

# The Consequences of Collective Action: An Incomplete-Contracts Approach

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*Public policy may be determined as much by what cannot be agreed to by politicians and organized interests as by what can. Focusing on the inability of organized groups to credibly promise that their members will fully report revenues to tax authorities, I develop an incomplete-contracts lobbying model that shows that the provision of collective goods may be influenced by the anticipated tax compliance of economic sectors as well as by the organization of interests. Data from a survey of firms in Eastern Europe and the former Soviet Union are broadly supportive of the theory: the ability of firms to hide revenues from tax authorities rivals conventional collective-action variables in explaining variation in collective-goods provision, but only in that part of the postcommunist world where differences in revenue hiding across sectors are especially large.*

The theory of collective action (Olson 1965) teaches that common interest is not synonymous with collective representation. Some groups—perhaps those where benefits are concentrated among a small number of actors or where a political entrepreneur has solved the participation problem for a larger number of players—manage to organize in pursuit of their interests. Others do not. Among those who do not, action may nonetheless be taken by particular members if the individual share of the group benefit outweighs the cost, a scenario more likely when benefits are concentrated among a few (possibly large) interests.

Applied to public policy, the theory of collective action implies that (1) organized groups benefit at the expense of unorganized groups, and (2) any policy bias in favor of small groups or large individual interests derives from their lesser susceptibility to collective-action problems. But are these propositions always correct? And when they are, are they necessarily the most important factors in determining who benefits from public policy? I argue the answer to both questions is no. While it is true that the representatives of organized interests may provide politicians with various sorts of compensation in return for favorable policies, they may be unable to credibly promise that their members will take other actions that are politically

valuable, such as fully reporting their revenues to tax authorities. When there are large differences across groups in the behavior of their members with respect to these “noncontractible” provisions, unorganized interests may benefit at the expense of organized ones. Alternatively, small groups or large individual interests may receive favorable policy treatment, but not (just) because they suffer less from collective-action problems.<sup>1</sup>

In this article I provide a theoretical model to reinforce these claims, marrying the incomplete-contracts framework from economic theory (Grossman and Hart 1986; Hart and Moore 1990) to the much-used model of lobbying by multiple agents developed in Grossman and Helpman (1994, 2001). I test propositions from the model by examining satisfaction with the provision of collective goods among firms in postcommunist countries, finding that the degree to which firms hide revenues from tax authorities—an action which is noncontractible—rivals collective-action variables in its influence on public policy, but only in that part of the postcommunist world where differences in revenue hiding across sectors are especially large.

Both the model and the empirical exploration focus on a political-economic environment characterized by four features:

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<sup>1</sup>Following the publication of *The Logic of Collective Action*, there was much discussion of Olson’s conclusions regarding group size and collective action; see, e.g., Frohlich and Oppenheimer (1970), Chamberlin (1974), Hardin (1982), Sandler (1992), and Grier, Munger, and Roberts (1994). I do not take sides in this debate. Instead, I argue that the ability to overcome collective-action problems—by whatever mechanism—is neither necessary nor sufficient to disproportionately benefit in the setting of public policy.

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- Tax revenue is valued by politicians.
- Politicians determine the allocation of collective goods across economic sectors.
- Firms in those sectors choose a division between “hidden” and “unhidden” economic activity, where only unhidden activity is taxed and firms may differ in the cost of hiding.<sup>2</sup>
- Organized sectors may lobby politicians to provide collective goods in return for some form of direct compensation, but they may not enforce tax compliance among their members.<sup>3</sup>

In such an environment, the ex post division of gains, determined by the extent to which firms in a sector find it costly to hide revenues from the state, influences the outcome of lobbying for collective goods ex ante. In particular, when tax revenues are important to politicians and differences in revenue hiding across sectors are large, politicians may have an incentive to favor those sectors whose firms are more *taxable*, i.e., those whose firms find it harder to hide revenues from tax authorities.

A brief example may help to illustrate the argument. Pskov oblast', one of 89 regions in the Russian Federation, sits at the western edge of Russia across the border from Estonia, Latvia, and Belarus. A natural trade corridor between Russia and the West, the region's early Orthodox churches and monasteries also provide enormous and unrealized potential as a tourist destination. Situated against this promise, however, was a political economy in the mid-1990s with vested interests in sectors developed under Soviet rule: machine building, light industry, food processing, and agriculture. The theory of collective action suggests that the scarce administrative and financial resources available to the oblast' administration should have been spent promoting these traditionally organized sectors at the expense of those in which the region had a comparative advantage.

But in fact, starting in 1997, economic-development policy was directed still elsewhere: toward the creation of a local vodka industry where none had previously existed. The key was the tax revenue promised by vodka

production. As stressed to me by the head of the oblast' Committee for Economic Development and Property Relations, excise tax—the primary source of state revenue from vodka production—has the advantage that it is based on physical output and hence is less easily evaded than taxes levied on many other forms of economic activity.<sup>4</sup> Coupled with the fact that excises on vodka remained partly in the region where they were collected rather than passed up to the federal budget, this created a powerful incentive to support a previously nonexistent industry at the expense of other interests. “Support” took many forms, including grain subsidization (so as to hold down the price of raw spirit) and—by most accounts—a policy of selective enforcement of property rights. The losers from this policy included local food-processing firms, which lost control of assets to the vodka industry, allegedly through manipulation of the legal system, and other sectors of the economy that could not claim the attention or resources of the oblast' administration.<sup>5</sup> It is, for example, probably no coincidence that budgetary support of the small-business sector (notoriously hard to tax in Russia) dried up just as the economic advisor to the oblast' governor was declaring that “one working factory will provide more tax revenue than all small enterprises taken together.”<sup>6</sup>

My analysis of data from a survey of firms in 25 countries suggests that a similar logic played out in postcommunist countries across various forms of economic activity. Firms that are presumably more taxable—large enterprises, monopolies, resource-extraction firms, etc.—report less hiding of revenues from tax authorities than do other firms; those that hide less revenue in turn report greater satisfaction with a broad array of public services and agencies. This effect far outweighs membership in a business association, and rivals enterprise size, in its influence on the allocation of collective goods. Further, the impact of firm size on satisfaction with public services and agencies is smaller when controlling for revenue hiding: large firms seem to be favored not just because they manage to overcome their collective-action problems, but because they are more taxable. The model and empirical results I present here thus complement recent work by Carpenter (2004), who suggests that large, established firms may be favored by regulators for reasons other than

<sup>2</sup>In contrast to the typical approach of the incomplete-contracts literature in economics, I take the allocation of control rights—here, over the allocation of collective goods and the division between hidden and unhidden activity—as given. While future research might extend the arguments below to explore the endogenous allocation of control rights, any such endeavor would need to take into account constraints on contracting over control rights that exist in the political but not economic realm.

<sup>3</sup>My assumption that some but not all actions by interest groups are contractible contrasts not only with models that assume that policy-contingent contracts are fully enforceable, but also those like Fox (2004), which assume complete unenforceability.

<sup>4</sup>Interview with Vadim Petrukhin, July 13, 2005.

<sup>5</sup>Slider (1999) provides an overview of vodka politics in Pskov oblast'. The motives behind economic policy in Pskov were laid out in many interviews with Evgenii Mikhailov, the governor from 1997 to 2004; see, e.g., *Pskovskaya Pravda*, February 28, 1997. Many of the various allegations of legal wrongdoing are summarized in *Rossiiskaya Gazeta*, February 21, 1998.

<sup>6</sup>*Pskovskaya Pravda*, April 23, 1997, and November 27, 1997.

the “capture” (Peltzman 1976; Stigler 1971) of regulatory agencies by these firms.

More generally, an incomplete-contracts approach provides a framework to evaluate arguments about the degree to which business-state relations are characterized by “capture” or “exchange,” a debate that has had particular resonance among scholars of postcommunist political economy (e.g., Frye 2002; Gorjaev and Sonin 2005; Hellman, Jones, and Kaufmann 2000; Jones Luong and Weinthal 2004; Slinko, Yakovlev, and Zhuravskaya 2005). The model I present below demonstrates that firms can indeed compensate politicians for the receipt of collective goods, but the exchange may be implicit (through the expected receipt of tax revenues) rather than explicit. The difference is important: when bargaining outcomes are determined by the ex post division of gains (i.e., when contracts are incomplete), negotiated agreements may not be efficient. In particular, sectors that receive the most collective goods may not have most effectively “captured” the state: the loss of revenue to tax authorities may be worth more to them than the collective goods that they receive in return.

Beyond basic empirical support for the model, I find that the relative importance of collective-action variables and revenue hiding in determining the provision of collective goods depends critically on the broader political-economic environment. In the former Soviet Union, where the industrial structure inherited from communism encouraged the development of tax systems focused on a few critical sectors, satisfaction with collective-goods provision is determined as much by the ex post division of gains from revenue hiding as it is by collective action. In contrast, revenue hiding (while sizeable) plays little role in determining public policy in Eastern Europe, where a focus on broadening the tax base led to smaller differences in revenue hiding across sectors. My work thus complements Coates and Heckelman (2003), who provide evidence that the role of collective action in comparative economic development (e.g., Bates 1981; Frieden 1992; Knack and Keefer 1997; Olson 1982) depends on the broader institutional environment.

In arguing that policymakers will tend to favor sectors that are easier to tax, I build on a substantial literature that places state actors’ desire for revenues at the center of analysis. North (1981), for example, builds his economic history on the premise that states are interested in maximizing revenues; Olson (1993) contrasts the revenue-maximizing behavior of “roving bandits” and “stationary bandits”; and the various essays in Evans, Rueschemeyer, and Skocpol (1985) and related literature motivate the assumption of state autonomy by emphasizing the revenue needs of the state. Further, many studies of the political

economy of taxation emphasize that economic sectors differ in their taxability (see, e.g., Levi, 1988; Lieberman 2001), a consideration in various analyses of business-state relations: these include the literatures on fiscal federalism and hybrid ownership forms in China (where the retention of profits from township-village enterprises encourages local officials to provide collective goods) and the “resource curse” (one variant of which argues that the high taxability of the natural-resource industry crowds out state support of other sectors).<sup>7</sup> Nonetheless, my work is to my knowledge the first formal characterization of the argument that the allocation of collective goods across sectors may depend on the taxability of those sectors.<sup>8</sup>

The next section presents my incomplete-contracts model of lobbying. Readers primarily interested in the empirical results will want to glance at the beginning of this section and at the empirical predictions—Propositions 2–5—before proceeding to the following section.

## An Incomplete-Contracts Model of Lobbying

My starting point is the widely employed Grossman-Helpman lobbying model (Grossman and Helpman 1994, 2001), which features a politician and a finite number of organized and unorganized interest groups. In the Grossman-Helpman model organized groups attempt to influence policy by offering “contribution schedules,” which promise a particular contribution for every policy the politician may choose. I modify the model in three ways:

1. I assume that the politician maximizes a weighted average of tax revenues and personal contributions, rather than a weighted average of social welfare and personal contributions. Both assumptions are clearly reduced-form; mine may be viewed as an approximation of the incentives of politicians when tax revenues pay for politically important goods and transfers. The model

<sup>7</sup>On hybrid ownership forms and fiscal federalism in China, see, e.g., Oi (1992) and Qian and Weingast (1996). With respect to the resource curse Shafer nicely captures that portion of the phenomenon relevant to my argument when he states that countries with large natural-resource sectors or similar “inflexible leading sectors” will develop “specialized tax authorities to tap the huge, concentrated revenue streams such sectors produce, and specialized agencies to monitor, regulate, and promote the activities of these few critical firms” (1994, 13).

<sup>8</sup>Acemoglu (2005) argues that state actors may have a greater incentive to provide public goods when they have more power to tax, but does not consider the possibility that this logic extends to the allocation of collective goods *across* economic sectors.

may be easily extended to incorporate concern for broader social welfare, albeit with some loss of transparency.

2. I assume that the policy in question is the allocation of funds to the provision of collective goods for a finite number of economic sectors. Collective goods are sector-specific: they increase production only in the economic sector for which they are intended. Organized sectors may attempt to influence this policy by offering “contribution schedules.”
3. I assume that these sectors are each populated by a finite number of firms, which choose what portion of their production to hide from tax authorities. Hiding revenues is costly, equally so for all firms within a sector, but possibly different across sectors. As discussed above, tax compliance is not contractible: firms hide what they can get away with.

As this discussion implies, a “sector” is thus defined as a set of firms that share a common revenue-hiding technology and organization (or lack thereof). In principle this set might comprise one firm, or many. In practice, sectors will be larger when politicians find it difficult to discriminate in the provision of collective goods, a consideration I take up in the next section.

The sequence of play is as follows: (1) organized-sector lobbies simultaneously and noncooperatively submit contribution schedules, and (2) the politician allocates funds among collective goods, while firms simultaneously and noncooperatively choose a level of revenue hiding. (The equilibrium outcome will be the same regardless of whether firms and the politician move simultaneously, or firms move after the politician.) The following subsection describes the model in detail.

### Model

The actors in the model are the firms that make up organized and unorganized sectors, the organized-sector lobbies, and the politician. I consider each in turn.

**Firms.** There is a set  $O$  of organized sectors, and a set  $U$  of unorganized sectors, each made up of a finite number of firms. Index sectors by  $s$  and firms by  $i$ . Each firm  $i$  is endowed with  $k_i$  units of capital. To focus attention on the incentive effects of taxation, assume that all sectors are of an equal size normalized to one unit of capital, i.e., let  $\sum_{i \in s} k_i = 1$  for all sectors  $s$ .

Each firm allocates its capital to “hidden” and “unhidden” economic activity, choosing  $H_i \in [0, 1]$ , where  $H_i$  refers to the proportion of revenues hidden by firm  $i$ . Unhidden activity is taxed at an exogenous tax rate  $\tau$ ;

hidden activity is not taxed. (One may think of the tax rate as being set according to macroeconomic considerations or, in a federal system, by some higher-level government. I discuss the empirical implications of this assumption in the following section.) However, hiding revenues comes at a cost, assumed for simplicity to be equal to fraction  $\frac{\alpha_s}{2} H_i^2$  of the firm’s capital.<sup>9</sup> The parameter  $\alpha_s$  captures the costliness of hiding revenues for firms in sector  $s$ . I assume that  $\alpha_s > \tau$  for all  $s$ , which ensures an interior solution in which revenue hiding is sufficiently costly that firms choose to keep some portion of their activity unhidden. I will sometimes refer to  $\alpha_s$  as the *taxability* of sector  $s$ , since in equilibrium firms that find it more costly to hide revenues will choose to hide less of their revenues from tax authorities.

Both hidden and unhidden activity benefit from the provision of sector-specific collective goods. Let  $g_s$  be the per-capita provision of collective goods to sector  $s$  (to be chosen by the politician), with  $k_i g_s^\beta$  the resulting production of firm  $i$  in sector  $s$ , where  $\beta$  is a parameter of the model. Assume  $\beta \in (0, 1)$ , so that there are decreasing returns to the provision of collective goods. Given the exogenous tax rate  $\tau$ , the proportion of capital allocated to hidden economic activity  $H_i$  (chosen by the firm), and the provision of collective goods  $g_s$  (chosen by the politician), the after-tax production of firm  $i$  in sector  $s$  is

$$\left[ (1 - \tau)(1 - H_i) + \left( H_i - \frac{\alpha_s}{2} H_i^2 \right) \right] k_i g_s^\beta \quad (1)$$

The first term in brackets represents the proportion of capital unhidden and remaining after taxation, while the second is the untaxed (since hidden) remainder, less the proportion of capital lost while hiding revenues.

**Organized-Sector Lobbies.** Organized-sector lobbies attempt to influence the provision of collective goods to their sectors. They do so by promising a contribution  $C_s \geq 0$  for every allocation of collective goods across sectors; I denote the vector of such allocations  $g_s$  as  $\mathbf{g}$ . Formally, each lobby  $s$  offers a contribution schedule  $C_s(\mathbf{g})$ , with  $C_s(\mathbf{g}) \geq 0$  for all  $\mathbf{g}$ . Organized-sector lobbies maximize the joint welfare of their members:

$$\sum_{i \in s} \left[ (1 - \tau)(1 - H_i) + \left( H_i - \frac{\alpha_s}{2} H_i^2 \right) \right] k_i g_s^\beta - C_s(\mathbf{g}) \quad (2)$$

**Politician.** The politician values both tax revenues and contributions from the organized-sector lobbies. He has

<sup>9</sup>Any cost function  $h(H, \alpha_s)$  satisfying  $h_H, h_{HH}, h_{H\alpha_s} > 0$  and certain boundary conditions will produce the same qualitative results.



at his disposal a fixed sum of money, which he may allocate in any way to the provision of collective goods for the various organized and unorganized sectors.<sup>10</sup> Normalize this sum of money to be equal to one, so that the set of allocations must satisfy  $\sum_s g_s = 1$ . Having received the contribution schedules  $C_s$ , the politician thus chooses a vector of collective-good allocations  $\mathbf{g}$  to maximize:

$$\sum_{s \in O} C_s(\mathbf{g}) + \gamma \sum_s T_s(g_s) \quad (3)$$

where  $T_s(g_s)$  is the total tax revenue collected from sector  $s$ , to be derived below. The parameter  $\gamma$  represents the degree to which the politician cares about tax revenues relative to contributions from the organized-sector lobbies. I assume only that  $\gamma > 0$ .

### Equilibrium

I search for the subgame-perfect Nash equilibrium of this extensive game with perfect information, beginning with firms' allocation of capital between hidden and unhidden economic activity. Each firm  $i$  chooses  $H_i$  to maximize (1). The solution to this problem is

$$H_i^* = \frac{\tau}{\alpha_s} \quad (4)$$

A firm will hide more, the larger is the exogenous tax rate, and the smaller is its cost of hiding revenues. Since all firms within a sector share the same cost  $\alpha_s$  of hiding revenues, equations (1) and (4) together imply that the after-tax production of sector  $s$  is

$$\begin{aligned} \sum_{i \in s} \left[ (1 - \tau)(1 - H_i^*) + \left( H_i^* - \frac{\alpha_s}{2} (H_i^*)^2 \right) \right] k_i g_s^\beta \\ = \left( 1 - \tau + \frac{\tau^2}{2\alpha_s} \right) g_s^\beta \end{aligned} \quad (5)$$

(Recall that the total capital of all firms in any sector  $s$  is normalized to one.) Holding  $g_s$  constant, after-tax production in any sector is a decreasing function of the tax rate  $\tau$  and of the taxability of the sector  $\alpha_s$ . However,  $g_s$  is itself a function of  $\tau$  and  $\alpha_s$ , since the incentive for the politician to provide sector-specific collective goods depends on the taxability of that sector. In particular, note that we can derive  $T_s(g_s)$ , the total tax revenue collected from sector  $s$ , as

$$\sum_{i \in s} [\tau(1 - H_i^*)] k_i g_s^\beta = \left( \tau - \frac{\tau^2}{\alpha_s} \right) g_s^\beta \quad (6)$$

which is an increasing function of  $\alpha_s$ .

<sup>10</sup>At the cost of additional notation, we can obtain analogous results by assuming that the politician values both contributions and that portion of tax revenues not allocated to public-goods production, where tax revenues are in turn augmented by the provision of collective goods.

Anticipating this behavior, the politician then chooses the optimal allocation  $\mathbf{g}$  of collective goods across sectors, taking into account the contribution schedules  $C_s(\mathbf{g})$  offered by the organized-sector lobbies. Grossman and Helpman (1994, 2001) show that when attention is restricted to contribution schedules which are *truthful*—those for which differences in an organized sector's promised contributions reflect differences in the utility that would be received from different policies—then in equilibrium the politician maximizes a social welfare function that gives a weight of one to the policy payoff of organized groups, and a weight of  $\gamma$  to the politician's other concerns (in Grossman and Helpman, social welfare; here, tax revenues):<sup>11</sup>

$$\sum_{s \in O} \left( 1 - \tau + \frac{\tau^2}{2\alpha_s} \right) g_s^\beta + \gamma \sum_s \left( \tau - \frac{\tau^2}{\alpha_s} \right) g_s^\beta \quad (7)$$

Maximizing (7) subject to the constraint that  $\sum_s g_s = 1$  gives the equilibrium provision of collective goods to each sector.

**Proposition 1.** *When contribution schedules are “truthful,” then the equilibrium provision of collective goods to any two sectors  $s$  and  $t$  satisfies*

$$\frac{g_s}{g_t} = \left( \frac{\Pi_s}{\Pi_t} \right)^{\frac{1}{1-\beta}} \quad (8)$$

where for any sector  $s$ :

$$\Pi_s = \gamma \left( \tau - \frac{\tau^2}{\alpha_s} \right) \text{ if the sector is unorganized} \quad (9)$$

$$\begin{aligned} \Pi_s = \left( 1 - \tau + \frac{\tau^2}{2\alpha_s} \right) \\ + \gamma \left( \tau - \frac{\tau^2}{\alpha_s} \right) \text{ if the sector is organized} \end{aligned} \quad (10)$$

**Proof.** Defining  $\Pi_s$  as in (9) and (10), equation (7) can be rewritten as

$$\sum_s \Pi_s g_s^\beta \quad (11)$$

Maximizing (11) subject to the constraint that  $\sum_s g_s = 1$  gives the following the first-order condition for any  $s$ :

$$\beta \Pi_s g_s^{\beta-1} - \lambda = 0 \quad (12)$$

<sup>11</sup>More precisely, any truthful equilibrium of a menu-auction game will be jointly efficient; see Bernheim and Whinston (1986). Note that joint efficiency is defined only with respect to what is contractible: in this model there will typically be unrealized gains from trade due to the inability of organized-sector lobbies to commit that their members will pay taxes in full.

where  $\lambda$  is the Lagrange multiplier on the constraint  $\sum_s g_s = 1$ . Rearranging terms for any  $g_s$  and  $g_t$  gives (8).

Proposition 1 says that provision of collective goods to one sector will be larger than that to another if the joint importance of the first sector's production to the politician (because of tax revenues) and to the firms in that sector (but only if organized) is greater than that of the other sector. That importance is captured in  $\Pi_s$ , defined in (9) and (10), which expresses the nature of influence in the model:

- When revenues are relatively unimportant to the politician (i.e., when  $\gamma$  is small), then the collective-action effect dominates: sectors will tend to be favored when they are organized (since  $\Pi_s$  will typically be larger for organized sectors).
- When revenues are relatively important to the politician (i.e., when  $\gamma$  is large), then the taxability effect dominates: sectors will tend to be favored when they are easier to tax (since  $\Pi_s$  will be relatively large only when  $\alpha_s$  is large).

The difference between equations (9) and (10) reflects the different incentives the politician has to support organized and unorganized sectors. Unorganized sectors are important to the politician only because of the tax revenues they provide. As a consequence, they will always achieve a sort of representation through taxation: sectors whose firms hide less will receive more collective goods. (Again, this representation will be imperfect: collective goods are provided in proportion to the sector's revenue importance to the politician, not in proportion to the value of those goods to the sector.) In contrast, organized sectors are politically important both because of their tax potential and because they may compensate the politician for providing collective goods. The relationship between revenue hiding and provision of collective goods for organized sectors is thus more subtle. Sectors whose firms hide more from tax authorities are willing to pay more for collective goods, since they retain more of the resulting production. However, politicians are less predisposed to provide these goods, since they receive little tax revenue from such sectors. The second effect will outweigh the first when tax revenues are relatively important. (Note that these and the following arguments—expressed formally as Propositions 2–5—take advantage of the assumption that the exogenous tax rate  $\tau$  is constant across firms, which implies that differences in revenue hiding across sectors are due entirely to differences in taxability  $\alpha_s$ . I consider the empirical implications of this assumption below.)

**Proposition 2.** *Holding constant the taxability and organization of other sectors, the provision of collective goods to an*

- *unorganized sector is always decreasing in the proportion of revenues hidden by firms in that sector*
- *organized sector is decreasing in the proportion of revenues hidden by firms in that sector so long as tax revenues are sufficiently important to the politician*

**Proof.** Proposition 1 states that the provision of collective goods to any sector  $s$  is increasing in  $\Pi_s$ , defined by (9) and (10). Letting  $H_s^*$  be the level of revenue hiding by firms in sector  $s$ , (9) can be rewritten as

$$\gamma\tau(1 - H_s^*) \tag{13}$$

which is always decreasing in  $H_s^*$ . Similarly, (10) can be rewritten as

$$(1 - \tau + \gamma\tau) + H_s^*\tau\left(\frac{1}{2} - \gamma\right) \tag{14}$$

which is decreasing in  $H_s^*$  for  $\gamma > \frac{1}{2}$ .

The fact that revenue hiding cuts both ways for organized sectors suggests that politicians may punish an unorganized sector more for revenue hiding than they will an organized sector, since an unorganized sector is valuable only to the extent that it provides tax revenue. The following proposition shows this to be the case so long as the value of tax revenue to the politician is sufficiently small (so that whether a sector is organized is relatively important) or there are sufficient diminishing returns to the provision of collective goods (so that the politician is responsive to changes in the importance of any sector).

**Proposition 3.** *For a given level of revenue hiding, an increase in the ability of firms in an unorganized sector to hide revenues results in a larger drop in collective-goods provision than an increase in the ability of firms in an organized sector to hide revenues so long as the value of tax revenue to the politician is sufficiently small or there are sufficient diminishing returns to the production of collective goods.*

**Proof.** Using Proposition 1 and the constraint  $\sum g_s = 1$ , we can derive the value of collective-goods provision for any sector  $t$  as  $g_t = \frac{(\Pi_t)^{\frac{1}{1-\beta}}}{\sum_s (\Pi_s)^{\frac{1}{1-\beta}}}$ . Consider some unorganized sector  $u$  and organized sector  $o$ . Differentiating  $g_u$  with respect to  $H_u^*$  gives

$$\begin{aligned} & \frac{\partial \Pi_u}{\partial H_u^*} \cdot \frac{(\Pi_u)^{\frac{\beta}{1-\beta}} \left[ \sum_{s \neq u} (\Pi_s)^{\frac{1}{1-\beta}} \right]}{(1-\beta) \left[ \sum_s (\Pi_s)^{\frac{1}{1-\beta}} \right]^2} \\ &= -\gamma \tau \frac{(\Pi_u)^{\frac{\beta}{1-\beta}} \left[ \sum_{s \neq u} (\Pi_s)^{\frac{1}{1-\beta}} \right]}{(1-\beta) \left[ \sum_s (\Pi_s)^{\frac{1}{1-\beta}} \right]^2} \end{aligned} \quad (15)$$

where, following the proof to Proposition 2,  $\Pi_u = \gamma \tau (1 - H_u^*)$ . Similarly, differentiating  $g_o$  with respect to  $H_o^*$  gives

$$\begin{aligned} & \frac{\partial \Pi_o}{\partial H_o^*} \cdot \frac{(\Pi_o)^{\frac{\beta}{1-\beta}} \left[ \sum_{s \neq o} (\Pi_s)^{\frac{1}{1-\beta}} \right]}{(1-\beta) \left[ \sum_s (\Pi_s)^{\frac{1}{1-\beta}} \right]^2} \\ &= \tau \left( \frac{1}{2} - \gamma \right) \frac{(\Pi_o)^{\frac{\beta}{1-\beta}} \left[ \sum_{s \neq o} (\Pi_s)^{\frac{1}{1-\beta}} \right]}{(1-\beta) \left[ \sum_s (\Pi_s)^{\frac{1}{1-\beta}} \right]^2} \end{aligned} \quad (16)$$

where  $\Pi_o = (1 - \tau + \gamma \tau) + H_o^* \tau (\frac{1}{2} - \gamma)$ . Clearly (15) is less than (16) when  $\gamma \leq \frac{1}{2}$ . With respect to diminishing returns, note that as  $\beta$  approaches zero, (15) approaches  $-\gamma \tau \frac{[\sum_{s \neq u} (\Pi_s)]}{[\sum_s \Pi_s]^2}$ , while (16) approaches  $\tau (\frac{1}{2} - \gamma) \frac{[\sum_{s \neq o} (\Pi_s)]}{[\sum_s \Pi_s]^2}$ , so that (15) is always less than (16) since  $\sum_{s \neq o} \Pi_s < \sum_{s \neq u} \Pi_s$  (because  $\Pi_u < \Pi_o$  when  $H_u^* = H_o^*$ , which is the premise of the proposition).

Together, Propositions 1, 2, and 3 suggest that the predictions and inferences we make about the consequences of collective action may be very different when tax revenues are important and differences in taxability across sectors are large. The following two propositions show explicitly how our conventional understanding of politics should change under these conditions.

**Proposition 4.** *Firms in a sector that is not organized may receive more provision of collective goods than firms in a sector that is organized when*

- *politicians especially care about tax revenues, and*
- *the unorganized sector is easy to tax relative to the organized sector, i.e., when firms in the unorganized sector hide less of their revenues from tax authorities.*

**Proof.** Consider an unorganized sector  $u$  and an organized sector  $o$ . Equation (8) says that  $g_u > g_o$  if

$$\gamma \left( \tau - \frac{\tau^2}{\alpha_u} \right) > \left( 1 - \tau + \frac{\tau^2}{2\alpha_o} \right) + \gamma \left( \tau - \frac{\tau^2}{\alpha_o} \right) \quad (17)$$

Rewriting this as

$$\gamma (\alpha_u - \alpha_o) > \frac{\alpha_u \alpha_o}{\tau^2} \left( 1 - \tau + \frac{\tau^2}{2\alpha_o} \right) \quad (18)$$

we see that the unorganized sector will be favored when  $\gamma (\alpha_u - \alpha_o)$  is large. With respect to revenue hiding, recall that for any firm  $i$  in any sector  $s$ ,  $H_i^*$  is a decreasing function of  $\alpha_s$ .

**Proposition 5.** *When politicians especially care about tax revenues, then firms in an organized sector may benefit at the expense of firms in an unorganized sector not because they are organized, but because they are more taxable, i.e., because they hide less of their revenues from tax authorities.*

**Proof.** Consider an unorganized sector  $u$  and an organized sector  $o$ , and let  $\gamma$  approach infinity. Then by Proposition 1, the ratio of collective-goods provision  $\frac{g_o}{g_u}$  is

$$\lim_{\gamma \rightarrow \infty} \left( \frac{\Pi_o}{\Pi_u} \right)^{\frac{1}{1-\beta}} = \left( \frac{1 - \frac{\tau}{\alpha_o}}{1 - \frac{\tau}{\alpha_u}} \right)^{\frac{1}{1-\beta}} \quad (19)$$

which is greater than one if and only if  $\alpha_o > \alpha_u$ , i.e., if and only if firms in sector  $o$  hide less than do those in sector  $u$ .

## Evidence

What is the empirical evidence for the hypotheses generated by this model? I begin to answer this question by analyzing data from a survey of firms in 25 postcommunist countries, an ideal setting for examining the political economy of taxation. Under the socialist system, “taxation” was more akin to an accounting procedure than the extraction of resources from autonomous economic actors (Kornai 1992, chapter 8). With privatization and liberalization, postcommunist states thus faced the challenge of creating tax regimes from scratch (e.g., Ebrill and Havrylyshyn 1999; Hemming, Cheasty, and Lahiri 1995). The difficulty of this task meant that politicians in these countries have often faced immense pressure to raise tax revenues (e.g., Treisman 1999; Way 2002), even while some economic sectors have yielded up revenues more easily than others (Yakovlev 2001). The model above

suggests that in such an environment the political importance of an economic sector may depend on its taxability. At the same time, there has been substantial variation in the degree to which postcommunist states have been able to create functioning tax systems that extract revenues from broad segments of the economy, a fact that I exploit when discussing the role of political-economic environment in the provision of collective goods.

**Data**

My empirical analysis uses data from the Business Environment and Enterprise Performance Survey (BEEPS) carried out in 1999 by the World Bank and the European Bank for Reconstruction and Development. Through the BEEPS project, firms were surveyed on various aspects of business-state relations. Sampling was done at the country level, with quotas established for industrial sector, employment, location, ownership (foreign versus domestic and private versus state), and contribution of exports to total sales. Businesses were randomly sampled from business or telephone directories, with an initial screening interview by telephone to establish interest and conformity with quotas; unfortunately, no record seems to exist of the response rate at this initial screening stage. All follow-up interviews were carried out in person with a high-ranking officer of the firm. For purposes of consistency the survey was implemented in all countries by the local office of A. C. Nielsen. In all, 4,104 small and medium-sized enterprises were interviewed in 25 postcommunist countries.<sup>12</sup> Russian enterprises are somewhat overrepresented, with 552 out of the 3,954 firms in the subsample of postcommunist countries. Below I check the robustness of my results to exclusion of Russian firms from the sample. Throughout I control for institutional variation at the country level by including country dummies. In addition, in all empirical models I include town-size dummies as a rough control for within-country variation in institutional environment, since the precise location of firms within a country is not coded.

Table 1 presents the dependent variables used in the analysis below. Respondents were asked to “rate the overall quality and efficiency of services delivered” by 14 “public agencies or services” on a 6-point scale (emphasis in

<sup>12</sup>Further details on the survey and its implementation can be found in Hellman et al. (2000). Note that while Hellman et al. refer to a survey in 1999 of firms in 20 countries, six countries (Albania, Turkey, Latvia, Bosnia, the Serb Republic in Bosnia, and Macedonia) were added to the project later in the year. I exclude firms in Turkey from the analysis. Among postcommunist states in Eastern Europe and the former Soviet Union, only Tajikistan, Turkmenistan, and Yugoslavia were ultimately not included in the survey.

**TABLE 1 Quality and Efficiency of Public Agencies and Services**

	Customs	Courts	Roads	Post	Telephone	Electricity	Water	Health	Education	Police	Military	Government	Parliament	Central Bank
Very bad	5.96	9.29	12.95	1.86	3.12	4.10	4.55	10.05	5.40	9.99	7.55	15.28	17.83	7.70
Bad	13.45	20.72	23.88	6.57	8.98	8.56	10.84	23.74	13.99	17.79	12.91	16.77	22.05	11.98
Slightly bad	19.45	25.96	22.78	10.06	12.51	10.31	13.62	24.31	20.21	23.26	15.43	22.37	25.09	15.15
Slightly good	28.35	25.24	22.56	31.13	27.52	26.36	25.96	21.50	30.06	23.70	24.17	21.90	18.62	24.90
Good	28.83	17.17	16.43	46.04	42.28	45.18	40.95	18.34	27.72	22.23	34.55	19.53	14.29	34.08
Very Good	3.97	1.61	1.40	4.34	5.60	5.49	4.08	2.05	2.62	3.03	5.40	4.16	2.13	6.19
N	2,921	3,035	3,560	3,758	3,910	3,900	3,802	3,702	3,553	3,603	2,611	3,416	3,388	3,181

*Note:* Percent of respondents rating public agency or service at given level of quality and efficiency. Full names of variables: customs service/agency, judiciary/courts, roads department/public works, postal service/agency, telephone service/agency, electric power company/agency, water/sewage service/agency, public health care service/hospitals, education services/schools, police, armed forces/military, central government leadership (president/PM/cabinet), parliament, central bank.



original). The frequency distribution for most variables is roughly bell-shaped, with a slight skew towards satisfaction with the service provided. The advantage of this set of variables is that these public services and agencies are in principle valuable to all firms, not merely those in certain sectors. (The one obvious exception is customs, which is of direct use only for importing and exporting firms.) Consequently, it should be less likely that firms in certain sectors rate particular collective goods positively or negatively merely because those goods are unimportant to those sectors. It is worth noting that agencies that provide collective goods typically thought of as nonexcludable—the military, the central bank, etc.—often provide sector- or firm-specific goods in postcommunist countries: interior-ministry troops moonlight as security “consultants,” central banks channel credits to specific sectors, etc. That said, the ability of politicians to discriminate in the provision of collective goods may vary according to the public service or agency involved, a topic I address below.

The traditional theory of collective action suggests that the quality and efficiency of services delivered to an economic sector should be related to the ability of members of that sector to overcome their collective-action problems. I examine three such measures in particular:

- Whether or not the firm belongs to a “trade association or lobby group.”
- The employment of the firm, since large firms are more likely to undertake action on their own, despite the presence of free riders. I use the log of employment in my empirical analysis, since there may be decreasing returns to scale in the political arena; qualitatively similar results obtain if employment without the log transformation is used instead.
- The degree of competition, since action will be more likely if benefits are concentrated among a small number of firms. The BEEPS questionnaire asks firms whether they have no competitors in their major product line in the domestic market, one to three competitors, or more than three competitors. I use dummy variables for the first two categories.

Summary statistics for these and other variables are given in Table 2.

The incomplete-contracts model presented above stresses instead the importance of revenue hiding in determining the provision of collective goods in certain settings. Respondents were asked, “What percentage of the sales of a typical firm in your area of activity would you estimate is reported to the tax authorities, bearing in mind difficulties with complying with taxes and other regula-

**TABLE 2** Summary Statistics

Variable	Mean	Std. Dev.	N
Association	0.240		3953
Employment	141	173	3952
Monopoly	0.096		3949
1–3 Competitors	0.129		3949
Revenue hiding	21.5	25.9	3662
State-owned	0.141		3870
Foreign ownership	0.127		3947
Exporter	0.237		3945
Personal services	0.054		3951
Transportation	0.059		3951
Wholesale trade	0.137		3951
Retail trade	0.145		3951
Construction	0.087		3951
Other	0.015		3951
Resource extraction	0.123		3951
Business services	0.062		3951
Financial services	0.017		3951
Manufacturing	0.301		3951

Notes: Revenue hiding is percentage of revenues hidden. For dummy variables only proportion given.

tions?”<sup>13</sup> For consistency with the model above, I recode this variable as the level of revenue hiding. Wording such as “typical firm in your area of activity” is standard in survey research when questions touch on sensitive matters. For our purposes, this phrasing has the additional benefit of implying a sectoral characteristic, as the model above suggests should be important to politicians making decisions about the allocation of collective goods. Interviewers were instructed to assure respondents that their responses to this and other questions would remain anonymous, and in the event the response rate was quite high: 92.6% of all firms answered the question. Respondents were allowed to choose from eight predefined intervals (e.g., 70–79%). I code the responses as the midpoint of the intervals, and treat the variable as continuous. However, to check that this treatment is not driving the results I reran all equations where revenue hiding was the dependent variable as “interval regressions” (Stewart 1983); the estimated coefficients are virtually identical. As Table 2 shows, the mean level of revenue hiding reported is 21.5%, with 66.4% of firms reporting that firms like theirs underreport sales to tax authorities. Variation is large, with a standard deviation of 25.9%.

<sup>13</sup>In three countries respondents were instead asked what percentage of sales is *hidden* from tax authorities. My results are robust to exclusion of firms in these countries from the sample.

Further, as I show below, this variation is systematic, with firms in sectors where it is presumably harder to hide revenues from tax authorities reporting lower levels of revenue hiding. Thus, rather than refusing to answer the question or to admit that tax evasion takes place, respondents typically reported some level of revenue hiding, with the degree of hiding related to characteristics of the firm in an intuitive way. These empirical relationships are similar to those identified with the identical question in the much broader World Business Environment Survey (of which the BEEPS formed the initial stage) carried out by the World Bank in 1999 and 2000 in 80 countries (Batra, Kaufmann, and Stone 2003; Tedds 2005), and cross-country differences are analogous to those found with a similar question in a smaller survey of firms in five postcommunist countries (Johnson et al. 2000).

All of the empirical models that I estimate control for firm characteristics that may be correlated with either the collective-action or revenue-hiding variables on the one hand, and the measures of collective-good provision on the other (independently of their effect on the collective-action and revenue-hiding variables): (majority) state ownership, (any) foreign ownership, whether or not the firm exports any goods directly, and industrial sector (with nine sector dummies).<sup>14</sup>

## Results

**Comparing the Collective-Action and Incomplete-Contracts Models.** I begin by estimating a “pure” collective-action model, where the key determinants of collective-goods provision are (a) a dummy variable reflecting whether or not the firm belongs to a trade associ-

ation or lobby group, (b) (the log of) firm employment, and (c) the absence of competition in the firm’s major product line in the domestic market (a dummy variable reflecting whether or not the firm is a monopolist, and a dummy variable that takes a value of one if the firm has one to three competitors). Formally, my empirical model is

$$Y_i^* = Z_i\eta + X_i\theta + \varepsilon_i \quad (20)$$

where  $Y_i^*$  is the quality or efficiency of some public agency or service, as experienced by firm  $i$ ;  $Z_i$  is the vector of collective-action variables for firm  $i$ ;  $X_i$  is the other firm characteristics included as control variables, including industrial-sector, country, and town-size dummy variables;  $\varepsilon_i$  is the unobserved residual; and  $\eta$  and  $\theta$  are vectors of parameters to be estimated.

As discussed above, we do not observe  $Y_i^*$  directly, but only a categorical rating  $Y_i$  (“very good,” “good,” etc.) of the quality and efficiency of the public agency or service. However, we may assume that there exist common thresholds (cutpoints) that determine when a firm that experiences  $Y_i^*$  switches from one categorical rating  $Y_i$  to another. If it is further assumed that  $\varepsilon_i$  is distributed as a standard normal, then this is the ordered-probit model, which may be estimated by maximum likelihood. In this model, the cutpoints are parameters to be estimated.

The theory of collective action suggests that the parameters in  $\eta$  should be positive: membership in a trade association or lobby group, employment, and the absence of competition should all be positively associated with the provision of collective goods. Table 3 presents estimation results for each of the 14 public agencies and services whose quality and efficiency firms were asked to rate. Of the four collective-action variables, firm size has the most unambiguous effect: the estimated coefficient on log of employment is almost always (for all dependent variables but telephone and education) positive and statistically significant at conventional levels.<sup>15</sup> Further,

<sup>14</sup>Note that country dummies alone would not control for variation across countries in the taxability of industrial sectors due to variation in those sectors’ ownership structures (see, e.g., Weintal and Jones Luong (2002) on variation in ownership of the natural-resource sector across post-Soviet states). I include ownership variables in part to pick up this cross-country effect, as well to control for within-country variation in the taxability of industrial sectors that may correlate with those firms’ capacity for collective action (as in Russia, where there is both private and state ownership of resource-extraction firms). “Resource-extraction” firms in the sample are those engaged in either “farming/fishing/forestry” or “mining/quarrying.” I treat state and foreign ownership asymmetrically because of the presumed mechanisms by which such ownership influences managerial behavior. State ownership is most likely to matter when the state has a controlling stake and thus has the ability to remove the manager if necessary (Shleifer and Vishny 1994). In contrast, any level of foreign ownership may constrain managerial behavior, since foreign owners may choose to withdraw their stake—or withhold further capital investment—if dissatisfied with their investment. For discussion of sectoral characteristics that may be associated with capacity for collective action, see, e.g., Alt and Gilligan (1994).

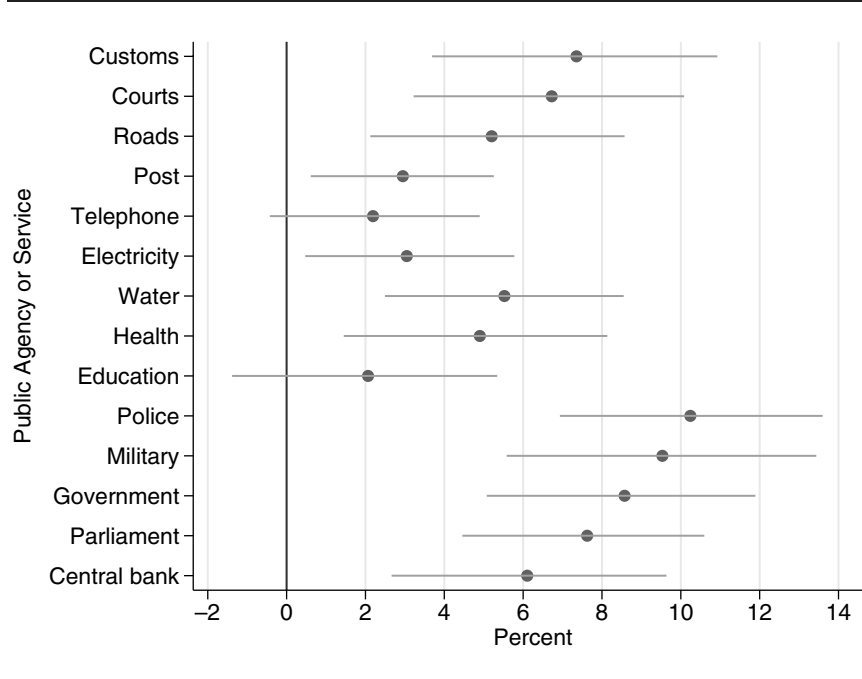
<sup>15</sup>For all empirical models in this article I report robust standard errors with associated significance levels and confidence intervals. Arguably, one should additionally cluster by the primary sampling unit, which is country, so that standard errors are robust to correlation among observations within a country. Unfortunately, the Clarify package that I use to produce the data for estimated effects generally breaks down when the cluster option is invoked, though (nonclustered) robust standard errors are supported. For purposes of consistency with estimated effects I therefore report robust standard errors in all tables of estimation results. However, I reran all models (including those used to produce the data for Figure 3, where estimated coefficients are not reported) clustering by country, and checked significance levels against those with robust standard errors. While a few estimated coefficients are occasionally significant at the 10% level with clustered robust standard errors while significant at the 5% level with robust standard errors, all my key results are unaffected.

TABLE 3 Collective-Action Model

	Customs	Courts	Roads	Post	Telephone	Electricity	Water	Health	Education	Police	Military	Government	Parliament	Central Bank
Association	0.015 (0.050)	-0.026 (0.051)	-0.096* (0.048)	-0.004 (0.048)	-0.005 (0.045)	-0.062 (0.047)	-0.031 (0.047)	-0.034 (0.047)	-0.016 (0.047)	0.006 (0.047)	-0.098 (0.057)	-0.008 (0.048)	-0.012 (0.048)	-0.037 (0.050)
Log employment	0.062** (0.016)	0.056** (0.016)	0.045** (0.015)	0.038** (0.014)	0.024 (0.014)	0.034* (0.014)	0.054** (0.014)	0.042** (0.014)	0.018 (0.015)	0.085** (0.014)	0.082** (0.017)	0.073** (0.015)	0.071** (0.015)	0.055** (0.015)
Monopoly	0.162* (0.070)	0.211** (0.067)	0.201** (0.069)	0.083 (0.066)	0.112 (0.064)	0.124 (0.071)	0.064 (0.069)	0.144* (0.065)	0.028 (0.069)	0.103 (0.062)	0.019 (0.074)	0.157* (0.067)	0.218** (0.070)	0.060 (0.074)
1-3 Competitors	0.098 (0.060)	0.046 (0.059)	-0.027 (0.055)	-0.133* (0.057)	-0.048 (0.054)	-0.038 (0.056)	-0.012 (0.055)	-0.038 (0.055)	-0.045 (0.054)	-0.006 (0.056)	-0.047 (0.068)	-0.021 (0.054)	-0.025 (0.056)	0.010 (0.057)
State-owned	0.053 (0.062)	-0.010 (0.061)	0.154* (0.060)	0.122* (0.060)	0.082 (0.057)	0.100 (0.059)	0.096 (0.058)	0.012 (0.057)	0.064 (0.060)	0.083 (0.057)	0.127 (0.068)	0.154* (0.061)	0.105 (0.062)	0.065 (0.064)
Foreign ownership	-0.006 (0.056)	0.026 (0.062)	-0.059 (0.059)	-0.082 (0.057)	0.011 (0.057)	0.049 (0.056)	-0.028 (0.055)	0.013 (0.056)	-0.098 (0.059)	-0.069 (0.056)	-0.099 (0.067)	-0.008 (0.054)	0.035 (0.056)	0.019 (0.059)
Exporter	0.002 (0.052)	-0.038 (0.052)	-0.007 (0.051)	-0.001 (0.050)	0.034 (0.049)	-0.028 (0.051)	0.044 (0.050)	-0.035 (0.049)	-0.027 (0.050)	-0.038 (0.050)	-0.145* (0.061)	0.021 (0.051)	-0.024 (0.051)	0.076 (0.054)
Cutpoint 1	-1.271 (0.111)	-0.976 (0.106)	-1.128 (0.097)	-1.895 (0.108)	-1.699 (0.102)	-1.772 (0.098)	-1.639 (0.099)	-0.878 (0.092)	-1.288 (0.097)	-0.641 (0.098)	-0.742 (0.110)	-0.030 (0.100)	-0.180 (0.098)	-0.544 (0.102)
Cutpoint 2	-0.538 (0.107)	-0.167 (0.103)	-0.268 (0.095)	-1.124 (0.098)	-0.938 (0.095)	-1.090 (0.093)	-0.893 (0.093)	0.027 (0.090)	-0.495 (0.094)	0.105 (0.097)	-0.062 (0.108)	0.608 (0.100)	0.539 (0.098)	0.092 (0.101)
Cutpoint 3	0.097 (0.106)	0.532 (0.103)	0.364 (0.095)	-0.600 (0.097)	-0.408 (0.094)	-0.625 (0.092)	-0.363 (0.092)	0.690 (0.090)	0.144 (0.095)	0.791 (0.098)	0.483 (0.109)	1.298 (0.101)	1.256 (0.099)	0.635 (0.101)
Cutpoint 4	0.901 (0.107)	1.294 (0.105)	1.093 (0.095)	0.370 (0.096)	0.398 (0.093)	0.184 (0.091)	0.382 (0.092)	1.363 (0.092)	0.985 (0.096)	1.524 (0.100)	1.213 (0.111)	2.034 (0.103)	1.937 (0.101)	1.383 (0.103)
Cutpoint 5	2.349 (0.116)	2.623 (0.121)	2.479 (0.110)	2.258 (0.104)	2.098 (0.100)	1.959 (0.097)	2.139 (0.100)	2.687 (0.105)	2.540 (0.109)	2.892 (0.110)	2.778 (0.122)	3.260 (0.115)	3.157 (0.116)	2.857 (0.111)
N	2,841	2,950	3,463	3,649	3,801	3,790	3,697	3,601	3,453	3,500	2,535	3,322	3,293	3,090
Log pseudolikelihood	-4316.51	-4673.60	-5405.59	-4625.29	-5261.33	-5126.75	-5234.61	-5686.82	-5187.33	-5456.44	-3773.78	-5150.79	-5146.37	-4633.11

Notes: Ordered-probit model. Dependent variable is quality and efficiency of public agency or service. Revenue hiding is proportion of revenues hidden. Industrial-sector, town-size, and country dummies included. Robust standard errors in parentheses. Significance levels: \*\* = .01, \* = .05.

**FIGURE 1 Collective-Action Model: Change in Probability Satisfied with Public Agency or Service as Employment Increases by 100 for Smallest Firms**



Note: Dots represent point estimates, lines 95% confidence intervals.

the estimated effect of employment is substantively large, as illustrated in Figure 1. The estimated change in the probability that a respondent is generally satisfied with the quality or efficiency of a public agency or service—that the respondent rates the quality or efficiency as “very good,” “good,” or “slightly good”—as employment increases by 100 for the smallest firms (i.e., as employment increases from 5 to 105) ranges from 2% for education to over 10% for the police. The 95% confidence intervals for these effects exclude zero for all but telephone and education, and the lower bound of the 95% confidence interval is greater than 2% for nine of the 14 public services or agencies.<sup>16</sup>

Beneath this general trend, however, lie substantial differences in the estimated effect of size on collective-goods provision. In particular, the estimated effect is generally small (or not significantly different from zero) for those collective goods that are presumably harder to provide on a discriminatory basis: roads, post, telephone, electricity, water, health, and education. For these goods,

discrimination may take place in large part on a territorial basis, limiting the ability of the politician to reward sectors that are more important (in the sense of having a higher  $\Pi_s$ ).<sup>17</sup>

Of the remaining collective-action variables, only monopoly status is even occasionally positive and statistically significant. In particular, for 13 of the 14 public agencies or services the estimated effect of belonging to a trade association or lobby group is not significantly different from zero, and for the fourteenth (roads) the estimated coefficient has the “wrong” sign; firms that have managed to overcome their collective-action problems by banding together are in general no more satisfied with the quality and efficiency of collective-goods provision than are those that have not. (Among the various controls, the estimated coefficient on state ownership is almost always positive—a result consistent with the view that state-owned firms may also have disproportionate access to state officials—though is statistically significant

<sup>16</sup>The Stata programs in the Clarify package used to produce these and other effects are described in King, Tomz, and Wittenberg (2000) and Tomz, Wittenberg, and King (2003).

<sup>17</sup>More precisely, the impact of a change in  $\Pi_s$  on the provision of collective goods will be smaller when the set of sectors is partitioned into *territories*, where the politician can provide only territory-specific collective goods. A formal proof is available from the author upon request.



**TABLE 4** Determinants of Revenue Hiding

	Estimated Coefficient	Standard Error
Association	0.009	1.021
Log employment	-2.305**	0.328
Monopoly	-8.800**	1.442
1-3 Competitors	-2.248	1.148
State-owned	-0.459	1.302
Foreign ownership	-4.634**	1.143
Exporter	-0.302	1.092
Personal services	3.612	2.111
Transportation	2.709	2.015
Wholesale trade	1.754	1.426
Retail trade	0.600	1.425
Construction	0.311	1.573
Other	-0.784	3.291
Resource extraction	-1.470	1.535
Business services	-1.546	1.931
Financial services	-8.071**	2.296
N		3,573
R <sup>2</sup>		0.19

*Notes:* OLS regression. Dependent variable is percentage of revenues hidden. Manufacturing is excluded industrial-sector dummy variable. Country and town-size dummies included. Robust standard errors reported. Significance levels: \*\* = .01, \* = .05.

for only three of 14 public agencies or services.) The basic collective-action model therefore suggests that size is the major determinant of success in the battle for public resources in the postcommunist world.<sup>18</sup>

But what accounts for the size effect? The incomplete-contracts model suggests that large firms may benefit from better provision of collective goods if they are more taxable and not just because they are less subject to collective-action problems. To explore this possibility, I begin by estimating the effect of employment on the reported level of revenue hiding. For purposes of transparency I report in Table 4 the results of an OLS regression of what respondents say is the percentage of revenues hidden from tax authorities by a “typical firm in [their] area of activity”

<sup>18</sup>My results contrast somewhat with those of Frye (2002), who includes many of the same variables in his analysis of the determinants of successful lobbying at various levels of government in Russia. In particular, while Frye also finds that size is positively correlated with success in lobbying, he generally finds no effect of monopoly status but a positive effect of membership in a business organization. One possible explanation for this difference is that firms in Frye’s study were asked whether they could influence legislation or normative acts, while my dependent variables measure actual satisfaction with the level of collective-goods provision.

on the log of employment, as well as other firm characteristics. Qualitatively similar results obtain (here, and later in the article) if one instead estimates a “fractional logit” model, which is appropriate when the dependent variable is a proportion (Papke and Wooldridge 1996), or if the log-odds ratio of the proportion of revenues hidden to that not hidden (with a suitable transformation to take account of the fact that revenue hiding may take on a value of zero) is regressed on firm characteristics.<sup>19</sup> Further, as noted above, OLS estimates are nearly identical to those from an “interval regression” where revenue hiding is treated as the underlying interval-coded variable. Note that the Tobit model is inappropriate here, despite the concentration of firms reporting zero revenue hiding, since revenue hiding cannot in principle take on negative values (Sigelman and Zeng 1999).

Employment is indeed significantly and negatively associated with revenue hiding: controlling for other variables, the average level of revenue hiding reported by a firm with 1,000 employees is 12 percentage points lower than it is for a firm with only five employees. In addition, other firm characteristics plausibly associated with the taxability of the firm are negatively associated with revenue hiding. In particular, monopolies (presumably easier to tax because of reduced information asymmetries between firms and state officials) report revenue hiding nine percentage points lower than do firms with more than three competitors. Thus, some of the effect of monopoly status on collective-goods provision noted above may be due to the greater taxability of monopolies. Further, the industrial-sector dummies line up in an intuitive way, even if the estimated coefficients are often not significantly different from each other. For example, personal-service firms (which deal primarily in cash) report more revenue hiding than do manufacturing firms (the omitted category), which in turn report more hiding than resource-extraction firms (which often sell their output through government-controlled bottlenecks) and financial-service firms (whose transactions may leave a particular paper trail). Foreign ownership and state ownership are both negatively associated with revenue hiding, though only the estimated coefficient on foreign ownership is significantly different from zero. (That said, the revenues of state-owned firms may be extracted by means other than formal taxation, and the question in the BEEPS refers only to revenues reported to “tax authorities.”)

Thus, large firms and other firms that are presumably more taxable report less revenue hiding (by

<sup>19</sup>The one substantive difference in the latter model is that the estimated coefficient on state ownership—still negative—is statistically significant.

“typical” firms in their area of activity) than do other firms. Do firms that hide less consequently benefit from better collective-goods provision? I check this prediction—Proposition 2 above—by adding the *proportion* of revenues hidden  $H_i$  to the basic collective-action model already estimated:

$$Y_i^* = Z_i\eta + H_i\delta + X_i\theta + \varepsilon_i \quad (21)$$

where as before  $Z_i$  is the vector of collective-action variables for firm  $i$ , and  $X_i$  is the other firm characteristics included as control variables, including industrial-sector, town-size, and country dummy variables. Since the determinants of revenue hiding examined in the regression in Table 4 are included in  $Z_i$  and  $X_i$ , I thus implicitly assume that there are characteristics of the sector—broadly defined—to which the firm belongs that are observable to political actors and convey information about the level of revenue hiding in that sector, but are unobservable in the data (and uncorrelated with  $\varepsilon_i$ ). My experience in the postcommunist world suggests that this assumption is plausible: politicians in these countries seem to know with a great deal of precision which types of firms pay their taxes and which do not, even if they can do little about it.

Table 5 presents the estimation results. The estimated coefficient on revenue hiding is always negative as predicted and is significantly different from zero at conventional levels for all public agencies or services but customs, post, and the central bank. As Figure 2 shows, the estimated effect of revenue hiding on collective-goods provision is comparable in magnitude to that of employment in the basic collective-action model.<sup>20</sup> As with employment, the impact of revenue hiding is generally higher for those collective goods that are presumably easier to provide on a discriminatory basis. (One exception to this general pattern—customs—makes intuitive sense: it is the job of the customs service to raise revenues, implying that sectors with more revenue hiding should not necessarily expect better service.)

Thus, as Proposition 2 predicts, firms in sectors that hide less benefit from better collective-goods provision. Proposition 3 suggests that this effect may be greater for unorganized firms than for organized firms. To test this proposition I interacted revenue hiding with the log of employment, the variable with the strongest impact in the basic collective-action model. For reasons of space I do not present the estimation results. As predicted, the estimated coefficient on the interaction term is almost

always positive, and of a magnitude such that the effect of revenue hiding completely disappears for the largest firms. The interaction effect is statistically significant at the 5% level for police, government, and parliament, and at the 10% level also for electricity, water, and military. Thus, the data are generally supportive of the proposition that revenue hiding will most affect the political importance of firms that have little direct voice in government.

Finally, Propositions 4 and 5 deal directly with the difference between the basic collective-action model and the incomplete-contracts model. Proposition 4 says that when tax revenues are especially important to politicians, then a sector which is unorganized but easy to tax may benefit from greater collective-goods provision than is one which is organized but hard to tax. The empirical results suggest that this is indeed possible, since membership in a trade association or lobby group is estimated to have no effect while the estimated impact of revenue hiding is generally quite large. Proposition 5 says that firms which are organized may benefit from greater collective-goods protection not just because they are organized, but because they are more taxable. In terms of the empirical model, we should thus expect that the estimated coefficient on the collective-action variables will trend towards zero with the inclusion of revenue hiding. Comparison of Tables 3 and 5 shows that this is the case: the estimated coefficients on log employment and monopoly are generally smaller in the incomplete-contracts model than in the collective-action model. In the next subsection I discuss these differences in more detail. As will be seen, the degree to which the revenue importance of a sector attenuates the effect of collective-action variables depends on the broader political-economic environment.

**Political-Economic Environment and the Consequences of Collective Action.** All postcommunist states faced the challenge of constructing revenue systems appropriate for a market economy from scratch. Countries in the former Soviet Union less the Baltics (the Commonwealth of Independent States, or CIS) generally approached this challenge differently than did those in Eastern Europe and the Baltics. Those in the first group had industrialized under communism, and consequently inherited an industrial structure top-heavy with a small number of large enterprises, often in relatively easy-to-tax sectors such as resource extraction (Brown, Ickes, and Ryterman 1994). Tax authorities in these states concentrated on extracting taxes from the most lucrative revenue sources among such firms (see, e.g., Easter 2002). In contrast, there were few easy pickings in Eastern Europe and the Baltics, so states in this group undertook the more difficult task of

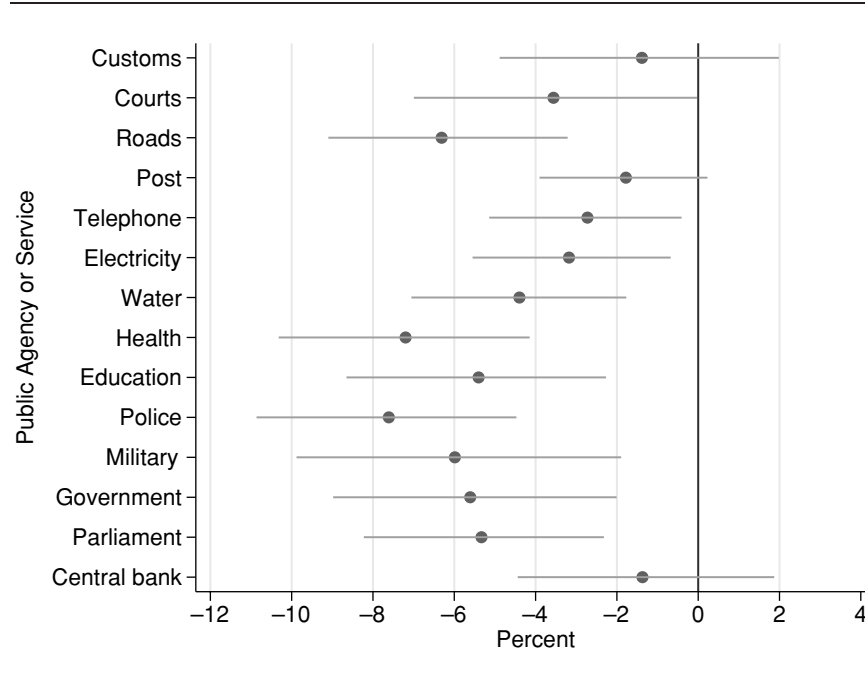
<sup>20</sup>While not visually different from zero in the figure, the upper bound on the 95% confidence interval for the effect of revenue hiding on satisfaction with the courts is  $-.031$ .

TABLE 5 Incomplete-Contracts Model

	Customs	Courts	Roads	Post	Telephone	Electricity	Water	Health	Education	Police	Military	Government	Parliament	Central Bank
Association	0.021 (0.052)	0.003 (0.053)	-0.090 (0.050)	-0.008 (0.050)	0.012 (0.047)	-0.048 (0.048)	-0.015 (0.050)	-0.027 (0.048)	-0.025 (0.049)	0.014 (0.050)	-0.097 (0.059)	-0.004 (0.051)	-0.018 (0.051)	-0.039 (0.052)
Log employment	0.058** (0.016)	0.055** (0.016)	0.033* (0.015)	0.041** (0.015)	0.025 (0.015)	0.028 (0.015)	0.043** (0.015)	0.040** (0.015)	0.014 (0.015)	0.077** (0.015)	0.078** (0.018)	0.066** (0.016)	0.064** (0.016)	0.060** (0.016)
Monopoly	0.170* (0.073)	0.214** (0.072)	0.160* (0.072)	0.069 (0.070)	0.083 (0.068)	0.088 (0.075)	0.062 (0.074)	0.136* (0.067)	0.038 (0.071)	0.083 (0.065)	-0.008 (0.077)	0.115 (0.070)	0.193** (0.073)	0.028 (0.077)
1-3 Competitors	0.109 (0.062)	0.035 (0.061)	-0.024 (0.057)	-0.097 (0.059)	-0.040 (0.056)	-0.017 (0.058)	0.008 (0.056)	-0.026 (0.057)	-0.020 (0.056)	0.019 (0.058)	-0.044 (0.070)	0.003 (0.056)	-0.013 (0.058)	0.019 (0.058)
Revenue hiding	-0.071 (0.093)	-0.177* (0.088)	-0.333** (0.082)	-0.140 (0.084)	-0.181* (0.079)	-0.219** (0.080)	-0.265** (0.081)	-0.371** (0.081)	-0.278** (0.083)	-0.383** (0.084)	-0.320** (0.103)	-0.284** (0.086)	-0.299** (0.087)	-0.075 (0.089)
State-owned	0.066 (0.065)	-0.030 (0.064)	0.134* (0.060)	0.093 (0.061)	0.060 (0.059)	0.082 (0.061)	0.074 (0.060)	0.011 (0.059)	0.057 (0.062)	0.073 (0.060)	0.098 (0.071)	0.130* (0.063)	0.086 (0.064)	0.043 (0.066)
Foreign ownership	-0.008 (0.058)	0.011 (0.064)	-0.101 (0.062)	-0.139* (0.059)	-0.042 (0.060)	0.035 (0.058)	-0.068 (0.057)	-0.033 (0.058)	-0.125* (0.060)	-0.107 (0.059)	-0.122 (0.070)	-0.045 (0.056)	0.006 (0.059)	-0.021 (0.061)
Exporter	0.002 (0.054)	-0.044 (0.055)	-0.026 (0.053)	-0.025 (0.052)	0.021 (0.051)	-0.042 (0.052)	0.054 (0.052)	-0.046 (0.051)	-0.045 (0.052)	-0.064 (0.053)	-0.179** (0.063)	0.015 (0.053)	-0.028 (0.053)	0.076 (0.056)
Cutpoint 1	-1.282 (0.117)	-1.043 (0.112)	-1.291 (0.103)	-1.946 (0.114)	-1.768 (0.108)	-1.894 (0.106)	-1.790 (0.106)	-0.993 (0.098)	-1.371 (0.104)	-0.770 (0.105)	-0.823 (0.119)	-0.143 (0.108)	-0.291 (0.106)	-0.581 (0.110)
Cutpoint 2	-0.555 (0.114)	-0.228 (0.109)	-0.420 (0.101)	-1.179 (0.104)	-1.009 (0.101)	-1.197 (0.100)	-1.030 (0.100)	-0.070 (0.096)	-0.576 (0.101)	-0.011 (0.103)	-0.145 (0.117)	0.503 (0.108)	0.433 (0.106)	0.055 (0.109)
Cutpoint 3	0.085 (0.113)	0.484 (0.109)	0.221 (0.101)	-0.651 (0.102)	-0.486 (0.100)	-0.727 (0.099)	-0.498 (0.099)	0.596 (0.096)	0.059 (0.101)	0.670 (0.103)	0.398 (0.117)	1.204 (0.108)	1.157 (0.106)	0.611 (0.110)
Cutpoint 4	0.893 (0.114)	1.250 (0.111)	0.961 (0.101)	0.321 (0.102)	0.322 (0.100)	0.092 (0.098)	0.256 (0.099)	1.283 (0.098)	0.904 (0.102)	1.415 (0.105)	1.127 (0.119)	1.936 (0.111)	1.832 (0.108)	1.364 (0.111)
Cutpoint 5	2.344 (0.124)	2.593 (0.129)	2.406 (0.119)	2.202 (0.110)	2.031 (0.106)	1.870 (0.104)	2.011 (0.106)	2.591 (0.111)	2.451 (0.116)	2.766 (0.115)	2.688 (0.129)	3.158 (0.124)	3.058 (0.124)	2.818 (0.119)
N	2,657	2,767	3,232	3,394	3,538	3,529	3,445	3,368	3,235	3,258	2,393	3,102	3,078	2,884
Log pseudolikelihood	-4037.92	-4367.16	-4999.95	-4312.04	-4888.51	-4760.61	-4870.25	-5295.62	-4861.96	-5070.56	-3568.64	-4799.81	-4797.95	-4339.33

Notes: Ordered-probit model. Dependent variable is quality and efficiency of public agency or service. Revenue hiding is proportion of revenues hidden. Industrial-sector, town-size, and country dummies included. Robust standard errors in parentheses. Significance levels: \*\* = .01, \* = .05.

**FIGURE 2 Incomplete-Contracts Model: Change in Probability Satisfied with Public Agency or Service as Revenue Hiding Increases from 0% to 50%**



Note: Dots represent point estimates, lines 95% confidence intervals.

developing systems to tax labor income (Mitra and Stern, 2003); the imperative of harmonizing tax systems with EU norms helped to sustain this process (Appel, Forthcoming). Though withholding of personal and payroll taxes meant that tax compliance was still focused on the firm, the result was a broader tax base with less need to focus on a few critically important sectors.

As a result of this difference in revenue strategy, firms that are easy or difficult to tax in general seem to be especially so in the CIS, despite the fact that there is essentially no difference between the two halves of the postcommunist world in either the mean (21.7 in Eastern Europe and the Baltics, 21.3 in the CIS) or standard deviation (25.6 in Eastern Europe and the Baltics, 26.2 in the CIS) of the percentage of revenues hidden. Table 6 presents the results of two OLS regressions—one for firms in Eastern Europe and the Baltics, and the other for firms in the CIS—of the percentage of revenues hidden on the same firm characteristics as in Table 4. As can be seen, the effect of the firm characteristics most strongly associated with revenue hiding—size and degree of competition—is substantially higher in the CIS. For example, the difference in revenue hiding between that reported by the smallest (five employees) and largest (1,000 employees) firms is 17 points in the CIS, but only 8 percentage points in East-

ern Europe and the Baltics. More generally, firm characteristics do much to explain variance in revenue hiding in the CIS (the R-squared statistic in the regression reported in Table 6 is 0.14, versus 0.06 when only country and town-size dummies are included), but little in Eastern Europe and the Baltics (an R-squared statistic of 0.26 versus 0.22). Roughly speaking, systematic variation in revenue hiding in the CIS is cross-sectoral, while that in Eastern Europe and the Baltics is cross-national.

What is the consequence of these differences in patterns of revenue hiding for provision of collective goods? If variation in revenue hiding across firms is systematically related to sectoral characteristics (as in the CIS), then politicians may respond by discriminating in the provision of collective goods. In contrast, if variation is not strongly associated with sectoral characteristics (as in Eastern Europe and the Baltics), there will be little or no such discrimination. As Figure 3 shows, the relationship between revenue hiding and the quality and efficiency of public services or agencies is indeed dramatically different in the two halves of the postcommunist world. (For reasons of space I do not include tables of estimated coefficients and standard errors.) Revenue hiding is strongly associated with the quality and efficiency of all public agencies or services but customs and post in



**TABLE 6** Determinants of Revenue Hiding—Eastern Europe and Baltics Versus CIS

	Eastern Europe and Baltics		CIS	
	Estimated Coefficient	Standard Error	Estimated Coefficient	Standard Error
Association	−0.857	1.291	0.855	1.679
Log employment	−1.498**	0.425	−3.146**	0.530
Monopoly	−5.943**	2.078	−11.252**	1.992
1–3 Competitors	−1.384	1.559	−3.122	1.738
State-owned	−0.651	1.854	−1.704	1.822
Foreign ownership	−5.631**	1.398	−4.846*	1.981
Exporter	−1.066	1.368	0.051	1.808
Personal services	1.968	2.411	6.132	4.142
Transportation	2.553	2.741	4.170	2.949
Wholesale trade	−1.123	1.854	5.050*	2.194
Retail trade	−0.662	1.865	1.725	2.180
Construction	−0.167	2.271	1.191	2.180
Other	−2.603	4.110	0.631	5.261
Resource extraction	3.609	2.695	−2.848	2.002
Business services	−1.438	2.342	−1.119	3.455
Financial services	−8.531**	2.769	−8.443*	3.454
N		1804		1769
R <sup>2</sup>		0.26		0.14

Notes: OLS regressions. Dependent variable is percentage of revenues hidden. Manufacturing is excluded industrial-sector dummy variable. Country and town-size dummies included. Robust standard errors reported. Significance levels: \*\* = .01, \* = .05.

the CIS. In contrast, in Eastern Europe and the Baltics, the estimated effect of revenue hiding is not significantly different from zero for *any* of the 14 public agencies or services.<sup>21</sup> Politicians to the east seem to favor sectors that are easier to tax, while those to the west do not.

As a result, much of the apparent explanatory power of the collective-action model in the former Soviet Union (less the Baltics) is in fact due to the differences in revenue hiding. For firms in the CIS, the estimated effect on satisfaction with public services of agencies of an increase in employment of 100 for the smallest firms is approximately one-third smaller, and the estimated increase in satisfaction for firms that are monopolies (relative to those with more than three competitors) is approximately 40% smaller, after controlling for revenue hiding. In contrast, the addition of revenue hiding to the collective-action model for firms in Eastern Europe and the Baltics leaves

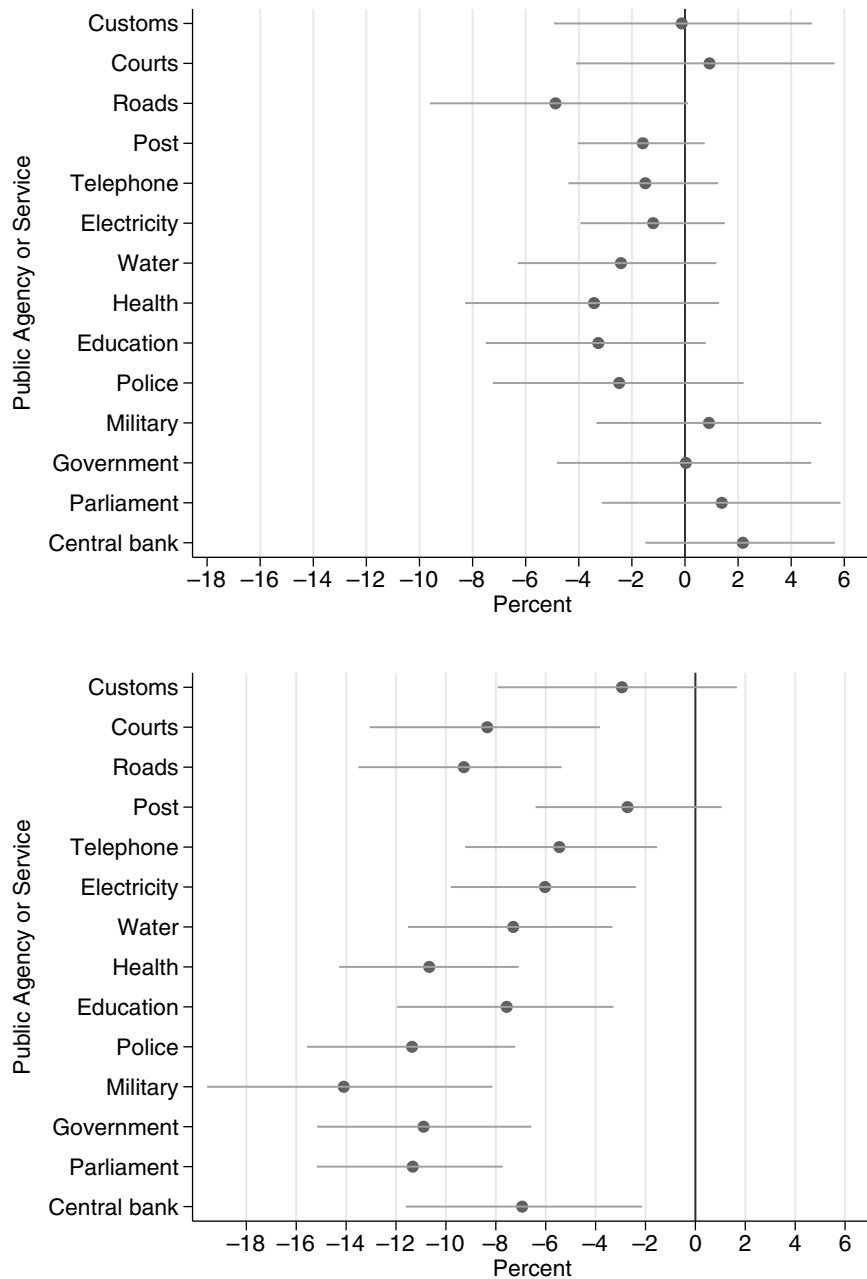
the estimated impact of employment and competition essentially unchanged.

**Alternative Explanations and Robustness Checks.** The results reported thus far are broadly consistent with the incomplete-contracts model presented above. Here I examine various alternative explanations for these empirical patterns and check the robustness of the results to changes in specification and sample.

As shown in Table 5 and Figure 2, revenue hiding is negatively associated with the quality and efficiency of public agencies and services experienced by firms in the sample. My interpretation of this result is that politicians in (parts of) the postcommunist world favor sectors that are important sources of tax revenue. An alternative reading of the data, following Levi's (1988) concept of "quasi-voluntary compliance," is that firms that are satisfied with collective-goods provision hide less of their revenues from tax authorities. However, such behavior is not profit-maximizing. Firms that hide less than they can get away with due to satisfaction with the provision of

<sup>21</sup>Consistent with this result, Johnson et al. (2000) also find no significant correlation between the provision of collective goods and revenue hiding among firms in Eastern Europe.

**FIGURE 3 Incomplete-Contracts Model: Change in Probability Satisfied with Public Agency or Service as Revenue Hiding Increases from 0% to 50%. Eastern Europe and Baltics (top) versus CIS (bottom)**



Note: Dots represent point estimates, lines 95% confidence intervals.

collective goods will find themselves at a disadvantage vis-à-vis their competitors. While individuals may engage in self-sacrificing behavior when they feel they have been treated unfairly (Rabin 1993), competitive pressure should keep such behavior among firms to a minimum. Further, the relationship between revenue hiding and pro-

vision of collective goods is dramatically different in the two halves of the postcommunist world. It seems unlikely that firms in the former Soviet Union (less the Baltics) would engage in reciprocity by not hiding revenues in response to good government services, while firms in Eastern Europe and the Baltics would not.

A related interpretation is that firms respond to poor provision of government services by exiting to an “informal” sector, where they avoid paying taxes but forfeit access to state-provided collective goods (Buena de Mesquita and Hafer 2005; de Soto 1990; Frye and Zhuravskaya 2000; Johnson, Kaufmann, and Shleifer 1998; Roland and Verdier 2003). While undoubtedly an important story for certain sectors in various parts of the world, it is important to note that the firms in the BEEPS sample are officially registered firms that operate in the “formal” sector, regardless of the degree to which they hide revenues from tax authorities. As such, they should benefit from whatever state-provided goods have been provided to “typical” firms in their “area of activity,” as the model above suggests. Moreover, it seems implausible that firms in Eastern Europe and the Baltics should ignore the quality of collective goods when deciding whether or not to operate in the “informal” sector, while firms in the CIS should condition their decision on the level of collective-goods provision.

Another possible explanation relates to firms’ tax-avoidance strategies. One can think of firms as having two options: they may hide revenues from tax authorities, or they may report their revenues but then refuse to meet their tax obligations (Radaev 2002). The latter strategy is likely to be employed by politically powerful firms, which may also find it easier to lobby for collective goods. Thus, if the variable “political power” is not completely captured by observable characteristics, the positive correlation between revenue hiding and collective-goods provision could be spurious. To check for this possibility, I added a dummy variable to the incomplete-contracts model (equation 21) that equals one if the firm received “subsidies (including tolerance of tax arrears) from local or national government.” (In all, 11% of firms report that they received such subsidies.) The estimated impact of revenue hiding in this revised model was virtually identical to that reported above.

Firms may also differ in profitability, with more profitable firms choosing to hide more of their revenues from the state. Unfortunately, the BEEPS questionnaire contains no measure of profitability, which may not be completely captured by industrial-sector dummies and other control variables. Nonetheless, it is implausible that more profitable sectors—those whose firms may hide more—would receive *fewer* collective goods. Rather, profitability should be associated with greater provision of collective goods, either because more profitable firms can pay for better provision, or because they are more profitable precisely because they have been better provided for.

The model presented above assumes that  $\gamma$  is constant across sectors, i.e., that tax revenue is equally valu-

able to the politician, regardless of the sector from which it is collected. While that seems reasonable in a unitary state, it is possible that revenue-sharing agreements between different levels of government in a federal system would render the assumption invalid. For example, the example in the introduction suggests that local leaders in Pskov oblast’ were quite sensitive not only to the relative ease of collecting revenues from the vodka sector, but also to the fact that a substantial portion of excise revenues remained in the region in which they were collected. If  $\gamma$  is systematically correlated with  $\alpha_s$ , then politicians might be allocating more collective goods to sectors that are important sources of tax revenue, but not only or primarily due to the mechanisms stressed in this article. This theoretical possibility is further suggested by the large number of firms in the sample located in Russia, the most truly federal system in the former Soviet Union. To check that such considerations are not driving the results, I reestimated the incomplete-contracts model for firms in the CIS, dropping all Russian firms from the sample. The key qualitative results were virtually unchanged from the full sample of firms in the CIS. In particular, revenue hiding is negatively associated with collective-goods provision (and statistically significant at conventional levels) for firms in the subsample for all public services or agencies but customs.

Similarly, the model assumes that the tax rate is fixed and constant across sectors. But what if the politician set a tax rate  $\tau_s$  separately for each sector  $s$ ? (Intuitively, we might think of the politician as writing tax breaks for individual sectors into the tax code.) This possibility is easily incorporated into the present model: simply assume that the politician maximizes (7) with respect to both  $\mathbf{g}$  and the vector of sector-specific tax rates  $\tau_s$ .<sup>22</sup> Then in equilibrium  $\tau_s^* = \alpha_s \left( \frac{\gamma-1}{2\gamma-1} \right)$  if the sector is organized, and  $\tau_s^* = \frac{\alpha_s}{2}$  if it is not. (If we want to avoid the possibility of “negative taxes,” we may assume that  $\gamma \geq 1$ .)

Two conclusions follow. First, revenue hiding is correlated only with the organization of a sector, not with its taxability. (In particular,  $H_i^* = \frac{\tau_s^*}{\alpha_s} = \frac{\gamma-1}{2\gamma-1}$  for all firms in organized sectors, and  $H_i^* = \frac{1}{2}$  for all firms in unorganized sectors.) As we have seen, this appears not to be the case: revenue hiding is correlated systematically with firm characteristics other than the collective-action variables (which themselves may be correlated with revenue hiding for reasons other than the ability of those firms to lobby state officials). Second, because the level of revenue hiding in this revised model depends only on whether a

<sup>22</sup>In this alternative formulation the natural timing assumption would be for firms to choose a level of revenue hiding after policy has been chosen.

firm belongs to an organized sector, any observed correlation between revenue hiding and the provision of collective goods should be due only to the revenue hiding variable's picking up unmeasured capacity for collective action. But then the sharp disjunction in the data between Eastern Europe and the former Soviet Union makes little sense. As shown above, collective action *does* seem to matter for public policy in Eastern Europe, as in the former Soviet Union. However, that implies that revenue hiding (in this alternative story, correlated with unmeasured capacity for collective action) should be associated with collective-goods provision in *both* halves of the postcommunist world, which is not true.

## Conclusion

I have endeavored to show that public policy may be determined as much by what cannot be agreed to by politicians and organized interest groups as by what can. Focusing on the inability of organized groups to credibly promise tax compliance by their members, I have demonstrated that lobbying for collective goods may be influenced by the ex post taxability of economic activity. In deciding on the allocation of collective goods across sectors, a politician will take into account not only promises of compensation by organized interests, but the expected tax revenue to be earned from both organized and unorganized interests. Data from postcommunist states are broadly supportive of the theory: the ability of firms to hide revenues from tax authorities rivals conventional collective-action variables in explaining variation in collective-goods provision, but only in that part of the postcommunist world where differences in taxability across sectors are especially large.

How does the theory presented here generalize to other settings? At one level, any lobbying environment inevitably involves noncontractible actions that are politically important. For example, the allocation of time between work and leisure is typically outside the scope of what may be credibly promised to politicians, but such decisions may have large consequences for economic growth and tax collection. At the same time, there is considerable variation across political-economic environments in the degree to which actions may be contractible: as stressed by the literature on "varieties of capitalism" (Hall and Soskice 2001), employer associations vary enormously in their ability to monitor and sanction the actions of their members. The modeling approach in this article can be a tool for examining these institutional differences.

More generally, any policy where compliance plays a role involves both contractible and noncontractible elements. Interest groups may lobby regulatory agencies for favorable decisions, but differences in groups' expected compliance with regulatory decisions may be as important to regulators as anything those interests can credibly promise. Here too the consequences of collective action may be best analyzed in an incomplete-contracts framework.

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