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

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Abstract. This paper examines the political economy of privatization and liberalization in the telecommunications sector in recent decades. We find that countries with stronger pro-reform interest groups, namely, the financial services sector and the urban consumers, are more likely to reform in more democratic countries. However, less democratic countries are more likely to maintain the public sector monopoly when the government benefits more from such a governance mode—when the fiscal deficit is higher. Democracy affects the pace of reforms by magnifying the voices of interest groups in more democratic countries and by moderating politicians' discretion in less democratic countries.

JEL codes: L9, L5, H1.

1. Introduction

If good economics is good politics, the telecommunications sector in many countries should be privatized and liberalized for competition, following the work of Noll (1999), Wallsten (2001b), and Li and Xu (2002). However, good economics does not automatically translate into good politics, as Rodrik (1998) suggests. Many developing countries still rely on the traditional means of providing telecommunications services by public ownership and bureaucratic control. Nevertheless, neoliberal reforms have transformed dramatically the telecommunications sector in some countries since the middle 1980s. In 1980, less than 2 percent of telecommunications firms in 167 countries were privatized. By 1998, the proportion had increased to 42 percent. In many countries, competition has increased in fixed phone and especially in mobile phone services. These dramatic changes in the organization raise important 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?

The telecommunications industry is one of the fastest-growing sectors in most countries. Currently its service revenue alone, equipment sales not included, accounts for approximately two to three percent of GDP in most countries. The sector is believed to offer substantial positive externalities to other industries by, among other things, reducing transaction costs for businesses. Indeed, Roller and Waveman (2001) have found a positive linkage between a country's telecommunications infrastructure and its economic growth. Therefore, understanding the forces behind telecommunications liberalization may yield important policy implications. As discussed in Noll (1999) and Wallsten (2000b), privatization of the telecommunications sector signals a dramatic shift from state-dominated institutions to pro-market institutions in many

countries. Given the sector's economic, financial, and technological importance, countries have used privatization as a signal to the international community of their seriousness about instituting pro-market reforms. Understanding the forces behind telecommunications liberalization may also shed light on the determinants of pro-market reforms.

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 sector. The data set on telecommunications reforms combines information from several sources, privatization from the World Bank and Stanford University, competition from Pyramid,[2] and some performance measures from the International Telecommunications Union (ITU). The resulting data sets have information on the extent of non-state ownership of the telecommunications sector for 45 countries from 1990 to 1998, and information on competitive policies from 50 countries from 1990 to 1998.[3] 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, 2001). We have extracted a rich set of variables characterizing the politico-economic environment of each country in the sample.

Our guiding framework is a generalized private-interest theory that incorporates the political economy of not only democratic but also non-democratic societies. Policy outcomes in a country could arise either as a result of competition among interest groups in a democratic society or as a result of politicians pursuing their private interests subject to institutional constraints, e.g., bureaucratic checks and balances and a free press. Whether a country privatizes

and liberalizes its telecommunications sector will depend on its political structure and the configuration of interest groups, among other factors.

Our empirical analysis yields findings that are broadly consistent with the predictions of private-interest theory. We find that more democratic countries with stronger pro-reform interest groups, namely, the financial services sector and the urban consumers, are more likely to reform. However, less democratic countries are likely to retain higher state ownership when such a governance mode yields a higher payoff for the governments, for example, when their fiscal deficits are high. Democracy appears to affect the pace of reforms by magnifying the voices of the interest groups in more democratic countries and by moderating politicians' discretion in less democratic countries.

These empirical results should contribute towards filling the main hole in research on telecommunications reforms identified by Noll (1999), namely, the lack of systematic empirical studies of the political economy of telecommunications reforms.[4] With a large sample, we are able to explore simultaneously the role of private interest groups and the political structure. Some authors use cross-country samples to ascertain statistical effects of the reforms.[5] However, no one of these explores the determinants of the privatization and competition in the telecommunication sector and this is the focus of our paper.

2. The evolution of the telecommunications reforms[6]

Fueled by innovations in telecommunications and information technologies, the late 1980s and the 1990s witnessed the most dramatic policy reforms that the telecommunications world has ever seen. National carriers were privatized, new competitors licensed, and new

services allowed. More than 150 countries introduced new telecommunications legislation or modified existing regulations.

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. Given the telecommunications sector's economic, financial, and technological importance, its privatization has been at the forefront in many countries' privatization programs and has often been one of the most controversial. Many governments have chosen to privatize their national telecommunications carriers, one of their highly valued assets, early on to signal their commitment to pro-market reforms, to attract private and foreign investment in national infrastructure, and to raise revenues needed to reduce public debt (Adam, 1992; Ramamurti, 1992; Noll, 1999; and Wallsten, 2001b). These developments have increased local and foreign private participation in the telecommunications sector in many countries.

In addition, the rapid improvements in technology that have brought about many new products and services, such as the internet, cable TV, and new switching and transmission technologies, have lowered significantly the cost barrier of entry and enabled new, including foreign and private, participants to enter the telecommunications market. The monopoly-based system of service supply, which dominated the world's telecommunications markets for over three-quarters of the last century, has declined in popularity. Liberalization in a large number of markets around the world has turned competition to becoming the dominant mode of service supply. Even in the developing world, market liberalization has been expanding in a consistent

and sustained way. However, there is still a large cross-country variation in the degree of market liberalization. While many countries have opened basic voice telephony services to competition, 73 percent of the basic service markets in the world are still monopolies. Many countries have been willing to allow and have even encouraged private sector participation in some value-added services. For example, the most competitive markets are data and mobile communications, along with the provision of internet services and cable television.

The rapid changes in the organization of the telecommunications sector raise important questions. Why the telecommunications sectors in these countries beginning similarly would in the end diverge in the choice of governance mode? In the next section we shall present a guiding conceptual framework to understand the cross country experiences in reforms.

3. Hypotheses

3.1. Overview

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 (Levy and Spiller, 1996; and Galal and Nauriyal, 1995). Whether a country privatizes and liberalizes its telecommunications sector depends on its political structure and the configuration of interest groups, among other factors. An appropriate organizing framework for our analysis is a generalized private-interest theory that incorporates the political economy of not only democratic but also non-democratic societies. The private-interest theory views policy outcomes in a democratic society as equilibrium results from competition in the policy market (Peltzman, 1976; Becker, 1983; and Stigler, 1986). Politicians supply and 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. However, public officials are also agents of their constituents. With imperfect information and imperfect public oversight, their private interest, i.e., preference differing from those of their constituents, has the potential to shape policy outcomes. 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, which Drazen (2000) provides for a summary, are particularly useful in devising testable implications.

The degree of popular participation in the political process differs across countries, 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 have more discretion to introduce policy changes that further their private interests. In extreme cases (e.g., Shleifer and Vishny, 1994), politicians choose policies that maximize 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.

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

3.2. Private interests

The ability of an interest group to influence policies depends not only on the cohesiveness of the group but also on the degree of democracy in the environment where it operates. A more democratic society 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. However, 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 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 the largest users of telecommunications services. For example, insurance and financial institutions alone accounted for 30% of the telecommunications business market in the UK in 1990 (Wheatly, 1999, 93-95). In addition to the increase in demand for financial services that privatization and liberalization of the telecommunications sector cause, the financial sector stands to benefit from improved and expanded services and lower tariffs from the reform. Thus countries with a larger financial sector would be more likely to push for privatization and liberalization of the telecommunications sector. However, the pro-liberalization effect of the financial sector may not materialize in less democratic countries, where the incumbent financial elite will not push for telecommunications liberalization if it signals competition in the finance sector .

Relative to rural consumers, urban consumers are more likely to gain from reforms that reduce cross-subsidization and increase service offerings in densely populated areas. One manifestation of the relative gains of urban consumers is the tariff rebalancing associated with liberalization.[7] While liberalization generally does not affect monthly connection and initial connection charges, it usually results in a reduction in the relative price of long-distance and international calls. Since urban consumers tend to have larger long-distance and international call volumes than rural residents, partly due to income, education, and social networking effects, they should benefit more than rural residents from liberalization reforms. Perhaps more importantly, urban consumers may benefit from the increase in the offering of value-added services, such as call waiting, voice mail, and internet access, brought about by liberalization. If urban consumers are better organized in more democratic societies because these 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. The proportion of urban population may be used as a proxy for the relative effectiveness of the urban consumers in influencing policies. Therefore, we expect countries with higher urban populations to be more likely to liberalize.

However, the losers in the liberalization process, i.e., the lower-income population who would lose subsidies, have an incentive to block reforms. Their ability to organize and to influence the policy outcomes is also expected to be stronger in more democratic countries. Therefore, we expect that those democratic countries with higher income inequality are less likely to liberalize the telecommunications sector. These conclusions lead us to posit the following hypothesis.

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. This effect will be stronger in more democratic countries.

Privatization and liberalization may not benefit politicians if the reforms weaken their political and regulatory control of the sector and hence their ability to extract rents. To the extent that they pursue private interest, politicians may resist any pressure to reform. Their resistance will be stronger if the telecommunications sector, a profitable sector in most countries, 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 but a manageable public debt load, 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 a one-time receipt 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, in a more democratic country where large proceeds from privatization are more likely to be scrutinized by the media and the general public, politicians may perceive the proceeds as less valuable than 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.

Therefore we expect countries that are not yet facing a debt crisis to be less likely to privatize or liberalize if they have a higher budget deficit. We also expect that for a given deficit level, the likelihood of privatization and liberalization may 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; this effect may mitigate the politicians' resistance to reform.

Countries facing a debt crisis have different incentives. Under pressure from foreign and domestic creditors, these countries often resort to selling relatively profitable state-owned assets to avoid a default. Ramamurti (1992) and Adam (1992) have argued that privatization emerged in many developing countries amidst the debt crisis during the 1980s. A large government debt relative to GDP may have different implications than a budget deficit. Hence, we posit the following.

Hypothesis 2. A higher government budget deficit makes privatization and liberalization less likely, while a larger government debt has the opposite implications. However, a government's budget deficit may not impede telecommunications reforms in a country with a developed financial market in which the deficit can be financed more easily.

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' interests are not perfectly aligned to that of their constituents, their ideologies may affect policy outcomes (Kalt and Zupan, 1984). Parties with different ideologies have distinct preferred policies. When right-wing parties dominate the government, privatization and liberalization will be more likely. In fact, a large body of empirical literature finds that party appears to matter (Alt and Lowry, 1994; Clarke and Cull, 2002; 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; for example, see Kalt and Zupan (1984), and Poole and Rosenthal (1997).[8]

The Washington consensus, of which privatization is an important prescription, has influenced heavily the way international organizations give policy advice. The involvement of international organizations like the World Bank in the telecommunications sector often entails advocacy and providing financial incentives, e.g., subsidized World Bank loans, for liberal reforms.[9] These considerations lead us to the following hypothesis.

Hypothesis 3. Countries with a right-of-center government and countries that receive World Bank assistance in the telecommunication sector are more likely to privatize and liberalize.

The ideology effect may also be the result of omitted variable bias since the heterogeneity of constituent interests cannot be observed fully [Peltzman, 1984, 1985, and 1998 (pp. xvii-xix)]. Such omitted variable bias can occur because countries in which the majority of the constituents prefer privatization and liberalization may elect a right-of-center party that intends to implement such policies once they are in power.

3.3 The 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 the political structure is the division of power that creates checks and balances in governance. In a more democratic country, opposition parties may have veto power in the policy-making process, whereas in a less democratic country, one party is likely to monopolize most policies. Thus a more democratic country has more checks and balances, and some veto players can block a reform initiative more effectively than in a less

democratic country. Furthermore, these veto players are 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, 1996). When reforms do proceed, the distance between the passed reform legislation and that required by efficiency is often large. Compromises must 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, the 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, denoted the credibility effect. Second, the division of power may help counterbalance ruling politicians' discretion to pursue self-interest, creating a more competitive environment in policy-making. Therefore, it tends to attenuate rent extraction by ruling politicians. This positive effect would be even stronger if power were 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. But the overall effects of the division of power on telecommunication reforms cannot be ascertained theoretically.

3.4 Other Factors

In addition to political economy determinants, whether and by how much a country reforms its telecommunications sector depends also 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.

A country on a higher technological ladder is more likely to succeed in attracting private investment to its telecommunications sector and will therefore be better positioned to push for reforms. However, 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, can be used as control variables. These indicators have implications for the demand for, 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. Satisfying this demand can be accomplished by privatization and

competition. Therefore, we expect an increase in per capita income and a decrease in illiteracy rate to contribute positively towards more reforms.

History may also matter because investment in telecommunications infrastructure is based on long-term cost-benefit evaluations. Countries in whch the public or a heavily regulated telecommunications sector has invested significantly in infrastructure in the past may be reluctant to implement liberalization reforms that reduce the value of past investment. The incumbent firms and their investors 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.

Past profitability of the telecommunications sector may also have an effect on privatization and liberalization. If this monopolistic sector has served as a cash cow, the ruling politicians would tend to resist any pressure to liberalize it, suggesting that profitability may hinder liberalization. However, periods of financial crisis as experienced in a number of developing countries involve pressures from private and multilateral lenders to force a reluctant government to privatize and to introduce competition. More importantly, changes in governments, such as those brought about by democratization and the collapse in Communism, have resulted in the election of reform-minded politicians who do not share the objectives of the outgoing politicians and who face very different incentives. Many of these new politicians have embarked on pro-market reforms. Evidence shows that they have often privatized early telecommunications assets, which have often been better performing than other state assets, in order to maximize revenue from privatization and to signal their commitment to reforms

(Vernon, 1988; Ros, 1999). As a result, past profitability is likely to have an ambiguous effect on privatization and liberalization.

4. Empirical Implementation

With testable hypotheses on the determinants of telecommunications reforms outlined, we now turn to the data.

4.1 Data and Policy Measures

Our empirical work relies on several sources of data, which we describe in more detail in the Appendix. The measure on privatization in the telecommunications sector, the share of non-state ownership of the sector, is constructed recently by the World Bank-Stanford group.[10] This variable is available for 45 countries over the period from 1990 to 1998. We denote the non-state share as S_{it} for country i in year t. We also have a dummy variable of privatization, which is one if a country has a positive share of private ownership. Since the non-state ownership share is more informative than the privatization dummy, we use the ownership share variable to measure the pace and the extent of privatization. We have also experimented with using the dummy variable of privatization as the dependent variable and obtained qualitatively similar, but statistically less significant, results.

Reflecting the fact that competition policies are multi-faceted, multiple indicators of competitive 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 competitive 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 competition index as the principal component of the available competition indicators. The Appendix provides the details. The constructed competition variable for country i in year t, C_{it}, has a sample mean normalized to 0 and a sample standard deviation of 1.787. It ranges from a minimum of –3.175 to a maximum of 5.433.

4.2. Empirical Specification

To test the hypotheses outlined in Section 3 using the available data, we estimate a linear regression model on non-state ownership share and another on the competition index. These equations are:

$$\begin{aligned} S_{it} &= X_{it}^{'} b_1 + v_i^S + e_{it}^S \\ C_{it} &= X_{it}^{'} b_2 + v_i^C + e_{it}^C \end{aligned} \tag{1}$$

where X_{it} is a vector of the explanatory variables suggested in Section 3 along with some control variables. n_i^S (n_i^C) is country-specific effects that control for cross-sectional heterogeneity in the non-state share and competition equations. e_{it}^S and e_{it}^C are the idiosyncratic errors.

Given that our data set is longitudinal, a natural alternative choice is the fixed-effects estimator. However, we decided not to use this approach for two reasons. First, some of our important explanatory variables are either time-invariant or nearly so. For instance, the initial tele-density is time-invariant by definition. We also cannot expect the political structure and democracy to change much during the sample period. Neither does the Gini coefficient in a particular country change much over time (Li, Squire, and Zou, 1998). Second, as pointed out in Hausman and Griliches (1986), the fixed-effects approach exacerbates measurement error

problems, especially when the time-series variations are relatively thin. Therefore we choose to estimate the non-state share equation and the competition equation using the random-effects model. In Table 1, we list our explanatory variables and their summary statistics.[11]

[insert Table 1 here]

In addition to the variables motivated by the discussion in Section 3, we also include several other variables. Logarithm of population is included to control for potential country size effects. Manufacturing/GDP is included to control for sectoral structure, which might affect demand for telecommunications services. Share of population in the largest city is used to control for a geographical configuration that might affect the cost structure of the telecommunications sector.

4.3. Basic Empirical Results

Columns (1) and (2) of Table 2 report the random-effects (RE) estimates of the non-state share and the competition index equations. The non-state ownership regressions use data from 45 countries over the period of 1990 to 1998, while the competition equation uses 50 countries over the same period. We also estimated the equations using OLS under the hypothesis of no random effects and obtained qualitatively similar results. But the hypothesis of no random effects was strongly rejected by the data based on the Breuch-Pagen test statistics. The OLS results are available from the authors upon request.

[insert Table 2 here]

Inspection of the estimates suggests that the hypotheses outlined in Section 3 are generally consistent with the data. Hypothesis 1 posits that countries with more financial depth, higher concentration of urban population, and lower income inequality are more likely to

privatize and liberalize. Indeed, the estimates of the coefficient on financial depth in the non-state ownership equation and in the competition equation are statistically significant and signed correctly. Income inequality as measured by the Gini coefficient, has a marginally statistically significant negative effect on non-state ownership, and negative but statistically insignificant effect on competition. As predicted, a concentration of urban population appears to have a positive effect on both privatization and competition. Our results suggest that the financial depth and urbanization indices, which proxy the relative strength of the two likely pro-reform interest groups, i.e., the financial sector and urban consumers, appear to have played important roles in promoting pro-market reforms.

To analyze the supply-side determinants of policy reforms, we turn to estimates of coefficients relating to Hypothesis 2. We expect that the government deficit as a proportion of GDP will have a negative effect on the reforms. The budget deficit increases the value to politicians of controlling the telecommunications cash cow in the absence of a major financial crisis. Inspection of the estimates of the coefficient of government deficit as a percent of GDP shows that government deficit exerts a strong negative effect on competition. The coefficient on non-state share is negative, but statistically insignificant. It is interesting to note that, as expected, the coefficient on the interaction term between government deficit and financial depth has a positive sign for the competition index. This suggests that governments that can finance their deficits more easily are more likely to open their formerly monopolistic telecommunications sectors to competition. However, the coefficient of the interaction term in the non-state equation is not statistically significantly different from zero. Hypothesis 2 asserts that government debt as a proportion of GDP has a positive effect on privatization and competition because governments in financial distress often resort to selling their prized assets in

order to raise revenue and to opening their lucrative telecommunications sector to foreign investment and competition as a condition for receiving debt relief from international lenders. Our regression results show that, while the effects on privatization are small and insignificant, the effects on competition are positive and significant. Our findings therefore offer some statistical support for the political economy hypotheses on the behavior of politicians in policy making with and without external pressures.

As hypothesized in Section 3, reforms may also be determined by factors beyond private interests. The regression results show that ideology, measured by the right-of-center orientation of the government, has a strong, positive effect on non-state ownership. A one-standard-deviation increase toward the right-wing inclination is estimated to increase non-state ownership by 7 percentage points. However, the estimated effect of ideology may simply reflect 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 variable biases. Consistent with Hypothesis 3, the proactive involvement of the World Bank helps diffuse the pro-market ideology of the Washington Consensus. Indeed, the World Bank telecommunications assistance dummy, lagged by one year, is statistically significant in raising the non-state ownership share and the competition index in the sector. The World Bank influence is sizable: its assistance is associated with an increase in non-state ownership share by 6.7 percentage points and an increase in the competition index by 0.5, or about 28% of the standard deviation.

As discussed in Section 3, the political structure, represented by the division of power, matters, although the effects are difficult to ascertain theoretically. While the division of power serves to restrain the discretion of the ruling politicians and to establish credibility in policies, it may also introduce gridlock. It is thus not surprising that we do not find significant effects of

checks and balance. However, the effects of ideology polarization are positive and statistically significant for both the non-state ownership and the competition equations. Changing the ideology polarization measure by one standard deviation would raise non-state ownership by 6 percentage points and the competition index by 7% of a standard deviation.

The control variables listed at the bottom of Table 2 explain some variations in reforms across countries. A higher initial tele-density, measured as the number of main fixed-phone lines per capita, is negatively associated with both non-state share and competition. This suggests that countries that were laggards in telecommunications services have been more likely to use reforms as a means to improve services, perhaps because weak incumbents have been less effective in blocking reforms. The level of per capita GDP turns out to be unimportant in explaining the move to either privatization or competition**.** Country size, measured by population, has a negligible effect on privatization, but it does have a significant negative effect on competition. However, population concentration in the largest city seems to increase the share of non-state ownership. The inability of a country to adopt new technologies is expected to slow the adoption of new governance structure. The data appear to confirm this conjecture. The underdevelopment of human capital, measured by illiteracy rate, has sizeable negative effects on both privatization and competition. And the size of the manufacturing sector relative to GDP also has negative effects on non-state ownership and competition policies. Finally, lagged profitability, which is expected to have ambiguous effects on privatization, indeed has little effect on privatization. Lagged profitability also has no statistically significant effect on competition.

Surprisingly, democracy, as a standard-alone explanatory variable, has negligible effects on either privatization or competition. In what follows, we show that democracy does have an indirect impact on the reform agenda in that it magnifies the effects of interest groups.

4.4 Democracy as a Channels

The effects of interest group politics and political structure on telecommunications policy may hinge on the degree of democracy in the country. To estimate the indirect effects of democracy, we estimate the two equations using two split sub-samples. Countries with a democracy rating below the median score of 1.5 forms the low democracy sub-sample, while the remaining countries form the high democracy sub-sample. We list the countries in each sub-sample and their democracy scores in 1995 in Section A.4. In Table 3, we list estimates of the non-state share and competition equations using the random-effects model. Inspection of the differences between the estimates for low- and high-democracy countries clearly indicates that democracy plays a pivotal role in shaping the effects of other political economy variables.

[insert Table 3 here]

While democracy, by itself, does not have much effect on the privatization decision in either the high or low-democracy sub-sample, it does lower non-state ownership in high-democracy countries. This result is consistent with the credibility story. Since low-democracy countries have less credibility in implementing reforms, they may have to offer more shares for sale relative to high-democracy countries in order to signal their commitment to reforms.

Consistent with Hypothesis 1, interest group politics appears to play a more prominent role in high-democracy countries. Estimates of the coefficient on financial depth are positive and statistically significant only in high-democracy countries; in the low-democracy sub-sample,

they are statistically indistinguishable from zero. Estimates of the coefficient on the proportion of urban population are positive and statistically significant in both sub-samples, but the size of the estimated coefficients is statistically significantly larger in high-democracy countries. But as in Table 2, estimates of the coefficient on income inequality (Gini coefficient) in Table 3 are mostly insignificant, except in the competition equation for low-democracy countries where it is negative.

For each sub-sample, our regression results also offer empirical support for Hypothesis 2, which assets that government deficit has a negative effect on the reforms. We find that the negative effects of government deficit on non-state ownership are stronger in low-democracy countries, where ruling politicians presumably have more freedom to choose policies that further their own interest. Government deficits have negative effects on competition for both low and high-democracy countries, but only the negative effect on competition is statistically significant. The interaction between government deficit and financial depth is never statistically significant in either privatization or competition equation. Also consistent with Hypothesis 2, government debt as a proportion of GDP has positive effects on both privatization and competition, but only the effects on competition are statistically significant.

The positive effect of right-wing ideology on non-state share identified in the regression using the full sample appears to be present among only high-democracy countries. This finding is consistent with Peltzman's (1984) interpretation that the estimated ideological effect simply reflects unobserved heterogeneity of constituents' interests in high-democracy countries. Estimates of the coefficients on checks and balances and on ideology polarization show that checks and balances are largely insignificant, while ideology polarization has positive effects on both non-state ownership and competition. More interestingly, the positive effects of ideology

polarization are significantly stronger among in low-democracy countries. A one-standard-deviation increase of ideology polarization would raise the non-state ownership in low-democracy countries by 12 percentage points and the competition index by 0.34, or roughly 20 percent of its 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 much smaller or statistically insignificant. And finally, Table 3 shows that the World Bank's telecommunications aid is associated with less competition in low-democracy countries, but with more competition in high-democracy countries. This is consistent with recent studies of the World Bank on aid effectiveness (World Bank, 1998a). Aid works well only in countries that have the right policy environment.

5. 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 decade can be explained by differences in the configuration of interest groups and in the political structure—in particular, in the decision-making mechanisms and in the ideology of the government. Democratic countries with a strong presence of pro-reform interest groups indicated by a larger financial sector, a greater proportion of urban consumers, are more likely to privatize or liberalize. Less democratic countries whose governments may benefit more from controlling the sector directly because of high budget deficits, are more likely to retain higher state ownership. We also find that the effects of interest groups and of political structure depend on the degree of democracy.

For instance, democracy amplifies the voices of the pro-reform interest groups, i.e., the financial sector and urban consumers. Democracy and the division of power tend to make reforms more likely by attenuating politicians' discretion in pursuing private interests in low-democracy countries.

Our findings suggest that the policy outcomes are endogenous and determined by the interplay of the configuration of private interests, government interests, and the political structure. These institutional variables take time to change in most countries. If we concur with recent findings that privatization and competition lead to important welfare improvement (Wallsten, 2001b; Li and Xu, 2002) and that the telecommunications sector is a very important contributor to growth (Roller and Waveman, 2001), less efficient modes of governance in the telecommunications sector may remain a bottleneck for growth in some developing economies for some time to come.

A. Data appendix

A.1. 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. about here]

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

$$C_{it} = .41\times \text{MPFP}_{it} + .48\times \text{MPMP}_{it} + .43\times \text{PCIFP}_{it} + .49\times \text{PCIMP}_{it} + .22\times \text{ICFP} + .35\times \text{IPMP}_{it}.$$

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

A.2. Explanatory Variables

From the World Development Indicators (World Bank, 1998b), we construct log(GDP per capita), log(population), illiteracy rate, and urban/total population. Data on the government deficit come from the IMF government financial statistics. Government Debt/GDP_{t-1} is based on Government Financial Statistics of IMF.

Financial depth is constructed as an index of principal components of three variables measuring financial depth. The equation is 0.60 × M2/GDP + 0.53 × stock market capitalization/GDP + 0.59 × bank assets/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 (1999) and the method of transformation in Longdregan and Poole (1996). In particular, we transform two measures, one for autocracy and the other for 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.[12] The right inclination of the legislature is constructed as $\sum_{j=1}^{J} s_j 1(\textit{party j was politically right})$, 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 × (the right inclination of the government) + 0.45× (the centrist inclination of the government)

– 0.67 × (the leftist inclination of the government).

Mnline_100_0 and profitability$_0$ are constructed based on the International Telecommunications Union data. The Gini coefficient is from Deininger and Squire (1996).

A.3. Missing data

Some of the explanatory variables contain missing observations. For example, the democracy index is available only up to 1997. Hence we use the 1997 value for 1998 for a country. Similarly, the Gini coefficients are not available after 1996 because surveys on income inequality are done infrequently. Thus we use their nearest lagged value as the replacement. This imputation for the Gini coefficient should not cause much concern because Li, Squire and Zou (1998) suggest that income inequality changes very slowly over time. In addition to the Gini and democracy variables, there are still some variables with many missing observations; deleting each observation with one variable missing 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 variables.[13] More specifically, we use an innocuous set of RHS variables that we believe have good prediction power to impute missing values to make sure that the imputed maximum and minimum of the missing variable reasonably similar to the maximum and minimum of the non-missing variable. For time-invariant variables, we rely on regional dummies.[14] For time-variant missing variables, we rely on the regional dummies along with dummies for income category, i.e., low income, lower middle, upper middle, upper OECD, upper non-OECD; the logarithm of GDP per capita, the urbanization ratio, and the average index of democracy. These imputing variables have good predictive power for the independent variables.

A.4. Countries With Low And High Democracy Scores in 1995

The following is a list of countries with a low democracy score, i.e., below 1.5:

Qatar, Saudi Arabia, Bahrain, Turkmenistan, Korea, Dem. Rep., Iraq, Uzbekistán, Syrian Arab Republic, Oman, Bhutan, Gambia, Liberia, Cuba, China, United Arab Emirates, Kuwait, Sudan, Lao PDR, Indonesia, Zimbabwe, Mauritania, Rwanda, Niger, Djibouti, Azerbaijan, Cote d'Ivoire, Tajikistan, Iran, Islamic Rep., Kenya, Burkina Faso, Chad, Morocco, Uganda, Tunisia, Kazakhstan, Lebanon, Gabon, Jordan, Egypt, Arab Rep., Eritrea, Singapore, Togo, Croatia, Guinea, Cameroon, Ireland, Botswana, Zambia, Comoros, Austria, Yemen Rep, Angola, Denmark, Somalia, Ukraine, Slovak Republic, Guatemala, Swaziland, Afghanistan, Bosnia and Herzegovina, Vietnam, Belarus, Burundi, Tanzania, Malawi, Libya, Ethiopia, Sierra Leone, Cambodia, Congo Dem. Rep., Ghana, Senegal**.**

The following is a list of countries with a high democracy score, i.e., above 1.5:

Peru, Armenia, Fiji, Malaysia, Mexico, Russian Federation, Romania, Georgia, Guinea-Bissau, Sri Lanka, Kyrgyz Republic, Albania, Congo Rep., Bangladesh, Central African Republic, Guyana, Mozambique, Haití, Mali, Honduras, Paraguay, Moldova, Colombia, France, Latvia, Argentina, Bulgaria, Namibia, Nepal, Chile, Pakistan, Lesotho, Brazil, Mongolia, Venezuela, Nicaragua, India, Nigeria, Estonia, Israel, Jamaica, Ecuador, Madagascar, South Africa, Thailand, Philippines, Panama, Korea Rep., Trinidad and Tobago, Bolivia, Turkey, Poland, Benin, Italy, Lithuania, Czech Republic, Sweden, Canada, Belgium, New Zealand, United , ingdom, Norway, Greece, Portugal, Hungary, Germany, El Salvador, Australia, Costa Rica, Luxembourg, Iceland, United States, Cyprus, Switzerland, Japan, Papua New Guinea, Netherlands, Germany, Spain, Mauritius, Uruguay, Finland.

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Table 1. Definition of Variables Used and Summary Statistics

	Definitions	*Mean*	*(s.d.)*
Constituents Characteristics:			
Urban/total population $_t$	Urban population as a percentage of total population.	50.23	(24.03)
Gini coefficient $_t$	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 $_{t-1}$	Operating profits over total revenue from the telecommunications sector, lagged one year.	0.19	(0.31)
Ideology $_{t-1}$	A principal component index of variables indicating the ideological inclination of the legislature, lagged one year. The index increases with the "right" inclination of the government and decreases with the "left" inclination of the government.	-0.01	(1.21)
WB$_{t-1}$	A dummy variable indicating that the World Bank had a telecommunications project with the country at year *t-1*.	0.12	(0.32)
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)
Govt debt/GDP$_{t-1}$	The share of government debt (both domestic and foreign) in GDP.		

Note:

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

Table 2. Baseline Results

	(1) Non-state share: RE	(2) competition: RE
Special interests:		
Financial depth $_{t-1}$	0.079	0.293
	(2.92)***	(2.65)***
Gini coefficient $_{t}$	-0.008	-0.024
	(-1.91)*	(-1.59)
Urban/total population $_{t}$	0.018	0.031
	(5.52)***	(2.58)***
Policy suppliers:		
Deficit/GDP$_{t-1}$	-0.572	-5.211
	(-1.06)	(-2.35)**
Deficit/GDP$_{t-1}$ × financial depth $_{t-1}$	-0.429	2.007
	(-1.21)	(1.89)*
Gov Debt/GDP $_{t-1}$	0.007	0.775
	(0.13)	(3.37)***
Right-Wing Ideology $_{t-1}$	0.056	-0.029
	(4.94)***	(-0.42)
World Bank Telecom Aid $_{t-1}$	0.067	0.500
	(2.15)**	(3.55)***
log(checks and balance $_{t}$)	-0.056	-0.093
	(-1.29)	(-0.53)
Ideology polarization $_{t}$	0.100	0.195
	(4.26)***	(1.80)*
Other controls:		
mnline_100 $_{0}$	-0.044	-0.164
	(-2.54)**	(-3.48)***
log(GDP$_{t}$ per capita)	-0.082	0.088
	(-0.47)	(0.14)
log(population $_{t}$)	0.005	-0.229
	(0.53)	(-4.74)***
Illiteracy rate $_{t-1}$	-0.005	-0.037
	(-1.61)	(-2.85)***
% population in the biggest city $_{t}$	0.008	-0.000
	(2.33)**	(-0.02)
manufacturing/GDP $_{t}$	-0.008	-0.036
	(-2.02)**	(-1.89)*
Profitability $_{t-1}$	0.028	0.013
	(0.78)	(0.07)
Democracy $_{t}$	0.000	0.007
	(0.11)	(0.40)
Observations	360	417
R-squared		
P-value of test of no random effects	0.000	0.000
Number of countries	45	50

Note.

1. *, **, and *** represent statistical significance at the 10%, 5%, and 1% levels.
2. The figures in parentheses are z-statistics.
3. The intercept is suppressed.

Table 3. Results Separated by the Democracy Index

	Non-state share: RE		Competition: RE	
	(1) Low demo.	(2) High demo.	(3) Low demo.	(4) High demo.
Special interests:				
Democracy $_t$	0.015	-0.013	0.058	-0.025
	(1.47)	(-1.78)*	(1.57)	(-0.78)
Financial depth $_{t-1}$	0.065	0.092	-0.058	0.334
	(0.79)	(2.87)***	(-0.30)	(2.45)**
Gini coefficient $_t$	0.003	-0.002	-0.058	0.001
	(0.50)	(-0.35)	(-2.81)***	(0.03)
Urban/total population $_t$	0.010	0.016	0.006	0.034
	(3.27)***	(3.38)***	(0.33)	(2.23)**
Policy suppliers:				
Deficit/GDP$_{t-1}$	-2.828	-0.114	-2.023	-5.647
	(-1.89)*	(-0.20)	(-0.43)	(-2.08)**
Deficit/GDP$_{t-1}$ × financial depth $_{t-1}$	0.421	-0.420	0.977	2.065
	(0.24)	(-1.16)	(0.57)	(1.27)
Government Debt/GDP $_{t-1}$	0.097	0.012	0.794	1.216
	(1.14)	(0.16)	(2.38)**	(3.58)***
Right-Wing Ideology $_{t-1}$	-0.048	0.055	0.232	-0.078
	(-1.36)	(4.75)***	(1.15)	(-1.13)
Log(checks and balances $_t$)	-0.137	-0.039	0.206	-0.240
	(-1.14)	(-0.83)	(0.61)	(-1.16)
Ideology polarization $_t$	0.211	0.073	0.547	0.047
	(1.78)*	(2.87)***	(2.32)**	(0.40)
World Bank Telecom Aid $_{t-1}$	0.044	0.052	-0.590	0.803
	(0.72)	(1.40)	(-2.01)**	(5.00)***
Other controls:				
mnline_100 $_0$	-0.029	-0.046	-0.059	-0.213
	(-1.50)	(-2.08)**	(-1.01)	(-3.10)***
log(GDP$_t$ per capita)	-0.096	-0.177	0.286	0.493
	(-0.51)	(-0.78)	(0.35)	(0.62)
log(population $_t$)	0.006	0.015	-0.217	-0.209
	(0.30)	(1.20)	(-2.82)***	(-3.40)***
illiteracy rate $_{t-1}$	-0.005	-0.013	-0.013	-0.075
	(-1.64)	(-2.30)**	(-0.79)	(-3.54)***
% population in the biggest city $_t$	0.006	0.003	-0.005	-0.004
	(1.89)*	(0.68)	(-0.30)	(-0.31)
manufacturing/GDP $_t$	0.000	-0.012	0.025	-0.060
	(0.03)	(-2.50)**	(1.00)	(-2.17)**
Profitability $_{t-1}$	0.016	0.088	-0.094	0.214
	(0.37)	(0.82)	(-0.46)	(0.43)
Observations	108	252	164	253
P-value of test of no random effects	0.000	0.019	0.000	0.000
Number of countries	24	37	29	38

Note.

1. *, **, and *** represent statistical significance at the 10%, 5%, and 1% levels.
2. The figures in parentheses are z-statistics.
3. The intercept is suppressed.

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	Proactive policies aimed at 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, and 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.

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[2] Pyramid Research is a Division of the Economist Intelligence Unit. See the data appendix for more details.

[3] Our data contain more information than those used in previous studies. For example, Wallsten (2001a) uses a sample of 38 countries in Latin America and Africa to analyze the effects of privatization.

[4] Several case studies of the telecommunications reforms have appeared; for example, see Kikeri, Nellis and Shirley (1992); Wellenium and Stern (1994); Levy and Spiller (1996); and Petrazzini (1996). Although case studies are useful, their contribution has two important limits according to Noll (1999). First, the cases are not thoroughly integrated because they don't have the same information, nor do they use the same conceptual model. Second, the number of cases are too small to support general conclusions and distinguish alternative hypotheses.

[5] These authors include Boubakri and Cosset (1998); Petrazzini and Clarke (1996); D'Souza and Megginson (1998); and Megginson, Nash, and Van Randenborgh (1994); Ros (1999), Boylaud and Nicoletti (2000); Bortolotti, D'Souza, Fantini, and Megginson (2001); McNary (2001); Li and Xu (2002); and Wallsten (2001a, 2001b, 2001c).

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

[7] We thank a referee for clarifying the mechanisms for the relative gains of urban consumers after liberalization.

[8] Poole and Rosenthal (1997) find that much of the variations in regulation/deregulation that are not explained well by private interest groups variables or party politics can be explained by an ideology measure that locates a legislator on a simple left-to-right scale based on a complete history of roll-call votes.

[9] We thank a referee for the suggestion of exploring the role of the World Bank involvement in facilitating the telecommunications reforms.

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