DEPARTMENT OF ECONOMICS

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THE FISCAL CONSTRAINT TO
RESTRUCTURING OF FIRMS
IN TRANSITION ECONOMIES

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The Fiscal Constraint to Restructuring of Firms in Transition Economies

Philipp J.H. Schröder[1]

Department of Economics
University of Aarhus
DK-8000 Aarhus C
E.mail: pschroeder@eco.aau.dk

Abstract:

The restructuring process of formerly state owned enterprises, including dismissal of excess labour, has been slow. Since the recovery of transition economies depends on the restructured sector, a convincing take-off has been delayed.

Many arguments have been forwarded to explain the low adaptation speed. This paper focuses on an additional structural barrier at the governmental level. Here the privatisation program - leading to restructuring or not - is designed. Transition governments are in a fiscal squeeze: on the one hand restructuring relocates costs from the restructured firms to the public budget, on the other hand - in order to contain inflationary pressures - the public deficit should be kept within narrow limits. This problem is analysed by means of a stylized, dynamic model.

Key Words: Restructuring, Privatisation, Government Deficit, Transition

JEL classification: H69, L33, P41

1

1. Introduction

A prominent characteristic of the transition economies in Central and Eastern Europe is the low speed of restructuring of firms, be they privatized or not. Firms continue to employ excessive amounts of labour and provide a host of social functions. Thus, the term restructuring in the present context comprises the increase of labour productivity, generated by the elimination of redundant labour and/or activities. Restructuring concerns both under-productive workers, and those overhead costs that are attributed to operations which are irrelevant to the main activity of the firm, e.g. kindergarten, health service, housing, etc.[2] The literature on transition provides a series of explanations to this core problem. But as long as it has not been solved in essence it constitutes a basic obstacle to recovery and economic growth of the former centrally planned economies.

The suggested impediments to restructuring of formerly state owned enterprises (SOEs) are: 1) The negative influence of extreme uncertainty, typically accompanied by a 'wait and see' attitude. 2) The infancy and unpreparedness of the domestic and external financial system. 3) The inefficiency and lack of enforcement of the legal system, especially bankruptcy laws. 4) The lack of incentives to restructure due to e.g. soft budgets or stake holdings. 5) The widespread fear among SOE workers (and maybe managers) of becoming unemployed. 6) The lack of experience and ability with respect to the functioning of the market economic system. 7) The lack of clarity created by unsettled restitution claims. 8) The remaining rigidities in the labour market, e.g. severance payments. For these and further explanations of the slow restructuring process see Tanzi (1993), Aghion and Burgess (1994), ECE (1994 and 1995), World Bank (1996), Standing (1996), Commander and Schankerman (1997) and Schröder (1997).

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2. For an overview on privatization issues and methods see Hare (1994) and Aghion and Blanchard (1996). Country by country descriptions of privatization and detailed reports on practical issues are found in the World Development Report 1996 (World Bank, 1996) and Lieberman et al. (1997). On continued over manning see Aghion and Carlin (1996) and Aukutsionek (1997). For an account of continued social provisions by firms see Commander and Schankerman (1997).

The decision to restructure a firm or not depends crucially on its ownership form i.e. its corporate governance structure in interplay with outside incentives e.g. tax rules. Hence, it follows that the restructuring speed in a transition economy is more or less directly determined by the privatisation program of the government, because privatisation settles the ownership of firms. In this paper it will be demonstrated that at the governmental level there may exist an additional and perhaps decisive structural barrier to effective restructuring - causing governments to privatise slowly and/or in an inefficient manner.

To contain the inflationary consequences of transition and to reduce the dominating role of the public sector, the government is urged by international organisations and other advisors to keep the public deficit within narrow limits. Also, - but with less weight - transition economies are expected and advised to perform a fast and effective privatisation of their economies in order to create the basis for growth (Frenkel and Khan, 1994).

However, the classic chicken-egg problem of macroeconomic stabilization versus structural reform is lurking behind such objectives. In fact this has long been recognized by international organisations like the IMF (Tanzi, 1993). There is an inherent conflict between a low budget deficit and effective privatisation. Privatisation of SOEs - resulting in restructuring - stretches the government budget on both sides. Firstly, restructuring releases an upward pressure on the public expenditure side: a) firms scrap social functions that have to be taken over by the state, b) excess labour is freed and government expenditure on unemployment rises. Secondly, restructuring exerts a downward influence on the revenue side, because the reorientation of the incentive structure typically includes a lower than average tax on profits.[3] Hence, the government is left in a squeeze where the effects on the two sides of its budget create a blocked situation. The government 'cannot afford' to let firms restructure in an effective manner. Thus, the endeavour by transition countries to

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3. Revenue from privatisation has been negligible in transition economies for various reasons. A lack of private wealth, considerations of fairness, political constraints etc. have resulted in voucher privatisations and token payments being the main means of "selling" SOEs (World Bank, 1996).

balance the budget and to privatise the economy fast and effectively in order to achieve economic growth - in that order - is unfeasible. As the present paper will show, in opposite order the two policy goals are no longer in conflict. Hence, the egg comes before the chicken.[4]

By means of a stylized dynamic model it can be demonstrated how this apparent paradox follows from the interaction of the privatised sector and the public budget. The effect of a narrow budget limit can - within the model - impede the restructuring process or even result in an only partially restructured economy. Further, it is found that sufficient growth in the restructured sector can remedy the deadlock, or speed up privatisation.

The Cost of Privatisation and Restructuring

It is difficult to underpin the argument of the paper by direct evidence from Central and Eastern Europe. Firstly, data is a problem. Even though some data on government deficits are available, it is impossible to define the degree and speed of restructuring. This is so because restructuring can take place in many dimensions and different industries, not all of which will strain the public budget. Secondly, governments do react. Given the conflicting demands of a small deficit and effective restructuring, other fiscal policy measures or incentives for firms might be applied. This in turn will relieve the pressure on the budget or improve the level of restructuring. Nonetheless, the fiscal constraint effect of the present model will still be underlying such system.

As 'second best' evidence one can pinpoint the immense costs associated with effective privatisation and restructuring. Consider the case of the former DDR. Usually the East German case is brushed away as special and different from that of all the other transition economies. Here I turn this difference into an advantage. I take it as given that East Germany started from a better position and had a number of

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4. There is a related argument on over employment in Shleifer and Vishny (1994), where a government bribes firms (pre- and post-privatization) into inefficient production (excess labor) in order to promote public acceptance. While Shleifer and Vishny's argument is based on political economy considerations, our argument is based on pure budget accounting and the micro structure of firms.

advantages during the transition process: less uncertainty, access to a well working financial system, a well defined and enforced legal system, a social welfare system, access to experienced personal and management - in fact the Treuhand agency did not just organize privatisation but also designed restructuring plans for some firms, fast settlement of restitution claims, and unification with the West German industry and labour market in general. Hence, we can define the East German transition as the best case.

Treuhand statistics show that privatisation took five years. However, costs like unemployment benefit and investment subsidies are continuing beyond this point. Data on privatisation shows that only 6% of all the East German SOEs where sold to East German investors. The lions share of 85% went to West German buyers. One would expect that under such conditions - in a non-voucher privatisation - the sales revenue should be substantial. But on the contrary, total sales of the Treuhand amounted only to 50 billion DM, which is 25% of the estimated real estate value of all the Treuhand firms and only 5% of all the funds that poured into East Germany (Sinn and Weichenrieder, 1997). Hence, even under the best case conditions is a financially self sustained privatisation unfeasible. Incorporating the costs of the Treuhand as well, the sale of SOEs turns out to be a loss maker.

As to the success of restructuring in the former DDR, there are recent indications of weaknesses. Despite an average annual GDP growth of more than 5% in the past 6 years, the DIW (1997) points at sluggish results for 1996. As an example realize that in 1996 only 2% of German exports origin from East Germany; on a per capita basis this should be more than 20%, and according to GDP the number ought to be 10%.

However, the real costs of restructuring at all levels, i.e. the total of West German funds that were pumped into East Germany from 1990 until 1996 are estimated at 1000 billion DM (Sinn and Weichenrieder, 1997, p.181), (DIW, 1997), (FT, 1997,

p.1). This amounts to approximately 60% of East German GDP (and 5% of West German GDP) in that period.[5]

Despite such inflows and the fiscal transfers to the Länder budgets, the new Länder accumulated in only six years almost as much per capita public debt as the West German Länder. Also the average Länder deficit in 1996 is at 5% of the Local GDP in the East and at less than 1% in the West.

So, transition is expensive - even in the best case. Via the transfers from the West the new Länder had the possibility to run such deficits for several years. Other transition economies did not have this possibility.

As a back of the envelope exercise let's assume that only half of the entire funds that came into the new Länder are associated with effective restructuring of the economy (including necessary infra structure expenses etc.). Further say that a level of 50% - due to less demands on social welfare in other transition economies - is the actually necessary cost level to achieve full restructuring; i.e. we realise that there was excess compensation in Germany. If the entire inflow had to be deficit financed, then the deficit per year would still amount to more than 17% - at best. It should be obvious that a restrictive 3% budget deficit - as is aimed for in many transition economies - will put a country at a serious disadvantage. In fact if we agree that it took five years to complete restructuring in Germany - and ignore any dynamic effects - than a 3% deficit constraint would have prolonged the process to more than 25 years; presuming that it could be self-financed at all. These reflections suggest that the costs of privatisation and restructuring are substantial. Hindering governments in covering those costs will restrict their ability to administer effective privatisation programs.

The paper proceeds as follows. The next section introduces the model. The model is solved analytically, and the core results are derived in section 3. Section 4 present some summary results of an enlarged version of the model - including growth, debt

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5. All percentages are author's calculations. National accounting and Länder deficit data comes from DIW (1996/97) several issues, but in particular Volkswirtschaftliche Gesamtrechnung.

accumulation and an unemployment pool - which has been solved by means of numerical simulation (Schröder and Yndgaard, 1997). The limitations of the model, and some further extensions are discussed in section 5. Section 6 concludes the paper.

2. The Model

Before considering the budget variables that are relevant to the government when designing the privatisation process, we look at the micro structure of the model.

The firms restructuring decision

The economy consists of a continuum of equally-sized firms f. There is no entry and the labour force is constant. There are no deficiency of demand problems. Thus privatisation and restructuring need not be avoided by the government because of a slump triggered by temporarily inactive labour.

The numeraire of the economy is the wage rate. Firms generate a value added Π at a requiered labour cost of W (i.e. proportional to the number of workers), identical to all firms. This gives potential profits $V=\Pi-W$. A firm's actual gross profit Π_f is given by:

$$\Pi_f = \Pi - W - L_f + T(L_f)$$

(1)

Where L_f is the cost of inefficient, namely idle labour or firm social assets ($L_f \geq 0$). $T(L_f)$ captures growth gains from restructuring. Firms are assumed to respect their income (and liquidity) constraint $\Pi_f \geq 0$, i.e. no soft budgets. Π, W, L_f, V and $T(L_f)$ are measured in identical units, i.e. the wage rate. Firms do restructure by cutting L_f. If $L_f=0$ (no inefficiency) and $T=0$, then actual gross profits are equal to potential gross profits V.

The function $T(L_f)$ is assumed to be non-negative in the interval $[0,V]$, once continuously differentiable and satisfying $0 \geq \frac{\partial T}{\partial L_f} > -k$, $T(V)=0$. The assumption $\frac{\partial T}{\partial L_f} \leq 0$

7

reflects the hypothesis that the growth potential is negatively correlated with the level of inefficiency. $\frac{\partial T}{\partial L_f} > -k$ sets a limit on growth gains. k is set such as to excludes the possibility of a worker owner accepting the risk of being sacked - voting pro restructuring- , because his compensation payment together with his share of T(L$_f$) exceeds his wage in the case of no restructuring. Further, the assumption of *T(V)=0* says that there is no growth in the firm if inefficiency is at its maximum value - from the liquidity constraint we can see that $L_f^{max}=V$. In (1) we can interpret *T*(L$_f$) as the potential (net of taxes) capital gain or present value of the increase of output capacity, to the single firm. So far dynamic effects are ignored.

Turning to corporate governance and the chosen inefficiency levels, I distinguish between two types of firms. 1) Firms *p* that are privatised to outside owners. 2) Firms *i* that are not yet privatised or are privatised to inside owners. Firms *p* are governed by outsiders who decide on L$_p$ maximising their net profit *(1-τ)*Π$_p$, where τ is the profit tax rate of the economy. As can be seen from (1), the resulting inefficiency level must be L$_p$=0, i.e. privatised firms with outsider dominance are run without any inefficiency, generating a gross profit Π$_p$=V+T(0); they are completely restructured.

Insider dominated, or state owned, firms *i*, on the other hand, are run by agents that hold stakes in inefficiency, (Nuti, 1996); (Schröder, 1997). Insiders can be suppliers of labour (or receivers of social provisions) and take this into account when deciding on the inefficiency level L$_i$. In general control in the *i* firms is exercised by agents not holding all the property rights. They maximise expected income:

$$\max_{L_i} (1-\theta)(1-\tau)\Pi_i + (1-\omega)(W+L_i) + \mu(V-L_i)$$

Where ω is the income tax rate taken to exceed the profit tax rate (ω>τ), μ is the net unemployment compensation taken to be less than the net wage (1-ω), and θ is the non-voting stock, i.e. the amount of shares in an *i* firm that is held by others than the deciding insiders (θ∈[0,1]). The maximization from the point of view of the controlling insiders takes account of the dividend payments on their share holdings,

plus the probability of continued employment in the firm times the net wage, plus the probability of unemployment times the compensation rate.

The central feature of *i* firms is that control and property rights are not aligned. In particular in an SOE prior to privatisation $\theta=1$, i.e. all profits of state owned firms are appropriated to the state budget. However, decisions are still made at the firm level, hence, not yet privatised (stated owned) firms will put inefficiency at the maximum level $L_i=V$, since $\mu<(1-\omega)$. Also privatised but insider dominated firms will continue this policy as long as $\theta > \theta^* = 1 + \frac{\mu+\omega-1}{(1-\tau)(1-T'(L_i))}$.[6] Consequently, since $\mu<(1-\omega)$ there will be some $\theta^*<1$ such that *i* firms choose <u>not</u> to restructure at all. However, for some fixed $\theta > \theta^*$, large enough growth gains from a cut in inefficiency can induce partial or full restructuring in firm *i*. In any case, since the non-voting stock/non-insider share θ is a feature of the privatisation program it should be clear that the government can perfectly but indirectly control the degree of restructured firms in the economy. Of course two other necessary conditions are that control rights and property rights are separable - this issue is studied in Aghion and Blanchard (1995) - and that the growth effects from cutting L_i are not too large (see the definition of $T(L_f)$). In the remainder of the paper we assume that θ is set large enough to fulfil the above conditions; accordingly the total amount of labour cost (wages) in *i* firms is given by $W+V=\Pi$, and gross profits Π_i are zero.

The government s problem

Now consider the government's action. The government faces a continuum of firms, and has to switch the ownership status from being *i* type firms to being *p* type firms over time. Let α_t be the share of privatised and outsider owned firms (*p*) at time t ($0\le\alpha_t\le1$). At time zero all firms are state owned, i.e. $\alpha_0=0$. Further, we denote by $\sigma_t\ge0$ the volume of firms converted from *i* into *p* type at the beginning of period t. Note that we implicitly assume privatisation to be irreversible.

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6. To derive this condition differentiate the *i* firm controller maximization problem with respect to L_i to get: $-(1-\theta)(1-\tau)+T'(L_i)(1-\tau)(1-\theta)+(1-\omega)-\mu>0$. The inequality is set for the case where the firm will opt for maximal inefficiency. Also, recall that $0\ge T'(L_i)>-k$.

Converting firms into restructuring entities has effects on the governments tax base. Figure 1 describes the situation. The horizontal-axis represents the share of firms that

Figure 1
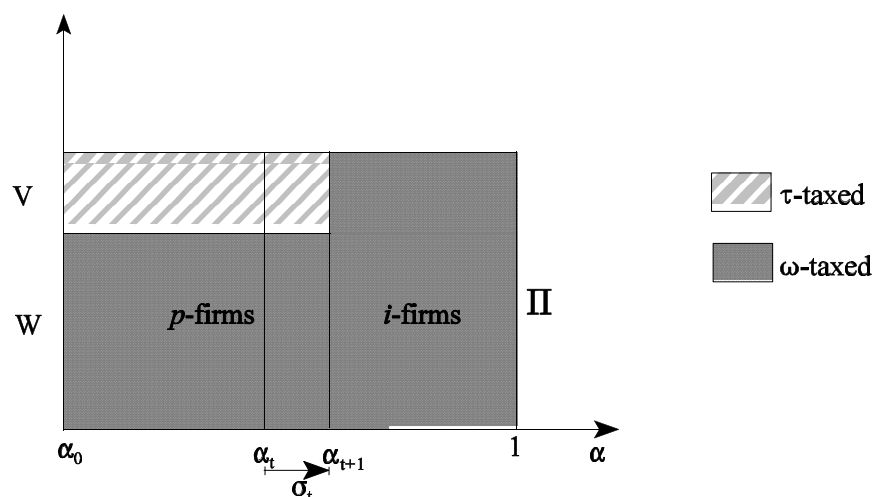
has been restructured at time t. The ordinate axis measures the value added Π. In the figure $T(L_p)=0$, such that Π is (uniformly) obtained by equally sized firms both before and after restructuring. The pre-privatisation degree of labour inefficiency equals the post-privatisation gross profit V. W remains as the necessary labour remuneration when the firm's primary activity is run efficiently. During restructuring, the new p firms (former i firms) fire their $L_i=V$ idle labour, reducing inefficiency to zero ($L_p=0$), and increasing their gross profit accordingly. The amount V is converted from wages to profits. Further, figure 1 indicates the different tax rates (wage tax ω and profit tax τ) that apply to the parts of total economic activity.

At t=0 total government revenue is equal to $R_0=\omega\Pi$. We assume that the government has initial total expenditure $E_0=\omega\Pi+\Gamma$, where Γ reflects the government's inherited budget deficit. The expenditure E_0 can be thought of as the basic provisions of schooling, public housing, social services, health care, etc. that by assumption will continue at an unchanged level.[7]

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7. Tax revenue and expenditure in period 0 might actually not go through the government books, but could be indirectly collected and redistributed by the state owned enterprises. Therefore the visible budget figures of the socialist economy can well be less than those of the post reform budgets. For a further discussion see Tanzi (1993) who highlights the difference between the two concepts: budget and fiscal deficit. The first one refers

Calculating the government's revenue account in period t, after some restructuring has taken place and including the new σ_t-step taken for that period, we find total revenue to be given by:

$$R_t = (\alpha_t + \sigma_t)(\tau V + \omega W) + (1 - \alpha_t - \sigma_t)\omega\Pi + \tilde{T}_t$$

(2)

where $\tilde{T}_t$ reflects the government's income from the growth effects $T(L_p)$ and $T(L_i)$. Obviously growth effects arise under the above assumptions on $T(L_f)$ only in the privatised and restructured sector p. In section 4 below I introduce a specific $\tilde{T}_t$ function that was used in a simulation study by Schröder and Yndgaard (1997).[8]

On the expenditure side the accounting identity is composed of three constituents. One is the already introduced E_0 - initial expenses that have to be maintained as the economy proceeds. The two additional expenses are related to the release of redundant labour under restructuring:

$$E_t = \mu\sigma_t V + \nu U_t + E_0$$

(3)

The first term reflects the compensation at the rate μ of the net income lost by those people who are laid off in period t when the share σ_t of firms is privatised into p types and thus restructures completely. The second U-part reflects the hypothesis that people who have been dismissed in the time preceding t should be compensated at some rate $\nu < \mu$. Over time U_t decreases if no new redundancies emerge, because the

unemployed are absorbed in the growing *p* sector, and/or leave the compensation system.[9]

Deficit and solution

In each period we assume that the government is restricted in its choice of a deficit level by some constant B>0; B could be defined by some outside authority, reflect an absolute limitation on the capital market, or constitute some political objective. The constraint is given by:

$$R_t - E_t \geq -B.$$

(4)

The rationale behind limiting the public deficit is manyfold: firstly the general malfunctioning of the financial sector of transition economies leaves most governments with only one source of finance, namely that of monetization, which in turn fuels the inflationary process. Secondly, if the capital market were able to absorb some public bonds to neutralize the initial monetary finance there is a high risk of severely impeding the already low private investment via a crowding out effect. Thirdly, an increase of the public deficit to a level beyond 2-3 per cent of GDP could easily send the government into an unsustainable debt spiral. Finally, it is an outspoken aim of transition governments to reduce their general participation rate in the economy.

The above equations constitute the basis for an optimal control problem in σ_t. However, until now we have not specified any objective function to be optimized, subject to the motion equations (2) and (3) and the inequality conditions set by the deficit limit (4) and the irreversibility assumption of restructuring $\sigma_t \geq 0$ (or more completely $0 \leq \alpha_t \leq \alpha_{t+1} \leq 1$). A natural objective function of the government could use the discounted value of all future incomes as a criterion. However, noticing that the only potential growth of the economy is attached to the restructured sector this would

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9. Note that in (3) there are no rent payments on government debt, in the simulated model presented in section 4 this feature is incorporated.

simply correspond to minimizing the number of σ-steps until $\alpha_t=1$, i.e. reflecting a policy that minimized the time needed to restructure the economy completely.[10]

The solution to this problem is straightforward: In each period the government should strive for a maximization of the σ-step. In particular this amounts to choosing the σ-size that hits the limit dictated by the budget constraint, since $\frac{\partial(R-E)}{\partial\sigma} = (\tau V + \omega W) - \omega\Pi - \mu V < 0$. Doing so as long as $\alpha_t < 1$ we simply solve constraint (4) after substituting for R_t and E_t. Solving with regard to σ_t we get:

$$\sigma_t = \frac{B - E_0 + \tilde{T}_t - \nu U_t + \omega\Pi - (\omega - \tau)\alpha_t V}{(\mu + (\omega - \tau))V} \qquad (5)$$

Equation (5) shows the share of i-firms (σ_t) privatised into p types at any time t. The central theme of the paper is featured by the fact that $\frac{\partial\sigma_t}{\partial B} > 0$. The step size is reduced as the deficit requirement becomes stricter (lower B). Thus attempts by transition governments to run close to balanced budgets can impede their ability to administer effective privatisation of their economies. Further, it can be seen from (5) that the σ-steps will become smaller during the privatisation process, as α_t enters with a negative sign (recall that $\omega > \tau$). Since the terms $-E_0$ and $\omega\Pi$ add up to $-\Gamma$ an inherited (pre-reform) deficit (Γ) reduces the σ-step. The opposite effect would follow from cashing some revenue in connection with privatization; here, however, we assume that a give-away privatization policy is applied. Increased growth $\tilde{T}_t$ will expand the privatisation step, while a rise in the initial/instant unemployment compensation μ and the long term compensation ν will strain the budget and thus reduce the σ-step possible.

The paper proceed to solve a basic version of (5) analytically. In section 4 I present some results from numerical simulations of the complete model.

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10. Alternatively, it could be argued that it is quite acceptable to simply assume that transition governments are interested in restructuring the economy; and/or are advised/urged to do so by international organizations, or supranational institutions.

3. Analytical solution of the basic model

To highlight the central themes of the analysis further we simplify the model by ignoring the growth effect of privatisation and the cost effect of the unemployment pool. Further let us assume that the government inherits a balanced budget, i.e. $\tilde{T}_t = v = \Gamma = 0$. Note that there are still budget costs from layoffs caused by restructuring; but the unemployed leave the benefits system after one period. Writing out σ_t as $\alpha_{t+1} - \alpha_t$ we can restate (5) as the following difference equation:

$$\alpha_{t+1} - \frac{\mu}{(\mu + \omega - \tau)} \alpha_t = \frac{B}{(\mu + \omega - \tau)V} \tag{6}$$

The solution to (6) gives the privatisation path α_t as:

$$\alpha_t = \frac{-B}{(\omega - \tau)V} \left(\frac{\mu}{\mu + \omega - \tau} \right)^t + \frac{B}{(\omega - \tau)V} \tag{7}$$

First of all we note that the dynamic part of the solution fulfils $0 < \frac{\mu}{\mu + (\omega - \tau)} < 1$, producing a monotone path. The adjustment becomes faster (the base closer to zero) as the unemployment compensation rate μ decreases. Likewise and perhaps counter intuitively, the adjustment to the long term value also becomes faster as the wedge between the income tax ω and the profit tax τ is increased. Usually one would expect a longer adaption time, since an increased tax wedge should strain the public budget. However, this apparent conflict between the speed of adaptation and the restraining fiscal effect is clarified once we look more closely at the particular solution to (7). We find that the long term equilibrium is given by $\lim_{t \to \infty} \alpha_t = \frac{B}{(\omega - \tau)V}$. A narrow budget limit (low B) will not only reduce each individual σ-step, but may also prevent the government from implementing a complete privatisation program, namely $\lim_{t \to \infty} \alpha_t < 1$ if $B < (\omega - \tau)V$. Thus, the counter intuitive increase in adaption speed - as a consequence of increasing the tax wedge - is explained by the fact that a *lower final level* is reached in fewer steps. The likelihood of this situation to occur grows with the pre-reform inefficiency level (V).

It is relevant to ask for what period t^* the adaptation process will be completed, or more precisely when will (7) equal 1, now assuming that $B>(\omega-\tau)V$. When will the economy be completely and effectively privatised into firms that do restructure? We solve $\alpha_{t^*}=1$ for t^* to get:

$$t^* = \frac{Log\left(\frac{B-(\omega-\tau)V}{B}\right)}{Log\left(\frac{\mu}{\mu+(\omega-\tau)}\right)} \qquad (8)$$

It is easy to verify that $\frac{\partial t^*}{\partial B}<0$ - given that an α_t value of 1 can be reached at all. Hence, a less restrictive budget requirement will decrease the time needed to privatise the economy completely and effectively. Further, $\frac{\partial t^*}{\partial\mu}>0$, i.e. a higher restructuring (one-time) costs per dismissed worker increases t^*. Also $\frac{\partial t^*}{\partial(\omega-\tau)}>0$, i.e. a larger fiscal drain triggered by redistributing the tax base from wages to profits increases t^* (see Appendix for the derivation of the latter). Stated differently a higher unemployment compensation or a larger tax wedge delays complete privatisation.

Finally we examine what budget deficit B would be needed to induce the government to privatise the entire economy within one σ-step. Solving from (7) the inequality $\alpha_1\geq 1$ we arrive at $B\geq V(\omega-\tau)+V\mu$. This is intuitively compelling since *each period* the government can spend B, hence our previous long run condition for complete restructuring ($\lim_{t\to\infty}\alpha_t\geq 1$) needs to be fulfilled, i.e. B>V(ω-τ) - the government is able to accept the permanent loss in tax revenue. Additionally - in order to privatise in one big step - the government needs also to be able to compensate the entire labour income V (income to inefficient workers), lost during restructuring, at the compensation rate μ.

The above section has established that a tight budget limit does hinder the transition government to privatisation swiftly; a very strick limit may even obstruct complete privatisation in the long run. The latter result depends crucially on the absence of growth. This will be examined next.

15

4. Numerical simulations of the extended model

In this section I present results from simulations of an extended version of the above model. The exposition is based on Schröder and Yndgaard (1997).[11] To proceed, we specify the growth effect and the unemployment pool, introduced above. Further, debt accumulation and interest payments are included.

The $\tilde{T}_t$ in equation (2) reflects the government's revenue from the growth effects $T(L_p)$ and $T(L_i)$. Obviously growth effects arise under the assumptions of section 2 and the requirements on $T(L_f)$ only in the privatised and restructured firms p. We postulate $\tilde{T}_t$ to affect the government revenue in the following simple ad hoc way:[12]

$$\tilde{T}_t = \sum_{\kappa=1}^{t-1} \sigma_\kappa (\tau V + \omega W)[(1+\gamma)^{t-\kappa} - 1].$$

Here σ_κ times the first parenthesis represents the public tax revenue from the restructured shares of firms in the preceding periods. Growth of the economy imerges only here and accumulates by the rate of γ, i.e. the revenue is *increased* by the addition represented by the square bracket expression.

On the expenditure side (3) we introduced the compensation payments to the unemployment pool. For the simulations we let the unemployment pool U_t shrink by the absorbed portion of labour in the growing p sector, plus a decay ratio, i.e. people that leave the benefits system. Recall that the workers in the unemployment pool - i.e. people who have been dismissed in the time preceding t - are compensated at the rate v. While those dismissed in period t get a net compensation μ (v<μ).

Adaptation time profiles

11. The simulations have been conducted with the program FisCon. See Schröder and Yndgaard (1997) for further details on the software, the model and a comprehensive presentation of experiments, results and interpretations.

12. The formula can be interpreted as relying on the assumption that the functional distribution between profit earners and workers is constant, also for the growing production part.

Figure 2 presents the screen output from one simulation experiment and illustrates the time profile of the adaptation process. In particular the model is solved with growth in the restructured sector. In this mode the X-axis in each panel measures the time periods (steps). The lower window shows the specific parameter values and the number of steps needed for the path to conclude. All parameter names correspond to the variable names of the model.

In figure 2, the top left panel ALFA and the corresponding panel SIGMA show that under the chosen parameter values full restructuring will be achieved. After 35 steps α has reached the value of 1 - accordingly σ drops to zero. It is noticeable that the time profile of σ reveals an initial relatively large step. At the beginning the full B deficit can be used for restructuring, because no 'historic' unemployment exists. However, in the following periods the unemployment pool strains the budget, see panel U_Pool, U_cost and EXPENDITURE.

Figure 2

FISCAL CONSTRAINT TO RESTRUCTURING: ADAPTATION
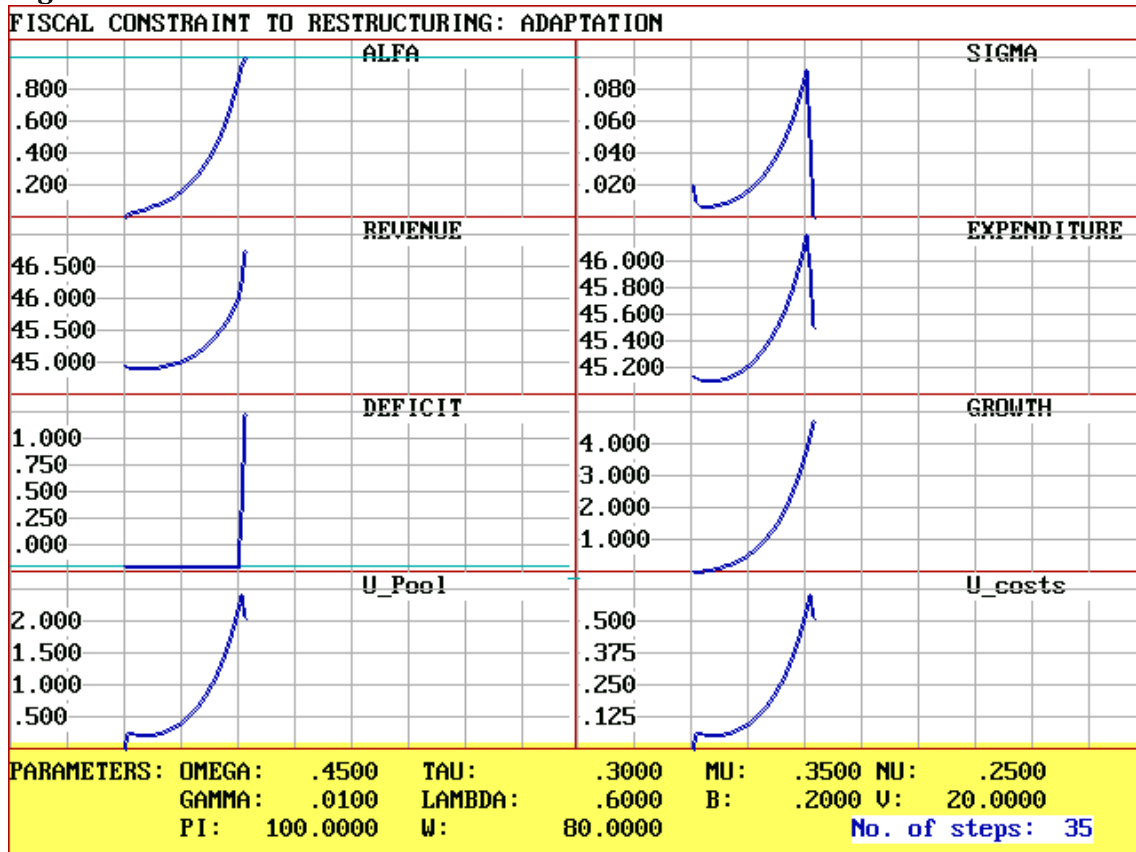
The DEFICIT panel clearly mirrors the extreme path traced. During the transformation process the deficit tracks the limit exactly, except for period 35. REVENUE to the public budget rises due to growth in the privatised sector. Growth is assumed to occur at a rate of $\gamma=0.01$, the GROWTH panel follows an upward trend, also reflected in the REVENUE panel, where the increased tax revenue from the growing p-firm sector is featuring. To minimize the time of restructuring the expenditure is maximized within the limit set by the (increasing) revenue plus permitted deficit B. The final step to full restructuring is calculated residually; hence the last step is of an irregular shape.

If we simulate what happens to the same scenario once the positive growth effect is removed (i.e. $\gamma=0$), we are practically back in the analytical case of section 3. The

18

simulation shows that again the deficit limit is traced exactly. However, the restructuring share in the economy is not reaching a level of more than a few per cent. In fact a value of $\alpha=0.066$ is reached corresponding to the particular solution of (7), after plugging in the parameter values of the simulation. Most firms remain inefficient i-types. An initial large σ-step has transformed so many firms into p-types, that the shift in the tax base from wages to profits worsen the budget situation considerably. After this step any additional privatisation is financed by those resources that are freed once the unemployed move from the μ compensation to ν compensation. Finally the process grinds to a halt at incomplete restructuring. This illustrates the impact and importance of the growth effect. Namely, given growth, any budget limit (B>0) will eventually result in complete restructuring. However, in the absence of growth restrictive deficit values will prevent the system from reaching complete efficiency.

Further simulation results

Running simulations for a series of budget values (with growth) we find that increasing B values produce a shorter adjustment period. Hence the speed of restructuring increases, and overall economic growth after 50 periods is higher, if larger deficits are permitted.[13] Further, it is found that higher initial inefficiency (V) prolongs the adaption period, while a larger profit tax speeds up the process, and a larger income tax slows it down. Also an increased μ and ν delay adaptation. Hence the results of section 3 carry over. Finally, we find that higher debt interest payments delay the adjustment. In particular a combination of high interest payments and low growth can deadlock the process at below full restructuring. In all other cases, as long as there is some growth in the restructured sector, and some deficit range (B>0), all the experiments result in complete restructuring ($\alpha_{t*}=1$).[14] But the time until this outcome is reached, and the resulting growth in the economy varies widly.

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13. In fact this is an example of a link between budget policy and growth, a relation that is discussed systematically in Tanzi and Zee (1997).

14. Implicitly we also demand that $\omega>\tau$ and $\omega>\mu>\nu$. In fact the simulations can handle parameter experiments where these inequalities are not fulfilled. However, the interpretation of such tax and compensation systems goes beyond the scope of this paper.

5. Limitations and Extensions

The major drawback of the presented model is its partial character, in particular it ignores all deficiency of demand problems. Certainly the model could be extended into a richer and more complex set up. However, such course would overkill a simple but nevertheless frighteningly relevant point. In fact the core results of the analysis are based on indisputable accounting identities, and carry the main message: If transition governments are restricted to narrow fiscal deficits, then their ability to carry out effective privatisation programs is limited.

However, given the nature of the model set-up, it is important to realize that there are various policy tools available to transition governments. Tools that make it possible to circumvent the fiscal constraint to restructuring. Once the privatisation process has halted at incomplete levels, or is progressing too slow, a tax increase can smoothen the deficit limitations. The tax tools of our model did always concern the period 0 tax levels as well. Similarly, the transfer levels μ and ν could be cut, to put the fiscal deficit back in shape.

Further critical limitations of the model are the definition of the output variables and markets, the micro structure of the insider dominated firms and the assumption on equally sized firms. I will discuss these issues in turn, and sketch some further implications.

Interpretation of the output variable
While during the transition process the restructured part of the production potential is assumed to be open to growth at some rate γ the traditional i.e. non-restructured part of the production system is assumed to be able to maintain its former capacity only. Implicitly it is therefore postulated that no accumulation of capital in a broad sense takes place in the latter sector. The GDP of the model represents a *measure of potential capacity.* Whether the potential output is demanded or not is not of concern here. Such analysis would require a much more ambitious setup, reflecting for example the roles of fiscal policy, rate of exchange regime, rate of inflation, the real

rate of interest and many more aspects. Hence the above setup describes what the economy's possibility of catching up would be under the implicit precondition that possible deficiency of demand problems have been solved by economic policy measures. Therefore it should be stressed that the results are on the optimistic side.

Workers coalition

It is often claimed that firms, managed/owned by workers are run inefficiently because the employees try to maximize wages. This statement is utilized in section 2, and is valid in *i*-firms if the tax on profits is of a confiscatory nature, or if the non-voting stock is substantial. However, if the firm is really owned by the workers, it is theoretically irrational because any majority coalition even among homogenous employees could win a gain for its members by disposing of their idle colleagues.

The assumption of equally sized firms

In the model it is assumed that firms are of equal size. This construction is artificial in the sense that the α-axis - introduced in figure 1 above - measures *productive mass*. In reality the distribution of firms according to size is not rectangular. Alternatively, we could imagine that a fixed σ-step at different places on the axis represents a different number of firms. Within the formal model it is tacitly assumed that firms have been selected for restructuring on a random basis. But, if we suppose that the firms in figure 1 are implicitly ordered according to size, we can consider the fact that the majority of restructured firms consists of relatively small firms. Most large SOEs have not been restructured, yet. The reason could very well be that firm inefficiencies, i.e. excess labour and redundant social arrangements are disproportionally larger in oversized firms. Hence, the cost of restructuring those super-SOEs will be proportionally higher. Accordingly governments delay their privatisation further.

6. Conclusion

The restructuring process of former SOEs in transition economies - i.e. the dismissal of idle labour input and scrapping of social functions - has been surprisingly low. But

effective restructuring of firms is of paramount importance for the economies. A number of arguments have been forwarded to explain the low restructuring speed: e.g. uncertainty, lack of a legal system, bad incentives, lack of ability, unsettled restitution claim, etc. All these explanations concern agents, firms and the economies' structure. This paper identifies another underlying barrier to effective restructuring located at the governmental level: Transition governments are in a fiscal squeeze. On the one hand restructuring relocates costs from the restructured firms to the public budget; on the other hand - in order to contain inflationary pressures - the public deficit should be kept within narrow limits.

The present paper develops a stylized dynamic model to consider this point. Transition governments are faced with conflicting demands. The conflict between macroeconomic stabilization (low deficit) and structural reform (effective privatisation and restructuring) appears serious. Evidence from East Germany suggests that the cost of restructuring is substantial. Hindering transition governments recovering those costs - and given no other source of finance - the speed and effectiveness of privatisation will be hampered. Allowing for structural reform to proceed the aim of low deficits can circumvent such squeeze. Further it is found that introducing growth into the model can remedy a situation where the privatisation process has halted at an incomplete restructuring level. Although the speed of adjustment will still be constrained by the budget limit.

The above conclusions should not be understood to mean that cautious fiscal policy is irrelevant or exclusively harmful. On the contrary there are many good reasons for sound fiscal policy. However, it must be realised that low budget deficits in transition countries come at a cost.

Appendix

Dependence of the time of complete privatisation (t^*) on the tax wedge ($\omega-\tau$):

In order to show that $\frac{\partial t^*}{\partial(\omega-\tau)}>0$, we write the partial derivative of (8) with respect to the tax wedge in the following form:

$$\frac{\partial t^*}{\partial(\omega-\tau)} = \frac{V(\mu+(\omega-\tau))\log\left(\dfrac{\mu}{\mu+(\omega-\tau)}\right) + (V(\omega-\tau)-B)\log\left(\dfrac{B-V(\omega-\tau)}{B}\right)}{(V(\omega-\tau)-B)(\mu+(\omega-\tau))\log\left(\dfrac{\mu}{\mu+(\omega-\tau)}\right)^2} > 0$$

Noticing that the denominator is always negative - since $B>(\omega-\tau)V$ if an $\alpha_{t^*}=1$ value is to be obtained at all (see (7)) - we can focus on the numerator, where the first term is negative and the second positive. Hence, we require that:

$$-V(\mu+(\omega-\tau))\log\left(\dfrac{1}{1+\dfrac{(\omega-\tau)}{\mu}}\right) > (V(\omega-\tau)-B)\log\left(1-\dfrac{V(\omega-\tau)}{B}\right).$$

Utilising that $\log(1)=0$, and dividing the above by $V(\omega-\tau)$ we arrive at:

$$\left(1+\dfrac{\mu}{(\omega-\tau)}\right)\log\left(1+\dfrac{(\omega-\tau)}{\mu}\right) > \left(1-\dfrac{B}{(\omega-\tau)V}\right)\log\left(1-\dfrac{(\omega-\tau)V}{B}\right)$$

Both sides are of the form $f(a)=(1+\frac{1}{a})\log(1+a)$. This function is defined for $a>-1$ and is positive sloped, hence $f(a)>f(b)$ implies $a>b$. Thus taking the values from above for a and b, and dividing both sides by $(\omega-\tau)$ we find:

$$\frac{1}{\mu} > -\frac{V}{B}$$

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