

RCEP/WORKING PAPER NO.25/AUGUST, 2000

PUBLIC FINANCE AND LOW EQUILIBRIA IN TRANSITION ECONOMIES. THE ROLE OF INSTITUTIONS

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Abstract

This paper develops two stylised models of the transitional economy that challenge to some extent conventional approach to policy-reforms. In the first model, the absence of market-oriented institutions is responsible for the occurrence of a non-cooperative equilibrium, where the amount of public services provided by the state is too low, which, in turn, adversely affects the global performance of the productive sector. In the second model, the government, which aims to maximise tax receipts, will choose a taxation level that pushes out of the market a too large number of firms; hence the global supply falls below its optimal level. In both models, strain and disruptions specific to transitional systems lead to abnormal responses of the real sector to standard policy measures. Efficient economic policies should explicitly take into account the institutional shortage.

Keywords: Institution building, Transition, Policy reform, Strain.

1. INTRODUCTION

Highlighting the role of institutions in economic life is not of recent vintage. There is even a school of economic thought, *institutional economics*, with its older and newer versions, which focuses on the institutional underpinnings of economic processes.¹ John Kenneth Arrow, in a very insightful and precious small book written years ago, remarked that *trust, loyalty, truth-telling, etc.*, are quasi-public goods, which oil the economic machinery of society.² And Mancur Olson constantly referred to the role of sound institutions for growth and prosperity.³ In transition economies, which are plagued by congenital institutional fragility, the nexus institutions/economic performance has aroused increasing interest. As a matter of fact, in recent years there has not been one major conference or seminar which did not underline the key role of institutions in determining economic performance. For instance, Joseph Stiglitz recalled attention on the need to build solid market institutions as a precondition to successful economic reforms.⁴ Richard Kozul-Wright and Paul Rayment⁵ have stressed the impossibility of conducting successful “orthodox” reforms in economies lacking of basic institutions, which, in Western Europe, are the outcome of a long-term social evolution. Dani Rodrik, too, emphasised that, although relative prices matter a lot for development policy by the 1990s, the shortcomings of the focus on price reform were increasingly evident. He put forward the fact that economists were generally inclined to take for granted the existence of important institutions such as a clearly delineated system of property rights, a regulatory apparatus curbing the worst forms of fraud and anti-competitive behaviour, as well as the social and political bodies deemed to mitigate and manage social

¹ See for instance Douglas North, “Structure and Change in Economic History”, Norton, New York, 1981.

² Kenneth J. Arrow, “The Limits of Organisation”, New York, Norton, 1971, p. 13. See also Kenneth J. Arrow, “Economic Transition: Speed and Scope”, *Journal of Institutional and Theoretical Economics*, vol. 156, 2000.

³ Mancur Olson, “Big Bills Left on the Sidewalk: Why Some Nations are Rich and Others Poor?”, *Journal of Economic Perspectives*, 10, 2, Spring 1996, pp. 3-24. This line of reasoning was echoed powerfully by writings of non-economists such as Robert Putnam (“Making Democracy Work”, Princeton, Princeton University Press, 1993) and Francis Fukuyama (“Trust. The Social Virtues and the Creation of Prosperity”, New York, Simon and Schuster, 1995) in recent years.

⁴ Joseph E. Stiglitz, “Whither Reform? Ten Years of Transition”, paper presented at the *ABCDE Conference of the World Bank*, April 28-30, 1999, Washington DC.

⁵ Richard Kozul-Wright and Paul Rayment, “The institutional hiatus in economies in transition its policy consequences”, *Cambridge Journal of Economics*, 1997, 21, pp. 641-661.

conflicts. Unfortunately, these are in general absent in poor countries, and this major drawback is at the origin of the failure of many stabilisation policies.⁶

The role of the state in the context of transition to a market economy is obvious: to enforce contracts, guaranty property rights and provide public services like education and health systems, social security and basic infrastructures, and last but not least, to set up an effective regulatory framework. Its actions must be predictable, transparent, and accountable. In the absence of such institutions, external financial aid would be diverted into rent-seeking activities,⁷ and its impact on economic development will be limited. Moreover, much needed structural reforms would be considerably slowed down, or could not be implemented, as unregulated economic agents will find ways to avoid the constraints intended to make their activity compatible with public interest. In presence of incomplete information on the nature of policymakers, structural policies may be time-inconsistent, and private agents may suffer utility losses from unfulfilled expectations with reforms.⁸

The text at hand builds on two simple models, which challenge to some extent conventional reform-policy in transition countries. Firstly, we develop a simple analysis of firms' strategic behaviour in transitional economy, where the state is able to provide a public service enhancing output of the representative firm. It is shown that in the absence of adequate institutions to monitor firms, the decentralised equilibrium might not be Pareto optimal. Under certain circumstances, it may be rational for a firm to unilaterally "misbehave". In this paper, such an action will be interpreted as the refusal to pay taxes; alternatively, it might be seen as a tendency not to respect contracts (not to provide the goods, to alter the quality of the goods provided, not to pay the price or to delay the payment, and so on). The bad equilibrium is a result of the non-coordinated decision of rational individual firms. This behavioural approach should be distinguished from the case in which the chain of

⁶ Dani Rodrik, "Institutions for High-Quality Growth: What They Are and How to Acquire Them", 14 October, 1999, Paper prepared for the *IMF Conference on Second Generation Reforms*.

⁷ For an analysis of the impact of rent-seeking on economic performance see Andrei Shleifer and Robert Vishny, "Corruption", *Quarterly Journal of Economics*, 108, 3, pp. 461-488. See also P. Boone and J. Hoerder, "Inflation: Causes, Consequences and Cures" in P. Boone, S. Gomulka and R. Layard (eds), "Emerging from Communism. Lessons from Russia, China and Eastern Europe", pp. 42-72.

⁸ The scope for policy reversal under incomplete information of private agents on the priorities of the government was analysed by Damien Besancenot and Radu Vranceanu in "On the Dynamic Consistency of Economy-wide Privatisation", *Economic Systems*, 21, 2, 1997 and "Macroeconomic Consequences of Voucher Privatisation in a Model with Incomplete Information", forthcoming, *Journal of Policy Reform*, 2000.

non-payment (arrears) is caused by structural inability to pay of a large number of firms.⁹ In the Nash equilibrium, all firms misbehave and the economy is stuck in a low equilibrium, which can become a development trap. As an important policy implication we argue that external support be directed toward institution building and enforcement of the state regulatory and judicial activities. This policy implication should be seen in the wider context of the need to work out effective public policy in transition economies as a means for fostering development (catching-up).

At variance with the previous set-up, in the second model it is assumed that the state disposes of an efficient tax collection institution, thus free rider behaviour by the firms is ruled out. From the every beginning of the reform process in Central and Eastern Europe, the international financial institutions have pushed toward drastic reduction of public deficits, as a necessary precondition for price stability and credible monetary policy. This objective was often achieved not by reduced spending but by an increased tax burden. It is shown that in the specific industrial context of transitional economies, the objective of tax revenue maximisation can conflict with the first best optimum of output maximisation – when the latter is conditioned by the need to manage (reduce) disequilibria. In other words, the pursuit of a balanced budget may come with the hidden risk of pulling out of the market too many firms, which may cause excessive disruption and destruction of human capital (and organisational capital), and cause intense hysteresis in labour markets. Of course, this is not a plea in favour of deficits, but a call for more careful assessment of policy tradeoffs and of the means for controlling the budget deficit (control of the spending), consistent with a first best taxation policy. This statement can also be interpreted as an argument in favour of a *sui generis* industrial policy, which should help restructuring of the economy as an inherently gradual process.¹⁰

Both models suggest that reform effectiveness in transitional economies may have been partially affected by perverse mechanisms stemming from the specific features of these

⁹ See Daniel Daianu, “Arrears in a Post-command Economy”, *IMF Working Paper 94/54* and ‘Structure and Strain in Explaining Inter-enterprise Arrears’, in D. Daianu, “Transformation of Economy as a Real Process”, Aldershot, Ashgate, 1998, pp. 195-222. A recent World Bank study by Brian Pinto, on arrears in Russia, corroborates this interpretation of the phenomenon (Financial Times, March, 2000)

¹⁰ An early advocate of such industrial policy was John Flemming, “Relative price shocks and unemployment: arguments for temporarily reduced payroll taxes or protection”, mimeo, EBRD, 1993. On the speed of actual transition and its policy implications, see also Philippe Aghion and Oliver Blanchard, “One the Speed of Transition in Central Europe”, *NBER Macroeconomic Annual*, 1994, pp. 283-320

economies, which sometimes may have been neglected by international advisory agencies. A careful analysis of the experience of the past ten years is thus necessary in order to improve policies and avoid further waste of resources. Simple models like those developed here may shed some light on various policy episodes.

2. FREE RIDER BEHAVIOUR AND THE COST OF A WEAK STATE

2.1. Main assumptions and optimal decision of the firm

The economy is made up of $n+1$ identical firms, producing a homogeneous output. Each firm has to pay a lump-sum tax, denoted by t . A given firm i may choose either to pay the tax or not: $t_i=(0,t)$.

The state collects the tax and uses it to produce a public service in quantity D with a linear technology. Thus, $D = \alpha + \sum_i^{n+1} t_i$, where $\alpha > 0$ is a minimum public service, which will be provided independent of the tax collection. The public service may concern the functioning of the judicial system that protects property and enforces contracts, education, public health, but also infrastructures related to different networks (telecommunication, transportation, and energy and water distribution). Institutions in charge of tax collection themselves may be seen as an element of this public service.

The firm produces the good by means of a private input, denoted by K and which will be interpreted as the mono-periodic capital. Production also increases with the public good provided by the state. In a simple framework, the production function of the firm i is multiplicative in the input:

$$F_i(K_i, D) = K_i^{0.5} D$$

In keeping with the standard neoclassical assumption, this function exhibits decreasing marginal returns with respect to capital. However, we assume constant marginal returns with respect to the public service, a reasonable assumption in the context of developing countries (in fact, given the low initial endowment, one may imagine that marginal returns to D may even be increasing).

Then, the real profit function is:

$$\pi_i = K_i^{0.5} D - RK_i - t_i \quad (1)$$

where R is the capital rental in real terms, $R=(1+r)$, r standing for the real interest rate.

Profit equation (1) can be written in the alternative form:

$$\pi_i = K_i^{0.5} (\alpha + t_i + nt_j) - RK_i - t_i, \text{ with } j=(1, \dots, i-1, i+1, \dots, n+1) \quad (2)$$

where t_j indicates the tax paid by every other firm in the economy (n firms without the firm i).

The profit maximising amount of capital can easily be inferred from first order condition $d\pi_i/dK_i=0$:

$$K_i^* = \left(\frac{\alpha + t_i + nt_j}{2R} \right)^2 \quad (3)$$

By replacing (3) into (1) we obtain the maximum profit as a function of the tax rate only:

$$\hat{\pi}_i = \frac{[\alpha + t_i + nt_j]^2}{4R} - t_i \quad (4)$$

2.2. The strategic decision of the firms

We can now analyse the strategic decision that will be carried out in a decentralised framework.

a) In the case where all firms pay the tax: $t_i = t_j = t$, and the maximal profit of the firm i is:

$$\hat{\pi}_i^{t,t} = \frac{[\alpha + (1+n)t]^2}{4R} - t \quad (4)$$

b) In the case where the firm does not pay the tax, while the other do, $t_i=0$, $t_j>0$, $j=(1, \dots, i-1, i+1, \dots, n+1)$, a firm i will have an incentive to deviate (that is not to pay its taxes) if the profit of not paying taxes, while all other firms pay them is higher than in the case when it pays taxes. The deviating firm would adjust the optimal capital and get the profit:

$$\hat{\pi}_i^{0,t} = \frac{[\alpha + nt]^2}{4R} \quad (5)$$

So, a firm would unilaterally deviate if:

$$\hat{\pi}_i^{0,t} > \hat{\pi}_i^{t,t} \quad (6)$$

that is, if:

$$\frac{[\alpha + nt]^2}{4R} > \frac{[\alpha + (1+n)t]^2}{4R} - t$$

or

$$R > 0.5\alpha + 0.25t + 0.5tn \quad (7)$$

For a predetermined tax, the condition for “deviant behaviour” is more probably to be fulfilled if:

- real interest rates are high (in this case, the left hand term in eq. (7) is relatively large), which induces firms to try to avoid paying taxes in order to have more liquidity; this reaction of firms should be judged bearing in mind their large bank debt exposure (as against reliance on capital markets), low own capital (working capital) and high risk premia (high real interest rates) on capital markets;
- the number of firms is low (in this case, the right hand term in eq. (7) is relatively small); in such a “concentrated” economy, the individual tax burden is relatively high with respect to the amount of tax revenues ($t/T = 1/n$) –particularly if the reduced competition harms efficiency and overall output¹¹ and the supply of public goods, thus the incentive to deviate is powerful.

Of course, if condition (7) is fulfilled, not only one, but all firms would deviate: $t_i = t_j = 0 \quad \forall j$. The resulting non-cooperative Nash equilibrium is clearly inefficient from a social point of view given that capital and output are lower than in the co-operative configuration.

Unfortunately, transitional economies suffer – more or less – from this kind of free-riding behaviour. At several decision levels, firms “misbehave”, given that their decision is individually rational. As it could be observed, the social outcome is disastrous (low activity, low investment and profits) and the economy can easily get into a development trap.

3. A CASE OF WELL-INTENDED EXCESSIVE TAX BURDEN

3.1. A rather general formulation

At variance with the previous section, in the following we assume that the government has set up an efficient tax collection institution. In this case, firms cannot follow free rider strategies and refuse to pay the tax. In this context, there is a risk that the government will

¹¹ More competition would presumably increase efficiency and thus profits: higher profits would allow less tax rates for a certain amount of tax revenues.

pursue a “second best” policy of tax revenue maximisation, which – via massive exits – can lead to a too low number of firms in the economy and too low an output level.¹²

In a formal way, let us denote by n the number of firms in the economy. In a first step, each firm has made an optimal microeconomic choice, that is, has fixed all variables under its control in such a way as to maximise the profit flow. In this case, the production function will represent output as depending only on those variables that are beyond the firms’ control.

Production in one firm depends on the relationships with firms that provide it with various inputs. In a developed economy, these inputs are traded, largely, in the global market given low transaction costs. In transitional economies, markets are less developed and segmented, and production in one firm depends to a large extent on the survival of its traditional suppliers.¹³ To bring in the picture this feature in a simple way, we assume that the production of one firm will depend on the total number of firms in the economy. Like in the former model, the state delivers a public good, proportional to the total amount of taxes collected, which also have a favourable impact on output (this public services may be interpreted as roads, communication, education, etc). Therefore, the production function of the representative firm may be written as:

$$y = f(n, T), \quad \text{with } f_1 > 0, f_2 > 0$$

where y stands for output, n for the total number of firms and T for total tax revenues collected by the state. The form of $f(,)$ encompasses the optimal choice of other inputs by the firm.

¹² Such an outcome implies a limited rationality of the government, which is not aware of the true structure of the economy, and proceeds by try and error to successive tax raises until the maximal total tax revenue is achieved.

¹³ Olivier Blanchard elaborates on this in his “The Economics of Transition”, Oxford, Clarendon Press, 1997. See also O. Blanchard and M. Kremer, “Disorganisation”, *Quarterly Journal of Economics*, 1997, 112, pp, 109-126. For an earlier study see Guillermo Calvo and Fabrizio Coricelli, “Stagflationary Effects of Stabilisation Programs in Reforming Socialist Countries: Enterprise-Side and Household-Side Factors”, *World Bank Review*, 6, 1, pp. 71-90, 1992

By assumption, each firm which is making positive profits has to pay a lump-sum tax t . While all firms produce the same amount of output, they are not all equally solvent.¹⁴ The number of surviving firms is therefore a decreasing function of the tax: for a low tax, more firms stay in the market, for a high tax only a few firms are enough profitable to survive. We can write this assumption as: $n=n(t)$, with $dn/dt < 0$. Finally, the total tax revenue is $T=tn$, the product of the tax and the number of surviving (efficient) firms.¹⁵

Under these assumptions, it can be shown that the tax that maximises total tax receipts is “too high”.

The proof goes as follow. Let us write total output as a function of the tax:

$$Y=nf(n, T) = n(t)f[n(t), tn(t)]$$

If one wishes to plot this function, the study of the first derivative is useful:

$$dY/dt = n'f + nn'f_1 + nf_2(dT/dt) \quad (8)$$

At a point t^* where the output is maximal, we also have $dY/dt=0$, therefore

$$\left(\frac{dT}{dt} \right)_{t=t^*} = - \frac{n'(f + nf_1)}{nf_2} > 0,$$

that is increasing t above t^* would increase the total tax revenue.

Conversely, the tax (tax rate) which maximises total tax revenue should verify $dT/dt=0$. Let us denote the solution of this condition by \hat{t} . If one turns back to condition (8), it may remark that:

$$\left(\frac{dY}{dt} \right)_{t=\hat{t}} = n'(f + nf_1) < 0,$$

¹⁴ This could be modelled explicitly by introducing a specific cost c per firm and a statistical distribution on c across firms.

¹⁵ For simplification we consider tax burdens to be equal, although this does not match real life where companies show different profits.

that is reducing the tax rate below \hat{t} contributes to increase overall output by allowing more firms to operate; over time this may, eventually, even raise the total tax revenue by expanding the tax base.¹⁶

3.2. A numerical example

To get some more intuition, let us introduce the simple linear functions: $n(t) = a - bt$ and $f(n, T) = \lambda[(a - bt) + t(a - bt)]$, where a , b and λ are positive parameters. Of course, $0 < t < a/b$, or else no firm would survive.

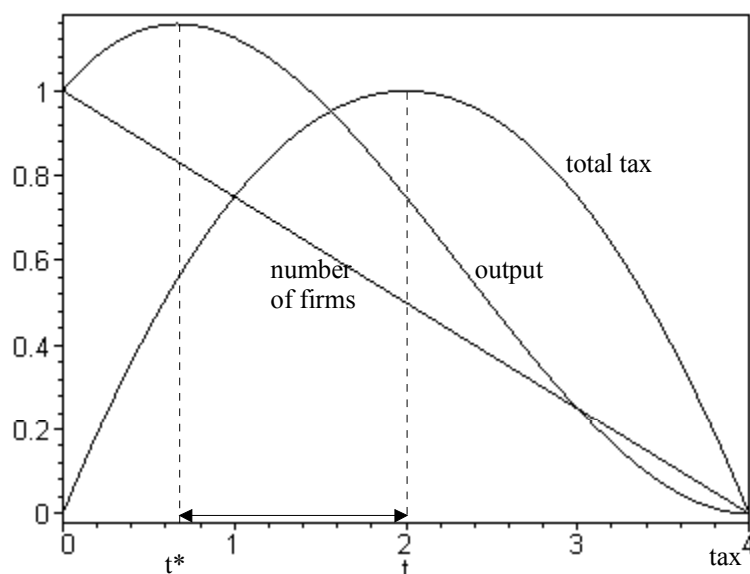
From the first order condition, the output maximising tax is $t^* = \frac{1}{3} \frac{a - 2b}{b}$ (one can check that the second derivative is $-2b\lambda(a+b) < 0$). (In the following we assume that $b < 0.5a$, such that an internal solution exists.)

The output maximising tax is not maximising total tax revenue. This can be demonstrated by evaluating the derivative dT/dt for this value: $\left(\frac{dT}{dt}\right)_{t=t^*} = \frac{a + 4b}{3} > 0$.

The figure below represents the number of firms, total tax revenue and total output as a function of the tax, for $a=1$, $b=0.2$ and $\lambda=1$.

The conflict of objectives is self-evident: $t^* < \hat{t}$.

¹⁶ This effect should be distinguished from the supply-side logic, which says that lower tax rates enhance the propensity of firms to pay taxes. In our case, behaviour is taken as constant. Certainly, one can combine the two effects.



As an upshot, it is shown that in this theoretical context, a government that pursues an immediate objective of maximum tax revenues (very likely related to the more general goal of balanced budget) might pull out of the market a too large number of firms and, thereby, harm future growth.

4. CONCLUSION

In transitional economies, reform policy faces the challenge of very distorted economic relationships and particular constraints. Against the background of intense strain¹⁷ and disorganisation¹⁸, the text at hand proposes two highly stylised models that emphasise unconventional responses of the economic system to orthodox reform programmes, focusing on tax related issues.

In the first part, we argue that the main challenge for the government is to find appropriate ways to enforce the co-operative equilibrium. Clearly, the setting up of institutions necessary to enforce the law (for example to collect taxes) is costly. But there is a

¹⁷ For a definition of *strain* in the transition context, see Daniel Daianu, "Resource Misallocation and Strain" (1998), pp. 173-195.

¹⁸ According to Oliver Blanchard "The evidence from those Central European countries which are doing less well suggests a larger role for *disorganisation*. In Bulgaria and Romania, two of the countries with the largest drop in output, supply shortages still played an important role more than two years after the beginning of transition" (1997, pp. 45) By implications, the history of partial reforms and the institutional ingredients of a market economy lie behind the amount of *disorganisation*.

vicious circle at play. If, non-cooperation leads to the bad equilibrium in a first step, no taxes are paid and the state has no resources to build the needed institutions and enforce rules and regulations. In this case, taxes will not be levied (or will not be exacted) in the future. This self-sustained bad equilibrium may not be broken without external support. Our simple model puts forward why an important fraction of the external support should be directed toward institution building.

In the second part of the text, we show that the goal of balanced public budgets may come with the risks of excessive taxation, where the revenue maximising tax implies a too low number of firms and reduced output. In this context, the tax systems should take into account the firm's financial viability, given that the existence of sound firms may be endangered if financially weak firms are pulled out of the market at once.¹⁹ This should not be necessarily interpreted as an argument in favour of state support to weaker companies (although a clever industrial policy can be effective), but as a suggestion to focus on the spending side of the budget when imbalances become unsustainable.

The two models complement each other by stressing the complex notion of optimal taxation in a transitional economy, which should reconcile the need for public goods and services, with that of not burdening firms with excessive levies when there is a scarcity of suppliers in the production chain.

The analysis sheds its own light on the Russian 1995-mid 1998 special situation, where firms delayed their payments to state-owned energy suppliers, which, in turn, were not forced to pay their taxes. This is clearly an indirect and bizarre way of condoning tax exemptions to firms. According to the mentioned report of the World Bank this lax stance on public finances has led to the 1998 crisis. Our analysis would suggest a more reserved position. True, in keeping with the first model, a generalised failure to collect taxes would provoke a general breakdown of economic activity, as all firms would engage in free-riding tax avoidance. But granting tax exemptions to some firms might have been a way to acknowledge that in the absence of well-developed markets (and the operation of overwhelming switching costs), pulling out of the market some firms in financial troubles may cause significant damage to those which, placed in a different market context, would perform quite well.

¹⁹ Too high taxes are analogous to too high real interest rates, when the latter damage good companies that are burdened by large bank debts.

Whether Central and Eastern countries will manage to fill the institutional hiatus in a short period of time remains to be seen. Their decision to join the European Union started a process of quick replication of the European regulations and laws summarised by the 80000 pages of the “Acquis Communautaire”. Although this should set up the basis for modern institutions, their efficient functioning is not automatic. Many years may go before Western institutions get integrated into the civil society of these countries. Meantime, efficient economic policy reform should take into account the institutional shortage.