

APPENDIX A

Appendix to Chapter 1: A Formal Analysis

The following is an adaptation of Timur Kuran's formal analysis of the way revolutionary activity spreads, sometimes rapidly and unexpectedly, among previously docile populations (1989).¹ The logic of bandwagons and deterrence in such cases resembles that observable in the interactions between center and regions in multilevel states such as Russia. Besides adapting Kuran's model to the case of intergovernmental relations in a divided state, I suggest two natural extensions. These are to incorporate central strategies of fiscal appeasement into the analysis of how protests spread, and to consider the way that imperfect information affects such central strategies.

Consider a two-level state consisting of a central government and N regional governments, subscripted i .² The center sets net tax (or subsidy) rates for each of the N regions, $T_i \in (-\infty, \infty)$. Next, each of the N regional governors decides simultaneously on a course of action, $X_i \in \{A, R\}$, where A constitutes accepting the center's authority and paying the tax (accepting the subsidy), and R constitutes rejecting the center's authority and withholding the tax (refusing the subsidy). Assume that at a given moment the center has a fixed stock of resources it can use to sanction recalcitrant governors, and that it is irrevocably and incorruptibly committed to punish all defectors to the limit of its ability, splitting the punishment between them. Thus, if $X_i = R$, the governor of i will be subjected to a central punishment that decreases his utility by an amount negatively related to the number of regions choosing R (denoted N_R).³

Governors are assumed to derive positive utility from both income and local political support. They suffer utility losses when they remit taxes to the center, since any revenue remitted either reduces the governors' own tax take or his local support (since constituents do not like paying more tax and expect their governor to negotiate a favorable deal with the center). However, support of local constituents does not depend just on the level of tax they are required to pay. It also depends on how historical, cultural, and other factors predispose constituents to respond to conflicts between their regional governor and the center, independent of the impact such conflicts may have on tax rates. Populations of different regions have different propensities to "rally round" behind a local leader in confrontations with the center. Let $\sigma_i \in [0, 1]$ denote region i 's "rallying-round" factor—the exogenous propensity of its population to support a regional leader who defies the center *because of the act itself, regardless of instrumental calculations*. A high value of σ_i —i.e., a population prone to rally behind the governor—suggests that a provincial leader can earn a high support premium by defying the center. Assume that σ_i varies across regions, but that its distribution is common knowledge.

Governor i 's choice of action, then, depends on the balance between three factors.

$$V_i(R|\sigma_i, T_i) = M(T_i) - P(N_R^e) + S(\sigma_i) \quad (1)$$

$$V_i(A|\sigma_i, T_i) = 0. \quad (2)$$

As noted, T_i represents the net tax or subsidy that the center has assessed to region i . N_R^e is the number of regions governor i expects to choose R . Assume $M(\cdot)$ and $S(\cdot)$ are monotonically increasing in T_i and σ_i respectively, and $P(\cdot)$ is monotonically decreasing in N_R^e . That is, the governor's expected utility of choosing R increases as the region's tax assessment and the anti-center predisposition of the population increase. It also rises as the expected number choosing R rises—and, therefore, the expected cost of central punishment falls. Note that the utility of not paying tax (disutility of not receiving a subsidy) enters as a positive term in the expected value of rejecting the center's authority, but the tax term does not enter in the expected value function of accepting the center's authority to avoid double counting.

From (1) and (2), governor i will just be indifferent between A and R when

$$M(T_i) - P(N_R^e) + S(\sigma_i) = 0. \quad (3)$$

From this, it follows that for a given level of T_i , the value of σ_i that makes governor i just indifferent between choosing A and choosing R declines with increases in N_R^e . This is illustrated in figure A1, in which the governor prefers to choose R if the ordered pair (σ_i, N_R^e) lies above the function depicted, and prefers to choose A if it lies below the function. Intuitively, for any given expected level of regional defection, there will be a threshold level of regions' "rallying-round" factor above which governors will choose to build support through mobilizational confrontation even knowing that they can expect to be punished by the center.

For simplicity, following Kuran, I assume that all governors form the same point expectations of the number of regions defecting, N_R^e , and that they all have the same functions translating σ into utility when R is chosen, $S(\cdot)$, and higher tax levels into dissatisfaction, $M(\cdot)$. I assume, in addition, that the center's punishment function is common knowledge and that each governor is equally sensitive to central punishment (i.e., $P(\cdot)$ is the same for all). These assumptions make it possible to focus on how differences in the values of σ_i , N_R^e , and T_i affect the nature of possible equilibria. They imply that all governors share the same boundary in figure A1.

Note that the boundary curve in figure A1 has a horizontal segment at $\sigma_i = 1$. This indicates that when the expected number choosing R is below $N_R^{e_1}$, even the regions most predisposed toward confrontation with the center (those for which $\sigma_i = 1$) will still choose A . Because the fear of central punishment is so great, N_R^e must pass above $N_R^{e_1}$ to provoke even these firebrands into rebellion. It is also possible for there to be a horizontal segment toward the bottom right at $\sigma_i = 0$. This would indicate that above a certain level of N_R^e , all regions—even those maximally loyal to the center—would join in a rebellion. Following Kuran, I call the boundary curve in figure A1 the *threshold function*, denoted $x(N_R^e)$. It assigns to each possible expectation about the number of defections a range of values of σ_i for which choosing R is optimal.

Figure A2 superimposes on figure A1 a curve, $g(\sigma)$, that represents the *cumulative density* of regions' values of σ . It measures across the top axis the number of regions

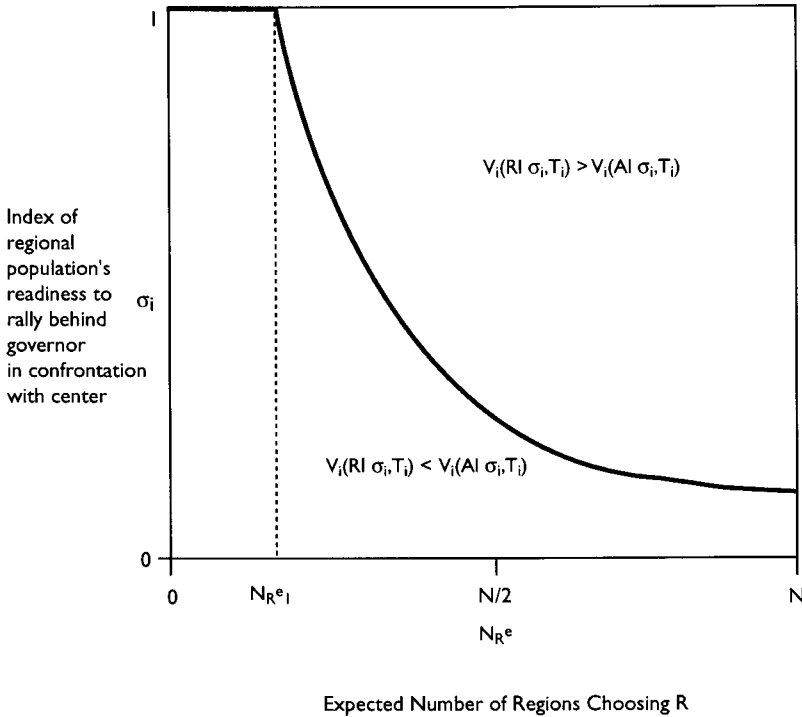


Fig. A1. The threshold function for regional rebellion

with values of σ greater than the value on the vertical axis. The relatively steep shape of the curve as drawn implies that most regions have relatively low values of σ . A curve that was concave upward throughout would indicate a larger proportion of high values.

At equilibrium, the expectations of governors and the center about how many will choose R are correct: $N_R^e = N_R$. This implies that $x(N_R^e) = g(\sigma)$; i.e., equilibrium occurs where the two curves in figure A2 intersect. In figure A2, there is only one equilibrium, at $N_R^e = N_R = 0$. To see why other points represent disequilibria, imagine that expectations started higher: 15 regions were expected to choose R . From the graph, this implies that only regions with a value of σ greater than σ_1 would actually choose R . From the cumulative distribution function, however, there are only 11 regions with $\sigma > \sigma_1$. Since expectations were too high, this will lead to a downward revision of expectations. If, based on this experience, 11 regions are expected to choose R next round, no regions will actually choose R since even at $\sigma = 1$, regions require a higher level of expected defection to defect themselves. At the point where $N_R^e = N_R = 0$, the top left-hand corner, expectations will correspond to actual choices, representing an equilibrium. It will also be a stable equilibrium, since any shock that leads to higher expectations will set off a similar process of downward revision. While any point where the two curves

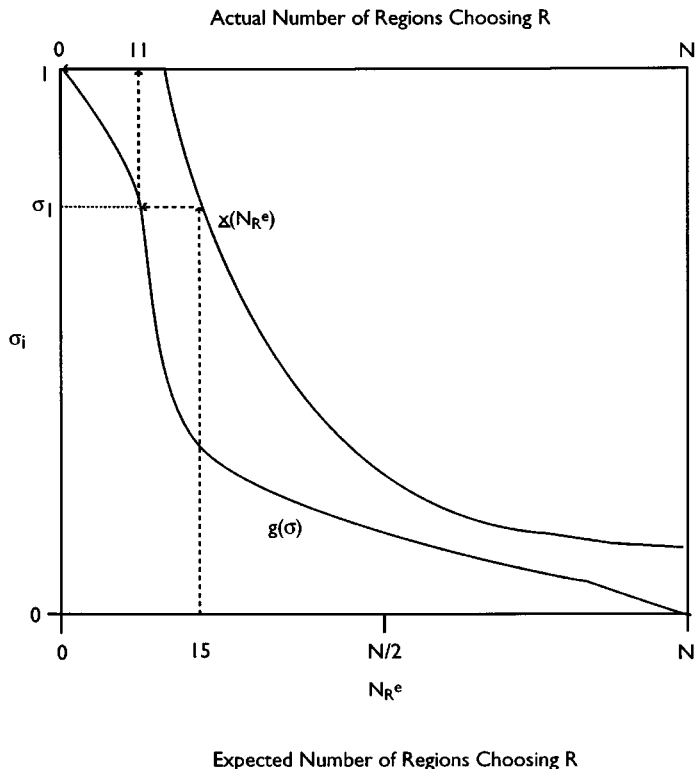


Fig. A2. Threshold function and cumulative density of σ

cross constitutes an equilibrium, stable equilibria will occur where the cumulative density function, $g(\sigma)$, crosses the threshold function, $x(N_R^e)$, from above.

Consider now how tax policy can affect the nature of equilibria. In figure A3, three equilibria exist given the two solid curves as drawn. A full-compliance equilibrium exists at the top left corner; a full-defection equilibrium exists at the bottom right corner. Both of these are stable—i.e., the system will return to these equilibria after small perturbations. There is also an unstable equilibrium at the point where the two curves cross. It is unstable because if expectations are slightly too high, a process of revision will occur that leads to the full-defection equilibrium, and if expectations are slightly too low, revisions will lead the system to full compliance. Up to this point, the center's tax assignments to the regions have been assumed fixed. In fact, an increase in all regions' tax assignments will lead to a downward shift in the threshold function: the higher the tax, the more attractive defection becomes regardless of one's level of σ_i and the level of N_R^e . A decrease in all regions' tax assignments, by contrast, will shift $x(N_R^e)$ upward.

Imagine that a state begins at the full-compliance equilibrium, where $N_R^e = N_R = 0$. All regions are paying tax and acknowledging the center's authority. But then the cen-

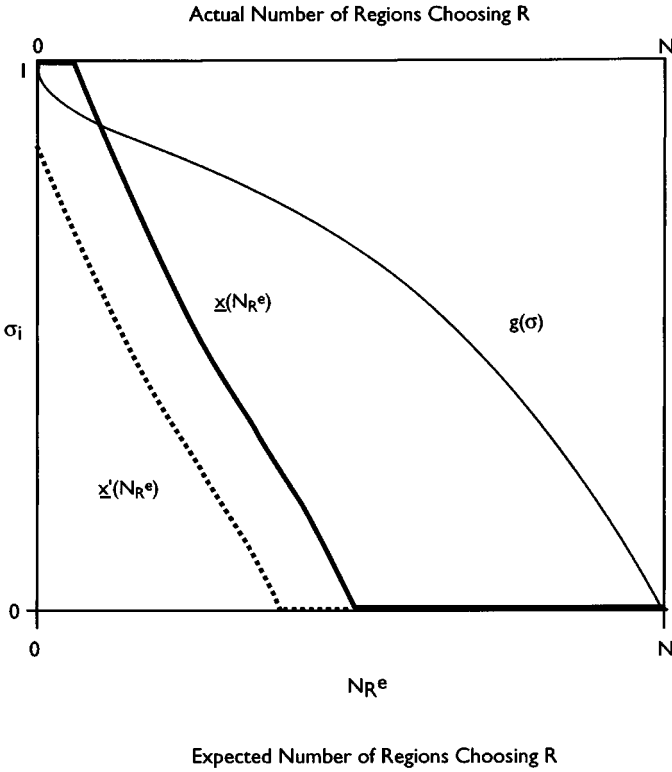


Fig. A3. Increasing tax

ter raises all regions' tax assignments slightly, shifting $x(N_R^e)$ down to $x'(N_R^e)$. Now full compliance is no longer an equilibrium; the only equilibrium lies at universal defection. The slight tax increase sets off a spiral of challenges that quickly forms into a bandwagon of regional protest, leading eventually to complete collapse of the state's fiscal capacity. At any value of σ_i greater than 0, the number actually choosing R, $g(\sigma)$, will turn out to be greater than the number expected, $x'(N_R^e)$.

There is a way, however, for the center to avoid such a fiscal meltdown if it is able to assign different T_i 's to the various regions and if it knows each region's value of σ_i .⁴ Suppose that instead of increasing taxes equally for all regions, the center concentrates the tax increases on those with the lowest values of σ_i and uses the gains to reduce the tax increases for those at the highest values of σ_i (the n_1 regions with $\sigma_i > \sigma_1$, in fig. A4), thus achieving the same final value of $\sum T_i$. This could preserve the full-compliance equilibrium by making the slope of the threshold function steeper (replacing $x'(N_R^e)$ with $x''(N_R^e)$ in fig. A4). And since the only equilibrium in the previous case was at $N_R^e = N$, yielding an actual total tax take of zero, the actual tax take under $x''(N_R^e)$ would

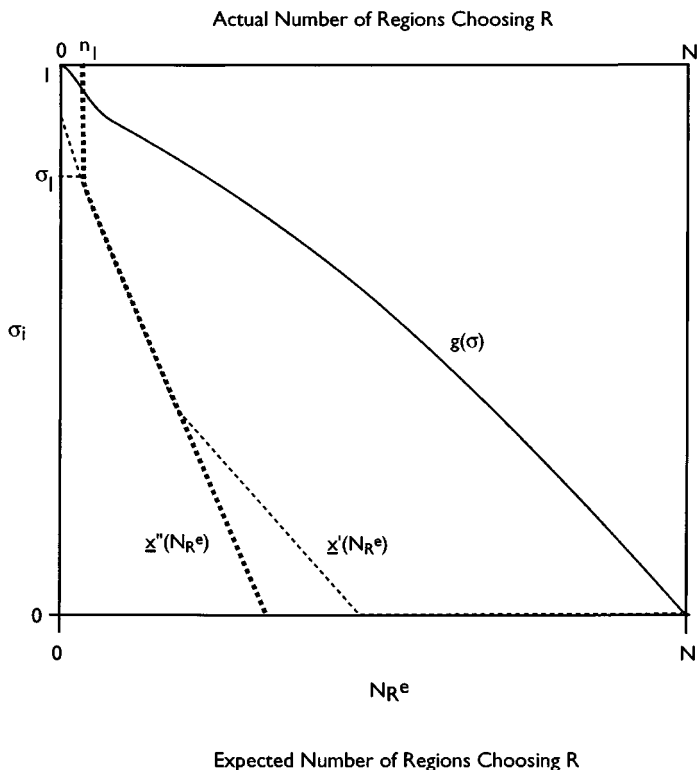


Fig. A4. Tax increase with selective appeasement

be much higher (assuming expectations of defections had not risen too fast, undermining the strategy). Thus, a strategy of redistributing via the tax system in favor of those regions where populations are more predisposed to favor conflict with the center, at the expense of more loyal regions, may prevent spirals of noncompliance and increase the center's total tax take. Such a strategy may require just charging lower tax to the confrontation-prone, or it may require paying them a positive subsidy. Either way, it will sometimes be the center's optimal strategy to maximize net receipts.

Finally, what if the center wishes to adopt such a redistributive strategy but does not know which regions are the most confrontation-prone. Suppose that while it (and all the regions) knows the distribution of σ , only the regions themselves know their particular value, σ_i . In such a situation, it may be optimal for the center to redistribute each round to try to demobilize those that have chosen R in the previous round. Imagine a state faces a threshold curve $x'(NR^e)$ and a cumulative distribution $g(\sigma)$, as in figure A3. Expectations start at $NR^e = 0$. This implies, in this example, that five regions will choose R (see fig. A5). If the center has time to alter tax assignments before regional governors adjust their expectations to this new baseline, it can appease these five defiant regions by re-

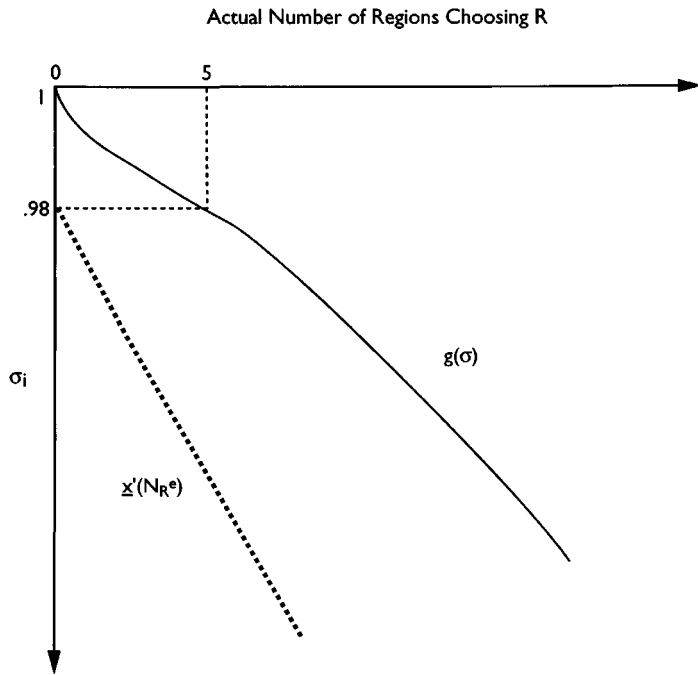


Fig. A5. Appeasement with imperfect information

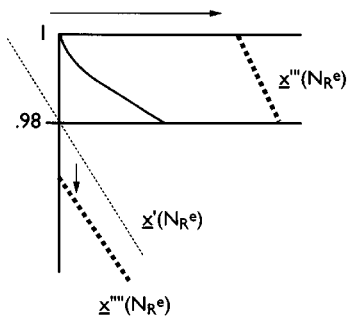


Fig. A5A

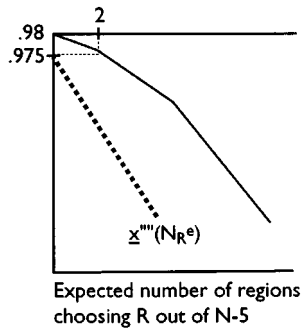


Fig. A5B

ducing their tax assignments, so that their threshold function shifts right to $x'''(N_R^e)$ (fig. A5A). Each of these regions is now expected *not* to protest in the future, unless a certain number of others have already broken the ice. Assuming the center must finance these payoffs domestically, it must then increase the tax assignments on other regions. Since it does not know which of the remaining regions have high and which have low values of σ_i , its best bet is to increase all other regions' taxes by a small, equal amount. This shifts the threshold function for these regions down to $x''''(N_R^e)$ (fig. A5A). As can be seen, while the appeasement strategy succeeds in demobilizing the protests of the five regions with the highest values of σ , the additional tax burden prompts two of those regions with slightly lower σ values to rebel, even though they do not expect any other regions to join them (fig. A5B). If the center wishes to prevent this stimulating a bandwagon in future rounds, it must in turn appease these two regions, financing their tax cuts with money from those that still have not defected.

Such a process of appeasement stimulating additional protests may go on for several rounds—or may continue indefinitely, depending on the shape of the functions. If the cumulative density of σ slopes downward sufficiently steeply in the region near the top left corner, then each successive increase in the tax level to finance appeasement of protesters will probably provoke a smaller number of additional defections, leading relatively sooner to an end to the cycle of protest. If, on the other hand, large numbers of regions have high σ values, then the center's appeasement attempts may never catch up with the bandwagon, merely slowing rather than halting the escalation. If the general tax increase stimulates a large number of defections, this may even threaten to return regions already appeased to protest strategies. But for a range of values of the parameters, appeasement will lead to a deescalation of protest and return the system to the full-compliance equilibrium. The model, therefore, demonstrates how rational choices on the part of a central government with imperfect information might lead to a pattern of selective appeasement, starting with the most exogenously defiant regions, and moving down gradually to regions predisposed to greater loyalty to the center that are provoked into protest by the accumulating tax burden they are required to pay to support the appeasement of other regions. It also explains why even some previously appeased regions may jump back onto the bandwagon if the number protesting continues to increase, or if they too are required to finance part of the appeasement payments to more recent defectors.

APPENDIX B

Appendix to Chapter 3

Notes on Data and Construction of the Variables

The experience of the Soviet era, in which statistics were deliberately distorted for purposes of propaganda, along with the general confusion and dislocation of the transition years, provide good reason to be cautious in using statistics collected in Russia by official sources. Nevertheless, in the 1990s the availability and quality of published statistics has risen. One OECD economist even writes of “spectacular improvements” at the main statistical agency, Goskomstat Rossii (Koen 1996, 321). The data used in this study have been cross-checked wherever possible, and attempts are made to test hypotheses more than once, using different data streams and different years. The persuasiveness of claims should not depend on any one particular coefficient estimate, but rather on the accumulation of supportive evidence, both statistical and derived from other kinds of analysis.

Some types of data are thought to be particularly vulnerable to error in postcommunist economies. The postreform decline in output is likely to be overstated for several reasons (Fischer et al. 1996, 48–49; Koen 1996). Quality improvements induced by competition often go unmeasured. The collapse of planning reduces incentives for inflated production reporting, and incentives for tax evasion or goods withholding for barter may lead to subsequent underreporting (Noren 1993, 421). In addition, state statistical services in communist countries were set up to measure output from the state sector, and in the Soviet case used a complete enumeration method rather than sampling. Lack of resources and experience may impede broadening the scope to include growth of output in the private sector initially; and deliberate evasion by semilegal or illegal private enterprises will also probably lower the estimates (Koen 1996; Plyshevskii 1996, 135–40). Some adjustments were made by Goskomstat to better capture private sector output in 1994, but these were probably still insufficient (Koen 1996).

Price data may also contain error. Since “price increases in the previous controlled price regime may have been disguised as quality improvements and inflation in the black markets simply ignored, inflation during the transition may have been overestimated” (Fischer et al. 1996, 49). In the transition, the prices of individual items in Russia moved at very different speeds, complicating index construction (Koen 1996). Foreign trade figures, especially in the early period of transition, were thought to be underreported, as statistical reporting lagged behind the liberalization of the old system of special exporters (Noren 1993, 422). Banking and financial statistics have also been subject to question (Grigori Khanin, in *EKO*, no. 6, 1992, cited in Noren 1993, 421). According to

TABLE B1. Center-to-Region Transfers and Regional Tax Share, Russia 1994

	Region's Share of Tax Revenue		Federal Budget Transfers to Region		Subsidies Paid to Region in First Quarter	
	(1)	(2)	(1)	(2)	(1)	(2)
A. Bargaining Power						
<i>Recent Protest or Opposition</i>						
Vote for "Russia's Choice" December '93	-.34 (.25)		-7.96* (4.35)	-5.55** (2.71)	-.56 (.93)	
Log (1 + man-days lost to strikes, 1993)	-.73 (2.21)		51.14 (38.51)		11.42 (8.25)	5.45 (7.61)
Region's governor publicly opposed Yeltsin Sept. 1993	5.21** (2.11)	4.14** (1.82)	40.91 (36.66)		7.63 (7.85)	
<i>Political Weight</i>						
Population	.00 (.00)		-.01 (.01)		-.00 (.00)	
Estimated regional output per capita	.01 (.00)	.01*** (.00)	.19** (.08)	.18*** (.06)	.02 (.02)	.03** (.01)
Republic status	6.41** (2.65)	7.33*** (1.84)	-131.52*** (46.06)	-84.01** (33.80)	-9.34 (9.86)	
B. Alleviating Need						
Social infrastructure more developed	-.07 (.10)		6.66*** (1.69)	7.43*** (1.17)	.82** (.36)	.52** (.23)
Classified in federal budget as "needy"						
Classified in federal budget as "especially needy" ^a						
Profits per capita 1993	-49.13*** (14.43)	-48.37*** (9.72)	-1273.48*** (250.89)	-1087.43*** (183.66)	-137.17** (53.73)	-172.40*** (37.09)
% of population under 16	.69 (.78)		12.16 (13.61)		6.79** (2.92)	5.29*** (.79)
% of population of pension age	-.01 (.50)		-24.70*** (8.78)	-34.04*** (3.59)	1.39 (1.88)	
Estimated real income 1993	.00 (.01)		.28 (.19)		.05 (.04)	
Degrees latitude north	.25 (.22)		-6.04 (3.87)		-1.26 (.83)	
C. Other Central Objectives						
Advanced pace of economic reform	.29 (.22)		7.96* (3.87)	7.70** (3.29)	.90 (.83)	
% of work force in agriculture	-.11 (.22)		-7.28* (3.79)		-.98 (.81)	

Types of Central Transfers
to the Regions, 1994

Direct Transfers From Regional Support Fund in II-IV Quarters		Total Transfers from RSF, including Added Reductions From VAT Remissions		Net Mutual Payments		Federal Budget Investment	
(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
-1.18*	-1.49***	-3.63**	-3.16***	-4.70		-1.07	
(.68)	(.40)	(1.41)	(.82)	(2.98)		(1.78)	
10.23*		17.08	21.31*	29.96		15.05	
(5.74)		(11.96)	(11.69)	(26.35)		(15.75)	
9.33*		18.01		6.33		21.86	
(5.44)		(11.34)		(25.09)		(15.00)	
-.00		.00		-.02	-.02**	.00	
(.00)		(.00)		(.01)	(.01)	(.01)	
.01		.03	.05***	.29***	.31***	-.11***	-.10***
(.01)		(.02)	(.02)	(.05)	(.05)	(.03)	(.02)
-6.99		-16.11		-51.45		-50.04**	36.12**
(6.92)		(14.42)		(31.52)		(18.84)	(14.02)
.68***	.56***	.91*	.71*	3.12***	2.90***	1.17*	.93**
(.25)	(.19)	(.52)	(.37)	(1.16)	(.92)	(.69)	(.46)
-.21		16.07					
(6.79)		(14.13)					
25.94***	21.88***	56.05***	63.44***				
(7.71)	(6.58)	(16.07)	(12.55)				
-86.67*	-62.93***	-236.98**	-323.86***	-1038.68***	-970.32***	52.33	
(43.85)	(14.94)	(91.33)	(58.90)	(171.69)	(134.60)	(102.64)	
5.13**	2.82***	3.98		6.47		2.17	
(2.04)	(.67)	(4.25)		(9.31)		(5.57)	
1.98		1.38		-14.82**	-14.82***	-6.16*	-6.80***
(1.31)		(2.74)		(6.01)	(2.09)	(3.59)	(1.30)
-.01		-.06		.15		.09	
(.03)		(.06)		(.13)		(.08)	
-.39		.98		-5.92**	-6.56***	-1.23	
(.58)		(1.20)		(2.64)	(1.96)	(1.58)	
1.66***	1.44***	1.41		3.28	2.90	.69	
(.59)	(.48)	(1.22)		(2.65)	(2.23)	(1.58)	
-.43		-1.88		-2.47		-4.61***	-3.20***
(.58)		(1.21)		(2.59)		(1.55)	(.83)

(continued)

TABLE B.1. Center-to-Region Transfers and Regional Tax Share, Russia 1994

	Region's Share of Tax Revenue		Federal Budget Transfers to Region		Subsidies Paid to Region in First Quarter	
	(1)	(2)	(1)	(2)	(1)	(2)
Region's share in RF output of raw materials	.05 (.28)		-6.85 (4.94)	-6.82* (3.76)	-.74 (1.06)	
Tax collection effort	-.77 (2.42)	-3.35** (1.65)	30.13 (42.12)	-12.67 (51.68)	-4.61 (9.02)	
D. Access and "Pork"						
Chairman (or deputy) of Budget Commission is from region	-.94 (3.93)		26.35 (68.41)		-18.35 (14.65)	
Chairman (or deputy) of parliament is from region	-4.27 (3.29)		47.98 (57.17)		-12.12 (12.24)	
Representatives per capita in State Duma (sme)	-.13 (2.58)		31.58 (44.85)		-4.45 (9.61)	
Yeltsin visited region in 1994	-2.40 (2.04)		-4.79 (35.49)		-4.08 (7.60)	
Chernomyrdin visited region in 1994	2.35 (2.42)		17.88 (42.15)		-7.05 (9.03)	
Region had perm. rep. in Moscow	-1.78 (1.99)		-83.92** (34.60)	-105.06*** (31.00)	-6.97 (7.41)	
Constant	51.78* (28.46)	73.35*** (2.29)	874.84* (494.78)	1007.70*** (114.57)	-88.09 (105.97)	-104.11*** (23.06)
R^2	.65538	.59896	.84423	.80439	.57661	.59785
Adjusted R^2	.50375	.57032	.77570	.77688	.39032	.56952
N	72	75	72	73	72	76

Note: standard errors in parentheses. Federal Budget Transfers to the regions include direct payments from the support fund, additional indirect subsidies via later exemptions from VAT sharing, federal subventions, net mutual payments, net budget loans, federal budget investment, and payments to the closed cities. For sources, see notes on data. One extreme outlier, the Koryaksky Autonomous Okrug, was excluded from the data except that for the regional tax share since its value for all the other dependent variables was more than 5 standard deviations greater than the mean. The Koryaksky Autonomous Okrug, a

Central Bank Chairman Viktor Gerashchenko, the Russian Central Bank did not in 1992 have a reporting system that extended to the rayon level, comparable to that of the former State Bank, Gosbank (Noren 1993, 421).

I have, therefore, exercised particular care when using these types of statistics. Not much emphasis is placed upon the analysis of figures on bank credits. Measures of var-

Types of Central Transfers to the Regions, 1994							
Direct Transfers From Regional Support Fund in II–IV Quarters		Total Transfers from RSF, including Added Reductions From VAT Remissions		Net Mutual Payments		Federal Budget Investment	
(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
.83		.96		–8.22**	–6.80**	1.79	3.55**
(.82)		(1.72)		(3.38)	(2.80)	(2.02)	(1.57)
–4.27		–5.93		18.82		13.72	23.64*
(6.31)		(13.14)		(28.82)		(17.23)	(12.85)
.24		–10.71		–34.51		37.15	54.62**
(10.18)		(21.20)		(46.81)		(27.99)	(23.32)
–9.48	–12.66*	–17.30		–3.67		49.41**	54.80***
(8.62)	(6.77)	(17.96)		(39.12)		(23.39)	(18.99)
11.62*	10.08**	7.38		52.10*	55.38*	–9.40	
(6.72)	(4.93)	(13.99)		(30.69)	(27.96)	(18.35)	
4.94		1.54		6.87		–7.65	
(5.36)		(11.16)		(24.29)		(14.52)	
3.21		.73		36.52		–16.63	
(6.41)		(13.36)		(28.84)		(17.24)	
–4.89		–15.93		–17.42		–48.69***	–44.67***
(5.16)		(10.74)		(23.68)		(14.16)	(11.80)
–107.34	–39.43*	–32.25	96.11***	487.29	604.04***	361.95*	335.50***
(73.39)	(19.77)	(153.70)	(16.63)	(338.59)	(110.31)	(202.43)	(44.45)
.78196	.73007	.72264	.67552	.86395	.83300	.70546	.63659
.67294	.69684	.58395	.64770	.80409	.80952	.57586	.58068
72	73	72	76	72	73	72	75

sparingly inhabited North-Eastern territory of 35,000 inhabitants, received more than 6 million rubles per capita in 1994 central transfers.

^aIncluded in regressions for FFSR, to test relationship between allocation and the specific criteria on which FFSR allocations are supposed to be based.

* $p < .10$ ** $p < .05$ *** $p < .01$

ious independent variables used in the study are taken from recent Goskomstat Rossii publications. Some of these may, indeed, be problematic. Territorial statistical agencies, to the degree that they fall under the influence of local political authorities, may be pressured to inflate indicators of “need” that would justify greater transfers. Yet, if the incentive is equal in all regions, the distortions are likely to average out in cross-regional

TABLE B2. Regions' Ranks in Net Transfers Received (as % of Total Revenue Collected in Region)

Region	Rank in Net Transfers Received 1988	Rank in Net Transfers Received 1992
Karelia	3	13
Komi	22	4
Archangl	20	42
Nen AO	.	.
Vologda	69	47
Murmansk	2	27
St. Peter	42	68
Leningra	48	20
Novgorod	51	32
Pskov	14	26
Bryansk	37	15
Vladimir	71	59
Ivanovo	70	66
Kaluga	25	29
Kostroma	53	35
Moscow C	18	57
Moskovsk	30	52
Orlovska	44	37
Ryazan	56	64
Smolensk	27	55
Tverskay	60	49
Tulskaya	61	38
Yaroslav	67	67
Mari El	13	16
Mordovia	23	12
Chuvashi	28	28
Kirovska	40	53
Nizhegor	59	62
Belgorod	35	65
Voronezh	43	58
Kursk	38	63
Lipetsk	64	36
Tambov	24	70
Kalmykia	8	5
Tatarstan	68	8
Astrakhan	17	21
Volgogra	66	46
Penza	33	40
Samara	72	71

TABLE B2.—*Continued*

Region	Rank in Net Transfers Received 1988	Rank in Net Transfers Received 1992
Saratov	50	44
Ulyanovs	62	56
Adygeia	.	.
Dagestan	4	2
Kab-Balk	21	11
Kar-Cher	.	.
N. Osset	45	1
Chechnya	31	6
Krasnoda	46	60
Stavropol	49	61
Rostov	32	50
Bashkort	54	19
Udmurtia	65	.
Kurgan	26	33
Orenburg	58	39
Perm	63	69
Komi-Per	.	.
Sverdlov	55	48
Chelyabi	41	30
Gorn Alt	.	.
Altai Kr	29	22
Kemerovo	57	23
Novosib	1	51
Omsk	52	43
Tomsk	10	45
Tyumen	73	72
Khant-Ma	.	.
Yam-Nen	.	.
Buryatia	5	7
Tyva	7	3
Khakassi	.	.
Krasnoya	47	25
Taimir	.	.
Evenki	.	.
Irkutsk	39	9
Ust-Orda	.	.
Chita	6	10
Ag-Burya	.	.
Sakha	15	18

(continued)

TABLE B2.—*Continued*

Region	Rank in Net Transfers Received 1988	Rank in Net Transfers Received 1992
Primore	36	41
Khabarov	19	34
Yevreiskaya	.	.
Amur	9	14
Kamchatka	11	17
Koryaksky	.	.
Magadan	12	24
Chukotka	.	.
Sakhalin	16	31
Kaliningrad	34	54

regressions. The weakness of some statistics suggests one should be cautious in ruling out hypotheses that might fail primarily because of inadequate data sources. Yet, the strong positive results reported seem quite unlikely to be caused by data distortions.

The data on fiscal transfers and taxes were obtained from several sources. Those for 1992 on tax payments and receipts of central transfers (other than budget investments) are based on figures published by Leonid Smirnyagin, an adviser to President Yeltsin on political geography and a member of the Presidential Council, in the newspaper *Segodnya* (Smirnyagin 1993a). A fuller accounting than the one published was provided to me by Smirnyagin. According to Smirnyagin, the data on tax remittances by the regions in 1992 were taken from the President's Budget Message (*Byudzhethoe poslanie*), which circulated in the spring of 1993. The statistics on receipts of central financial resources were prepared by the Regional Politics Department of the Council of Ministers, using information from the Ministry of Finance. (Smirnyagin has said that these data were rechecked by the Ministry of Finance and corrected before he was allowed to present his findings to President Yeltsin. I, of course, use the corrected version.) The figures on central budget investments were obtained from Goskomstat Rossii. Most data for 1994, 1995, and 1996 come from the Ministry of Finance and State Tax Service and were provided by Aleksei Lavrov, of the President's Analytical Administration. Figures on transfers to closed cities come from the corrected federal budget for 1994 and investment figures for 1994 come from Goskomstat.

One issue of obvious concern is whether incentives to misreport data might lead to distortions. In the case of this data, such problems are unlikely to arise, since the figures were obtained from central agencies. While regional governments might have an incentive to exaggerate the amount of tax they pay to the center, the central Tax Service, from which the data were obtained, has no such incentive, as it would be required to account for any shortfall between its reported collections and the actual amount remitted. Nor does it have any obvious reason to underreport the amount of tax specific regions have paid, and thus reveal itself to be failing in its tax collection responsibilities. Like-

wise, though regions might underreport the levels of central transfers they receive in the attempt to lobby for more, the central agencies making these transfers have no incentive not to report them in full, since again they would be liable for diversions between Finance Ministry and recipients. The only figures where such distortions might plausibly play a part are those for the level of regional tax collection and the proportion of total tax collected in a region remitted to the center. Regional leaders might seek to conceal part of regional revenue, to keep certain flows off-budget, and hence to exaggerate the proportion sent to Moscow. This is likely to lead to some overestimation of Moscow's share across the board, which should not affect the relative differences between regions too greatly. In any case, the results for revenue share retained are only one of many fiscal variables analyzed separately, and the main conclusions do not rely on these particular results.

While caution is merited in using Goskomstat statistics, the emerging consensus in the field is that, with certain exceptions, they are sufficiently reliable to be informative in works of this kind when used carefully. Citations of Goskomstat Rossii data are virtually universal in studies of post-Soviet Russian economic, political, and social developments. (For a few recent examples, see Hanson 1996; Sutherland and Hanson 1996; Hough, Davidheiser and Lehmann 1996; IMF 1992b.) Where possible, alternative indicators and specifications should, of course, be attempted. I have done my best to do so in this study.

Sources of Data

Dependent Variables

Main data compiled from State Tax Service and Ministry of Finance accounts. Provided to the author by Leonid Smirnyagin and Aleksei Lavrov of the President's Analytical Administration. Data on federal budget investments in the regions in 1992 and 1994 calculated from Goskomstat, *Rossiisky Statistichesky Yezhegodnik 1995*, 842–50; figures for payments to closed cities 1994 taken from the 1994 (corrected) Russian Budget.

For 1992, the Smirnyagin aggregate transfers data differs slightly from the sum of the separate transfer streams for which data were available (in 13 of the 72 cases, the Smirnyagin transfers variable is slightly larger). In table 3.3, the 1992 net transfers variable is constructed from the original Smirnyagin aggregate variable. However, results are almost identical if the sum of separate transfer streams is used instead. For 1996, the net transfers variable used is that estimated by Alexei Lavrov, and apparently includes estimates of part of federal spending in the regions.

Independent Variables

Bargaining Power

Recent vote for pro-reform party or presidential candidate

1992: vote for Yeltsin in 1991 presidential election (McFaul and Petrov 1995).

- 1994 and 1995: vote for Russia's Choice in 1993 parliamentary election (official results from Central Electoral Commission).
- 1996: vote for Yabloko or Russia's Choice in 1995 parliamentary election (Moscow Carnegie Center, *Parlamentskie vybori 1995 goda v Rossii*, Moscow, 1996, 19).

Region declared sovereignty by end of 1990

(Sheehy and other sources: see table B5)

Governor opposed Yeltsin September 1993

(Teague 1993 and reports in FBIS). "Governor" here taken as head of administration of oblasts and kraia, and president—or if none, chairman of Council of Ministers—of republics.

Governor did not support Chernomyrdin's Our Home Is Russia bloc 1995

Variable set at -2 if governor ran on OHIR electoral list; at -1 if governor did not run, but another high official from regional administration did; at 0 if no high official from regional administration ran on OHIR list (Official party lists).

Log Strike Variable

- 1992: Log of 1,000 man-days lost to strikes in 1991 (from Goskomstat Rossii, *Narodnoe Khoziaistvo RF*, 1992). Adjusted, so that those regions with less than 1,000 man-days lost coded as zero.
- 1994: Log of 1,000 man-days lost to strikes in 1993 plus one (Goskomstat Rossii, *Rossiisky Statisticheskyy Yezhegodnik* 1994, 475). I assume all strikes given as in Tyumen in fact occurred in Yamalo-Nenetsky AO (gas industry).
- 1995: Log of 1,000 man-days lost to strikes in 1994 plus one (Goskomstat Rossii, *Rossiisky Statisticheskyy Yezhegodnik* 1995, 577–79).
- 1996: Log of 1,000 man-days lost to strikes in 1995 plus one (Goskomstat Rossii, *Rossiisky Statisticheskyy Yezhegodnik* 1996, 780).

Population

- 1992: Population 1992 (Goskomstat Rossii, *Sotsial'noe Razvitiye Rossiiskoi Federatsii*. 1992, Moscow: Goskomstat Rossii, 1992, 17–21).
- 1994–96: Population 1994 (*Rossiisky Statisticheskyy Yezhegodnik* 1994, Moscow: Goskomstat Rossii, 1994).

Estimated economic output

- All years: estimate of 1993 industrial output plus agricultural output plus services output, all per capita (Goskomstat Rossii).

Republic

Goskomstat Rossii, *Rossiisky Statistichesky Yezhegodnik 1996*

*Access**Visited by President or Prime Minister that year*

- 1992: tally of official visits constructed on the basis of reports in *Nezavisimaya Gazeta*.
 1994: tally constructed from FBIS.
 1996: visits by president in period up to June 16, 1996, compiled from Moscow Carnegie Center, *Prezidentskie Vybori v Rossii*, no. 9, June 1996, and press reports.

Region had member on parliament's budget committee

- 1992: member on Supreme Soviet's Commission on Budgets, Planning, Taxes and Prices (Carroll Publishing, *Russian Government Today*, spring 1993 and fall 1993 editions).

Chairman of parliamentary budget committee (or deputy) from region

- 1994–95: membership of commissions (either lower or upper house) from *Russian Government Today*, spring 1994.
 1996: Panorama Publishing, *Telefonnaya Kniga Rossii*, April 1997, and election results. (1 if chairman or a deputy chairman of either house's budget committee was elected from that region—i.e., in Duma, not on party list).

Chairman (or deputy) of one house of parliament from region

- 1994–95: *Russian Government Today*, spring 1994.
 1996: Panorama Publishing, *Telefonnaya Kniga Rossii*, April 1997.

Parliamentary deputies per capita

- 1992: Supreme Soviet representatives per million inhabitants (official listings).
 1994–95: Duma representatives elected in single-mandate constituencies per million inhabitants (McFaul and Petrov 1995).
 1996: Duma representatives elected in single-mandate constituencies per million inhabitants (official 1995 election results).

Region had permanent representative in Moscow

Russian Government Today, fall 1993; Panorama Publishing's *Rossiskaya Federatsia: Telefonnaya Kniga* (July 1993 and April 1997 editions).

*Alleviating Need**Social infrastructure underdevelopment*

In each case, an index of social infrastructure underdevelopment was tried, as well as the elements of this index, and some additional indicators of social infrastructure underdevelopment. The one most significant was used in the final specification. 1992: index; 1994: telephones (or access to them) per 100 urban families in 1992; 1995: telephones (or access to them) per 100 urban families 1995; 1996: doctors per 100,000 residents 1994. (Signs changed so that higher value indicates greater need.)

- 1992: Index constructed using factor analysis from four indicators of social need:¹ (a) average housing space per inhabitant in 1991; (b) the number of doctors per thousand inhabitants in 1991; (c) the number of hospital beds per thousand inhabitants in 1991; and (d) the number of home telephones per hundred urban families in 1991. The first factor extracted explained 39 percent of the variance, and was used as the index. Factor loadings are shown in table B3.
- 1994: proportion of urban households with a telephone or access to one in 1991 (from *Sotsial'noe Razvitie Rossiiskoi Federatsii. 1992. 1992. Moscow: Goskomstat RF, 235–36*).
- 1995: telephones (or access to them) per 100 urban families 1995 (Goskomstat Rossii, *Rossiisky Statistichesky Yezhegodnik 1996*).
- 1996: Doctors per 10,000 residents 1994 (Goskomstat Rossii, *Rossiisky Statistichesky Yezhegodnik 1995, 643-45*).

Proportion of population under 16

As of 1994 (Goskomstat Rossii, *Demografichesky Yezhegodnik RF 1993, 1994, 32*).

TABLE B3. Index of Social Infrastructure Underdevelopment

	Factor Loadings
Telephones per hundred urban families	.894
Doctors per thousand residents	.873
Housing space per capita	.086
Hospital beds per thousand residents	-.029

Source: Goskomstat Rossii, *Sotsialnoe Razvitie Rossiiskoi Federatsii, 1992* (Moscow: Goskomstat Rossii, 1992, 122–24, 165–67, 175–77, 235–36).

Proportion of population of pension age

Percentage of population over 60 for men, over 55 for women, 1994 (Goskomstat Rossii, *Demografichesky Yezhegodnik RF 1993, 1994*, 32).

Profits per capita previous year

- 1992: region's total profits in 1991 divided by its population (Goskomstat Rossii, *Finansy v Rossiiskoi Federatsii 1992*, Goskomstat Rossii, Moscow, 1992, 18–20).
- 1994: profit in 1993 divided by population (*Sotsialno-Ekonomicheskoe Polozhenie Rossii 1994*, Goskomstat Rossii, 318–19).
- 1995: profit in 1994 divided by population (*Sotsialno-Ekonomicheskoe Polozhenie Rossii*, Goskomstat Rossii, January 1995, 204–7).
- 1996: profit in 1995 divided by population (Goskomstat Rossii, *Rossiisky Statistichesky Yezhegodnik 1996*).

Estimated average real income previous year (1992 same year)

- 1992: average monthly money income as percentage of cost of 19 basic food commodities end 1992 (Goskomstat Rossii, *Tseny v Rossii 1996*, 139).
- 1994: average monthly money income previous year as percentage of cost of 19 basic food commodities end 1993 (Goskomstat Rossii, *Tseny v Rossii 1996*, 139).
- 1995: per capita monthly money income as percentage of per capita monthly subsistence minimum 1994 (Goskomstat Rossii, *Rossiisky Statistichesky Yezhegodnik 1996*, 786–88).
- 1996: per capita monthly money income as percentage of per capita monthly subsistence minimum 1995 (Goskomstat Rossii, *Rossiisky Statistichesky Yezhegodnik 1996*, 789–91).

Degrees latitude north

Times Atlas.

*Other Central Objectives**Advanced economic reform*

- 1992: index of economic reform constructed from: (a) percentage of enterprises included in the privatization program that had in fact been privatized in 1992 (Goskominmushchestvo Rossii, *Panorama Privatizatsii* 2 (4), January 1993, 66–67 (variable labeled “Ipr”)); (b) the percentage of apartments privatized by January 1993 (calculated from Goskomstat Rossii, *O Razvitiu Ekonomicheskoykh Reform v Rossiiskoi Federatsii (1–6 1993)*, Moscow, Goskomstat Rossii, 1993, 100–101); (c) the number of private farms per thousand rural residents (for

- Moscow and St. Petersburg set to mean for other regions, since no rural population or private farms) (calculated from Goskomstat Rossii, *Razvitie Ekonomicheskikh Reform v Regionakh Rossiiskoi Federatsii*, 1993, 6, 98–100); (d) number of commodity exchanges per thousand residents in 1993 (Goskomstat Rossii, special report); and (e) a variable measuring the extent to which regional governments continued to regulate local prices even after central price liberalization (Yasin 1993b, 24).² These five variables were combined by factor analysis.³ The first factor extracted, which explained 27 percent of the variance, was positively correlated with the prevalence of commodity exchanges and private farms, with the degree of achieved privatization of both enterprises and apartments, and negatively correlated with the extent of regional price regulation. It was used as the index of economic reform. Factor loadings are shown in table B4.
- 1994: percentage of 285 goods with controlled prices (Goskomstat Rossii, provided to me by Andrew Warner).
- 1995: private farms January 1994 per 1,000 inhabitants (Goskomstat Rossii, *Ekonomicheskoe Polozhenie Regionov RF 1994*, 290–91 (set at mean for Moscow, St. Petersburg).)
- 1996: percentage of 285 goods with controlled prices (Goskomstat Rossii, provided to me by Andrew Warner).

Percentage of work force in agriculture

Percentage of work force in agriculture 1993 (Goskomstat Rossii, *Ekonomicheskoe Polozhenie Regionov RF 1994*).

Region's share in RF raw materials output

Percentage of Russian Federation output of raw materials industries accounted for by region 1993 (Goskomstat Rossii, *Ekonomicheskoe Polozhenie Regionov RF 1994*, 49–50).

Index of tax effort

Constructed by method of Roy Bahl (Bahl 1994, 177–79), using most appropriate available data for each year. It measures the ratio of the tax actually collected in the

Table B4. Index of Pace of Economic Reform

	Factor Loadings
Private farms per 1,000 rural residents	.616
Percent of eligible enterprises privatized	.535
Commodity exchanges per 1,000 residents	.334
Percent of apartments privatized	.187
Extent of regional price regulation	-.737

region to an estimate of that region's "taxable capacity," derived by regressing tax collected on per capita gross value of industrial output, the average monthly wage, the percentage of the population living in urban areas, and the population size. For 1992, Bahl's original index is used: it ranges in value from .49 to 2.53 and is calculated for 67 of Russia's regions.

TABLE B5. Sovereignty Declarations, August 1990–May 1991

Region	Date of Declaration	Source
Karelia	Aug. 10, 1990	Anne Sheehy, "Fact Sheet on Declarations of Sovereignty" <i>Radio Liberty Report on the USSR</i> , Nov. 9, 1990, 23–25.
Komi	Aug. 30, 1990	Sheehy
Tatarstan	Aug. 30, 1990	Sheehy
Udmurtia	Sept. 19, 1990	Sheehy
Yakutia	Sept. 27, 1990	Sheehy
Chukotka	Sept. 29, 1990	Sheehy
Adygeia	Oct. 7, 1990	Sheehy
Buryatia	Oct. 8, 1990	Sheehy
Koryaksky	Oct. 9, 1990	Sheehy
Bashkiria	Oct. 11, 1990	Sheehy
Komi-Perm	Oct. 11, 1990	Sheehy
Kalmykia	Oct. 18, 1990	Sheehy
Yam-Nen	Oct. 17, 1990	Yuri Perepletkin, "Yet Another Republic," <i>Izvestia</i> , Oct. 17, 2. Sheehy.
Mari El	Oct. 22, 1990	Sheehy
Chuvashia	Oct. 24, 1990	Sheehy
Altai Rep	Oct. 25, 1990	Sheehy
Irkutsk	Oct. 26, 1990	TASS, 2011 GMT, Oct. 26, 1990. Declares region an "equal and independent subject of the federation" <i>RL Report on the USSR</i> , Nov. 2, 1990, 37.
Nenetsk	Nov. 1990	<i>RL Report on the USSR</i> , Nov. 23, 1990, 35.
Kar-Cherk	Nov.–Dec. 1990	<i>RL Report on the USSR</i> , Nov. 30, 1990, 22.
Chech-Ing	Nov. 27, 1990	<i>RL Report on the USSR</i> , Dec. 7, 1990, 23–24.
Mordovia	Dec. 1990	<i>RL Report on the USSR</i> , Dec. 21, 1990, 28. (watered down sovereignty declaration without word 'sovereignty'—on the state-legal status of the Mordvinian SSR).
N Ossetia	Dec. 1990	<i>RL Report on the USSR</i> , Jan. 4, 1991, 65.
Kab-Balkar	Jan. 1991	Ali Kazikhanov, "A Step Toward Sovereignty," <i>Izvestia</i> , Feb. 1, 1991, 2.
Dagestan	May 15, 1991	<i>RL Report on the USSR</i> , May. 24, 1991, 38.

TABLE B6. Characteristics of the Independent Variables Used in Final Regressions

Continuous Variables	Mean	Standard Deviation	Min	Max
A. Bargaining Power				
Pro-Yeltsin Vote 1991 Elections (%)	52.29	12.47	15.25	84.80
Vote for Russia's Choice Dec. 1993 (%)	14.5	5.8	1.7	34.7
Vote for Yabloko or Russia's Choice 1995 (%)	8.4	4.8	2.5	28.5
Population 1992 (mn)	1.7	1.5	.03	9.0
Population 1994 (mn)	1.7	1.5	.02	8.8
Estimated Regional Output per capita (1,000 Rs per capita, 1993)	969.3	455.9	210.4	2,567.1
Log Man-Days Lost to Strikes 1991	.21	.60	.00	3.21
Log Man-Days Lost to Strikes 1993	.16	.40	.00	1.85
Log Man-Days Lost to Strikes 1994	.31	.56	.00	2.40
Log Man-Days Lost to Strikes 1995	.72	.66	.00	2.65
B. Need				
Social Infrastructure Development Index 1992	0	1.0	-1.40	5.53
Access to phone per 100 urban families 1992	34.80	12.80	13.50	96.40
Access to phone per 100 urban families 1995	40.81	15.19	3.80	105.10
% of Population Under 16	25.10	4.10	18.90	36.50
% of Population of Pension Age	17.99	5.69	3.80	26.90
Degrees North	54.32	5.78	42.59	69.27
Real Income end 1992 (% cost of 19 products)	223.26	69.57	101.01	526.32
Real Income 1993 (% cost of 19 products)	363.83	102.18	212.77	714.29
Real Income 1994 (% subsistence minimum)	197.45	69.82	99.00	641.00
Real Income 1995 (% subsistence minimum)	167.80	54.64	84.00	520.00
Profits per capita 1991 (1,000 rubles p.c.)	2.33	.74	.52	4.38

TABLE B6.—*Continued*

Continuous Variables	Mean	Standard Deviation	Min	Max
Profits per capita, 1993 (m rubles p.c.)	.24	.14	0	.77
Profits per capita, 1994 (1,000 rubles p.c.)	328.83	378.80	-1511.94	1625.43
Profits per capita, 1995 (1,000 rubles p.c.)	997.68	1398.73	-4093.72	6972.42
C. Access				
Deputies to Supreme Soviet per mn inhabitants	3.52	5.59	0	40.00
State Duma SMC Reps. per mn inhabitants 1994	3.09	6.13	.64	44.25
State Duma SMC Reps. per mn inhabitants 1996	3.08	6.14	.64	44.25
D. Other Objectives				
Index of Advanced Pace of Economic Reform 1992	0	1.0	-2.17	3.37
% 285 goods with controlled prices	4.43	3.88	.00	14.74
Private Farms per 1,000 rural inhabitants 1995	6.60	3.83	.18	18.48
Employment in Agriculture 1993 (% work force)	14.79	7.16	.30	35.30
Region's Share in RF Raw Materials Output (%)	1.3	4.0	0	33.8
Index of Region's Tax Collection Effort 1992	1.02	.27	.49	2.53
Tax Collection Effort 1994	1.1	.4	.6	3.3
Tax Collection Effort 1995	.97	.72	.20	5.48
Dummy Variables	Yes	No	<i>N</i>	
Declared Sovereignty, 1990	22	66	88	
Yeltsin visited 1992	13	74	87	
PM visited 1992	10	77	87	
Yeltsin visited 1994	15	73	88	
Chernomyrdin visited 1994	11	77	88	
Yeltsin visited first half of 1996	23	66	89	
Region had permanent repre- sentative in Moscow 1992	63	25	88	
Region had permanent repre- sentative in Moscow 1994	60	28	88	

(continued)

TABLE B6.—*Continued*

Dummy Variables	Yes	No	<i>N</i>
Region had permanent representative in Moscow 1995	79	10	89
Republic Status (AO's excluded)	21	58	79
Region's Governor Publicly Opposed Yeltsin Sept. 1993	15	73	88
Representative on the Parliament's Budget Commission 1992	6	82	88
Chairman (or Deputy) of Budget Comm. from Region 1994	5	84	89
Chairman (or Deputy) of Budget Comm. from Region 1996	7	82	89
Chairman (or Deputy) of Parliament from Region 1994	7	82	89
Chairman (or Deputy) of Parliament from Region 1996	8	81	89
	–2	–1	0
Reg. Admin. Support for "Our Home Is Russia" 1995	5	24	59

TABLE B7. Correlation Coefficients for Independent Variables Used in Same Long Regression in Table 3.3 (only those with $r > .50$ shown)

	% of Population Pension Age	Republic Status		
% of Population Under 16	-.753	.636		
	Share of RF Raw Materials Production	Estimated Economic Output 1993	1991 Profits per Capita	1993 Profits per Capita
Estimated Real Income 1992	.647	.696	.607	
Estimated Economic Output 1993	.563	.747		.798
Estimated Real Income 1993				.538
	Degrees Latitude North	% of Work force in Agriculture	Population 1994	
1991 Profits per Capita	.508	-.555		
Vote for Russia's Choice 1993	.622	-.721		
Vote for Yabloko + Russia's Choice 95		-.655	.502	
	Population 1994	Profits per Capita 1995	Vote for Yabloko + RC 1995	
Estimated Real Income 1994	.514			
Estimated Real Income 1995	.528	.568	.504	

TABLE B8. Breakdown of the Dependent Variable, 1992 (all figures given per capita)

	Mean (1,000 rs)	Standard Deviation	Min	Max	Coefficient of Variation
(1) Total Central Transfers	11.36	12.99	1.27	95.59	1.14
Subventions	3.45	6.95	0	50.14	2.01
Investment Grants	3.38	2.28	.95	12.44	.67
Government Reserve Fund Payments	.06	.18	0	1.03	3.0
Supreme Soviet Reserve Fund	.26	.71	0	4.60	2.73
Credits (Subset for which data available)	2.48	1.36	.08	8.25	.55
Special Benefits	3.66	12.07	0	81.60	3.30
(2) Tax Payments to the Center	14.75	9.89	.03	74.75	0.67
(3) Net Central Transfers	-3.14	15.17	-57.66	64.34	-4.83

TABLE B9. Breakdown of the Dependent Variable, 1994 (all figures given per capita, Koryak AO outlier excluded)

	Mean (1,000 rs)	Standard Deviation	Min	Max
Total Central Transfers	419.96	532.43	17.6	3,939.5
Subsidies, QI	43.56	83.96	0	549.1
Federal Subventions	3.35	31.60	0	298.15
Direct Transfers from Support Fund	42.31	87.69	0	622.9
Total Payments from Support Fund (inc. indirect subsidy via VAT reduction)	78.7	117.1	0	711.6
Net Mutual Payments	226.12	371.72	0	2,774.0
Federal Investment Grants	100.7	71.8	7.7	429.8
Payments to Closed Cities	3.21	11.17	0	68.1
Budget Loans	4.4	29.2	0	265.3
Regional Share of Tax Revenue, %	70.1	9.6	52.0	100.0
Net Center-Region Budget Transfers	122.04	543.60	-1,348.9	3,144.7

Note: First Quarter subsidies not included in total transfers, since they were likely included in year-end figures for support fund payments. Indirect subsidies via VAT reductions are included in total transfers, but not in net transfers, since this represents transfers minus tax payments and to include them would constitute double counting.

APPENDIX C

Appendix to Chapter 4

Notes on Variables in Tables 4.1–4.7

Dependent Variables

- April 1993: percentage voting yes to question 1 on April 1993 referendum, from McFaul and Petrov (1995).
- December 1993: vote for Yabloko, Russia's Choice and RDDR, from official results as reported by Central Electoral Commission, Moscow (1995).
- December 1995: from Orttung and Parrish, *Transition*, Feb. 23, 1996.
- 1996: from Moscow Carnegie Center, *Prezidentskie Vybory v Rossii* June 1996, No.9; second round 1996 voting official results from printout from Central Electoral Commission, Moscow.

Dependent variables for regional administration official elections compiled from official election results, McFaul and Petrov 1995, and press reports.

Estimated Output Per Capita

1993 for all. From Goskomstat Rossii, *Ekonomicheskoe Polozhenie Regionov RF*, 1994, 9–11; and Goskomstat Rossii, *Rossiisky Statistichesky Yezhegodnik* 1994, 557–59. All in 1,000 Rs per capita.

Estimated Recent Real Income Change

1993 regressions: estimated change in real incomes of the population June 1992–June 1993, money incomes from Goskomstat Rossii, *O Razvitií Ekonomicheskikh Reform v RF (dopolnitel'nie dannie za I polugodie 1993 goda)*, 1993, 38–39; deflated by estimated average inflation first half of 1992–first half of 1993, calculated from *O Razvitií Ekonomicheskikh Reform*, 1993, 14–15.

1995 and 1996 regressions: change in average income 1994–95 as percentage of subsistence minimum in region, from TACIS, *Analiz Tendentsii Razvitiia Regionov Rossii v 1992–1995 gg.* Moscow, March 1996, 84–87.

Unemployment

1993 regressions: unemployment level in August 1993 as percentage of work force,

Goskomstat Rossii, *Razvitie Ekonomicheskikh Reform v Regionov RF* 1993 (10): 122.

1995–96 regressions: unemployment in percentage in September 1995, from TACIS, *Analiz Tendentsii Razvitiia Regionov Rossii v 1992–1995 gg*, Moscow, March 1996, 92.

Inflation

April 1993 regression: regional CPI December 1992 divided by regional CPI December 1991, in times, from Goskomstat, electronic transfer.

December 1993 regression: regional CPI December 1993/regional CPI December 1992, from Goskomstat, electronic transfer.

1995–96 regressions: most recent inflation data available were change in CPI 1993–1994, average for year, from Le Houerou 1995, table A11.

Proportion of Enterprises Insolvent

April 1993 regression: proportion of regional enterprises insolvent in January–May 1993, from *O Razvitiia Ekonomicheskikh Reform v RF (dopolnitel'nie dannie za I polugodie 1993 goda)*, 1993, 5–6.

December 1993 regression: proportion of enterprises insolvent in January–August 1993, from Goskomstat Rossii, *Razvitie Ekonomicheskikh Reform v Regionakh Rossiiskoi Federatsii* (10) 1993, 61–62.

1995–96 regressions: percentage of enterprises insolvent in 1995, from TACIS, *Analiz Tendentsii Razvitiia Regionov Rossii v 1992–1995 gg*, Moscow, March 1996, 116.

Wage Arrears

April 1993 regression: index of overdue payments for consumption per worker on 1/10/92, from Goskomstat Rossii, *Razvitie Ekonomicheskikh Reform v Regionov RF* 1993 (10): 67 (Russian Federation average = 1).

December 1993 regression: index of overdue payments for consumption per worker 1/10/93, (Russian Federation average = 1), Goskomstat Rossii, *Razvitie Ekonomicheskikh Reform v Regionov RF* 1993 (10): 67.

1995 regression: index of overdue payments for consumption per employee on 1/1/96 (RF average = 1), from TACIS, *Analiz Tendentsii Razvitiia Regionov Rossii v 1992–1995 gg*, Moscow, March 1996, 113.

1996 regressions: overdue payments for consumption per employee as of June 1996, Goskomstat Rossii, *Sotsial'no-ekonomicheskoe Polozhenie Rossii*, 1996, presented in Yitzhak Brudny, "How and Why Russian Regions Vote: Regional Voting Patterns, 1991–96," Yale University, manuscript, 1996.

Percentage of Work Force in Agriculture

All regressions: percentage of work force in agriculture 1993, from Goskomstat Rosii, *Ekonomicheskoe polozhenie regionov RF*, 1994.

Region's Share in RF Raw Materials Output

All regressions: percentage of RF output of raw materials industries accounted for by region, from Goskomstat Rossii, *Ekonomicheskoe Polozhenie Regionov RF*, 1994, 49–50.

Exports Per Capita

April 1993 regression: region's exports per capita in 1992 (1,000 Rs per cap), from Goskomstat Rossii, *Rossiisky Statisticheskyy Yezhegodnik* 1995, 869.

December 1993: region's exports per capita in 1993 (1,000 Rs per cap), from Goskomstat Rossii, *Rossiisky Statisticheskyy Yezhegodnik* 1995, 869.

1995–96 regressions: region's exports in 1994 in 1,000 Rs per capita, from TACIS (op. cit., 142).

Value of Enterprises Privatized

April 1993 regression: value of privatized enterprises as of 1/1/93, in 1,000 Rs per regional inhabitant, calculated from Goskomimushchestva Rossii, *Panorama Privatizatsii*, January 1993, 70.

December 1993: charter capital of enterprises privatized in 1993, per regional inhabitant (1,000 Rs per cap), from Goskomstat Rossii, *Rossiisky Statisticheskyy Yezhegodnik* (1994).

1995–96 regressions: charter capital of enterprises privatized in 1993 and 1994, per regional inhabitant (1,000 Rs per cap): Goskomstat Rossii, *Rossiisky Statisticheskyy Yezhegodnik* 1994 and *Rossiisky Statisticheskyy Yezhegodnik* 1995, 694–96.

Proportion of Apartments Privatized

1993 regressions: calculated from *Razvitie Ekonomicheskoykh Reform v Regionov RF* 1993 (6) 108–9.

1995–96 regressions: from Goskomstat Rossii, *Sotsialno-Ekonomicheskoe Polozhenie Rossii, ianvar-aprel 1995 g.*, 1995, 296–97.

Percentage of Population Russian

New World Demographics, *The First Book of Demographics for the Republics of the Former Soviet Union, 1951–1990*, Shady Side, MD (1992).

Proportion of Population Above Working Age

All regressions: percentage of population 60 or older (for men), 55 or older (for women), as of 1994, Goskomstat Rossii, *Demograficheskyy Yezhegodnik RF* 1993 1994, 32.

Proportion of Population Below Age 16

All regressions: percentage of population 15 or younger as of 1994, Goskomstat Rossii, *Demograficheskyy Yezhegodnik RF* 1993 1994, 32.

Proportion of Population With Higher Education

All regressions: percentage of economically active population with higher education, as of Nov. 1, 1994, Goskomstat Rossii, *Rossiisky Statistichesky Yezhegodnik 1995 1996*, 550.

Pollution

All regressions: emission of pollutants from stationary sources into air 1994, in tons per thousand inhabitants, Goskomstat Rossii, *Rossiisky Statistichesky Yezhegodnik 1995 1996*, 676–78.

Crime

1993 regressions: crimes registered per thousand inhabitants, January–September 1993, Goskomstat Rossii, *Razvitie Ekonomicheskikh Reform v Regionov RF 1993* (10): 130–31.

1995–96 regressions: crimes registered per 100,000 inhabitants in 1994, Goskomstat Rossii, *Rossiisky Statistichesky Yezhegodnik 1995 1996*, 625–27.

Recent Change in Life Expectancy

All regressions: change in life expectancy 1991–93; from *Demografichesky Yezhegodnik RF 1993 1994*, 84.

Refugees and Forced Migrants Per Capita

1993 regressions: number of refugees (forced migrants) registered, per 1,000 residents, July 1, 1993, from Federalnaya Migratsionnaya Sluzhba Rossii, *Vynuzhdenie pereselentsy v Rossii 1995*, 13.

1995–96 regressions: number of refugees and forced migrants as of April 1, 1995; from Federalnaya Migratsionnaya Sluzhba Rossii, *Vynuzhdenie pereselentsy v Rossii 1995*, 9.

Regional Budget Expenditures Per Capita

1993 regressions: regional budget expenditure per capita in 1991, from Philippe Le Houerou 1993, Annex 5, table 1.

1995 regression: regional budget expenditure per capita 1993, data provided by Aleksei Lavrov from Ministry of Finance and State Tax Service.

1996 regression: regional budget expenditure per capita 1994, data provided by Aleksei Lavrov from Ministry of Finance and State Tax Service.

Recent Change in Regional Budget Expenditure Per Capita

1993 regressions: estimated real change in regional budget expenditure per capita, 1991–92, deflated using change in CPI December 1992 over December 1991, expressed

in 1992 1,000 Rs per capita, calculated from Le Houerou 1993, Annex 5.

1995 regression: estimated real change in regional budget expenditure per capita, 1993–94, deflated using change in average change in monthly CPI 1993–94, expressed in 1994 1,000 Rs per capita, from data provided by Aleksei Lavrov from Ministry of Finance and State Tax Service.

1996 regression: estimated real change in regional budget expenditure per capita, 1994–95, deflated by nationwide CPI December 1995/December 1994 (= 2.31 times), since data were not available on changes in CPI 1994–95 broken down by region, from data provided by Aleksei Lavrov from Ministry of Finance and State Tax Service.

Bilateral Power-Sharing Agreement Signed

Yeltsin had signed bilateral treaty with region by time of second round of 1996 presidential election, compiled from Federal Broadcast Information Service Daily Reports and other sources.

At Least One Presidential Decree or Government Resolution Passed on Economic Aid to Region

Up to June 16, 1996, for presidential decrees, and to June 11, 1996, for government resolutions; compiled from official publications of normative acts (*Sobranie Zakonodatelnykh Aktov*). A presidential decree or government resolution (*postanovlenie*) was included if it mentioned a specific region (i.e., oblast, republic, etc.) in its title, with the following exceptions: acts on appointment or dismissal of the head of administration or other personnel changes, on the organization of elections in the region, on technical changes in the wording of housing law, on the Chechen war, on canceling local decrees, or on transferring shares to regional governments. These exceptions were made to ensure that decrees and resolutions reflected aid to the regions (also does not include decrees providing aid to broader areas such as Siberia or the Central Chernozem).

Pro-Yeltsin or Pro-Reform Vote Previous Time

1993 regressions: regional vote for Yeltsin in 1991 presidential election, from McFaul and Petrov 1995.

1995 regression: vote for Russia's Choice in December 1993 election (official results from Central Electoral Commission).

1996 election: vote of support for Yeltsin on question one in April 1993 referendum, from McFaul and Petrov 1995, 657–58.

TABLE C1. Characteristics of Russia's Regions

	Mean	Std. Dev.	Minimum	Maximum
Estimated change in average real income (June 92–June 93)	1.45	.30	.82	2.77
Change in average income as % of subsistence minimum, 1994–95	–65.85	34.61	–233.50	36.70
Unemployment August 1993 (%)	1.01	.87	.00	3.92
Unemployment 1995 (%)	3.28	3.39	.49	28.05
Proportion of enterprises insolvent Jan.–May 1993 (%)	19.4	8.8	6.8	50.9
Proportion of enterprises insolvent 1993 (%)	18.07	8.60	5.70	48.80
Proportion of enterprises insolvent 1995 (%)	40.88	13.26	15.00	75.00
Increase in CPI Dec. 1992/Dec. 1991, times	25.9	8.1	11.9	52.7
Increase in CPI 1993/92	10.0	2.09	6.70	17.80
Increase in CPI 1994/93	3.11	.28	2.63	4.01
Wage arrears 1992	1.15	1.44	.02	8.23
Wage arrears 1993	1.16	1.02	.01	6.23
Percent of working age population employed in agriculture	5.54	3.94	0	16.5
Region's share in total raw materials output (%)	1.28	4.02	0	33.80
% of apartments privatized 1993	9.2	6.9	.7	38.2
% of apartments privatized 1995	33.3	11.6	2.0	74.0
Regional budget expenditure 1991 (Rs p.c.)	1,338	733	663	4,488
Exports per capita 1992 (1,000 Rs p.c.)	9.6	13.5	.01	69.2
Exports per capita 1993	89.3	129.3	0	825.0
Exports per capita 1994	292.2	335.0	0	1,769.7
Regional budget expenditure 1993 (1,000 Rs p.c.)	340.1	462.4	127.6	4127.0
Regional budget expenditure 1994 (1,000 Rs p.c.)	935.8	1,068.3	386.4	7,639.0
Change in estimated real regional budget expenditure 1991–92	–19.7	27.0	–168.3	9.6

TABLE C1.—*Continued*

	Mean	Std. Dev.	Minimum	Maximum
Change in estimated real regional budget expenditure 1993–94	–116.0	634.7	–5,360.9	1,192.9
Change in estimated real regional budget expenditure 1994–95	–282.1	1,016.6	–8,462.2	1,020.4
Value of privatized enterprises as of Jan. 1, 1993 (1,000 Rs per cap)	1.41	2.13	.02	17.06
Value of enterprises privatized in 1993 (1,000 Rs per cap)	3.47	4.56	0	37.18
Value of enterprises privatized in 1993–94 (1,000 Rs per cap)	7.82	12.54	.59	91.15
Percent of population Russian	75.6	21.3	9.2	97.4
Percent of population above working age	18.0	5.7	3.8	26.9
Percent of population below age 16	25.1	4.1	18.9	36.5
Percent of economically active population with some higher education	16.5	4.1	10.1	38.4
Change in life expectancy 1991–93	–3.6	1.3	–6.6	.4
Refugees per 1,000 residents 1993	2.02	2.05	.03	10.72
Refugees per 1,000 residents 1994	5.23	8.17	0	69.82
Crimes registered per 1,000 residents 1993	13.8	4.4	6.8	24.9
Emission of pollutants 1994 (tons per 1,000 inhabitants)	177.0	224.5	1.6	1,194.5
Estimated output 1993 (1,000 Rs per cap)	969.3	455.9	210.4	2,567.1
		% Yes	% No	<i>N</i>
Region Predominantly Christian	83	17	76	

Appendix to Chapter 5

Note: What Determined How Regional Delegates to the National Parliament Voted?

Chapter 5 examined the constraints and objectives of regional executive officials. But how do these differ from those of regional deputies to the national parliament? One might expect such regional representatives to be more loyal to the legislative branch and the national parliamentary leadership than to President Yeltsin and his government. On the other hand, a parliamentary delegation that contained the region's governor might be influenced by him to take positions closer to those of the national executive branch. But most of the same factors that seemed plausible determinants of governors' strategies—local public opinion, personal background, institutional factors, fiscal dependence, and administrative status of republic—might be expected also to influence regional deputies' political behavior.

The Russian political scientist Alexander Sobyenin and colleagues compiled ratings for the regional delegations to the different meetings of the larger parliament, the Congress of People's Deputies, on the basis of how their members voted on roll-call votes (see Sobyenin et al. 1993). He calculated an index of political "temperature," which measures on average how a region's deputies broke down between the president's and opposition sides on different issues. It ranges from +100, indicating unwavering support for Yeltsin's side, to -100, indicating unwavering opposition.¹ This index makes it possible to calculate in relative terms the degree to which each delegation's voting behavior changed between 1991 and 1993. The mean rating of regional delegations in 1991 was -7 (i.e., opposing Yeltsin's side slightly more often than supporting it); by 1993 it had dropped to -37.

I used ordinary least squares regression to explore which factors were associated with changes in the "temperature" of the region's deputies to the central parliament. The 1993 roll-call voting rating was regressed on a range of independent variables, controlling for the 1991 rating. Results are shown in table D1. Column 1 shows the estimates when all relevant factors are included; column 2 gives estimates when all independent variables that do not significantly improve the fit of the regression (as judged by an *F*-test, at the .10 level) are excluded.

Looking at these estimates, it is striking how similar the determinants of regional delegation voting appear to have been to those of regional governor strategy analyzed in chapter 5. Again, recent changes in the regional population's voting seemed to influence politicians. The delegates from regions where voters' approval of Yeltsin had recently increased were very significantly more likely to vote on the side supported by Yeltsin on

TABLE D1. Which Regional Delegations to the 1993 Congress of People's Deputies Voted with Yeltsin's Side? (OLS regression coefficients: Dependent variable is degree to which regional parliamentary delegation voted with the president's side, 1993.)

	(1)	(2)
<i>Regional Public Opinion</i>		
Yeltsin vote June 1991	.52 (.28)	
Pro-Yeltsin vote <i>rose</i> June 91– April 93	21.55*** (5.86)	16.76** (4.89)
<i>Background of Deputies</i>		
Percentage who were (still) Communist Party members, Feb. 91	–20.63 (19.17)	
Percentage of Russian nationality	11.43 (16.64)	
<i>Relations with Regional Executive</i>		
Governor was a member of the delegation	15.26** (5.08)	13.87** (4.90)
<i>Region's Dependence on Central Subsidies</i>		
Central subventions as percentage of total regional tax revenue, 1992	.25 (.17)	
<i>Republic Status</i>		
	–18.25* (8.95)	–22.59*** (5.34)
<i>Degree to which Parliamentary Delegation voted with Yeltsin's side, 1991</i>		
	.40*** (.10)	.53*** (.07)
Constant	–71.48* (32.01)	–43.17*** (4.64)
Adjusted R^2	.544	.535
N	78	78

Note: standard errors in parentheses.

* $p < .05$ ** $p < .01$ *** $p < .001$

roll-call votes in the Congress. This provides some quite impressive evidence of democratic influences at work.² As before, the evidence suggested different political processes in regions of different administrative status. Delegations from the republics, regardless of their ethnic composition and the recent voting history of their constituents, were very significantly more likely to vote against Yeltsin's side. This seems to add evidence for the hypothesis that regional political elites in the republics are more conservative, or

they have political resources that make it more rational for them to oppose Yeltsin than for the leaders of oblasts and kraiss.

The background of delegates—whether their levels of Communist Party membership or ethnicity—did not bear any significant relationship to their voting. But their institutional integration did: those delegations that included the region's governor, and therefore had closer ties to the regional level executive branch, were more likely to vote with the side supported by the head of the nation's executive. While insignificant, the coefficient estimate for subventions suggests that dependence on central transfers may have reduced the likelihood the delegation would vote against Yeltsin.

So the way a region's parliamentary representatives vote seems to be shaped by some of the same factors that determine whether its governor sides with Yeltsin or his opposition; and among them are the expressed positions of the region's voters.

Explanation of Variables in Table 5.1

Voting Data. Both for 1991 and 1993 expressed as percentage of total ballots cast (i.e., including spoiled ballots). Data available in McFaul and Petrov 1995, 655–58.

Governors' Backgrounds. Compiled from Barsenkov 1993 and other sources.

Governor's Institutional History. Compiled from Barsenkov 1993 and other sources.

Fiscal Dependence of Region. Data on 1992 subventions from Ministry of Finance, provided to author by Leonid Smirnyagin; data on regional tax revenue, from Le Houerou 1993.

Explanation of Variables in Table 5.2

Voting Data. Source and classification of reform parties from Clem and Craumer 1995b. Reform parties in 1993: Russia's Choice, Russian Movement for Democratic Reform (RDDR), Party of Russian Unity and Accord (PRES), Yabloko; Reform parties in 1995: Russia's Democratic Choice, RDDR, PRES, Yabloko, Our Home Is Russia, Worker's Self-Government, Pamfilova/Gurov/Lysenko, Forward Russia, Common Cause, CD Union. 1993 Referendum data in McFaul and Petrov 1995, 655–58.

Governors' Background. Compiled from Barsenkov 1993, McFaul and Petrov 1995, and other sources.

Governor Popularly Elected. Listing prepared by Robert Orttung, OMRI.

Central Budget Transfers and Regional Tax Revenues. From data provided to author by Aleksei Lavrov, from Ministry of Finance and State Tax Service.

Yeltsin Regional Visits during 1996 Campaign. Compiled from Moscow Carnegie Center, *Prezidentskie Vyborny v Rossii*, June 1996, no. 9, and press reports.

Bilateral Power-sharing Agreement, Aid Decrees. See appendix C (to chap. 4).

Notes on Data Used in Table D1

Voting Data. See above.

Sobyanin Ratings. Sobyenin et al. 1993.

Fiscal Dependence. See above.

Governor Elected to 1990 Parliament. See above.

Percentage of Congress Delegation Party Members as of February 1991. Supreme Soviet RSFSR, *Spisok Narodnykh Deputatov RSFSR na 12 Fevralya 1991 g.*, Moscow, 1991.

Percentage of Congress Delegation Russian Nationality. Supreme Soviet RSFSR, *Spisok Narodnykh Deputatov RSFSR na 12 Fevralya 1991 g.*, Moscow, 1991.

