Taxability and Low-Productivity Traps

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March 5, 2003

Abstract

When governments care about tax revenues, the taxability of different forms of economic activity will influence the decisions of governments about what activity to support. If factors of production are mobile across sectors which differ in their taxability, political economies will organize themselves into equilibria where governments support activity because resources are allocated to it, which in turn encourages that resource allocation.

When resources and government support are organized in support of an "old" equilibrium, and the possibility of a "new," possibly more efficient equilibrium beckons, the relative taxability of the old and new sectors will determine the likelihood of such a shift. In postcommunist Europe, such factors were influential in the creation of two general political-economic configurations: one where new economic activity is supported by the government and is common, and one where such support is lacking and new businesses are rare. Differences in relative taxability of new and old economic activity contribute to the prevalence of the first configuration in Eastern Europe, and the second in the former Soviet Union.

1. Introduction

An enduring puzzle of political economy is why economies persist in inefficient form when the possibility of evolution exists. Examples abound: Ten years into the postcommunist transition, most individuals in the former Soviet Union remain employed by minimally profitable former state enterprises, while corruption and overregulation prevent new firms from taking root. Workers and politicians maintain their support for aging factories in monoindustrial towns, despite more profitable opportunities that only need a helping hand from the government to get off the ground. Governments in countries rich in natural resources preserve their symbiotic relationships with large extraction industries, despite clear evidence of the benefits of economic diversification.

As these examples suggest, what often needs explaining is the failure of the government to provide the necessary support for new economic activity, rather than the failure of the economy to provide the necessary preconditions. Of course, what constitutes "support" will vary according to the political-economic context. In some cases, explicit state intervention may be necessary to break out of a low-productivity trap, perhaps by providing public goods necessary for economic development (including the necessary regulatory infrastructure, as stressed by Vogel 1996) or by solving the coordination problems of individual economic actors (as in the "big push" literature in development economics – see Rosenstein-Rodan 1943 and Murphy *et al* 1989). In others, what is needed is less of traditional state behavior: less corruption, less overregulation, etc. Paradoxically, this hands-off approach may require the

active (and costly) involvement of senior government officials if it is subordinate parts of the state that are doing the rent seeking. Alternatively, "support" may merely be restraint on the part of senior politicians, where the costliness of that support is the opportunity cost of rents foregone.

Whatever the nature of support, it is often underprovided by governments, meaning that governments do not equate the marginal social benefit of support with the marginal cost of providing it. Why that should be the case is the partial focus of a vast literature in political science and economics on ("bad") policy choice. Robinson (1998) surveys this literature, distinguishing between theories in which governments are interested in maximizing social welfare but have incorrect beliefs about how to do so, and theories in which political actors choose inefficient policies because they have interests other than welfare maximization in mind (see also Acemoglu 2002).

This paper falls into the latter category, assuming as in much of the political-economy literature that the state is interested in tax revenues rather than social welfare (e.g., North 1981, Levi 1988, Brennan and Buchanan 1980), and that it thus allocates support across sectors based on the exogenous *taxability* of economic activity, i.e. the ease with which the state can extract revenues from economic actors.[1] Building upon this basic argument – for which Gehlbach (2003a) provides empirical support from a survey of firms in 23 postcommunist

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[1]Gehlbach (2003b) relaxes the crude assumption of revenue maximization by considering the allocation of government support across sectors when elected politicians value tax revenues not for their own sake, but as a means of providing goods desired by voters.

countries – the simple model presented in Section 2 below shows that factor mobility can exaggerate the impact of differences in taxability across sectors, so that even small differences in relative taxability can translate into large differences in support. States, interested in tax revenues, choose whether or not to support an economic sector based on its revenue potential, which is determined both by the size of sector and its taxability. But factors of production, if mobile, in turn choose whether or not to locate in a sector based in part on the degree of government support provided. Thus, the model suggests that government support and factors of production will pool together in one sector or the other, but not both simultaneously.

Two empirical predictions follow: First, one should see countries sorting themselves into two groups: one where government support and factors of production are concentrated in old, less productive economic activity, and one where they are concentrated in new, more productive economic activity. Second, movement from the "old equilibrium" to the "new equilibrium" – perhaps in response to an exogenous shock to resource allocation – will be less likely if the old sector is relatively more taxable and if government support (however defined) is essential for economic output. Thus, countries can become stuck in low-productivity traps due to the relatively low taxability of alternative economic activity.

Section 3 uses the model to explain the "great divide" in postcommunist countries, where government support and resource allocation are concentrated in new businesses in Eastern Europe, but in the old (formerly or still) state-owned sector in the former Soviet Union.

Consistent with the argument in this paper, it is indeed the case that there are small differences in taxability across firm types in Eastern Europe, but large differences in the former Soviet Union.

In exploring the impact of taxability of economic activity on government support for business, this paper touches on many of the themes of the literature on fiscal incentives of politicians (see, e.g., Gordon and Li 1997), including work emphasizing the influence of fiscal federalist systems in creating positive (as in China) or negative (as in Russia) incentives for local politicians to support growth, as well as that relating differences in taxability across sectors and countries to empirical variation in government support of business activity.[2] However, most of this literature only considers the impact of government behavior on economic performance, and not the feedback from the latter to the former; as such, it does not explain the multiple equilibria predicted by this model and observed in reality. One exception is Berkowitz and Li (2000), but in their model the sector that is harder to tax (the unofficial sector) is less productive than the sector easier to tax. As will be argued below, quite often the opposite is true.

Models in which resource allocation to a particular sector in turn encourages more allocation to that sector include the formalization of the "big push" argument cited above, as well as models of the unofficial economy in transition countries (Johnson *et al* 1997, Roland

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[2] On fiscal federalism, see, e.g., Oi (1992) and Qian and Weingast (1996) on China, and Zhuravskaya (2000) on Russia. Gehlbach surveys the literature on taxability and government support of business activity and provides an organizing theoretical framework.

and Verdier 1999). As in the unofficial-economy models, government support in the model in this paper flows into a particular sector only if resources are concentrated in that sector, where resource concentration is in turn determined by government support. Unlike in the unofficial-economy models, the state is a monopoly provider of public goods (support) in this paper, and the government is a strategic actor. The distinctions are important: when the state has a monopoly over public goods provision, higher taxability unambiguously discourages resource allocation to a sector unless politicians are strategically motivated to provide support in part based on a sector's size. When they are so motivated, the additional support engendered by higher taxability can encourage factors to locate in a sector, perhaps in disproportionate measure to differences in taxability across sectors.

While useful, the simple model presented in Section 2 abstracts from reality in various ways. Through a series of extensions to the basic model, Section 4 examines the robustness of the argument, considering the provision of public goods financed by tax revenues, the necessity of government support for economic activity, and economies of scale in the provision of that support. Discussion of welfare considerations concludes this section and the paper.

2. A Simple Model

Consider an economy in which there are two economic sectors, indexed by $S \in \{O, N\}$, where O represents an old sector and N a new sector. For simplicity, assume labor to be the sole input into production, with total labor supply inelastic and normalized to one,

and the proportion of labor in sector i equal to L_i.[3]   (In what follows, we will often refer to "resources" rather than labor.) Labor is homogenous, and production from labor is augmented by a sector-specific productivity parameter α_S and sector-specific government support e_S, so that total output in sector S is $Y_S = \alpha_S L_S e_S$. For a given level of government support, productivity in the new sector will typically be higher, so that $\alpha_N > \alpha_O$. Thus, in contrast to the old sector, the new sector might be unburdened by an obsolete capital stock or a difficult-to-replace workforce, or might benefit from a different ownership form. Nonetheless, overall productivity might be lower in the new sector if government support is insufficient.

In this section we assume that government support is necessary for production to take place, and that this support is sector-specific.   We relax the assumption of necessity in Section 4.2. Let e_N and e_O be the level of support of the new and old sector, respectively. This assistance might take two forms. First, the government may have a role to play in facilitating economic activity by providing the necessary legal framework for markets to exist and by solving certain coordination problems. In the U.S., for example, internet commerce has been encouraged by legislation recognizing electronic signatures as legally binding, while in postcommunist Europe legislation and decrees legalizing markets were necessary before

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[3]Elasticity of total labor supply can be easily incorporated into the model by assuming that there is an alternative sector R which is nonproductive (or at least nontaxable) and which provides utility to labor of $u(L_R)$, with u concave and certain limit conditions assumed. Of the major results in this section, multiple equilibria will hold (with the same indifference conditions defining the intermediate equilibrium) regardless of the elasticity of total labor supply, while Corollary 1 will hold if total labor supply is not too elastic, i.e. if marginal returns to labor in sector R diminish quickly enough.

private economic activity could operate on any substantial scale. Second, in many political-economic environments, corruption, overregulation, and other "government failures" are the norm, with relief possible only through the active intervention of senior government officials.

Regardless of whether the state offers a "helping hand" or restrains its "grabbing hand" (Shleifer and Vishny (1998)), providing support is costly: promoting one package of laws means that other bills are pushed off the legislative calendar or political capital is expended, giving up a share of bribes collected by lower-level bureaucrats implies an opportunity cost, preventing maladministration by lower-level government employees requires time and energy, etc. For simplicity, in this section we assume that this cost is not borne by the treasury, but rather is a personal cost $c(e_O + e_N)$ of the senior government officials which make up the state, with $c(.)$ strictly increasing and convex, $c(0) = 0$, and $\lim_{x \to 0} c'(x) = 0$.[4] In Section 4.1 we show that qualitatively similar results obtain if we instead assume that public goods are financed out of tax revenues.

Since supporting economic activity is costly, the government will weigh the cost of support against the benefits. In this model, we assume that the benefits come in the form of increased tax revenues. That governments are interested in at least some tax revenue should be uncontroversial: even proponents of the most limited state need tax revenues to pay the night watchman. Nonetheless, this assumption may be less reflective of reality the better are states at collecting taxes. Thus, this is a model of a political economy in which tax revenue

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[4]This functional form is chosen for simplicity. We could instead assume cost $c(e_O, e_N)$, with $c_S, c_{SS} > 0$, $c_{OO}c_{NN} > (c_O c_N)^2$, $c(0,0) = 0$, and $\lim_{e_S \to 0} c_S(e_O, e_N) = 0$, with analogous results.

is relatively scarce, where the desire for tax revenue dominates considerations other than the cost of supporting economic activity. In Section 3, we use the model to interpret the experience of postcommunist countries, many of which have faced particularly acute fiscal crises following the collapse of communism.

We assume that the proportion of revenues that can be extracted from a particular sector is exogenous, with T_S being the level of taxability of sector S. There are two possible interpretations of this assumption. First, the government can be viewed as setting tax rates optimally, given the opportunities for tax evasion in a particular sector. Thus, the level of taxability of a given sector represents the tax rate associated with the peak of the Laffer curve for that sector.[5] Second, the state in this model can be viewed as a lower-level (regional, local) authority whose taxing power is set by a higher-level government, as in a fiscal federalist arrangement. Of course, the central government may also take the relative taxability of different sectors into account when setting tax rates. In either case, T_N will often be less than T_O. For example, as will be discussed in Section 3 below, governments in the former Soviet Union have found it especially difficult to extract tax revenues from new, small firms relative to old, large enterprises. Similarly, governments in resource-rich countries often find it substantially easier to tax the resource-extraction sector than manufacturing or service activity.

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[5]Crudely, consider a generalized version of this model in which the state sets tax rates t_O and t_N, with the cost of collecting taxes from a sector equal to zero for $t_s \leq T_s$, and infinitely (or sufficiently) high for $t_s > T_s$. Taking labor allocation as given, the politician will then set tax rates equal to T_O and T_N.

Thus, the government solves the following problem:

$$\max_{e_O, e_N} T_O \alpha_O L_O e_O + T_N \alpha_N L_N e_N - c(e_O + e_N) \qquad (2.1)$$

As marginal returns to government effort are constant in each sector, the government will allocate all of its effort to the sector offering the highest return, so that:

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\begin{aligned}
q_O &= f(T_O \alpha_O L_O), \, q_N = 0 \text{ if } T_O \alpha_O L_O > T_N \alpha_N L_N \qquad (2.2)\\
q_O &= 0, \, q_N = f(T_N \alpha_N L_N) \text{ if } T_O \alpha_O L_O < T_N \alpha_N L_N \\
q_O + q_N &= f(T_O \alpha_O L_O) = f(T_N \alpha_N L_N) \text{ if } T_O \alpha_O L_O = T_N \alpha_N L_N
\end{aligned}
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where we define $f(x)$ such that if $c'(y) = x$, $y = f(x)$. Obviously, given that $c(.)$ is a convex function, $f'(.) > 0$, while $f(0) = 0$ follows from the limit condition on $c'(.)$. Critically for the discussion that follows in Section 3, note that if T_N/T_O is low enough, the government will not support the new sector unless the bulk of labor is in that sector or the inherent productivity advantage of the new sector is overwhelming.

Simultaneously with the government decision, individuals decide how to allocate their labor between the new and old sector. Since labor is the only input into production, all post-tax profits accrue to the workers in that sector. Since agents are homogeneous, labor

flows entirely to the sector offering the highest post-tax return. Thus,

$$L_O = 1 \ (L_N = 0) \text{ if } (1 - T_O)\alpha_O e_O > (1 - T_N)\alpha_N e_N \tag{2.3}$$

$$L_O = 0 \ (L_N = 1) \text{ if } (1 - T_O)\alpha_O e_O < (1 - T_N)\alpha_N e_N$$

$$L_O \in [0, 1] \ (L_N = 1 - L_O) \text{ if } (1 - T_O)\alpha_O e_O = (1 - T_N)\alpha_N e_N$$

Comparing (2.2) to (2.3) shows the nature of equilibrium in this model: Government support of an economic sector causes resources (here, labor) to be allocated to that sector, which in turn encourages the government to support the sector. Thus, there are multiple equilibria, as summarized in the following proposition:

Proposition 1. *When the government can provide support on a sector-specific basis, there are three equilibria:*

1) *Old equilibrium:* $L_O^* = 1$, $L_N^* = 0$, $e_O^* = f(T_O L_O)$, $e_N^* = 0$.

2) *New equilibrium:* $L_O^* = 0$, $L_N^* = 1$, $e_O^* = 0$, $e_N^* = f(T_N L_N)$.

3) *Intermediate equilibrium:* $\frac{L_N^*}{L_O^*} = \frac{T_O \alpha_O}{T_N \alpha_N}$, $\frac{e_N^*}{e_O^*} = \frac{(1 - T_O)\alpha_O}{(1 - T_N)\alpha_N}$, $e_O^* + e_N^* = f(T_O \alpha_O L_O^*) = f(T_N \alpha_N L_N^*)$, *and* $L_O^* + L_N^* = 1$.

Proof. That (1) and (2) are equilibria is immediately apparent. The nature of the intermediate equilibrium follows from the condition for the government to be indifferent between providing support to the old sector and to the new $(T_O \alpha_O L_O = T_N \alpha_N L_N)$ and the condition for labor to be indifferent between locating in the old sector and the new

$((1 - T_O)\alpha_O e_O = (1 - T_N)\alpha_N e_N)$. That no other equilibria are possible is discussed below.

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In one extreme equilibrium, the government supports the old sector but not the new, thus encouraging labor to locate in the old sector, which in turn reinforces the government decision to support that sector. A similar equilibrium exists where both government effort and labor are concentrated in the new sector.

In each of the extreme equilibria, government effort is $e_S^* = f(T_S\alpha_S)$, $e_{-S}^* = 0$, where S is the sector supported. Thus, government effort in equilibrium is increasing in both the productivity of the supported sector and its taxability. From labor's point of view, then, an increase in taxability is not unambiguously bad, but must be weighed against the improved incentives it provides to the government. Indeed, as the following corollary indicates, labor utility will be increasing in taxability for sufficiently low T_S:

Corollary 1. *Labor utility in either of the extreme equilibria will be increasing in T_S for T_S sufficiently low, where S is the sector supported.*

Proof. Labor utility $U_{LS} = (1 - T_S)\alpha_S f(\alpha_S T_S)$ in the extreme equilibrium in support of sector S. Since $f'' < 0$, which follows from the shape of the cost function $c(.)$, U_{LS} is concave in T_S on $T_S \in (0,1)$, with $\lim_{T_S \to 0} \frac{\partial U_{LS}}{\partial T_S} > 0$, and $\lim_{T_S \to 1} \frac{\partial U_{LS}}{\partial T_S} < 0$. Thus, $\frac{\partial U_{LS}}{\partial T_S} > 0$ over some interval $T_S \in (0, \bar{T}_S)$. ∎

Corollary 1 does not say that economic actors will not find it optimal to avoid paying taxes. For example, avoiding taxes is a dominant strategy, given that the government

observes the tax behavior only of sectors and not of any individual taxpayer. However, Corollary 1 suggests that if tax evasion is easy, and government support of business activity depends on the taxability of that activity, then efforts to improve revenue collection (by a central government interested in the impact of tax incentives at the local level, by taxpayers acting collectively) may not be unambiguously negative from the point of view of taxpayers, even discounting the use of government revenues to pay for tax-financed public goods enjoyed by both sectors. Indeed, Gehlbach (2003a) demonstrates empirically that the more that firms in postcommunist Europe underreport revenues to tax authorities, the more likely those firms are to say that they would be willing to pay more in taxes to eliminate corruption and overregulation.

There is also an intermediate equilibrium where the old and new sectors coexist, defined as in Proposition 1. In contrast to the extreme equilibria, this equilibrium is unstable. For example, if $L_O = \frac{\alpha_N T_N}{\alpha_O T_O + \alpha_N T_N} + \epsilon$, then the government will find it optimal to support the old sector only, which in turn will encourage that portion of the labor force still in the new sector to abandon it. Thus, the model predicts that one should observe political economies sorting themselves into two groups: one where political institutions support a new economic sector, which is where resources tend to be concentrated, and one where resources and government support remain concentrated in an old sector. Indeed, many observers have seen precisely this pattern develop in postcommunist Europe, as by the late 1990s the countries of east-central Europe and the Baltics were more "new" in political-economic configuration, while

the non-Baltic post-Soviet republics looked more "old." The following section discusses this development in terms of the basic model.

3. The "Great Divide" in Postcommunist Europe

In the early 1990s in postcommunist Europe, the key question for many policy makers, advisors, and scholars was how to effect a shift from an old equilibrium in which the state was heavily involved in the economy and most individuals and capital were employed in state-owned enterprises, to a new equilibrium with state support for an economy in which private enterprise would be predominant. Privatization was seen as the central element of a strategy to effect this shift. What was necessary was to create a "private property regime" – a "social and economic order defining a new set of expectations that individuals may have with respect to their ability to dispose of the assets recognized as 'theirs' by the legal system" (Frydman and Rapaczynski 1994, p. 169) – as well as to provide the necessary conditions for private property to be profitably employed. But, paradoxically, such an environment could not be created in the absence of private property, as the state would have no interest in providing the necessary institutions. Privatization, enacted during the "window of opportunity" (Balcerowicz 1994) opened briefly by the collapse of the *ancien regime*, would create the constituency necessary for these institutions to develop, providing political pressure on the state long after the enactors of privatization had disappeared from the political scene (see especially Boycko *et al*, 1995; also Schmidt 2000, Roland and Verdier

1994).

In essence, what many officials and analysts seemed to have in mind was a variant of the model presented in Section 2, where the future state would respond to political pressure from the owners of capital and their employees:

$$\max_{e_O, e_N} L_O e_O + L_N e_N - c(e_O + e_N) \tag{3.1}$$

In this formulation, it is the size of the sector, in the sense of allocation of resources, that is the first-order concern. The more resources allocated to a sector, the larger the incentive of the government to support it. As in the model in the previous section, when the government has such an objective function there is both an "old equilibrium" and a "new equilibrium." The hope was that privatization, carried out by political actors with objectives different from those defined in (3.1), would force the hand of future generations of policy makers. With capital and (especially) labor relatively immobile in the short run, government behavior would shift towards support of new, private economic activity if mass privatization pushed $\frac{L_N}{L_O}$ high enough, effecting a move towards a new equilibrium..

How successful were the architects of privatization in achieving this goal? To answer this question, we must be more precise about what "new" is. If one takes "new" to be private as opposed to state-owned economic activity, then privatization must be judged a success. Across the postcommunist world, property which has been privatized has largely stayed in private hands. While a societal consensus has not formed everywhere in support of

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private property, there has been no major attempt to political elites to renationalize formerly state-owned property, and no major reallocation of resources out of the private sector back into that portion of the state sector which remains.[6] The "mass" nature of privatization in most postcommunist countries, in which $\frac{L_N}{L_O}$ reached very high levels, likely has much to do with the unwillingness of postcommunist politicians to seriously attempt renationalization.

However, with the benefit of hindsight, it now seems clear that the better definition of "new" is truly new economic activity. Across the postcommunist world, the performance of *de novo* enterprises has clearly outstripped that of privatized enterprises, even where privatization has had a beneficial economic impact (see, e.g., World Bank 2002, ch. 4, and the review in Havrylyshyn and McGettigan 2000). Despite the seeming efficiency benefits of promoting such economic activity, however, not all governments have shown the same interest in providing an environment in which new firms can flourish, one where corruption and overregulation are kept to a minimum and contracts and property rights are enforced. In particular, a "great divide" (Berglof and Bolton 2002) has opened between Eastern Europe and the Baltics on the one hand, and the former Soviet Union less the Baltics on the other. In the former, governments are generally supportive of new business activity, with a corresponding flow of labor and capital into *de novo* enterprises. In the latter, both state support and factors of production have largely remained in the old (state

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[6]There are exceptions. In Russia, for example, there has been some attempt by governors to acquire ownership of enterprises which have accumulated large debts to regional governments. See, e.g., Barnes (2002) or *EWI Russian Regional Report*, Nov. 14, 2001, "New Ulyanovsk Governor Plans to Maintain Control Over Privatized Enterprises." Nonetheless, for the moment these appear to be the exceptions which prove the rule. On changes in attitudes as a result of privatization, see Earle and Gehlbach (2003).

and privatized) sector.[7] Figure 1 illustrates the divide: by the late 1990s, the share of employment in small enterprises (a term largely synonymous with "new enterprises" in the postcommunist world) was around 50 percent in Eastern Europe and the Baltics, while in the former Soviet Union less the Baltics small firms made up only one fifth of total employment.[8]

FIGURE 1

What accounts for this sharp divide? The model presented in Section 2 suggests that governments will provide support to new firms, which in the present context amounts to providing a bureaucratic environment which does not stifle new business activity, only if the benefit in the form of tax revenues is sufficient. As before, privatization might in principle have provided the exogenous shock to labor allocation necessary for the political economy to settle into the new equilibrium. After all, it was not only large manufacturing enterprises which were privatized, but also real estate, shops, and other assets which could be used to start new firms.[9] Nonetheless, this was clearly a smaller proportion of total assets in the economy than the share of private property overall post-privatization, so $\frac{L_N}{L_O}$ was not overwhelming. Given that, the question of whether the economy would tip into the new equilibrium or not depended more critically on the incentives facing governments in the

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[7]Various studies have explored government-business relations in transition countries using data from surveys of firms. See, e.g., Hellman, Jones, and Kaufmann (2000) for survey evidence from 22 postcommunist countries, Johnson *et al* (2000) for results from five East European and former Soviet states, Frye and Shleifer (1997) for a comparative analysis of Russia and Poland, Frye and Zhuravskaya (2000) and CEFIR and World Bank (2002) for Russia, and Pop-Eleches (1998) for Romania. The first three works all document the greater burden imposed on small businesses in the former Soviet Union.

[8]See also Boeri and Terrell (2002) on labor reallocation. World Bank (2002) discusses the equivalence of "small" and "new" in the postcommunist world.

[9]On "small privatization" in postcommunist countries, see, e.g., Earle *et al* (1994).

region.[10]

Those incentives were intimately related to the fiscal crisis that engulfed much of the postcommunist world following the collapse of communism (see, e.g., IMF 1998). The nature of the crisis was twofold: on the one hand, postcommunist politicians inherited levels of expenditure that could be reduced only at significant political cost; on the other, the tax revenues necessary to meet those obligations declined dramatically as a result of both the general output collapse and a decrease in the ability of the state to extract revenues from the economy. Faced with crumbling infrastructure, wage arrears, and demands from various interest groups for subsidies and transfers, the desire to increase tax revenues has been a first-order concern for most postcommunist politicians.[11] In such an environment, the government objective function (2.1) in Section 2 is likely a better approximation of reality than (3.1).

The best-reply correspondence (2.2) shows that the government will find it optimal to support new firms only if $\frac{L_N}{L_O} \geq \frac{T_O \alpha_O}{T_N \alpha_N}$. Thus, in looking to explain the divergent performance of the two halves of the postcommunist world, we should look for evidence that $\frac{L_N}{L_O}$, $\frac{T_O}{T_N}$, or $\frac{\alpha_O}{\alpha_N}$ are markedly different in the former Soviet Union than in Eastern Europe. Substantial

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[10] In emphasizing the perspective provided by the model in Section 2, this paper does not discount the importance of complementary explanations for divergent outcomes, including the nature of political institutions (Hellman 1998), speed of reform (Aslund, Boone, and Johnson 1996), culture and historical experience (McDaniel 1996), the results of early elections (Fish 1998), and the incentives provided by the possibility of EU accession (Janos 2002). That said, some of these explanations are more consistent with a smooth gradient of political and economic development across the postcommunist world, rather than the sharp divide observed in practice.

[11] Akhmedov *et al* (2002) discusses the importance of public expenditures in determining regional electoral outcomes in Russia.

differences in $\frac{\alpha_O}{\alpha_N}$ can be dismissed on theoretical grounds: given the massive misallocation of resources in communist economies, the inherent productivity of any new enterprise was likely quite large relative to that of most of the old state sector across the postcommunist world. Table 1 suggests that differences in $\frac{L_N}{L_O}$ were also small. There is little variation across postcommunist countries in the scale of small-scale privatization, which formed the foundation for development of the new, small-business sector. With the exception of Belarus, all countries represented in Table 1 had implemented a "nearly comprehensive program" of small-scale privatization (a score of 3 on the EBRD Index of Small-Scale Privatization) by 1999. Indeed, on average, progress in small-scale privatization was larger in the former Soviet Union than was progress with large-scale privatization in Eastern Europe.

TABLE 1

In contrast, the aggregate revenue figures reported in Table 1 suggest the possibility that $\frac{T_O}{T_N}$ was substantially higher in the eastern half of the postcommunist world. Collecting taxes has been a particular problem in the former Soviet Union, with tax collection averaging 27 percent of GDP among CIS members in 1999, whereas by and large the countries of Eastern Europe and the Baltics have had fewer difficulties meeting their revenue needs, extracting 37 percent of GDP on average as taxes.[12] Again, Belarus is the exception to the rule, as the virtual absence of large-scale privatization in that country, together with the maintenance

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[12]The literature is unanimous in its view that the lower revenue figures in the former Soviet Union are due to the state's inability to collect taxes, and not to any greater desire on the part of the general population to limit government expenditures. See, e.g., Hemming *et al* (1995), Ebrill and Havrylyshyn (1999), or Schaffer and Turley (2000).

of various institutions of state power, has allowed the state to continue to collect taxes at Soviet-era levels. Lower tax collection overall, if affecting all sectors equally, will result in a higher $\frac{T_O}{T_N}$ if $T_O > T_N$: defining $T_O = T + t$ and $T_N = T$, a decline in T increases $\frac{T_O}{T_N}$.

To more carefully test the proposition that new firms are especially hard to tax in the former Soviet Union, we use firm-level data from a survey of enterprises carried out in 1999 by the World Bank and EBRD in the 23 postcommunist countries listed in Table 1.[13] Firms in the survey, of which slightly more than half are *de novo* enterprises, were asked, "What percentage of sales of a typical firm in your area of activity would you estimate is reported to the tax authorities, bearing in mind difficulties in complying with taxes and other regulations?" If one accepts that respondents answer based on their personal experience, as is typically assumed when sensitive questions are posed in this way, then this is a rough measure of the degree to which firms are taxable: firms which find it easier to hide revenues, perhaps because they are more likely to deal in cash or because government officials are less familiar with their operations, will report less of their revenues to tax authorities. Gehlbach (2003a) justifies this assumption by demonstrating that the covariance of this variable with sector and country of residence corresponds with publicly available data on tax compliance by sector and country.

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[13]In fact, there are 26 countries represented in the data set, but firms in Bosnia and the Serb Republic in Bosnia were dropped due to the long war in those entities, while firms in Turkey were not included in the analysis since Turkey is not a postcommunist country. Hellman, Jones, Kaufmann, and Schankerman (2000) presents an overview of the BEEPS project and details on the survey instrument. Gehlbach (2003a) provides more information on the variables used in the analysis here, with the exception of the *de novo* variable, which is not used in the analysis in that paper.

Table 2 presents results of three regressions of this measure of taxability on various firm characteristics, including dummies for *de novo* status and location in the former Soviet Union (less the Baltics).[14] While there is a great deal of noise in the data, the impact of *de novo* status is quite precisely estimated, as can be seen from the results of the first model. New firms in Eastern Europe and the Baltics report three percentage points more of their revenues to tax authorities than do old firms, while the reverse is the case in the former Soviet Union. (The linear combination of the *de novo* dummy and its interaction with the dummy for presence in the former Soviet Union is statistically significant at the 5 percent level.)

TABLE 2

Why might new firms be especially difficult to tax in the former Soviet Union? Generally speaking, there are two possibilities: states may find it difficult to tax such firms because of their novelty *per se*, or because of some characteristic which these firms share. As mentioned above, the one characteristic common to almost all new enterprises in the postcommunist world is small size. Of the *de novo* firms in the sample, fully 85 percent have fewer than 100 employees (vs. 32 percent of old firms). The second model presented in Table 2 regresses revenue reporting on the log of employment and its interaction with presence in the former Soviet Union. Across the postcommunist world, small firms report less of their revenues to tax authorities, presumably because their size makes it easier for them to deal in cash, or

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[14]In all regressions, enterprises which are joint ventures between domestic and foreign firms are dropped from the sample: while generally "new" in postcommunist countries, joint ventures are fundamentally different from the *de novo* domestic firms which are the focus here. There is no substantial difference in results if instead joint ventures are included and classified as new.

because it is easier to remain below the radar screen of tax authorities when a firm is small. However, this effect is especially pronounced in the former Soviet Union, where the effect of size is twice as large as that in Eastern Europe. As in the first model, marginal effects are quite large.

The third model jointly tests the impact of novelty and size, including the *de novo* dummy and log of employment, and the interaction of both with the location dummy. Both interaction terms are statistically significant, and both sizeable. Thus, governments in the former Soviet Union seem to find it harder to tax *de novo* firms both because they are small and because they are new.

As to why novelty and size might be particular problems for tax collection in the former Soviet Union, at least three possibilities present themselves:

- One-company towns: Relative to Eastern Europe, the economic landscape of the Soviet Union seems to have been disproportionately populated by cities with a single or a few large enterprises, many located far from any other population center.[15] In such an environment, given a fixed cost of collecting taxes from any given enterprise, the relative cost of collecting taxes from old enterprises is particularly low.[16] In contrast, the more diverse economic geography of Eastern Europe reduced the incentive to concentrate on

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[15] This is certainly the conventional view, though little cross-national work has been done. On Russia, see Brown *et al* (1994), Expert Institute (2000), and Andrienko and Guriev (2002).

[16] This effect may be exaggerated if local politicians are largely responsible for the local business environment, and if such politicians cut deals with large local firms to protect them from federal taxes in return for larger payments – perhaps in kind – to the regional budget (Treisman 1999, Sonin 2003).

a few old enterprises.

- Banks: While doing business in cash helps a firm to avoid tax obligations, holding cash is costly. The opportunity cost of holding cash depends on the benefits of instead maintaining bank deposits, which will be greater where financial markets are well developed, as well as on firm-specific characteristics, such as size and industrial sector. Across the region, large firms find it impossible to avoid the banking sector. However, given the better development of financial markets in Eastern Europe (Berglof and Bolton 2002), small firms in those countries are less likely to deal in cash, and thus more likely to pay their taxes.

- Low-hanging fruit and short fruit pickers: Limited administrative capacity and the scale of state collapse in general has led tax officials in the former Soviet Union to concentrate their resources on entities which they know how to and can tax. Thus, recent entrants – never having been part of the state planning apparatus, and engaged in relatively novel business activity – are more likely to be neglected.

In all likelihood, some combination of these and other factors is behind the quite different relative taxability of new and old firms in Eastern Europe and the former Soviet Union. Whatever the reasons, the fact that $\frac{T_O}{T_N}$ was considerably higher in the latter may have encouraged different patterns of support for new and old businesses across the region, which together with factor mobility, led to the great divide in government performance and factor

allocation that had developed by the late 1990s.

4. Discussion and Extensions

A number of simplifying assumptions were made in developing the model presented in Section 2. This section considers the impact of relaxing those assumptions, and examines the welfare implications of the model. As will be seen, the assumption that government support is not financed from public funds is unimportant, while the assumptions that production may not take place without government support and that there are perfect economies of scale in the provision of that support may be partially relaxed without any qualitative change in results. Further, the old equilibrium – while possibly inefficient – may be second-best if the government would provide little support in the new equilibrium.

4.1. Tax-Financed Public Goods

In Section 2, we assumed that government support is provided at no cost to the public treasury, but is costly to the government for other reasons. This is plausible if one assumes that government support entails the expenditure of time or energy monitoring lower-level bureaucrats, or involves an opportunity cost in terms of rents foregone or other political priorities not pursued. However, other forms of support might require the expenditure of public funds, as when encouraging bureaucratic compliance necessitates increasing government wages. Thus, a natural question is whether the results in Section 2 depend on the

assumption that support is provided by the state at no cost to the public treasury. The answer is no.

Consider the following alternative model. Rather than providing support e_O and e_N at cost $c(e_O + e_N)$, the state uses tax revenues to produce public goods which improve the productivity of labor. Some proportion λ_O of total public-goods production q will be useful to the old sector alone, while the remaining proportion $\lambda_N = 1 - \lambda_O$ will benefit the new sector only.[17] Thus, production in sector S is $Y_S = \alpha_S L_S \lambda_S q$.

Obviously, if the state is motivated by the desire to produce tax revenues, not all tax revenues will be used to provide public goods. Let β be the (endogenous) proportion of tax revenues kept by the state, with proportion $(1 - \beta)$ spent on public-goods production. Thus, total spending on public goods is $(1 - \beta)(T_O \alpha_O L_O (\lambda_O q) + T_N \alpha_N L_N (\lambda_N q))$. Further, assume that the state produces public goods according to a concave production technology, so that total provision of public goods is:

$$q = [(1 - \beta)(T_O \alpha_O L_O (\lambda_O q) + T_N \alpha_N L_N (\lambda_N q))]^{\gamma} \tag{4.1}$$

where $\gamma \in (0, 1)$. Thus,

$$q = [(1 - \beta)(T_O \alpha_O L_O \lambda_O + T_N \alpha_N L_N \lambda_N)]^{\frac{\gamma}{1-\gamma}} \tag{4.2}$$

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[17]In an extended model, we might further assume that some proportion of public-goods production benefits both sectors. The results of this section will be more likely to hold, the smaller is that proportion.

The state solves for the optimal proportion of taxes retained β and allocation λ_O and λ_N across sectors of public-goods production:

$$\max_{\lambda_O, \lambda_N, \beta} \beta T_O \alpha_O L_O (\lambda_O q) + \beta T_N \alpha_N L_N (\lambda_N q) \tag{4.3}$$

$$\text{s.t.} \quad q = [(1 - \beta)(T_O \alpha_O L_O \lambda_O + T_N \alpha_N L_N \lambda_N)]^{\frac{\gamma}{1-\gamma}}$$

$$\text{and } \lambda_O + \lambda_N = 1$$

or

$$\max_{\lambda_O, \beta} \beta (1 - \beta)^{\frac{\gamma}{1-\gamma}} (T_O \alpha_O L_O \lambda_O + T_N \alpha_N L_N (1 - \lambda_O))^{\frac{1}{1-\gamma}} \tag{4.4}$$

Labor's problem is analogous to that in Section 2.

Proposition 2. *In the model with tax-financed public goods, there are three equilibria:*

1) *Old equilibrium:* $L_O^* = 1$, $L_N^* = 0$, $\lambda_O^* = 1$, $\lambda_N^* = 0$, $\beta^* = 1 - \gamma$.

2) *New equilibrium:* $L_N^* = 1$, $L_O^* = 0$, $\lambda_N^* = 1$, $\lambda_O^* = 0$, $\beta^* = 1 - \gamma$.

3) *Intermediate equilibrium:* $\frac{L_N^*}{L_O^*} = \frac{T_O \alpha_O}{T_N \alpha_N}$, $\frac{\lambda_N^*}{\lambda_O^*} = \frac{(1 - T_O)\alpha_O}{(1 - T_N)\alpha_N}$, $\beta^* = 1 - \gamma$.

Proof. By inspection, (4.4) can be separated into two separate maximization problems: one over λ_O, and one over β. With respect to λ_O, the government will find it optimal to allocate all public goods to the old sector if $T_O \alpha_O L_O > T_N \alpha_N L_N$, all to the new sector if $T_O \alpha_O L_O < T_N \alpha_N L_N$, and will be indifferent if $T_O \alpha_O L_O = T_N \alpha_N L_N$. Similarly, labor's decision will depend on whether $(1 - T_O)\alpha_O \lambda_O$ is greater or less than $(1 - T_N)\alpha_N \lambda_N$. As

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in Section 2, these imply two extreme equilibria and an intermediate equilibrium defined by the indifference condition for each player.

To see that $\beta^* = 1 - \gamma$, note that $\beta(1-\beta)^{\frac{\gamma}{1-\gamma}}$ is quasiconcave over $\beta \in [0, 1]$ for $\gamma \in (0, 1)$ (and concave for $\gamma \leq \frac{1}{2}$). Hence, the first-order condition $\beta^* = 1 - \gamma$ defines a maximum over $\beta \in [0, 1]$. ∎

The most important thing to note about Proposition 2 is that the equilibria look very similar to those in Section 2. As before, there are two extreme equilibria and an intermediate equilibrium. Further, the allocation of public goods across sectors in the intermediate equilibrium is identical to the allocation of support in Section 2, as is the division of labor between the old and new sectors. Thus, our arguments about the impact of relative taxability of the two sectors on the likelihood that the economy will tip into the new equilibrium do not depend on the assumptions in the model in Section 2 about costliness of government support.

In addition, Proposition 1 tells us what proportion of public funds a government will spend on the production of public goods, and what proportion will be skimmed off for personal use. As Proposition 2 shows, the share retained by the government is decreasing in γ. In essence, the better is the public-goods production technology, the more the government will be motivated to take a small slice of a large pie rather than a large slice of a small pie.

4.2. Necessity of Government Support

In Section 2, the production function $Y_S = \alpha_S L_S e_S$ assumed that production is impossible without government support. The extent to which that assumption holds will depend on the political-economic environment and the definition of "support." For example, private economic activity of any real scale in postcommunist states required legislation and decrees liberalizing prices and trade. At the same time, many state-owned enterprises were able to continue operating in the absence of any change in government policy.

To capture variation in the necessity of government support, consider a modified production function $Y_S = \alpha_S L_S(\bar{e}_S + e_S)$, with $\bar{e}_S$ exogenous. The parameter $\bar{e}_S$ might reflect the stock of support inherited from a previous government, or could capture technological considerations which determine the extent to which production is possible without government intervention to create markets or restrain rent-seeking behavior among bureaucrats. As the following proposition shows, if $\bar{e}_S$ is sufficiently high (relative to $\bar{e}_{-S}$), then there is no multiplicity of equilibria. The unique equilibrium is that in which government support and factors of production are allocated to the sector with relatively high preexisting "support."

Proposition 3. *In the model with $\bar{e}_O, \bar{e}_N \geq 0$, the old equilibrium will be the unique equilibrium if:*

$$(1 - T_O)\alpha_O \bar{e}_O > (1 - T_N)\alpha_N[\bar{e}_N + f(T_N \alpha_N)] \qquad (4.5)$$

while the new equilibrium will be the unique equilibrium if:

$$(1 - T_N)\alpha_N \bar{e}_N > (1 - T_O)\alpha_O[\bar{e}_O + f(T_O\alpha_O)] \qquad (4.6)$$

Proof. Without less of generality, consider the case of uniqueness of the old equilibrium. Assume to the contrary that there are multiple equilibria when $(1 - T_O)\alpha_O\bar{e}_O >$ $(1 - T_N)\alpha_N[\bar{e}_N + f(T_N\alpha_N)]$. Then a new equilibrium will exist in which $L_N = 1$, with government support defined by $f(T_N\alpha_N)$. Labor will then find it optimal to remain in the new sector so long as $(1 - T_N)\alpha_N[\bar{e}_N + f(T_N\alpha_N)] \geq (1 - T_O)\alpha_O\bar{e}_O$, which by assumption is false. Thus, the new equilibrium does not exist. Nonexistence of the intermediate equilibrium immediately follows. ∎

Proposition 3 says that an equilibrium will not exist if even full allocation of labor to a sector does not produce sufficient government support to keep labor from migrating to the other sector. That will be more likely, the more productive is the other sector in the absence of government support.

How are the predictions of the basic model affected by Proposition 3? The general conclusion of the analysis in Section 2 is that movement from an old to a new equilibrium will be difficult if $T_O > T_N$. Under certain conditions, that result is strengthened by Proposition 3. As the following corollary indicates, if support is more important for a new, low-taxability sector than an old, high-taxability sector, then the mere existence of the new equilibrium will be threatened by low taxability overall:

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Corollary 2. If $T_O > T_N$, and if support is necessary for production to take place in the new but not the old sector, i.e. $\bar{e}_N = 0$ and $\bar{e}_O > 0$, then a sufficiently large decline in taxability affecting both sectors equally (i.e. a reduction of k in both T_O and T_N) will render the old equilibrium unique.

Proof. Define $T \equiv T_N$, $t = T_O - T_N$, and $y = (1 - T_O)\alpha_O \bar{e}_O - (1 - T_N)\alpha_N[\bar{e}_N + f(T_N \alpha_N)]$. As $T \to 0$, $y \to (1 - t)\alpha_O \bar{e}_O$, which is clearly greater than zero. Thus, according to Proposition 2, the old equilibrium is unique. ∎

By assumption, the old sector can operate in the absence of government support, while the new sector cannot. Thus, low taxability overall, while reducing the incentive of the government to support either sector, makes the new sector especially unattractive. In the context of postcommunist political economy, Corollary 2 says that the transition to a new economy in the former Soviet Union may have been especially difficult due to states' general inability to collect taxes from any sector of the economy, their particular inability to tax the new economy, and the greater necessity of government support for new economic activity to take place.

4.3. Economies of Scale in Provision of Government Support

In positing the production function $Y_S = \alpha_S L_S e_S$ and government cost function $c = c(e_O + e_N)$, the model in Section 2 implicitly assumed perfect economies of scale in the provision of government support, i.e. for a single unit of labor the marginal productivity of government

support is independent of the size of the sector being supported. Thus, for example, the model assumes that the cost of monitoring bureaucratic compliance with laws regulating inspections is independent of the size of the sector being inspected.

In fact, while there will typically be economies of scale in providing the sort of support envisioned in this paper – passage of legislation, monitoring of lower-level bureaucrats, etc. – the assumption of perfect economies of scale is strong. To examine the extent to which the conclusions of the model depend on this assumption, consider the production function $Y_S = \alpha_S L_S[\sigma e_S + (1 - \sigma)\frac{e_S}{L_S}]$. The parameter σ captures in a simple way the degree to which economies of scale are present in the provision of government support, i.e. the extent to which the government is able to stretch a given expenditure of time, energy, etc. across an entire sector. If $\sigma = 1$, then there are perfect economies of scale, and the model is identical to that in Section 2. If $\sigma = 0$, then there are no economies of scale. In this case, $Y_S = \alpha_S e_S$, and for a given level of government support e_S the direct impact of an increase in labor allocation is completely offset by the fact that government support is now less effective for any unit of labor.

Further, for technical reasons, assume that an infinitesimally small proportion ϵ of total labor supply remains in each of the two sectors regardless of where it is optimal for labor to locate. Thus, total production in a sector is $Y_S = \sigma \alpha_S L_S e_S + (1-\sigma)\alpha_S e_S$, where the second term is well defined because we assume that L_S can approach but not equal zero. We then have the following proposition:

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Proposition 4. *In the model with variable economies of scale in provision of government support, there will be multiple equilibria if and only if $(1 - \sigma) \leq \min(\frac{T_O \alpha_O}{T_N \alpha_N}, \frac{T_N \alpha_N}{T_O \alpha_O})$. When there is a unique equilibrium, it will be the equilibrium in support of sector S, where S satisfies $T_S \alpha_S > T_{-S} \alpha_{-S}$.*

Proof. Labor optimizes as in Section 2. To see whether an extreme equilibrium S exists, we must check whether the government will allocate support to sector S when $L_S \to 1$. Thus, the old equilibrium will exist when $T_O[\sigma \alpha_O + (1 - \sigma)\alpha_O] \geq T_N(1 - \sigma)\alpha_N$, i.e. when $(1 - \sigma) \leq \frac{T_O \alpha_O}{T_N \alpha_N}$. Similarly, the new equilibrium will exist when $(1 - \sigma) \leq \frac{T_N \alpha_N}{T_O \alpha_O}$. Since $(1 - \sigma) \leq 1$, at least one of these conditions will always be met, and in particular when there is a unique equilibrium the sector S supported will satisfy $\frac{T_S \alpha_S}{T_{-S} \alpha_{-S}} > 1$. ∎

Proposition 4 states that multiple equilibria will be more likely when economies of scale are large, i.e. when σ is high. To see why this is the case, recall the logic of the model in Section 2. Labor chooses to locate in a sector because of government support, but the government in turn chooses to support a sector because it is large and taxable. If increased labor allocation to a sector does little to increase the taxable revenues produced by that sector (because, when economies of scale are small, the direct effect of increased labor allocation is offset by the reduced effectiveness of a given level of government support for any individual unit of labor), then this logic disappears.

That said, multiple equilibria may be possible even when economies of scale are small if $T_O \alpha_O$ is close to $T_N \alpha_N$. Given that it will often be the case that $T_O > T_N$ but $\alpha_O < \alpha_N$, we

can probably expect that the existence of multiple equilibria will not typically be challenged by limited economies of scale in the provision of government support.

4.4. Welfare

While the new sector is perhaps inherently more productive than the old, the new equilibrium does not necessarily dominate the old equilibrium from an efficiency point of view. Rather, any inherent productivity advantage must be weighed against the fact that the government will provide less support in the new equilibrium if the new sector is considerably less taxable.

Formally, welfare in the equilibrium in support of sector S can be defined as:

$$W_S = \alpha_S f(T_S \alpha_S) - c(f(T_S \alpha_S)) \tag{4.7}$$

where we consider only the incentive effects of taxation, implicitly assuming that the government values tax revenues as would labor had those taxes not been collected.[18] W_S is increasing in α_S (both because α_S increases production directly and because it improves government incentives) and T_S (for the latter reason only).[19] Thus, even if $\alpha_N > \alpha_O$, if $T_O >> T_N$, the old equilibrium may be preferable.

Thus, an economy cursed by government reliance on highly taxable natural resources

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[18] We could alternatively assume that taxation involves a welfare loss of some sort without detracting from the main point of this section. See Corollary 1.

[19] For example, $\frac{\partial W_S}{\partial \alpha_S} = f(T_S \alpha_S) + T_S f'(T_S \alpha_S)[\alpha_S - c'(f(T_S \alpha_S))]$, where $\alpha_S - c'(f(T_S \alpha_S)) > 0$ since by the government's first-order condition $T_S \alpha_S - c'(f(T_S \alpha_S)) = 0$. The derivation for $\frac{\partial W_S}{\partial T_S}$ is analogous.

may nonetheless be preferable to one in which resources are allocated to a sector that the government exclusively, but only weakly, supports. Of course, as Section 2 showed, movement from the former to the latter may be a rare phenomenon indeed.

In a world in which government behavior is driven primarily by revenue concerns, the ideal is when the new economy exhibits both greater inherent productivity and greater taxability. This not only increases the odds of a successful transition to a new equilibrium, but assures that the new equilibrium provides greater welfare. The advent of township-village enterprises in China – which not only benefitted from government support due to their high (local) taxability, but may also have been inherently more productive than the traditional industrial and agricultural sectors – seems to meet these conditions (Oi 1992, Che and Qian 1998, Jin and Qian 1998).

The downside is that the control of local governments over TVEs – which is what provides for their taxability - carries its own inefficiencies, so that α_N is probably not so great there as in, say, Poland. The fact that TVEs and similar firms are easier to tax, by the logic of this paper, means that they will be harder to dislodge by truly private competitors. Today's new equilibrium may become tomorrow's old.

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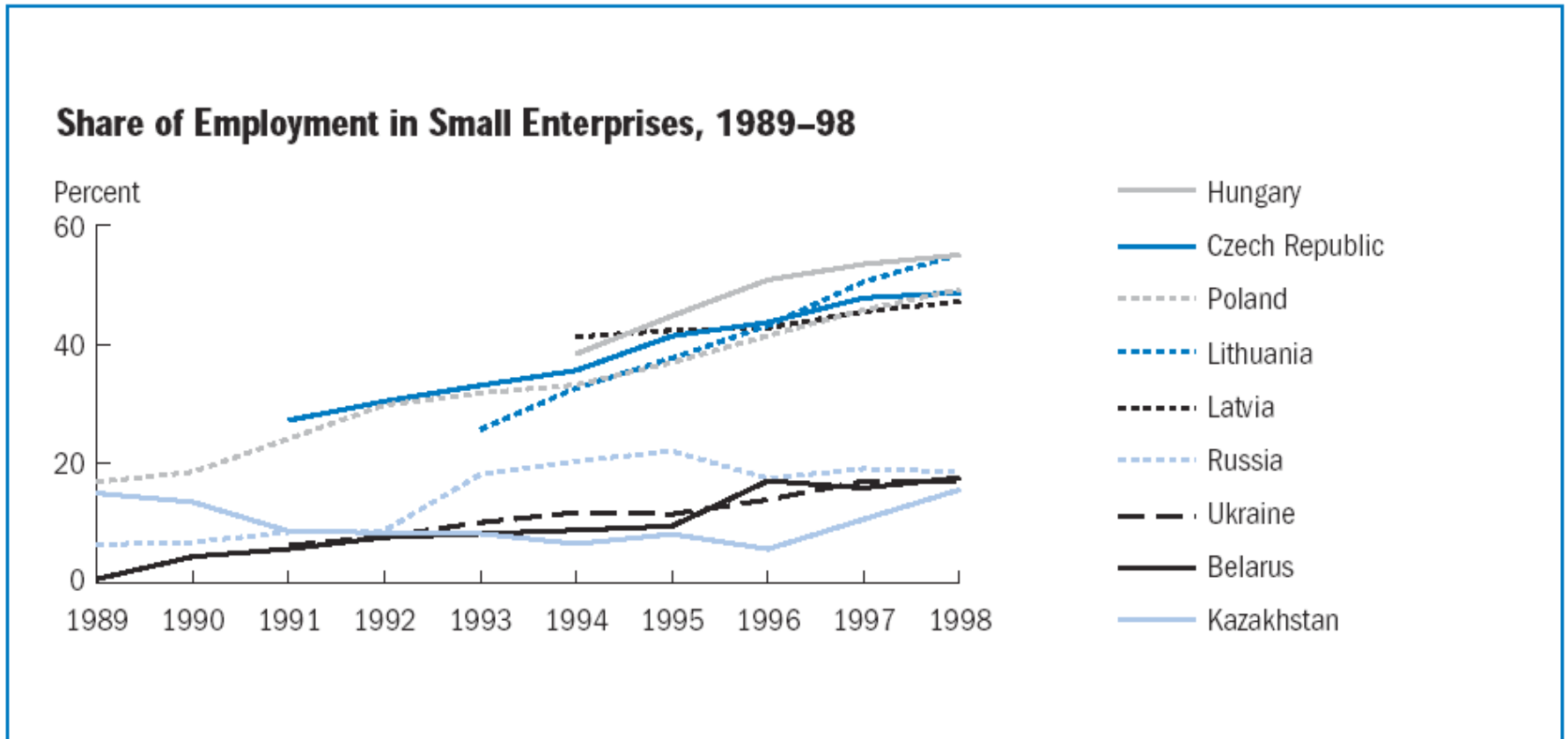
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Figure 1

Share of Employment in Small Enterprises, 1989–98

Percent

Legend:
- Hungary
- Czech Republic
- Poland
- Lithuania
- Latvia
- Russia
- Ukraine
- Belarus
- Kazakhstan

X-axis: 1989 1990 1991 1992 1993 1994 1995 1996 1997 1998

Y-axis: 0, 20, 40, 60

Source: World Bank (2002), p. 41.

Table 1: Privatization and Revenue Performance in Postcommunist States

	1999 EBRD Index of Large-Scale Privatization	1999 EBRD Index of Small-Scale Privatization	1999 General Government Revenue as Percent of GDP	Firms in BEEPS Sample
Eastern Europe and Baltics				
Albania	2	4	21.3	163
Bulgaria	3	3+	39.8	130
Croatia	3	4+	42.8	127
Czech Republic	4	4+	38.7	149
Estonia	4	4+	36.4	132
Hungary	4	4+	39.1	147
Latvia	3	4	40.1	166
Lithuania	3	4+	31.7	112
Macedonia	3	4	38.0	136
Poland	3+	4+	40.2	246
Romania	3-	4-	33.3	125
Slovakia	4	4+	39.7	138
Slovenia	3	4+	43.6	125
Average EE and Baltics			**37.3**	
Commonwealth of Independent States				
Armenia	3	3+	20.3	125
Azerbaijan	2-	3+	18.9	137
Belarus	1	2	45.7	132
Georgia	3+	4	15.4	129
Kazakhstan	3	4	17.4	147
Kyrgyzstan	3	4	24.0	132
Moldova	3	3+	27.4	139
Russia	3+	4	35.1	552
Ukraine	2+	3+	33.7	247
Uzbekistan	3-	3	30.4	126
Average CIS			**26.8**	

Notes: Countries included are those represented in the BEEPS dataset (less Turkey, Bosnia-Herzegovina, and the Serb Republic in Bosnia). EBRD privatization indexes can take on values from 1 to 4+.
Sources: Privatization indexes are from EBRD (2000). Revenue figures are imputed from expenditure and balance data in EBRD (2001).

Table 2: Determinants of Revenue Reporting - OLS Regressions
(Significance levels: 10% - *; 5% - **; 1% - ***)

Dependent Variable: Percent of Revenues Reported to Tax Authorities

	Estimated coefficient	Robust std. error	Estimated coefficient	Robust std. error	Estimated coefficient	Robust std. error
De novo firm	3.40**	1.35			1.68	1.43
De novo * CIS	-6.79***	1.74			-3.67*	2.10
CIS	-1.11	1.31	-14.05***	2.59	-9.58**	3.80
Log employment	2.90***	0.36	1.84***	0.36	2.11***	0.43
Log employment * CIS			2.35***	0.58	1.70**	0.70
Degree of competition	-4.06***	0.62	-3.97***	0.62	-4.09***	0.62
Transportation sector	-4.13**	2.02	-3.82*	2.01	-4.18**	2.02
Personal-service sector	-3.09	2.12	-3.31	2.12	-3.24	2.11
Wholesale sector	-1.75	1.47	-1.52	1.46	-1.65	1.47
Other sector	-1.33	3.31	-1.07	3.26	-1.26	3.27
Retail sector	0.23	1.47	0.53	1.46	0.37	1.47
Construction sector	0.82	1.55	0.65	1.54	0.64	1.55
Resource sector	0.97	1.54	0.42	1.55	0.50	1.55
Business-service sector	1.91	1.96	1.50	1.98	1.71	1.97
Finance sector	9.67***	2.46	10.14***	2.45	9.90***	2.46
Constant	80.95***	2.76	86.72***	2.68	85.15***	3.11
N	3371		3388		3371	
R^2	.066		.066		.068	

Notes: Omitted category for sector dummies is manufacturing sector. Town-size dummies also included in all regressions.