



Provincial protectionism

Konstantin Sonin

CEFIR and CEPR, New Economic School, Russia

ARTICLE INFO

Article history:

Received 24 October 2007

Revised 3 April 2009

Available online 15 July 2009

Keywords:

Federalism

Positive political economics

Transition

Development

Monotone comparative statics

ABSTRACT

Sonin, Konstantin—Provincial protectionism

In a federal state with weak political institutions, constituent units might protect their enterprises from enforcement of federal taxes. The effectiveness of such protection depends on the ability of local politicians to extract rents from enterprises. They can do so when local monopolies can be effectively sustained and electoral competition is weak. To analyze effects of political decentralization in a country with powerful regional industries, we build a simple general-equilibrium model where local politicians' electoral positions are levels of competition in the regional market, heterogeneous firms provide campaign finance and compete in the labor market, and voters care about their wages, but could be influenced by campaign spending. *Journal of Comparative Economics* **38** (2) (2010) 111–122. CEFIR and CEPR, New Economic School, Russia.

© 2009 Association for Comparative Economic Studies Published by Elsevier Inc. All rights reserved.

1. Introduction

Over the last two decades, transition from command to market economies in two large states, China and Russia, have taken profoundly different paths. Why in one of these countries has market-preserving federalism (Qian and Weingast, 1997; Weingast, 1995; Qian and Roland, 1998) developed, while the other country is stuck with market-destroying federalism (de Figueiredo and Weingast, 2002; Zhuravskaya, 2000; Ickes and Ofer, 2003; Shleifer and Treisman, 1999; Treisman, 2000, 2006)? Why Russian governors not only favor particular large firms, but oppress small business (Ericson, 1999; Slinko et al., 2005)? What are the specific features of Russian federalism that distinguish Russia from other federal states?

Blanchard and Shleifer (2000) observed that a crucial difference between Russia and China's transition to market economy is that Russia entered the transition as a heavily industrialized economy, while China had a relatively few large enterprises.¹ This paper argues that the possibility to extract rents and political support from large and inefficient enterprises in exchange for protection against the federal center results in suppression of new entry and intra-regional competition. Thus, Russian governors often found it attractive to suppress small business. Ponomareva and Zhuravskaya (2004), Slinko et al. (2005) verified predictions of our model: in Russia, large and inefficient firms benefit from preferential treatment by regional politicians, and the capture has adverse effect on small-business growth.

de Figueiredo and Weingast (2001) note that "Russia violates both the classical federal principles articulated by Hayek, Musgrave, Oates, and Tiebout as well as those associated with market-preserving federalism." A detailed report of the McKinsey Research Institute (1999) on the Russian economy concluded that "the sector-level market distortions result from unequal laws and enforcement, originated in most cases by regional or municipal authorities in the absence of clear laws

E-mail address: ksonin@yahoo.com

¹ The role of initial conditions in Russia is emphasized in Blanchard and Kremer (1997), Qian et al. (2000); see also Bardhan (2002) on the role of inequality resulting from the speedy Russian privatization. Bardhan and Mookherjee (1999, 2000) discuss political determinants of local capture by focusing on interaction of politicians with the local industry.

and/or strong control mechanisms at the federal level.”² Ericson (1999) notes that “. . . there seems to have developed a symbiosis, particularly at the regional and local levels, between governments and important businesses that goes well beyond what one would see were relations intermediated by law and law-structured markets.”

This paper attempts to provide consistent political and microECONOMIC foundations for this picture.³ First, our model highlights the importance of initial conditions. A more general message is that federalism does not work without rule of law, supported either by strong independent courts and grass-root traditions (US or Great Britain) or a powerful central authority (China). For example, the Russian constitution places appointment of judges in the federal jurisdiction with the intent to assure their independence. Nevertheless, regional powers have exerted almost unrestricted influence over the regional judiciary in Russia. In contrast, according to China Security Commission Report to the US Congress dated July 2002, over 90% of China’s approximately 180,000 judges are members of the Communist Party, which makes them subordinated to the nation-wide structure.

The “provincial protectionism” works as follows.⁴ Governors of industrially developed regions having high political support choose to protect their enterprises from paying federal taxes. Lack of means precludes the federal center from effective policy towards these regions. Inside the region, the governor’s aversion to cooperate with the federal center provides bad incentives for most profitable regional firms: they do not pay federal taxes, and bribe governors in exchange for protection. There are more restrictions on the entry of new firms, and thus lower social welfare, than in an equilibrium without protection. As a result, federal tax non-payments (arrears) are concentrated in regions with large productive enterprises, and the political strength of the governor accounts for accumulated tax arrears. (Though we employ the terminology of tax collection in the subsequent analysis, similar consideration apply to other issues where provincial authorities are able to subvert operation of a federal authority.)

At the regional level, governors are strong in those regions where there are few large enterprises that do not compete heavily with each other (i.e. belong to different industries). The basic starting point is that one can obtain a huge rent from enterprises by protecting them from intra-regional competition and the federal center. This allows the provision of transfers to bad enterprises, thus maintaining political power, and thus maintaining bargaining power with large firms. The governor might oppose the entry of new and profitable firms since they may reduce his rents via competition, and may provide political support to his political rivals. If there are few strong enterprises in a region, the governor’s protection for these enterprises against the federal center leads to more restrictions on entry to the intra-regional market. Such situation might cause additional disincentives for enterprise management to restructure and pay taxes, since it becomes more costly for governors to control a restructured enterprise.

Berkowitz and Li (2000) model the situation that government agencies of different levels can unilaterally levy taxes on the same tax base, as documented in Shleifer and Treisman (1999). Our model demonstrates how such a mechanism might work when tax rights are clearly defined. The possibility of avoiding or delaying payments leads to competition of federal and local authorities over the fixed tax payments that accrue to the federal center, thus again exhibiting properties of a ‘tragedy of the commons’.⁵ While an OECD (2000) report acknowledges a number of serious improvements in Russian fiscal federal arrangements, the main problem remains to make such arrangements work in an appropriate way. Cai and Treisman (2004), Treisman (2000, 2004) model market competition within regions and in the common market, but have a reduced-form political economy model. Our model solves for a general equilibrium with fully worked-out micro-foundations and voting. Litwack (2003) analyses relationship between the Russian federal and regional government within a multi-task principal-agent framework.

Lambert et al. (2000) suggest an explanation for why the federal center is unable to collect tax payments from regional enterprises. Frye and Shleifer (1997) and Frye and Zhuravskaya (2000) report findings on regional over-regulation and bribery. Empirical findings of Zhuravskaya (2000), Alexeev and Kurlyandskaya (2003) allows us to treat the Russian government as two-tier, although it is three-tier formally. Efficiency losses due to decentralization are analyzed in Inman and Rubinfeld (1997), McKinnon and Nechyba (1997), Sanguinetti (1994), Jones et al. (1999), Rodden (2000). Chapter 11 in Roland (2000) provides theoretical framework for study of federalism in transition economies.

The rest of the paper is organized as follows. Section 2 introduces the setup of the model. In Section 3, we discuss comparative statics in regional equilibria. Section 4 analyses federal equilibria of the model. Section 5 describes federalism, Russian style, which we use as a motivating example. Section 6 concludes.

² The phenomenon of provincial protectionism is not confined exclusively to Russia. Tomassi et al. (2001) say about Argentina: “The non-cooperative behavior among provincial governments has also affected the collection of national taxes. . . This has occurred through very generous and poorly controlled regimes for industrial promotions . . . [under which] exemptions from major national taxes can be allocated.” In five provinces (Catamarca, La Rioja, San Luis, San Juan, and Tierra del Fuego), authorities can legally postpone payment of major federal taxes for a period of up to 15 years. In Brazil, “the net result of state expenditures and tax abatements favors the southeast where industry is highly concentrated” (Melo and Rezende, 2003). Young (2000) found negative consequence of ‘provincial protectionism’ in China as well.

³ A classic early analysis of positive aspects of relationship between different levels of government is Riker (1964). Bardhan and Mookherjee (1999, 2000) formally investigate relative capture of local and federal governments.

⁴ The term “provincial protectionism” is sometimes applied to protection of one province against another province, such as erecting trade barriers across provinces. The relative weakness of the federal center allows governors to erect trading barriers, and the rents that can be extracted inside the province gives governors incentives and resources to erect these barriers despite the center’s fight for a common market.

⁵ The most recent empirical investigation of federal tax arrears in Russia is Ponomareva and Zhuravskaya (2004). Earlier studies include Alfandari and Schaffer (1996), Ivanova and Wyplosz (1999), Schaffer (1998), and Treisman (2000).

2. The setup

In this model, there are the federal center, regions, regional firms and regional politicians. In each region, firms make production decisions and pay taxes to the federal government. The governor protects firms from competition and federal tax enforcement, takes payments from them, and looks toward re-election. Employees of firms constitute a part of electorate. Regions might differ with respect to the size and productivity of population, the impact of money on elections outcomes, and the potential output of their firms. The incumbent governor and his rival take electoral positions on how much firms are allowed to compete in the market. While studying regional equilibrium, we denote the governor's position (the number of firms in the market) as n , and the rivals position as m . Firms compete with each other in the labor market, and the wage rate is determined by conditions that equilibrate supply and demand in this market.

Firm i has a production function $F(L_i) = aL_i - \frac{1}{2b_i}L_i^2$; the most efficient firms are those that have high b 's. The output price is normalized to 1. We allow the number of firms in the market to be any real number $n \geq 1$, not necessarily integer.⁶ Thus, the function $b_i : [1, +\infty) \rightarrow \mathbb{R}_+$, which is assumed to be monotone non-increasing and integrable over any interval in $[1, +\infty)$, defines the potential industrial structure of the region. (The actual industrial structure is determined in the political equilibrium.) To analyze comparative statics with respect to potential industrial structure, we will need to define a (partial) ordering on the lattice of all such functions.

To maximize its profit, $\pi_i(w) = F(L_i) - wL_i$, firm i decides how many workers are hired given the region-wide wage level w . An individual either works for the market wage w , or enjoys her reservation utility r_j distributed uniformly on $[0, R]$. When faced with a policy choice, an individual voter votes according to preferences which reflect her wage income and an idiosyncratic component. By law, each firm has to pay the share τ of its profits to the federal center. In the study of the inside-region game, the tax rate is given. In the federal equilibria, we endogenize it.

Since firms are heterogenous (some of them are already in the market, while others are out; their efficiency also differs), they are not indifferent between different policy choices. Although firms are free to contribute to any politicians, in equilibrium, firms that are already in the market would not like to contribute more than zero to the challenger, while potential entrants would not support the incumbent. Firm i will have profit $\pi_i(n)$ if the incumbent wins, and $\pi_i(m)$ otherwise. Thus, firm i is willing to contribute to the incumbent campaign up to $(1 - \tau)(\pi_i(n) - \pi_i(m))$, where τ is the federal tax rate. A firm outside the market but the one that would have entered if more competition is allowed is ready to contribute to the challenger's campaign as much as $(1 - \tau)\pi_i(m)$. The total campaign funds of the candidates are:

$$k_I = \int_{i \in n} k_i(n) di,$$

$$k_C = \int_{i \in m \setminus n} k_i(m) di.$$

We do not model explicitly the game between firms and politicians (see, e.g. Grossman and Helpman (2001); Persson and Tabellini (2000); Section 3.5, for a review of the literature, and Baron, 1994; also, Bardhan and Mookherjee, 1999). We simply assume that if candidates' positions are (n, m) , then each firm i , which is already in the market, contributes $\beta_I(1 - \tau)(\pi_i(n) - \pi_i(m))$ to the incumbent's campaign, while each firm j that would enter if the challenger wins, contributes $\beta_C(1 - \tau)\pi_j(m)$ to the challenger's campaign. In other words, politicians and firms split the gain of restricting (or expanding) competition, and β_I and β_C parametrize politicians' bargaining power. For instance, if firms that are not yet in the market cannot provide any campaign finance to the challenger, which is not unusual in countries with underdeveloped credit markets, then $\beta_C = 0$. We will always assume that $\beta_I \geq \beta_C$.

The governor might be able to protect enterprises from the federal center; in this case, the effective tax rate for the firm is $t_\alpha \in [0, \tau]$ (the subscript α is omitted when we analyze intra-regional equilibria in Section 3). Such protection is costly for the governor: the cost increases with (i) the proportion of taxes left unpaid $\tau - t_\alpha$, which means that punishment increases with the size of crime, and (ii) the amount of total revenues of the federal center $t_\alpha + t_{-\alpha}$, which means that the federal center can use resources to punish deviators. For the sake of simplicity, we assume that the cost function is $c(t_\alpha + t_{-\alpha})(\tau - t_\alpha)$, where c is a non-negative parameter.

A politician in region α (either the incumbent governor or the challenger) has the following utility function

$$u_\alpha = p(\cdot)(\bar{u} - c(t_\alpha + t_{-\alpha})(\tau - t_\alpha)),$$

where the probability of being elected, p , is determined by chosen electoral positions of both candidates, campaign contributions, and voters' attitude; the actual procedure is described below, and \bar{u} is the utility of holding the office.

In addition to policy utility which depends on wages they expect to receive, voters have non-policy-related preferences over the candidates. As it is standard in the probabilistic-voting literature, we assume that these preferences have a random component, so that the identity of the winner of the election cannot be determined before election day (Lindbeck and Weibull, 1987; Grossman and Helpman, 1996). In particular, we assume that voter i has an ideological preference for the challenger given by $\sigma_i + \delta + \gamma(k_C - k_I)$. The term σ_i is an individual preference for the challenger, with voters' preferences σ_i distributed uniformly over $[-\frac{1}{2}, \frac{1}{2}]$. Aggregate uncertainty about voters' preferences is given by δ , which represents a random

⁶ This assumption greatly simplifies general equilibrium analysis, without sacrificing any insights.

preference for the challenger shared by all voters, but unknown prior to election day. Assume δ to be distributed uniformly over $[-\frac{1}{2}, \frac{1}{2}]$. The impact of campaign spending on voter preferences is captured by $\gamma(k_c - k_r)$, where $\gamma, 0 < \gamma < 3$ is a scalar representing the effectiveness of campaign spending. We might expect γ to be larger, for example, where voters are less well-informed.

The timing of the main game is as follows.

1. Candidates make binding campaign promises. Firms provide campaign contributions.
2. Elections take place.
3. The winner chooses policy, the number of firms entering the regional marginal, according to his pre-election position.
4. In each region, firms enter the market, make production decisions, and pay federal taxes. Profits are realized, and consumption takes place.

We confine our analysis to subgame-perfect equilibria. We shall start with the analysis of what is going on inside one region; this allows to economize on notation. Once we have analyzed regional equilibria, we shall proceed to the extended game, where the federal center is present and a governor takes into account what is going on in the other region.

3. Regional equilibrium

Before focusing on political determinants of industrial organization, we analyze the industrial structure of a region given a choice of the effective tax rate. Suppose that the number of firms in the market, n , is determined.⁷ When each individual firm i , which is already in the market, has decided on its labor demand,

$$L_i = \arg \max_{L_i} \{F(L_i) - wL_i\} = b_i(a - w),$$

the aggregate demand for labor is as follows:

$$L^D(w) = \int_{i=1}^n L_i di = (a - w) \int_{i=1}^n b_i di.$$

Given the wage level w , the labor supply can be derived as $L^S(w) = \frac{1}{R}w$. Indeed, any person with reservation utility less than w is willing to work for w , while those who has $r_j > w$ will be out of the labor market. Then the equilibrium wage $w(n)$ and the equilibrium employment level $L(n)$ are determined by

$$L^D(w) = L^S(w).$$

So, the equilibrium wage is determined by

$$\frac{1}{R}w = (a - w) \int_{i=1}^n b_i di.$$

Therefore

$$w(n) = \frac{a \int_{i=1}^n b_i di}{1/R + \int_{i=1}^n b_i di},$$

$$\pi_i(n) = F(L_i(w)) - w(n)L_i(w) = \frac{1}{2} b_i [a - w(n)]^2.$$

The following straightforward proposition summarizes comparative statics.

Proposition 1. *Given the number of firms in the market, n , the equilibrium wage $w(n)$ is higher when firms are more efficient (a is large) and the opportunity costs in the labor market are high (R is large). Also, the equilibrium wage increases with the number of firms entering the market. The profit that firm i receives, conditional on being in the market, depends negatively on the number of firms that operate in the market.*

Now we turn to the political competition. As players are symmetric, assuming that $n \leq m$ is without loss of generality. Total campaign contributions collected by the two candidates are as follows:

$$k_i(n, m) = \int_{i \in n} k_i(n) di = \beta_I(1 - t) \left(\int_{i=1}^n \pi_i(n) di - \int_{i=1}^n \pi_i(m) di \right),$$

$$k_c(n, m) = \int_{i \in m \setminus n} k_i(m) di = \beta_C(1 - t) \int_{i=n}^m \pi_i(m) di.$$

For each profile of industrial policies (n, m) proposed by the candidates, there are three different groups of voters: those who are employed in n firms that are in the market, those who are currently self-employed but would be employed if there are m ,

⁷ In this section, we omit all the regional identifies, e.g. the tax rate firms actually pay is denoted t , not t_x .

firms in the market, and those who are self-employed under both policies. Employed voters have preferences over both policy and ideology. A voter employed by a business in n will vote for the candidate supported by the incumbent as long as

$$w(n) \geq w(m) + \sigma_j + \delta + \gamma(k_C - k_I)$$

which given the distribution of σ_j implies that the mass of such voters who support the incumbent candidate is:

$$\left(\frac{1}{2} + w(n) - w(m) + \gamma(k_I - k_C) - \delta\right) \frac{w(n)}{R}.$$

(There are $w(n)/R$ such voters.)

Now focus on a voter j that is not currently employed but would have been employed if there are m , firms in the market, i.e.

$$r_j \geq w(m) + \sigma_j + \delta + \gamma(k_C - k_I).$$

Thus, the probability that she votes for the incumbent on the election day is

$$\frac{1}{2} + [r_j - w(m) + \gamma(k_I - k_C) - \delta].$$

Since r_j is distributed uniformly on $[0, R]$ and voters that fall into this category all have $r_j \in [w(n), w(m)]$, the mass of such voters that will vote for the incumbent (conditional on δ) is

$$\frac{w(m) - w(n)}{R} \left[\frac{1}{2} - \frac{1}{2}w(m) + \frac{1}{2}w(n) + \gamma(k_I - k_C) - \delta \right].$$

Finally, we can find the mass of voters with $r_i \geq w(m)$ who support the incumbent by referring to voters' ideological preferences: all such voters with $\sigma_j < \gamma(k_I - k_C) - \delta$ support the incumbent, which given that σ_j is distributed uniformly over $[-\frac{1}{2}, \frac{1}{2}]$ implies that the incumbent receives

$$\left[\frac{1}{2} + \gamma(k_I - k_C) - \delta \right] \left(1 - \frac{w(m)}{R} \right).$$

votes among self-employed voters.

Summing across the three groups, we can derive the total vote for the incumbent as

$$V_I(n, m) = \frac{1}{2} + \gamma(k_I - k_C) - \delta + \frac{1}{2R}(w(n)^2 - w(m)^2).$$

Using the formula for the campaign contributions, one gets

$$\Pr\left(V_I(n, m) > \frac{1}{2}\right) = \frac{1}{2} + \gamma(1 - t) \left(\beta_I \int_1^n [\pi_i(n) - \pi_i(m)] di - \beta_C \int_n^m \pi_i(m) di \right) + \frac{1}{2R}(w(n)^2 - w(m)^2).$$

(The probability of the challenger's win is $1 - \Pr(V_I(n, m) > \frac{1}{2})$.)

The following Proposition asserts the existence of an equilibrium and describes the relationship between the parameters of the model and the optimal policy choices n^* and m^* . (Proofs are relegated to Appendix.)

Proposition 2.

- (i) There exists a unique Nash equilibrium of the voting game (n^*, m^*) .
- (ii) In equilibrium, a candidate's electoral position is more pro-competition, the higher is the federal tax rate t , the lower is the role of money, γ , and the lower is R .
- (iii) In equilibrium, a candidate's electoral position is more protectionist if β , his ability to elicit campaign contributions from firms, is high. If $\beta_I > \beta_C$, then the incumbent's position n^* is more protectionist: $n^* < m^*$.

These comparative statics results deserve additional discussion. When profits of most efficient firms are low than the governor has fewer incentives to restrict entry to the market. This is a simple illustration for the Blanchard and Shleifer (2001) general insight. In China, at the beginning of transition, there were very few firms that earned large rents in the absence of competition. In Russia, many regions had enterprises with high cash flows and large employment, and it is their rents the governors protect from competition both in and outside the region. In Zhuravskaya (2000) and Ponomareva and Zhuravskaya (2004), the index that reflects the relationship between governors and the federal center appears to be a significant determinant of the number of governor-controlled bankruptcies and the size of tax arrears, respectively. Also, the latter paper finds that regional enterprises have more tax arrears when regions have higher bargaining power vis-a-vis the federal center and higher GRP per capita.

Our model allows to analyze the effect of potential industrial structure on the market equilibrium, and thus single out the constraints politicians face in their choice of market parameters. Comparative statics with respect to b requires using the special technique developed in Milgrom and Shannon (1994), since the set of all non-increasing integrable functions

$\{b : [0, 1] \rightarrow \mathbb{R}_+\}$ does not, obviously, admit any linear ordering. Still, this set is a lattice which admits the following partial ordering. Consider $b, b' : [1, +\infty) \rightarrow \mathbb{R}_+$ such that b, b' are decreasing functions of i and $\int_{i=1}^n b_i di \geq \int_{i=1}^n b'_i di$ for any $n > 1$ and $\int_{i=1}^{\infty} b_i di = \int_{i=1}^{\infty} b'_i di$. Then, we say that the industrial structure b is *technically more concentrated* than b' . (For e.g. if $b_i = ke^{-ki}$, then parameter k measures concentration.)

Proposition 3.

- (i) Suppose that the challenger is as able to collect campaign contributions as the incumbent, $\beta_I = \beta_C$. The vote-maximizing position of candidates, $n^* = m^*$, decreases when the industrial structure becomes more (potentially) concentrated. Formally, let $b, b' : [0, 1] \rightarrow \mathbb{R}_+$ be two industrial structures; and suppose that b is more concentrated than b' . Then, for the number of firms in the political equilibrium, one has $n^*(b) \leq n^*(b')$.
- (ii) Suppose that the challenger cannot collect money from would be entrants, $\beta_C = 0$. Then $m^* = \infty$, i.e. the challenger will place no restriction on the competition in the product market. The electoral position of the incumbent, n^* , decreases when the industrial structure becomes more (potentially) concentrated.⁸

4. Federal equilibria

To analyze federal aspects of regional protectionism, we consider a game that regions play non-cooperatively against and each other in the presence of the federal center. In this game, we assume that the industrial structure, determined in the course of the elections, is given. In this analysis, our emphasis is not on the standard coordination failure, where all regions choose to protect themselves from the federal center, but the fact that protection against the federal center translates into governor's incentives to suppress intra-regional competition and vice-versa.⁹

Recall that in each region $\alpha, \alpha \in \{A, B\}$, firm i has to pay $\tau\pi_i(n_\alpha)$ in federal taxes, where n_α is the equilibrium number of firms in the region, but ends up paying at the rate determined by the governor, $t_\alpha \in [0, t]$; at this point, each governor has the following utility function

$$u_\alpha = \bar{u} - c(t_\alpha + t_{-\alpha})(\tau - t_\alpha).$$

The equilibria in the federal game are now described by the following Proposition. Since we focus on subgame-perfect equilibria, the number of firms in each regional market is determined by (t_A, t_B) .

Proposition 4. Suppose that the number of firms in both regions, n_A^* and n_B^* , is given.

- (i) There exist at most two pure-strategy Nash equilibria in the federal game. The protectionist equilibrium, where firms in both regions do not pay federal taxes, is unique if and only if

$$\frac{c\tau}{\gamma} \leq \max\{\pi_A(n_A^*), \pi_B(n_B^*)\},$$

i.e. when cost of opposing the federal center is low, money matter a lot in regional elections, and the regional industrial structure allows to generate high rents. Otherwise, there exist an equilibrium, where both governors do not protect enterprises from the federal center.

- (ii) Suppose that both equilibria exist. In each region, the number of firms that enter the market is lower in the protectionist equilibrium than in the non-protectionist one.

The fact that the federal center can use resources obtained from other regions to fight a defector and thus sustain the no-protection equilibrium shows that the constituent units have incentives to coordinate for collective action against the center. In Russian experience, the governors of regions put a lot of efforts to coordinate their fight with the federal centers. In many situations, it was the position of governors, who had a legislative power at the federal level as the members of the upper chamber of Russian parliament, that does not allow the federal center to punish some governors. In any case, whether or not the province-coordination effect is taken into account, these two equilibria highlight the two distinguished possibilities: either there is an economy, where large enterprises do not pay taxes, and small enterprises are driven out of the market, or there is an economy, where taxes are paid and thus there is no need to suppress competition.

Now the regional-level analysis carried through in the previous sections provides conditions that make particular equilibria more or less likely. Having scarce resources, the federal center could not fight all regions at the same time. This suggests some policy implications: to eliminate the coordination problem, the federal center should concentrate resources on fighting protectionism of a few regions, instead of dispersing resources between all regions. Carreaga and Weingast

⁸ Proofs of Propositions 3 and 4 are relegated to Appendix.

⁹ Bolton and Roland (1997) consider an environment where agents strategically choose the allocation of authority between different levels of government. Besley and Coate (2003) study bargaining in the federal legislature under different degrees of centralization.

(2001) analyze the successful federation-building strategy by the Mexican government after 1930. Sequential involvement of provinces in more close cooperation with the federal center has been an essential part of this strategy.

Blanchard and Shleifer (2000) argue that it is the lack of political centralization that is responsible for Russian federalism failure compared to that of China, where the federal center is relatively strong. de Figueiredo and Weingast (2001) conclude that “a necessary condition for a stable federalism is that the center must be strong enough to detect and punish potential shirkers.” If the federal center has enough resources or a way to employ the existing resources more efficiently, the problem of provincial protectionism would be overcome. Indeed, if the federal center has enough administrative resources to punish those governors that allow enterprises to avoid tax payment, governors would have to rely more on economic performance (either by increased provision of public goods or diminishing regulation) in order to gain votes. Enikolopov and Zhuravskaya (2005) findings empirically support the above argument. Technically, if the federal center has a more cost-effective technology of fighting provincial protectionism, the less possible is the bad equilibrium.

At the same time, there are countries, where effectiveness of federalism rely on strength of local institutions rather than on the power of a central authority. At least historically, USA is an example of such a country (e.g. Inman and Rubinfeld, 1998). Technically, if a governor is forced to increase the intra-regional competition this provides him with less incentives to protect firms from the federal center. Indeed, if the governor is unable to suppress competition and extract bribes, allowing for more competition becomes a more attractive choice. Although incentives to protect regional enterprises from the federal center remain, they are weaker than otherwise. A higher level of political competition inside the region leads to more competition and less protection against the federal center. This gives the federal center an additional instrument for dealing with the governors: the federal center might support governor’s rivals, or try to reduce his chances for re-election, e.g. by using the federal prosecutor office.

In the above analysis, we always assumed that labor is completely immobile. Though the issue of labor and voters’ mobility has been prominent in studies of federalism since Tiebout (1956), these issues are outside the scope of this paper. Still, the model allows to obtain some insights about the impact of labor mobility on governor’s incentives to protect enterprises from the federal center. We assume that now (i) labor is absolutely mobile, but voters vote in their home regions, and (ii) the level of competition in region B , n_B^* , is fixed (in many countries, including e.g. USA and Russia, regional elections are not fully synchronized). With mobile labor, the wage rate is uniform across the country and, given (n_A, n_B^*) , is as follows

$$w(n_A, n_B^*) = \frac{a_A b_A(n_A) + a_B b_B(n_B^*)}{b_A(n_A) + b_B(n_B^*) + \frac{1}{R_A} + \frac{1}{R_B}},$$

where $b_\alpha(n_\alpha) = \int_{i=1}^{n_\alpha} b_{i\alpha} di$, $\alpha \in \{A, B\}$. In this situation, optimal choices of politicians (assuming they have identical β) in region A are different from those that are made if there is no labor mobility as the other region’s level of competition affects them not only via the federal budget, but via the labor market as well. Now, a politician in region A maximizes the following function:

$$v_A(n_A) = \gamma(1 - t_A) [a_A - w(n_A, n_B^*)]^2 b_A(n_A) + \frac{1}{R} w(n_A, n_B^*)^2.$$

Suppose further that, with immobile labor, $w_A(n_A^*) > w_B(n_B^*)$. Then $w_A(n_A^*) > w(n_A, n_B^*) > w_B(n_B^*)$. With the new wage rate, profits, and thus campaign contributions, rise. At the same time, the marginal increase in the number of firms has less impact on the wage rate. If the ‘wage effect’ (a decrease in voters’ support due to the fall in wages) dominates the ‘campaign effect’ (an increased support due to more campaign spending), opening up labor mobility should decrease incentives of politicians in region A to be protectionist. The effect will be more pronounced if money plays a bigger role in elections.

However, increasing mobility might work in the opposite direction as well. Suppose that the region A is so small, that decision made by the politicians inside the region does not affect the country-wide wage rate, assuming that the labor is fully mobile. In this situation, the political choice will be highly protectionist: the only leverage left to a politician is maximizing campaign contributions. One implication from this is that, across the world, we should see that heterogenous federations are more protectionist than more homogenous ones.

5. Federalism, Russian style

Russia has been a federal state *de jure* since 1992, with 89 sub-federal units (regions). What makes Russian federalism an attractive choice for investigation? Russia provides the possibility for a unique case study: its federalist system started from scratch in 1992, and so initial conditions are easily observable, and the whole development is well-documented. Also, understanding the nature of this development might be more fruitful than in a similar enquiry into the nature of a more mature federalist system, since policy reforms might have much more profound impact. As Djankov and Murrell (2002) say about transition economics in general: “With changes in the institutional and policy environment much faster and more encompassing than in virtually any other historical episode, this is as close to a policy laboratory as economics gets” (see also Djankov et al., 2003).

What are the specific features of Russian federalism that distinguish Russia from other federal states? First, it is a unique industrial structure, with its large (and thus politically powerful) enterprises (Ericson, 2000; Roland, 2000; Shleifer and Treisman, 2000; Treisman, 2004; Gaddy and Ickes, 2002). Second, it is the weakness of the federal center and the virtual

absence of Russia-wide political structures. Third, as noted above, it has a short history, and has experienced rapid changes recently.

Since the beginning of transition in 1992, the Russian federalist system has changed a lot (in 1991–1993, the regional governments' share of total taxes increased from 35% to more than 55%). In 1992–1994, empowering regional political powers and eliminating central government's direct control of regional enterprises was a part of the new Russian leadership's strategy during the initial period of reforms. (On this, see Shleifer and Treisman, 1999.) Ericson (1999) describes the whole process at the regional level as follows: "... the old political elites, and enterprise and farm managements, have largely succeeded in entrenching themselves in both new and surviving economic and political organizations, where they have been joined by a small group of new elite that was able to seize wealth and control of assets in the early wild period of 1989–1993... Licensing and regulatory restrictions site new business initiatives, unless initiated by an elite insider, and existing small and medium business is looked on as a source of continuing rents to be extracted through micro-regulation of activity, multiple fees, and creative taxation by local and regional elites."

One particular problem of Russian federalism is regional protectionism. The 2000 OECD report stated that "the case of Russian Federation involves the gross violation of virtually all of these conditions [defining a market-preserving federalism], while economic policies have a reported anti-reformist orientation in many regions." There are a number of recent papers reporting opportunistic behavior by local Russian politicians in their relations with the federal center (e.g. Treisman, 1999; Lambert et al., 2000), and local business (Frye and Shleifer, 1997; Frye and Zhuravskaya, 1999).¹⁰ Litwack (2003) notes that "the various tools and schemes for supporting informal substantial regional and local budgets include extensive bilateral bargaining with large firms for the direct provision of goods and services in return for various benefits, such as tax exemptions, loan guarantees, protection from competition or bankruptcy, debt restructuring, cheap energy inputs, assured safety and supplies of utilities, and freedom from inspections and fines." In Russia, huge federal tax arrears have been accumulated by large and productive enterprises in strong regions with governors having huge electoral support (Ponomareva and Zhuravskaya, 2004). The same study finds that local tax agencies make more efforts to collect taxes owed to local authorities rather than the federal center.

An important element of provincial protectionism is subversion of courts, which are formally independent, by regional governors (e.g. Shvets, 2005). As a case-study in institutional subversion, Lambert et al. (2000) analyze empirically the causes and consequences of bankruptcies in Russia, and conclude that bankruptcy proceedings are subverted by governors. After a bankruptcy procedure starts, a governor uses his influence over the regional judiciary to appoint management controlled by the regional administration. The second observation is that firms that go into bankruptcy are not inefficient in the technical sense (measured by labor productivity) and many of them have a very high cash flow. Specifically, more than 30% of firms have higher costs per ruble of output and about 50% of firms have lower labor productivity than the median firm where a reorganization procedure has started. Furthermore, firms being restructured are distributed unevenly across industries. About 80% of externally managed firms' output is produced by firms in three industries: oil and gas (54.5), chemical (9.4), and ferrous metallurgy (16.5). For comparison, the output of all firms in these industries accounted for 30% of total industrial output. Firms under external management produced 24% of output in the oil and gas industry. Industries in which external management procedures are more frequent are the best-performing in terms of cash flows and technical efficiency.

Slinko et al. (2005) test empirical predictions of our model. Unlike previous analysis of state capture in transition economies, which was based for the most part on surveys, this study employs data on preferential treatment at the regional level. In line with our predictions (Propositions 2 and 3), one finding is that capture of regional governments by large and inefficient enterprises has adverse effect on small-business development and federal tax collection. In Russia, the reported median productivity of firms with tax arrears is 60.75 (mean, 133.62) bln rb/worker compared to 34.43, the median productivity of all firms in RERLD (mean, 75.59) in 1997, as reported in Ponomareva and Zhuravskaya (2004). (The 1996 data were 53.96 (mean, 126.24) compared to 30.74 (mean, 68.01).) Tax arrears at the end of 1997 were significantly higher for firms with high cash flows at the beginning of 1997; and are higher for enterprises with high employment.

In the model, governors prefer that firms with higher profits enter first. To evaluate the effect of employment on the likelihood to be protected, we would need to assume that if a firm has excess employment, it might use it as a part of the protection fee as in Shleifer and Vishny (1994). Indeed, suppose that firm i employs L_i^a workers, and $L_i^a > L_i^* = \arg \max_{L_i} \pi_i(L_i)$. If the firm could control votes of its employees, the firm might expect to pay at least $w(L_i^a - L_i^*)$ less in campaign contributions. For the candidate, this deal is especially worth pursuing if the role of money, γ , is relatively small. This argument applies to the entry to the regional market. The possibility of using excess employment instead of bribes makes it possible that firms that are less profitable enter the regional market, while more profitable firms are driven out. Here, protection against intra-regional competition may also be viewed as a fine imposed on value-creating firms. McKinsey (1999) report on Russia stated that "financially sound companies end up paying taxes and energy bills 'for themselves and the other guys'".

The problem might become much more severe if a firm's internal cost of keeping excess labor is below the region-wide wage rate. The reason is that provision of social goods (which might attach workers through in-kind payments as documented in Gaddy and Ickes, 2002; Friebel and Guriev, 2001) often involves huge fixed costs, which at the beginning of transition were already sunk for old soviet enterprises. This creates disincentives to restructure: if restructuring assumes layoffs, as is often the case, the firm loses (a part of) its bargaining power. Here political decentralization may promote soft budget

¹⁰ Chapter 6 of Shleifer and Treisman (1999) is the most comprehensive and thorough analysis of Russian federalism's performance.

constraints for managers, instead eliminating them as in China (Qian and Roland, 1998).¹¹ The McKinsey report (1999) finds that one of the main operational reasons for persistent low productivity in Russia is excess employment maintained in old firms: the output of old companies fell by 50%, while employment fell by only 20%. The report says that “These inequalities (in competition) tend to favor low productivity incumbents, protecting them from takeovers and productive new entrants. These policies are often put in place to achieve social objectives, namely protecting existing jobs, but in many cases, the suspicion is that they also serve the personal financial interests of government officials in collusion with businessmen.”

Still, there is a type of enterprises that any Russian governor would welcome. These are oil and gas companies that register in regions, often small and poor, to use them as tax harbors (on Russian oil companies and tax enforcement, see Desai et al. (2005); Cai and Treisman (2004)). This is naturally explained by our model, since these companies do not create any competition in the labor market (i.e. those that correspond to low b 's). At the same time, many attempts of Western companies to start production in Russian regions faced stiff opposition from the authorities. Yudaeva et al. (2004) analyze the famous story of a failed attempt by the Dutch giant Philips to open a production facility in Voronezh.

Blanchard and Shleifer (2000) note that Gasprom, a natural gas monopoly effectively controlled by the central government, plays the role of a unionizing structure in the absence of strong party system. The McKinsey report (1999) shows the limits to this argument: In the steel and cement, and confectionery industries, which were case studies in the report, it is found that regional governments often channel implicit federal energy subsidies to companies by letting arrears to federal suppliers accumulate at the local gas and electricity distribution companies. The key ingredient for this scheme to work smoothly is that local energy distribution companies are often under the effective control of regional governments. The report concludes that “these subsidies slow down recovery in many manufacturing sectors by preventing upgrading investments and industry consolidation in and around the viable industrial assets”.

6. Conclusions

Stability and performance of a federalist system is affected by the industrial structure of constituent units. If local authorities find it profitable to protect enterprises from paying federal taxes, they have more incentives to restrict intra-unit competition to accumulate more rents. Via a coordination effect, such a situation is made self-sustainable. The same logic applies in the case of starting a federalist system. If the initial rent-holders are strong, the country is likely to end up with a form of peripheralized federalism which is unfriendly to economic development. The main source of stylized facts for our analysis was Russian, although insights obtained here might be applied as well to explain federalism performance in such countries as Argentina, Brazil, China, and Mexico.

Blanchard and Shleifer (2000) argue that Russia's (as compared to China's) transition story proves that political centralization matters for a federal structure to be efficient (as was first suggested by Riker (1964)). In this paper, we demonstrate that the industrial structure inherited from Soviet times has undermined Russian federalism at the early stages of transition and provided bad incentives to politicians, both local and central, and managers of industrial enterprises. In contrast, in China, political centralization reduces regional administration incentives to protect firms from the federal center. Now, there is no incentive to reduce market competition, since there are no large local monopolies to extract rents from. In Russia, there are disincentives to soft-budget constraint elimination, since a firm might use excess employment as a substitute for a payment for protection. Since excess employment is likely to be in old enterprises, governors keep old enterprises and restrict entry of new ones.

Since 2000, the Russian central government under President Putin has undertaken a serious effort to enforce tax authority over regional enterprises. The windfall oil revenues due to raising oil prices greatly increased the ability of the central government to do so. In 2001, elected governors were stripped of their positions in the higher chamber of Russian parliament, and in 2005 regional elections were replaced by a special appointment procedure. Our model predicts that this should be less provincial protectionism as a result of these changes. Anecdotal evidence suggests that this is indeed so.

The view of the federal center as a benevolent, although imperfect, social planner is far more generous than it should be.¹² In this paper, our analysis is focused on the dark side of federalism, i.e. the perverse incentives that separation of power between the center and regions create in a weakly institutionalized environment, rather than on a full evaluation of the performance of federalism in transition countries. In particular, we do not focus on relative capture of two level of government (on this, see Blanchard and Shleifer, 2000, 2001). Obviously, the same impossibility of the federal center in providing correct incentives to regional firms directly, which lies at the core of our model, is a major motivation for the existence of separation of powers as suggested by Hayek (1948).

There is little doubt that in the long-run the influence of the industrial structure on the political structure is not one-way. For an example related to our main story, recent studies of China's industry cite negative influence of emerging provincial protectionism. China Security Commission Report to the US Congress (2002) considers provincial protectionism (which is a manifestation of the center's inability to efficiently oppose emergence of trade barriers across provinces) as a major obstacle

¹¹ Chinese experience tells us that if entering firms use new technology such that their profits are very high compared to those of incumbent firms, governor's incentives to suppress entry might be reversed (e.g. Stiglitz and Qian, 1996).

¹² Prudhomme (1995) and Tanzi (2000) analyze such dangers of decentralization as the inability of constituent units to take part in an economic stabilization policy pursued by the federal government.

to China’s efforts to fulfill its World Trade Organization obligations. Although our model does allow to analyze dangers of these developments, it does not provide a formal study of federalism dynamics, which is a topic for future research.

7. Uncited references

Careaga and Weingast (2000), de Figueiredo and Weingast (2003), Filippov et al. (2004), Gehlbach (2005), Montinola et al. (1995), Myerson (2005), Oates (1972), Oates (1999), Prud’homme (1995), Saiegh and Tommasi (1999), and Weingast (2000).

Acknowledgments

The author is grateful to seminar participants in Columbia, Harvard, and University of Chicago, EEA Annual Congress in Stockholm, NASM of Econometric Society in Evanston, CEPR/WDI Transition Conference in Budapest, ISNIE conference in Cambridge, and to Richard Ericson, Mikhail Filippov, Scott Gehlbach, Philip Keefer, Roger Myerson, Yingyi Qian, Gerard Roland, Andrei Shleifer, Barry Weingast, and Ekaterina Zhuravskaya for extensive comments and constant encouragement.

Appendix.

Definition 1. (Milgrom and Shannon, 1994). Given a lattice X (e.g. a subset of \mathbb{R}^n) and a partially ordered set T , the function $f : X \rightarrow \mathbb{R}$ is quasisupermodular if $f(x) > (\text{resp.}, \geq) f(x \wedge y)$ implies that $f(x \vee y) > (\text{resp.}, \geq) f(y)$, the function $f : X \rightarrow \mathbb{R}$ is supermodular if for all $x, y \in X$, $f(x) + f(y) \leq f(x \vee y) + f(x \wedge y)$, the function $f : X \times T \rightarrow \mathbb{R}$ satisfies the single-crossing property in (x, t) if for $x' > x''$ and $t' > t''$, $f(x', t') > (\text{resp.}, \geq) f(x'', t')$ implies that $f(x', t') > (\text{resp.}, \geq) f(x'', t')$, and the function $f : X \times T \rightarrow \mathbb{R}$ has increasing differences in (x, t) if for $x' \geq x$, $f(x', t) - f(x, t)$ is monotone nondecreasing in t .

Proposition 5. (Milgrom and Shannon, 1994; Th. 6). Let $f : \mathbb{R}^n \times \mathbb{R}^m \rightarrow \mathbb{R}$ be twice continuously differentiable on an interval. Then f is supermodular in x if and only if $\frac{\partial^2 f}{\partial x_i \partial x_j} \geq 0$ for all $i \neq j$, and f has increasing differences in (x, t) if and only if $\frac{\partial^2 f}{\partial x_i \partial t} \geq 0$ for all $i = 1, \dots, n$.

Proposition 6. (Milgrom and Shannon, 1994; Th. 4). Let X be a lattice, S a sublattice of X , T a partially ordered set, and $f : X \times T \rightarrow \mathbb{R}$. If $f(x, t)$ is supermodular in x and satisfies the single-crossing property in (x, t) if and only if $\arg \max_{x \in S} f(x, t)$ is monotone nodecreasing in (t, S) .

Proposition 7. (Milgrom and Shannon, 1994; Th. 5). Let X be a lattice, S a sublattice of X , T a partially ordered set, and $f : X \times T \rightarrow \mathbb{R}$. If $f(x, t)$ is supermodular in x and has increasing differences in (x, t) , then $\arg \max_{x \in S} f(x, t)$ is monotone nodecreasing in (t, S) .

Proof of Proposition 2

Denote

$$v(n, m) = \Pr\left(V_I(n, m) > \frac{1}{2}\right) = \frac{1}{2} + \gamma(1 - t) \left(\beta_I \int_1^n [\pi_i(n) - \pi_i(m)] di - \beta_C \int_n^m \pi_i(m) di \right) + \frac{1}{2R} (w(n)^2 - w(m)^2).$$

Our next goal is to demonstrate that there exists an equilibrium of the voting game. First, as a composition of differentiable functions of n and m , function $v(n, m)$ is differentiable (and thus continuous). Second, we note that for any $m \geq 1$, there exists $n^*(m) \in \arg \max_{n \in [1, +\infty)} v(n, m)$. Indeed, let

$$\frac{\partial}{\partial n} v(n, m) = \gamma(1 - t) (\beta_I (\pi_n(n) - \pi_n(m)) + \int_1^n \pi'_i(n) di) + \beta_C \pi_n(m) + \frac{1}{R} w(n) w'(n) = 0.$$

Now

$$\frac{\partial^2 v(n, m)}{\partial n \partial m} = -2\gamma(1 - t) w'(m) (\beta_I - \beta_C) [a - w(m)] b_n < 0,$$

so n^* is decreasing with m . Similarly, m^* is increasing in n . Suppose that functions $m^*(n^*)$ and $n^*(m^*)$ are continuous. As a negatively-sloped curve and a positively-sloped curve have at most one intersection (and continuous functions necessarily intersect: checking that appropriate conditions are satisfied is straightforward), there exists a unique equilibrium (n^*, m^*) with $m^*(n^*) = m^*$, $n^*(m^*) = n^*$. If functions $m^*(n^*)$ and $n^*(m^*)$ are not continuous, than the existence of an equilibrium follows from the assumption that firms that are already in the market (and remain in the market under the incumbent’s plan) continue to contribute to the incumbent’s campaign.

The optimal electoral position is defined by

$$n^* = \arg \max_n v(n, m) = \arg \max_n \left\{ \gamma(1 - \tau) \left(\beta_I \int_1^n \pi_i(n) di - \beta_I \int_1^n \pi_i(m) di - \beta_C \int_n^m \pi_i(m) di \right) + \frac{1}{2R} (w(n)^2 - w(m)^2) \right\}.$$

To get the comparative statics that relate a candidate's position to parameters, one needs to calculate cross-derivatives. If the sign of the derivatives is well-defined, Proposition 5 can be combined with Proposition 7 to complete the proof.

$$\frac{\partial^2}{\partial \tau \partial n} v = -\gamma(-2\beta_I[a - w(n)]w'(n) \int_1^n b_i di + \beta_I[a - w(n)]^2 b_n + (\beta_C - \beta_I)[a - w(m)]^2 b_n) > 0,$$

$$\frac{\partial^2}{\partial \gamma \partial n} v = (1 - \tau)(-2\beta_I[a - w(n)]w'(n) \int_1^n b_i di + \beta_I[a - w(n)]^2 b_n + (\beta_I - \beta_C)[a - w(m)]^2 b_n) < 0.$$

Also,

$$\frac{\partial^2}{\partial R \partial n} v = -\frac{1}{R^2} w'(n) < 0.$$

If $\beta_I > \beta_C$, then

$$\frac{\partial^2}{\partial \beta_I \partial n} v = -\gamma \left(-2[a - w(n)]w'(n) \int_1^n b_i di + [a - w(n)]^2 b_n - [a - w(m)]^2 b_n \right) > 0,$$

which follows, as above, from $-2\beta_I[a - w(n)]w'(n) \int_1^n b_i di + \beta_I[a - w(n)]^2 b_n < 0$.

Now applying Proposition 7 to function v completes the proof of comparative statics for the incumbent.

Similarly, one can calculate

$$\frac{\partial^2}{\partial \tau \partial m} v = -\gamma \left(-\beta_I \int_1^n \frac{\partial}{\partial m} \pi_i(m) di - \beta_C \left(\pi_m(m) + \int_n^m \frac{\partial}{\partial m} \pi_i(m) di \right) \right) < 0,$$

$$\frac{\partial^2}{\partial \gamma \partial m} v = (1 - \tau) \left(-\beta_I \int_1^n \frac{\partial}{\partial m} \pi_i(m) di - \beta_C \left(\pi_m(m) + \int_n^m \frac{\partial}{\partial m} \pi_i(m) di \right) \right) > 0,$$

which implies, by Propositions 5 and 6, similar comparative statics (recall that the for the challenger the maximand is $1 - v$). □

Proof of Proposition 3

(i) With $\beta_I = \beta_C$, the maximand for either candidate is $v(n|b) = \gamma(1 - \tau)\pi(n|b) + \frac{1}{R}w(n)^2$. Denote $x = 1/(R \int_{i=1}^n b_i di)$. Then

$$w(n) = \frac{\int_{i=1}^n b_i di}{1/R + \int_{i=1}^n b_i di} = \frac{1}{1/(R \int_{i=1}^n b_i di) + 1} = \frac{1}{x + 1},$$

$$\pi(n|b) = [1 - w(n)]^2 \int_1^n b_i di = \left[\frac{x}{x + 1} \right]^2 \frac{1}{Rx} = \frac{x}{R(x + 1)^2}$$

$$v(n|b) = \gamma(1 - \tau)\pi(n|b) + \frac{1}{R}w(n)^2 = \frac{\gamma(1 - \tau)x + 1}{R(x + 1)^2}$$

Now $\frac{dv(n|b)}{dx} = \frac{-\gamma(1-\tau)(x-1)-2}{R(x+1)^3} < 0$, as $x \geq 1$, and $\frac{d^2}{dx^2} v(n|b) = \frac{6+2\gamma(1-\tau)(x-2)}{(x+1)^4} > 0$ as $\gamma < 3$ by assumption. Returning to the initial notation,

$$\frac{dv(n|b)}{d(\int_{i=1}^n b_i di)} > 0, \quad \frac{d^2 v(n|b)}{d(\int_{i=1}^n b_i di)^2} < 0. \tag{1}$$

Now we need to prove that the function $F(n|b) = \int_{i=1}^n b_i di$ satisfies single-crossing condition with respect to (n, b) , i.e. that, assuming $n > n'$ and $b \succ b'$ (with respect to the partial ordering described in the Setup), $F(n|b) - F(n'|b) \geq 0$ yields that $F(n|b) - F(n|b') \geq 0$ (see Definition 1). But this is trivial, since $\int_{i=1}^n [b_i - b'_i] di \geq 0$ for all n .

By Theorem 7 (iii) of Milgrom and Shannon (1994), a composition of a supermodular and increasing function and a convex and increasing function is supermodular. Since $F(n|b) = \int_{i=1}^n b_i di$ satisfies single-crossing property in (n, b) , Eq. (1) is sufficient to assert that the function $v(n|b)$ satisfies single-crossing property in $(-n, b)$. The result now follows from Theorem 4 in Milgrom and Shannon (1994): the more concentrated is b , the lower is the optimal $n^*(b)$.

(ii) The proof for the case $\beta_C = 0$ repeats all the steps of (i). The only difference is that the maximand now is.

$$\gamma(1 - \tau) \left(\beta_I \int_1^n (\pi_i(n) di - \pi_i(m) di) \right) + \frac{1}{R} (w(n)^2 - w(m)^2).$$

Consequently, there is an additional term of $-\beta_I \int_n^\infty (b_i - b'_i) di$, which is supermodular in $(-n, b)$. (Indeed, $\int_{i=1}^n b_i di - \int_{i=1}^n b'_i di \geq 0$ for any n . Therefore $\int_n^\infty (b_i - b'_i) di < 0$ for any n . □

Proof of Proposition 4

(i) In region α , governor's maximand is a concave function. Thus, each governor would prefer either to have his firms paying all taxes in full, or not paying at all. The condition $\frac{c\tau}{\gamma} \leq \max\{\pi_A(n_A^*), \pi_B(n_B^*)\}$ follows from equilibrium conditions. (ii) is a direct corollary of Proposition 2. \square

References

- Alexeev, M., Kurlyandskaya, G., 2003. Fiscal federalism and incentives in a Russian region. *Journal of Comparative Economics* 31, 20–33.
- Bardhan, P., 2002. Decentralization of governance and development. *Journal of Economic Perspectives* 16 (4), 185–206.
- Bardhan, P., Mookherjee, D., 1999. Relative capture of local and national governments: an essay in the political economy of decentralization. Working Paper, Institute for Economic Development, Boston University.
- Bardhan, P., Mookherjee, D., 2000. Capture and governance at local and national levels. *American Economic Review* 90 (2), 135–139.
- Berkowitz, D., Li, W., 2000. Tax rights in transition economies: a tragedy of the commons. *Journal of Public Economics* 76, 369–397.
- Besley, T., Coate, S., 2003. Centralized vs. decentralized provision of local public goods: a political economy analysis. *Journal of Public Economics*.
- Blanchard, O., Kremer, M., 1997. Disorganization. *Quarterly Journal of Economics*, 1091–1126.
- Blanchard, O., Shleifer, A., 2000. Federalism with and without political centralization: China versus Russia, IMF Staff Paper.
- Bolton, P., Roland, G., 1997. The breakup of nations: a political economy analysis. *Quarterly Journal of Economics*, 1057–1090.
- Cai, H., Treisman, D., 2004. State corroding federalism. *Journal of Public Economics* 88, 819–843.
- Careaga, M., Weingast, B., 2000. The Fiscal Pact with the Devil: A Positive Approach to Fiscal Federalism, Revenue Sharing and Good Governance, mimeo.
- de Figueiredo, R., Weingast, B., 2001. Russian federalism: a contradiction in terms. *Hoover Digest: Research and Opinion on Public Policy*, 116–123.
- de Figueiredo, R., Weingast, B., 2002. Pathologies of Federalism, Russian Style: Political Institutions and Economic Transition, mimeo.
- de Figueiredo, R., Weingast, B., 2003. Constructing Self-Enforcing Federalism in the Early United States and Modern Russia, mimeo.
- Desai, M., Dyck, A., Zingales, L., 2005. Theft and Taxes, mimeo.
- Djankov, S., Glaeser, E., La Porta, R., Lopes-de-Silanes, F., Shleifer, A., 2003. The new comparative economics. *Journal of Comparative Economics* 23 (4), 595–619.
- Enikolopov, R., Zhuravskaya, E., forthcoming. Influence of political institutions on the effect of decentralization. *Journal of Public Economics*.
- Ericson, R., 2000. Industrial feudalism. In: Kommulainen, T., Konhonen, I. (Eds.), *Russian Crisis and Its Effects*. Kikumora Publications, Helsinki, pp. 133–166.
- Filippov, M., Ordeshook, P., Shvetsova, O., 2004. *Designing Federalism: A Theory of Self-sustainable Federal Institutions*. Cambridge University Press, Cambridge.
- Friebel, G., Guriev, S., forthcoming. Should I stay or can I go? Worker attachment in Russia, *World Bank Economic Review*.
- Frye, T., Shleifer, A., 1997. The invisible hand and the grabbing hand. *American Economic Review Papers and Proceedings* 87 (2), 354–358.
- Frye, T., Zhuravskaya, E., 2000. Private protection and public goods: the role of regulation. *Journal of Law, Economics, and Organization*.
- Gaddy, C., Ickes, B., 2002. *Russia's Virtual Economy*. Brookings Inst., Washington, DC.
- Gehlbach, S., 2005. The Electoral Control of Local and National Politicians, mimeo.
- Grossman, G., Helpman, E., 1996. Electoral competition and special interest politics. *Review of Economic Studies* 63, 265–286.
- Grossman, G., Helpman, E., 2001. *Special Interest Politics*. MIT Press, Cambridge, MA.
- Hayek, F., 1948. The economic conditions of interstate federalism. In: Hayek, Friedrich (Ed.), *Individualism and Economic Order*. U. of Chicago.
- Ickes, B., Ofer, G., 2003. The Political Economy of Structural Change in Russia, mimeo.
- Inman, R., Rubinfeld, D., 1998. Rethinking federalism. *Journal of Economic Perspectives* 11 (4), 43–64.
- Lambert, A., Sonin, K., Zhuravskaya, E., 2000. Capture of Bankruptcy: Theory and Evidence from Russia. CEPR Working Paper No. 2488.
- Lindbeck, A., Weibull, J., 1987. Balanced budget redistribution as the outcome of political competition. *Public Choice* 52, 273–297.
- Litwack, J., forthcoming. Central control of regional budgets: theory with applications to Russia, *Journal of Comparative Economics*.
- McKinsey, 1999. *Russia's Economic Performance*, report.
- Melo, M., Rezende, F., 2003. Decentralization and governance in Brazil. In: Tulchin, J., Selee, A. (Eds.), *Decentralization and Democratic Governance in Latin America*. Woodrow Wilson Center, Washington, DC.
- Montinola, G., Qian, Y., Weingast, B., 1995. Federalism, Chinese style: the political basis for economic success in China. *World Politics* 48 (1), 50–81.
- Myerson, R., forthcoming. Federalism and incentives for success of democracy. *Quarterly Journal of Political Science*.
- Oates, W., 1972. *Fiscal Federalism*. Harcourt Brace Jovanovich, New York.
- Oates, W., 1999. An essay on fiscal federalism. *Journal of Economic Literature* 37 (3), 1120–1149.
- OECD, 2000. *Economic Surveys: Russian Federation*.
- Persson, T., Tabellini, G., 2000. *Political Economics: Explaining Economic Policy*. MIT Press.
- Ponomareva, M., Zhuravskaya, E., 2004. Federal tax arrears in Russia: liquidity problems, federal redistribution, or regional protection? *Economics of Transition* 12 (3), 373–398.
- Prud'homme, R., 1995. On the dangers of decentralization. *World Bank Research Observer* 10 (2), 201–226.
- Qian, Y., Roland, G., 1998. Federalism and the soft budget constraint. *American Economic Review* 88 (5), 1143–1162.
- Qian, Y., Weingast, B., 1997. Federalism as a commitment to preserving market incentives. *Journal of Economic Perspectives* 11 (4), 83–92.
- Qian, Y., Roland, G., Xu, C., 2000. Coordinating Changes in M-Form and U-Form Organizations, mimeo.
- Riker, W., 1964. *Federalism: Origin, Operation, Significance*. Little, Brown and Company, Boston and Toronto.
- Roland, G., 2000. *Transition and Economics: Politics, Markets, and Firms*. MIT Press, Cambridge, MA.
- Saiegh, S., Tommasi, M., 1999. Why is Argentina's fiscal federalism so inefficient? Entering the labyrinth. *Journal of Applied Economics*.
- Shleifer, A., Treisman, D., 1999. Without a Map: Political Tactics and Economic Reform in Russia. MIT Press.
- Shleifer, A., Vishny, R., 1994. Politicians and firms. *Quarterly Journal of Economics* 4, 995–1025.
- Shvets, J., 2005. *Judicial Bias in Russian Commercial Courts*, LSE mimeo.
- Slinko, I., Yakovlev, E., Zhuravskaya, E., 2005. Laws for sale: evidence from Russian regions. *American Law and Economics Review* 7 (1), 284–318.
- Stiglitz, J., Qian, Y., 1996. Institutional innovations and the role of local government in transition economies: the case of Guangdong province of China. In: McMillan, John, Naughton, Barry (Eds.), *Reforming Asian Socialism: The Growth of Market Institutions*. The University of Michigan Press, pp. 175–193.
- Tanzi, V., 2000. Some politically incorrect remarks on decentralization and public finance. In: Dethier, J.-J. (Ed.), *Governance, Decentralization and Reform in China, India and Russia*. Kluwer Academic Publishers.
- Tiebout, C., 1956. A pure theory of local public expenditures. *Journal of Political Economy* 64, 416–424.
- Tommasi, M., Saiegh, S., Sanguinetti, P., 2001. Fiscal federalism in Argentina: policies, politics, and institutional reform. *Economia* (Spring), 147–201.
- Treisman, D., 1999. Political decentralization and economic reform: a game-theoretic analysis. *American Journal of Political Science* 43 (40), 488–517.
- Treisman, D., 2000. *Fiscal Pathologies and Federal Politics: Understanding Tax Arrears in Russian Regions*, mimeo.
- Treisman, D., 2006. Decentralization, fiscal incentives, and economic performance: a reconsideration. *Economics and Politics* 18 (2), 219–235.
- Weingast, B., 1995. The economic role of political institutions: market-preserving federalism and economic development. *Journal of Law, Economics, and Organization* 11 (1), 1–31.
- Weingast, B., 2000. *The Theory of Comparative Federalism and The Emergence of Economic Liberalization in Mexico, China, and India*, mimeo.
- Young, A., 2000. The Razor's edge: distortions and incremental reform in the People's Republic of China. *Quarterly Journal of Economics* 115, 1091–1136.
- Zhuravskaya, E., 2000. Incentives to provide local public goods: fiscal federalism Russian style. *Journal of Public Economics* 76 (3).