PITFALLS OF TAXATION POLICY
IN TRANSITION ECONOMIES

D. DAIANU and R. P. VRANCEANU

This paper develops two stylised models of the transition economy that challenge, to some extent, the 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 economy. In the second model, a benevolent government will choose a taxation level that pushes too many firms out of the market; hence global supply falls below its optimal level. In both models, disruptions specific to transitional systems lead to abnormal responses to standard fiscal policy.

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] Arrow (1971) 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. In his influential writings, Olson (1996, 2000) also put forward the positive role of state institutions in protecting individuals entering the voluntary exchange against abuses and fraud on growth and prosperity.[2] On empirical grounds, several studies, such as surveyed by Aron

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[1]   The major contribution of North (1981) should be acknowledged here.
[2]   This line of reasoning was buttressed by social writers such as Putnam (1993) and Fukuyama (1995) in recent years.

Corresponding author: R. P. Vranceanu, ESSEC, Department of Economics, BP 105, 95021 Cergy-Paris, France. E-mail: radu@essec.fr

(2000), tend to indicate a positive correlation between the quality of public and private economic institutions and growth.

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 in the economics of transition which did not underline the key role of institutions in determining economic performance. Kozul-Wright and Rayment (1997) have stressed the impossibility of conducting successful "orthodox" reforms in economies lacking basic institutions, which, in Western Europe, are the outcome of a long-term social evolution. In a very influential speech, Stiglitz (1999) criticised what he perceived as an overdue emphasis set on macroeconomic stabilisation in transitional economies and called attention to the need to build solid market institutions as a precondition to successful economic reforms. Rodrik (1999) also emphasised that, although relative prices matter a lot for development policy, the shortcomings of the focus on price reform during the 1990s were increasingly evident. He put forward the argument 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 conflicts. Unfortunately, these are in general absent in poor countries, and this major drawback seems to explain the failure of many stabilisation policies. Finally, Arrow (2000) points out that abrupt deregulation of the planned economy may be counter-productive in a world where the intermediate institutions and instruments, which allow individuals to exchange among themselves, are absent.

The role of the state in the context of transition to a market economy is obvious: to enforce contracts, guarantee property rights, provide public services like education and health systems, social security and basic infrastructure (telecommunication, transportation, etc.) and, last but not least, to set up an effective juridical and regulatory framework. In the absence of such institutions, external financial aid is in danger of being diverted towards rent-seeking activities and its impact on economic development would thereby be limited.[3] Moreover, much-needed structural reforms would be considerably slowed down, or could not be implemented, as unregulated economic agents would find ways to avoid the constraints intended to make their activity compatible with the public interest. Of course, the actions of the state institutions must be predictable, transparent, and accountable. In the presence of incomplete information on the nature of policymakers, structural poli-

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[3] In the last years, an impressive number of papers analysed the impact of state official corruption on economic performance. See the survey by Bardhan (1997).

cies may be time-inconsistent, and private agents may suffer utility losses from unfulfilled expectations of reforms.[4]

  This article builds on two simple models inspired by the economic context of (the less advanced) transition economies which challenge, to some extent, the standard approach to policy reform in these countries. It emphasises the lack of well-functioning institutions as a source of major economic disruption and failure of conventional fiscal policy. The first model develops a simple analysis of firm-strategic behaviour in a transition economy, where the state is able to provide a public service enhancing the 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). Decisions of rational individual firms are non-coordinated. In the Nash equilibrium, all firms misbehave and the global output collapses; in the end, this may become a development trap.[5] As an important policy implication, external support should be directed toward institution-building and enforcement of the state regulatory and juridical activities. This recommendation 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 firms is ruled out. From the very beginning of the reform process in Central and Eastern Europe, the international financial institutions have pushed for a drastic reduction of public deficits, as a prerequisite 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 transition economies, the objective of increasing tax incomes may conflict with the first-best optimum of output maximisation. The quest for large tax receipts comes with the hidden risk of pulling too many firms out of the market, which may cause excessive unemployment and would harm human and organisational capital. Of course, this is not a plea in favour of deficits, but a call for a more careful assessment of

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[4] The scope for policy reversal under incomplete information of private agents on the priorities of the government was analysed in a game theoretical framework by Besancenot and Vranceanu (2000).

[5] An alternative explanation builds on the structural inability to pay of a large number of firms (Daianu, 1994, 1998).

policy tradeoffs and of the means for controlling the budget deficit (control of 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 would help the restructuring of potentially viable companies as an inherently gradual process (Flemming, 1993).

Both models suggest that reform effectiveness in transition economies may have been partially affected by perverse mechanisms stemming from the characteristic features of these 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 wasting 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, all 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/good in quantity D with a linear technology. Public service refers to the functioning of the juridical system that protects property and enforces contracts, education, public health, but also infrastructure related to different networks (telecommunications, transportation, energy and water distribution). Institutions in charge of tax collection themselves may be seen as an element of this public service. Formally, we write $D = \delta + \sum_{i}^{n+1} t_i$, where $\delta \geq 0$ is a minimum level of the public service, which will be provided independent of the tax collection and μ is a positive parameter related to the technology of producing the public service and the relative price of the input utilised for this production. As the main conclusions do not depend on this parameter, we set $\mu = 1$.

The representative firm produces the final goods by means of a "private input" (like capital assets) which is bought by the firm in the marketplace at a predetermined price. The quantity of private input utilised by the firm i is denoted by x_i. Production also increases with the public good provided by the state. In a simple framework, the production function is multiplicative in the two factors:

$$f(x_i, D) \quad x_i^{0.5} D.$$

In keeping with the standard neoclassical assumption, this function exhibits decreasing marginal returns with respect to the private input. 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). We also have $f_{xD} > 0$, that is, increases in the available quantity of one factor increase the marginal productivity of the other factor.

To simplify, we assume that the price of the final good is normalised to one. Then, the (real) profit function is:

$$_i \quad f(x_i, D) \quad px_i \quad t_i \tag{1}$$

where p is the price of the private input.

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

$$_i = x_i^{0.5}(\quad + t_i + nt_j) - px_i - t_i, \quad \text{with} \quad j = (1, \ldots, i-1, I+1, \ldots, n+1) \tag{2}$$

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

The profit maximising amount of private factor can easily be inferred from first order condition $d_i/dx_i = 0$:

$$x_i \quad \frac{t_i \quad nt_j}{2p}^2. \tag{3}$$

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

$$\hat{\pi}_i \quad \frac{[\quad t_i \quad nt_j]^2}{4p} \quad t_i. \tag{4}$$

2.2. The strategic decision of the firms

We can now analyse the strategic decision that will be carried out in a decentralised framework. Two cases should be considered:

a) When all firms pay the tax: $t_i = t_j = t$, then the maximal profit of the firm i is:

$$\hat{\pi}_i^{t,t} \quad \frac{[\quad (1 \quad n)t]^2}{4p} \quad t. \tag{5}$$

b) In the case where the firm does not pay the tax, while the other do, $t_i = 0$, $t_j > 0$, $j = (1,\ldots,i-1, I+1,\ldots,n+1)$, the "deviating" firm would obtain the profit:

$$\hat{\pi}_i^{0,t} \quad \frac{[\quad nt]^2}{4p}. \tag{6}$$

A firm i will have an incentive to deviate (that is not to pay its taxes) if the profit for the individual firm of not paying taxes – while all other firms pay them – is higher than in the case when it pays taxes. So, a firm would unilaterally deviate if:

$$\hat{\pi}_i^{0,t} \quad \hat{\pi}_i^{t,t} \tag{7}$$

that is, if:

$$\frac{[\quad nt]^2}{4p} \quad \frac{[\quad (1 \quad n)t]^2}{4p} \quad t$$

or:

$$p > 0.5 \quad + 0.25t + 0.5tn. \tag{8}$$

For a predetermined tax, the condition for "deviant behaviour" is more likely to be fulfilled if the price of the private input is high (in this case, the left hand term in eq. (8) is relatively large) or the number of firms is low (in this case, the right hand term in eq. (8) is relatively small).

To interpret this condition, it should be noted that the marginal productivity of each factor is increasing in the available quantity of the other factor. Thus, a reduction in the amount of private input x would decrease the marginal productivity of the public good and this, in turn, would reduce the marginal productivity of the private input. Ceteris paribus, a high p induces the firm to use less x. In turn, this reduces the contribution of D to output, which gives less incentive to the firm to pay the tax so as to increase D.

In order to bring more intuition to the theoretical construct, let us take D as a project to build a public highway and x as the capital assets of transportation firms, i.e. trucks.[6] Basically, the cost of operating one truck depends on the price of trucks and the interest rates or, if the firm does not own the trucks, on the rental cost of one truck. A high rental cost would make it too costly for firms to run large numbers of trucks, thereby diminishing their use of the highway. This would make firms less eager to pay the tax for building the highway. Similar reasoning applies to a low number of firms. The smaller is this number, the less is the total tax in-

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[6]   We thank our referee for providing us with this nice illustration.

come. That prevents the proper level of D from being provided. This reduces the productivity of capital and results in a lower than optimal level of x than would otherwise be the case, again reducing the marginal productivity of the public good.

Of course, if condition (8) is fulfilled, not only one, but all firms would deviate: $t_i = t_j = 0$ j. The resulting non-cooperative Nash equilibrium is clearly inefficient from a social point of view given that the global output will be lower than in the cooperative configuration. Unfortunately, transition economies suffer – to a greater or lesser extent – from this kind of free-riding behaviour. At several decision levels, firms "misbehave", given that such a decision is individually rational.

An extension of the model would analyse the case of free entry of firms into the market. To deal with this complication, the profit function would need to be slightly modified. For instance, let us assume that in addition to taxes and capital costs, each firm bears a cost $c(n)$, increasing in the number of firms in the market. Such a form may be justified by the congestion effect. Under plausible assumptions, profits of the representative firm could be expected to be higher in the cooperative equilibrium than in the non-cooperative one.[7] Given that free entry implies zero profits in the long run, a larger number of firms (each producing more) will be present in the cooperative than in the non-cooperative equilibrium.

3. A CASE OF A WELL-INTENDED EXCESSIVE TAX BURDEN

3.1. A rather general formulation

At variance with the previous section, we now assume that the government has set up an efficient tax collection institution and uses the full tax income to provide a public commodity or service. Firms cannot follow free-rider strategies by refusing to pay the tax. In this context, there is a risk that the government will pursue a "second best" policy of tax revenue maximisation, so as to deliver the largest amount of public service. It will be shown that this policy may lead to a lower than optimal number of firms in the economy.[8]

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[7] This would occur for not a too high price of the private input. ^{t,t} ^{0,0} p 0.25[(1 n)(2 (1 n)t)]. It should be remarked that this condition is consistent with condition 8, i.e. there is a range in which p satisfies both inequalities.

[8] Such an outcome implies limited rationality of the government, which is not aware of the true structure of the economy, and proceeds by trial and error through successive tax increases until the maximal total tax revenue is achieved.

Formally 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 choice 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, e.g. taxes and the number of firms.

Production in a firm depends on the relationships with vertically-upstream firms that provide it with various inputs. In a developed economy, these inputs are traded, largely, in the global marketplace given low transaction costs. In transition economies, markets are segmented and less developed, and so production in one firm depends largely on the survival of its traditional suppliers (Guillermo and Coricelli, 1992; Blanchard, 1997; Blanchard and Kremer, 1997). To bring this feature into the picture in a simple way, we assume that the production of one firm will depend on the total number of firms in the economy. As in the former model, the state delivers a public good/service proportional to the total amount of taxes collected, which also has a favourable impact on output (this public service may be interpreted as in the former model). 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.

By assumption, each firm which is making positive profits has to pay a lump-sum tax *t*. At variance with the previous model, firms are not strictly identical. While all firms produce the same amount of output, they are not all equally solvent. The number of surviving firms is 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 profitable enough to survive. We can write this assumption as: $n = n(t)$, with $dn/dt < 0$.[9] Finally, the total tax revenue is $T = tn$, the product of the tax and the number of surviving (efficient) firms.

Under these assumptions, it can be shown that the tax that maximises total tax receipts is "too high". The proof goes as follows. Let us write total output *Y* as a function of the tax:

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[9] With a lump-sum tax, firm heterogeneity could be modelled explicitly by introducing a fixed cost *c* per firm and a statistical distribution of *c* across firms. A more realistic assumption would consider that corporate taxes are proportional to company profits. However, the model would not change much if we assume that those firms that systematically make zero profits get out of the market.

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

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

$$dY/dt = n'f + nn'f_1 + nf_2(dT/dt). \tag{9}$$

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

$$\frac{dT}{dt}\Big|_{t^*} \quad \frac{n(f \quad nf_1)}{nf_2} \quad 0,$$

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

Conversely, the tax which maximises total tax revenue should fulfil $dT/dt = 0$. Let us denote the solution of this condition by $\hat{t}$. Turning back to condition (9), it is also clear that:

$$\frac{dY}{dt}\Big|_{t = \hat{t}} \quad n(f \quad nf_1) \quad 0,$$

that is, reducing the tax rate below $\hat{t}$ contributes to increasing overall output by allowing more firms to operate; over time this may, eventually, even raise total tax revenue by expanding the tax base.[10]

3.2. A numerical example

To obtain some more intuition, let us introduce the simple linear functions: $n(t) = a - bt$ and $f(n,T) = [(a - bt) + t(a - bt)]$, where a, b and 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 $t^* = \frac{1}{3}\frac{a \quad 2b}{b}$ (it can be checked that for this value the second derivative is $-2b\ (a + b) < 0$). (In the following we assume that $b < 0.5a$, such that an internal solution exists.)

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[10] This effect should be distinguished from the supply-side school argument according to which a lower tax rate enhances the propensity of firms to pay taxes. A more powerful model would combine the two effects.

The output-maximising tax does not maximise total tax revenue. This can be verified by evaluating the derivative dT/dt for this value: $\left.\dfrac{dT}{dt}\right|_{t \, \hat{t}} \quad \dfrac{a \quad 4b}{3} \quad 0.$

The maximum tax income is obtained at $\hat{t} = \dfrac{a}{2b} \quad t$.

The conflict of objectives is self-evident in *Figure 1* which represents the number of firms, total tax revenue and total output as a function of the tax, for $a = 1$, $b = 0.25$ and $= 1$.
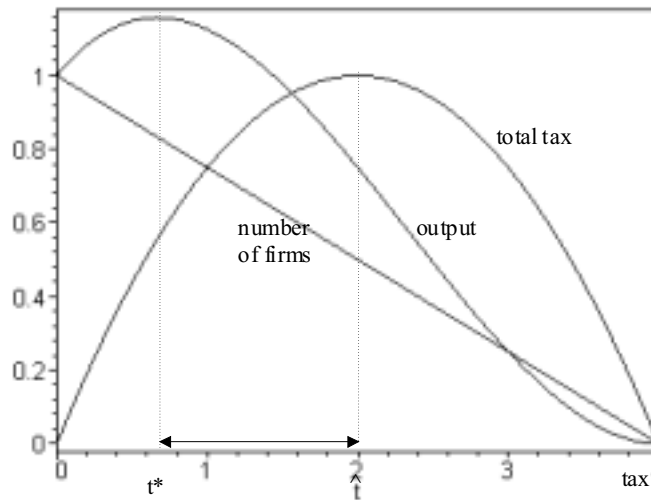

Figure 1. A fiscal policy dilemma

In this theoretical context, a government that pursues the immediate objective of maximising tax revenues – very likely to be related to the more general aim of providing the largest supply of public goods – might pull an overly large number of firms out of the market, thereby harming welfare and future growth.

4. CONCLUSION

In transition economies, reform policy faces the challenge of very distorted economic relationships and particular constraints. Against the background of intense strain and disorganisation (Blanchard, 1997; Daianu, 1998), 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 cooperative equilibrium. Clearly, the setting up of institutions necessary to enforce the law (for example to collect taxes) is costly. But there is a 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 required 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 a justification for directing an important fraction of the international aid 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 lower than optimal 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.[11] This should not be necessarily interpreted as an argument in favour of uniform state support to weaker companies (although a case-by-case approach should not be precluded), 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 transition 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 also sheds light on the situation faced by Russian companies in the period from 1995 to mid 1998, when these massively 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 an analysis by Pinto et al. (2000), this lax stance on public finances has contributed, to a large extent, to the 1998 financial 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 firms in financial trouble may cause significant damage to those which, placed in a different market context, would perform quite well.

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[11] The impact of excessive taxation is analogous to that of high real interest rates, when the increases in the latter strain balance sheets of indebted companies.

Whether Central and Eastern countries will manage to fill the institutional gap 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 80,000 pages of the "Acquis Communautaire". Although this should set up the basis for modern institutions, their efficient functioning is not automatic. Many years may elapse before Western institutions become integrated into the civil society of these countries. In the meantime, efficient economic policy reform should take into account institutional shortages.

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