu_2$ should add up to unity as they represent the weights in private sector costs of labour and goods produced by state-owned enterprises, respectively. The constant $\mu_3$ is a measure of the mark-up sensitivity to
demand conditions and introduces some degree of flexibility in the behaviour of prices in response to changes in aggregate demand.

The wage rate in the private sector is assumed to be fully indexed to past inflation. The fact that the bulk 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:

\[ \hat{w}_t = \hat{\pi}_{t-1}. \]  \hspace{1cm} (17)

Equations (16) and (17) can be introduced in (7) to get the equation of the inflation rate:

\[ \hat{\pi}_t = \alpha \mu_1 \hat{\pi}_{t-1} + (\alpha \mu_2 + \beta) \hat{p}_{s,t} + \alpha \mu_3 \hat{y}_t - \alpha \mu_3 \hat{\pi}_t - (\alpha \mu_2 + \beta) \hat{\pi}_t + (\alpha \mu_2 + \beta) \hat{\pi}_t, \]  \hspace{1cm} (18)

where the approximation of the real growth rate \( \hat{y}_t = \hat{y}_t - \hat{\pi}_t \) has been used. The constant income velocity of money assumption implies \( \hat{y}_t = \hat{M}_t \) and so

\[ \hat{\pi}_t = A \hat{\pi}_{t-1} + B(\hat{p}_{s,t} - \hat{\pi}_t) + C d + C_s(\hat{W}_t l - \hat{p}_{s,t}), \]  \hspace{1cm} (19)

where

\[ A = \mu_1 / (\mu_1 + \mu_3) \]  \hspace{1cm} (20)

\[ B = (\alpha \mu_2 + \beta) / \alpha (\mu_1 + \mu_3) \]  \hspace{1cm} (21)

\[ C = \mu_3 / (\mu_1 + \mu_3). \]  \hspace{1cm} (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.
II

The model can be developed further to capture the actual behaviour of state-owned enterprises in Bulgaria for the period of 1991-1993. A well known fact common for most countries in transition is that a considerable wedge appeared between the general price index and prices set by state-owned enterprises as the latter grew at a slower rate. Wages followed the inflation rate and consequently real labour costs increased due to the wedge between the inflation rate and the changes in the producer prices.

During 1991-1993 large-scale losses could have been avoided if Bulgarian state-owned enterprises had implemented a set of measures designed to keep constant or to decrease average labour costs. Instead they selected another pattern of behaviour. They were reluctant to promote a rise in real wages by shedding redundant labour. The outcome was a drop in productivity and an increase of unit labour cost. Positioned between small-scaled private trading firms, which turned out to be their suppliers and distributors, the state-owned firms accepted to share their rents with the newly-born private sector by maintaining relatively low output prices. As a result the state sector started accumulating an ever rising amount of debts due to the banking system and tax arrears due 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 $\eta$ such that $0 < \eta < 1$. A value of $h$ less than one implies that state-owned enterprises keep the negative wedge between their prices and both private firms prices and overall inflation rate thus sharing a part of their rents with the private sector. It means that prices follow the rule

$$\hat{p}_{s,t} = \eta \hat{\pi}_t.$$  \hfill (23)

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7 See Nenova M. (1995) for a detailed empirical analysis of this behaviour.
State-sector wages are indexed to the inflation rate just enough to keep losses constant, so

\[ \bar{w}_t \bar{l} - \bar{p}_{s,t} = \text{const.} \]  \hspace{1cm} (24)

Hence, real wages in state-owned enterprises inevitably go down

\[ \dot{\hat{w}}_t = (\bar{p}_{s,t} / l \bar{w}_t) (\eta - 1) \hat{\pi}_t + \hat{\pi}_t. \]  \hspace{1cm} (25)

If real prices set by state-owned firms are held constant (\( \eta = 1 \)) then real wages paid by the same enterprises remain also constant since \( \eta - 1 = 0 \). In this case the pricing policy of the state 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 state enterprises before the reforms only if \( \eta < 1 \). The private firms needed to get a higher share of rents and they were powerful enough to exert the necessary pressure over the state sector. The constraint set by the private sector over the state sector price rise creates a ceiling to the level of the state firms’ prices which otherwise might go to infinity.

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

\[ \hat{\pi}_t = \frac{1}{1 - \eta + \alpha(\mu_{\beta} + \eta \mu_{\beta})}[\alpha \mu_{\beta} \hat{\pi}_{t-1} + \alpha \mu_{\beta}[d + s(\bar{w}_t \bar{l} - \bar{p}_{s,t})]]. \]  \hspace{1cm} (26)

The solution to the difference equation (26) gives

\[ \hat{\pi}_t = \hat{\pi}_t^* + (\hat{\pi}_0 - \hat{\pi}_t^*) \lambda^t \]  \hspace{1cm} (27)

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\(^a\) In the majority of 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 R. Avramov and K. Genov (1994).
where the parameter $\lambda$ is an expression including the parameter $\alpha$ from equation (7) and the parameters $\mu_i$ and $\mu_s$ from equation (16)

$$\lambda = \frac{\alpha \mu_i}{(1 - \eta) + \alpha(\mu_s + \eta \mu_i)} \quad (28)$$

and the steady-state inflation rate is

$$\hat{\pi}^* = \frac{\alpha \mu_i}{(1 - \eta) + \alpha[(\mu_s + (\eta - 1)\mu_i)] [d + s(\bar{w}_i, l - \bar{p}_{i,t})]} \quad (29)$$

The steady-state inflation rate ($\hat{\pi}^*$) 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 coefficient $\eta$, which means that when prices of state firms grow less than the general price level a lower steady-state inflation rate can be achieved.

Depending on the value of $\lambda$ the inflation rate may either converge to its steady-state or go into an explosive path.

The inflation rate converges to the steady-state inflation rate if $l$ is between zero and one. Since $\lambda$ is smaller for higher values of $\mu_s$ and smaller values of $\mu_i$, convergence to the long-run inflation rate is quicker the less sticky are prices set in the private sector (the value of $\mu_s > 1$) 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 $l$ is between zero and one the parameter $h$ satisfies the condition

$$\eta < \frac{1 + \alpha(\mu_s - \mu_i)}{(1 - \alpha \mu_i)} \quad (30)$$

When condition (30) is satisfied $\eta$ 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 $\eta$ smaller than one,
implies decreasing real wages and it cannot go on forever.

A value of $\eta$ such that

$$\eta > \frac{1 + \alpha(\mu_1 - \mu_1)}{(1 - \alpha \mu)}$$

(31)

implies that $\lambda$ is greater than one and the system is on a path on which the rate of inflation is ever increasing. In this case the state-owned enterprises, possibly pushed by wage earners, rise real prices and real wages but keep losses constant to avoid a further increment of their flow demand for funds from the banks.

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

The model presented in the paper suggests that the pricing and wage setting policies followed by the state-owned enterprises has an important impact both on the short- and the long-run rates of inflation. In the short-run they can suppress inflation by deteriorating their real prices and real wages. This policy will also decrease the long-run inflation rate if losses remain constant. But a continuous erosion of real wages is inconceivable as it will create social unrest. If real prices and wages in the state sector are kept constant then the long-run inflation rate will depend on the size of the state firms’ losses and their importance in the economy.

The model also shows that the problem of persistent and relatively high rate of inflation that plagues transition economies can only be solved either by rising productivity in the state sector (a decrease in $l$) or by lowering the weight of the state-owned firms in the economy (a decrease in $s$) through privatisation. Both ways imply substantial restructuring of the firms and imposing from outside a hard budget constraint over their demand for financial resources.

The experience up to now⁹ do not favour the belief that the state-owned firms are able to move to a more efficient path of operation. The management of the firms is dominated by the insider control 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 a growth of real wages and private firms profits but not in a decrease of losses.

Privatisation is a discretionary operation targeted at changing the style of firm’s management and lowering the weight of the state sector in the economy. As far as the economic performance of the state-owned firms is concerned recent experience show that the way privatisation has been implemented matters. The evidence up to now is that there is no change in behaviour of state-owned firms privatised by workers or managers buy-outs or by mass privatisation.

REFERENCES


