

The Political Economy of Telecommunications Reforms

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Abstract

Since most of the dramatic changes in telecommunications policies occurred in the past two decades, sufficient data to evaluate the many differences in details across countries are only now emerging. Using a new data set on privatization, competition, regulation, and tariff policies of the telecommunications sector, this paper investigates the political economy of Telecommunications reforms. In particular, we empirically analyze the explanatory power of various factors – including sectoral performances, constituents characteristics, political structure, as well as macroeconomic variables – in shaping countries' decision of reforms. In so doing we are able to test some influential (but not mutually exclusive) hypotheses in the literature of policy reforms such as the crisis hypothesis, the constituents demand hypothesis, the private-interest hypothesis, the ideology hypothesis, and some hypotheses emerging from the new institutional economics.

I. INTRODUCTION

If good economics theories become good politics, the telecommunications sector would be privatized, liberalized (except for a few elements with natural monopoly characteristics such as access services), independently regulated, and the tariff structure more or less competitively determined. Yet good economics does not automatically translate into good politics (Rodrik, 1996). A lot of developing countries are still relying on public ownership and bureaucratic control for the provision of telecommunications services, as how it traditionally was. And in practice, few developing countries have embraced competition wholeheartedly, although ideally neoliberal reforms involves a commitment to a competitive market structure if it is economically and politically feasible.

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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 percents. Competition in this sector has increased in many developing countries, both in fixed phone and especially in mobile phone.

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 differences in the ownership and governance of this sector, in particular, why is the reform process at different stage in different countries? Why is the extent of the reforms larger in some countries than in others? Why did some countries respond to crisis by taking reform actions faster than others?

These questions are the focus of our investigation in this paper. By trying to answer these questions, we attempt to incorporate some of the most popular hypotheses about policy reforms² in order to explain the rationale behind the Telecommunications reforms (see Rodrik 1996, Williamson 1994 for some “conventional” but rarely econometrically-tested wisdom): (a) the crisis hypotheses--economic crises foster policy reforms, (b) special interest groups--changes in configurations of special interest groups alter costs-benefits of policies, (c) learning--constituents and politicians learn about the payoffs associated with different policy options and then change their preferred policy options, (d) foreign aid--foreign aid may facilitate policy reforms, but the effects may hinge on the institutional setup, and (e) political institutions--political institutions alter political calculus thus policy outcomes.

Obviously addressing these questions requires new data not available from the existing literature. Our research is made possible by two new data sets, one about telecommunications reforms, and one about political structure. The data on telecommunications reforms combines information from several sources—privatization from the World Bank, regulation, competition, and tariff structures from Pyramid, and some performance measures from ITU (international telecommunications union). The resulting data set contains much more information than previous studies. Wallsten (1998), representing perhaps one of the most comprehensive in data coverage, uses a sample of 38 countries in Latin America and Africa to analyze privatization (the study does not deal with other aspects of telecommunications reforms), while we have information on

² see Rodrik 1996, Williamson 1994 for some “conventional” but rarely econometrically-tested wisdom.

privatization on 167 countries over a longer time span, from 1980 to 1998. We also have information of regulation, competition, and tariff policies on more than 50 countries. The second data we have is a new cross-country data set of political structure compiled by researchers in the World Bank (Beck et al. 2000). From it we have extracted more variables characterizing political incentives than previous political economy papers in the context of cross-country studies.

Our empirical explorations offer some support for several prominent hypotheses form policy reforms, and shed some new light on the political economy of telecommunications reforms. We find some evidence in favor of the crisis hypothesis, and discover that the promptness of response to crisis also depended on the combination of checks and balances and ideology polarization in the legislature. Policy reforms were more likely where the constituents' demand was larger, where institutional environments were better, and where foreign aid was larger and there were World Bank telecommunications loans. In addition, World Bank telecommunications projects improved competition in more democratic countries, consistent with the latest literature on aid effectiveness (Burnside and Dollar, forthcoming; Cull 2000; World Bank 1998). Political structure played an important role in explaining reforms: ideology mattered; executive authority (in the form of executive control over the legislature) enhanced reforms; ideology polarization in the government facilitated reforms; federalism improved tariffs policy and enhances competition.

By focusing on the determinants of the various dimensions of telecommunications reforms-- privatization, regulation, competition, and tariff policies, this paper shed some light on on the neoliberal reform in telecommunications services. We hope that the empirical knowledge learned from this study will contribute towards partially filling "the main hole in research" on telecommunications reforms (Noll, 1999). Indeed, most of the research on telecommunications reforms has so far focused on case studies. Good examples include Levy and Spiller (1996), Galal et al. (1994), Kikeri, Nellis and Shirley (1992), Petrazzini (1995), Ramamurtri (1996), Roth (1987), and Wellenium and Stern (1994). Although such case studies have proved to be very useful knowledge, its 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. But using our data, we are able to explore simultaneously the role of initial sectoral

performance, ideology, government deficit/GDP, inflation, checks and balance, ideology polarization, World Bank telecommunications loans, and institutional environment; inferences about the role of each is obviously impossible from case studies. A few authors have tried to construct cross-country samples in order to ascertain statistical *effects* of reforms, including Boubakri and Cosset (1998), D'Souza and Megginson (1998), and Megginson, Nash and Van Randenborgh (1994), as summarized by Noll (1999). However, none of them explore the determinants of the various dimensions of telecommunications reforms -- privatization, regulation, competition, and tariff policies -- on which we focus in this paper.

The empirical knowledge gained in the study has implications beyond telecommunications reforms. By testing a multitude of existing political economy hypotheses on economic reforms, this paper may also provide a better understanding of the political economy of reforms in general.

The rest of the paper is organized as follows: Section II describes the history and trends of telecommunications reforms. The main purpose is to explain the types of reforms that have occurred or are under way, and identifies the structural options available. Section III is a literature review on the various hypotheses that have been used in political economy, both theoretically and empirically. Section IV discusses data and variables used in the study. Section V presents our empirical results. The last section provides summary of findings and policy implications.

II. THE EVOLUTION OF THE TELECOMMUNICATIONS REFORMS³

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 modified existing regulations.

The Privatization of Telecommunications Services

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

These developments have had the results of increasing 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 participants to enter the telecommunications, also increasing private participation and foreign investments. In addition to attracting private and foreign investment into their telecommunications sector, most countries have engaged in the privatization also in order to improve their existing infrastructure, to satisfy unmet demand and to benefit from the rapid introduction of new products and services.

Despite the general increase in privatization initiatives, the privatization process is at different stages in different parts of the world. In most countries, separation of the post from telecommunications services has been the first step towards privatization. After this separation, many countries then go on to separate operational and regulatory functions. This often leads to the corporatization of the incumbent, which is a way of pursuing increased levels of efficiency and productivity in the telecommunications sector without giving up state ownership or control.

³ The factual information in this Section rely on International Telecommunications Union (ITU) 1999 Report and Pyramid Research, 2000, and summarized and compiled by the authors.

Although many African and Arab countries have not privatized, they have incorporated their operators.

For a variety of reasons ranging from political to economic including national sovereignty, culture protection issues, countries employ different methods to privatize their incumbents. Most countries have favored mixtures of privatization methods.

With more than 20 countries that have privatized their incumbents, the Americas region have the largest number of fully privatized operators. This region has set the least limitations on private and foreign investment in the telecommunications sector. The Bahamas, Honduras and Nicaragua are expected to follow suit in the near future.

The Asia-Pacific region is well known for its use of build-transfer arrangements, management consultancy contracts and joint ventures. These encourage private and foreign private participation in the sector. As a result, large volumes of private capital have flowed into Asia's telecommunications markets and foreign investment in the sector has increased.

Public offerings and sales to strategic partners have been two methods of privatizing in Europe. In most of these cases, only minority shares of the incumbent have been sold or new operators were created through joint ventures between government and foreign partners. These partnerships and privatization efforts increased foreign as well as local private capital involvement in the telecommunications sector. 28 out of 53 European countries partially privatized their operators up to the end of 1998. Ireland is the only European country currently in the process of privatizing 100 percent of its incumbent.

In Africa, the most popular mode of privatization is the sale of shares to strategic partners. This approach usually entails performance requirements that obligate the private companies to make some investments in order to improve infrastructure and performance. As a result of the low limitations on private and foreign ownership and the development of new services and technologies, the African telecommunications sector is developing relatively fast. Of the 42 African countries, 14 have privatized their operators and another eight have plans to privatize in the near future. Half of those that have privatized have sold majority shares of their operators.

In contrast, in the Arab States, where the telecommunications sector is still dominated by state-owned monopolies, there are presently no fixed-link operators which are 100 percent privately-owned. In these countries, foreign participation in the incumbent remains minimal.

Some of the Arab States, however, are involved in privatization efforts – mainly because of the need for private capital for infrastructure development.

The Increasing Number of Regulators

As of August 1999, there were 84 separate regulators. Europe has the largest number of separate regulators, followed by the Americas and Africa. Another 15 are expected by the end of 2000. With new privatization and continued liberalization, and partly also because of the requirements posed by the World Trade Organization (WTO) reference paper on regulatory principles, the rise of separate regulators is expected to continue.

Until the early 1990s, the regulation of telecommunications services in most countries was not a priority, as the state-owned operator in many countries was under a self-regulation regime. With the rise of corporatizations and privatizations, the introduction of effective competition, and the change in the nature of services offered, the active presence of regulators became urgent. The fact that there are more than 80 regulators with varying profiles and capabilities at the end of 90s, compared with only 10 at the beginning of the 1990s, is a clear evidence.

In virtually all countries, the regulator and/or the ministry is responsible for the following regulatory functions: numbering plan, tariff approval (and in some cases, tariff proposal), technical standards, interconnection rates, arbitration of disputes, frequency allocation, type approval, monitoring service quality and the establishment of licenses fees and licensing. The main sources of funding come from license fees, government appropriation and spectrum fees, with greater emphasis on license and spectrum fees and less reliance on government appropriation. In countries where no separate regulator exists, these responsibilities are mostly mandated to the ministry and/or split with the operators.

The degree of autonomy and functions of the separate regulators vary: In some countries, the regulator plays a role in most regulatory issues such as in Mexico, Bolivia, Kenya, Paraguay and Sudan. In others, the telecommunications ministry and/or the operator share, with the regulator, the responsibility over many regulatory issues. In Egypt and Madagascar, for example, specific regulatory functions such as numbering plan, tariffs and interconnection rates are dealt with by both the operator and the regulator. In Brazil, Anatel, the regulator has been given the mandate to oversee all the telecommunications regulatory functions. However,

arbitration of disputes is dealt with by the regulator and the courts. In Paraguay, the regulator, Conatel, oversees all regulatory functions except for tariff approval for which the President is responsible.

Currently, in most countries broadcasting and telecommunications regulation has been separate from one another. As convergence of these two sectors increase, the distinguishing role by either authority will become rather vague. This may be resolved by merging both authorities or through closer cooperation. Malaysia, for example, groups telecommunications, broadcasting and the computing industries into one industry with one regulator. And universal services, mergers and acquisitions, the regulation of content are areas where converged regulators should exercise particular vigilance. And even if there are separate regulatory bodies, great attention has to be paid to collaboration and cooperation if wasteful duplication of effort or contradiction and uncertainty are to be avoided.

Associations of regulators are also on the increase as a means of fostering the exchange of experiences and to improve regional and sub-regional coordination. There are a growing number of bodies with a cross-border supervisory or advisory function. Three examples are the Asean Telecommunications Regulators Council (ARTX), the Foiro Latino Americano de Entes Reguladores de Telecomunicaciones (REGULATEL) and the Telecommunications Regulators Association of Southern Africa (TRASA). In general, these associations are responsible for the discussion and coordination of all policy, strategic, and regulatory issues in telecommunications that are of mutual interest to the member countries. The purpose is to promote the harmonization of telecommunications regulation in order to contribute to regional integration and identify and defend regional interests. They also facilitate a uniform level of understanding on regulatory matters and maximize the utilization of scarce resources.

While the increase in regulators is certainly encouraging, new technologies and services are giving rise to the convergence of the telecommunications, broadcasting and IT industries. Advances in information and communications technology are moving faster than the bodies that regulate them. And on the other hand, those innovations concern services or products which, if offered by conventional means, would be highly regulated. Thus the challenge for the regulatory framework of the future is to develop consistent, relevant and pro-competitive regulations that are flexible enough to adapt to new development, in both technologies and services, and to reflect the different perspective of both providers and consumers. This is by no means an easy

task, and difficult to achieve to every party's satisfaction. The global consensus is moving towards the position that open and fair competition between all players is probably the best way of achieving long-term success.

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. In the developing world, market liberalization is expanding in a consistent and sustained way.

While many countries opened basic services to full competition, others shifted from duopoly to full competition. And a number of other countries, for example, Eritrea, Kenya and Nigeria in Africa, Argentina, Venezuela, Bolivia and Costa Rica in Latin America, Kuwait in Arab States, Singapore in Asia and Czech Republic and Croatia in Europe plan to open their basic services to competition in the next two years. Basic services, with 73 percent of the markets still maintaining a monopoly, remain a fairly closed segment of the global telecommunications market. However, if one is considering the large number of liberalization measures announced, and those committed to under the World Trade Organization Agreement on Basic Telecommunications Services, it is reasonable to expect that, by the beginning of the next century, the balance might turn in favor of open markets.

There is also some variation in the degree of openness across market segment. Local services, for example, 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 the 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.

As an alternative way, to privatization, of attracting foreign investment into the country, countries have been willing to allow and even encouraged private sector participation in some value-added services. The most competitive markets are data and mobile communications along

with the provision of Internet services and cable television. In 1999, more than 66 percent of the global cellular market, 85 percent of the cable television and 80 percent of the Internet markets, measured in terms of the number of countries, were open to competition. In the early days of cellular mobile services, most incumbent carriers did not see it as a threat to their core business-basic voice wireline services. The low growth expectations and a profile of marginal service led to a low level of resistance from incumbents to a rapid opening of cellular markets worldwide. But there are many differences in the degree of competition amongst the regions. Europe and Arab States are two extremes of the spectrum. In Europe, 84 percent of countries allow competition while in Arab States only 27 percent of the countries do.

The growth of data and mobile services has far outpaced that of basic fixed voice services where monopolies have been allowed to remain. In fact, an increasing number of incumbents report that data traffic now exceeds voice traffic on their networks, and that the number of mobile phone users in some countries now exceeds the number of fixed phone lines. Competition has come to play a greater role more quickly than initially predicted.

III. LITERATURE AND HYPOTHESES

Why would a country reform its telecommunications sector? In this section we summarize the literature and present testable hypotheses among which include the public interest theory, the private interest theory, and new institutional economics.

Public Interest Theory

The simplest framework is the principal-agent model, in which the black-box government acts as the (perfect) agent of the constituents.⁴ In this case, the characteristics of the government do not matter at all. It does not matter what the legislative structure is, how many veto players there are, whether the executive party controls the legislature, and so on. Instead, it suffices to focus on the characteristics of the constituents. Yet even in this simplest model we need to impose simplification about the characteristics of constituents to obtain testable implications. In most tests, studies just focus on the *average* characteristics of the constituents.

⁴ Here the principal-agent relationship is not in the sense of risk-incentive tradeoff, rather, it is a more trivial type of agency relationship in which the constituents can monitor the principal perfectly.

One implication of this model is that telecommunications reforms stem from the changing demand for telecommunications service and the changing characteristics of the constituents. Since (our maintained hypothesis is that) privatized and liberalized telecommunications is better in meeting increasing demand for telecommunications services,⁵ the prediction is this: *The probability of privatization and liberalization should increase with characteristics of constituents that increase their demand for telecommunications.* It is easy to conceive, for instance, that telecommunications demand increases with income level, and the literacy rate; and that the telecommunications demand should depend on the distribution of income, and the industrial structure (such as the percent of manufacturing value added in total GDP). The testable implication of this model is then privatization and liberalization should increase in income level, the literacy ratio, and depend on the Gini coefficient and the share of manufacturing in GDP.

Another testable implication is that countries with worse initial telecommunications sector would be more likely to privatize and liberalize. Suppose the constituents or their delegated agents (the politicians) do not know whether state-owned or privatized telecommunications would deliver better service, they learn over time. The fact that a country has worse telecommunications service would mean that the probability of a privatized and liberalized telecommunications sector outperforming the state-owned telecommunications sector has to be larger. In other words, the constituents or their delegated agents would realize that the gains from privatization would be larger in countries with a worse initial telecommunications sector.

A final implication of the learning notion would be the neighborhood effect. If neighbors undertake more telecommunications reforms (and presumably such reforms lead to efficiency gains), the increase in the number of experiments and narrowing of the variance of efficiency gains would presumably make privatization or other telecommunications reforms more appealing (to risk-averse constituents). Moreover, the experiments of neighbors would also reveal best practices and lessons learned as how to reform the Telecommunication (such as in regulation, interconnection policies). As a consequence, we expect there would be *a spillover effects of telecommunications reforms.*

⁵ See Noll (1999) for a summary of evidence, and Wallsten (1998) for cross-country evidence.

Private Interest Theory

The private interest theory (Stigler, 1976; Peltzman, 1976; Becker, 1983) suggests that policy outcomes are equilibrium results of policy markets. Politicians supply, while constituents demand, policies. Politicians want to maximize votes for election (or re-election), and their votes increase with the campaign contributions of special interests and the benefits different constituents receive. In this theory special interest groups (such as producers, special associations, and so on) would often be the winners while the loosely-organized consumer groups would be the losers of regulation or policy reforms. This theory then implies that efficient policies are the exception rather than the rule. Instead, the politicians/regulators can be “captured” by special interest groups at the expense of the general public.

Under this theory, the distribution of income should have effects on telecommunications reforms (Rodrik, 1996). Under equality of income distribution, for instance, policy making can be insulated from powerful interest groups. Moreover, governments do not have to undertake redistributive policies; instead, they can focus on expanding the pie.

Another implication stems from the postulate of self-interest of politicians under this theory. In deciding whether to privatize, the politicians’ tradeoff is between revenues from privatization (which would be used to benefit other constituents) and the benefits of the status quo policy to current constituents. Politicians need to collect enough revenue to patronize their power base. When the level of government revenue drops, the marginal value of government revenue increases, and the maintenance of the status quo telecommunications policies become too expensive (in net forgone votes). Consequently, the government would be more drawn to privatize. Thus, *higher government deficit leads to a higher likelihood of privatization.*

In addition, we expect *politicians facing higher inflation to have lower likelihood of privatization.* A high inflation affects most of the constituents, while telecommunications reforms *significantly* affect only a small percentage of constituents (such as producers and Telecommunication employees). Thus, vote-maximizing politicians would first focus on containing inflation before tackling telecommunications reforms if (a) they have so limited energy that they can only afford one major policy change, and (b) both inflation containment and telecommunications reforms involve risks (in reelection probability), and the politicians want to avoid too much exposure in risks. Thus in countries with high inflation, privatization only has low priority and thus a low probability of coming into reality.

New Institutional Economics

The new institutional economics approach emphasizes the role of institutional and political structure in shaping policy outcomes (McCubbins, Noll and Weingast 1988, North 1996, Alston, Eggerston, and North 1996, Irwin and Krozner 1999). Different institutional and political structure offers distinct incentives for politicians. As a consequence, rational politicians alter their policy proposals, and accordingly, the equilibrium policies also change. Here we focus on the role in shaping telecommunications reforms of a country's institutional environment.

Rule of Law and Democracy. In general, a good institutional environment—as characterized by the rule of law and democracy—would make privatization more credible, thus attracts private investors and make privatization more likely. However, redistribution is a necessary consequence of democracy (Williamson, ch. 8, 1996), we thus expect the tariff policies in more decentralized countries to be more distorted.

Executive Authority. A regime with executive control over the legislature makes reforms more feasible. If the powerful executive finds telecommunications reforms yield net benefits in its political calculus, it will simply implement telecommunications reforms. Perhaps this is the reason why Williamson (1994) suggest that reforms need, or at least are easier with, an authoritarian regime. His evidence includes the following eminent examples: the military regimes installed in Argentina (1966 and 1976), Brazil (1964), Chile (1973), and Uruguay (1976), Korea and Taiwan. (The case studies in the volume, however, also contain democratic countries embarking reforms.) It is however unclear whether reforms are necessarily to their best interests. Thus ex ante executive power should raise the possibility of reforms.

Ideology polarization in legislature. When the legislature consists of parties with ideologies different from each other, different types of constituents are likely to be represented. Then, *holding constant the number of veto players*, reforms are more likely to be proposed by one of the parties. Furthermore, the proposal if in place should be more credible because it is harder to reverse it—there is a veto player with the opposite ideology. We thus expect reforms more likely with polarized legislature once the number of veto players is held constant.

Veto Players (or agenda-setters). Closely related, the number of veto players also has important implications about policy reforms. In particular, three effects stand out.

- First, raising the number of veto players makes reforms more infeasible because now multiple parties can block the reforms. If they reach an agreement, the final reform package may resemble “pork barrel”—each endorse pork barrel bills that bundle together narrow policies benefiting each congressional district, but that collectively imposes greater costs on all districts than they collectively receive benefits (Cox and McCubbins, 1996; Schwartz, 1994; Weingast, Shepsle, and Johnson, 1981). The greater the number of veto players, the larger the extent of inefficiency arises from such a package. This effect (“infeasibility effect”) would make privatization less likely, and makes tariff structure more distortionary (“pork barrel” effect).
- Second, increasing the number of veto players also increase the credibility of the reform program to private investors (Levy and Spiller, 1994, 1996) thus increasing the probability of privatization (“credibility effect”).
- Finally, more veto player also implies more agenda-setters or interest-representers (Keefer and Stavasage, 1998) if we assume that each veto player represents different sets of constituents. As discussed earlier, increasing the number of veto players, or more precisely, the number of delegated agents, would make proposal of efficient policy more likely. If the multiple agents have similar ideology, the probability that reform proposal by one agent would be adopted would be greater than when the positions (such as in ideology) of the multiple agents are far from each other. The underlying logic is provided by Alesina and Drazen (1991): the more homogeneous the groups, the less uncertainty about the other groups, the less the gains from stubbornness or continued disagreement about collective outcomes, the faster the adoption of efficient policy reforms. We thus expect that more veto players would be associated with a higher probability of policy reforms when they are more homogeneous (“polarization-checks effects”)—that is, the interaction of polarization and checks and balances should have a negative impact on facilitating policy reforms.

Federalism. Federalism can affect policy outcomes in general and telecommunications reforms in particular through a range of mechanisms. Federalism is associated with harder budget constraints (Qian and Weingast, 1997) because (a) in general local governments have no

or less access to central bank, and (b) mobile resources imply that local governments have lower incentives to bail out local firms because the latter can move out. Budget constraints of local governments imply that there is less room for redistribution and subsidization. Thus, the local government under federalism cannot subsidize too much the telecommunications sector, allowing more favorable conditions for new entrants. Thus we expect countries under federalism to have a more competitive sector and a less distorted tariff structure. It is true that for most countries, federalism mostly operate through the channel of local governments, thus federalism should have minimal impacts on fixed phones; however, local governments have ample room in designing policies for mobile phones. Later we shall present evidence that mobile phones appeared to be a driving force for telecommunications reforms.

Other hypotheses

The crisis hypothesis. Perhaps the most influential hypothesis related to reforms is *the crisis hypothesis* (Olson, 1982; Ranis and Mahmood, 1992; Williamson, 1994, p. 112; Rodrik, 1996): Policy reforms emerge as a response to crisis. Crises alter the benefits and costs of different policy options, thus enabling shocking countries out of traditional policy patterns. In particular, Crisis facilitates reforms in three ways (Sturzenegger and Tommasi, 1998). First, it makes income streams in status quo lower than expected income streams associated with reforms. Second, it contributes to Bayesian learning about the “right” model of the world. Finally, crisis creates a sense of urgency: something has to be done soon, and agenda-setters can take advantage this window of opportunity to pass Pareto-improving bills.

This hypothesis isn't without its critics. Rodrik (1996) charges that it is a tautology and it is unfalsifiable (if there is no reform but crisis, one can always asserts that the crisis is not serious enough). The real question then becomes: Why do some countries readily reform in the slight hint of crisis, while others wait much longer?

The sensitivity of policy reforms to crises should depend on the structure of the legislature, in particular, the interaction between checks/balance and ideology polarization. Consider the case when polarization is low—when members of the legislature have homogeneous ideology. On the one hand, more checks and balances imply that more parties can veto the privatization bill, and the privatization will more likely be vetoed, and the crisis response will be slower. But on the other hand, more checks and balance in a legislature with

similar ideology can be interpreted as the presence of multiple parties with differences in constituents and thus differences in benefits and costs of privatization. When crisis (such as fiscal drain) hits, the parties being hit the most would act as agenda setter and proceed to propose a reform; since the parties have similar ideology, they find it easy to reach agreement (again, in the spirits of Alesina and Drazen 1991). When polarization is high—both the political left and the political right constitutes the legislature—the policy response will be slower when the legislature is consisted of more checks/balances: when the increase of veto players is coupled with large differences in ideology, proposals for policy reforms are more likely to be blocked.

Foreign aid. Foreign aid can either foster or hinder reform (Rodrik, 1996). It may foster reforms because it can compensate the losers of the reforms thus reduce their resistance. Such compensation is likely to happen, however, only when mechanisms are in place to allow the voice of the losers (politically unorganized, financially poor) to be heard, and when the losers have chance to revenge for the potential losses occurred to them. Such mechanisms are more likely in more democratic society. We thus expect the positive effect of foreign aid to be greater in more democratic countries. Yet aid may hinder reforms--it may help government (with poor policies) to survive even without reforms, and with foreign aid, governments feel less need to be accountable for their constituents. Such hindrance is more likely to be observed where there is no accountability to the constituents. Again, the negative effects of foreign aid should demonstrate themselves in less democratic societies. Thus, *the net effect of foreign aid on telecommunications reforms is ambiguous; however, foreign aid in countries with good accountability should better foster policy reforms than in countries with poor accountability.*

Ideology. Our hypothesis is that ideology matters for telecom reforms. Why? Ideology can be viewed as altruism-motivated behavior of politicians. Given the imperfect competition in the political arena and the reality of political discretion, the ideology of politicians would no doubt affect outcomes, making them differ from what the constituents want, much as the shirking results as in Alchian and Demsetz (1972) (Kalt and Zupan, 1984). Alternatively, politician ideology is endogenous, merely reflecting constituents' interest (Peltzman, 1982). In both cases, the empirical implication delivers the same message: ideology matters for policy outcomes. Previous literature has shown the importance of beliefs and ideology of voters and politicians in explaining regulation and deregulation over the past two decades (see, for instance, Kalt and

Zupan 1984, Poole and Rosenthal 1997). 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 an legislator on a simple left-right scale based on their complete history of roll-call votes. Similar favorable evidence for the role of ideology is found in Poole and Rosenthal (1993) and Berglof and Rosenthal (1999).

One conventional wisdom is that “reform is a monopoly of the political right (Williamson, 1994)”. However, this wisdom comes out of limited number of case studies, the degree of freedom of which makes it hard to judge the power of the test. We shall later present econometric test of this claim, holding constant other factors.

IV. DATA AND VARIABLES⁶

There are several major sources of the data used in the empirical work of this paper:

Pyramid Research, the telecommunications division of the Economist Intelligent Unit, has a database of information infrastructure indicators that covers the worldwide geographical scope with special emphasis on developing countries. 3 out of our 4 dependent variables are calculated from the indicators for key drivers of the infrastructure growth. More specifically, as it is unwieldy to examine each item in the above list, in our empirical implementation we have aggregated them into more manageable indices for regulation, competition and tariff setting, respectively. Principal Component Analysis has been used and based on the following reform indicators:

- competition: multiple player environment, pro-competition initiatives, and interconnection policy;
- regulation: interconnection policy, regulatory body autonomy, regulatory transparency;
- tariff setting: interconnection policy, and tariff regime.

Note that interconnection policy appears in each of the three categories. A well-designed interconnection policy would reduce incumbency advantage, reduce entry barrier and thus pave the way for competition. And interconnection policy is a good measure to judge whether the regulation rules are appropriately set up. Obviously interconnection charges constitute a significant part of the total costs for new entrants.

This aggregation is also justified by the close correlations of sub-indices of each category. Figures 2 to Figure 6 show that the co-movements of these sub-indices are similar in trends, and their correlations range from 0.6 to 0.9. More interestingly, for all categories of policies, mobile phones were leading the changes—the beginning-end changes were always significantly larger for mobile than for fixed phones. Finally, Figure 6 suggests that competition showed the largest increase, while regulation showed the least, with tariff policies being sandwiched in between.

In light of these considerations, we constructed three (principal-component) indices:

- COMPETE for indices in part (a), with the formula: $COMPETE = 0.18 \times (\text{multiple player environment for fixed phone}) + 0.29 \times (\text{multiple player environment for mobile phone}) + 0.21 \times (\text{pro-competition initiatives for fixed phone}) + 0.35 \times (\text{pro-competition initiatives for$

⁶ See Appendix I for more details of these data sets.

obile phone) + 0.11×(interconnection policy for fixed phone) + 0.11 × (interconnection policy for mobile phone).

- REGULATE for part (b), with the formula: $REGULATE = 0.23 \times (\text{regulation autonomy for fixed phone}) + 0.29 \times (\text{regulation autonomy for mobile phone}) + 0.23 \times (\text{regulation transparency for fixed phone}) + 0.30 \times (\text{regulation transparency for mobile phone}) + 0.27 \times (\text{interconnection policy for fixed phone}) + 0.40 \times (\text{interconnection policy for mobile phone})$.
- Q_TARIFF for part (c), with the formula: $Q_TARIFF = 0.20 \times (\text{quality of tariff policy for fixed phone}) + 0.36 \times (\text{quality of tariff policy for mobile phone}) + 0.18 \times (\text{interconnection policy for fixed phone}) + 0.35 \times (\text{interconnection policy for mobile phone})$.

Note that for each categories, subindices for mobile phones always get a larger weight than for fixed phones—due to the fact that mobile phones explained more variations than fixed phones. The descriptive statistics of these indices are shown in Table 1, and their time series averages are depicted in Graph 6. Graphs 7 to 9 plot the three indices against average GDP level for available countries for the 1990s.

Table 1. Statistical Properties of the Constructed Indices

	mean	standard deviation	minimum	maximum
REGULATE	0	0.98	-1.97	3.04
COMPETE	0	0.96	-1.56	2.27
Q_TARIFF	0	0.92	-2.34	3.07

The four types of telecommunications reforms appeared to be closely related (See table 2), evidence that these reforms were complementary. This is of course not conclusive evidence. Later we shall provide more evidence.

Table 2. Correlation Coefficients of the Four Aspects of Telecommunications Reforms

	Privatization	COMPETE	REGULATE
Privatization			
COMPETE	0.55 (0.0000)		
REGULATE	0.25 (0.0000)	0.53 (0.0000)	
Q_TARIFF	0.46 (0.0000)	0.60 (0.0000)	0.43 (0.0000)

Sectoral indicators are mainly drawn from ITU database simply because it covers the longest period of time and the data on penetration levels are quite reliable. Data concerning the political structure of countries come from Beck et al. (2000), a new cross-country data set compiled by researchers at the World Bank. More variables characterizing political incentives are used in the empirical work here than those in previous political economy studies in the context of cross-country studies.

V. EMPIRICAL IMPLEMENTATIONS

We first estimate the following equation:

$$\begin{aligned}
 y_{it} = & \mathbf{b}_0 + \mathbf{b}_1 y_{it-s}^N + \mathbf{b}_2 \text{performance}_{i0} + \mathbf{b}_3 \text{Constituents Characteristics}_{it} \\
 & + \mathbf{b}_4 \text{Deficit/GDP}_{it} + \mathbf{b}_5 \text{Inflation}_{it} + \mathbf{b}_6 \text{Ideology}_{it} + \mathbf{b}_7 \text{rule of law}_{it} \\
 & + \mathbf{b}_8 \text{democracy}_i + \mathbf{b}_9 \text{Executive control}_{it} + \mathbf{b}_{10} \text{Checks \& Balances}_{it} \\
 & + \mathbf{b}_{11} \text{Polarization}_{it} + u_i + e_{it}
 \end{aligned} \tag{1}$$

Here, y_{it} can be one of the four outcomes for country i and year t : the dummy variable of privatization, and the continuous indices of regulation, competition and tariff. y_{it-s}^N is the average of y_{it} for the ten neighbors of country i for year $t-1$ and $t-2$, with neighbors defined as the countries whose capitals have the shortest distance to the capital of country i . Table 2 is a summary of the definitions of the independent variables.

Table 2. Definition of Used Variables

Sectoral performance

mnlne_100	The number of main line per 100 inhabitants at the <i>initial year</i> . From ITU.
profitability	Net profits over total revenue from the telecommunications sector. Calculated from ITU.
waitlist	The number of people in waiting list / the number of main lines. From ITU.
labor_prod	The logarithm of the number of main lines per employee. From ITU
callquality	The percentage of successful call. From ITU.

Constituents Characteristics:

GDPpc	The logarithm of GDP per capita. From Easterly and Rong (2000).
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Urban	Urban population as a percentage of total population. From the World Development Indicators (WDI).
Illiteracy	The percentage of population that are illiterate. From WDI.
Gini	The Gini coefficient. A larger value represents a larger income inequality. From Deninger and Squire (1996).
Man./GDP	The ratio of manufacturing value added to GDP. From WDI.

Foreign aid

Aid/GNP	The ratio of foreign aid to GNP. From WDI.
WBdummy	This variable is one if the World Bank had a telecommunications project in the country. From World Bank.

Macro:

Deficit	The ratio of government deficit to GDP. From Government Financial Statistics of IMF.
Inflation	Log(1+inflation rate). The inflation rate is from WDI.

Political Structure and Other Variables

Ideology	The principal component index of three variables indicating the ideological inclination of the legislature. The three variables are the right, the center, and the left inclination of the legislature. ⁷ The rightmost inclination of the legislature, for instance, is constructed as $\sum_{j=1}^J s_j 1(\text{party } j \text{ was rightest})$, 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 1 st , 2 nd , 3 rd largest and the largest opposition parties. Computed based on Beck et al. (2000).
Rulelaw	The rule of law index from ICRG, ranging from 0 to 6. A larger value represents more respect for the rule of law.

⁷ Beck et al. (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). The executive is not described as centrist if competing factions “average out” to a centrist position (e.g., a party of “right-wing muslims and Beijing-oriented Marxists”). Otherwise, the ideology inclination of the executive is classified as missing.

Democracy	The average index of democracy ranging from 0 to 10. It is time-invariant.
CtrHouse	A dummy variable indicating whether the executive had control over the legislature. Source: Beck et al. (2000a).
Checks	The logarithm of the number of veto players (which ranges from 1 to 14, with 90 percent in the range of 1 to 4). (See Beck et al. 2000 for details.)
Polarization	After assigning values to the orientation measures (L=-1, C=0, R=1), this variable records the absolute value of the greatest difference between two veto players (of the government). Minimum is 0, and the maximum is 2.
Federalism	The principal component index of several indicators of federalism: 1(municipal governments locally elected), 1(state/province governments locally elected), 1(there are contiguous autonomous regions), and 1(the state/province has authority over taxing, spending, or legislating). A large value indicates more control rights or discretion at the subnational level.

To avoid contemporaneous bias, most of the performance measures are entered in the regressions with their initial-period values. An exception is the ratio of mobile phones to fixed phones. Since it has large time-series variations and for which we are keen to see its impacts on shaping telecommunications policies, it is entered in the regression with lagged one-period values.

Both the OLS and the fixed effects (FE) results are presented in our paper (and for the privatization dummy, we show the Probit estimates when the fixed effects are omitted, and the fixed effect (FE) linear probability model when the country effects are considered). The FE estimates outperform the OLS invariably, according to the F-tests, and the random effects models generally, according to the Hausman-Wu tests. Therefore we focus on the FE-based models in this section. However, the Probit or the OLS results will also be reported to show how the *initial* sectoral performances—which are time-invariant and automatically dropped from the FE regressions—affect the telecommunications reforms.⁸

⁸ We have also tried the fixed-effect SURE model to take into account the cross-equation correlation of the time-varying error term. Without much difference in regressions across equations, the efficiency gains are not large, and not surprisingly, the results remain similar. Since using the fixed-effects SURE model entails the loss of many observations—it requires the same set of observations where all the dependent variables and independent variables are non-missing—we opted to use the FE estimates as our final estimates.

There is the missing data problem in the estimation. For the privatization dummy, we have observations on 167 countries, and for the rest of telecommunications reforms (from the Pyramid source), we have information on 52 countries. However, if we use only the subset that each explanatory variable is non-missing, the estimation samples would be reduced dramatically—in fact, we would lose the vast majority of the sample. The main reason is that each variable has a substantial subset of unique missing observations, yet each variable also has substantial non-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.⁹ More specifically, we use a minimum set of RHS variables (and a minimum set of other excluded 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 (East Asia, Eastern Europe and Central Asia, Mid East and North Africa, South Asia, Western Europe, North America, Sub-Sahara Africa, Latin America), and for time-variant missing variables, we rely on the above 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.

For the estimations on privatization, we use 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. For the estimation of regulation, competition, and tariff setting, we cover 50 countries from 1990 to 1998, for which period we have data on the indices.

Base Results (Table 3)

Table 3 presents the basic results of the determinants of the telecommunications reforms (column 2, 4, 6, and 8).

Strong evidence for neighborhood effects is obtained only for privatization. If the incidence of privatization by its neighbors is increased by 0.5 on average, a country would be 20-

⁹ Little and Rubin (1987) suggest that usually it is far more efficient to impute than dropping any observation with a single variable missing. They suggest using other right-hand-side to impute the missing values of a right-hand-side

30 percent more likely to privatize. However, for regulation, tariff and competition policies, no significant effects are found once we control for country dummies.

Initial characteristics of the telecommunications sector appeared to have important consequences for their telecommunications reforms (see columns 1, 3, 5, and 7 of Table 3). Privatization was more likely when the initial quality of the call was lower; this is consistent with the efficiency argument that privatization was conducted to realize efficiency gains. Other initial characteristics did not affect privatization decisions. Competition intensified where initial teledensity and profitability were lower. This is easy to explain: lower teledensity called for entry; lower profitability captured the heterogeneity of willingness to liberalize. Regulation was better where teledensity is higher (perhaps because there is increasing returns to good regulation), where initial profitability was lower (perhaps capturing the initial regulation quality, which should prevent a too high profitability). Tariff policy was better where profitability was lower (which is not surprising because good tariff system should protect consumers), and where initial labor productivity was higher.

Entry of mobile phones in the market (lagged by one period), which is included in the regression to control for initial market structure, appeared to have a positive effect upon some aspects of telecommunications reforms. Countries with higher ratios of mobile phones to main lines (in logarithm) were more likely to privatize. A one-SD increase of this ratio (i.e., 1.08) would increase change of privatization by 3 percentage points, and raise Q_TARIFF by 0.09, or, roughly 10% of one S.D of TARIFF.

The variables that capture constituents interest—including log(GDP per capita), urbanization ratio, illiteracy ratio, the Gini coefficient, the share of manufacturing, and rural-oriented government--as a whole affected telecommunications reforms as predicted by the constituents-demand hypothesis. Countries with higher income level, higher urbanization ratio, and lower illiteracy rate experienced more dramatic reform of the telecommunications (see the FE estimates). This is consistent with the hypothesis that countries with higher income, urbanization ratio, and more literate people have higher demand for telecommunications services, and would therefore demand reforms that improve capacity expansion and quality of service. Although the Gini coefficient did not have a significant impact on other telecommunications reforms, it did lower the quality of regulation ($t=2.06$), perhaps reflecting

variable. As a result of imputation, the estimates of the effects of the imputed variables are often bias toward zero.

the stronger redistributive pressure from income polarization. Interestingly, a larger manufacturing appears to imply less dramatic reforms in privatization, competition, regulation, and tariff setting. Our preferred interpretation is that manufacturing played the role of special interest capturing telecommunications regulators (or politicians governing telecom) to deter entry and alter tariffs to suit themselves. Surprisingly, governments whose orientation was rural did not have significant impact on any aspect of the reforms by the FE estimates.

The two variables capturing the urgency for the government to privatization, deficit/GDP and inflation, affected the reforms as we expected.¹⁰ More government deficits were associated with a higher probability of privatization. According to the FE specification, a one-SD increase of deficit/GDP (0.06) would increase the probability of privatization by roughly 4 percentage points. In contrast, a higher inflation rate reduces the government's urgency to reform. All these findings are consistent with the vote-maximization hypothesis.

Foreign aid appears to have significant impacts on telecommunications reforms. Aid/GDP significantly increase the probability of privatization. The FE estimates suggest that a one-SD increase of aid/GNP (12.9) would make privatization more likely by 4 percentage points. Aid/GNP, however, did not significantly affect other aspects of the reforms. In contrast, sectoral-specific aid—the World Bank Telecommunications loan dummy (WORLD BANK)—appeared to have more pervasive impacts. The FE estimates suggest that the presence of a World Bank Telecommunications loan (in the previous year) would improve COMPETE and REGULATE significantly. And the magnitudes were not small: compared with countries without WB Telecommunications loans, countries with such loans had a COMPETE that was 1/3 S.D. higher, and a REGULATE roughly 1/6 S.D. lower. Thus, it appears that general foreign aid did help in compensating losers from privatization; and the technical support (the usual contents of World Bank Telecommunications loans) helped strengthen a country's regulation and competition policies. Later we shall show that the effects of WORLD BANK also hinged on recipient country's institutional background.

Ideology appeared to matter for telecommunications reforms. The ideology index--which is constructed as $0.30 \times GV_right + 0.18 \times GV_center - 0.39 \times GV_left$, where GV_j is the probability that a randomly-chosen member of the legislature had ideology j , j being right, left,

or center—measures essentially the inclination toward the political right. Clearly a country with a right-leaning legislature was more likely to privatize and to liberalize. This is consistent with the conventional wisdom that “reform is a monopoly of the political right” (Williamson, 1994). However, the FE results also suggest that REGULATE and Q_TARIFF did not hinge on the ideology index of the legislature.

Overall the institutional environment appeared to matter. Countries with higher respect for rule of law were more likely to privatize and to liberalize, consistent with the notion that, since rule of law increases the credibility of the no-expropriation promise of the government, privatization attempts attracted private investors more easily and as a result privatization and new entry became more likely. Countries with higher average score of democracy were more likely to privatize, though they also had lower Q_TARIFF. The negative impact of democracy on Q_TARIFF appeared to highlight the redistributive aspect that inevitably goes with democratic process (Williamson, 1996). Later we shall show that the interaction of institutional environment with political structure yields a more elaborate portrait.

Executive authority appeared to facilitate telecommunications reforms. One indication of executive authority is executive control over house (i.e. the party of the executive and that of the control party of the legislature is the same). The FE results imply that executive control over house was positively associated with COMPETE (by one third of the S.D.). The other indication of executive control is the checks and balances. The FE results indicate that more veto players meant a reduction of probability of privatization and a drop of REGULATE. Thus, overall it appeared that more executive discretion meant more dramatic reforms, consistent with another conventional wisdom that reforms need, or at least more easier with, an authoritarian regime (Williamson, 1994).¹¹

In contrast, ideology polarization (of the government) appeared to have a strong positive effect on reforms. Both chance of privatization and COMPETE increase with polarization. The change of government composition from homogeneous ideology (polarization=0) to complete representation (polarization=2) implies a change of probability of privatization by 18 percent,

¹⁰ Note that we do not include these two terms in the regressions of REGULATE, COMPETE, and Q_TARIFF. The reason is that these two terms are generally insignificant; and a priori we felt that they should affect privatization more than the other reforms.

¹¹ For instance, consider the military regimes installed in Argentina (1966 and 1976), Brazil (1964), Chile (1973), and Uruguay (1976), Korea and Taiwan. Here we have interpreted “authoritarian” regime in a broad sense, that is, in the sense of the amount of discretion of the executive.

and an increase of COMPETE by roughly 1/6 of one S.D. This is consistent with our interpretation of ideology polarization as meaning a higher percentage of voters are represented in the government thus more efficient bills are proposed and passed as a consequence.

If federalism is “market-preserving” (Qian and Weingast, 1997), we expect federalism to increase Q_TARIFF and COMPETE, two aspects of telecommunications reforms more related to market force. Indeed, this is precisely what we find: one S.D. increase of federalism (by 0.95) would increase COMPETE by a third of a S.D., and raise Q_TARIFF by 15 percent of one S.D. Countries under federalism might also have slightly reduced the chance of privatization (by 2 percentage points, with a t-statistics of 1.62).

As promised, we deliver another piece of evidence in favor of the complementarity of the reforms. The residual of the four FE estimations (columns 2, 4, 6, and 8) are strongly correlated, all significant as the level of p values of 0.0000, as show in Table 3. Most of the correlation coefficients are only slightly smaller than the unconditional correlation coefficient; in fact, the correlation between Q_TARIFF and COMPETE becomes even stronger.

Table 3. Conditional Correlation Coefficients of the Four Aspects of Telecommunications Reforms

	Privatization	COMPETE	REGULATE
Privatization			
COMPETE	0.43 (0.0000)		
REGULATE	0.19 (0.0000)	0.39 (0.0000)	
Q_TARIFF	0.28 (0.0000)	0.80 (0.0000)	0.44 (0.0000)

The Interaction Results

Here, we expand the list of right-hand-side variable by including the interaction terms. Some of the interaction of the right-hand-side variables especially between the institutional environment and the political structure give fairly interesting results. Columns 9 to 12 of Table 3 allow for such interactions.

First, consider the interaction between democracy and political structure. *Democracy and checks/balance* are complementary in facilitating privatization, probably highlighting the role of checks and balance in democratic society in signaling credibility of no holdup by the government. In contrast, democracy and checks and balance are substitutes in improving competition and tariff policies. This is consistent with the notion that more veto players imply more “pork barrel” typed bills that materialized through tariff setting, and that it was more likely to find patronage for monopolist when there are more veto players. *Democracy and polarization*

appears to be complementary in increasing competition. Again, interpreting polarization as a signal of a more participatory society, we interpret this piece of evidence as implying more efficient policy outcomes occur in the presence of wider participation. Democracy and polarization are substitutes in improving the quality of tariff policies. This implies that even after holding constant the number of veto players (checks and balances), more polarized legislature would pass bills with stronger flavor of pork barrels. This is not surprising; after all, the distance in policy tastes for different parties of the polarized legislatures is longer, and more give and take has to occur.

Second, we also explore the determinants of government's promptness to respond to crisis. Both theory and our empirical explorations suggest that the difference may stem from legislature structure. To implement we use $d \text{ probability}(\text{privatize})/d(\text{deficit}/\text{GDP})$ to measure the promptness of response to crisis, allowing the response sensitivity to depend on the structure of the legislature, in particular, checks/balance and ideology polarization. The FE results, column 9 of Table 4, suggest that the responsibility sensitivity can be written as follows:

$$\begin{aligned} \text{Response sensitivity} = & 0.13 + 1.48 \times \text{polarization} + 0.61 \times \log(\text{checks}) \\ & - 0.85 \times \text{polarization} \times \log(\text{checks}) \end{aligned} \quad (2)$$

which implies:

$$\frac{\partial \text{sensitivity}}{\partial \log(\text{checks})} = 0.61 - 0.85 \times \text{polarization} \quad (3)$$

Thus, when polarization is 0—when members of the legislature have homogeneous ideology—the more checks and balances (or better put, the more interest-representers) in the legislature, the faster the government responded to crisis. As discussed earlier, if we only take the veto-player point of view, this is hard to understand--after all, the more parties capable of vetoing the privatization bill, the more likely the privatization will be vetoed, and the slower will the crisis respond. However, more checks and balance in a legislature with similar ideology can in addition be understood as the presence of multiple parties with differences in constituents and thus differences in benefits and costs of privatization. When crisis hits, the parties being hit the most would act as agenda setter and propose privatization bill; since these parties has similar ideology, they find it easy to reach agreement. When polarization exceeds 1 (i.e., when at least two veto players have distinct ideologies), $\frac{\partial \text{sensitivity}}{\partial \log(\text{checks})}$ becomes negative: More checks and

balances slow down the response to crises. When the increase of veto players is coupled with differences in ideology, proposals for policy reforms easily get rejected. These findings are consistent with the notion in Alesina and Drazen (1991): a higher degree of cohesion (here as proxied by low polarization) could facilitate policy reforms in response to crises.

Finally, since World Bank Telecommunications projects might have different effects in countries with different degree of accountability, we interact WORLD BANK with the average score of democracy. Consistent with our expectation, World Bank Telecommunications projects in more democratic countries indeed performed better, especially in improving competition.¹² Our findings on the World Bank's role in reforms are consistent with the recent literature on the impact of foreign aid. World Bank (1998) and Burnside and Dollar (forthcoming), for instance, present strong evidence suggesting that aid improves growth only in a sound institutional environment; Cull (2000) similarly finds that World Bank loans for financial adjustment improved financial development only in more sound policy environments.

VI. CONCLUDING REMARKS

In this paper we have used several new data sources to explore the political economy of telecommunications reforms. Our main findings are:

- The entry of mobile phone boosted the chance of privatization while at the same time improved the price structure.
- *Ceteris paribus*, countries with a worse telecommunications sector—as measured by lower teledensity, profitability, call quality, and labor productivity -- at the initial period, were more likely to privatize or liberalize. This is consistent with the crisis hypotheses.
- Neighborhood or learning effects are fairly strong for privatization, but not for other aspects of telecommunication reforms.
- Countries with higher deficit were more likely to privatize their telecom, presumably because of the larger marginal values of privatization revenues. This is consistent with the crisis hypothesis. Moreover, the speed or the extent of policy reforms depended on the checks/balances and polarization of the legislature. When the government consists of ideologically homogeneous players, checks/balances increased policy adjustment; when the

¹² Note that the dummy for World Bank telecommunications project is not missing in our sample.

government consists of ideologically-diverse players, in contrast, checks/balances slowed down policy reforms.

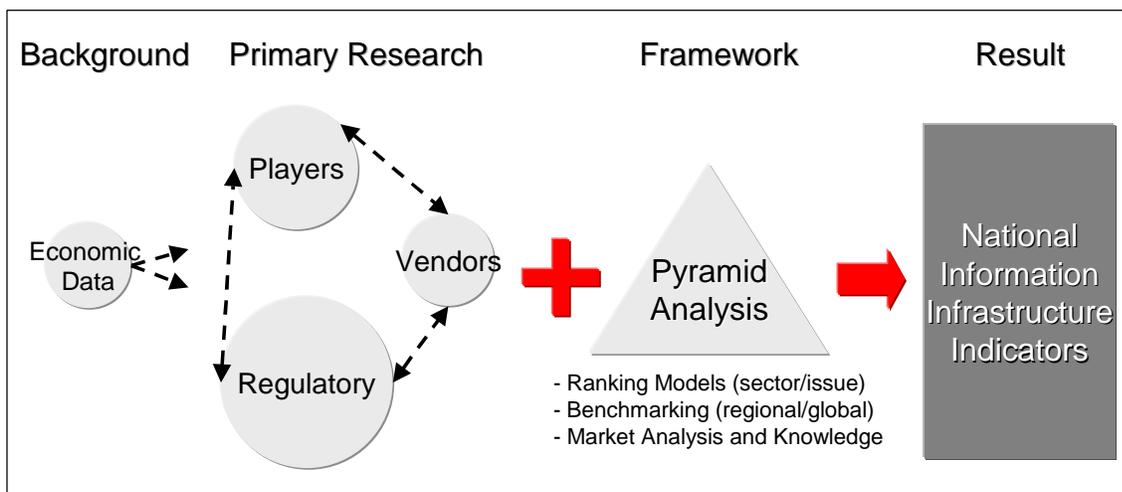
- Countries with higher inflation rates had a smaller chance of privatization. This is consistent with vote-maximizing behavior of politicians.
- There is some evidence that telecommunications reforms reflected the demand of constituents. Moreover, countries with higher manufacturing share in GDP tended to be slower in privatizing and have worse indices of regulation and of tariff structure, consistent with the notion that manufacturing as a special interest group captured regulation.
- Foreign aid in general and World Bank telecommunications projects facilitated reforms in the sector. In particular, World Bank telecommunications projects appeared to improved competition more in democratic countries, consistent with the latest literature on aid effectiveness (Burnside and Dollar, forthcoming; Cull 2000; World Bank 1998).
- Ideology appeared to matter for telecommunications reforms. In particular, a government leaning toward the right was more likely to privatize and to liberalize.
- Perhaps reflecting the stronger credibility, both the rule of law and democracy raised the chance of privatization, and the former also facilitated liberalization. There is some evidence that democratic society had worse tariff structure, perhaps reflecting the greater tendency for redistribution in such societies.
- Executive discretion appeared to have enhanced the chance of telecommunications reforms. Countries whose chief executives also controlled the legislature were more likely to liberalize.
- Checks and balances and democracy were complementary for privatization, but substitutes for liberalization; democracy and polarization in legislature were complementary in liberalization, but substitutes in improving the quality of tariff policies.
- Federalism tended to have a powerful impact in preserving market. On average federalism countries have more competitive Telecommunication sectors, and their tariff structures were less distorted.

This paper has presumed that privatization constitutes good policy reforms. Our future work will examine how the privatization affects performance, especially their interactions with regulation and competition.

Appendix 1. The Pyramid Data Set

To achieve a thorough understanding of these variables, Pyramid analysts relied upon a variety of information sources. These included 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. These factors play an important role in determining the prospects for communications growth in a country and often have the impact of either accelerating or hindering the effects of technological innovation and broader based consumer trends.

The rankings and impact 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. They are based on the market expertise of the relevant Pyramid Analyst and incorporate information and analysis provided by sources outlined in the previous paragraph.



While most of the ranking categories are relatively self-explanatory, the following provide a brief definition and explanation of the ranking approach taken by Pyramid Research.

Regulatory

The regulatory rankings attempt to evaluate the effectiveness and therefore impact of the regulatory structures in facilitating competition and growth in the local communications sector. Each of the items

ranked is considered a critical element in achieving these goals. Due to the complexity of these issues, each item is defined individually as follows:

Regulatory Body Autonomy: This measure evaluates the ability of the regulatory institution to enact policies regardless of any influence from a larger governing body. A neutral ranking implies a regulatory institution that, while maintaining ties to the government, is not wholly or completely directed by other government bodies (such as the President or Congress). Autonomy is critical in that “politics” must be removed from the decision-making process and policy frameworks must, ultimately, be based upon what is ultimately best for the industry and consumers.

Regulatory Transparency: This measure evaluates the extent to which the regulatory body publicly communicates its policies and efforts to the public. A neutral ranking implies an institution where information is available, but where no pro-active effort is made in disseminating that information, particularly to relevant and interested parties.

Competitive

<i>Category</i>	<i>Positive Ranking Implies</i>
Multiple Player Environment	Three or more equally strong players in a market.
Pro-Competition Initiatives	Policies aimed at proactively promoting competition and reducing barriers to market entry.
Interconnection Policy	Policies aimed at facilitating and ensuring that interconnection does not serve as a barrier to good competition and market entry.
Tariff Regime	Policies and a structure that allow for free determination of tariff structures (assuming a competitive environment) with little to no intervention, bureaucracy and red tape.

The Competitive category is based on a subjective evaluation of the factors that enable and facilitate competition in the local communications market. To this end, a neutral rating in each of the categories outlined above imply the existence of unbiased policies or market situations that promote competition (meaning enabling the rise of several equally powerful and competing firms that compete with each other). A positive rating, on the other hand, implies not only positive policies for competition, but also a proactive environment that actually promotes new competition and new technologies (to some extent, almost the detriment of incumbents and mature technologies).

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Table 3. The Determinants of Telecommunication Reforms

	(1)Probit ^Δ	(2) FE	(3) OLS	(4) FE	(5) OLS	(5) FE	(7) OLS	(8) FE	(9) FE	(10) FE	(11) FE	(12) FE
	Privatization Dummy		COMPETE		REGULATE		Q_TARIFF		privatizatoin	COMPETE	REGULATE	Q_TARIFF
% privatization for	0.415	0.600							0.596			
10 neighbors	(8.57)**	(11.09)**							(11.00)**			
avg COMPETE for			-0.155	-0.052						-0.061		
10 neighbors			(1.83)	(0.78)						(0.93)		
avg. REGULATE for					0.191	0.033					0.038	
10 neighbors					(2.65)**	(0.52)					(0.59)	
avg. Q_TARIFF for							0.298	0.018				0.022
10 neighbors							(4.82)**	(0.20)				(0.24)
# cell phone / # main lines _{t-1}	0.019	0.030	0.084	0.028	0.073	0.006	0.072	0.091	0.030	0.030	0.006	0.092
	(2.58)**	(4.17)**	(2.01)*	(0.87)	(1.51)	(0.20)	(1.99)*	(3.25)**	(4.11)**	(0.95)	(0.20)	(3.27)**
Initial main line /100 residents	0.000		-0.041		0.040		0.008					
	(0.39)		(4.02)**		(3.49)**		(0.98)					
Initial profitability	-0.062		-4.224		-1.869		-2.002					
	(0.85)		(6.61)**		(2.60)**		(3.83)**					
Initial Waiting list / #main lines	0.022		-0.025		0.296		0.085					
	(0.58)		(0.13)		(1.38)		(0.56)					
Initial % successful calls	-0.005											
	(4.30)**											
log(initial lab. prod.)	-0.011		0.054		-0.078		0.190					
	(0.98)		(0.52)		(0.66)		(2.26)*					
Log(GDP per capita)	-0.033	0.253	0.773	0.846	0.326	-0.064	0.484	0.444	0.239	0.891	-0.104	0.390
	(1.66)	(6.64)**	(5.24)**	(3.01)**	(1.96)	(0.25)	(4.01)**	(1.82)	(6.26)**	(3.24)**	(0.39)	(1.59)
Urbanization ratio	0.003	0.003	0.000	0.028	-0.002	-0.006	-0.005	0.028	0.003	0.028	-0.002	0.034
	(6.08)**	(1.86)	(0.10)	(1.75)	(0.53)	(0.40)	(1.70)	(2.05)*	(1.89)	(1.76)	(0.13)	(2.41)*
Illiteracy rate	-0.003	-0.003	-0.002	-0.024	0.001	-0.049	-0.006	-0.037	-0.003	-0.029	-0.045	-0.033
	(5.96)**	(1.66)	(0.56)	(1.75)	(0.35)	(3.75)**	(1.99)*	(3.01)**	(1.92)	(2.10)*	(3.39)**	(2.64)**
GINI	0.002	0.000	0.004	0.006	-0.003	-0.021	0.014	-0.009	0.000	0.002	-0.023	-0.012
	(1.64)	(0.20)	(0.50)	(0.55)	(0.34)	(2.06)*	(1.95)	(0.98)	(0.08)	(0.17)	(2.22)*	(1.23)
Manufacturing/GDP	0.001	-0.006	-0.017	-0.011	-0.010	-0.020	-0.012	-0.018	-0.006	-0.012	-0.020	-0.018
	(0.91)	(3.89)**	(2.30)*	(1.13)	(1.24)	(2.21)*	(1.98)*	(2.17)*	(4.04)**	(1.23)	(2.18)*	(2.14)*
Aid/GNP	0.004	0.003	0.003	0.001	0.013	0.001	0.002	0.003	0.003	0.001	0.000	0.003
	(6.96)**	(4.10)**	(0.33)	(0.17)	(1.54)	(0.09)	(0.35)	(0.54)	(4.31)**	(0.12)	(0.03)	(0.40)
1(WB Telecommunication project)	-0.035	0.030	0.323	0.332	0.112	0.168	0.202	0.106	0.040	-0.117	0.141	0.031
	(2.06)*	(1.68)	(3.42)**	(3.83)**	(1.05)	(2.11)*	(2.62)**	(1.42)	(1.67)	(0.87)	(1.06)	(0.26)
Gov. Deficit / GDP	0.261	0.719							0.126			
	(1.46)	(4.78)**							(0.46)			
INFLA	-0.363	-0.099							-0.083			
	(5.14)**	(2.11)*							(1.77)			
ideology	-0.007	0.089	0.089	-0.250	0.255	-0.086	0.323	-0.151	0.094	-0.156	-0.106	-0.183
	(0.67)	(6.13)**	(1.16)	(2.54)*	(2.95)**	(0.95)	(5.09)**	(1.78)	(6.44)**	(1.56)	(1.12)	(2.07)*
GVRURAL	0.463	0.041	-2.576	0.372	-1.645	-0.746	-0.030	0.709	0.089	0.131	-0.727	0.583
	(5.20)**	(0.19)	(4.49)**	(0.46)	(2.54)*	(1.00)	(0.06)	(1.01)	(0.40)	(0.16)	(0.94)	(0.81)
The rule of law index	0.018	0.041	0.108	0.075	0.007	-0.047	0.106	-0.006	0.043	0.046	-0.068	-0.033
	(3.43)**	(5.48)**	(2.68)**	(1.60)	(0.16)	(1.09)	(3.23)**	(0.14)	(5.80)**	(0.98)	(1.50)	(0.77)
avg score of democracy	0.005	0.000	-0.027	0.000	-0.021	0.000	-0.063	0.000	0.000	0.000	0.000	0.000
	(1.81)	(.)	(1.57)	(.)	(1.06)	(.)	(4.38)**	(.)	(.)	(.)	(.)	(.)
1(executive controlling house)	0.006	-0.004	0.300	0.326	0.195	0.058	0.095	0.072	0.010	0.270	0.005	0.006
	(0.43)	(0.22)	(3.22)**	(2.11)*	(1.82)	(0.41)	(1.21)	(0.54)	(0.57)	(1.76)	(0.03)	(0.05)

log(# checks/balances)	0.026 (1.78)	-0.037 (2.54)*	0.387 (3.95)**	-0.073 (0.68)	0.219 (1.99)*	-0.200 (2.00)*	0.233 (2.91)**	-0.083 (0.88)	-0.043 (1.87)	0.165 (1.02)	-0.061 (0.39)	0.048 (0.33)
Ideology polarization	0.034 (3.60)**	0.089 (8.57)**	0.237 (3.38)**	0.159 (2.30)*	0.217 (2.72)**	0.095 (1.48)	0.157 (2.72)**	0.009 (0.16)	0.085 (3.87)**	-0.057 (0.43)	0.171 (1.37)	0.180 (1.54)
Federalism index	-0.025 (2.32)*	-0.019 (1.62)	0.435 (4.91)**	0.284 (4.34)**	0.054 (0.56)	-0.031 (0.53)	0.100 (1.45)	0.146 (2.59)*	-0.015 (1.24)	0.292 (4.55)**	-0.046 (0.76)	0.122 (2.15)*
democracy * Checks									0.009 (1.97)*	-0.083 (2.25)*	-0.044 (1.24)	-0.044 (1.34)
democracy * polarization									0.003 (1.10)	0.041 (1.79)	-0.017 (0.79)	-0.036 (1.80)
WB * Democracy index									-0.001 (0.24)	0.111 (4.17)**	0.011 (0.44)	0.026 (1.08)
deficit/GDP * polarization									1.483 (2.52)*			
deficit/GDP * checks									0.613 (2.08)*			
deficit/GDP * polarization * checks									-0.845 (1.98)*			
Observations	2842	2842	426	417	426	417	426	417	2842	417	417	417
Number of ccode		167		50		50		50	167	50	50	50
R-squared		0.25	0.38	0.30	0.24	0.12	0.54	0.25	0.25	0.35	0.13	0.27

Note.

* and ** represent statistical significance at the 5 and 1 percent levels; t-statistics are in parentheses. The constant is suppressed.

^A Reported are dp/dX, and X is one when X is a dummy variable.

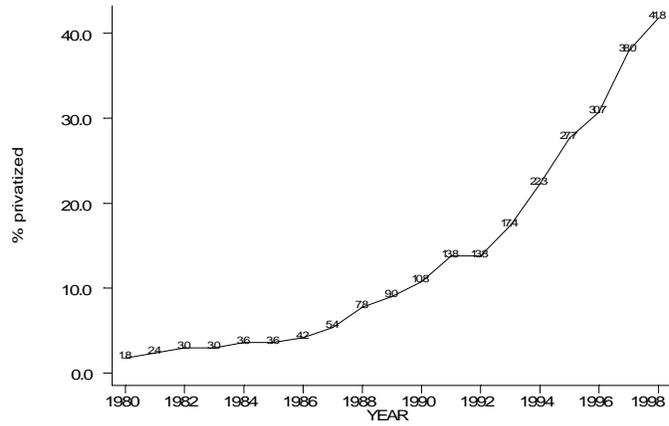


Figure 1. The pace of privatization across the World

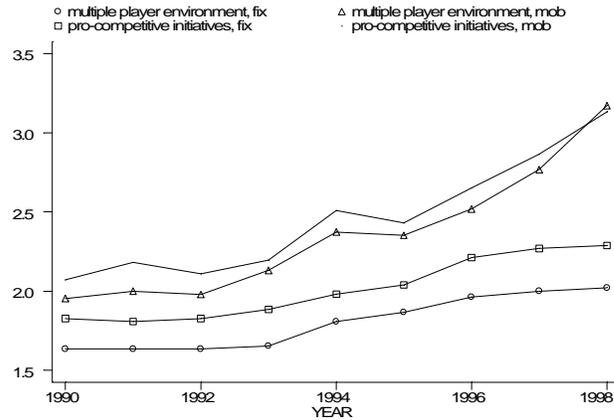


Figure 2. Evolution of competition

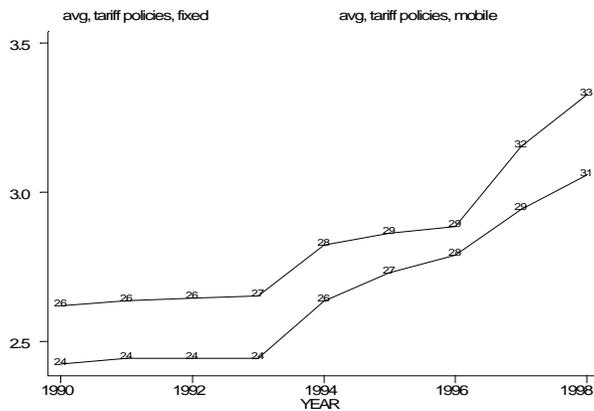


Figure 3. Evolution of tariff policies

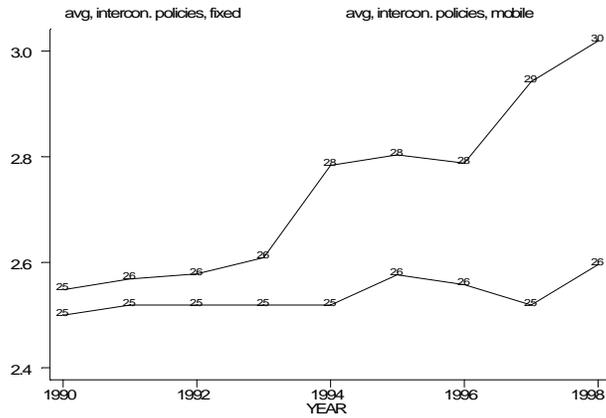


Figure 4. Evolutions of interconnection policies

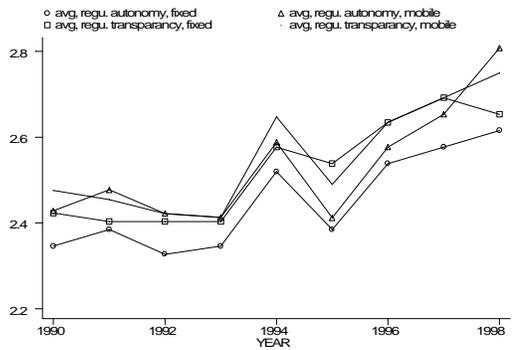


Figure 5. Evolution of regulation

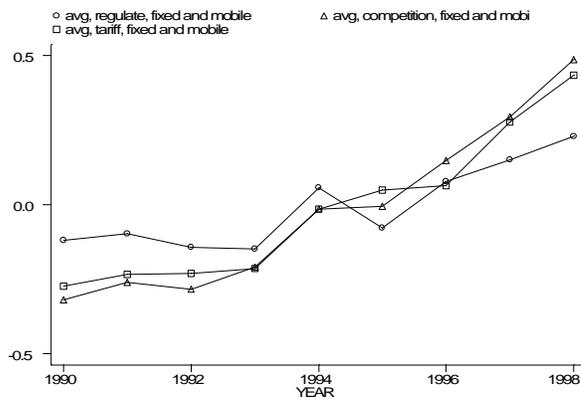


Figure 6. Evolution of the aggregate indices of regulation competition, and tariff policies

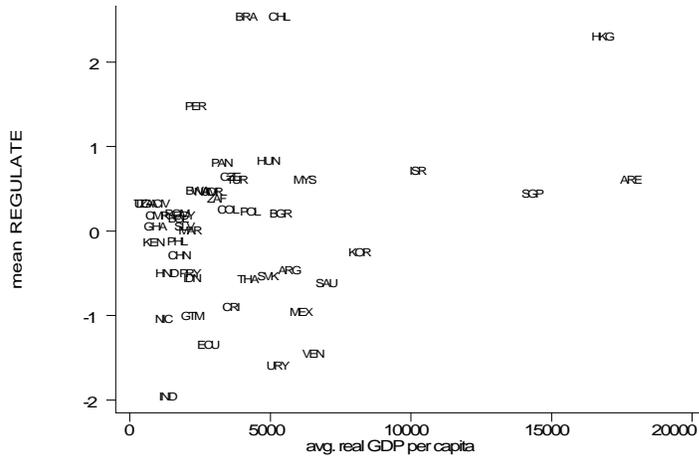


Figure 7. REGULATE and Income level

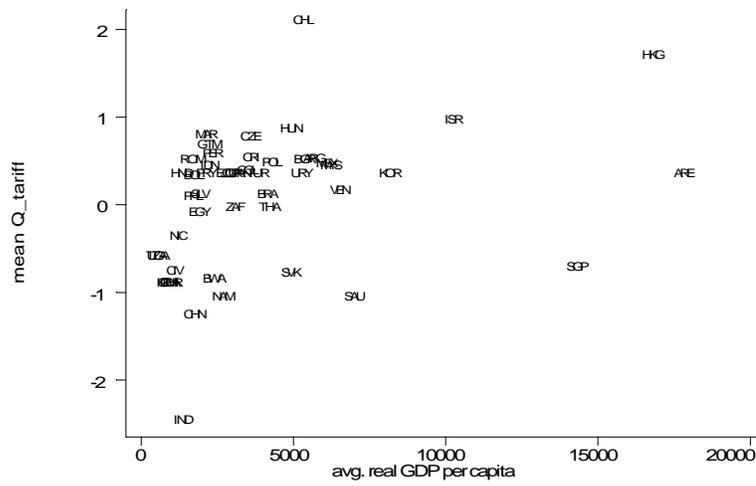


Figure 8. Q_TARIFF and Income level

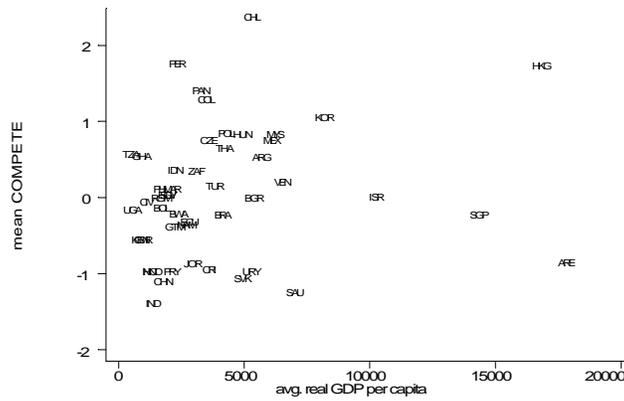


Figure 9. COMPETE and Income level