Determinants of Ultimate Control of Large Firms in Transition Countries: Empirical Evidence

by

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We identify the *ultimate* ownership structures of the 20 largest firms in 12 transition countries in 1996, and the subsequent patterns of ownership change over 1996–2008. Of the state-controlled companies in 1996 more than half are still in state hands in 2008. Better quality of governmental institutions, larger external but not domestic government debt, smaller company size, and higher company profitability increase the likelihood of privatization as well as the likelihood that the company ends up ultimately in foreign hands. We document that, after 20 years, control structure and institutional quality convergence on the West is still largely incomplete. (JEL: P31, L33, P36, P50)

1 Introduction

The early literature on the postcommunist transition largely neglected the quality of country governance, emphasizing the importance of the liberalization of markets, financial stabilization, and privatization (see, for example, De Melo, Denizer, and Gelb, 1996). Since 1995, country governance issues have been gradually included on the reform agenda in transition countries (Murrell, 2005). However, the interactions between the building of formal state institutions and privatization have rarely been examined.[1] In this article, we examine the patterns of privatization and ownership change in the broader context of country governance re-

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[1] Among a few exceptions, see, e.g., McKinnon (1991). He discusses the importance of institution building *before* privatization of large firms. Grzymała-Busse (2007) presents empirical evidence on the link between robust political party competition, establishment of institutions for oversight over the privatization process, and state exploitation via privatization.

form. We study a much-neglected domain in postcommunist transition studies – the *change* of the *ultimate* ownership and control structures of large firms. Most studies of company ownership use direct ownership measures. Some examine ultimate ownership of Western corporations (e.g., Faccio and Lang, 2002), but only in a cross section, and only a few study ultimate ownership structures in transition countries.[2]

The first contribution of this article is to construct a unique data set on ultimate ownership and control structures of the 20 largest firms in 12 transition countries in 1996, and the patterns of their change over the period 1996–2008. Second, although privatization was a key element of enterprise reform in postcommunist transition, only a few empirical studies on postcommunist transition have examined ownership *change* patterns.[3] The second contribution of the article is to study the determinants of ultimate control of large firms in transition countries.

We examine the ultimate ownership structures of 12 countries – the ten transition countries, which have already joined the European Union (EU); Croatia, which aspires to join; and Russia, which does not. We focus on these 12 countries because ownership data for early transition years are available for them. Russia is included because of its economic importance, and as a kind of barometer for privatization in the remaining countries of the former Soviet Union.

In testing for the effects of institutions, we explicitly take into account their endogenous and sticky nature. We instrument our measure of the quality of institutions, the Worldwide Governance Indicators (WGI), by the communist displacement index of Fish (1997) and the communist legacy index of Kitschelt (1999). The communist displacement index codes the extent to which the first postcommunist government replaced the old communist elite; the communist legacy index tries to measure the deeper structural factors, such as bureaucratic legacies and state–society relations, that influenced institutional choices in the early postcommunist transition years. We argue below that these instruments can be seen as truly exogenous.

We proceed as follows. Section 2 discusses the progress made in governance reforms over the period 1996–2008. In section 3 we use a unique data set, which identifies the ultimate owners of the 20 largest nonfinancial companies in each of the 12 countries to examine the extent of privatization into domestic and foreign entities. Section 4 discusses the determinants of privatization. A model of the determinants of privatization and the results of our econometric analysis are presented in section 5. Conclusions are drawn in the final section.

[2] See, e.g., Mueller, Dietl, and Peev (2003) on large firms in Bulgaria; Guriev and Rachinsky (2005) on oligarchs in Russia.

[3] For a transition matrix describing ownership transformation see Jones and Mygind (1999) on Estonia; Grosfeld and Hashi (2003) on the Czech Republic and Poland; Gugler and Peev (2010) on 13 transition countries.

2 *Country Governance Reform*

After the collapse of communism in Europe beginning in 1989, the first step of transition was political liberalization. The conditions for introducing democracy, however, varied greatly across the formerly communist countries. In some, like the Czech Republic and Poland, strong anticommunist opposition groups existed before the collapse. They won the first democratic elections and immediately began the liberalization process. In other countries, like Bulgaria and Romania, the ex-communists took power after the first democratic elections. Political liberalization and privatization were delayed, and members of the former communist governments and their cronies in state-owned enterprises exploited the transition process for their own gains. These differences across the transition countries can be seen in Table 1, which provides a snapshot of six indexes of the quality of democratic and governance institutions in 1996, following the initial liberalization steps.[4] The table reports the WGI scores obtained for each transition country by Kaufmann, Kraay, and Mastruzzi (2010). (Brief definitions of the indexes appear in the Appendix.) The indexes run from −2.5 to 2.5, with higher numbers indicating higher-quality institutions.

The composite WGI indexes have been criticized on the grounds that changes in country scores could arise simply from adding a new data source to the index or dropping an outdated one (Knack, 2006; Rohwer, 2009). For example, in our 12 countries the average number of individual sources of governance data in which each country appeared in 1996 was only 4, whereas in 2008 it was 13.

Thus, all governance measures are unavoidably imprecise. This imprecision can be measured by the standard errors of the governance scores. The true level of governance has roughly a 70% chance of lying within one standard error of the point estimate. Kaufmann, Kraay, and Mastruzzi (2005, 2010) refer to this as the *margin of error* for the governance score. These margins of error reflect the extent of agreement among the underlying data sources. Margins are smaller when data sources for country governance tend to agree and when country estimates are based on more data sources. Thus, using the WGI for comparing two countries, or one country at two points in time, it is important to take margins of error into account. Table 1 reports the governance scores and standard errors (in parentheses). These standard errors are all quite small, implying that we can be fairly confident about our rankings of the different countries.

The WGI scores suggest a division of the 12 countries into four groups. The Czech Republic, Estonia, Hungary, and Slovenia have possessed the strongest institutions during the transition process. All had relatively high scores in 1996. For voice and accountability their scores were around 1.0 in 1996, and were about the same in 2008. In the other five categories, however, there were noticeable improvements. Estonia received a 1.49 in the regulatory quality category in 2008, slightly above the mean for the 17 Western European countries (1.44). Estonia's corruption score went

[4] Country governance issues were not on the reform agenda in transition countries till 1995 (see, e.g., De Melo, Denizer, and Gelb, 1996). For the remarkable change after 1995, see the discussion by Murrell (2005).

Table 1

Governance Indicators in Transition Countries, 1996–2008

	Voice and accountability		Government effectiveness		Regulatory quality		Rule of law		Control of corruption		Political stability	
	1996	2008	1996	2008	1996	2008	1996	2008	1996	2008	1996	2008
Czech Republic	0.97	1.04	0.65	0.96	0.95	1.14	0.94	0.89	0.58	0.37	1.09	1.00
	(0.23)	(0.14)	(0.26)	(0.18)	(0.23)	(0.17)	(0.19)	(0.13)	(0.12)	(0.12)	(0.33)	(0.22)
Estonia	0.92	1.09	0.53	1.25	1.20	1.49	0.70	1.16	−0.21	0.96	0.67	0.78
	(0.25)	(0.14)	(0.31)	(0.18)	(0.35)	(0.17)	(0.22)	(0.13)	(0.13)	(0.12)	(0.34)	(0.22)
Hungary	1.05	1.02	0.72	0.70	0.67	1.22	1.02	0.85	0.49	0.56	0.82	0.75
	(0.23)	(0.13)	(0.26)	(0.18)	(0.23)	(0.17)	(0.19)	(0.13)	(0.12)	(0.12)	(0.33)	(0.22)
Slovenia	1.10	1.00	0.93	1.23	0.86	0.83	1.08	0.98	1.36	0.95	1.02	1.08
	(0.25)	(0.14)	(0.31)	(0.19)	(0.35)	(0.18)	(0.22)	(0.14)	(0.13)	(0.13)	(0.34)	(0.24)
Latvia	0.75	0.75	−0.48	0.64	0.89	1.02	0.29	0.81	−1.02	0.29	0.52	0.38
	(0.25)	(0.14)	(0.31)	(0.19)	(0.35)	(0.18)	(0.22)	(0.14)	(0.13)	(0.14)	(0.34)	(0.24)
Lithuania	0.93	0.85	−0.22	0.69	0.81	1.11	0.48	0.65	−0.24	0.13	0.44	0.78
	(0.25)	(0.13)	(0.31)	(0.18)	(0.35)	(0.18)	(0.22)	(0.13)	(0.13)	(0.12)	(0.34)	(0.22)
Poland	0.98	0.88	0.90	0.52	0.62	0.80	0.87	0.55	0.42	0.33	0.70	0.88
	(0.23)	(0.13)	(0.26)	(0.18)	(0.23)	(0.17)	(0.19)	(0.13)	(0.12)	(0.12)	(0.33)	(0.22)
Slovak Republic	0.25	0.87	0.61	0.89	0.39	1.09	0.32	0.60	0.54	0.41	0.67	1.03
	(0.23)	(0.15)	(0.27)	(0.19)	(0.28)	(0.18)	(0.21)	(0.14)	(0.13)	(0.13)	(0.33)	(0.24)
Bulgaria	0.11	0.57	−0.96	0.10	0.18	0.69	−0.04	−0.16	−1.02	−0.20	−0.22	0.43
	(0.23)	(0.13)	(0.29)	(0.18)	(0.32)	(0.17)	(0.22)	(0.13)	(0.13)	(0.12)	(0.33)	(0.22)
Croatia	−0.34	0.53	−0.01	0.64	0.14	0.48	−0.56	0.12	−1.01	0.07	−0.10	0.57
	(0.25)	(0.14)	(0.31)	(0.19)	(0.35)	(0.18)	(0.22)	(0.14)	(0.13)	(0.13)	(0.34)	(0.24)
Romania	0.18	0.48	−0.82	−0.07	−0.23	0.55	−0.01	0.03	−0.23	−0.03	0.39	0.26
	(0.23)	(0.13)	(0.29)	(0.18)	(0.32)	(0.17)	(0.22)	(0.13)	(0.13)	(0.12)	(0.33)	(0.22)
Russia	−0.43	−0.91	−0.69	−0.32	−0.40	−0.48	−0.64	−0.92	−1.03	−1.02	−0.95	−0.61
	(0.23)	(0.12)	(0.26)	(0.18)	(0.23)	(0.17)	(0.19)	(0.13)	(0.12)	(0.12)	(0.33)	(0.22)
Western Europe	1.24	1.34	1.82	1.54	1.01	1.44	1.64	1.56	1.73	1.65	1.08	0.92
	(0.23)	(0.15)	(0.26)	(0.20)	(0.23)	(0.23)	(0.22)	(0.15)	(0.12)	(0.16)	(0.33)	(0.23)

Source: Kaufmann, Kraay, and Mastruzzi (2010).
Note: Standard errors in parentheses.

from slightly negative in 1996 to first among the 12 countries, just before Slovenia. Although the four transition countries with the best democracy and governance institutions continued to trail Western European countries in these categories in 2008, they had narrowed the gap between them to a considerable extent.

Poland also exhibited relatively high scores in 1996, but between 1996 and 2008 its scores fell in four of the six democracy and governance categories. It has been placed in a middle tier of transition countries, therefore, along with Latvia, Lithuania, and Slovakia. Lithuania recorded a slightly lower score for voice and accountability in 2008 than in 1996, but with this exception all of the democracy and governance scores for the last three countries rose – sometimes dramatically. Thus, in 2008 the quality of regulation in Latvia, Lithuania, and Slovakia was comparable to that in the top four transition countries, and their scores for voice and accountability were also reasonably close. Fairly large differences between the two groups of countries remained in the other four categories, however.

Noticeable improvement also took place in a still-lower tier consisting of Bulgaria, Croatia, and Romania. These three transition countries had such low quality of democracy and governance institutions in 1996, however, that they continued to lag the top eight countries in Table 1 and in Western Europe by wide margins in 2008. In particular, they still scored very poorly in the categories rule-of-law and corruption.

And then there is Russia in a category by itself. In 1996, it had the lowest scores among the 12 countries in five of the democracy and governance categories, and tied for lowest with Bulgaria in a sixth (corruption). Between 1996 and 2008 the quality of its democratic and governance institutions deteriorated in four of the six categories. In 2008, Russia still had negative scores in all categories and the lowest scores of any of the 12 countries.

Strengthening the rule of law and property rights and curbing corruption threaten the rents extracted by politicians and oligarchs who have exploited the transition process for their own benefit. Reforms in these areas have only taken place where voice and accountability in the democratic process have been strong. Only the Czech Republic, Estonia, Hungary, and Slovenia can be said to have come close to closing the institutional gap with Western Europe.

3 The Ultimate Control of Large Firms

An important part of the reform package pushed by the IMF and World Bank included privatization of state-owned companies.[5] If the former communist countries were to become full-fledged market economies, then the amount of productive assets in state hands would have to decline. In a survey of papers on transition published before 2000, Djankov and Murrell (2002) present evidence on the positive effects of privatization on productivity. In a recent survey, Estrin et al. (2009) overview 34 empirical studies, which show that privatization has had positive effects on

[5] See Megginson and Netter (2001) for a survey of the literature on privatization in developed, developing, and transition countries.

performance in central Europe, but that the effects were often conditional on various factors like the type of the new private owners, corporate governance institutions, and access to know-how and markets. Surprisingly, most studies treat the emerging ownership structures as exogenous and do not explicitly control for possible selection bias due to the quality of country governance, financial market development, or government debt.

To determine how far along the 12 countries have come in the privatization process, we identified the ultimate owners of the 20 largest nonfinancial companies in 1996 and during the subsequent 12 years. We applied the definition of Faccio and Lang (2002) – an ultimate owner is a person, family, or institution that holds 20 percent or more of a company's shares. When no single entity owned at least 20 percent, a company was categorized as having dispersed ownership. When defining state ownership, Faccio and Lang (2002) did not distinguish whether a company was controlled by the state in which it is located or a foreign state. We expect companies controlled by the state in which they are located to perform differently from foreign-state-controlled companies. A domestic-state-controlled company may be under pressure from the state to, say, maintain employment levels even at the expense of profits. It is unlikely, however, that a German government would put pressure on a company that it controls to protect jobs at a subsidiary in Austria at the cost of profits in Germany. Thus, we expect state control to be associated with quite different incentives and possibly company performance, depending upon whether it is the state in the company's own country that controls it, or a foreign state.

With these considerations in mind, we categorize companies in the transition countries somewhat differently from Faccio and Lang (2002). We define a state-controlled company as one for which its own state is the largest shareholder and also holds 20 percent or more of its shares. We introduce the category *foreign-controlled*. When the transition countries began selling off state-owned assets, there typically were no domestic families with the wealth to purchase controlling stakes. In some cases, the states responded by essentially giving away companies to their employees or managers. Such privatizations not only failed to bring money into state coffers, but often transferred state assets to individuals who were incapable of managing them efficiently. In other cases, states sold assets to foreign entities – typically foreign firms. This form of privatization both brought in cash for the state, and often ensured that the privatized firms would be managed efficiently. A description of our ownership data sources and our construction of ownership categories appears in the Appendix.

We assume that all of the largest companies in the 12 transition countries were in state hands when communism ended, and so begin our examination of ownership change with 1996.[6] Table 2 reports fractions of the 20 largest companies in each country that were state-controlled in 1996 and 2008. It was not possible to identify the *ultimate* owners and financial data of some of the largest companies, so the

[6] Before 1996, the quality of ownership data for transition countries in our initial data source, the Amadeus and Osiris databases, was very poor.

Table 2
Ultimate State and Foreign Control by Countries

Country	Companies	State Control		Foreign Control	
		1996	2008	1996	2008
Czech Republic	18	66.7	16.7	22.2	66.7
Estonia	18	27.8	5.5	66.7	88.2
Hungary	18	66.7	33.3	27.8	66.7
Slovenia	14	50.0	33.3	27.8	27.8
Latvia	15	20.0	20.0	26.7	61.1
Lithuania	16	27.8	16.7	44.4	26.7
Poland	20	75.0	45.0	25.0	0.30
Slovak Republic	14	14.3	7.1	57.1	71.4
Bulgaria	18	88.9	33.3	0.0	46.7
Croatia	20	40.0	40.0	30.0	40.0
Romania	16	93.8	41.2	5.8	52.9
Russia	18	61.1	55.6	0.0	11.1
Western Europe*		12.0			

Source: Amadeus database; Internet research; authors' calculations. * Faccio and Lang (2002, Table 5, pp. 383f.).

figures in Table 2 are for only those companies among the 20 largest in each country for which the identity of the ultimate owner could be established.

The numbers in Table 2 indicate considerable variation in privatization across the 12 countries. The leftmost column reports the number of firms among the 20 largest for which the identity of the ultimate owner could be established. The second column gives the fractions of these companies that remained in state hands in 1996. Four of the smallest countries – Estonia, Latvia, Lithuania, and the Slovak Republic – sold off between 75 and 85 percent of their largest companies by 1996. In the other eight countries, the state continued to control from 50 to nearly 100 percent of the largest companies in 1996. The third column presents the fractions of the 20 largest companies in each country that were in state hands in 2008. These fractions declined from their 1996 levels in all 12 countries. In four – the Czech Republic, Estonia, Latvia, and Slovakia – state ownership in 2008 was about the same as in the average Western European country (12 percent, bottom of table). All four countries at the bottom of Table 2 with the weakest democratic and governance institutions had state-ownership fractions of 30 percent or more – Russia's was over 50 percent. The high percentages of large companies in state hands in these countries imply a rather slow-paced transition in Bulgaria, Croatia, and Romania, and perhaps indicate the end of the transition in Russia.

Columns 4 and 5 present the same statistics for ultimate foreign control. There is a general inverse relationship between state and foreign control. Countries with

a large percentage of ultimate state control have a small percentage of ultimate foreign control, and vice versa.[7]

Table 3 presents the matrix of ultimate control change in the 12 countries over the period 1996–2008. Rows designate ultimate owners as of 1996; columns designate ultimate owners in 2008. Of the 114 state-controlled companies in 1996, more than half (62) remained in state hands in 2008. There were three state-controlled companies in 1996 that were privatized into domestic family hands by 2008, and seven were sold to private domestic companies. Private foreign companies were the states' biggest customers, buying almost a quarter of their companies (31), while foreign state-controlled companies bought another 9. Domestic family-controlled companies fell from 20 to 17. The number of firms with dispersed ownership rose from one to seven, still just 3 percent of the total sample.

Table 3
Matrix of Ultimate Control Change (1996–2008)

	Family	Nonfi-nancial	Fi-nancial	State	Foreign private	Foreign state	Dis-persed	Total (1996)
Family	10	2	2	0	4	0	2	20
Nonfinancial	3	3	1	1	5	0	0	13
Financial	0	1	1	0	2	0	2	6
State	3	7	1	62	31	9	1	114
Foreign private	0	1	2	2	34	1	1	41
Foreign state	1	0	0	1	5	9	1	17
Dispersed	0	0	0	0	1	0	0	1
Total (2008)	17	14	7	66	82	19	7	212

Sources: Amadeus database; Internet research; authors' calculations.

4 The Determinants of Large-Scale Privatization

We have seen in the previous section that there is considerable variation in privatization across the 12 transition countries. It has frequently been asserted that differences in privatization methods result from a complex interplay of many factors. Megginson and Netter (2001), in a survey of the literature on privatization, mention nine such factors: (1) the history of the asset's ownership, (2) the financial and competitive position of the state-owned enterprise, (3) the government's ideological view of markets and regulation, (4) the past, present, and potential future regulatory structure in the country, (5) the need to pay off important interest groups in the privatization, (6) the government's ability to credibly commit itself

[7] This does not need to be the case automatically. It could be that the domestic private sector buys the companies; however, we do not see this in our data.

to respect investors' property rights after divestiture, (7) the capital market conditions and existing institutional framework for corporate governance in the country, (8) the sophistication of potential investors, and (9) the government's willingness to let foreigners own divested assets. Bortolotti, Fantini, and Siniscalco (2004) identified four key factors explaining the extent of privatization across countries – fiscal imbalances, stock market liquidity, the ideology of the government, and the origins of a country's legal system. Given that all 12 countries upon which we focus have a common, recent history as communist states, it does not make much sense to try to identify the legal origins of each country. It is possible, however, to construct variables that measure the other three factors. Moreover, since we use firm-level data as opposed to Bortolotti, Fantini, and Siniscalco (2004), who use country-level data, we are able to test hypotheses about firm and industry characteristics.

Strength of Government Institutions. Recent studies show that the quality of governance institutions matters for country performance. Countries with low levels of corruption, strong property rights, independent judiciaries, and other institutions that underpin market systems grow faster and are more open to foreign trade (see Knack and Keefer, 1995, and Knack, 1996). High corruption is associated with greater entrenchment of domestic interest groups. One expects that large state-owned firms create bigger opportunities for rent extraction by these groups, and thus that high corruption is associated with slower privatization.

The literature has also demonstrated that companies operating in countries with legal environments that provide weak shareholder protection have significantly worse investment performance (Gugler, Mueller, and Yurtoglu, 2004). If governments in weak systems are rational, they will be reluctant to sell state-owned assets, because investors would discount the shares of newly privatized companies due to the great risk of expropriation by their managers. Consequently, the expected proceeds from privatization would be low.

For similar reasons, foreign investors should be more willing to invest, the stronger institutional protection is in the host country. The better the institutions, the less likely their risk of expropriation. Likewise, countries with better institutions are generally more open to foreign investors. Thus, both demand- and supply-side considerations lead us to expect that:

HYPOTHESIS 1 *The better the quality of governmental institutions, (1) the faster is the privatization process, and (2) the more former state-controlled firms are privatized to foreign investors.*

The WGI are obvious choices for measuring the strength of government institutions. We employ both the average of the six indexes and each separately as explanatory variables.

Privatization and political and economic reforms were all occurring simultaneously following the end of communism, and it is reasonable to assume that these reforms were driven by common underlying factors. With this in mind, we instru-

ment the governance indicators in the regressions. As an instrument we use the index of displacement of communist incumbents in first elections that was introduced by Fish (1997). He codes the extent to which the first postcommunist government replaces the old communist elite. The index ranges from 0 to 5; the higher the score, the better the initial election outcome for the anticommunist opposition. An alternative choice of instrument would be the index created by Kitschelt (1999) to measure the communist legacy of each transition country. Kitschelt's index tries to measure the deeper structural factors, such as bureaucratic legacies and state–society relations, that influenced institutional choices in the early postcommunist transition years – for example, whether a country's bureaucracy was professional, or relied on patronage, or was patrimonial. The index ranges from 0 to 3; the higher the score, the better suited a country's communist legacy was for the development of liberal economic and democratic institutions. We also tried this index as an instrument.

Government's Ideology. Bortolotti, Fantini, and Siniscalco (2004) found that right-wing governments privatized state-owned companies more eagerly than left-wing governments. One might expect this to be the case also in transition countries. To explore the possible effects of ideology, we constructed a conventional left–right ideology dimension to measure the ideological bent of each country's ruling coalition, using the Database of Political Institutions (DPI) and other sources.[8] The variable never was significant, however, and so we do not report any results for it.

Here we see an important difference between the transition countries in central Europe and other countries. One reason for this difference might be that the necessity for widespread privatization was recognized by parties of all ideological persuasions. Bortolotti, Fantini, and Siniscalco (2004, p. 312) actually leave out transition countries and note in their study of the determinants of privatization in 34 countries that "privatization in transition economies is a unique phenomenon." In fact, privatization in transition countries was not driven only by considerations of economic efficiency, government debt, and the like (the usual factors explaining its rationale in developed and developing countries), but a key objective was also to transform a planned economic system into a market economy.

Government Debt. The larger a country's debt, the greater is the pressure on the ruling government, whatever its ideological persuasion, to raise funds. Selling off state-owned assets is likely to be more attractive for countries with high levels of debt (see Roland, 2000). In fact, IMF loan conditions focus on meeting economic targets, such as trade and financial liberalization, fiscal discipline and restrictive monetary policy, and privatization. Privatization to foreign investors was seen as a major priority by the European Bank for Reconstruction and Development (EBRD), the

[8] University of Essex data set (UED), International Parliamentary Organization Parline data set (IPO), and University of Bern data set (UBD).

World Bank, and other international institutions. Various potential benefits from foreign investors were anticipated. Domestic savings in transition economies could not absorb huge amounts of privatized equity. Foreign firms, on the other hand, have access to various sources of finance. They also possess managerial and technical know-how to help restructure and improve the long-term performance of former socialist state-owned firms. The penetration of foreign owners into local markets can also generate positive spillover effects to domestic firms through technology transfer, and can impose more efficient corporate governance structures on privatized firms than would insiders, who frequently impede restructuring. Foreign investors can also harden budget constraints by cutting the link between the state and firms.

We use two measures of debt: *domestic debt*, the ratio of domestic government debt to GDP; and *external debt*, the ratio of external government debt to GDP. We expect the pressure to privatize to be greater for external than for domestic debt, and more firms to be privatized to foreign investors if *external* indebtedness is large. Some domestically held debt was and is held by friendly institutions like state-controlled banks. Indeed, large domestic debt ratios may signal an inward-looking government averse to foreign influence. We thus have:

HYPOTHESIS 2 *The larger the ratio of domestic government debt to GDP, (1) the slower is the privatization process, and (2) the fewer formerly state-controlled firms are privatized to foreign investors. The larger the ratio of external government debt to GDP, (1) the faster is the privatization process, and (2) the more former state-controlled firms are privatized to foreign investors.*

Stock Market Liquidity. There are many reasons why better-developed financial markets favor privatization and in particular privatization to foreigners. Better-developed financial markets facilitate the privatization of large state companies, illiquidity discounts will be lower, price signals will be more efficient, and (foreign) investors will feel more secure, since the risk of expropriation will be lower (see also Bortolotti, Fantini, and Siniscalco, 2004). Thus we have:

HYPOTHESIS 3 *The higher a country's stock market turnover, (1) the faster is the privatization process, and (2) the more former state-controlled firms are privatized to foreign investors.*

The liquidity of a country's stock market is generally measured in two ways: its total capitalization divided by GDP (market capitalization), and the volume of stocks traded in a year divided by GDP (market turnover). For transition countries, the latter measure is to be preferred, since many companies in transition countries are listed but seldom traded.[9] Thus, stock market turnover can be viewed as a general

[9] Levine and Zervos (1998) also emphasize that simply listing on the national stock exchange does not necessarily foster resource allocation. Rather, it is the ability to trade the economy's productive technologies easily that influences resource allocation and growth.

proxy for capital and financial market development in transition countries. We are also confident that reverse causality is not an issue here, since we measure turnover during the 4–5 years *before* we observe ownership structure (this is also true for the other explanatory variables).

Firm-Level Determinants. Most existing studies of the determinants of ownership structures in postcommunist transition examine only one country and focus on company characteristics. Bishop, Filatotchev, and Mickiewicz (2001), for example, study large firms in Hungary during the period 1994–1999, and find firm size positively associated with the presence of foreign investors. Jones and Mygind (1999) study the postprivatization ownership change in Estonia in 1995–1997, and find that large firms have higher ownership stakes of outside owners and that profitability is not an important factor for ownership structures. Sprenger (2011) examines the ownership structures of Russian manufacturing firms at the end of the mass privatization program in 1994 and their evolution over the period 1994–1999, and finds that the state keeps greater stakes in larger firms.

Our data allow us to test hypotheses on the firm (and industry) level using cross-country data. Thus, in addition to the country-level variables, we include two firm-level variables: π/K, the lagged profit-to-asset ratio of a company; and $\ln(K)$, the lag of the log of the total assets of a company. We expect it to be easier to sell profitable and small companies than unprofitable and large ones. Thus, when predicting whether a company is in state hands, we expect a negative coefficient on π/K, and a positive coefficient on $\ln(K)$.

HYPOTHESIS 4 *The government is more likely to privatize state-controlled companies and in particular to foreign investors, the larger the company's profit-to-assets ratio.*

HYPOTHESIS 5 *The government is less likely to privatize state-controlled companies and in particular to foreign investors, the larger the company's size.*

Industry. An obvious reason for a company being in state hands is that it is a "natural monopoly" in, say, telecommunications or electricity, and/or that the company operates in a "strategic" industry and is state-controlled for political reasons. To control for these factors we assigned all companies to one of eight one-digit ISIC industries: (1) agriculture and fishing, (2) coal, crude oil, mining, (3) oil processing, chemicals, metallurgy, (4) machinery, (5) energy, (6) food processing and beverages, textiles, retail trade, pharmacy, (7) transport, post, telecom, and (8) others, and we included industry dummy variables in the regressions. Thus, our results explain continued state control *beyond* the industrial characteristics of a company.

Definitions of the variables appear in the Appendix. Table 4A presents descriptive statistics for the main variables. Although we use the log of total assets in our empirical work, we also report the figures for total assets. On average, in 41 percent of the firm–year observations the controlling ultimate shareholder is the state, in

Table 4A
Descriptive Statistics

	Mean	Std. dev.
State control	0.41	0.49
Foreign control	0.39	0.49
Governance index	0.43	0.47
Total assets (1000 USD)	1,638,341	10,400,000
Log of total assets	12.43	1.16
Profit to total assets	0.029	0.111
Communist displacement index	4.50	0.76
Communist legacy index	1.79	0.56
Domestic debt	0.37	0.32
External debt	0.48	0.24
Market turnover	0.36	0.32

Notes: Variable definitions are presented in the Appendix.

39% it is a foreign entity, and in 20% it is private and domestic. The average of the WGI over the period is 0.43. (Recall that the range of this index is −2.5 to 2.5.) While the average ratio of domestic government debt to GDP is 37%, the average ratio of external government debt to GDP is 48%. The average turnover-to-GDP ratio is 36%.

Table 4B presents the correlation matrix for the variables. State ownership is significantly negatively correlated with the WGI, communist legacy, communist displacement, and company profitability, and positively with company size and domestic government debt. The reverse is true for foreign control. The two debt variables are highly correlated, as are the three variables measuring institutions: governance index, communist legacy, and communist displacement. As noted above, we used communist displacement as our instrument for the WGI, but communist legacy worked just as well.

5 *Econometric Analysis*

5.1 *Main Results*

As already discussed, privatization and governance reforms following the end of communism were likely driven by common underlying factors. Therefore, we treat the governance indicators as endogenous, and instrument them using the index of displacement of communist incumbents in first elections that was introduced by Fish (1997), and alternatively Kitschelt's (1999) index of communist legacy, for each transition country.

These instruments can be seen as exogenous to the control structures in 1996, 2003, and 2008, for at least three reasons. First, they are measured in the early 1990s,

Table 4B
Correlations

	State control	Foreign control	Governance index	Log of total assets	Profit to total assets	Comm. displacement	Comm. legacy	Domestic debt	External debt
State control	1.0000								
Foreign control	−0.6755*	1.0000							
Governance index	−0.1912*	0.2855*	1.0000						
Log of total assets	0.2351*	−0.1770*	−0.2279*	1.0000					
Profit to total assets	−0.1405*	0.1312*	0.0268	0.1436*	1.0000				
Communist displacement	−0.1867*	0.1879*	0.5569*	−0.0488	0.1206*	1.0000			
Communist legacy	−0.1527*	0.2135*	0.7967*	−0.0395	0.0388	0.7245*	1.0000		
Domestic debt	0.2385*	−0.2005*	−0.2814*	0.1906*	0.0001	−0.3238*	−0.3255*	1.0000	
External debt	−0.0233	0.0673	0.1081*	0.0198	0.0928	−0.0904	−0.1392*	0.5233*	1.0000
Market turnover	−0.0915	0.2068*	0.3406*	−0.0245	0.0656	0.3002*	0.3229*	−0.0843	−0.2091*

Notes: * significant at 1%. Variable definitions are presented in the Appendix.

years before the first cross section of control structures is measured in our sample (1996), and some fifteen years before we measure the last cross section of control structures (2008). Second, while initial elections or the deeper structural factors that influenced institutional choices in the early postcommunist transition years certainly determined the speed and quality of subsequent institution building (i.e., the WGI), they are much less likely to have directly determined privatization and privatization to foreigners several years later. As already mentioned, country governance issues were not on the reform agenda in transition countries until 1995 (see, e.g., De Melo, Denizer, and Gelb, 1996). Finally, while the simple correlation coefficients with state or foreign control are significant (see Table 4B), the correlation with the residuals of the estimated equations are near zero (i.e., the Sargan test does not reject exogeneity of the instruments).

Our first specification uses a maximum-likelihood probit model with continuous endogenous regressors with cluster (countries) bootstrapped standard errors, in the spirit of Cameron, Gelbach, and Miller (2008). This model fits our specification with a dichotomous dependent variable and endogenously determined regressors (i.e., the governance indicators). The dependent variable takes the value 1 if the firm is under state (foreign) control, and 0 otherwise. In all regressions, state control means domestic state control. Since the unit of observation is a firm–year, but we include country–year observations (viz., the governance index, domestic and external government debt, and market turnover), we use repeated observations, and the requirement that observations be independent is violated. If we did not allow for the induced correlation within each country, we would get standard errors that were biased downward. Thus, we use a robust variance estimator based on country clustering, i.e., standard errors that allow for intracountry correlation. This does not reduce the number of observations, but only places restrictions on the variance–covariance matrix. Since estimates of standard errors may additionally be biased downward with clustering for just 12 groups (countries), we estimate all our regressions using cluster bootstrap procedures in the spirit of Cameron, Gelbach, and Miller (2008).[10]

Our second specification fits a random-effects probit model, instrumenting the governance index again by communist displacement (and, as a robustness check, communist legacy). We chose the random-effects model because unconditional fixed-effects probit models are biased. We also fitted, however, a fixed-effects probit model with country indicator variables. The results were very similar to those of the random-effects model, which was also supported by a Hausman specification test under the null of nonsystematic differences in coefficients; so we report only the results on the consistent random-effects estimations.

Table 5 reports these using ultimate ownership data for 1996, 2003, and 2008, and averages of the independent variables over the periods 1990–1995, 1996–2002, and 2003–2007, respectively. The dependent variable takes the value 1 if a company was ultimately state-controlled in the year in question. A Wald test implied that the

[10] We thank the referee for this suggestion.

governance index is only marginally endogenous (p-value 0.12). At the bottom of the table, we report the regression of the governance index on the displacement index and year dummies for 2003 and 2008. The displacement index is highly significant ($t = 17.1$) and together with the year dummies explains 33% of the variance in the governance index. This is remarkable when we remember that the displacement index is measured only at the beginning of the 1990s in the cross section. The year dummies indicate that there is a secular trend towards better institutions in central and eastern European countries.

With only the (instrumented) governance index, the log of company total assets, and company profitability in the random-effects equation, all three variables are statistically significant with the expected signs. Better governance implies less state control. The probability of still being in state control falls by nearly 50% when we move from the average WGI value for the transition countries (0.43) to the Western European countries' average (around 1.5). Larger companies are more likely to remain in state hands; more profitable companies are more likely to be privatized. The industry dummies measure deviations from the left-out sector *energy*, and are significant as a group. Not surprisingly, energy companies are most likely to remain in ultimate state control.

As we add the other country-level variables, the governance index remains statistically significant and negative in the IV probit specification and preserves its negative sign in the random-effects regression, although becoming insignificant. The coefficients of the other country-level variables are insignificant, with the exception of external debt, in the random-effects specification.[11] As expected, transition governments were more eager to privatize if they had large outstanding *external* debt.

The results in Table 5 are plausible. Governments privatized more readily in countries with large amounts of external debt. Governments found it easier, or at least more attractive, to sell smaller and more profitable companies than large, unprofitable ones. Greater efficiency in governmental institutions increased the likelihood of privatization. Table 6 presents the mirror image to state control, namely foreign control. The table answers the question of what determined ultimate foreign control in transition countries. All variables obtain the opposite signs in Table 6 from those in Table 5! Better governance institutions, more profitable and smaller firms, less domestic government debt but more external government debt, and larger stock market turnover favored privatization to foreign entities. As predicted, countries with high turnover on their stock exchanges engaged in greater amounts of privatization to foreigners. A well-developed stock market may be regarded as another indicator of progress in the transition process. Industry effects are again significant.

Thus, we have found rather strong support for our hypotheses about the determinants of state and foreign control in transition countries. There is a third category

[11] Domestic debt, however, becomes positive and significant on using some subindexes of WGI (Table 8) as well as on using the communist legacy index as instrument for WGI (Table 10).

Table 5

The Determinants of Ultimate State Control

	IV Probit				Random Effects			
Equations:	(1)		(2)		(3)		(4)	
Explanatory Variables:	Coeff.	*z*-val.	Coeff.	*z*-val.	Coeff.	*z*-val.	Coeff.	*z*-val.
Governance index	−1.10	−5.67	−0.91	−2.75	−1.64	−3.94	−0.76	−1.32
π/K	−2.16	−3.67	−2.17	−3.88	−2.35	−2.56	−2.31	−2.13
$\ln(K)$	0.08	2.61	0.10	2.19	0.15	2.44	0.15	1.84
Domestic debt			0.005	1.43			0.01	1.46
External debt			−0.006	−1.48			−0.01	−2.28
Market turnover			−0.002	−0.92			−0.005	−1.27
Agriculture, fishing	−0.17	−0.96	−0.28	−1.11	−0.63	−0.21	−0.64	−0.23
Coal, crude oil, mining	−1.05	−4.72	−1.06	−3.98	−0.68	−1.33	−0.76	−1.44
Oil proc., chem. metallurgy	−0.90	−5.33	−0.92	−4.91	−0.85	−2.00	−0.87	−2.02
Machinery	−1.20	−5.65	−1.22	−4.35	−1.27	−2.95	−1.26	−1.23
Food, textiles	−1.73	−5.97	−1.78	−4.66	−2.02	−2.44	−1.98	−1.49
Transport, telecom	−0.61	−3.36	−0.58	−2.97	−0.65	−1.79	−0.63	−1.62
Others	−0.47	−1.81	−0.47	−1.74	−0.49	−0.81	−0.50	−0.85
Constant	−0.04	−0.09	−0.04	−0.06	−0.58	−0.71	−0.62	−0.63
Log likelihood	−572.56		−502.44		−323.75		−317.33	
No. obs.	599		599		599		599	

Notes: Equations (1) and (2) report the estimated coefficients of a probit model with continuous endogenous regressors with cluster (countries) bootstrapped standard errors in the spirit of Cameron, Gelbach, and Miller (2008). The dependent variable is a binary variable, which takes the value 1 if the firm is under ultimate state control and 0 otherwise. Governance index is instrumented by the communist displacement index. Equations (3) and (4) report the estimated coefficients of a random-effects model. Governance index is instrumented by the communist displacement index and two time dummies for period 2 (2003) and period 3 (2008) (*t*-statistics in brackets): Governance $= -1.18\,[-12.5] + 0.34\,[17.10] \cdot$ Displcom $+ 0.038\,[1.00] \cdot$ period2 $+ 0.156\,[4.15] \cdot$ period3; $N = 636$, $R^2 = 0.33$. Industry dummies are included and reported in all equations. All explanatory variables are lagged one period. Variable definitions are presented in the Appendix.

Table 6

The Determinants of Ultimate Foreign Control

	IV Probit				Random Effects			
Equations:	(1)		(2)		(3)		(4)	
Explanatory Variables:	Coeff.	z-val.	Coeff.	z-val.	Coeff.	z-val.	Coeff.	z-val.
Governance index	1.10	4.01	0.57	1.73	1.75	4.61	0.52	1.53
π/K	1.91	3.26	1.66	2.88	1.85	3.22	1.77	3.04
$\ln(K)$	−0.07	−1.68	−0.07	−1.95	−0.08	−2.29	−0.09	−2.55
Domestic debt			−0.009	−2.42			−0.01	−3.67
External debt			0.01	2.80			0.01	3.37
Market turnover			0.008	3.33			0.008	3.14
Agriculture, fishing	−0.01	−0.05	0.22	0.86	0.09	0.27	0.28	0.88
Coal, crude oil, mining	0.36	1.29	0.29	1.05	0.32	1.29	0.23	0.96
Oil proc., chem., metallurgy	0.60	3.01	0.63	3.13	0.63	3.24	0.61	3.03
Machinery	0.79	2.60	0.85	2.85	0.97	3.15	0.90	2.82
Food, textiles	0.67	3.44	0.70	3.60	0.89	4.87	0.82	4.53
Transport, telecom	0.64	2.98	0.61	2.82	0.68	3.28	0.64	3.15
Others	0.29	1.01	0.31	1.12	0.31	1.16	0.31	1.16
Constant	−0.42	−0.73	−0.68	−1.24	−0.56	−1.07	−0.50	−1.01
Log likelihood	−593.32		−519.63		−346.49		−336.98	
No. obs.	599		599		599		599	

Notes: Equations (1) and (2) report the estimated coefficients of a probit model with continuous endogenous regressors with cluster (countries) bootstrapped standard errors in the spirit of Cameron, Gelbach, and Miller (2008). The dependent variable is a binary variable, which takes the value 1 if the firm is under ultimate foreign control and 0 otherwise. Governance index is instrumented by the communist displacement index. Equations (3) and (4) report the estimated coefficients of a random-effects model. Governance index is instrumented by the communist displacement index and two time dummies for period 2 (2003) and period 3 (2008) (t-statistics in brackets): Governance $= -1.18\,[-12.5] + 0.34\,[17.10] \cdot$ Displcom $+ 0.038\,[1.00] \cdot$ period2 $+ 0.156\,[4.15] \cdot$ period3; $N = 636$, $R^2 = 0.33$. Industry dummies are included and reported in all equations. All explanatory variables are lagged one period. Variable definitions are presented in the Appendix.

of companies in these countries, however, namely privatized firms in the hands of domestic owners. We have no strong hypotheses about the determinants of control in this category, but think nevertheless that it is worth examining whether any of the variables that explain privatization into foreign hands also explain privatization to domestic owners.[12]

The most efficient way to proceed in testing for the determinants of the three categories of companies is to estimate a multinomial probit model. The results of such an estimation are reported in Table 7. State-controlled, the largest category, is also the omitted category. Thus, the coefficients on the governance indexes estimate the change in probability of being a foreign- (or domestically) controlled company relative to being state-controlled as the quality of governmental institutions increases. Looking first at the coefficients on the left-hand side of Table 7, we see that they confirm the findings in Tables 5 and 6. Better-quality governance institutions and high profitability increase the likelihood of a firm being foreign-controlled relative to its being state-controlled. Large size reduces the probability of being foreign-controlled. Both debt variables are significant for foreign control but not for private domestic control.

Turning to the right-hand side of Table 7, we see that the coefficients on the governance variable, profitability, and firm size are of the same sign for ultimate domestic private control as for foreign control, and all three are statistically significant. All three coefficients are smaller in absolute value than for foreign control. Thus, although these variables work in the same way in determining both foreign and domestic control, the relationships are stronger for foreign control. In contrast with the foreign-control coefficients, however, both coefficients on the debt variables are insignificant as explanatory variables in explaining ultimate domestic private control. One reason why these debt variables are not associated with greater privatization into domestic hands might be that such privatizations were often at bargain prices and thus the economic incentives to privatize as they pertain to government debt were inoperative.

6 Additional Tests

In our main equation, we measure the strength of government institutions employing the overall governance index as an explanatory variable. However, this index is an average of the six indicators, each measuring different dimensions of the quality of governance and, potentially, having independent effects on the ownership choice. We tested for this possibility by replacing the overall governance index by each of the six (instrumented) subindexes in our main equation in turn (voice and accountability, government effectiveness, regulatory quality, rule of law, control of corruption, and

[12] A handful of companies had no owner holding 20 percent of the outstanding shares and thus did not fall into any of the three categories. We ignore these companies, as there are too few observations to try and explain why they differ from the others.

Table 7
The Determinants of Ultimate Control: Multinomial Probit Model

	Ultimate Foreign Control				Ultimate Private Domestic Control			
Equations:	(1)		(2)		(3)		(4)	
Explanatory Variables:	Coeff.	z-val.	Coeff.	z-val.	Coeff.	z-val.	Coeff.	z-val.
Governance index	1.95	5.58	1.005	2.54	1.15	3.04	1.04	2.87
π/K	3.43	3.63	3.00	3.56	2.22	2.67	2.32	2.68
$\ln(K)$	−0.23	−5.04	−0.21	−4.01	−0.18	−3.30	−0.18	−2.90
Domestic debt			−0.02	−3.93			−0.003	−0.64
External debt			0.02	3.82			0.004	0.78
Market turnover			0.01	4.26			−0.002	−0.57
Agriculture, fishing	−0.09	−0.29	0.41	1.23	0.56	1.36	0.61	1.41
Coal, crude oil, mining	0.48	1.64	0.69	1.85	1.60	3.70	1.60	3.63
Oil proc., chem., metallurgy	0.98	4.13	1.13	4.18	1.32	2.83	1.30	3.04
Machinery	1.30	3.65	1.52	3.53	1.68	2.89	1.64	3.11
Food, textiles	2.15	5.29	2.24	7.05	2.80	5.54	2.77	5.86
Transport, telecom	0.89	3.27	0.85	3.18	0.51	0.95	0.45	0.94
Others	0.46	1.10	0.56	1.34	0.83	1.36	0.81	1.28
Constant	1.15	1.81	0.22	0.29	−0.01	−0.02	0.007	0.01
Log likelihood	−531.77		−510.55		−531.77		−510.55	
No. obs.	599		599		599		599	

Note: Equations (1)–(4) report the estimated coefficients of a multinomial probit model with cluster (countries) bootstrapped standard errors in the spirit of Cameron, Gelbach, and Miller (2008). The outcome variable is an ultimate control with three categories: ultimate state control, ultimate foreign control, and ultimate private domestic control. The ultimate state control is the base category. Governance index is instrumented by the communist displacement index and two time dummies for period 2 (2003) and period 3 (2008) (t-statistics in brackets): Governance $= -1.18\,[-12.5] + 0.34\,[17.10] \cdot \text{Displcom} + 0.038\,[1.00] \cdot \text{period2} + 0.156\,[4.15] \cdot \text{period3}$; $N = 636$, $R^2 = 0.33$. Industry dummies are included and reported in all equations. All explanatory variables are lagged one period. Variable definitions are presented in the Appendix.

political stability). Table 8 presents the estimates for the random-effects model with ultimate state control as the dependent variable.[13] All subindexes are significant at the 10% level or better. The three most important indexes are regulatory quality, political stability, and control of corruption. Using subindexes of WGI makes domestic government debt positive and significant. More domestic government debt appears to be associated with *less* privatization. One explanation for this may be that large amounts of domestic debt indicate poor government policies, in general, including slow privatization. All other results carry over.

Table 9 performs the same task with ultimate foreign control. Foreigners are more often among the buyers of privatized companies, the better the country's regulatory quality and the higher its political stability. All other results carry over.

Table 10 presents the same regressions as in Tables 5 and 6, replacing the instrument of communist displacement index with communist legacy index. The results show no significant change, with the exception that domestic government debt again becomes positive and significant. Essentially the same results are obtained when (1) we include both instruments, communist displacement and communist legacy, at the same time or (2) we do not instrument at all.

We also control for the possible effects on our results by Russia as an outlier. We estimate our basic regressions in Tables 5 and 6, excluding Russia from our sample. We do not find any evidence that this is the case.

7 *Conclusions*

With respect to democratic and governmental reforms, the 12 former communist countries, upon which we have focused, fell into four groups. The greatest progress has been made by the Czech Republic, Estonia, Hungary, and Slovenia; the least progress is in evidence in Bulgaria, Croatia, Romania, and Russia, with Russia essentially falling into a category of its own. The remaining four countries form a middle group. Even the four countries in the first group lag the average Western European country, however, in almost all six areas of governance that we examined, with the gap for control of corruption being particularly great.

We have also seen that there are large differences across the 12 transition countries in the extent to which state-owned assets have been privatized. Even among the four countries with the highest-quality governance institutions, Hungary and Slovenia still had roughly 30 percent of their largest firms in state hands in 2008, compared to 12 percent for the average Western country. The state also controls roughly 30 percent of the largest firms' assets in Croatia and Romania, and even larger fractions in Bulgaria, Poland, and Russia. This concentration of high state ownership in some of the countries with weak governance institutions led to a significant negative relationship between the indicators of institutional quality and ultimate

[13] The estimates of the probit model with continuous endogenous regressors are similar and are omitted to save space.

Table 8
Ultimate State Control and Governance Subindexes

Explanatory Variables:	Random Effects											
	Voice and accountability		Government effectiveness		Regulatory quality		Rule of law		Control of corruption		Political stability	
	Coeff.	z-val.	Coeff.	z-val.	Coeff.	z-val.	Coeff.	z-val.	Coeff.	z-val.	Coeff.	z-val.
Governance	−0.76	−1.75	−0.64	−1.82	−0.97	−1.91	−0.63	−2.12	−0.873	−1.79	−0.913	−1.78
π/K	−2.32	−3.65	−2.32	−3.61	−2.32	−3.60	−2.32	−3.62	−2.31	−3.61	−2.33	−3.66
$\ln(K)$	0.145	3.59	0.148	3.66	0.152	3.79	0.145	3.51	0.147	3.61	0.146	3.62
Domestic debt	0.010	2.94	0.009	2.46	0.007	1.98	0.011	3.12	0.009	2.65	0.01	2.78
External debt	−0.012	−3.07	−0.010	−2.33	−0.008	−1.58	−0.013	−3.17	−0.011	−2.69	−0.012	−2.75
Market turnover	−0.005	−1.63	−0.004	−1.40	−0.004	−1.24	−0.005	−1.76	−0.004	−1.47	−0.004	−1.54
Agriculture, fishing	−0.704	−1.56	−0.645	− 1.45	−0.601	−1.37	−0.703	−1.57	–0.66	−1.48	−0.689	−1.66
Coal, crude oil, mining	−0.754	−3.26	−0.751	−3.28	−0.747	−3.28	−0.758	−3.29	−0.755	−3.30	−0.751	−3.22
Oil proc., chem., metallurgy	−0.878	−4.05	−0.879	−4.03	−0.877	−3.99	−0.879	−4.07	−0.88	−4.04	−0.876	−4.03
Machinery	−1.267	−4.39	−1.268	−4.35	−1.267	−4.35	−1.263	−4.28	−1.267	−4.34	−1.265	−4.41
Food, textiles	−1.99	−7.50	−1.995	−7.51	−1.999	−7.49	−1.987	−7.51	−1.991	−7.44	−1.993	−7.62
Transport, telecom	−0.634	−3.90	−0.636	−3.90	−0.641	−3.91	−0.634	−4.00	−0.633	−3.91	−0.636	−3.93
Others	−0.51	−1.72	−0.508	−1.71	−0.507	−1.70	−0.508	−1.73	−0.507	−1.71	−0.513	−1.73
Constant	−0.361	−0.62	−0.716	−1.39	−0.456	−0.85	−0.682	−1.26	−0.794	−1.53	−0.465	−0.84
Log likelihood	−317.39		−316.49		−315.72		−317.77		−316.95		−316.92	
No. obs.	599		599		599		599		599		599	

Notes: The table reports the estimated coefficients of a random-effects model with cluster (countries) bootstrapped standard errors in the spirit of Cameron, Gelbach, and Miller (2008). The dependent variable is a binary choice variable, which takes the value 1 if the firm is under ultimate state control and 0 otherwise. We use the six World Bank governance indicators: voice and accountability, government effectiveness, regulatory quality, rule of law, control of corruption, and political stability. Each indicator is instrumented using the communist displacement index and time dummies for period 2 (2003) and period 3 (2008) (the coefficients of the individual equations are not reported). Industry dummies are included and reported in all equations. All explanatory variables are lagged one period. Variable definitions are presented in the Appendix.

Table 9
Ultimate Foreign Control and Governance Subindexes

Explanatory Variables:	Random Effects											
	Voice and accountability		Government effectiveness		Regulatory quality		Rule of law		Control of corruption		Political stability	
	Coeff.	*z*-val.	Coeff.	*z*-val.	Coeff.	*z*-val.	Coeff.	*z*-val.	Coeff.	*z*-val.	Coeff.	*z*-val.
Governance	0.62	1.74	0.51	1.98	0.74	2.28	0.484	1.73	0.68	1.87	0.764	1.93
π/K	1.77	3.01	1.77	3.00	1.77	3.01	1.77	3.03	1.76	3.01	1.77	3.00
$\ln(K)$	−0.085	−2.45	−0.087	−2.51	−0.09	−2.59	−0.085	−2.48	−0.087	−2.49	−0.086	−2.46
Domestic debt	−0.012	−3.90	−0.011	−3.52	−0.01	−3.16	−0.012	−4.00	−0.011	−3.69	−0.011	−3.74
External debt	0.015	4.06	0.013	3.43	0.011	2.74	0.015	4.07	0.014	3.66	0.014	3.89
Market turnover	0.008	2.97	0.008	2.78	0.008	2.68	0.008	3.13	0.008	2.87	0.008	2.91
Agriculture, fishing	0.284	0.90	0.256	0.80	0.233	0.73	0.292	0.93	0.267	0.83	0.277	0.89
Coal, crude oil, mining	0.243	0.99	0.243	0.99	0.240	0.98	0.240	0.98	0.242	0.99	0.241	0.98
Oil proc., chem., metallurgy	0.611	3.09	0.613	3.09	0.611	3.07	0.608	3.07	0.612	3.08	0.610	3.08
Machinery	0.908	2.88	0.915	2.89	0.917	2.89	0.90	2.85	0.911	2.88	0.909	2.88
Food, textiles	0.824	4.58	0.827	4.61	0.829	4.64	0.82	4.55	0.825	4.58	0.826	4.61
Transport, telecom	0.637	3.15	0.642	3.16	0.648	3.18	0.638	3.14	0.640	3.15	0.639	3.16
Others	0.316	1.17	0.317	1.18	0.317	1.18	0.315	1.16	0.315	1.17	0.318	1.18
Constant	−0.766	−1.56	−0.465	−0.96	−0.659	−1.38	−0.487	−1.00	−0.402	−0.82	−0.685	−1.41
Log likelihood	−336.63		−336.17		−335.83		−337.04		−336.50		−336.25	
No. obs.	599		599		599		599		599		599	

Notes: The table reports the estimated coefficients of a random-effects model with cluster (countries) bootstrapped standard errors in the spirit of Cameron, Gelbach, and Miller (2008). The dependent variable is a binary choice variable, which takes the value 1 if the firm is under ultimate foreign control and 0 otherwise. We use the six World Bank governance indicators: voice and accountability, government effectiveness, regulatory quality, rule of law, control of corruption, and political stability. Each indicator is instrumented using the communist displacement index and time dummies for period 2 (2003) and period 3 (2008) (the coefficients of the individual equations are not reported). Industry dummies are included and reported in all equations. All explanatory variables are lagged one period. Variable definitions are presented in the Appendix.

Table 10

Robustness Test: Communist Legacy Index

Explanatory Variables:	Random Effects							
	Ultimate Foreign Control				Ultimate Private Domestic Control			
	Coeff.	z-val.	Coeff.	z-val.	Coeff.	z-val.	Coeff.	z-val.
Governance	−1.07	−3.52	−0.43	−1.75	1.23	4.55	0.52	2.02
π/K	−2.44	−3.86	−2.38	−3.79	1.94	3.33	1.77	3.02
$\ln(K)$	0.139	3.82	0.148	3.57	−0.084	−2.28	−0.092	−2.68
Domestic debt			0.011	3.14			−0.010	−3.59
External debt			−0.012	−2.95			0.014	3.62
Market turnover			−0.004	−1.44			0.008	3.31
Agriculture, fishing	−0.829	−2.57	−0.829	−2.19	0.150	0.48	0.285	1.00
Coal, crude oil, mining	−0.693	−2.99	−0.756	−3.26	0.303	1.18	0.209	0.84
Oil proc., chem., metallurgy	−0.847	−3.93	−0.876	−4.04	0.615	3.20	0.60	3.01
Machinery	−1.286	−4.46	−1.281	−4.37	0.963	3.17	0.89	2.84
Food, textiles	−2.023	−7.82	−2.00	−7.68	0.892	4.98	0.799	4.46
Transport, telecom	−0.683	−4.28	−0.659	−4.30	0.691	3.36	0.641	3.15
Others	−0.504	−1.66	−0.523	−1.79	0.312	1.16	0.315	1.15
Constant	−0.713	−1.34	−0.741	−1.40	−0.323	−0.62	−0.498	−1.03
Log likelihood	−325.98		−317.95		−346.16		−335.57	
No. obs.	599		599		599		599	

Notes: The table reports the estimated coefficients of a random-effects model with cluster (countries) bootstrapped standard errors in the spirit of Cameron, Gelbach, and Miller (2008). The dependent variable is a binary choice variable, which takes the value 1 if the firm is under ultimate state (foreign) control and 0 otherwise. Governance is instrumented using the communist legacy index and time dummies for period 2 (2003) and period 3 (2008) in the following equation (t-statistics below the coefficients): Governance $= -0.83\,[-20.83] + 0.66\,[34.08] \cdot \text{Comleg} + 0.038\,[1.40] \cdot \text{period2} + 0.155\,[5.78] \cdot \text{period3}$; $N = 636$, $R^2 = 0.65$. Industry dummies are included and reported in all equations. All explanatory variables are lagged one period. Variable definitions are presented in the Appendix.

state control in our model. This model performed well in explaining differences in ultimate control across the 12 countries.

Our results on the determinants of ultimate control are plausible and robust. Controlling for the possible endogeneity of the WGI, we find that (1) greater efficiency in governmental institutions increased the likelihood of privatization, (2) governments privatized more readily if their countries had large amounts of external debt, but they appear to have been more reluctant to privatize if they had more domestic debt, (3) stock market liquidity facilitated privatization to foreigners, (4) governments found it easier, or at least more attractive, to sell smaller and more profitable companies than large, unprofitable ones, (5) industry effects, e.g., reluctance to privatize in strategic industries, mattered, and (6) the determinants of ultimate foreign control are more or less the reverse of the determinants of ultimate state control. This last finding implies that the same factors that favor state control hinder the opening up of the economy and the transfer of ownership and control abroad.

Once communism fell, there was widespread belief both in the West and in many of the former communist countries that these countries would rapidly adopt the democratic institutions of the West and its free-market, capitalist systems. State-held assets would be placed in private hands, and political and economic structures of the former communist countries would converge on those of the West. We have documented that, after 20 years, this convergence is still largely incomplete.

Appendix

A.1 Worldwide Governance Indicators (WGI)

Measures of institutional quality are constructed by various institutions (e.g., Freedom House, the Heritage Foundation, the Business Environment Risk Intelligence (BERI), Gallup International, the World Economic Forum, and the International Country Risk Guide (ICRG) compiled by the Political Risk Services group). Drawing on data sources provided by the institutions mentioned above and other sources, Kaufmann, Kraay, and Mastruzzi (2008) estimate six different dimensions of institutional quality: voice and accountability, government effectiveness, rule of law, regulatory quality, absence of corruption, and political stability. The indicators are constructed using unobserved-components methodology and are measured in units ranging from −2.5 to +2.5, with higher values corresponding to better governance. Each index is briefly defined below.

Voice and accountability – measuring perceptions of the extent to which a country's citizens are able to participate in selecting their government, as well as freedom of expression, freedom of association, and free media.

Political stability – measuring perceptions of the likelihood that the government will be destabilized or overthrown by unconstitutional or violent means, including politically motivated violence and terrorism.

Government effectiveness – measuring perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies.

Regulatory quality – measuring perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private-sector development.

Rule of law – measuring perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence.

Control of corruption – measuring perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as capture of the state by elites and private interests.

A.2 Ultimate Ownership Structures

We identified the 20 largest firms in 12 transition countries in 1996 and constructed a unique data set on ultimate ownership structures of these firms at three points of time: 1996, 2003, and 2008. We describe the identity of shareholders using a typical classification scheme for ownership in developed economies: individual/family, nonfinancial firm, financial firm, the state, foreigners, and dispersed ownership. We separate foreign owners into two groups: private, and foreign states. Firms controlled by a domestic bank, mutual fund, pension fund, private privatization fund, insurance company, or other domestic financial institution are categorized as financial-firm-controlled. We identify the company's *direct* controlling owner as the largest shareholder holding 20 percent or more of outstanding shares. Using the same threshold, we then identify the largest shareholder of the *direct* controlling owner. We follow this process to the point where we can identify the last link of the control chain and label the controlling owners at that link as the company's *ultimate* controlling owners. In some cases, the data come from the Amadeus and Osiris databases. These data are provided by Bureau van Dijk electronic publishing. Amadeus contains ownership and financial firm-level data for mainly unlisted companies from 38 European countries; Osiris contains such data for publicly listed companies for around 120 countries. We also use additional sources of information like company annual reports, local stock exchanges, and the Internet.

A.3 List of Variables

State control – a dummy variable, which takes the value 1 if the firm is under ultimate state control and 0 otherwise.

Foreign control – a dummy variable, which takes the value 1 if the firm is under ultimate foreign control and 0 otherwise.

Domestic control – a dummy variable, which takes the value 1 if the firm is under ultimate domestic private control and 0 otherwise.

Governance index – the average of the six Worldwide Governance Indicators (WGI): voice and accountability, government effectiveness, rule of law, regulatory quality, absence of corruption, and political stability. The range of the index is −2.5 to +2.5, with higher values corresponding to better governance (Kaufmann, Kraay, and Mastruzzi, 2008).

π/K – the profit-to-asset ratio of a company lagged by one period; $\ln(K)$ – log of the total assets of a company lagged by one period.

Domestic debt – the ratio of domestic government debt to GDP (source: EBRD); *external debt* – the ratio of external government debt to GDP (source: EBRD).

Market turnover – the volume of stocks traded in a year divided by GDP (source: EBRD).

Communist displacement index (Displcom) – index measuring the displacement of communist incumbents in first elections. The index ranges from 0 to 5; the higher the score, the better the initial election outcome for the anticommunist opposition (Fish, 1997).

Communist legacy index (Comleg) – index measuring the bureaucratic legacies and state–society relations that influenced institutional choices in the early post-communist transition years. The index ranges from 0 to 3; the higher the score, the better suited a country's communist legacy was to the development of liberal economic and democratic institutions (Kitschelt, 1999).

Control variables: eight industry dummies. We assigned all companies to one of eight one-digit ISIC industries: *Agriculture, fishing* – agriculture and fishing; *Coal, crude oil, mining* – coal, crude oil, and mining; *Oil proc., chem., metallurgy* – oil processing, chemicals, and metallurgy; *Machinery* – machinery; *Energy* – energy; *Food, textiles* – food processing and beverage, textiles, retail trade, pharmacy; *Transport, telecom* – transport, post, telecom; *Others* – other industries.

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