Appendix from Quintin H. Beazer, "Political Centralization and Economic Performance: Evidence from Russia" (JOP, vol. 77, no. 1, p. 000)

This appendix contains the additional analyses that space considerations prevent from reporting in full in the main document.

Contents:

Appendix Tables

Appendix Figures

Table 1. Poor Growth and Reelection Less Likely in Russia's Competitive Regions

	High Political Competition		
	Was Economic Growth in Election Year Positive or Negative?		
New Governor Elected?	Positive	Negative	Total
No	43	20	63
	(63.24%)	(39.22%)	(52.94%)
Yes	25	31	56
	(36.76%)	(60.78%)	(47.06%)
	68	51	119
Total	(100%)	(100%)	(100%)
	Low Political Competition		
	Was Economic Growth in Election Year Positive or Negative?		
New Governor Elected?	Positive	Negative	Total
No	29	17	46
	(76.32%)	(62.96%)	(70.77%)
Yes	9	10	19
	(23.68%)	(37.04%)	(29.23%)
Total	38	27	65
	(100%)	(100%)	(100%)

Note—Economic data from *Rosstat*, election results from Labyrinth.ru database. Column percentages in parentheses. High versus low political competition relative to sample mean. For upper table, the Pearson chi-squared statistic for the paired observation is $\chi^2 = 6.749$, $p = 0.009$. For lower table: $\chi^2 = 1.361$, $p = 0.243$.

Table 2. Checking External Validity of Political Competition Index

	Political Competitiveness			
Variable	Low	High	n_L, n_H	p-value
Governor's Terms	2.563	1.942	(32, 52)	0.010
elected governor's # of terms, at reforms	(0.179)	(0.146)		
Governor's Years in Office	8.719	6.904	(32, 52)	0.021
elected governor's years in office, at reforms	(0.601)	(0.476)		
Region's Average Electoral Margin	51.076	30.515	(31, 50)	0.000
mean winning margin for gubernatorial elections	(4.561)	(2.544)		
Total Regional Governors	2.344	2.731	(32, 52)	0.177
region's # of governors, pre-reforms	(0.248)	(0.163)		
Organized Society	6.943	7.742	(36, 53)	0.002
number of registered civil organization (logged)	(0.233)	(0.128)		

Note—Political data collected by author from Labyrinth.ru, except civil organizations data from *Rosstat*. High versus low political competition relative to sample mean of POLITICAL COMPETITION; results similar if just lower and upper quartiles compared. Standard errors in parentheses below group means; *p*-values are two-tailed.

Table 3. Summary Statistics of Variables Used in Regression Analyses (2003–2010)

Variable	N	Mean	Std. Err	Min / Max
GDP Growth	676	5.213	9.0	−28.899 / 67.829
Private Investment	686	8.586	1.502	2.672 / 12.18
Poltical Centralization	757	0.587	0.493	0 / 1
Political Competition (index)	789	−0.095	2.160	−5 / 5
GDP per capita	677	−3.102	0.718	−5.023 / −0.114
Population (logged)	705	13.814	1.199	9.703 / 16.259
Infrastructure	648	124.296	105.596	0.800 / 670
Replacement	757	0.188	0.391	0 / 1
Birth Year	756	1952.560	8.903	1930 / 1976
Profitable Firms	768	65.293	9.802	21.620 / 89.920
R&D Spending per firm	653	52107.890	55316.660	61.4700 / 339177.400
Firm Birth Rate	415	106.275	26.179	33.100 / 208.500
Small Business Volume	512	2666.572	1578.872	126.793 / 8713.418

Note—Data on political competition from the Moscow Carnegie Center; appointment dates coded by author from Labyrinth.ru. All other data from *Rosstat* for years 2003–2010.

Table 4. Changes in Regional Growth Before and After Reforms' Announcement

Comparison of ΔGDP Growth	Political Competitiveness		n_L, n_H	*p*-value
	Low	High		
Immediate Change	−3.863	−1.781	(23, 20)	0.718
2004 vs. 2005	(2.705)	(2.237)		
Lagged Change	11.952	4.421	(21, 20)	0.035
2005 vs. 2006	(3.146)	(2.487)		
Excluding Ambiguous Year	7.734	2.640	(21, 20)	0.108
2004 vs. 2006	(3.604)	(1.135)		
Smoothed (Two-Year Averages)	6.526	2.747	(21, 20)	0.084
2003–04 vs. 2006–07	(2.255)	(1.416)		
Smoothed (Expanded Averages)	2.889	−3.097	(21, 20)	0.021
2003–04 vs. 2006–09	(2.511)	(1.225)		

Note—Economic data for Russia's regions from *Rosstat*, comparing average changes in GDP GROWTH by group; "Low" and "high" categories correspond with the first and fourth quartiles of POLITICAL COMPETITION, an index created using data from Moscow Carnegie Center. Standard errors in parentheses below group means; *p*-values are one-tailed, testing directional hypothesis that low-competition regions have higher mean changes in growth than high-competition regions.

Table 5. Political Centralization and Private Investment, Conditional on Political Competition

DV: Private Investment *mil. of rubles (logged)*	Simultaneous Centralization *reforms announced*				Staggered Centralization *actual appointments*			
POLITICAL CENTRALIZATION$_{t-1}$ *dummy; 1 = post-reform*	0.607	0.787	−0.077	0.182	0.031	0.034	0.054	0.038
	(0.063)	(0.124)	(0.053)	(0.070)	(0.054)	(0.053)	(0.039)	(0.036)
	0.000	0.000	0.148	0.011	0.571	0.527	0.168	0.296
POLITICAL CENTRALIZATION$_{t-1}$ *mean-centered; −5 = low, 5 = high*			0.027	0.017			0.023	0.015
			(0.011)	(0.011)			(0.010)	(0.010)
			0.017	0.114			0.024	0.138
CENTRALIZATION$_{t-1}$ × COMPETITION$_{t-1}$	−0.024	−0.029	−0.028	−0.027	−0.044	−0.044	−0.030	−0.033
	(0.021)	(0.022)	(0.013)	(0.013)	(0.020)	(0.021)	(0.013)	(0.013)
	0.258	0.191	0.033	0.034	0.030	0.035	0.019	0.014
GDP PER CAPITA$_{t-1}$ *constant 2000 rubles (logged)*		0.291		0.189		0.275		0.186
		(0.251)		(0.059)		(0.252)		(0.060)
		0.251		0.002		0.279		0.003
POPULATION$_{t-1}$ *in thousands of persons (logged)*		−0.093		0.222		−0.154		0.222
		(1.180)		(0.047)		(1.133)		(0.047)
		0.938		0.000		0.893		0.000
INFRASTRUCTURE$_{t-1}$ *km paved roads / km^2 land area*		−0.001		0.000		−0.001		0.000
		(0.001)		(0.000)		(0.001)		(0.000)
		0.270		0.867		0.160		0.897
GDP GROWTH$_{t-1}$ *lagged dependent variable*			0.958	0.793			0.950	0.794
			(0.012)	(0.043)			(0.009)	(0.044)
			0.000	0.000			0.000	0.000
Region Fixed Effects	Yes	Yes	No	No	Yes	Yes	No	No
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of Observations	681	640	681	640	666	640	666	640

Note—Data on Russian gubernatorial appointments collected by author from Labyrinth.ru, and measures of political competition come from the Moscow Carnegie Center; all economic data from *Rosstat*. Parameter estimates for fixed effects and model constants not presented in table to save space. Region-clustered standard errors in parentheses; *p*-values appear below standard errors.

Table 6. Political Centralization and Economic Performance: Alternate Performance Indicators

	Profitable Firms		R&D Spending		Firm Birth Rate		Small Biz Volume	
	% firms profitable		*thous. of rubles, per firm*		*new firms / 1000 firms*		*thous. of rubles, per firm*	
STAGGERED CENTRALIZATION$_{t-1}$		0.073		−2355.552		−2.123		−233.807
dummy; 1 = post-reform		(0.647)		(3274.500)		(2.336)		(139.487)
		0.911		0.474		0.366		0.098
SIMULTANEOUS CENTRALIZATION$_{t-1}$	5.130		−8866.725		−6.540		176.841	
dummy; 1 = post-reform	(0.981)		(3487.621)		(3.077)		(103.547)	
	0.000		0.013		0.037		0.092	
CENTRALIZATION$_{t-1}$	−0.436	−0.550	−3503.439	−4263.394	−2.219	−2.237	−180.223	−228.415
× COMPETITION$_{t-1}$	(0.208)	(0.271)	(1102.210)	(1203.549)	(0.665)	(0.614)	(55.971)	(79.170)
	0.039	0.046	0.002	0.001	0.001	0.000	0.002	0.005
GDP PER CAPITA$_{t-1}$	1.403	1.143	−1457.593	−4100.700	−1.185	−3.263	1494.188	1350.596
constant 2000 rubles (logged)	(2.225)	(2.226)	(10720.643)	(10507.57)	(12.521)	(12.354)	(551.825)	(537.641)
	0.530	0.609	0.892	0.697	0.925	0.792	0.008	0.014
POPULATION$_{t-1}$	−19.992	−20.369	29344.306	37651.286	14.183	25.260	505.471	486.558
in thousands of persons (logged)	(10.178)	(10.266)	(60090.463)	(57029.420)	(74.848)	(73.755)	(2913.358)	(2827.327)
	0.053	0.051	0.627	0.511	0.850	0.733	0.863	0.864
INFRASTRUCTURE$_{t-1}$	0.002	0.001	−19.573	−25.653	0.039	0.035	−4.545	−4.852
km paved roads / km² land area	(0.012)	(0.011)	(38.326)	(35.132)	(0.036)	(0.034)	(3.564)	(3.043)
	0.888	0.924	0.611	0.467	0.283	0.299	0.206	0.115
Region Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of Observations	720	720	632	632	400	400	480	480

Note—Data on Russian gubernatorial appointments collected by author from Labyrinth.ru, and measures of political competition come from the Moscow Carnegie Center; all economic data from *Rosstat*. Due to the inclusion of region fixed effects, the interaction's constituent component POLITICAL CENTRALIZATION is dropped because it is time-invariant. Parameter estimates for fixed effects and model constants not presented in table to save space. Region-clustered standard errors in parentheses; *p*-values appear below standard errors.

Table 7. Political Centralization and Economic Performance, Extended Sample (incl. pre-2003)

	GDP Growth				Private Investment			
	annual change in %				*mil. of rubles (logged)*			
POLITICAL CENTRALIZATION$_{t-1}$	−0.764	−1.351	−1.365	−0.858	0.089	0.041	0.086	0.038
dummy; 1 = post-reform	(1.263)	(1.125)	(1.025)	(1.060)	(0.061)	(0.053)	(0.042)	(0.036)
	0.547	0.233	0.187	0.421	0.150	0.448	0.044	0.304
POLITICAL COMPETITION$_{t-1}$			0.012	0.167			0.052	0.006
mean-centered; −5 = low, 5								
= high			(0.177)	(0.189)			(0.014)	(0.008)
			0.948	0.378			0.000	0.422
CENTRALIZATION$_{t-1}$	−0.610	−0.529	−0.571	−0.579	−0.036	−0.048	−0.027	−0.023
× COMPETITION$_{t-1}$	(0.282)	(0.301)	(0.300)	(0.263)	(0.018)	(0.020)	(0.010)	(0.011)
	0.033	0.083	0.060	0.030	0.048	0.020	0.006	0.041
GDP PER CAPITA$_{t-1}$		−32.867		−0.529		0.418		0.213
constant 2000 rubles (logged)		(4.645)		(0.832)		(0.254)		(0.047)
		0.000		0.527		0.103		0.000
POPULATION$_{t-1}$		7.964		−1.123		−1.117		0.224
in thousands of persons								
(logged)		(20.874)		(0.621)		(0.906)		(0.045)
		0.704		0.074		0.221		0.000
INFRASTRUCTURE$_{t-1}$		0.002		0.004		−0.001		0.000
km paved roads / km^2 land								
area		(0.016)		(0.005)		(0.001)		(0.000)
		0.886		0.427		0.072		0.960
GDP GROWTH$_{t-1}$			0.033	−0.076				
lagged dependent variable			(0.035)	(0.045)				
PRIVATE INVESTMENT$_{t-1}$			0.354	0.095			0.842	0.782
lagged dependent variable							(0.032)	(0.037)
							0.000	0.000
Region Fixed Effects	Yes	Yes	No	No	Yes	Yes	No	No
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of Observations	1134	799	1061	799	1222	799	1221	799

Note—Data on Russian gubernatorial appointments collected by author from Labyrinth.ru, and measures of political competition come from the Moscow Carnegie Center; all economic data from *Rosstat*. Models use the staggered measure of political centralization. Parameter estimates for fixed effects and model constants not presented in table to save space. Region-clustered standard errors in parentheses; *p*-values appear below standard errors.

Table 8. Political Centralization and Economic Performance: Additional Controls

	GDP Growth				Private Investment			
	annual change in %				*mil. of rubles (logged)*			
POLITICAL CENTRALIZATION$_{t-1}$	1.198	0.083	−1.138	−1.235	0.077	0.047	0.014	0.024
dummy; 1 = post-reform	(1.175)	(1.042)	(1.349)	(1.070)	(0.059)	(0.039)	(0.057)	(0.048)
	0.311	0.937	0.401	0.252	0.195	0.232	0.805	0.616
POLITICAL COMPETITION$_{t-1}$		0.581		0.554		0.016		0.016
mean-centered; −5 = low, 5 = high		(0.253)		(0.217)		(0.010)		(0.010)
		0.024		0.013		0.130		0.118
CENTRALIZATION$_{t-1}$	−1.068	−1.023	−0.869	−1.302	−0.048	−0.034	−0.032	−0.046
× Competition$_{t-1}$	(0.392)	(0.350)	(0.437)	(0.454)	(0.021)	(0.013)	(0.027)	(0.022)
	0.008	0.005	0.050	0.005	0.028	0.012	0.230	0.041
GDP PER CAPITA$_{t-1}$	−39.170	−0.679	−50.344	−1.608	0.460	0.192	0.176	0.169
constant 2000 rubles (logged)	(4.780)	(1.002)	(5.873)	(0.916)	(0.230)	(0.060)	(0.374)	(0.059)
	0.000	0.500	0.000	0.083	0.049	0.002	0.638	0.005
POPULATION$_{t-1}$	−49.475	−0.738	4.110	−0.553	−1.122	0.228	0.437	0.219
in thousands of persons (logged)	(21.050)	(0.728)	(25.090)	(0.731)	(1.037)	(0.048)	(1.244)	(0.047)
	0.021	0.314	0.870	0.452	0.282	0.000	0.726	0.000
INFRASTRUCTURE$_{t-1}$	0.010	0.002	0.041	0.010	−0.001	0.000	0.001	0.000
km paved roads / km² land area	(0.016)	(0.005)	(0.028)	(0.005)	(0.001)	(0.000)	(0.001)	(0.000)
	0.560	0.738	0.142	0.057	0.246	0.867	0.524	0.224
TIME TREND	1.036	−0.670			0.100	−0.005		
	(0.389)	(0.206)			(0.018)	(0.008)		
	0.009	0.002			0.000	0.489		
OIL PRODUCTION$_{t-1}$			2.745	0.399			−0.037	0.007
thousands of tons (logged)			(1.649)	(0.134)			(0.089)	(0.004)
			0.100	0.004			0.675	0.085
DEPENDENT VARIABLE$_{t-1}$		0.008		0.116		0.788		0.791
lagged DV		(0.035)		(0.037)		(0.044)		(0.042)
		0.817		0.002		0.000		0.000
Region Fixed Effects	Yes	No	Yes	No	Yes	No	Yes	No
Year Fixed Effects	No	No	Yes	Yes	No	No	Yes	Yes
Number of Observations	640	640	473	473	640	640	473	473

Note—Data on Russian gubernatorial appointments collected by author from Labyrinth.ru, and measures of political competition come from the Moscow Carnegie Center; all economic data from *Rosstat*. Models use the staggered measure of political centralization. Parameter estimates for fixed effects and model constants not presented in table to save space. Region-clustered standard errors in parentheses; *p*-values appear below standard errors.

Table 9. Political Centralization and Economic Performance: Alt. Measures of Political Competition

DV: GDP Growth annual change (%)	Petrov Index Component						Trichotomous Coding		Civil Society	
	Openness		Competitive Elections		Pluralism		−1 = low, 0 = mid, 1 = high		civil organizations (logged)	
POLITICAL CENTRALIZATION$_{t-1}$ dummy; 1 = post-reform	6.501	7.364	3.706	5.826	6.328	7.240	−0.886	−0.351	14.952	23.640
	(3.611)	(2.707)	(3.407)	(3.725)	(3.356)	(3.744)	(0.998)	(1.023)	(10.136)	(7.671)
	0.076	0.008	0.280	0.122	0.063	0.057	0.377	0.733	0.144	0.003
COMPETITION MEASURE$_{t-1}$ various, as indicated	1.924		0.482		1.406		1.479		−3.971	
	(0.658)		(0.755)		(0.702)		(0.833)		(3.893)	
	0.005		0.525		0.049		0.080		0.311	
CENTRALIZATION$_{t-1}$ × COMPETITION MEASURE$_{t-1}$	−2.206	−2.682	−1.544	−2.063	−2.460	−2.585	−1.950	−2.184	−2.166	−3.205
	(1.056)	(0.854)	(1.010)	(1.148)	(1.043)	(1.165)	(1.273)	(1.018)	(1.304)	(0.986)
	0.040	0.002	0.130	0.076	0.021	0.029	0.129	0.035	0.101	0.002
GDP PER CAPITA$_{t-1}$ constant 2000 rubles (logged)	−38.304	−0.717	−38.581	−0.424	−38.725	−0.458	−38.559	−0.558	−39.632	−0.017
	(5.154)	(1.036)	(5.146)	(0.999)	(5.018)	(0.992)	(5.137)	(0.995)	(5.048)	(0.993)
	0.000	0.491	0.000	0.672	0.000	0.646	0.000	0.577	0.000	0.987
POPULATION$_{t-1}$ in thousands of persons (logged)	−21.283	−0.853	−25.778	−0.581	−20.209	−0.716	−22.267	−0.761	−22.150	1.813
	(23.365)	(0.694)	(23.350)	(0.698)	(23.385)	(0.724)	(23.320)	(0.699)	(22.317)	(1.174)
	0.365	0.222	0.273	0.408	0.390	0.326	0.343	0.280	0.324	0.126
INFRASTRUCTURE$_{t-1}$ km paved roads / km^2 land area	0.013	0.002	0.008	0.002	0.011	0.003	0.011	0.003	0.028	0.005
	(0.015)	(0.004)	(0.005)	(0.005)	(0.015)	(0.004)	(0.015)	(0.004)	(0.016)	(0.005)
	0.388	0.580	0.661	0.609	0.456	0.498	0.451	0.486	0.090	0.295
GDP GROWTH$_{t-1}$ lagged dependent variable		0.009		0.015		0.012		0.015		0.002
		(0.038)		(0.038)		(0.038)		(0.038)		(0.036)
		0.81		0.695		0.754		0.706		0.964
Region Fixed Effects	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of Observations	640	640	640	640	640	640	640	640	645	644

Note—Data on Russian gubernatorial appointments collected by author from Labyrinth.ru, and measures of political competition come from the Moscow Carnegie Center; all economic data from Rosstat. Models use the staggered measure of political centralization. Parameter estimates for fixed effects and model constants not presented in table to save space. Region-clustered standard errors in parentheses; p-values appear below standard errors.

Table 10. Instrumental Variables Regression and First-Stage Results (Replacement)

DV: GDP Growth	Simultaneous Centralization		Staggered Centralization	
annual change (%)	1st stage	2nd stage	1st stage	2nd stage
POLITICAL CENTRALIZATION$_{t-1}$	0.144	9.407	0.245	−0.996
dummy; 1 = post-reform	(0.053)	(1.856)	(0.048)	(1.351)
	0.008	0.000	0.000	0.461
CENTRALIZATION$_{t-1}$	0.005	−0.735	0.013	−0.997
× COMPETITION$_{t-1}$	(0.013)	(0.362)	(0.017)	(0.385)
	0.696	0.042	0.454	0.010
GDP PER CAPITA$_{t-1}$	0.185	−38.384	0.202	−38.998
constant 2000 rubles (logged)	(0.160)	(4.963)	(0.144)	(5.094)
	0.251	0.000	0.165	0.000
POPULATION$_{t-1}$	0.657	−24.968	0.251	−22.983
in thousands of persons (logged)	(0.792)	(22.491)	(0.780)	(22.380)
	0.409	0.267	0.749	0.304
INFRASTRUCTURE$_{t-1}$	0.000	0.011	−0.0002	0.010
km paved roads / km^2 land area	(0.001)	(0.015)	(0.001)	(0.016)
	0.712	0.445	0.722	0.559
(2SLS): REPLACEMENT$_{t-1}$		1.489		1.889
dummy, 1 = incumbent replaced during reforms		(2.008)		(2.345)
		0.458		0.420
BIRTH YEAR$_{t-1}$	0.032		0.030	
governor birth year	(0.004)		(0.004)	
	0.000		0.000	
F-stat of excluded instruments	56.22		52.25	
F-stat (p-value)	0.000		0.000	
Region Fixed Effects	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	
Number of Observations	640	640	640	640

Note—Data on Russian gubernatorial appointments by author from Labyrinth.ru, and data on political competition from the Moscow Carnegie Center; all other data from *Rosstat*. Statistical models represent two-stage least squares regression (2SLS) using BIRTH YEAR to instrument for governors' replacement. Parameter estimates for fixed effects not presented to save space. Region-clustered standard errors in parentheses; p-values appear below standard errors.

Table 11. Instrumental Variables Regression and First-Stage Results (Scheduled Turnover)

	First-Stage Results: Endogenous Regressors			
	Centralization	Centralization × Competition	GDP Growth annual change in %	Private Investment mil. of rubles (logged)
(2SLS): STAGGERED CENTRALIZATION$_{t-1}$			−1.415	0.047
dummy; 1 = post-reform			(1.814)	(0.069)
			0.435	0.495
(2SLS): CENTRALIZATION$_{t-1}$			−1.091	−0.038
× COMPETITION$_{t-1}$			(0.485)	(0.022)
			0.024	0.078
GDP PER CAPITA$_{t-1}$	0.056	0.333	−38.520	0.273
constant 2000 rubles (logged)	(0.091)	(0.228)	(5.134)	(0.247)
	0.540	0.148	0.000	0.268
POPULATION$_{t-1}$	0.099	−0.436	−22.041	−0.144
in thousands of persons (logged)	(0.397)	(0.914)	(23.074)	(1.151)
	0.804	0.635	0.339	0.900
INFRASTRUCTURE$_{t-1}$	0.0005	−0.0001	0.010	−0.001
km paved roads / km² land area	(0.0004)	(0.0009)	(0.016)	(0.001)
	0.246	0.933	0.532	0.174
ELECTORAL SCHEDULE$_{t-1}$	0.690	0.093		
dummy; 1 = scheduled turnover, post-reform era	(0.053)	(0.135)		
	0.000	0.494		
ELECTORAL SCHEDULE$_{t-1}$	0.011	0.917		
× COMPETITION$_{t-1}$	(0.006)	(0.026)		
	0.098	0.000		
F-stat of excluded instruments	88.260	640.140		
F-stat (p-value)	0.000	0.000		
Partial R^2 of excluded instruments	0.489	0.803		
Region Fixed Effects	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes
Number of Observations	640	640	640	640

Note—Data on Russian gubernatorial appointments by author from Labyrinth.ru, and data on political competition from the Moscow Carnegie Center; all other data from *Rosstat*. Statistical models represent two-stage least squares regression (2SLS) using ELECTORAL SCHEDULE to instrument for regions' introduction to gubernatorial appointments. Parameter estimates for fixed effects not presented to save space. Region-clustered standard errors in parentheses; *p*-values appear below standard errors.

Table 12. Political Centralization and Economic Performance: Additional Analyses (LDV)

DV: GDP Growth annual change (%)	Averages 3-year avg. pre vs. post		Replacement controlling for gov. turnover				Alt. Timing scheduled
Simultaneous Centralization$_{t-1}$	0.418		−2.900		2.678		
	(0.418)		(1.599)		(2.374)		
dummy; 1 = post-reform	0.320		0.074		0.259		
Staggered Centralization$_{t-1}$		−1.426		−1.218		−0.376	
		(0.540)		(1.098)		(2.446)	
dummy; 1 = post-reform		0.010		0.271		0.878	
Political Competition$_{t-1}$	0.304	0.079	0.720	0.521	0.752	0.561	0.546
mean-centered; −5 = low, 5 = high	(0.131)	(0.183)	(0.269)	(0.246)	(0.287)	(0.269)	(0.248)
	0.023	0.668	0.009	0.037	0.009	0.037	0.027
Centralization$_{t-1}$	−0.667	−0.504	−0.994	−0.991	−0.972	−0.928	
× Competition$_{t-1}$	(0.237)	(0.299)	(0.353)	(0.350)	(0.343)	(0.352)	
	0.006	0.096	0.006	0.006	0.005	0.008	
GDP Growth$_{t-1}$	0.604	0.733	0.017	0.007	0.023	0.016	0.010
lagged dependent variable	(0.028)	(0.061)	(0.039)	(0.037)	(0.042)	(0.043)	(0.037)
	0.000	0.000	0.653	0.851	0.582	0.720	0.795
GDP per capita$_{t-1}$	0.381	1.144	−0.522	−0.438	−0.637	−0.635	−0.476
constant 2000 rubles (logged)	(0.298)	(0.383)	(0.955)	(0.991)	(0.934)	(1.019)	(0.986)
	0.204	0.004	0.586	0.660	0.495	0.533	0.630
Population$_{t-1}$	0.400	0.122	−0.749	−0.637	−0.864	−0.811	−0.686
in thousands of persons (logged)	(0.213)	(0.249)	(0.707)	(0.699)	(0.841)	(0.906)	(0.699)
	0.065	0.625	0.293	0.365	0.304	0.371	0.326
Infrastructure$_{t-1}$	0.005	−0.001	0.003	0.002	0.003	0.003	0.003
km paved roads / km^2 land area	(0.002)	(0.003)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
	0.007	0.823	0.564	0.628	0.508	0.559	0.554
Replacement$_{t-1}$			0.721	1.213			
dummy, 1 = incumbent replaced			(0.734)	(0.862)			
			0.329	0.163			
Replacement (IV)$_{t-1}$					−1.624	−1.824	
2SLS using governors' birth year					(6.569)	(7.824)	
					0.805	0.816	
Centralization (IV)$_{t-1}$							−1.600
2SLS using scheduled turnover							(1.478)
							0.279
Centralization (IV)$_{t-1}$							−1.006
× Competition$_{t-1}$							(0.395)
							0.011
First-stage F-stat					4.81	4.47	105.09
F-stat p-value					0.031	0.038	0.000
Region Fixed Effects	No	No	No	No	No	No	No
Year Fixed Effects	No	No	Yes	Yes	Yes	Yes	Yes
Number of Observations	160	156	640	640	640	640	640

Note—Data on Russian gubernatorial appointments and birth year collected by author and data on political competition from the Moscow Carnegie Center; all other data from Rosstat. Parameter estimates for fixed effects and model constants not presented to save space. The first two columns compare changes in three-year regional averages directly before and after reforms. The fifth and sixth columns use two-stage least squares regression (2SLS) with BIRTH YEAR as an instrument for governors' replacement; the last column reports results from 2SLS regression using ELECTORAL SCHEDULE to instrument for regions' introduction to reforms. Region-clustered standard errors in parentheses; p-values appear below standard errors.

Table 13. Economic Performance and Anticipation of Implemented Appointments

DV: GDP Growth *annual change (%)*	One-Year Lead		Two-Year Lead		Three-Year Lead	
CENTRALIZATION (ANTICIPATED) *dummy; 1 = reform*	1.904 (1.179) 0.110	0.786 (0.817) 0.339	−0.390 (1.274) 0.760	−1.172 (1.257) 0.354	0.468 (1.186) 0.694	−1.065 (1.383) 0.444
POLITICAL COMPETITION *mean-centered; −5 = low, 5 = high*		0.545 (0.309) 0.081		0.304 (0.394) 0.442		0.231 (0.586) 0.694
CENTRALIZATION × COMPETITION	−0.190 (0.298) 0.526	−0.602 (0.320) 0.064	0.422 (0.447) 0.349	−0.294 (0.381) 0.442	0.612 (0.595) 0.306	−0.098 (0.563) 0.862
GDP PER CAPITA$_{t-1}$ *constant 2000 rubles (logged)*	−38.536 (4.798) 0.000	−0.611 (0.966) 0.529	−42.545 (5.370) 0.000	−0.663 (1.043) 0.527	−48.797 (5.759) 0.000	−0.525 (0.851) 0.539
POPULATION$_{t-1}$ *in thousands of persons (logged)*	−18.314 (23.167) 0.432	−0.763 (0.715) 0.289	−13.119 (26.737) 0.625	−1.071 (0.765) 0.165	2.230 (25.871) 0.932	−0.068 (0.700) 0.923
INFRASTRUCTURE$_{t-1}$ *km paved roads / km² land area*	0.014 (0.014) 0.294	0.002 (0.005) 0.609	0.015 (0.018) 0.413	0.004 (0.005) 0.449	0.032 (0.028) 0.253	0.009 (0.005) 0.083
GDP GROWTH$_{t-1}$ *lagged dependent variable*		0.025 (0.040) 0.540		0.070 (0.057) 0.228		0.111 (0.046) 0.018
Region Fixed Effects	Yes	No	Yes	No	Yes	No
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Number of Observations	640	640	560	560	480	480

Note—Data on Russian gubernatorial appointments collected by author from Labyrinth.ru, and measures of political competition come from the Moscow Carnegie Center; all economic data from *Rosstat*. Parameter estimates for fixed effects and model constants not presented in table to save space. Region-clustered standard errors in parentheses; *p*-values appear below standard errors.

Table 14. Economic Performance and Staggered Centralization: Plausible Mechanisms

DV: GDP Growth	Selection		Uncertainty					
annual change (%)	*excl. replaced governors*		*early appointees*		*late appointees*		*interacted with time*	
POLITICAL CENTRALIZATION$_{t-1}$	−0.577	−0.904	0.089	−1.548	−0.533	−0.332	0.467	−2.346
dummy; 1 = post-reform	(1.368)	(1.202)	(1.397)	(1.750)	(3.286)	(2.908)	(1.957)	(2.170)
	0.675	0.456	0.949	0.380	0.873	0.910	0.812	0.283
POLITICAL COMPETITION$_{t-1}$		0.461		0.614		0.448		0.715
mean-centered; −5 = low, 5 = high		(0.239)		(0.269)		(0.646)		(0.251)
		0.059		0.027		0.495		0.006
CENTRALIZATION$_{t-1}$	−1.424	−1.257	−1.141	−1.051	0.260	−0.442	−0.996	−2.179
× COMPETITION$_{t-1}$	(0.519)	(0.451)	(0.435)	(0.393)	(1.111)	(0.897)	(0.645)	(0.790)
	0.008	0.007	0.011	0.010	0.817	0.627	0.127	0.007
YEARS POST-ANNOUNCEMENT$_{t-1}$							2.230	−0.621
years since reforms announced							(0.588)	(0.436)
							0.000	0.158
COMPETITION$_{t-1}$							−0.169	−0.392
× POST-ANNOUNCEMENT$_{t-1}$							(0.180)	(0.177)
							0.349	0.029
CENTRALIZATION$_{t-1}$							−0.351	0.546
× POST-ANNOUNCEMENT$_{t-1}$							(0.726)	(0.725)
							0.630	0.453
CENTRALIZATION$_{t-1}$ × COMPETITION$_{t-1}$							0.162	0.692
× POST-ANNOUNCEMENT$_{t-1}$							(0.199)	(0.248)
							0.416	0.007
GDP PER CAPITA$_{t-1}$	−43.141	−2.009	−42.302	−0.434	−35.061	−1.413	−38.492	−0.485
constant 2000 rubles (logged)	(3.450)	(0.872)	(3.672)	(0.924)	(10.634)	(4.544)	(5.394)	(0.968)
	0.000	0.025	0.000	0.640	0.003	0.759	0.000	0.618
POPULATION$_{t-1}$	−32.139	0.651	−38.727	−0.850	39.38	−0.058	−23.950	−0.696
in thousands of persons (logged)	(27.596)	(0.537)	(23.746)	(0.791)	(48.859)	(1.508)	(23.608)	(0.707)
	0.250	0.231	0.109	0.287	0.429	0.969	0.313	0.328
INFRASTRUCTURE$_{t-1}$	0.025	−0.002	0.010	0.004	0.040	−0.005	0.010	0.003
km paved roads / km^2 land area	(0.019)	(0.006)	(0.018)	(0.004)	(0.033)	(0.020)	(0.016)	(0.004)
	0.182	0.778	0.584	0.371	0.236	0.799	0.515	0.545
GDP GROWTH$_{t-1}$		0.024		0.008		0.012		0.018
lagged dependent variable		(0.045)		(0.050)		(0.056)		(0.040)
		0.594		0.870		0.840		0.645
Region Fixed Effects	Yes	No	Yes	No	Yes	No	Yes	No
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of Observations	416	416	448	448	192	192	640	640

Note—Data on Russian gubernatorial appointments and birth year collected by author, and data on political competition from the Moscow Carnegie Center; all other data from *Rosstat*. "Early" refers to regions with appointments between 2005 and 2007, "late" refers to regions with appointments 2008 or after. Parameter estimates for fixed effects and model constants not presented to save space. Region-clustered standard errors in parentheses; *p*-values appear below standard errors.

Table 15. Placebo Test: Political Centralization and Federal Investment

DV: Federal Investment *mil. of rubles (logged)*	Simultaneous Centralization		Staggered Centralization>	
POLITICAL CENTRALIZATION$_{t-1}$	0.340	0.042	0.022	0.044
dummy; 1 = post-reform	(0.180)	(0.073)	(0.061)	(0.055)
	0.062	0.570	0.717	0.426
POLITICAL COMPETITION$_{t-1}$		0.006		0.012
mean-centered; −5 = low, 5 = high		(0.010)		(0.010)
		0.550		0.211
CENTRALIZATION$_{t-1}$	0.010	0.005	−0.003	−0.005
× COMPETITION$_{t-1}$	(0.020)	(0.011)	(0.022)	(0.011)
	0.623	0.632	0.877	0.652
GDP PER CAPITA$_{t-1}$	−0.158	−0.004	−0.147	−0.006
constant 2000 rubles (logged)	(0.339)	(0.033)	(0.339)	(0.034)
	0.642	0.910	0.667	0.85
POPULATION$_{t-1}$	2.313	0.162	2.187	0.160
in thousands of persons (logged)	(1.591)	(0.032)	(1.583)	(0.032)
	0.150	0.000	0.171	0.000
INFRASTRUCTURE$_{t-1}$	0.001	0.000	0.001	0.000
km paved roads / km² land area	(0.001)	(0.000)	(0.001)	(0.000)
	0.315	0.269	0.339	0.243
FEDERAL INVESTMENT$_{t-1}$		0.829		0.830
lagged dependent variable		(0.031)		(0.031)
		0.000		0.000
Region Fixed Effects	Yes	No	Yes	No
Year Fixed Effects	Yes	Yes	Yes	Yes
Number of Observations	640	640	640	640

Note—Data on Russian gubernatorial appointments collected by author from Labyrinth.ru, and measures of political competition come from the Moscow Carnegie Center; all economic data from *Rosstat*. Parameter estimates for fixed effects and model constants not presented in table to save space. Region-clustered standard errors in parentheses; *p*-values appear below standard errors.
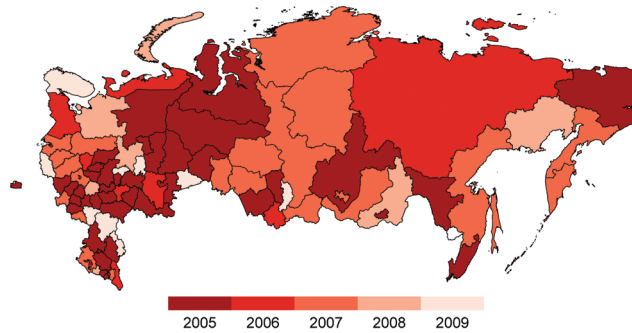

Figure 1. Year of first gubernatorial appointment, by region. Data collected by author from the Labyrinth biographical database on Russian political figures.
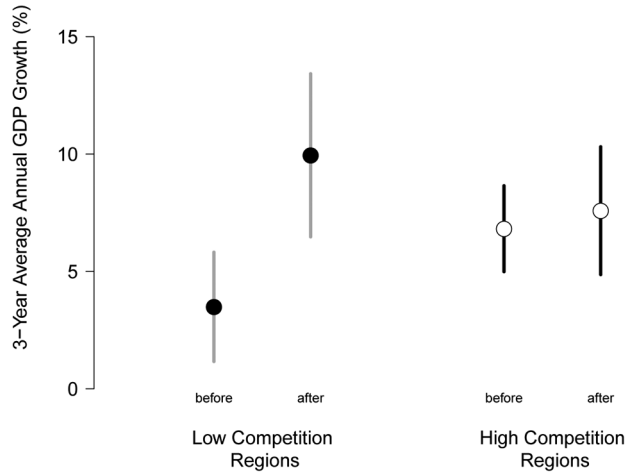
Figure 2. Russian regional economic performance, before and after centralization (simultaneous measure). Plot compares group means of year-on-year economic growth (in percentages) in Russia's regions for the three years proceeding and following the announcement of the gubernatorial appointment system. "Low" and "high" political competition groups include those regions in the first ($n = 21$) and fourth ($n = 21$) quartiles of POLITICAL COMPETITION, respectively. Bands represent 90% confidence intervals. This plot is the companion to Figure 1 in the article.

Centralization Measure: Simultaneous

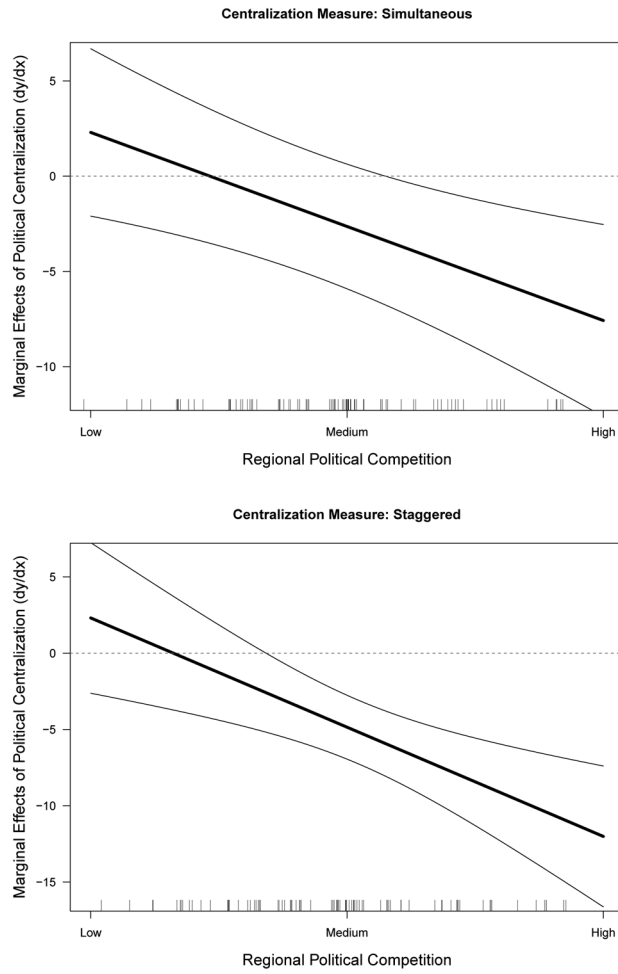**Centralization Measure: Staggered**

Figure 3. Marginal effects of centralization (three-year averages). The dependent variable is year-on-year change in regional GDP in percentage terms, averaged over three years before and after centralization; based on the first two columns of Table 3 in the paper. Bands represent 90% confidence intervals. Markers along the bottom of the graph indicate (jittered) location of regions on the x-axis.

Centralization Measure: Simultaneous

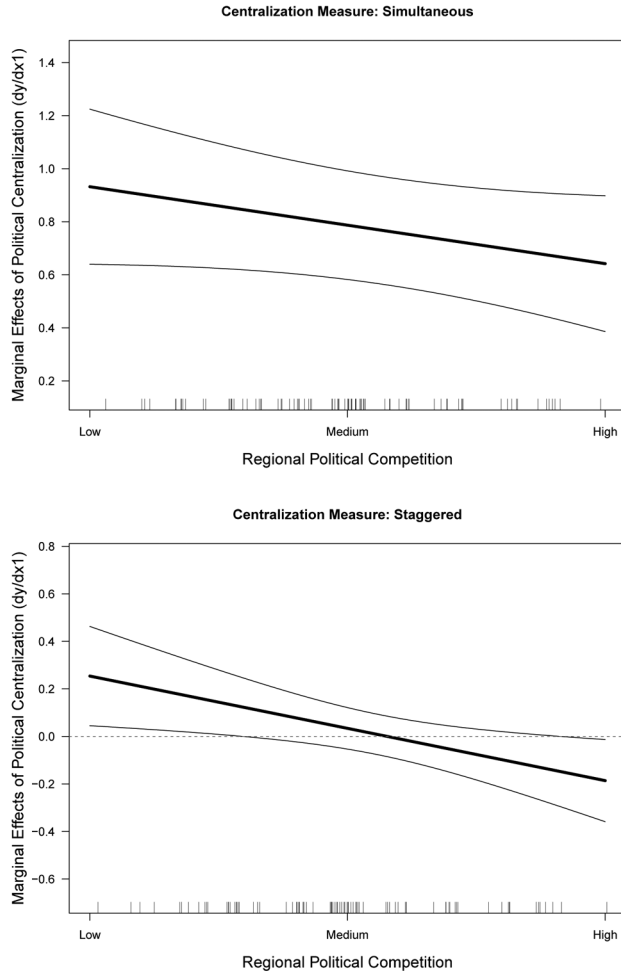**Centralization Measure: Staggered**

Figure 4. Marginal effects of centralization on private investment. The dependent variable is investment by private sector enterprises in fixed capital assets (logged millions of constant rubles). Bands represent 90% confidence intervals. Markers along the bottom of the graph indicate (jittered) location of regions on the x-axis.
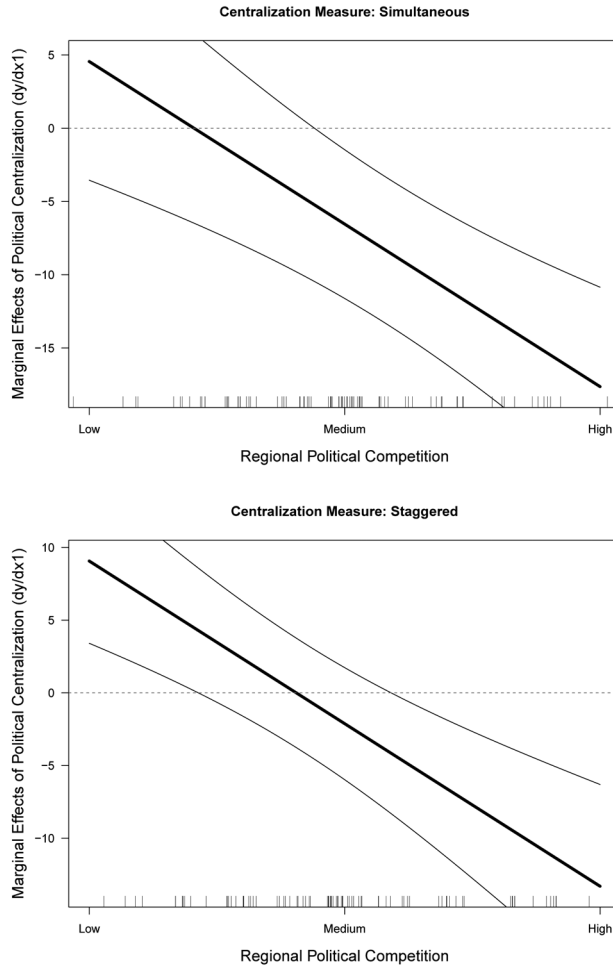
Figure 5. Marginal effects of centralization on rate of firm creation. The dependent variable is new firms registered per 1000 existing firms. Bands represent 90% confidence intervals. Markers along the bottom of the graph indicate (jittered) location of regions on the x-axis.
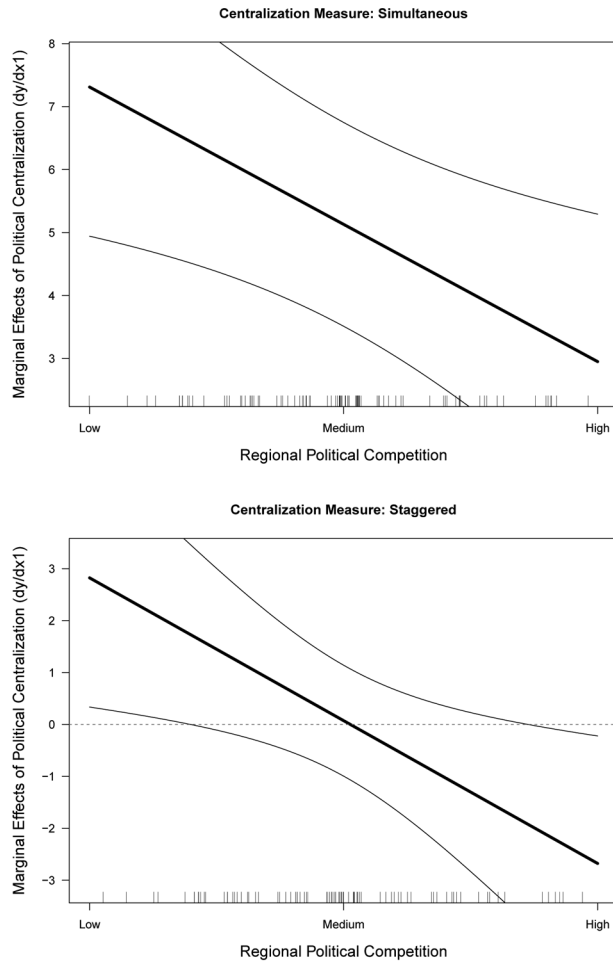
Figure 6. Marginal effects of centralization on firm profitability. The dependent variable is profitable enterprises as percent of total enterprises. Bands represent 90% confidence intervals. Markers along the bottom of the graph indicate (jittered) location of regions on the x-axis.

Centralization Measure: Simultaneous

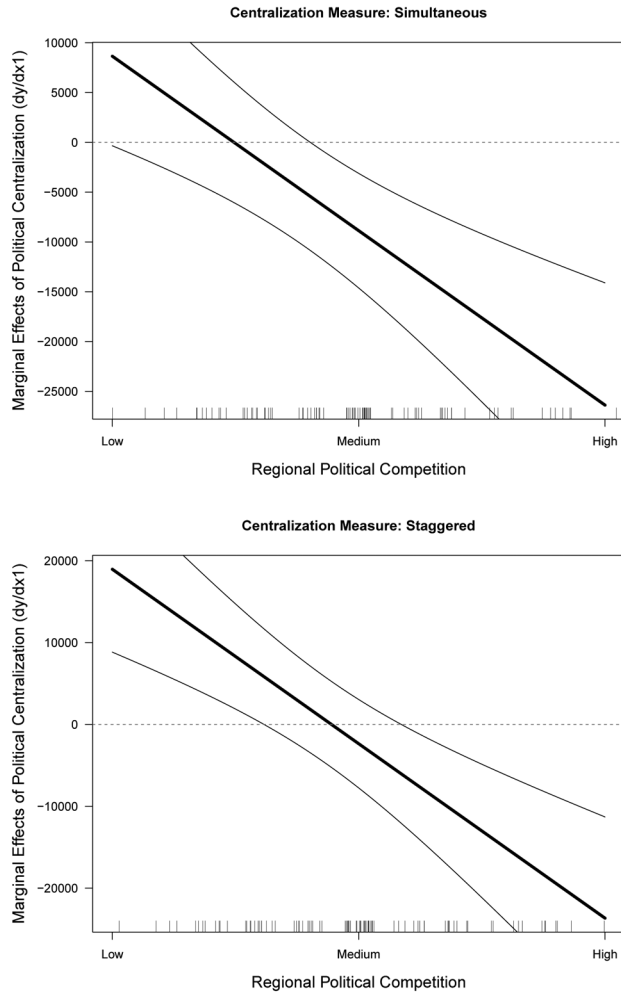**Centralization Measure: Staggered**

Figure 7. Marginal effects of centralization on R&D spending. The dependent variable is spending on research and development (per firm average, in thousands of constant rubles). Bands represent 90% confidence intervals. Markers along the bottom of the graph indicate (jittered) location of regions on the x-axis.
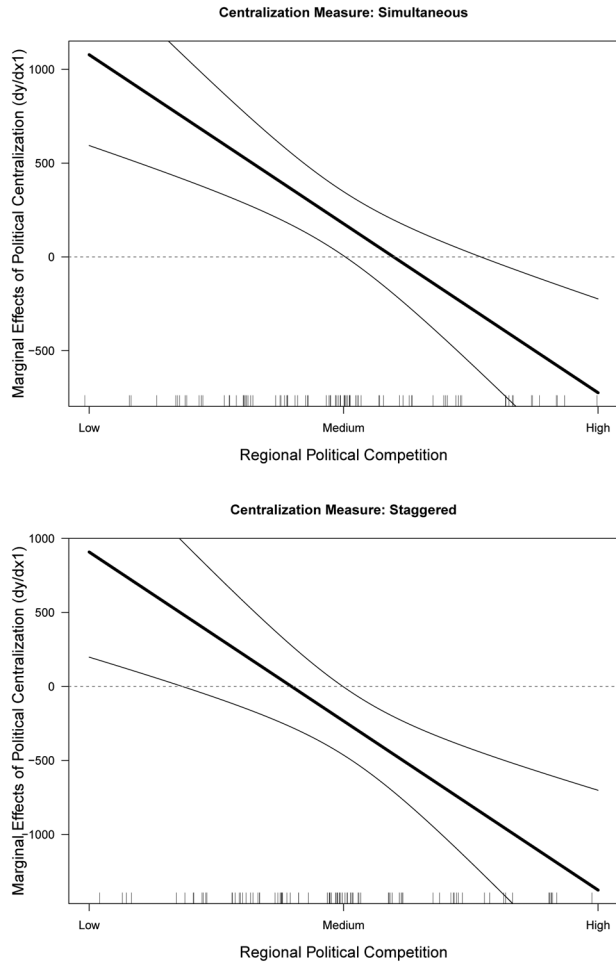
Figure 8. Marginal effects of centralization on small business volume. The dependent variable is small business volume (averaged per small firm, in millions of constant rubles). Bands represent 90% confidence intervals. Markers along the bottom of the graph indicate (jittered) location of regions on the x-axis.