INSTITUTIONS, REGULATION AND DEVELOPMENT

JEAN-JACQUES LAFFONT

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CONTENTS

FOREWORD

This edition of the Distinguished Lecture Series on *Institutions, Regulation and Development* is a noteworthy addition to the stock of knowledge compiled by ECES. Among the reasons why this lecture is important, three stand out in particular. First, the topic is *timely*, given that Egypt is on the verge of privatizing its telecom and segments of the power sectors. As these activities involve natural monopoly elements, discussion of the regulation of these activities to ensure the efficient operation of firms and the protection of consumers is highly relevant.

The lecture is also important for *intellectual reasons*. It builds on a fast growing area of economics, in particular the principal-agent literature and the economics of information, contract theory and new institutional economics. These theoretical foundations provide solid basis for thinking about various economic problems, including private provision of public services, share cropping, corporate governance and credit allocation.

Last but not least, the lecture is important because its author, *Prof. Laffont,* is one of the architects of modern industrial organization. His contributions to the development of theory are matched by only a few.

Beside the paper presented by Prof. Laffont, this publication includes a summary of the discussion that followed his presentation at ECES. I am certain the reader will, as always, find this discussion informative and very productive. It covers such pertinent questions as: what is an appropriate pricing formula for telecom and power in Egypt? Should we create a super regulatory body for utilities or a regulatory body for each sector? Finally, what is the most appropriate market structure for each sub market within these sectors?

Ahmed Galal

Executive Director, ECES

January 2001

تقديم

يعد هذا الإصدار من "سلسلة المحاضرات المتميزة" والذي يتناول بالتحليل والدراسة موضوع تنظيم النشاطات الاحتكارية، إضافة هامة إلى الرصيد المعرفي للمركز المصري للدراسات الاقتصادية. وترجع أهمية هذه المحاضرة إلى ثلاثة أسباب رئيسية؛ أولها أن هذا الموضوع جاء في توقيت مناسب، خاصة وأن مصر على وشك البدء في خصخصة قطاع الاتصالات وأجزاء من قطاع الطاقة. وبما أن هذه الأنشطة تتضمن بعض عناصر الاحتكار الطبيعي فإن مناقشة تنظيمها لضمان إدارة فاعلة للشركات وكذلك حماية المستهلكين يعد أمر حيوي.

وترجع أهمية هذه المحاضرة أيضا إلى أسباب علمية؛ حيث إنها تستند إلى مجال اقتصادي يتسم بالنمو السريع، وبصفة خاصة الأدب الاقتصادي المرتبط بانفصال الملكية عن الإدارة، اقتصاد المعلومات، نظرية التعاقدات والاقتصاد المؤسسي الجديد. ويشكل هذا الإطار النظري أساسا قويا لدراسة العديد من المشاكل الاقتصادية، بما فيها اشتراك القطاع الخاص في تقديم الخدمات العامة، وتنظيم اقتسام العائد في الزراعة، وأسلوب ممارسة سلطة الإدارة في الشركات، وتخصيص الائتمان. وأخيرا وليس آخرا، تنبع أهمية هذه المحاضرة من أن كاتبها البرفسور لافونت Prof. Laffont يعد أحد المساهمين البارزين في تطوير هذه الموضوعات.

وفضلا عن محاضرة البرفسور لافونت، يشتمل هذا الإصدارعلى ملخص للنقاش الذي تبع محاضرته في المركز المصري للدراسات الاقتصادية. وإنني لعلى يقين أن القارئ سيجد هذا النقاش مفيدا ومثمرا كما اعتاد، حيث إنه يعرض إجابات لبعض الأسئلة ذات الصلة بالموضوع ومنها على سبيل المثال: ما هو أسلوب التسعير الملائم لقطاعي الاتصالات والطاقة في مصر؟ هل يجب إقامة جهاز تنظيمي واحد لكافة المرافق أم جهاز تنظيمي لكل قطاع على حدة؟ وفي النهاية، ما هو هيكل السوق الأكثر ملائمة لكل سوق فرعي داخل تلك القطاعات؟

د. أحمد جلال
المدير التنفيذي
المركز المصري للدراسات الاقتصادية
فبراير ٢٠٠١

ABOUT THE SPEAKER

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Director of the Institute D'Economie Industrielle
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Jean-Jacques Laffont has been Professor of Economics at the University of Toulouse since 1979. He is also the Director of the Institut d'Economie Industrielle, which he created in 1990 and has since become one of Europe's leading centers for economic research.

Laffont obtained his Ph.D. from Harvard University in 1975. He has held visiting positions at the California Institute of Technology, the University of Pennsylvania, Harvard University and the Australian National University. He was President of the Econometric Society (1992) and of the European Economic Association (1998).

Dr. Laffont has published 12 books and over 180 scientific articles. He has made contributions to most areas of microeconomics, including the economics of incentives, public economics, the theory of regulation, and the economics of development. His book "A Theory of Incentives in Procurement and Regulation", co-authored with Jean Tirole, is considered an authoritative statement of the "New Economics of Regulation".

PART I

INSTITUTIONS, REGULATION AND DEVELOPMENT

1. Introduction

The large movement towards privatization, liberalization, and deregulation which has taken place in the Western world has been extended, under the leadership of the World Bank and the United States of America in particular, to transition and developing economies. This crusade was partly motivated by political reasons, supposedly helping to eradicate the totalitarian regimes often in place in these countries. The second motivation was simply that what is good for the Western world is good anywhere. In this paper, I would like to discuss this latter belief by considering the regulation of infrastructures in less developed countries (LDCs) through the eyes of the new regulatory economics.

Let me start with a few methodological remarks. The new regulatory economics treats the regulation of infrastructures as a principal agent problem in which the regulator –the principal– suffers from large asymmetries of information with respect to the regulated firm –the agent. For example, it does not know precisely the marginal cost of a firm that is a natural monopoly. We can distinguish several steps in the analysis. First, we may assume that the regulator is a rational benevolent representative of the population who is unrestricted in the contracts it can design for the firm. We can then rely on a fundamental result of economic theory, the Revelation Principle. Any form of regulation is equivalent to a truthful revelation mechanism through which the regulator elicits in an incentive-compatible way the private information of the firm and then instructs the firm about the production level to achieve (by *incentive-compatible way,* I mean a way which respects the strategic private interests of the firm which are different from the regulator's ones).

Within this paradigm we can discuss our question by using a comparative statics analysis of a model borrowed from the new regulatory economics. A developing country has parameter values that are different from those of a more developed country: a higher cost of public funds due to an inefficient tax system, a higher cost of auditing and control due to a lack of human and financial

resources, lower transaction costs of side contracting due to less control, greater family ties or traditions, weak technical knowledge, greater asymmetries of information, etc.

This simple framework is sufficient to discuss some issues concerning the methods of regulation, in particular the large debate about the choice between rate-of-return regulation or price-cap regulation. If we can identify relevant characteristics of LDCs, then we can develop specific recommendations for regulation in LDCs, everything else being fixed. Of course, one might want to affect those characteristics as well.

The next methodological step is to recognize that contracts available to the regulator are incomplete and more so in developing countries. This is due to stronger limited liability constraints, which restrict the possible penalties, or to weak abilities to commit, which favor opportunistic behavior.

Such a framework is needed to discuss the structure of regulation, for example the pros and cons of the multiplicity of regulators, either from a geographical point of view (the question of decentralization), or from a functional point of view (the question of one regulator per industry or a single regulator and the question of the integration or separation of competition policy and regulation).

To an extent, we can identify some specific contractual limitations LDCs in particular will face. Some characteristics such as the ability to commit, for example, rely on reputation effects and therefore on beliefs, and some new questions appear such as the possibility or not to transfer experience by affecting beliefs more quickly than through the only history of the particular country under consideration, or of the usefulness of third parties to help strengthen commitment.

The final step of the analysis is to give up the myth of the benevolent regulator (or politician) and take into account the incentive problem existing in the delegation to regulators or politicians of economic policy. We enter then the political economy of regulation. In this respect, the specificities of LDCs are also very strong. The lack of democracy and the lack of counter-powers induce very different behaviors of regulators and call for very different modes of intervention from outside agencies. Such a framework is particularly necessary when discussing privatization, competition policy or universal service.

These methodological remarks lead me to a discussion broken into four sub-topics. In Section 2 of this paper, we will see how the trade-off between rate-of-return regulation and price-cap regulation can be modeled by the economics of information, and how consideration of the characteristics of LDCs leads to a view in terms of stages of development, each one calling for a different trade-off. In Section 3, we will study a simple example of structural regulation by considering the pros and cons of the separation of regulators as an instrument against capture. This will lead to a notion of a vicious circle of underdevelopment. In Section 4, we will consider the major issue of access pricing in the liberalization of infrastructures and outline the specific recommendations we may have for LDCs based on the new regulatory economics.
Finally, Section 5 will discuss the privatization of natural monopolies in a non-democratic country and, through a positive theory of privatization, raise the issue of the legitimacy of outside intervention in such countries.

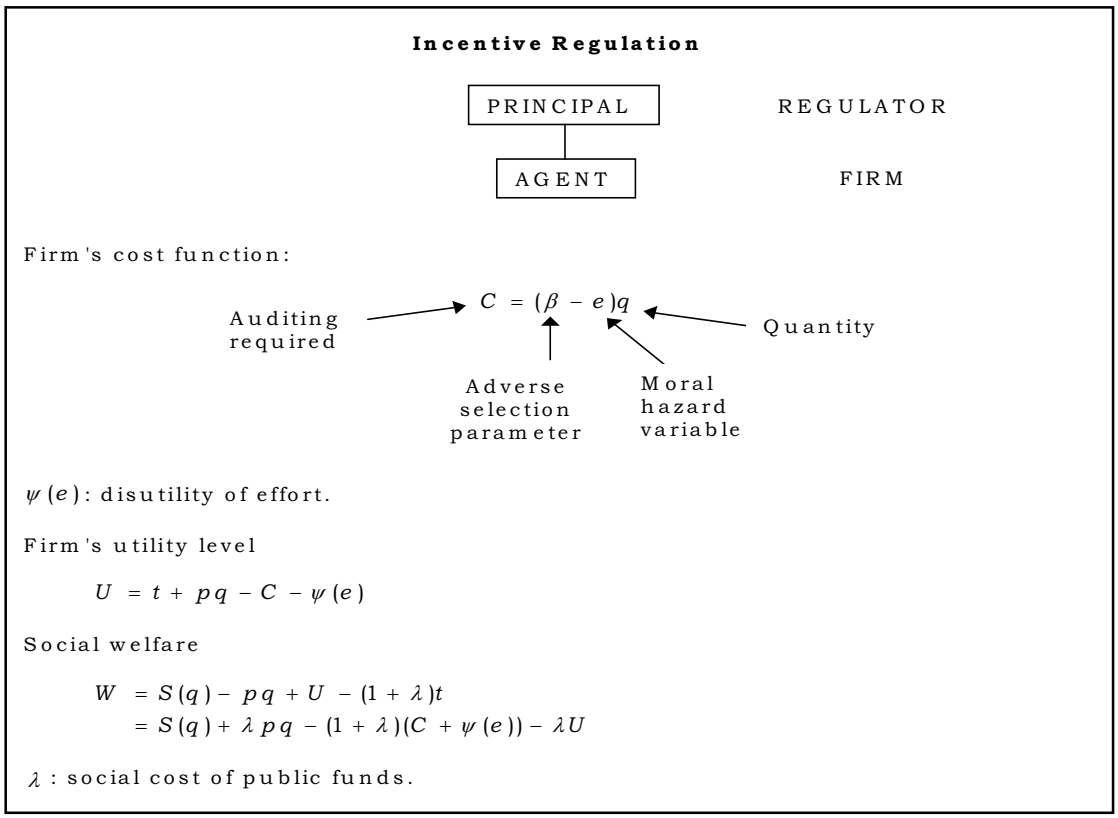
2. Incentive Regulation and Development

Following the pioneering application of incentive theory to regulation by Loeb and Magat (1979), and Baron and Myerson (1982), the 1980s have witnessed the emergence of a new theory of regulation that emphasizes the asymmetries of information between government, regulatory commissions, firms, and various interest groups.

Consider the regulation of a natural monopoly which has private information both on its technological characteristics (adverse selection parameter) and on an effort variable (moral hazard) that decreases costs but creates a non-monetary disutility to the firm's management (see Box 1). Cost is ex post observable by the regulator who can determine the pricing rule and the cost reimbursement rule. However, when high costs are observed, the regulator does not know if it is because the firm is technically inefficient or because of low effort levels. This asymmetric information about the firm's costs implies that an informational rent must be given up to the firm when it is efficient, since it can always mimic the inefficient firm and realize the same cost with

a lower effort level.[1] Note that this rent increases in direct relation to the amount of effort required from an inefficient firm.

Box 1. Incentive Regulation



Assuming a utilitarian regulator, social welfare equals the sum of the net surplus of consumers and the firm's utility level minus the social cost of the net transfer from the regulator to the firm. Because of the need to use distortive taxation to finance this transfer, we use the social cost of funds to evaluate it. This social cost of funds implies that it is socially costly to give up a rent to the firm, since any dollar that can be captured from the firm enables the government to decrease the distortive taxes by one dollar, which costs more than one dollar to society. The regulator will

[1] See Laffont and Tirole (1993).

want to decrease this costly rent and will be led to distorting the allocation of resources for this purpose, i.e., to accept inefficiencies.

Optimizing expected social welfare under incentive and individual rationality constraints of the firm, the regulator determines the optimal trade-off between efficiency and rent extraction, and optimal pricing. The trade-off between efficiency and rent extraction is determined by the cost reimbursement rule. Full reimbursement of cost enables the regulator to perfectly control the rent given up to the firm, but induces large inefficiencies because there is no incentive for cost minimization. At the other extreme, payments independent of cost induce proper behavior of cost minimization, but in general leave large rents to the firm.

The second part of optimal regulation is the pricing rules, which reduce here to the Ramsey pricing rules. More specifically, relative deviations of prices from the marginal costs evaluated for the effort level induced by the cost-reimbursement rule are inversely proportional to the superelasticities of the commodities considered. The coefficient of proportionality is increasing in the cost of public funds. If this cost is zero, we have marginal cost-pricing. If it becomes very large, we have monopoly pricing.

As we have stressed above, a major characteristic of developing countries is the high cost of public funds. It is easy to see that this high cost calls for higher prices of the commodities produced by the natural monopoly and for lower-powered incentive schemes or low efforts due to high shares of cost reimbursement. This is, of course, because a higher cost of public funds means a higher cost of giving up rents and also a higher cost of inefficiencies. Relatively speaking, however, the cost of rents increases faster. This is because the cost of an additional rent is proportional to the social cost of funds while the cost of the project itself is proportional to the price of social funds, i.e. one plus the cost of fund. Optimal regulation sacrifices some efficiency to decrease those rents. Thus, for LDCs, there is an argument favoring cost-plus schemes vis-à-vis fixed-price schemes, or rate-of-return regulation versus price-cap in the language of regulation theory.

Monitoring of effort generally enables the regulator to reduce the informational rents and calls for higher-powered incentive schemes, i.e., incentive mechanisms which induce higher effort

levels. A less-efficient monitoring technology of a LDC will call for relatively less powerful incentive schemes. Indeed, low incentives and monitoring are substitute instruments to extract the firm's rent. A decrease of the use of one instrument makes the other instrument more attractive. An increase in the cost of public funds induces low incentives both directly, and indirectly through a decrease of the more costly monitoring.

We have emphasized so far the strong assumption of perfect observability of costs. In practice, costs are imperfectly observable. Noisy cost observation in itself is not a problem as long as risk neutrality can be maintained, but one must also take into account the possibility of cost padding, i.e. the many ways in which a firm can divert money. Cost can now be increased by undue charges that benefit the management and the workers. Note that the existence of cost padding is itself the result of the regulator's desire to extract the firm's rent. Cost padding would never arise if the regulator offered a fixed price contract, since the firm would pay the entirety of each unit of money diverted.

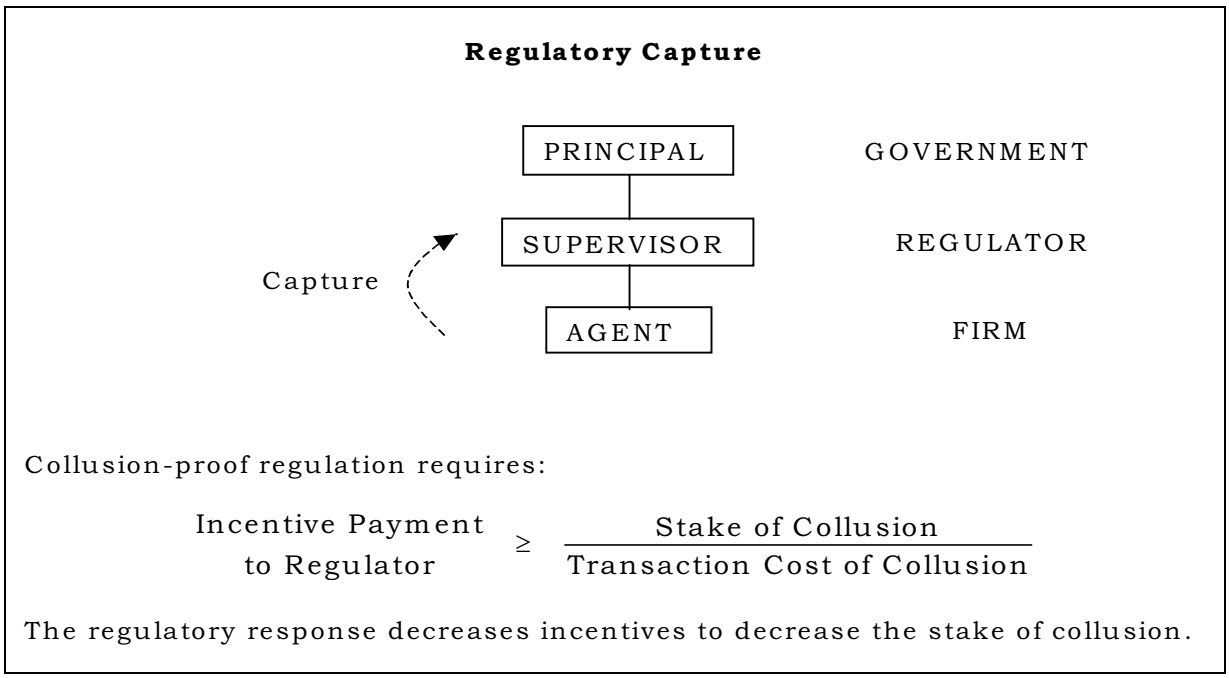
Imperfect auditing of cost padding calls for a shift toward higher-powered incentive schemes. In the extreme, if auditing did not exist, only fixed-price contracts would be possible. Indeed they would be the only ones preventing unlimited cost padding by making firms residual claimants of their costs. It is therefore intuitive that a deterioration of the auditing technology, as can be expected in developing countries, will induce an even higher desire to shift toward fixed-price mechanisms. This effect is reinforced by the savings of auditing costs allowed by fixed-price mechanisms in countries with high cost of public funds. This conflicts with the findings of the previous section and we will return to it.

The next consideration we want to integrate is the necessary decentralization of regulation to regulatory agencies or ministries. A main role of these institutions is to bridge partially the information gap between the public decision maker and the regulated firm. But then a new issue appears: the possible capture of the regulatory agency by the firm. Such collusion will occur with greater probability if the stakes of collusion are high, if the cost of side transfers between the firm and the regulator are low, and if no incentive mechanism is in place for the regulators.

The stake of collusion amounts to the informational rent that an efficient firm obtains when the regulator hides the fact that the firm is efficient. From our previous analysis, this rent is increasing with the level of effort chosen by the less efficient firm (since it is equivalent to the gain obtained by an efficient firm when it mimics an inefficient one).

The maximum bribe that a firm will be willing to offer to the agency is this stake. However, it should be discounted by the price of internal transfers, which includes the costs of being discovered as well as the need to use often indirect transfers that are less efficient than monetary transfers. Capture is avoided if the agency is paid an amount larger than the discounted value of the stake of collusion when it reveals the firm is efficient (we will call this constraint the collusion-proof constraint) (see Box 2).

Box 2. Regulatory Capture



In the simplest cases, the regulatory response to the fear of capture is to satisfy the collusion-proof constraint at the lowest possible cost. This includes shifting optimal regulation toward cost-plus schemes to decrease the stake of collusion, and improving monitoring to increase the cost of side transfers.

Three features of developing countries call for even higher shifts toward cost-plus mechanisms. First, we can expect a lower cost of internal transfers because of less monitoring of illegal activities. Second, incentive payments to the agency are more costly because of the higher cost of public funds. Third, it may be politically more difficult to create such strong incentive payments.

Thus, the discussion can be summarized by putting forward the notion of stages of development. In stage one of development, the auditing mechanisms are so bad that powerful incentive schemes should be advocated either through fixed-price procurement mechanisms or price-cap regulation. They promote short run efficiency, but are very costly in terms of required rents, favor ex post inequality and encourage some types of corruption. This stage should be used to develop a good auditing system. Once it is in place, one should switch rather discontinuously to stage two of development by moving toward low powered incentive schemes. As development progresses, it will be optimal to move slowly toward more powerful incentive schemes in stage three.

Note that this theoretical view fits well the historical evolution of the regulation of electricity in the Western World. In the 19th century and the beginning of the 20th century, electricity companies were regulated by price-caps that evolved by introducing various forms of indexing and pass through clauses. Then, we had the discontinuous event of nationalization in Europe and creation of rate-of-return regulation in the USA which, in both cases, correspond to the low powered incentive schemes referred to in stage two. Finally, we have seen more recently a strengthening of incentives by moves towards price-cap regulation with different uses of cost observability that weaken their strength of incentives.

This section has illustrated the fact that the debate between price-cap regulation and rate-of-return regulation for developing countries can be discussed within the paradigm of a benevolent regulator. Of course, further complications associated with contractual limitations, such as the ratchet effect due to limited commitment, or with political economy, such as the dependence of regulation on the types of capture of the government, should also be considered for a complete analysis.

3. Separation of Powers

It is well recognized now that the design of proper institutions is key to development. Among the characteristics of governmental institutions, the separation of powers is a fundamental cornerstone of democracy. Article 16 of the French Declaration of the Rights of Man of 1789 goes as far as saying, "A society in which the guarantee of rights is not assured, nor the separation of powers provided for, has no constitution." Later, Hamilton and Madison in the Federalist Papers referred to Montesquieu as "the oracle who is always consulted and cited on this subject." They put these principles into practice for the American Constitution within a broader view of checks and balances. Yet despite this history, it is only recently that economists have started modeling the value of separation of powers.

Separation of powers is valuable, but not easy to implement because it is costly, it affects the transaction costs of collusion and because the "separated" powers may collude. The cost-benefit analysis of separation of powers depends on the characteristics of the country. I want to ask now how the net value of separation of powers is affected by the level of development. More specifically, and more modestly, we will consider the regulation of an industry and we will ask how the value of duplicating regulation changes as various parameters characterizing the level of development vary.

A first reason for duplicating regulation agencies is yardstick competition. Using the correlation of the signals obtained by these agencies enables the principal to extract in a costless way their information rent. Alternatively, separation helps create incentives for individual regulators to take up activities that have negative externalities on the others (for example each regulator may act as an advocate of a given cause).

A second and related reason for separation of powers is to act as a device against regulatory capture. This general idea has been known for a while by political scientists (Moe (1986), Wilson (1980), Mueller (1997)). The Public Choice school has emphasized the fact that institutional rules may be designed to discourage rent seeking behavior. Rose-Ackerman (1978) and Congleton (1984) have argued that increasing the number of individuals who must be bribed before getting a permit may be optimal. Laffont and Martimort (1999) have provided a modeling

of the idea that the separation of powers can act as a device against regulatory capture, establishing that this function must be distinguished from yardstick competition, which is a pure informational competition.

A third reason reported in Moe (1986) is that separation of powers may be beneficial when intertemporal commitment is limited. It may act as an indirect way to commit. Agency models have been developed recently to capture this idea (Olsen and Torsvick (1993), Tirole (1994), Martimort (1995)).

Here I will pursue the second idea, namely that separation of regulators may act as an instrument against regulatory capture.

Consider a simpler version without moral hazard and cost observability of the regulation model considered above in which the marginal cost of the regulated firm can be low, corresponding to a good type (efficient) firm, or high, corresponding to a bad type (inefficient) firm. The social welfare maximizer (SWM) who is uninformed about this marginal cost wishes to maximize expected social welfare. The good produced by the regulated monopoly is a public good and there is a cost of public fund. Because the marginal cost is private information of the firm, the SWM must again give up an information rent to the firm when it is a good type. To mitigate this cost, the SWM delegates the task of supervising the firm to regulators. A regulator observes a signal correlated with the marginal cost. This enables the SWM to decrease the information rent. More precisely, a regulator discovers in a verifiable way the true value of the marginal cost with some probability, when it is the low value.

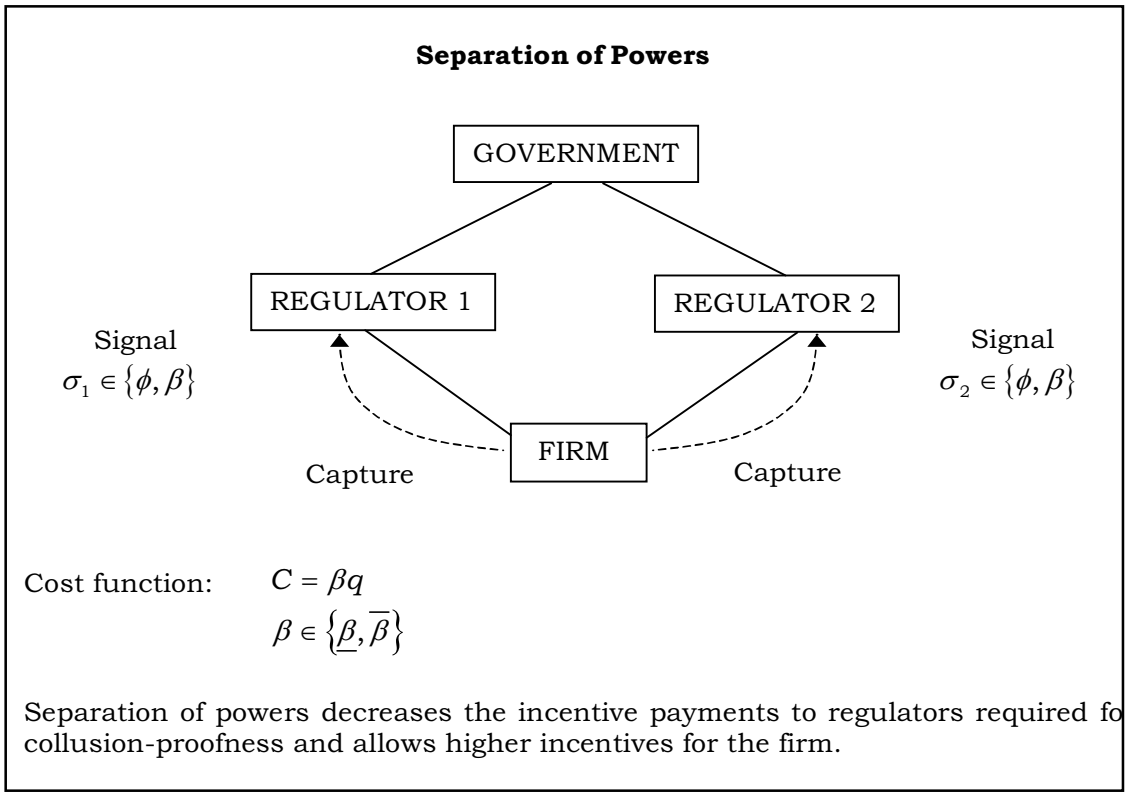
Two supervision technologies are available, corresponding to two signals which may or may not be correlated. One can either give the two technologies to a single regulator or use two regulators, each one associated with one technology (see Box 3). Regulators are risk neutral and face a limited liability constraint, which implies that their payments must be non-negative.

When a regulator transmits his signal to the SWM, the firm loses its information rent. The regulator has the discretion of hiding the signal he has observed and therefore there is a risk of capture. Collusion-proof regulation requires a payment to the regulator when he reports the signal that the firm has a low cost that is greater than the stake of collusion (which is here

proportional to the size of the asymmetric information) discounted by the inverse of the transaction cost of collusion.

First we characterize, with one regulator, the optimal collusion-proof regulation. Again we use three parameters to characterize a low level of development: a higher cost of public funds, lower transaction costs of collusion, and greater asymmetric information. We obtain that all these parameters have the same effect on the power of incentives in the optimal collusion-proof mechanism. As explained in the previous section, optimal collusion-proof regulation should be less high-powered in less developed countries.

Box 3. Separation of Powers



Similarly, when we characterize optimal collusion-proof regulation with two regulators, the separation of powers saves on incentive payments for regulators and produces a higher powered optimal regulation. The intuition is as follows: When one regulator reports truthfully his observations, he makes impossible a side contract between the firm and the other regulator. He

creates a negative externality on the other regulator. A single regulator internalizes those externalities. Independent regulators do not internalize those negative externalities and, in some sense, this increases the transaction costs of collusion. Therefore it decreases the incentive payments required to avoid collusion and favors higher powered incentives.

We can then study how the gain from separation varies with the parameters characterizing development. The gain from separation of powers is related to the savings on incentive payments for regulators and therefore it increases with the cost of public funds, greater asymmetric information or lower transaction costs of collusion. We may thus conclude that the separation of powers is more valuable in developing countries.

But, three factors limit the value of separation of powers. First, there is the possibility that the regulators collude and coordinate their collusive behavior, which is greater in less developed countries. There is the mere cost of an additional regulator, which is higher in a developing country with a higher cost of public funds and, if we believe that the transaction costs of collusion decrease when the regulator is more specialized, this weakening effect is higher for countries with low transaction cost of collusion. We obtain then that the implementation of separation of powers is more costly in developing countries.

This last result is important to moderate the enthusiasm of recent development economics, which sees (rightly) institution building as key to development. Even though improvements in institutions are even more valuable in developing countries than developed ones, it is unfortunately more difficult to implement them in such countries. The implementation of the institutional separation of powers is therefore more useful and more costly for the same reasons, leaving us with an ambiguous overall net result if the various weaknesses of these countries are not addressed simultaneously.

I believe that this type of result is quite general, and more research is needed to go beyond the indeterminacy stressed here.

4. Liberalization and Development

The former natural monopolies for public services in telecommunications, electricity, gas, transportation, etc. have been reconsidered. Parts of these firms, such as long-distance services in

telecommunications or generation in electricity or gas, are now viewed as potentially competitive and consequently opened to competition. Other elements are still considered as natural monopolies like the transmission grid in electricity, the tracks in railways and remain regulated, eventually with new forms of regulation like incentive regulation.

The management of the interface between the competitive and regulated sectors is crucial for the success of liberalization. The conditions under which competitors can access the regulated sector that is an essential input for their activities determine the profitability of entry and therefore the level of competition in the sectors opened to competition, as well as the efficiency of the utilization of the natural monopoly elements.

Despite their vital role in the success of liberalization viewed as a key institutional change for development, no specific proposals of desirable access pricing rules for developing economies are currently available. The pricing of interconnection is highly dependent on the market structure. One can distinguish three different situations.

In case 1, there is vertical disintegration. The firm controlling the bottleneck (the natural monopoly) is not allowed to compete in the provision of services using the bottleneck as an input. In case 2, the firm controlling the bottleneck is one competitor among many providing services using the bottleneck as an input. Finally, in case 3 competition takes place between vertically integrated firms and each controls a bottleneck and provides services.

The first question to ask is whether the characteristics of developing countries favor one market structure over another.

The comparison between cases 1 and 2 rests essentially on a comparison between the economies of scope that vertical integration makes possible, and the problems of favoritism it raises. Since the economies of scope are likely to be independent of the characteristics of developing countries (at least for given technologies) while, on the contrary, favoritism is more difficult to fight in LDCs, there should be a bias toward vertical disintegration in these countries.

The comparison between case 2 and case 3, however, rests on a comparison of the fixed costs that will be associated with the competition in the provision of a "bottleneck" (like local telephony) and the gains one may expect from this competition. The comparison here is difficult

for the LDCs where the high cost of public funds makes more expensive both the duplication of fixed costs but also the information rents of a monopolistic provision of the bottleneck.

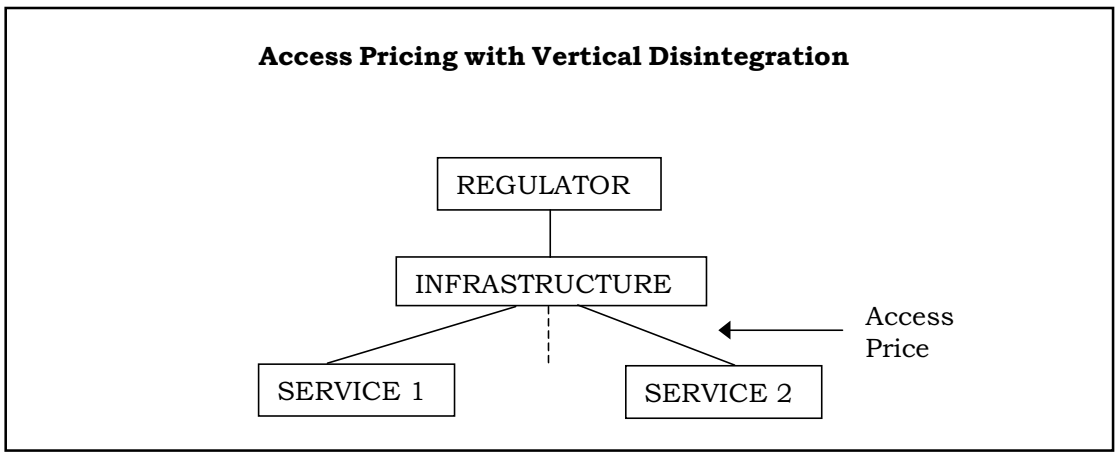
These comparisons are further complicated by the dynamics of an industry that may be moving toward case 3 such as the telecommunications industry. In such a case, vertical disintegration may in fact slow down the emergence of competition among vertically integrated firms providing both local and long distance telephony. Advising vertical disintegration may then be particularly inappropriate.

However, for railways (when road competition is insufficient), gas or electricity, vertical disintegration of the track, the pipelines or the transmission grid from transportation or generation can be strongly advised if competition in services is introduced.

In all these cases one has the choice between a single regulated entity owning the tracks, the pipelines, or the grid, or between a shared ownership of the bottleneck by the users who agree on rules for using it. The comparison here is between the inefficiency of regulation and the "free ride" problems of joint ownership. In a country where regulation is easily captured, one may favor the second scenario.

Consider first the case of an independently owned infrastructure. The utility owning the infrastructure sells wholesale services to other firms who market final services to the consumers (see Box 4).

Box 4. Access Pricing with Vertical Disintegration



The simplest case arises when the final services are produced by competitive industries at some constant marginal cost. In this case, it is as if the utility produced the final services itself at a unit cost equal to its own cost of providing access to the competitive downstream firms plus the latter's unit cost of producing the final services.

The Ramsey formula can be applied to the prices charged for access to the utility's infrastructure and they can be decentralized through a price-cap on access charges. Theory tells us that the excess of the access price over the marginal cost of access for a good relative to the access price for that good should be inversely proportional to its demand price superelasticity. The decentralization of Ramsey pricing by price-caps enables the regulator to rely on the demand information of the regulated firm (even if we still have the difficult choice of weights in the price-cap).

The demand information is naturally located with the users of the infrastructure. The utility can infer this demand information from the demand for access as long as the users report truthfully the type of final good for which they use the infrastructure. For example, for railways, this requires each shipper to specify truthfully the content of their cargos. This additional agency problem may be a serious issue in countries where one cannot expect a non-corrupted inspection system of cargos to be workable. This is particularly problematic with a very large number of users, as we have implicitly assumed here.

We can then issue a first warning: *In LDCs, for a very competitive usage of the infrastructure, Ramsey pricing of the infrastructure should be based on broad categories of usage that do not raise complex inspection issues and should be decentralized by price-caps*. Note that, in this case, decentralization is only partial in the sense that the regulator will still have to make sure that the firms use the correct classification of services into the different categories.

Consider now the opposite simple case where each user is a monopoly in one independent market. Theory tells us that with market power of users, the marginal access charges should subsidize access and excess profits of users should be recovered by fixed charges, and more generally by non-linear pricing.

Such a policy requires a lot of knowledge from the regulator and raises issues of favoritism in price discrimination. In the absence of long-term contracts, there is a potential for expropriation of some large users' investments. In countries with little technical expertise and low transaction costs of collusion, the complexity and potential discretion involved lead us to a second warning: *In LDCs the regulator should not attempt to undo the monopoly power of users of the infrastructure with access prices. Alternative policies should be used to foster the competitive use of the infrastructure.*

For example, the control of monopoly power of a user can be undertaken by the competition agency or by an appropriate policy of marginal subsidization and profit tax. The regulator can, as before, use a simple price-cap regulation. What is really needed is more instruments. But in general, the regulator is not given tax instruments and can only achieve very imperfectly multiple objectives with the single instruments of access prices.

Access pricing based on the Ramsey principles raises additional problems. When the regulator designs the tariffs, the discretion surrounding the determination of elasticities raises the problem of capture (when a price-cap is used, the problem is transferred to the choice of weights). Therefore, a non-discretionary method for choosing weights in the price-cap should be selected (for example, last year quantities and an exogenous change in the level).

In practice, the choice of a good starting point for price-cap regulation is difficult and is generally based on past prices. It is a crucial area where benchmarking made by good experts would be very useful and LDCs should be helped in this task.

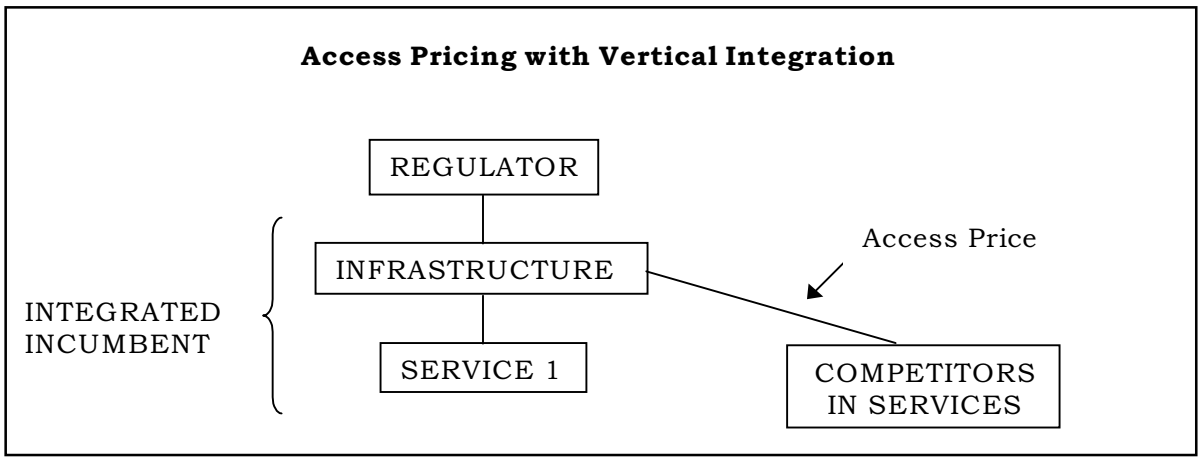
Price-cap regulation with reviews is viewed as the best and simplest way to strike a balance between rent extraction and incentives for cost minimization. However, in countries with little credibility one may argue that rate-of-return regulation offers a more reassuring environment.

First, in addition to the traditional problems of rate-of-return regulation, the specificities of LDCs favor price-cap regulation as we have discussed above. The drawback of giving up too much rent is weakened by the urgent need to attract capital. Second, rate-of-return regulation is not necessarily more effective in committing to a fair treatment when the government has little credibility to fulfill its promises.

We consider now the case of a vertically integrated utility (the incumbent) which provides access to the infrastructure and which also sells a service using the infrastructure. The problem here is to price access for other providers of services using the infrastructure (see Box 5).

We will only consider the case of competitive users with constant marginal cost providing a service that is an imperfect substitute of the service provided by the incumbent. Two sub-cases must be distinguished. In the first one, competitors are providing new products that are not (or cannot) be provided by the incumbent.

Box 5. Access Pricing with Vertical Integration



Theory tells us that if the services provided by users of access to the incumbent do not compete seriously with the services sold by the incumbent, a global price-cap should be favored, or more generally, regulation of such access should be treated just like regulation of an end-user service. Under such treatment, the owner of the infrastructure has good incentives to favor interconnection that will increase business.

However, there may be problems if there are congestions and pricing is not flexible enough to allocate the infrastructure with prices. If rationing occurs, then favoritism of the incumbent may happen again, and this may be particularly serious in LDCs.

In the second case, competitive users offer services that are very close substitutes of the services provided by the incumbent. This is the difficult case. Theory tells us that when entry

leads to business stealing, the access price should be higher than the marginal cost corrected by the Ramsey own elasticity term.

A regulation that does not allow this "competitive" response of the incumbent will create incentives for exclusionary behavior. Examples include telecommunications in Ghana and Columbia.

A good policy might be to allow a generous access pricing rule for the incumbent and to focus regulatory resources on implementing quick and high quality interconnection. One possibility is to use the Efficient Component Pricing Rule (ECPR) which prices access at the opportunity cost for the incumbent of losing a customer. If accounting is not available for calculating the incumbent's cost, one may, in the competitive context considered here, use the marginal cost of the entrants unless the incumbent can demonstrate that his cost is lower.

Summarizing, when the competitive entrants offer services that are highly substitutable with the incumbent's services, ECPR supplemented by active regulatory oversight to favor non-discriminatory interconnection can be used. Alternatively, one can use a global price-cap supplemented by maximal access prices defined by ECPR.

5. Privatization

The revelation principle serves as a good reference point of any theory of privatization through the Sappington-Stiglitz (1987) irrelevance result. Ownership does not matter for a benevolent government unrestricted in contracting. To give any substance to privatization requires relaxing either the complete contracting assumption, the benevolence assumption, or both.

Various models explore how privatization may mitigate contractual incompletenesses. Limited commitment, for example, may destroy incentives to invest in specific assets by fear of expropriation. Privatization, which increases asymmetric information for the government, may improve those incentives, as argued by Schmidt (1996a).

Common sense suggests, however, that political interference by governments with private agendas is the major driving force of privatization. The above incomplete information and incomplete contracting arguments must certainly be combined with a more cynical view of government.

In the existing literature, the non-benevolence of governments is combined with the fact that ownership affects directly either the information structures (in Shapiro-Willig (1990) or the ability of governments to extract rents (Shleifer-Vishny (1994), Boycko, Shleifer and Vishny (1996), Bennedsen (1996), Laffont (1996)).

For example, in a random majority model I considered in 1996, the intuition is as follows: majorities differ in their appropriation of the informational rent of the regulated firm when this firm is private, leading to a detrimental alternation of too high powered and too low powered regulation. Public ownership in this model leads to uniformly too high powered incentives, a situation which may be less favorable for some parameter values (see Box 6).

In a democratic country, even if we recognize the capture of majorities by their constituencies, there is room for a normative approach to privatization at the constitutional stage if we believe that, at such a stage, the constitutional designer is benevolent. However, such an approach is certainly meaningless in non-democratic developing countries. What are needed in such countries are positive theories of privatization which help them understand when privatization may occur.

In a model developed by looking at Sub-Saharan Africa (Laffont and Meleu (1999)), I argue that the ruling politicians will privatize only when the benefits they derive under the public monopoly regime become smaller than those they can achieve through privatization (see Box 6).

Let me call δ an index of corruption of the government. As δ is larger, it means that the objective function of the government is further away from social welfare.

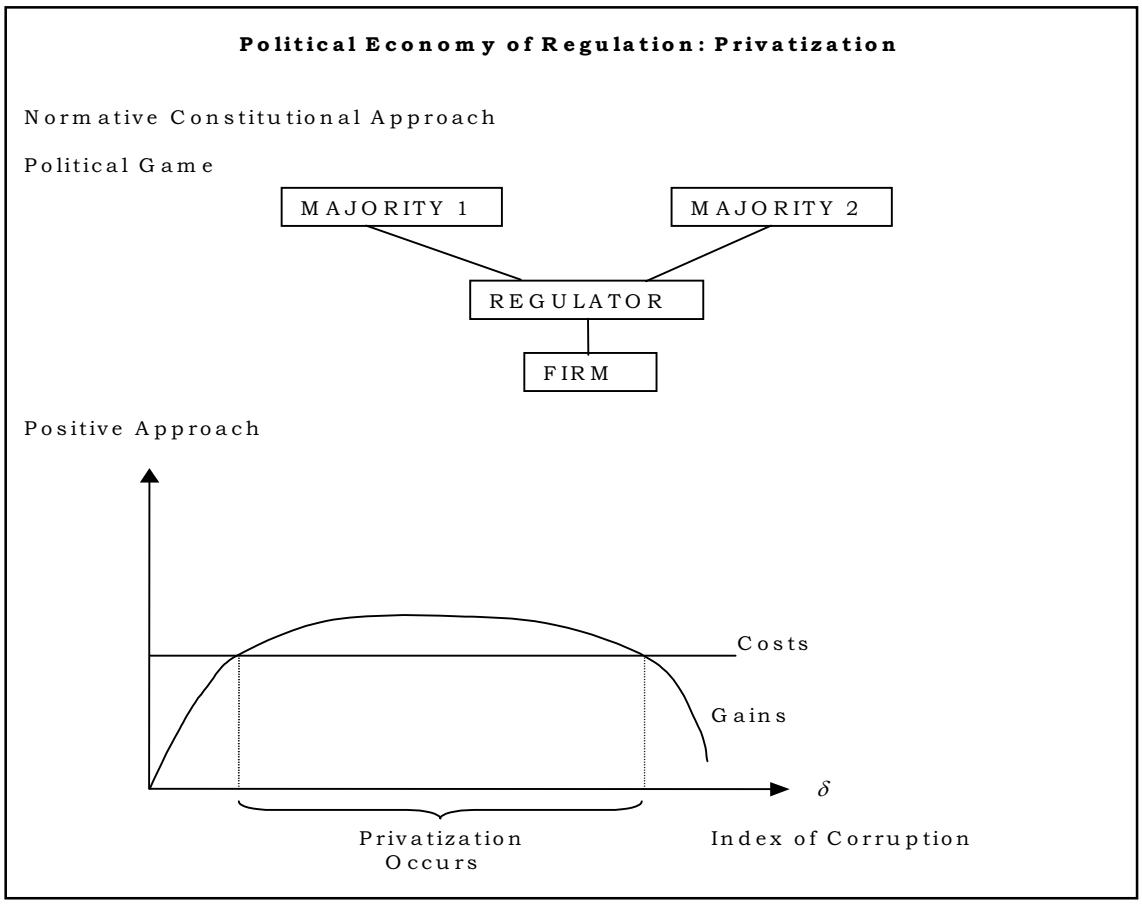
We obtain that privatization occurs only for intermediary values of δ. The benefits obtained under privatization follow from the greater efficiency of a management motivated by profit that are partially captured by the government at the privatization stage in the form of underpriced shares.

For a low δ, the government is almost benevolent and should not and does not privatize. For very large δ the private gains associated with public firms cannot be compensated by the appropriation of the rent under privatization because of the necessity to leave control to the

private shareholder. Such an inverted *U* shape theory was reasonably borne by data of Sub-Saharan Africa.

If we accept this view of the world, we can discuss the role of outside agencies such as the World Bank in promoting privatization. Just recommending privatization has no effect if the non-benevolent government prefers the public regime. The outside agency may tilt the trade-offs of the government with conditional aid. Privatization, particularly with foreign capital, has a reasonable commitment power so that such a quid pro quo can succeed. It is in my view a much more credible quid pro quo than the commitment to implement a competition policy for a given level of aid. The lack of credibility may also be on the side of the outside agency, hence the current debate between conditionality and selectivity for aid.

Box 6. Political Economy of Regulation: Privatization



However, the recognition of the capture of LDCs' governments leads to the following dilemma: Either one engineers a quid pro quo that maintains corrupt governments in power and maintains their welfare, or through NGOS, education programs or other means, one attempts to affect the political process itself in favor of more democratic institutions. But then we can raise the issue of the legitimacy of such an intervention. This problem itself leads us to question the incentives of the outside agencies or governments involved in such conditional aid programs.

Privatization is just one example of many constitutional designs for which we must recognize the limits of mechanism design. Economic institutions are endogenous and the outcome of conflicting interest groups within political institutions.

Thus, my conclusion is not only that we must question the relevance of the Western World's recipes for LDCs, but by recognizing in addition the incentive problems raised by their implementation, we must also ask how we can legitimate the political interferences in LDCs needed to achieve better institutional designs. That is probably an area where economics meets moral debate.

PART II : DISCUSSION
INSTITUTIONS, REGULATION AND DEVELOPMENT

Participants in the discussion following Jean-Jaques Laffont's presentation included Abdel Aziz Ismail, Credit Manager, Arab Banking Corporation Egypt; Ahmed Galal, Executive Director of the Egyptian Center for Economic Studies; Alaa El Shazly, Associate Professor of Economics at Cairo University; Mark Silver, USAID Cairo Mission; and Taher Helmy, Partner of Baker & McKenzie Law Firm and ECES Chairman. The following is a summary of the discussion.

Participant: I was wondering if you could comment further on the experiences of countries like Chile, Argentina and Mexico, which are similar to Egypt in their basic setups. We do know that Argentina and Mexico both follow price-cap regulations that basically allow firms to increase prices by inflation minus a productivity factor. Chile, on the other hand, follows rate-of-return regulation. Have the results been that dramatically different between these countries? How might we learn from these examples?

Speaker: Well, if you have a reasonable accounting system, then the "right" choice is somewhere between price-cap and cost regulation. This corresponds to the trade-off I was mentioning. If you move to price-cap regulation, you are going to have a lot of efficiency, but you are going to pay a lot of money to those firms. Thus, in applying these concepts, many opt to be somewhere in between. The FCC, for example, first introduced price-cap regulation in the US, but then said that if a firm made too much money then they would reimburse a share of their profits to the consumers – a solution that proved to be somewhere in the middle. After all, if a firm knows in advance that it will lose a share of its profit if it makes too much money, then it will not make as much effort as it would under a strict price-cap system. Theory tells us that the ideal is somewhere in between.

Second, when you come to real situations, you cannot forget about the dynamics. And when you look at the dynamics, you realize that rate-of-return regulation and price-cap regulation are

not, as you just said, as different as one might think. Why? What would be an ideal price-cap? The ideal price-cap is to make revenue exogenous. That is, if the price is fixed (price=p), then the demand (d (p)) and the revenue (p · d (p)) are also fixed. Facing fixed revenue, firms have to minimize cost – it's the only way to make profit. Now, let's try to fit this into a dynamic world. You will have the price-fix decreasing at some rate, like the rate of expected technological progress –say 3 percent– until the end of the ages. But in the real world it is difficult to get the rate of decrease right: either you will choose this rate too low, and so firms will make more and more money until consumers finally want the government to intervene. Or, you will choose this rate too high (i.e. the rate of price decrease too steep), and then firms will go bankrupt. In both cases, at some point in time, the whole thing will not work. Because there are so many states of nature, we cannot realize this pure price-cap.

Therefore, in practice, what you should do is set a price-cap for four or five years. However, it will no longer be a pure price-cap because the firm will then expect the regulator to look at the accounts after four years and find out, for example, that they made a lot of money. The firm anticipating the gap between their current profit and the price-cap determined for the next term will not make their best effort. Thus, by having a limited time for a price-cap, you re-create the incentives for less efficiency – and get a system that lies somewhere between the two poles.

Similarly, in the past, rate-of-return regulation became subject to the effects of a phenomenon termed *regulatory lag* when a regulator would evaluate firms' costs and then fix prices so that they could cover them. Under this system, prices were fixed for some time until the two parties decided to change the prices again. But during this period, or regulatory lag, the prices were fixed, so like in the previous example, the firms had no incentive to decrease cost. Hence, it seems that when actually practiced, rate-of-return regulation has a little bit of price-cap regulation in it as well. The two forms of regulation are not as far apart as they seem.

Most countries have chosen price-cap regulation due to its simplicity. This is because with the choice of price-cap regulation, you decentralize the choice of prices to the firm. The firm can manage its operations using its own information in a business type atmosphere. In rate-of-return

regulation, it is the bureaucrats who look at the accounts, allocate the fixed-costs and decide how to allocate the fixed costs.

Participant: I was interested in hearing more about the relationship between the legal framework that supports regulation and the business community. In the Egyptian context, it seems to me that the signals made by the regulatory authority to the investment community should be as transparent as possible, especially with respect to the rules of the game and the legislative framework that regulates them.

Speaker: Your question is very specific. To what extent does the structure of regulation attract foreign investment? In response to this concern, I can only reemphasize how important it is to have a powerful, independent regulatory agency. Such an agency will reassure the foreign investor because it will be independent from the day-to-day concerns of government.

For example, if pricing is in the hands of a regulatory agency that has a good reputation and has been there for five years, then the foreign investor can say, "Because I can depend on this price-cap, I will make my computation to see if it is worth investing." If, on the other hand, the price-cap can be changed at any time by the government and there is an election coming in two years, then investors will not know what to expect. But then again, even if you are in a country where the government is trustable, it might still change or have an influence on the regulatory agency.

So then we come to the question of *how* to have an independent agency. If the ministry of the industry in need of regulation is selected as its independent regulator, then it is not going to be very convincing. The difficulty is that it takes time to develop a strong reputation for being independent from the government. This is a process that has to be started and slowly developed, but if the quality of the people is good then they will become reasonably independent and good at their job.

Participant: To what extent should the law go into detail in the regulatory framework and to what extent should you give authority to the regulatory body in formulating certain policies? I ask because in the case of Egypt, some have criticized the telecommunications act for not specifying formulas for price setting. I happen to disagree. If you have a regulatory law or act that has too much detail about pricing, then every time you want to move from a price-cap to a cost-plus or to some formula in between, you will have to go to parliament to change it. At the stage we are in now, we need parliament to just approve of something to get us going. I have always believed that, above all, legislation must always be flexible. If you go into too much detail in legislation, then you lose this flexibility.

What we have done in the new presidential decree on electricity, for example, is set general statements that the cabinet and parliament can approve covering principles such as the viability of a firm, costs analysis, the interests of the consumer, but then left the decision on methods of implementation to be issued by the minister. I feel that this approach is better because we can put more detail in the legislation issued by a minister (which is still law) and it will be easier to amend. But, I can see that some disagree.

Speaker: Yes, I believe these are two sharply different views on the trade-off between flexibility and specificity. There are certainly merits to being flexible: It makes you able to adjust to the world's incessant changes. But one must also recognize that there are merits to being specific. If I am a foreign investor and I am going to put my money into an activity like power or telecom, I worry about what will happen tomorrow. I will want to know that there is something concrete that I am going to live by for some time.

I do know that in Chile, for instance, the regulatory law is very specific. It actually states the specific pricing rule, it states where the data are going to come from, etc. Now, that does not mean that the law will specify what the specific rate of return should be, or what the per unit cost or ceiling price will be, but it does specify the formula. Specifying a formula is very different from specifying the selling price per unit at, say, LE 10/unit. That is not reasonable because LE

10 today is not the same as LE 10 tomorrow. But it is terribly important to specify the formula so investors can base decisions on it.

Participant: I would like to hear your opinion on whether it would perhaps be more efficient to have two contracts (one for efficient firms and one for inefficient firms) or some other screening device rather than a hierarchal monitoring system that introduces moral hazards and thus demands higher forms of regulation? In other words, should the government invest more in screening devices, incentive compatibility and incentive schemes from the start and thus just have a principal and an agent without an intermediary?

Speaker: The choice between using contracts or a regulator involves several instruments. It is clear that ideally, what you want to do is to use your information system –your auditing system– to learn as much as possible. If you have very good and honest auditors, then they will discover a lot of information about the firms, but there will always be some uncertainty remaining. In order to deal with this remaining uncertainty, you must use these self-selection devices based on pricing. But how much of the first (auditing) and how much of the second (pricing) depends on many things, and in particular on those characteristics of developing countries – like the extent to which the auditors are corrupted. In order to keep the supervisor honest, you must pay him at least as much as the stake of collusion, if not more. If that stake is quite high, then it might be better to go, as you said, with a different device. Thus, one could say at this time, that in the country that is very corrupted and does not have a very dependable regulatory system, they should just use contracts.

Participant: With privatization, we expect that in addition to government regulation of the information rent, there will also be regulation of the stock market. I think that these two influences on firms may cause conflict, as they will be sending mixed regulatory signals. How has the West coped with problems like this and what institutional set-ups have they formulated?

Speaker: This question is complicated for two reasons. First, the successful privatization of monopolies is difficult since all the arguments you might have from the past criticizing regulation of public firms you may still have for a government that manipulates regulation. Secondly, what actually happens between the regulator and a private firm is a very gray area because the stock market will reflect as much the value of the firm and the good decisions of the manager, as it reflects the results of the lobbying of that manager to his regulatory agency. If he lobbies well, then he will get a good deal and will get a lot of profit. There is not yet any regulatory theory for how to counter these problems. In practice, we see a lot of this mixture of market behavior and new regulation. These signals are very ambiguous, but in a natural monopoly like telecom, where competition is increasing rapidly, there is actually competition among regulators. In this case, I think that the market value is quite useful.

Participant: You mentioned earlier that Australia has amalgamated all regulatory agencies into one super regulatory agency. How successful has this been? Are there any other countries that are also using this method? And finally, how did they deal with the difference of expertise between say, telecom and electricity, especially with the new developments in technology that are making industries so drastically different from each other?

Speaker: What does it mean to have separate regulators by industry? Of course, one could put all regulators in one building, divide them into different sections with specialists, and call it a super-regulator. You see, it is much more a matter of organization and operation than one of title, and various countries have experimented with this. The well-coordinated independent regulators in Bolivia, for instance, are just as effective and comprehensive as a single regulator. In the U.S., on the other hand, they have a strange system in which a single regulator covers all industries at the state level, but at the federal level, individual regulators cover each industry. Overall, you see a little bit of everything, and as I said, that it is mostly conditioned by history, political development and political structure. Usually, the political body that has some sort of regulatory power wants to keep it. If you start off —like in Europe— with telecom regulation in

each country, it is hard to force the regulatory bodies to give up their power. Do you think that we need an individual telecom regulator in Belgium? in Luxembourg? I don't think so. But it will probably take 50 years before all these countries are willing to give up their power to have one regional regulator.

Participant: I was curious about your reaction to the question of when and why privatization should happen. There is a theory called the positive theory that is supposed to tell you if and when to get privatization going. The theory basically states that politicians will initiate privatization only when it becomes more advantageous for them do so. Now, I think it is a little more complicated than that because the measurement of what is "beneficial to them" comprises much more than their interests, and society is made of other actors too. But beyond the positive theory of privatization, there are few other ways of examining whether privatization itself is beneficial or not. We did a study a few years ago that looked at the privatization of monopolies in poor countries and looked at its impact with and without privatization on the government, buyers, consumers and workers. By and large, the impact was positive. In most cases it was a matter of what the government did to ensure that privatization worked in terms of legislation, regulation, and the like. Do you have comments on this outcome?

Speaker: Well, I completely agree with the first point. The model I have in mind is a model where politicians have a weighted average of social welfare and you can look at it and instantly see when privatization is socially beneficial and when it is not. They don't quite coincide, sometimes you privatize when you should not, sometimes you don't do it when you should – and still, when you have other objectives, this changes.

We found a relationship between the level of corruption and privatization that fits more or less the situation for Africa. In countries where the government is a perfect government, you would not find many reasons to privatize. On the other hand, in countries where the government is very corrupted, you *cannot* privatize because no one is going to come do the tests. Therefore, we found that privatization is necessary somewhere in the middle, and we had some data on this.

In general, privatization is a good, but extremely political thing. Actually, it has much more to do with politicians than economists. It is a movement that reflects mistrust of the government all over the world. I insist on that because it has bearing on other issues. You see, you have to choose your side. Either you feel the government is perfect or that it is not. But should your view be that it is a perfect provider, then privatization is not necessary and you should not call for it. If, however, you decide that privatization is necessary, then you will see that you have inevitably moved towards a conception of society that is regulated by checks and balances. If you want to really trust your government, it means that you should have different independent bodies that form an organization of checks and balances that will provide the public with information and thus enable them to have better democracy.

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DISTINGUISHED LECTURE SERIES

The new regulatory economics largely developed by Prof. Jean-Jacques Laffont treats the regulation of infrastructures as a principal-agent problem in which the regulator –the principal– suffers from large asymmetries of information with respect to the regulated firm –the agent. Within this discourse, the case of developing countries is particularly challenging due to their high cost of public funds, high cost of auditing and control, low transaction costs of side contracting, weak technical knowledge, and greater asymmetries of information. These factors induce very different behaviors from regulators and call for unique modes of intervention from outside agencies.

For a country like Egypt, familiarity with these theories is necessary for many reasons, but particularly when discussing privatization, competition policy or universal service. Such knowledge will be of great value when designing the regulatory bodies that will accompany the country's current privatization efforts. In this spirit, ECES is proud to present the lecture delivered by Prof. Jean-Jacques Laffont himself on *Institutions, Regulation and Development* and a summary of the subsequent discussion. As readers will discover, it is a rare find – combining complex theory with practical and accessible applications.

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