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THE POLITICAL ECONOMY OF PRIVATIZATION AND COMPETITION: CROSS-COUNTRY EVIDENCE FROM THE TELECOMMUNICATIONS SECTOR

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THE POLITICAL ECONOMY OF PRIVATIZATION AND COMPETITION: CROSS-COUNTRY EVIDENCE FROM THE TELECOMMUNICATIONS SECTOR

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ABSTRACT

The Political Economy of Privatization and Competition: Cross-Country Evidence from the Telecommunications Sector*

Using a new data set of the telecommunications sector on privatization (1981–98 for 167 countries) and competition policies (1990–8 for roughly 50 countries), this Paper investigates the political economy determinants of privatization and liberalization in the telecommunications sector. Building on the framework of a generalized private interest theory, we derive hypotheses on how the characteristics of private interest groups and political structure affect policy changes in the telecommunications sector. We pay particular attention to how the effects of interest groups on policies vary from more democratic to less democratic countries. We find reasonably strong evidence in favour of the generalized interest group theory. Countries with stronger pro-reform interest groups (the financial services and the urban consumers) are more likely to reform. But countries are more likely to maintain state-owned monopolies in the sector when such a governance mode yields a higher pay-off for the governments – when the telecommunications sector has higher profitability and when the fiscal deficit is higher and cannot be more easily financed by borrowing from the financial market. Democracy appears to affect the pace of reform by magnifying the voices of interest groups and by moderating politicians' discretion.

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NON-TECHNICAL SUMMARY

Neoliberal reforms have dramatically transformed the telecommunications sector in some countries since the mid-1980s. According to our data, roughly 2% of telecommunications firms in 167 countries had been privatized in 1980; in 1998 the number increased to 42%. Competition has increased in many countries in fixed phone and especially in mobile phone services. Such dramatic changes in the organization of this sector beg the questions: why has the telecommunications sector experienced such a large change in the past two decades? What explains the cross-country and time-series differences in ownership structure and competition of this sector?

Since most of the dramatic changes in telecommunications policies occurred during the past two decades, sufficient data to evaluate cross-country differences in experience are only now emerging. Using two new data sets – one on telecommunications reform and one on political structure – we investigate the determinants of privatization and competition in the telecommunications sector.

Our guiding framework is a generalized private interest theory that incorporates the political economy of not only democratic but also non-democratic societies. With this framework, policy outcomes in a country could arise either as a result of competition among interest groups in the policy market under a democratic institution or as a result of politicians pursuing their private interests subject to institutional constraints (e.g. checks and balances and a free press). Whether a country privatizes and liberalizes its telecommunications sector will depend, among other factors, on its political structure and the configuration of interest groups. The generalized private interest theory thus implies that efficient policies are the exception rather than the rule. Indeed, the politicians/regulators either pursue private interests or can be 'captured' by special interest groups at the expense of the general public.

Our empirical analysis yields findings that are broadly consistent with the predictions of the private interest theory. We find that countries with stronger pro-reform interest groups (the financial services sector and the urban consumers) are more likely to reform. But countries are more likely to maintain state-owned monopolies in the sector when such a governance mode yields a higher pay-off for the governments – when the telecommunications sector has higher profitability and when the fiscal deficit is higher and cannot be more easily financed by borrowing from the financial market. Democracy appears to affect the pace of reform by magnifying the voices of the interest groups and by moderating politicians' discretion.

I.   INTRODUCTION

If good economics is good politics, the vast majority of the telecommunications sector should be privatized and liberalized for competition. But good economics does not automatically translate into good politics (Rodrik, 1996). Many developing countries are still relying on public ownership and bureaucratic control for the provision of telecommunications services, as how it traditionally was.

Nevertheless, neoliberal reforms have dramatically transformed the telecommunications sector in some countries since the middle and late 1980s. According to our data, roughly 2 percent of telecommunications firms in 167 countries were privatized in 1980; in 1998 the number increased to 42 percent. Competition has increased in many countries in fixed phone and especially in mobile phone services. Such dramatic changes in the organization of this sector beg the questions: Why has the telecommunications sector experienced such a large change in the past two decades? What explains the cross-country and time-series differences in ownership structure and competition of this sector?

Answers to these questions have important implications.   The telecommunications industry has been perhaps the fastest-growing sector in most countries. Currently its *service* revenue alone (equipments not included) accounts for approximately two to three percent of GDP in most countries. More importantly, it may offer substantial positive externality to other industries by, among other things, reducing transaction costs for businesses. A recent study (Roller and Waveman, forthcoming) finds that even after controlling for fixed effects and reverse causality (from income to telecommunications capacity), telecommunications investment still has a large *causal* effect on growth. This may have contributed to the divergence of growth over

time among nations. Thus, an understanding of the sub-optimal modes of governance of the telecommunications sector may yield important policy implications.

Since most of the dramatic changes in telecommunications policies occurred in the past two decades, sufficient data to evaluate cross-country differences in experience are only now emerging. Using two new data sets—one about telecommunications reforms, and one about political structure—we investigate the determinants of privatization and competition in the telecommunications sector. The data set on telecommunications reforms combines information from several sources—privatization from the World Bank, competition from Pyramid, and some performance measures from the ITU (International Telecommunications Union). The resulting data sets have information on privatization from 167 countries over a nineteen-year time span from 1980 to 1998 and information on competition policies from more than 50 countries from 1990 to 1998.   It contains much more information than previous studies.   (Wallsten (forthcoming), for example, uses a sample of 38 countries in Latin America and Africa to analyze the effects of privatization.) Our second data set is a new cross-country data set of political structure compiled by researchers in the World Bank (Beck, Clark, Groff, Keefe and Walsh, 2000). We have extracted from it a rich set of variables characterizing the political economy environment of each sample country.

Our guiding framework is a generalized private-interest theory that incorporates the political economy of not only democratic but also non-democratic societies. With this framework, policy outcomes in a country could arise either as a result of competition among interest groups in the policy market under a democratic institution or as a result of politicians pursuing their private interests subject to institutional constraints (e.g., checks and balances and a

free press). Whether a country privatizes and liberalizes its telecommunications sector will depend, among other factors, on its political structure and the configuration of interest groups.

Our empirical analysis yields findings that are broadly consistent with the predictions of the private-interest theory. We find that countries with stronger pro-reform interest groups (the financial services sector and the urban consumers) are more likely to reform. But countries are more likely to maintain state-owned monopolies in the sector when such a governance mode yields a higher payoff for the governments—when the telecommunications sector has higher profitability and when the fiscal deficit is higher and cannot be more easily financed by borrowing from the financial market. Democracy appears to affect the pace of reforms by magnifying the voices of the interest groups and by moderating politicians' discretion.

We hope that the empirical knowledge learned here will contribute towards partially filling "the main hole in research" on telecommunications reforms (Noll, 1999)--The lack of systematic empirical studies of the political economy of telecommunications reforms. So far most of the research on telecommunications reforms has focused on case studies (see Kikeri, Nellis and Shirley, 1992; Wellenium and Stern, 1994; Levy and Spiller, 1996; and Petrazzini, 1996 among others). Although case studies have proved to be very useful, their contribution has two important limits (Noll, 1999): (a) the cases are not thoroughly integrated (not the same information, not the same conceptual model); (b) the number of cases are too small to support general conclusions and distinguish alternative hypotheses. With a large sample, in contrast, we are able to explore simultaneously the role of private interest groups and political structure. Such systematic analysis is obviously impossible from case studies. A few authors have tried to construct cross-country samples in order to ascertain statistical *effects* of the reforms. They include Boubakri and Cosset (1998); D'Souza and Megginson (1998); and Megginson, Nash and

Van Randenborgh (1994); and Wallsten (forthcoming). However, none of them explore the determinants of the reforms, on which we focus in this paper.

More generally, we also hope to contribute to the emerging literature of determinants of policy reforms (see Rodrik 1996 for a nice summary). We adapt the special interest theory to encompass both the democratic and the non-democratic countries, and to examine how the demand and supply sides of policy reforms shape a reform agenda.

II.   THE EVOLUTION OF THE TELECOMMUNICATIONS REFORMS[2]

Fueled by innovations in telecommunications and information technologies, the late 1980s and 1990s have witnessed the most dramatic policy reforms the telecommunications world has ever seen. National carriers were privatized, new competitors licensed and new services allowed. More than 150 countries have introduced new telecommunications legislation, or have modified existing regulations.

The Privatization of Telecommunications Services

Until recently in most countries, telecommunications operators were state-owned and state-operated. Privatization of incumbent operators started in the early 1980s with the privatization of British Telecom in the United Kingdom. The momentum increased in the late 1980s and intensified throughout the 1990s. Many countries sell at least part of their incumbent operators to private, and sometimes foreign investors.

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[2] Factual information in this Section is drawn from reports published by the International Telecommunications Union (ITU, 1999a, 1999b) and Pyramid Research (2000).

These developments have increased local and foreign private participation in the telecommunications sector in many countries. On top of this, the growth of new technologies and services such as the Internet, cable TV, new broadcasting services and new switching and transmission technologies, has enabled new (including foreign and private) participants to enter the telecommunications market. In addition to attracting private and foreign investment into their telecommunications sector, many countries have engaged in privatization in order to improve their existing infrastructure, to satisfy unmet demand, and to benefit from the rapid introduction of new products and services.

Opening Markets to Competition

The monopoly-based system of service supply, which has dominated the world's telecommunications markets for over three-quarters of the last century, continues to decline in popularity. The liberalization in a number of markets around the world has meant that competition is moving towards becoming the dominant mode of service supply. Even in the developing world, market liberalization is expanding in a consistent and sustained way.

However, there is still large cross-country variation in the degree of market liberalization. While many countries opened basic voice telephony services to competition, 73 percent of the basic services markets still maintain a monopoly. There is also some variation in the degree of openness across market segment. Local services were the segment of the basic services market more receptive to competition in 1999, with 32 percent of countries in the world allowing competitive entry into this segment, as opposed to 26 percent in the national long distance and international services market. The logic behind this reform strategy is that network expansion is more difficult in the local loop and countries are hoping to attract private capital to share the

burden of building infrastructure at the local level, while keeping the large revenues from national long distance and international services that allow them to subsidize local loop development. Many countries have been willing to allow and have even encouraged private sector participation in some value-added services. The most competitive markets, for instance, are data and mobile communications along with the provision of Internet services and cable television.

III.   HYPOTHESES

While liberalization of the telecommunications sector can bring about large efficiency gains, the allocation of benefits and costs from the reform is often resolved politically (see Levy and Spiller, 1996; and Galal and Nauriyal, 1995). Whether a country privatizes and liberalizes its telecommunications sector often depends, among other factors, on its political structure and the configuration of interest groups. Given the purpose of this paper, an appropriate organizing framework for our analysis is thus a generalized private-interest theory that incorporates the political economy of not only democratic but also non-democratic societies. As it is traditionally stated, the private-interest theory views policy outcomes in a democratic society as equilibrium results of competition in the policy market (Peltzman, 1976; Becker, 1983; and Stigler, 1986). Politicians supply, while constituents demand, policies. Politicians seek elected public offices and their votes increase with campaign contributions from special interests and with the benefits that their constituents receive.

But public officials are agents of their constituents. With imperfect information and imperfect public oversight, their private interest (i.e., preference differing from that of their constituents) has the potential of shaping policy outcomes. Here insights offered by the new

institutional economics approach (e.g., North, 1990; Alston, Eggerston, and North 1996; and Irwin and Krozner, 1999) and the new political economy approach (see Drazen (2000) for a summary of this approach) are particularly useful in devising testable implications.

The degree of popular participation in the political process differs from one country to the next, with industrialized countries being more democratic than developing countries. Accordingly, opportunities to pursue private interest are likely to differ across countries. If ruling politicians in less democratic societies face less political competition, they would likely have more discretion to affect policy changes that further their private interests. In extreme cases (e.g., Shleifer and Vishny, 1994), they choose policies that maximize the rents or corruption proceeds. Their ability to extract rents may be limited if there are conflicts of interests among different groups of politicians, creating a more competitive environment for policy making. In this case, the configuration of these groups of politicians may affect telecommunications policies in ways that are similar to interest-group politics in more democratic societies.

The generalized private-interest theory thus implies that efficient policies are the exception rather than the rule. Indeed, the politicians/regulators either pursue private interests or can be "captured" by special interest groups at the expense of the general public. In this section, we apply this theoretical framework to posit hypotheses regarding the determinants of privatization and liberalization.

Private interests

The ability of an interest group to influence policies depends not only on the cohesiveness of the group itself but also on the degree of democracy in the environment where it operates. A more democratic society often provides more effective channels for its constituents

to voice concerns and erects lower barriers for its constituents to organize interest groups. As a result, the degree of democracy is expected to matter in telecommunications reforms. But its effects will depend in general on the outcome of political contests between pro-reform and anti-reform interest groups.

Privatization and liberalization often mean less political control and less cross-subsidization in the telecommunications sector. On the demand side for such policy reforms, businesses that rely heavily on telecommunications services are likely the main beneficiaries: subsidies to consumers and in particular to rural consumers are reduced and services for businesses are broadened. Among businesses, firms providing financial services are often the largest users of telecommunications services. For instance, insurance and financial institutions alone accounted for 30% of the telecommunications business market in UK in 1990 (Wheatly, 1999, pp. 93-95). In addition to the increase in demand for financial services that privatization and liberalization of the telecommunications sector can bring about, the financial sector stands to benefit from improved and expanded services and lower tariffs that the reform may lead to. It is thus plausible that countries with a larger financial sector would be more likely to push for privatization and liberalization of the telecommunications sector.

Relative to rural consumers, urban consumers are more likely to gain from the reforms that reduce cross-subsidization and increase service offerings in densely populated areas. If urban consumers are better organized in more democratic societies than in less democratic societies—because more democratic countries provide more effective channels for consumers to voice their concerns and erect lower political barriers to prevent them from organizing policy advocacy groups—they would exercise more influence over policy outcomes. As a proxy, the proportion of urban population may be used as an indicator of the relative effectiveness of the

urban consumers in influencing policies. We therefore expect countries with higher urban populations to be more likely to liberalize.

However, the losers in the liberalization process—the lower-income population who would lose subsidies—have an incentive to block the reforms. Their ability to organize and to influence the policy outcomes is also expected to be firmer in more democratic countries. We therefore expect that among democratic countries those with higher income inequality are less likely to liberalize the telecommunications sector.

Hypothesis 1. Holding everything else constant, countries with a larger financial sector, a higher urban population, and a lower income inequality, are more likely to privatize and liberalize, and more so in more democratic countries.

Privatization and liberalization, however, may not benefit politicians if the reforms weaken their political and regulatory control of the sector and hence their ability to extract rents from it. To the extent that they pursue private interest, politicians may resist any pressure to reform. Their resistance will be stronger if the telecommunications sector has been profitable and has served as their "cash cow." Rents extracted from this sector will be particularly valuable if it is more difficult to extract rents or to raise sufficient tax revenue from other sources. For countries with a larger government budget deficit, politicians will be more likely to maintain a state monopoly in the telecommunications sector and use it to collect both explicit and implicit taxes. Politicians must weigh the benefit of one-time receipts from selling ownership shares and licenses against the loss of control over future cash flow, and hence future rents, from the telecommunications sector. On the one hand, if large proceeds from privatization are likely to be scrutinized more closely by the media and the general public, which is more likely in a more democratic country, they may not be as valuable as the less transparent cash flows from a state-

owned telecommunications sector. On the other hand, if politicians in a more democratic country are expected to hold short tenure, they may value current proceeds from privatization more and discount future rents more steeply than politicians in a less democratic country.

We therefore expect countries to be less likely to privatize or liberalize if they have either a more profitable telecommunications sector or a higher budget deficit. We also expect the implications to differ across countries with different degrees of democracy. Since politicians in less democratic countries face less political competition and less public oversight than their counterparts in democratic societies, *ceteris paribus,* they should be less likely to privatize or to liberalize. They may also have a longer expected tenure in office and therefore may prefer a flow of rents to an immediate receipt of privatization proceeds. Moreover, for a given deficit level, the likelihood of privatization and liberalization might depend on the government's (and hence the politicians') access to the financial market. If the country has a larger financial sector, its government may find it easier to finance its budget deficit, thus partially mitigating the politicians' resistance to reform.

Hypothesis 2. Higher profitability in the telecommunications sector and higher public government deficit make privatization and liberalization less likely. This implication may be more pronounced in less democratic societies. However, government deficit may not impede telecommunications reforms in a country with a more developed financial market because the deficit may be more easily financed.

If politicians are perfect agents of their constituents and if the heterogeneity of constituent interests is fully observed, ideology should not affect the policy outcomes. When politicians' interest is not perfectly aligned to that of their constituents, their ideologies may affect policy outcomes (Kalt and Zupan*,* 1984*)*. Parties with different ideology have distinct

preferred policies. When right-wing parties dominate the government, privatization and liberalization would be more likely. In fact, a large body of empirical literature finds that party appears to matter (Alt and Lowry, 1994; Clarke and Cull, 1999; Jones, Sanguinetti and Tommasi, 2000). Beliefs and ideologies of voters and politicians are also found to help explain regulatory changes over the past two decades (see, for instance, Kalt and Zupan 1984, Poole and Rosenthal 1997).[3]

Hypothesis 3. Countries with a right-of-center government are more likely to privatize and liberalize.

But the ideology effect may be the result of omitted variables bias since the heterogeneity of constituent interests often cannot be fully observed (Peltzman, 1984, 1985, and 1998 (pp. xvii-xix)). Such omitted bias can occur because in countries where the majority of the constituents prefer privatization and liberalization may elect a right-of-center party that intends on implementing such policies once in power.

Political Structure.

Countries differ in the political structure through which constituents' demands are heard, policy initiatives are articulated and debated, and policies are formulated and implemented. The observed differences should account for some cross-country variation in telecommunications reforms. An important dimension of political structure is the division of power that creates checks and balances in governance.

In a more democratic country, opposition parties can have veto power in the policy-making process, whereas in a less democratic country, one party likely monopolizes most

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[3]   Poole and Rosenthal (1997) find that much of the variations in regulation/deregulation that are not well explained by private interest groups variables or party politics can be explained by an ideology measure that locates

policies. Thus a more democratic country often has more checks and balances whereby a good number of veto players can more effectively block a reform initiative than in a less democratic country. And these veto players are also more likely to have different ideological inclinations in a more democratic country.

However, the effects of checks and balances and ideological polarization on telecommunications reforms are difficult to ascertain analytically. On the one hand, division of power often means policy gridlocks, making reforms less feasible (Cox and McCubbins, 1997). And, when reforms do proceed, the distance between the passed reform legislation to that required by efficiency is often large: compromises have to be made to obtain majority votes. The relatively large deadweight loss associated with a more pronounced division of power should make telecommunications reforms less likely (Becker, 1983). Since division of power is the hallmark of a constitutional democracy, we expect this negative effect to be more significant in a more democratic country. On the other hand, division of power may also have positive effects on reforms. First, by subjecting a reform program to the scrutiny of both the ruling and the opposition parties, it increases the credibility of the reform program to private investors (Levy and Spiller, 1996), thus increasing the likelihood of success in implementing the program ("credibility effect"). Second, division of power may help counterbalance ruling politicians' discretion to pursue self-interest, creating a more competitive environment in policy making. It therefore tends to attenuate rent extraction by ruling politicians. This positive effect would be even stronger if power is divided among politicians with different ideological orientations. Given that politicians in less democratic countries tend to enjoy more discretion, we expect that this positive effect will be more significant in less democratic countries. Thus, the overall effects of division of power on telecommunication reforms cannot be ascertained theoretically.

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an legislator on a simple left-right scale based on their complete history of roll-call votes.

Hypothesis 4. Division of power—measured by checks and balances and ideological polarization of the government—is expected to have an ambiguous effect on telecommunications reform.

Other Factors

In addition to political economy determinants discussed above, whether and by how much a country reforms its telecommunications sector also depends on other factors such as technology, the state of economic development, and history. Many of these factors are likely to be correlated with the political economy determinants. To improve the accuracy of our estimates, we control for these factors in our empirical analysis. Below we discuss briefly the likely effects of these factors and how these factors can be measured.

It is plausible that a country on a higher technological ladder will more likely succeed in attracting private investment in its telecommunications sector and will therefore be better positioned to push for reforms. But rapid technological innovation often introduces new elements of competition that may make traditional regulation less relevant and hence reduce the need for either privatization or liberalization of the traditional telecommunications firms. One prominent example is the introduction of mobile telephone services as a substitute for fixed line services, which may reduce the need for opening up the fixed-line market. The net effect on reforms of technological innovations that undercut incumbents' market power cannot be ascertained theoretically.

Since technologically advanced countries are also developed countries, indicators of economic development, such as per capita GDP and illiteracy rate, could be used as control variables. These indicators have implications for the demand (and therefore supply) of

telecommunications reforms. Since telecommunications services are normal goods with high income elasticity, countries with higher income and lower illiteracy demand a larger amount of telecommunications services, which can be accomplished by privatization and competition. We expect an increase in per capita income and a decrease in illiteracy rate to contribute positively towards more reforms.

History may also matter here since investment in telecommunications infrastructure is based on long-term cost-benefit evaluations. Countries where the public or heavy regulated telecommunications sector has invested heavily in infrastructure in the past may be reluctant to implement liberalization reforms that may reduce the value of past investment. The incumbent firms and their investors would have a strong incentive to block any reform until they have had the opportunity to recoup their initial investment. In the estimation, we use the number of main fixed telephone lines per 100 people in the first sample year as an indicator of the initial state of each country's telecommunications infrastructure.

IV.   EMPIRICAL IMPLEMENTATION

Data and Policy Measures

Our empirical work relies on several major sources of data, which we describe in more detail in the Appendix. Data on telecommunications privatization, available from the Telecommunications Department of the World Bank, measure privatization using a dummy variable. It takes the value of 1 in a sample country in a given year if private investors hold ownership shares in the country's telecommunications sector.

Reflecting the fact that competition policies are multi-faceted, multiple indicators of competition policies in the telecommunications sector are available from Pyramid Research, a

division of the Economist Intelligent Unit, which publishes a database on information infrastructure indicators that are worldwide in scope with special emphasis on developing countries. A list of six competition indicators is given in Table A.1 in the Appendix. Since these indicators are highly correlated with each other, we choose to use information extracted from these indicators in our analysis rather than the indicators themselves. To extract relevant information, we construct a single index for competition policies ("C_{it}") as the principal component of the available indicators (see the Appendix for more detail). The constructed competition index, C_{it}, has a sample mean normalized to 0, sample standard deviation of 1.787. It ranges from a minimum of –3.175 to a maximum of 5.433.

The pace of privatization and the sample average competition index are depicted in Figures 1 to 6. The share of telecommunications operators with private ownership increased from 1.8 percent in 1980 to 41.8 percent in 1998 (see Figure 1), and countries with a higher average score of democracy (than the median) are much more likely to privatize than those with a lower score of democracy. However, Figure 3 shows that there does not appear to be a systematic relationship between income level and the likelihood of privatization. The competition index also shows a steady increase over the period 1990 to 1998 (Figure 4). Moreover, countries with a higher score in democracy (than the median) also score higher in C_{it}, and over time both groups of countries have increased competition in the telecommunications sector (Figure 5). Figure 6 graphs the mean level of C_{it} and average real GDP level for each country in our sample with available data.

Empirical specification

In order to test the hypotheses outlined in Section 3, we estimate a duration model on the timing of privatization and a simple linear regression model on the competition index:

$$h_{it} = h_{0t} e^{X_{it}'\beta_1}$$
$$C_{it} = X_{it}'\beta_2 + v_t + \varepsilon_{it} \tag{1}$$

Here h_{it} is the hazard rate of privatization, and h_{0t} is the base hazard rate for year t (which is similar to time dummies in the context of continuous variables). X_{it} is a vector of explanatory variables suggested in Section 3 along with some control variables. The list of variables is contained in Table 1. For the competition regressions, we include time dummies to take into account time-specific effects, which include the effects of technological changes and other factors that affect all countries.

Table 1. Definition of Used Variables

	Definitions	*Mean*	*(s.d.)*
Constituents Characteristics:			
Urban/total population$_t$	Urban population as a percentage of total population.	50.23	(24.03)
Gini coefficient $_t$	The Gini coefficient. A larger value represents a larger income inequality.	36.91	(10.30)
Financial depth$_{t-1}$	A principal component index of financial depth, lagged one year. A larger value means a greater financial depth.	-0.005	(1.533)
Deficit/GDP$_{t-1}$	The ratio of government deficit to GDP, lagged one year.	0.037	(0.059)
profitability $_{t-1}$	Net profits over total revenue from the telecommunications sector, lagged one year.	0.19	(0.31)
Ideology $_{t-1}$	A principal component index of several variables indicating the ideological inclination of the legislature, lagged one year. A larger value means closer to a right-winged government. The index increases in the centrist and especially the right inclination of the government and decreases with the left inclination of the government.	-0.01	(1.21)
Political Structure and Other Variables			
Democracy$_t$	A measure of democracy ranging from -10 to 10, with a greater level indicating a more democratic state.	0.72	(7.39)

Party Polarization$_t$	After assigning values to the orientation measures (Left=-1, Center=0, Right=1), this variable records the absolute value of the greatest difference in the orientation measure between two veto players (of the government). The minimum is 0, and the maximum is 2.	0.31	(0.62)
Checks$_t$	The logarithm of the number of veto players (which ranges from 1 to 14, with 90 percent in the range of 1 to 4).	0.91	(0.52)
Other controls:			
Mnline_100$_0$	The number of main lines per 100 inhabitants at the *initial year*.	9.40	(2.40)
Log(avg. GDP$_t$)	The logarithm of real GDP per capita.	7.91	(1.08)
Illiteracy rate $_{t-1}$	The percentage of illiterate people in the population.	29.10	(24.57)
Log(total population $_t$)	The logarithm of total population.	15.09	(2.20)
Manufacturing/GDP $_{t-1}$	The ratio of manufacturing value added over GDP.	15.69	(8.32)
% population in the largest city $_t$	The share of population in the largest city.	35.77	(16.37)

Note. See *the Data Appendix* for more details of the construction of some of the variables, and the source of each variable.

While most of the included variables are motivated by Section 3, we also control for some other variables. For instance, *the logarithm of population* is included to control for potential country size effects; *manufacturing/GDP,* for sectoral structure, which might affect demand for telecommunications services; and *share of population in the largest city*, for the geographical configuration that might affect the cost structure of the telecommunications sector. Table 1 provides the summary statistics of the relevant variables. To avoid contemporaneous bias, most of the performance measures and macro variables are entered in the regressions with lagged or initial values.

Our specification of a duration model for the determination of privatization merits discussion. Privatization is a non-repeated event in our data set (i.e., no re-nationalization has occurred after privatization). Some countries never privatized their telecommunications sector during the sample period, so we have some "censored" observations. For a country that undertook privatization during the sample period, the privatization dummy is zero before the

privatization event and one after the event. The available data on privatization therefore capture mainly cross-country variations in the timing of privatization. The spread of privatization can thus be viewed as the diffusion of an alternative governance mode—private ownership. What explains the cross-country variations in the speed in which privatization is adopted? Starting from an initial date, say, 1981, what are the factors that drive some countries to privatize earlier than others? To address the question, we use a duration model or hazard rate model.

We consider the period from the beginning of our sample, 1981, until the year of privatization as "duration of the status quo." Countries that are not privatized at the end of the sample period, 1998, are then right-censored. The hazard rate, h_{it}, is the likelihood that the country privatizes in year t, given that the country has not yet privatized. While there are several choices for the structure of the hazard function, the one we choose is the semi-parametric Cox proportional hazard model. The model imposes less parametric restrictions than those relying on distributional assumptions. The model also has an economic justification. It allows a year-specific base hazard rate—corresponding to our need to control for year-specific factors that contribute to the changing likelihood of privatization, say, due to international pressure exerted by "Washington consensus" or accelerated changes in telecommunications technologies.[4] In the empirical results of hazard rate models, we shall report β_1. A positive coefficient implies a higher likelihood of privatization. Note that e^{β_k} is the proportional increase of the hazard rate when x_k increases by one.[5]

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[4]   But the Cox proportional hazard model could be inefficient when time-specific hazard rate is unimportant. To check the robustness of our results, we also experimented with a Weibull regression specification, which is more efficient when time-specific hazard rate is unimportant, and we obtained quite similar results.

[5]   Given the increase of one-standard-deviation in x_k (denote as δ_{x_k}), the proportional increase of the likelihood of privatization can be computed as $(e^{\beta_k})^{\delta_{x_k}}$.

The estimations on privatization involve the sample of 167 countries from 1980 to 1998. This period covers the dramatic increase of privatization, from less than 4 countries to the current 88. The period before 1980 does not contain significant variations for us to analyze. The estimation of the competition equation involves 50 countries for the period from 1990 to 1998.

Empirical results

Table 2 reports three sets of estimates for the privatization duration model (columns 1 to 3). Column 1 reports the estimates using the full sample, whereas columns 2 and 3 report the estimates using two split samples: one including countries with a democracy rating below the median score of 1.5 (low demo.) and the other including countries with a democracy rating at or above the median (high demo.). Table 2 also reports three sets of OLS regression results of the competition equation (2): Column 4 using the full sample, column 5 using the low democracy sample and column 6 using the high democracy sample. See Table A.2 for a list of countries that are classified by democracy ratings in 1995.

Before delving into the results concerning our hypotheses, we note that the control variables listed at the bottom of Table 2 can explain some variations in competition policies across countries. But they do not do as good a job in explaining cross-country variations in the timing of privatization. For instance, a higher initial tele-density, measured as the number of main fixed phone lines per capita, appears to be an impediment for both privatization and, more statistically significantly, for competition. This seems to suggest that countries that are laggards in telecommunications services are more likely to use reforms as a means to improve services— perhaps because the politicians are less likely to be captured by strong incumbents wishing to block reforms (so that they can recoup investments in existing mainlines). Countries with higher

per capita GDP and higher literacy rate also tend to liberalize more by increasing competition in telecommunications services. And this effect is stronger in more democratic countries. This is not surprising. Since telecommunications services are normal goods with high income elasticity, richer countries tend to have a higher demand for telecommunications services, which can be fulfilled via increased market supply brought about by competition facilitated by technological innovations developed in these countries. Country size, measured by population, does not seem to have much effect on the reforms. But population concentration in the largest city seems to lessen competition policies. One interpretation is that when population is largely concentrated in the largest city, the country is likely to have a strong incumbent enjoying large rents from the pre-liberalization regime. In this case, the forces against telecommunications liberalization are stronger, and as a result the pace for liberalization is slowed. Interestingly, the size of the manufacturing sector relative to GDP also has negative effects on competition policies. While we do not have a convincing explanation for this result, we note that removing this variable from the list of explanatory variables does not change the qualitative results of other parameters.

Interestingly, democracy appears to have positive effects on both privatization and competition. While its effect on privatization is positive, small, and statistically insignificant, its effect on competition is statistically significant among low democracy countries. An increase in democracy rating by 1 would raise the competition index by 0.115 (or 6.4% of one standard deviation) for an average low democracy country. But there appears to be diminishing returns to democracy on telecommunications reforms. Among high democracy countries, a further increase in democracy rating has negligible impact on competition policies. This finding suggests that democratic reforms in developing countries are perhaps consistent with market reforms.

Turn now to the estimates of coefficients relating to our stated hypotheses. Inspection of the estimates suggests that the hypotheses are in general consistent with the data, with the precision of estimates better in competition regressions than in privatization regressions. Focus first on Hypothesis 1. It is posited that countries with more financial depth, higher concentration of urban population, and lower income inequality are more likely to privatize and liberalize, and the effects are stronger in more democratic countries. Estimates of the coefficient on financial depth (lagged one year) in the privatization duration regressions are statistically insignificant, suggesting that financial depth has a negligible effect on privatization. But estimates of the coefficient on financial depth in the competition equation are mostly statistically significant and right-signed. Consistent with Hypothesis 1, financial depth has a large, positive effect on competition in high democracy countries, but its effect is negligible in low democracy countries. Similarly, income inequality, measured by the Gini coefficient, has an insignificant effect on privatization, but a strong negative effect on competition in high democracy countries as predicted. As discussed, one interpretation of the finding is that lower income earners, who are likely losers in the reforms, may be able to form a more effective opposition to the reforms in countries with higher inequality and higher levels of democracy. Also as predicted, concentration of urban population appears to have a statistically positive effect on both privatization and competition in high democracy countries, suggesting that the urban population is relatively effective in pushing for the reforms that are expected to benefit them. These results suggest that the demand for telecommunications reforms from constituents and interest groups does help explain cross-country differences in reforms.

To analyze the determinants from the supply side for policy reforms, we turn to estimates of coefficients relating to Hypothesis 2. Here we expect that profitability in the sector and

government budget deficit to have a negative effect on the reforms. Inspection of the estimates of the coefficient of government budget deficit as a percent of GDP shows that government deficit exerts a very strong negative effect on both privatization and competition. The effect of government deficit on privatization is particularly strong in low democracy countries, where ruling politicians presumably have more freedom to choose policies that further their own interest. A one-percentage-point increase in government deficit would decrease the hazard rate to privatization by 13 percentage points and the competition index by 0.127 (or 9.5% of a standard deviation) for low democracy countries. It is interesting to note that, as expected, the interaction between government deficit and financial depth has a sizeable effect in promoting privatization in at least high democracy countries.   The effect of profitability in the telecommunications sector appears to have the predicted negative effects on privatization and competition for both the whole sample and for the subsample of low democracy countries. But profitability has a positive and statistically insignificant effect on privatization. Our empirical results thus offer support for the political economy hypothesis on the behavior of politicians in policy making.

The reforms are also determined by factors beyond private interests. As expected, the regression results show that ideology—right-of-center orientation of the government—has a strong, positive effect on competition. A one-standard-deviation increase (toward the right-wing inclination) is estimated to increase the competition index by .34, or 19 percent of the standard deviation of the index for an average country, and by 0.32 or 18 percent of the standard deviation of the index for an average high democracy country. However, it remains possible that the estimated effect of ideology simply reflects unobserved heterogeneity of constituents' interests

(Peltzman, 1984). Without additional data, we are unable to ascertain the degree to which the estimated effect is due to omitted variables bias.

The political structure—division of power—is also expected to matter, even though the effects of division of power are difficult to ascertain theoretically (Hypothesis 4). As discussed, while division of power helps to restrain ruling politicians' discretion and to establish credibility in policies, it can also introduce gridlock. Estimates on the coefficients on log(checks and balances) and ideology polarization in the competition equation show that division of power has a strongly positive effect on competition among low democracy countries. Indeed, a one standard deviation increase of the logarithm of checks/balances would raise the competition index in low democracy countries by 0.90, or 50 percent of its standard deviation, while an increase in ideology polarization by one—say, from a scenario of a single-ideology government to a two-ideology government—would raise the competition index by 0.84, or 47 percent of one standard deviation. This suggests that the benefit from constraining politicians' discretion exceeds the cost arising from gridlock in low democracy countries. But in high democracy countries, the cost from gridlock may be higher, while the benefit from restraining politicians' discretion may be lower, making the estimated net effects small and statistically insignificant. The regression results show that division of power seems to have only a relatively small effect on privatization.

IV.   CONCLUDING REMARKS

Consistent with a generalized interest group theory, we find that a portion of the cross-country reform experiences of the telecommunications sector in the past one to two decades can be explained by their differences in the configurations of interest groups and the political

structure—in particular, the decision making mechanisms and the ideology of the government. Countries with a strong presence of pro-reform interest groups—a larger financial sector and a greater proportion of urban consumers—are more likely to privatize or liberalize. Countries where the government benefits more from controlling the sector directly—in the cases of a highly profitable telecommunications sector, high government deficit, and especially in the case of a high government deficit coupled with a limited access to financial markets—are more likely to stay with the state-owned monopoly status quo. The effects of interest group lobbying and political structure depend in important ways on the degree of democracy. Democracy, for instance, amplifies the voices of both the pro-reform interest groups (financial sector and urban consumers) and the voice of the anti-reform low-income people. Democracy and the division of power also tend to make reforms more likely by attenuating politicians' discretion in pursuing private interests.

The findings of this paper do not offer comfort for people who want to reform the governance of the telecommunications sector quickly with the application of external pressures. Our findings suggest that the policy outcomes are endogenous and are determined by the interplay of the configurations of private interests, government interests, and the political structure. But these institutional variables often change only slowly in most countries. If we concur with the recent findings that privatization and competition lead to important welfare improvement (Wallsten, forthcoming), and that the telecommunications sector is a very important contributor to growth, less efficient modes of governance of the telecommunications sector will remain a bottleneck for growth for some time to come.

Data appendix

The competition index

Table A.1 lists indicators on competition policies compiled by Pyramid Research, a division of the Economist Intelligent Unit. All indicators are constructed such that a higher value is indicative of a policy that is more pro-competition. Since a coherent competition policy includes several common elements, competition policy indicators are likely highly correlated. For example, a country that has a more pro-competition initiative for fixed phones is also likely to have a better interconnection policy for fixed phones that lowers entry barriers and reduces incumbent advantages. As expected, pairwise correlation coefficients between these indicators are high, ranging from 0.6 to 0.9.

Table A.1. Competition Indices from Pyramid Research

Competition Index	*Definitions*
1. Multiple player environment for fixed phones or MPFP 2. Multiple player environment for mobile phones or MPMP	Three or more equally strong players in a market.
3. Pro-competition initiatives for fixed phones or PCIFP 4. Pro-competition initiatives for mobile phones or PCIMP	Policies aimed at proactively promoting competition and reducing barriers to market entry.
5. Interconnection charges for fixed phones or ICFP 6. Interconnection charges for mobile phones or ICMP	Policies aimed at facilitating and ensuring that interconnection does not serve as a barrier to good competition and market entry.

Note. To compile the indices, Pyramid analysts draw upon a variety of information sources. They include the Economist Intelligence Unit (from their Country Data, Country Risk and Country Report products), the World Bank, local publications, local industry players and analysts, as well as Pyramid analysts' own knowledge of the social and economic conditions in a given country. The rankings of these variables are based on a subjective understanding of the elements affecting each of the individual markets. Rankings are benchmarked at a regional level and then at a global level.

To aggregate the pro-competition policies embodied in the six indicators listed in Table A.1, we construct an index for competition policy, C_{it}, using principal component analysis. The result is

$$C_{it} = .41 \times MPFP_{it} + .48 \times MPMP_{it} + .43 \times PCIFP_{it} + .49 \times PCIMP_{it} + .22 \times ICFP + .35 \times IPMP_{it}.$$

Here each component indicator variable is standardized to have mean 0 and variance 1.

Explanatory variables

From the World Development Indicators, we construct log(GDP per capita), log(population), illiteracy rate, and urban/total population. Data on government deficit come from the IMF government financial statistics.

Financial depth is constructed as an index of principal components of three variables measuring financial depth: 0.60×M2/GDP + 0.53×stock/GDP + 0.59×bank/GDP. Here again, each component variable is standardized to have mean 0 and variance 1. Each of the three component measures comes from Beck, Demirguc-Kunt, and Levine (2000).

All the measures related to political structure—except democracy—are based on Beck, Clark, Groff, Keefe and Walsh (2000). The democracy score is based on the *polity 98* data set compiled by Gurr and Jaggers (1999) and the method of transformation in Longdregan and Poole (1996). In particular, we transform two measures—one about autocracy and the other about democracy—into a single indicator by subtracting the autocracy measure from the democracy measure.

Ideology is constructed as the principal component index of three variables indicating the ideological inclination of the legislature, lagged by one year. The three variables are the right, the center, and the left inclination of the legislature.[6] The right inclination of the legislature, for instance, is constructed as

$$\sum_{j=1}^{J} s_j 1(\text{party } j \text{ was politically right}),$$

where j indicates the party (the largest, the second and the third largest parties, and the largest opposition party), and s_j represents the ratio of the seats taken by party j to the total seats taken by the 1st, 2nd, 3rd largest and the largest opposition parties. Then *ideology* is constructed as the result of the principal component formula:

$0.59 \times$ (the right inclination of the government) $+ 0.45\times$ (the centrist inclination of the government) $- 0.67 \times$ (the leftist inclination of the government).

Mnline_100_0 and profitability$_0$ are constructed based on the ITU data.

The Gini coefficient is from Deininger and Squire (1996). The Gini coefficient is observable only up to year 1996. We thus replace the Gini coefficients in 1997 and 1998 for their lagged values. This is a reasonable solution: In general the Gini coefficient does not change much over time (Li, Squire and Zou, 1998).

Missing data

Some of the explanatory variables contain missing observations. Even though each variable has substantial non-missing observations, deleting missing observations would reduce the sample size dramatically since many variables contain unique missing observations. To make the best use of available data, we follow Little and Rubin (1987) to impute the missing value of one right-hand-side (RHS) variable with other RHS variables.[7] More specifically, we use a minimum set

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[6]   Beck, Clark, Groff, Keefe and Walsh (2000) defines the political right, left, and center carefully. First, in the handbooks, they first considered the party name, and used the following rules: Right if parties are defined as conservative, Christian democratic, or right-wing; Left if a party is defined as communist, socialist, social democratic, or left-wing; Center if a party is defined as centrist or when the position of the party can best be described as centrist (e.g. party advocates strengthening private enterprise in a social-liberal context). Otherwise, the ideology inclination of the executive is classified as missing.

[7]   Little and Rubin (1987) suggest that usually it is far more efficient to impute than to drop any observation with a single variable missing. They suggest using other right-hand-side to impute the missing values of a right-

of RHS variables to impute missing X to make sure that the imputed maximum and minimum of X to be reasonably similar to the maximum and minimum of the non-missing X. For time-invariant variables, for instance, we rely on regional dummies.[8] For time-variant missing variables, we rely on the regional dummies along with dummies of income category (i.e., low income, lower middle, upper middle, upper OECD, upper non-OECD), log(GDP per capita), urbanization ratio, and the average index of democracy. These imputing variables have good predictive power for the independent variables.

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hand-side variable. As a result of imputation, the estimates of the effects of the imputed variables are often biased toward zero.

[8] That is, dummies of East Asia, Eastern Europe and Central Asia, Mid East and North Africa, South Asia, Western Europe, North America, Sub-Sahara Africa, Latin America.

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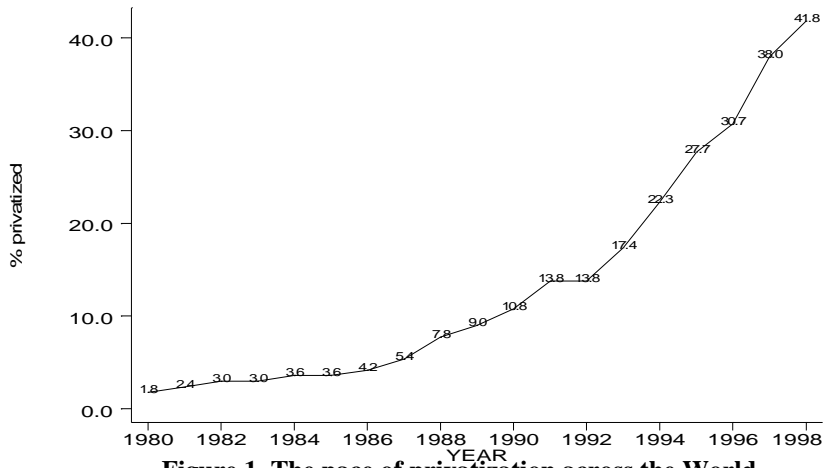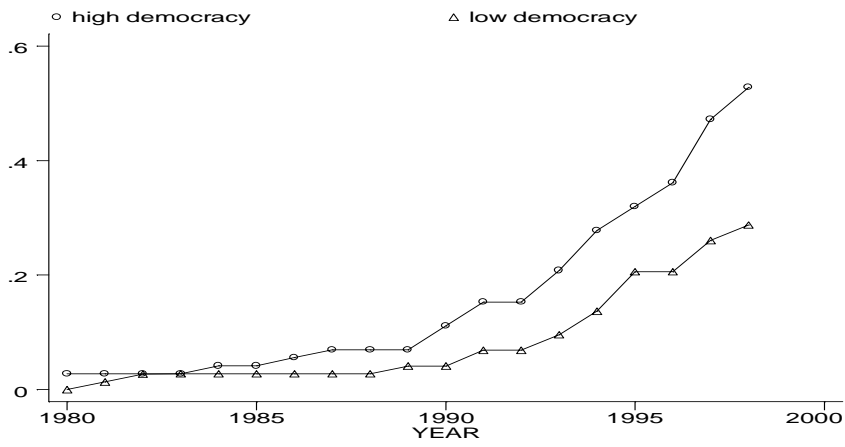**Figure 1. The pace of privatization across the World**

Figure 2. The pace of privatization across the World: by high and low democracy
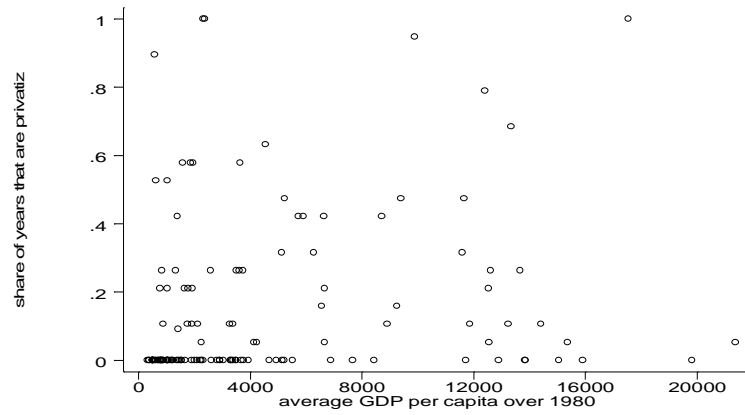

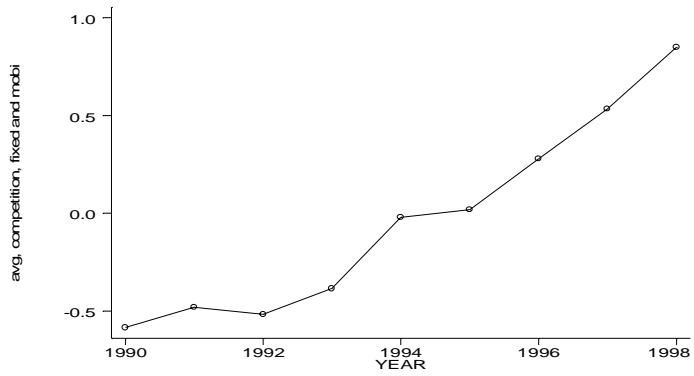**Figure 3. The pace of privatization across the World: by income level**

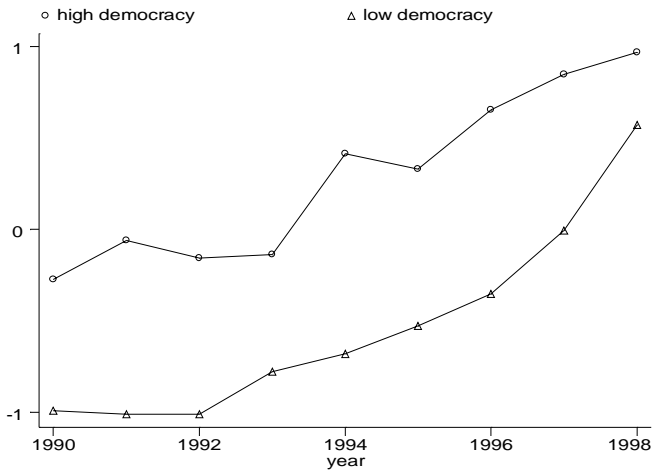**Figure 4. The evolution of the competition index: 1990-1998**

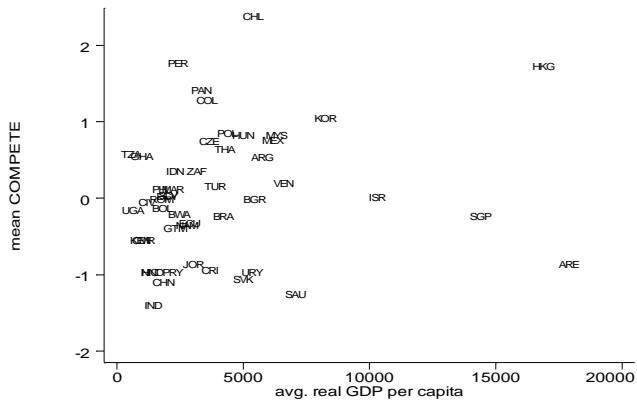**Figure 5. The evolution of the competition index: 1990-1998, by democracy**

Figure 6. Competition index and Income level

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Table 2. Regression Results

	Privatization			Competition index		
	Pooled sample	Low demo.	High demo.	Pooled sample	Low demo.	High demo.
	Hazard model	Hazard model	Hazard model	OLS	OLS	OLS
Other controls:						
$mnline\_100_0$	-0.010	-0.107	-0.006	-0.041	0.021	-0.130
	(0.65)	(1.58)	(0.31)	(1.96)*	(0.78)	(3.92)***
$log(GDP_t$ per capita)	0.036	0.949	-0.491	0.081	0.175	0.642
	(0.10)	(1.45)	(1.05)	(0.35)	(0.45)	(2.11)**
$log(population_t)$	0.050	-0.357	0.136	-0.047	0.095	-0.039
	(0.45)	(1.26)	(0.97)	(0.54)	(0.67)	(0.37)
illiteracy rate $_{t-1}$	-0.013	-0.020	-0.011	-0.019	0.010	-0.031
	(1.08)	(1.31)	(0.66)	(2.99)***	(1.17)	(2.51)**
% population in the biggest city $_t$	0.000	0.020	0.003	-0.016	-0.018	-0.006
	(0.02)	(1.14)	(0.20)	(2.52)**	(1.56)	(0.73)
manufacturing/GDP $_t$	-0.003	-0.003	0.008	-0.027	0.001	-0.046
	(0.17)	(0.10)	(0.27)	(1.83)*	(0.05)	(1.96)*
Special interests:						
Democracy $_t$	0.034	0.015	0.050	0.016	0.115	-0.059
	(1.18)	(0.23)	(0.59)	(0.87)	(2.72)***	(1.32)
financial depth $_{t-1}$	-0.018	-0.253	0.012	0.181	-0.150	0.390
	(0.11)	(0.84)	(0.06)	(2.48)**	(1.14)	(3.97)***
Gini coefficient $_t$	0.015	0.037	0.002	0.007	0.028	-0.046
	(0.68)	(0.89)	(0.08)	(0.52)	(1.33)	(2.47)**
Urban/total population $_t$	0.011	-0.004	0.024	0.001	-0.005	0.018
	(1.14)	(0.25)	(1.91)*	(0.19)	(0.46)	(1.94)*
Policy suppliers:						
Profitability $_{t-1}$	-0.415	-1.427	0.576	-0.723	-0.213	-0.504
	(0.56)	(1.44)	(0.74)	(2.31)**	(0.69)	(0.72)
Deficit/GDP$_{t-1}$	-7.478	-13.887	-4.195	-13.174	-12.720	-12.623
	(2.12)**	(2.74)***	(1.06)	(4.42)***	(2.50)**	(3.46)***
Deficit/GDP$_{t-1}$ × financial depth $_{t-1}$	3.984	5.208	6.851	-0.886	0.193	0.082
	(1.24)	(1.35)	(2.55)**	(0.77)	(0.11)	(0.05)
Idiology $_{t-1}$	-0.051	-0.357	0.034	0.280	0.159	0.261
	(0.40)	(1.51)	(0.26)	(4.09)***	(1.18)	(3.16)***
log(checks $_t$)	0.068	-0.516	0.677	0.442	0.895	-0.369
	(0.24)	(1.17)	(1.98)**	(2.38)**	(2.38)**	(1.54)
Ideology polarization $_t$	0.112	0.483	-0.058	0.433	0.840	0.213
	(0.62)	(1.07)	(0.29)	(3.61)***	(3.03)***	(1.64)
Observations	2643	1560	1083	426	163	263
R-squared				0.33	0.41	0.49

Note. *, **, and *** represent statistical significance at the 10%, 5%, and 1% levels. In parentheses are z-statistics. The intercept is intercepted. Other control variables (not reported) are year dummies.

Table A.2. Countries with a democracy score in 1995

Country	Democr. Score	Country	Democr. Score	Country	Democr. Score	Country	Democr. Score
Qatar	-10	Cameroon	0	Mozambique	6	Belgium	10
Saudi Arabia	-10	Ireland	0	Haiti	7	New Zealand	10
Bahrain	-9	Botswana	0	Mali	7	United Kingdom	10
Turkmenistan	-9	Zambia	0	Honduras	7	Norway	10
Korea, Dem. Rep.	-9	Comoros	0	Paraguay	7	Greece	10
Iraq	-9	Austria	0	Moldova	7	Portugal	10
Uzbekistan	-9	Yemen, Rep.	0	Colombia	7	Hungary	10
Syrian Arab Republic	-9	Angola	0	France	8	Germany	10
Oman	-9	Denmark	0	Latvia	8	El Salvador	10
Bhutan	-8	Somalia	0	Argentina	8	Australia	10
Gambia, The	-7	Ukraine	0	Bulgaria	8	Costa Rica	10
Liberia	-7	Slovak Republic	0	Namibia	8	Luxembourg	10
Cuba	-7	Guatemala	0	Nepal	8	Iceland	10
China	-7	Switzerland	0	Chile	8	United States	10
United Arab Emirates	-7	Afghanistan	0	Pakistan	8	Cyprus	10
Kuwait	-7	Bosnia and Herzegovina	0	Lesotho	8	Swaziland	10
Sudan	-7	Vietnam	0	Brazil	8	Japan	10
Lao PDR	-7	Belarus	0	Mongolia	8	Papua New Guinea	10
Indonesia	-7	Burundi	0	Venezuela	8	Netherlands	10
Zimbabwe	-6	Tanzania	0	Nicaragua	8	Germany	10
Mauritania	-6	Malawi	0	India	8	Spain	10
Rwanda	-6	Libya	0	Nigeria	8	Mauritius	10
Niger	-6	Ethiopia	1	Estonia	8	Uruguay	10
Djibouti	-6	Sierra Leone	1	Israel	9	Finland	10
Azerbaijan	-6	Cambodia	1	Jamaica	9		
Cote d'Ivoire	-6	Congo, Dem. Rep.	1	Ecuador	9		
Tajikistan	-6	Ghana	1	Madagascar	9		
Iran, Islamic Rep.	-6	Senegal	1	South Africa	9		
Kenya	-5	Peru	2	Thailand	9		
Burkina Faso	-5	Armenia	3	Philippines	9		
Chad	-4	Fiji	4	Panama	9		
Morocco	-4	Malaysia	4	Korea, Rep.	9		
Uganda	-4	Mexico	4	Trinidad and Tobago	9		
Tunisia	-3	Russian Federation	4	Bolivia	9		
Kazakhstan	-3	Romania	5	Turkey	9		
Lebanon	-3	Georgia	5	Poland	9		
Gabon	-3	Guinea-Bissau	5	Benin	9		
Jordan	-3	Sri Lanka	5	Italy	10		
Egypt, Arab Rep.	-3	Kyrgyz Republic	5	Lithuania	10		
Eritrea	-2	Albania	5	Czech Republic	10		
Singapore	-2	Congo, Rep.	5	Sweden	10		
Togo	-2	Bangladesh	6	Canada	10		
Croatia	-1	Central African Republic	6				
Guinea	-1	Guyana	6				