Financial Regulation of Infrastructure Companies

The theories developed for monopoly regulation have been oriented towards utility companies, such as waste management, electricity, water, and telecommunications. The functional structure of these companies is that of a corporation, whose real assets are composed of its facilities, machinery, equipment, and the corresponding contracts to deliver services to its customers. The ownership structure of utility companies is diverse: public monopolies, companies partially owned by the state, corporations entirely owned by private investors, and enterprises with rights over a previously defined time period on assets that belong to the state.

Regulation and Tariffs

The most common regulation techniques derived from utility companies to prevent them charging elevated prices are also applicable to highway infrastructure and include Rate-of-Return Regulation, and Price-Cap Regulation.

Rate-of-Return Regulation. Under this technique, the authority sets a fixed rate of return on the assets so that the utility company is able to charge a price that is consistent with the objectives of the regulators. Prices of utilities provided can be adjusted depending on the returns on assets realized by the company. Prices can only be increased/decreased if the realized rate of return is lower/greater than the rate of return.

Price-Cap Regulation. This type of regulation has been increasingly applied in regulated industries under the belief that it provides strong incentives for the enterprise to be efficient. Under this technique, prices are yearly adjusted according to inflation plus or minus a fixed amount that is not related to the company returns. Price-Cap Regulation does not indicate how prices should be set for the first year of operation; it only establishes an indicative rule of how these prices will change over time.

In order to comply with their commitment to deliver services in the most efficient manner, monopolies must carry forward an investment plan that is often agreed with the regulatory authority. However, the implementation and financing of this investment plan is the sole responsibility of the regulated company. Monopoly regulation theories do not contemplate how monopolies finance their investment plans, and what risks they undertake in doing so.

Possible explanations for this might be that:
- in the case of natural monopolies under state ownership (public companies), there is always present an explicit or implicit guarantee from the government.
- in the case of natural monopolies in private hands (privatized companies), financing is often conducted under a corporate finance context, where the backing of the debts incurred is the valuation of the company per se and of its real assets.
- in the case of public infrastructure monopolies, and specifically in the case of roads, the primary real asset in general does not belong to the firm. This is the

case under the Public Private Partnership scheme, where financing takes place under three conditions:

- that cash flows from the project should offer a return sufficiently attractive to risk capital;
- that the level of guarantees, collateral, and insurance provide creditors with confidence regarding the commitments and debts contracted;
- that the capital structure of the project be capable of separating the risks of the project from the risk of the project promoters.

Private participation in ground transportation infrastructure has generally taken place by means of contracts with governments, with defined time periods, where the private sector has the obligation to build and/or operate and/or a determined infrastructure in exchange for the right to charge a tariff or toll that remunerates the provision of such services and covers the investments allocated to that end. Such an association contract (henceforth denominated PPP contracts) establishes the risks to be assumed by the state and the private sector. The PPP's are materialized through a policy of risks distribution to the agent best prepared to assume them.

Since private participation in infrastructure projects does not take place through a corporate finance structure, but rather by means of Special Purpose Vehicles in which corporate capital budgeting techniques are not directly applicable. In this case, project finance comes forth, and is applied as a financial structuring technique to projects where, given the magnitude of investments and the extension of capital recovery periods, promoters often cannot participate alone without assuming unreasonable risks.

Projects undertaken through PPP schemes share characteristics that differentiate them from traditional projects, including:

- A primary asset, a roadway for instance, which is not the property of the firm, but rather of the State; hence, the real asset is not liable for use as collateral. Consequently, other assets are used as collateral.
- In general, the projects have no representative "history" to allow the forecasting, with a certain degree of confidence, of net cash flows of the project. In cases of projects of the green field type and/or non-tolled roadways, traffic statistics do not exist, thus the evaluation of costs and cash flows in these cases requires a greater degree of sophistication.
- Project financing and PPP concepts in infrastructure monopolies lead to the incorporation of a new perspective in natural monopoly regulation: the financial dimension. Regulation of infrastructure monopolies (IM) should not be governed only by economic efficiency and social welfare criteria. It should also incorporate the identification, assessment and allocation of a project's risks from a financial standpoint.
- Financial Regulation is the utilization of a series of financial and economic techniques and tools on the part of the State. Its objective is to maintain a stable relationship between risk and expected return, throughout the maturity of the contract. Financial regulation should be incorporated in the contract from the very beginning in the request for proposals (RFP) and/or in the PPP agreement by means of two procedures:

o On the risk side, through a series of clauses and/or covenants that specify the measures and define the responsibilities of the concessionary entity, along with the design of guarantees provided by the State;

o On the return side, in the definition of the life-span of the contract, the tariff scheme (absolute and relative levels of tolls depending on type of vehicle and its adjustment formula over time), the time schedule and investment program, and the definition of adjustment mechanisms in the case where the risk-return relationship becomes unbalanced during the period of the contract.

A functionally independent Regulator will assist to ensure compliance with the PPP 'rules of the game'. For private investors to consider partnering with the public sector in a sector regulated under price caps, or some type of incentive based regulatory regime, the business needs to generate a return at least as high as the cost of capital they will be paying.

Getting regulators to get organized to be able to estimate average tariffs in a way that gives an incentive to operators to commit for the long run is one of the major adjustments needed to the PPP model that was implemented during the 1990s. Regulation matters and hence regulatory institutions do too, and yet the development of the regulatory capacity of the transport sector continues world-wide to lag the development of the equivalent capacity in other public services.

Where Do We Stand on Transport Infrastructure Deregulation and Public-Private Partnership?
Antonio Estache and Tomás Serebrisky World Bank Policy Research Working Paper 3356, July 2004

Financial equilibrium of the concession

Financial regulation is closely related to the definition Financial-Economic Equilibrium (FEE), which is the upholding of a targeted profitability (e.g. rate of return) on the part of the conceding party for the benefit of the concessionaire. The targeted profitability is the financial engineering included in the bidding document which is reflected in a mathematical model that is structured according to standard parameters associated with investment valuation.

The model, and thus the target profitability, can be known by the conceding party throughout the contract if it was established for tendering and evaluated in the tender presentation. In this case, financial regulation should keep both the risk and the expected return stable throughout the contract.

Alternatively, the model and the targeted profitability of the concessionaire may not be explicitly known by the conceding party throughout the contract. In this case, the financial model and targeted profitability may only be known (or guessed) implicitly by the conceding party when agreements between the two parties are negotiated in relation to contractual modifications leading to compensating the concessionaire. Financial regulation should keep only the risk level of the contract stable, throughout the contract, given an expected profitability known only to the concessionaire.

Financial regulation when the state is not acquainted with the financial model

The Risk return relationship

A basic principle in finance is the existing relationship between the risk assumed in a given project and the expected return from such investment. The total risk has two components which are known as systematic risk and non-systematic risk. The systematic risk is an endogenous factor that is not under the control of the investor, and reflects the sensibility or volatility of the expected return on the project in relation to the overall market; in other words, it is an elasticity measure that determines how changes in the economy affect the profitability of the project.

This type of risk is measured by means of a factor denominated Beta (b), which is the covariance between the profitability of the project and that of the overall market, divided by the variance of the overall market.

On the other hand, the non-systematic risk is an endogenous factor to the project and be controlled through diversification. It plays an important role in the financial and operative leverage that can be achieved by the firm.

In this respect, a public works contract can be analyzed as a project with cash flows with given expected returns and risks.

In general, the profitability of a project E(Rp) is defined in the Capital Asset Pricing Model (CAPM) as:

$$E(Rp) = Rf + ßb \times (Rm - Rf)$$

Where Rf is the risk-free rate of return, Rm is the return of the overall market, and ßb is the marginal contribution to the portfolio risk of the project.

Alternatively, this equation can be rewritten as:

$$E(Rp) = Rf + ßb \times PR$$

Where PR is the risk premium and is defined as Rm - Rf.

A modification to this model for countries with high country risk implies the modification of the traditional CAPM model. This modification is denominated "Zero Beta CAPM", where, instead of employing the risk-free rate of return and zero variance, a risky rate of return with minimum variance is used given the conditions of the country. This change entails adding on to the standard risk free rate, a term that reflects a risk-premium according to country risk.

This approximation is detailed in section 2.5 of Hinojosa (2001) and was elaborated in Module 2 under the description of the Weighted Average Cost of Capital (WACC).

New Issues in Natural Monopolies Regulation: The Financial Side in Infrastructure Projects Through Public Private Partnership. Hinojosa, S. 2001.

Business design in the public-private partnership arena under a consistent risk return context

On many occasions, either because of public welfare reasons, economic policy, or unwillingness of users to pay, it is not possible to raise tariffs, all the more so, if a price elasticity appears that leads to a decrease in the total income of the project. This restricts a contract from applying any acceptable tariff from both social and private standpoints.

On the other hand, the time term of projects is usually limited by the present value of the cash flows, in the sense that long terms (over 30 years) contribute little to the present value of the project. Moreover, extension of terms over 30 years obstruct the possibility of financing projects by means of fixed income instruments, because their trading is very limited.

Finally, state contributions are available only in limited amounts, and are difficult to politically defend when they are directed towards increasing the private profitability of a project, and even more so when these funds could be better used in other socially sensitive sectors, such as education or health.

Therefore, the key question is how to design a project contract in a risk-profitability context, assuming that the project is socially profitable, that its risk is high, and that management of variables such as tariffs, time terms, and state contributions is not feasible. The response implicitly applied in contract schemes has been a public-private partnership (PPP) based on sharing the risks entailed by any given project. This way, the conceding party (the State, ministry or state agency) reduces the ß of projects by directly assuming the risks that cannot be diversified by the private sector.

Residual Public Risk

An example of a methodological proposal for the hypothetical estimation of the expected returns under the Zero Beta CAPM model is provided in section 2.5 of Hinojosa (2001)

New Issues in Natural Monopolies Regulation: The Financial Side in Infrastructure Projects Through Public Private Partnership. Hinojosa, S. 2001.

Re-establishing profitability of a project

There exists a broad criterion for the reestablishment of the economic and financial equilibrium of a contract in the face of situations affecting it. It is known as the reestablishment of the profitability of the project.

The objective of this approach is to modify the financial and economic conditions of the project, after the occurrence of endogenous or exogenous events affecting these conditions, so as to ensure that the project demonstrates again the profitability level that it enjoyed under the original conditions at the time of adjudication.

In order to attain this objective, it is necessary to reproduce the evaluation of the project performed during the tendering process, including the values for the variables that

determined the adjudication. In general, the evaluation performed by the concessionaire will not be available to the State, which will result in a negotiating process between the State and the concessionaire where each other's model profitability results will be compared for particular events affecting the economic and financial equilibrium.

The inconvenience of this process is that the concessionaire will be in an advantageous position to conceal the positive effects that may be generated over the project's profitability, and will simultaneously have the instruments to request compensation for events which do, or do not, require compensation.

This reinforces the recommendations in this Toolkit that the state must always have advisors either on call or by tender to review any contract revision proposals of a concessionaire.

Financial regulation when the state is acquainted with the financial model

Risks

The underlying concept in a public works contract is the allocation of project risks to the agent best prepared to cope with them. Therefore, this should be the central element guiding the necessary adjustments to the financial model in order to reestablish Economic and Financial Equilibrium (EFE). This objective is pursued by clearly and precisely differentiating:

- between the concepts of Real Firm (RF) and Model Firm (MF), and
- between the risks to be allocated to the RF and MF,

while meticulously observing the dispositions defined in the legal body of the contract as defined in Module 4.

Real Firm (RF)

This is the regulated enterprise (neither the promoter enterprises nor the parent company). It is the enterprise that assumes the responsibilities established in the contract. It takes the respective risks and receives remuneration in exchange. In legal terms the real firm is the Special Purpose Vehicle.

Model Firm (MF)

This is understood as the instrumental virtual company established by the RF in the tender process. The MF is translated into a mathematical cash flows model, whose dynamic structure depends in time on the specified and assigned risks defined in the contract. During the extension of the contract the MF obtains profit exactly equal to the profitability reported in the bidding process, which must be upheld in the contract. The MF also defines the compensation associated with the materialization of the risks assigned in the contract.

The distinction above has the objective of allowing the involved counterparts to separate those risks that are assigned to each one of them. Therefore, if the Economic and Financial Equilibrium (EFE) is based on fixing a determined profitability, the adverse events affecting the RF, and which are the responsibilities of the concessionaire, must not be compensated by the State.

Given the above definitions, it is possible to express the effective profitability of the RF as:

$$IRR_{RF} = f(IRR_{MF}, E)$$

Where IRRRF is the effective profitability of the real firm, IRRMF is the profitability of the model firm, which should be upheld throughout the lifetime of the contract, and e is a random variable equal to the difference between the effective and projected values of the project, for those variables that correspond to the risks assigned to the concessionaire.

For instance, if the traffic risk is assigned to the concessionaire, and the effective value of the traffic is greater than the value projected in the bidding process, this will contribute to a greater E . If on the contrary, the effective traffic is exactly equal to the projected traffic, E will tend to zero.

Effects of Risk allocation between Real Firm and Model Firm

As expressed previously, the MF incorporates effective values of those variables corresponding to the risks assigned to the conceding party. This isolates the risks assigned to the firm from the risks assigned to other agents, thus facilitating the determination of the exact compensation required to immunize the RF from the risks that have not been assigned to it, and simultaneously avoiding compensating the RF for risks that were effectively assigned to it.
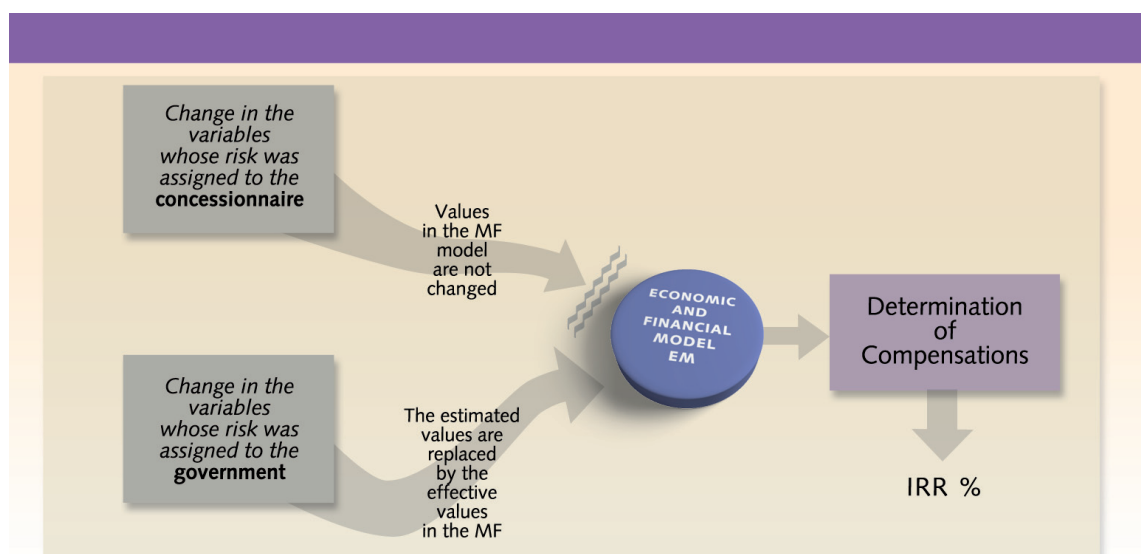
Thus, some of the systematic risks (risks that cannot be controlled) are removed from the MF and assigned to the state or directly to the users of the infrastructure project. Consequently, the removal of this systematic risk must be considered as a factor in the determination of the expected profit of the contract. In the case of the non-systematic risks, these are entirely assigned to the RF given the intuition that they can be diversified away.

As an illustration, assume the existence of a contract where the inflation risk is assigned to the user and to the state, by readjusting the tariff as defined. The risk is assigned to the user, because he will ultimately pay a higher tariff if inflation is high, and to the state, because it will have to pay the political costs associated with authorizing higher tolls on conceded roadways. Thus the firm should be compensated for this risk when the effective inflation is greater than the inflation assumed in the bid. This is expressed in the incorporation of the effective inflation values in the MF, which in turn affects other variables within the model, such as investments, other costs and the tariffs. The resulting change upholds the IRR at its fixed level.

An opposite example would be the case in which the demand risk has been assigned to the concessionaire. Should the traffic flow drop, no compensation should take place. Consequently, in the MF the traffic variable should not be altered. Otherwise, the model would signal a compensation that would not be in compliance with the terms of the contract, given the fact that demand risk was originally assigned to the firm.

In short, the effective values of those variables that correspond to risks assigned to the state should be incorporated in the model in order to determine in the MF the compensations that should take place. On the contrary, those variables that correspond to risks assigned to the concessionaire should be kept fixed within the MF, since no compensation is to be determined.

Conflict Resolution

Regulatory conflicts are common in the infrastructure sector. Typically they may involve disputes between government authorities or regulators and private companies and will concern subjects such as tariff reviews, award of concessions, permits, enforcement of and operational obligations.

The mechanisms that are available to resolve disputes and conflicts are a major part of the assessment of regulatory risk by private investors in PPP projects.