



**Infrastructure Funding:
Does it Matter Where the
Money Comes From?**

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Frontier Economics, London

Working Group Paper

2019

The International Transport Forum

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Cite this work as: Francis, R. and D. Elliot (2019), "Infrastructure Funding: Does it Matter Where the Money Comes From?", Working Group Paper, International Transport Forum, Paris.

Foreword

Transport infrastructure is a major enabler of economic development. In the drive to refurbish or build, governments worldwide have turned to the private capital market for financing. The primary narrative behind this push is the huge stocks of private capital that are available, while public financing capabilities are said to be limited and insufficient.

The almost exclusive vehicle of private investment in transport infrastructure, including social infrastructure, is Public-Private Partnerships (PPPs). In the context of PPPs, two important aspects have received little attention.

First, sufficient attention has not been given to the role of suppliers. The focus of governments and Intergovernmental Organisations has been on resolving the challenges to private investment from the viewpoint of investors: reducing the uncertainty they face and enabling them to price risk more efficiently by establishing infrastructure as an asset class.

However, looking only at investors gives an incomplete view of the total cost of the risk transferred from the public to the private sphere. In PPPs, investors transfer some of the major risks they are not comfortable bearing to design, construction, maintenance, and operations contractors.

Suppliers, too, face uncertainties and are unable to efficiently evaluate price risk. In such cases, the base cost of the initial investment – and of subsequent services – may be much higher than they might have been, and not just the cost of their financing.

Uncertainty arises from the difficulties to accurately estimate the cost of construction, maintenance, operations, and financing. But it also stems from “unknown unknowns” (the so-called Knightian uncertainty). For instance, changes in weather patterns or paradigmatic technological shifts, the timing and impact of which are unclear, will influence what infrastructure is needed and where.

So what can policy makers do to reduce the cost of inefficient risk pricing of suppliers? Where does this put PPPs? How can public decision makers reconcile long-term uncertainty with private investment in infrastructure? Who should bear long-term uncertainty in projects: the public or the private sector?

These were some of the guiding questions for a Working Group of 33 international experts convened by the International Transport Forum (ITF) in September 2016. The group, which assembled renowned practitioners and academics from areas including private infrastructure finance, incentive regulation, civil engineering, project management and transport policy, examined how to address the problem of uncertainty in contracts with a view to mobilise more private investment in transport infrastructure. As uncertainty matters for all contracts, not only those in the context of private investment in transport infrastructure, the Working Group’s findings are relevant for public procurement in general.

The synthesis report of the Working Group was published in June 2018. The report is complemented by a series of 19 topical papers that provide a more in-depth analysis of the issues. A full list of the Working Group’s research questions and outputs is available in Appendix 1.

Acknowledgements

The authors are grateful to all the participants of the Working Group for their helpful discussion of the issues presented here. Particular thanks go to Dejan Makovšek, Mar Beltran and John Stern for providing insightful comments and suggestions on working drafts of this paper. All opinions stated here are those of the authors.

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Executive summary

What we did

This paper compares Public-Private Partnerships (PPP) and Regulatory Asset Base (RAB) regulation approach as a method of securing the funding of infrastructure projects. In particular it focuses on the reasons why RAB-based regulation is able to attract a relatively low cost of finance, especially in the United Kingdom, despite appearing to be the most incomplete of contracts as regards investor protection. The paper considers whether the ability of the infrastructure operator to levy user charges is a necessary condition to obtain the apparent benefits of these low financing costs, or whether it derives from other institutional factors.

What we found

RAB-based regulation has typically been applied to infrastructure companies such as water and electricity distribution. In transport, several airports are subject to maximum aeronautical charges set on the basis of some form of RAB.

The economic reasoning for considering direct government funding of infrastructure unreliable or uncertain stems from the fact that marginal costs in these sectors are significantly lower than average costs. This makes them potential targets for reduced funding without immediately endangering operational ability. User charges are thought to provide protection to the investor because low demand elasticities permit the user to recover any potential shortfall through increased charges.

This argument fails to recognise the strong focus that RAB regimes have on consumer protection and the determination on maximum user charges. In that context, RAB-regulated entities typically do not have the freedom to set charges at will to meet financial shortfalls. For this reason, user funded regimes are, in principle, as open to detrimental government intervention as directly-funded ones.

User charges do provide some protection for investors where 100% of funding for the project comes via this route, however. In these circumstances it becomes necessary for the independent regulator to develop a clear, cost-based methodology for setting maximum charges. This must take into account the ability of the operator to finance its functions, including an acceptable return on its investment.

The main factor in the efficient financing of RAB-based entities in the United Kingdom has been the consistency and credibility of the institutional framework under which this regulation is applied. In the United Kingdom, established precedent about the interpretation of the “financing of functions” obligation is backed by a professional appeals body that can review decisions in the round. It also places a very high value on the maintenance of the integrity and predictability of the RAB regime in the round, and not simply limited to the specific case under investigation.

Private ownership of the regulated infrastructure provider is not essential for RAB regulation. It is likely to be far more effective, however, both because of stronger incentives for operational efficiency and

because of the strong incentive on the regulated company to hold the consistency of the regulator and the regulatory system to account.

What we recommend

Gain better understanding of the Regulatory Asset Base approach

The RAB model is not widely used outside the United Kingdom and Ireland, and it is still not well understood. There is potential value in further disseminating knowledge regarding the strengths and weaknesses of the RAB model, as well as best practice in its application, to national governments considering options for private finance of transport infrastructure.

Explore further the Public-Private Partnerships versus Regulatory Asset Base choice

Governments could benefit from better guidance to understanding the circumstances under which a RAB-based model may be preferable to the PPP approach for providing new transport infrastructure.

Investigate terms for contract renegotiation

At their best, Regulatory Asset Base models are very incomplete contracts. The Public-Private Partnerships model, on the other hand, is often criticised for being too restrictive. PPP practice would benefit from greater understanding of best practice when it comes to building contract renegotiation procedures into the original PPP agreement.

Explore the scope for cross-sector appeals panels

RAB models thrive best in the presence of independent regulators and recourse to independent expert, non-court-based appeals processes. Support for creating cross sector appeals panels could strengthen RAB or PPP models. It might also be interesting to explore scope for such panels on an international basis for countries without the capability to establish them locally.

Introduction

This paper has been prepared as a contribution to the International Transport Forum's (ITF) Working Group on Private Investment in Infrastructure. This working group has considered the relative merits of RAB-based schemes as opposed to PPP, given the observation that the cost of finance associated with RAB-based schemes often appears substantially lower than under PPP contracts. This has been particularly noticeable in the United Kingdom, which has significant experience of both approaches.

Clearly, insofar as it is true that RAB-based schemes have been able to attract cheaper finance than PPP schemes, this must relate to arrangements, perhaps contractual, perhaps legislative or institutional, that provide project investors with greater certainty over their ability to recoup their investment.

We observe that many (most) RAB-based schemes relate to the provision of utility infrastructure such as electricity, gas and water distribution, fixed telephone networks, etc., where the immediate source of funding is provided by user charges. In contrast most PPP schemes, especially in the transport sphere, are not underpinned by user charges, being reliant for the most part of agreed sources of public funding. While the terms of this funding will be specified in detail in the individual PPP agreement, there is nevertheless a concern on the part of investors that reliance on public funds form the long-term funding of infrastructure projects may be intrinsically riskier than the reliance on the direct charging of users. This risk can arise because of the asymmetry inherent in the contracting between a private organisation and public body with potential law-making powers, and the fact that a public body may not be able to irrevocably commit its successors to a particular policy or course of action. These risks persist even in the presence of detailed contracts. Concerns over PPP have increased as the funding capacity of many governments has become more constrained, and thus their creditworthiness as a source of funding for PPP has decreased in the eyes of investors. Furthermore, the public authority's ability to impact on a much wider set of influencing factors which could affect the performance of the PPP may add to the risks of PPPs in ways that detailed contracts may be unsuited to address. For instance, PPPs in transport infrastructure may be exposed to demand risk stemming from the impact of government macro-economic policy, as well as the effects of public investment in other transport infrastructure,¹ housing, etc., and the impact of general economic conditions on government finances.²

We ask, therefore, whether the ability of the infrastructure operator to levy user charges is a necessary condition to obtain the apparent benefits of low financing costs that appear to accompany RAB-based schemes. Or, rather, whether the observed low financing costs of RAB-based schemes may arise from wider institutional frameworks which protect the investor.

Overview of private investment models

PPP and RAB approaches are essentially alternative means to the same end, which is to ensure provision of new infrastructure in ways that try to secure adequate funding, encourage efficient delivery and

operation, deliver an appropriate quality of service and appropriately allocate the relevant risks between the parties involved (the private investors, the public sector and customers/users of the infrastructure).

While PPP adopts a long-term contractual approach to this problem, RAB regulation, especially as applied in the United Kingdom, addresses the same issue via a framework that usually consists in:

- the transfer of the ownership of the infrastructure provider to the private sector, often in the early days of the policy by a private share offering
- the establishment of an independent regulatory office responsible for the economic oversight of the infrastructure provider
- a legally binding framework (in the United Kingdom an Act of Parliament) specifying the powers and the duties of the independent regulator
- a licencing system which specifies the duties and obligations of the infrastructure providers/operators.³

A PPP contract will specify the services the contractor is required to provide, the sources of funding for those services and how those will be recalibrated over time. In contrast these details are typically not embodied in either the legislation or the licence of a RAB-regulated entity. Instead, both the method of calculation of allowable funding and the appropriate level of that funding is left to the determination, and periodic redetermination of the independent regulatory body. Table 1 summarises what are, in our view, the key comparative features of the two approaches.

Table 1. Comparison of key features of PPP and RAB approach

	PPP	RAB regulation
Typical Form	Legally binding long-term contract	Legally binding Licence with regular regulatory reviews
Key elements of contract/Licence	Required outputs Risk transfer Remuneration	Required outputs Service quality Process for setting price limits
Productive (cost) efficiency achieved by:	Contractual allocation of risk	Fixed prices periodically, renegotiated
Allocative (price) efficiency achieved by:	Initial competition for the contract	Periodic benchmarking
Strength	Strong incentive to deliver projects on time at an efficient cost	Strong protection for consumers from abuse of market power
Weakness	Potentially high financing costs	Potential capex bias from asymmetry of approach to OPEX and CAPEX
Issues	Sometimes absent or inadequate process for intertemporal adjustment	Institutional requirements around management of RAB and price determinations

If we were to characterise the key differences between the two approaches in the most general of terms, PPP focusses its primary efficiency incentives on initial competition for the contract (with the contract being a detailed risk-allocation agreement based on subsequent delivery) while RAB approaches are more open-ended with a stronger focus on consumer protection and the ability of authorities/regulators to set and re-set user charges by reference to external benchmarks. Indeed, in comparison to the typical

PPP contract, the RAB approach appears as the most incomplete of contracts. For instance, under the typical UK Licence-based approach, investor protection is summed up by no more written guarantee than an obligation on the relevant authority to ensure that the RAB-regulated entity can “finance its functions”. It is left to the authority to define (and periodically re-define) the meaning of “functions” and to establish from time to time what level of return to the operator is adequate to meet this obligation. Indeed, neither an initial RAB value nor even a method for calculating (and recalculating) the RAB is written into the licence. Hence the licence does not even guarantee the value on which an unspecified return can be earned.

If this were not enough, it is also established that this financing of functions is not an open-ended obligation on the authority regardless of the licensee’s performance. The licensee must be able to demonstrate reasonable levels of efficiency to be entitled to the offered financing protection.

All of this would appear to imply that the RAB approach is an extremely “incomplete contract” with the licensee exposed to many future uncertainties and unknowns, compared to the typically much more quantifiable risks embodied in a PPP contract. Yet despite this it can be observed that major infrastructure projects subject to RAB regulation have typically been financed at extremely low rates compared to typical PPP contracts. The inflexibility of PPP contracts is often pointed to as a reason why PPP projects fail, or are expensive to finance. But it is not intrinsically obvious that RAB’s more open flexible approach would be superior. Nevertheless, experience suggests that, one way or another, the benefits of the RAB approach provide a credibility that more than offsets the greater uncertainty inherent in the arrangement.

In the following sections we explore the source of this credibility in more detail. We start by considering the role that institutional frameworks have in influencing the risk to investors, before going on to consider the incremental effect that may come from the availability of user charges.

Importance of institutional framework

The case for any private investment model for infrastructure (whether RAB based or PPP based) depends on an assessment of the costs and benefits of the model relative to the public model. A high-level summary of these costs and benefits against the public model is set out in Table 2.

In a simplified view, the case for private investment involves trading off the higher financing costs against the benefits of greater efficiency. This applies to both the comparison of a private model to the public model, as well as the comparison of alternative private models with different levels of risk and incentives.

This highlights the importance of the institutional framework in determining the potential effectiveness of any private investment model and the relative merits of the different models. The institutional framework covers the form of the regulatory or contractual model, as well as the wider political and legal structures. This includes, for example:

- how business and economic risks are shared between the investor and customer (either end-user or government as funder), including pass-through and indexation arrangements

- approach to sharing of out-performance and under-performance, including the length of regulatory review period and other methods for sharing performance
- independence of regulatory and funding agencies from political and government intervention
- track record of judicial independence and respect for previous government commitments.

Table 2. Costs and benefits of private investments models

Costs and benefits	Description
Access to capital funding	Private model can access deep global markets for infrastructure finance. Less vulnerable to government funding cycles.
Improved productive and dynamic efficiency	Private sector involvement may boost productivity and facilitate innovation. Depends on incentive properties and risk sharing in the regulatory or contractual model.
Higher financing costs	Private sector investors require risk premium over the government borrowing rate to compensate for business risks (e.g. costs and revenues) and risks associated with regulatory / contractual model. Note that business risks would also be faced by investor under public model but would be smoothed over entire tax base.

The important characteristics of the institutional framework will vary depending on the model. For PPP models, the independence of the judiciary and the track record in litigation involving public contracts will be important. For RAB models the track record of independent regulatory agencies will be important.

Arguably the credibility of the institutional framework is more important for the RAB approach than for PPP. The RAB approach (as applied in the United Kingdom) has the following features:

- As already discussed, the legislation that underpins the regulatory model does not state any initial values for the RAB, or outline the method for the RAB to be calculated, or even that RAB must be used at all to set prices.⁴
- The use of RAB in calculating revenue allowances has been established through decisions by independent regulators, implemented consistently over time.
- The relevant legislation includes references to general terms such “ensuring companies can finance their functions” or “earn a reasonable return on capital”. This allows regulators a broad discretion on how the RAB is set and on how the return on the RAB is estimated.

Therefore, in the RAB model, as it has been implemented, the legal protection for investors over the level of the RAB, or the return allowed on it, is minimal. The level of risk faced by the investor, as a result, depends on the predictability and credibility of the institutional framework around the system of regulation rather than the relevant legislation itself.

In terms of how this risk feeds into the risk premium demanded by investors, there is some evidence from published studies. Two studies undertaken in the 1990s and published by the World Bank (1996; 1999) examined the risk premium of utilities under different RAB regulatory models. The risk premium was estimated as the asset beta using the Capital Asset Pricing Model (CAPM). For illustration, we have converted these into a percentage premium over a government long-term borrowing rate using a standard market risk premium assumption of 5%.

The asset beta values and risk premium estimates shown in Table 3 have been split according to the incentive power and risk of the regulatory model. The low incentive powered regimes are essentially

“rate of return” or cost pass-through models where the utility is exposed to little or no business and economic risk. The high-incentive powered models involve price-cap models with the utility exposed to material cost and/or volume risk.

Table 3. Asset betas of utilities under different regulatory models

	Low-incentive powered	Medium-incentive powered	High-incentive powered
Electricity	0.35	0.41	0.57
Gas	0.20	0.57	0.84
Water	0.29	0.46	0.67
Transport	0.40	0.46	0.44
Average	0.31	0.48	0.63
Implied risk premium	1.5%	2.4%	3.2%

Source: Alexander, Mayer and Weeds (1996); Alexander, Estache and Oliveri (1999).

The results in the table show that the low-risk regulatory regimes attract a risk premium of around 1.5% above the government borrowing rate, compared to 3.2% for the higher risk regimes. Given that the low risk regimes have almost no business or economic risks, this risk premium reflects the risks associated with the regulatory framework and institutions.⁵

Table 4. Moody’s rating methodology for energy networks

Factor	Weighting	Description
Stability and predictability of regulatory regime	15%	The predictability and supportiveness of the regulatory framework – as well as the legal and political framework that underpins it – is a key credit consideration. A network operating in a stable, reliable and highly predictable regulatory environment will be scored high; those networks operating in a less developed regulatory framework or one that is characterized by a high degree of political intervention in the regulatory process will receive much lower scores for this factor.
Asset ownership model	5%	The ability of a company to sell its assets is a key consideration. Risk may be higher in jurisdictions with an increased likelihood of expropriation or where the laws detailing property rights are weaker or less established.
Cost and investment recovery	15%	This factor focuses on the risk allocation between the network operator and its customers, i.e. the extent to which the regulatory formula is supportive of cost recovery, including the mechanism by which one-off costs or over-spends are recovered.
Revenue risk	5%	The ability of a network to generate the revenue allowed to it by the regulator.
Scale and complexity of capital programme	10%	A large or complex capital programme may result in cost-overruns or take management resources, leading to under-performance in other areas of the business.
Financial policy	10%	The way in which a network owner uses its debt capacity, therefore, is a key rating consideration.
Financial metrics	40%	Leverage and coverage ratios. Leverage ratios aim to capture how easily an issuer can repay its debt; coverage ratios focus more on the ability to service the debt taking into account the characteristics of different regulatory frameworks.

Source: Moody’s, Regulated Electric and Gas Networks – Rating Methodology (2014).

Another indication of the importance of the institutional framework can be seen in the weights applied to different factors in the methodologies used by credit rating agencies to assess the credit risk of infrastructure firms. The material in Table 4 summarises the rating methodology published by Moody's for electricity and gas networks. While the contribution of ex-post empirical analysis to the derivation of these weights may not be clear, at least they represent an expert view based on extensive experience.

As expected, the greatest weight is given the financial metrics of the firm, capturing leverage and interest coverage. At the same time, the supportiveness and predictability of the regulatory framework plays an important role, as a factor in its own right but also as a key driver in the asset ownership and cost recovery factors.

A strong rating against these factors improves the overall credit rating and enables the firm to issue debt finance at lower rates, thereby reducing the overall risk premium.

Role of user charging

It is relatively easy to see why the ability to levy user charges can be seen as a positive risk factor, given the apparent independence of the revenue stream from government action. This stems from the fact that in most infrastructure sectors both demand and supply are relatively price inelastic.

As regards supply, with infrastructure high sunk costs and short-run marginal costs well below average cost, there is, at least on paper, a theoretical incentive for public authorities to find ways to reduce payments to the operator, safe in the knowledge that short-to-medium-term financeability can be maintained. A reduction in funding appears to benefit the public purse at the expense of the private shareholder with the user left unaffected. By contrast, the inelastic nature of demand appears to act in the infrastructure operator's favour, because charges can be raised in excess of marginal cost to fund sunk investment with little risk to demand.⁶ However, both freedoms (public funder to withdraw funding and private operator to raise charges) can be exaggerated. Nevertheless, as we explore below, the fact that user charges can be levied does, to some extent, reduce risk to the operator, whether under PPP or RAB models. But even this advantage is not unconditional.

As regards direct public funding commitments, viewed as a repeated game, there is extremely limited scope for public authorities to renege, without this rapidly serving to undermine institutional credibility on which low finance costs rely. The key to investor confidence comes from the knowledge that the public institutions will keep to its commitments. This applies in either a PPP or a RAB framework. If institutional credibility comes into question, then the next time a RAB-based licensee seeks to finance investment it is likely to find that the cost will have risen significantly. Similarly, if public authorities are not seen as reliable counterparties to PPP agreements, the cost of finance in future deals will rise accordingly. So, the short-run incentive for public authorities to reduce funding is very much offset by the long-run cost that such behaviour is likely to create in terms of future financing costs. Furthermore, these credibility issues are not restricted to a single domain. A government counterparty that lacks credibility in the RAB domain is also likely to find itself on the receiving end of rising financing costs for PPP projects. More broadly, behaviour of this sort impacts the overall assessment of creditworthiness and can raise the cost of all government borrowing.

As regards the benefits to investors being able to levy user charges, the absence of substitutes and low price elasticities provide very little specific protection to the licensee under RAB. Indeed, it is this very fact that drives the wider regulatory structure of which RAB is simply one part; the overriding objectives of these regimes are to protect consumers from abuse of dominance while at the same time encouraging efficient operation and investment. Therefore, user charges need provide little or no direct protection to RAB regulated companies from excessive government intervention because user charges, or specifically the cap on maximum user charges, is in fact the key instrument regulators use to protect customers. And in this context regulatory authorities have the same short-run incentive as the providers of direct public funding: that is to lower charges to benefit consumers in short run; but this incentive is offset by the medium-term need to ensure the ability for functions to be financed and to maintain the credibility of the system.

However, while it would appear that a cap on user charges is open to the same manipulation as direct funding under RAB, the existence of user charges nevertheless provides additional protection under two specific assumptions. First when the RAB regulated entity is wholly funded by user charges and secondly where the regulated entity involves privately ownership.

Full as opposed to partial user charging

Funding by means of solely user charges brings additional discipline to the independent regulator, because it becomes necessary to derive a clear and consistent methodology that links user charges to total costs, including those of financing. In this circumstance it is clear that to meet the “financing of functions” obligation embodied in legislation and referred to earlier, that there must be a clear link between this obligation and the level of user charges. For this reason the regulator is obliged to develop a methodology that sets user charges at a sufficient enough level so that a reasonably efficient operator could cover its operating and capital maintenance costs, and earn a reasonable return on its capital. Under these pre-conditions, arbitrary reductions in user charges, implemented for reasons unrelated to the project itself, become much harder to explain or implement.

In any circumstance where only part of the operator’s funding is obtained from user charges, these protections quickly evaporate. In the first instance, even without any pressure on the user charging system itself, the marginal profitability of the regulated entity is now subject to the reliability or otherwise direct government funding, for which we have established there is no binding contract under RAB.

Secondly, if user charges are not pegged to a level that can reasonably be expected to meet the “financing of functions” obligation their basis in terms of cost becomes fundamentally more subjective and hence open to adjustment. Take for instance the case of a road project part funded by direct availability payments and part by user charges. In this case user charges are can be computed on an “economic” basis, to reflect the marginal cost the road user imposes on the infrastructure. But the available definitions of marginal costs are very wide leading to significantly different potential outcomes. Productive economic efficiency dictates short-run marginal cost, the immediate wear and tear caused by a vehicle on the road. This figure is likely to be far below the average cost per vehicle of providing the asset (it may cover maintenance but not the provision of the asset itself), leaving the majority of costs to be met by direct funding. Alternative long-run measures are too numerous and various to be covered here, but allow significant room for manoeuvre were an authority wished to make use of this room.

Private ownership

Private ownership is central to the application of PPP contracts, under RAB regulation private ownership is often assumed, but does not form a necessary part of the arrangement. Indeed, RAB regimes were originally introduced in the United Kingdom to regulate privatised utilities; initially implemented for the fixed phone network, they were then extended to water, gas, electricity and the rail network. But, from a theoretical point of view, there is no obstacle to applying a RAB regime to a publicly-owned entity. Indeed, as already noted, the United Kingdom applies RAB regulation to publicly-owned water networks in Scotland and Northern Ireland as well as to the rail network which was taken back into public ownership in 2002. Applying such a regime to a public body requires specific legal safeguards around ring-fencing, usually in some form of corporatised organisation.

RAB regulation applied to publicly owned corporations has been questioned with regards to its impact on operating efficiency, in the absence of a clear profit motive. But from a funding point of view, private ownership also provides a much more credible constraint on government in a RAB context.

The reason for this is straightforward: in the absence of a contractual guarantee over levels of funding, a RAB system relies on a sensible and pragmatic application of the “financing of functions” obligation. This obligation can be interpreted and enacted by regulators, but can only be enforced by the statutory appeals authorities in the event that the regulated entity itself is prepared and able to challenge the regulator’s decisions.

Public ownership potentially undermines the ability of the regulated company to undertake this challenge, because of the conflict of interest intrinsic in the fact that the beneficial owner of the corporation is itself an arm of government.

The constraints to discretion

We have argued that the primary constraint on regulatory discretion is the impact of perverse or unreasonable decisions on the credibility of the whole institutional framework.

The knock-on impact from an increase in perceived regulatory risk could affect risk premiums in future periods and across other firms and sectors within the same jurisdiction. This repeated-game aspect of regulation is crucial to the effectiveness of a model with a high degree of regulatory discretion. In this case the “game” is repeated over time, with a series of decisions applied of a given sector, and horizontally, with multiple regulatory decisions being applied to different sectors, with precedents in one area affecting the perception of the credibility of the regime more broadly.

In a one-shot or limited-shot situation, investors will consider that regulators or government have less incentive to build credibility into the framework and more incentive to intervene to pursue short-term objectives. The importance of regulatory commitment is highlighted in the example of the United Kingdom Competition Commission (CC) determination in the Phoenix Natural Gas case, summarised in Box 1.

Box 1. Competition Commission determination for Phoenix Natural Gas

In February 2012 Phoenix Natural Gas Limited (Pngl) rejected the price control proposed by the Northern Ireland energy regulator (UR) and the matter was referred to the then Competition Commission (CC) to investigate whether the price control operated against the public interest. The case centered on balancing the credibility of regulatory commitments against retrospective regulatory interventions.

The dispute focused on UR’s proposal to write off approximately 25% of Pngl’s RAB. Pngl considered this proposal to be unjustified and contrary to the principles of incentive regulation, since it retrospectively altered the previously agreed value of Pngl’s asset base. UR argued that it was protecting the interests of customers, by removing “unspent allowances” from the asset base after five years.

The CC found that UR’s proposal was not adequately signaled in advance, and that the rationale for it was not sufficiently communicated. Changes to the regulatory framework that were enacted in this way “would lead to a perception of regulatory uncertainty, as investors may assume that UR’s future actions could be unpredictable [...] and thus increased risks that returns on investment will not be realized in the way or to the extent that is expected. This is likely adversely to affect investment decisions in the future.”

The CC identified that increased regulatory uncertainty is likely to affect the cost of attracting capital. Investors in network infrastructure place high importance on the credibility of the regime when deciding where to invest. This is because investments in network industries often involve sinking substantial upfront investments. The only guarantee that the investment will be remunerated is the credibility of the regulator’s commitment: the less credible the commitment, the riskier the investment and the higher the cost of capital.

The CC’s decision in this case that the regulator’s intervention on the RAB was against the public interest was built on the repeated game aspect of the regulatory model. The CC identified that it would require only a modest increase in the risk premium across UK-regulated sectors to offset the short-term benefits of the reduction in the RAB.

Another way to consider the impact of regulatory credibility is to consider the trend in risk premia over time. Table 5 shows the risk premium allowed by the water regulator in England and Wales in 1999 and 2014.

Table 5. Asset betas and assumed gearing: Water sector in England and Wales

Water price control (England and Wales)	Asset beta	Implied risk premium (at 5% MRP)	Gearing level
1999	0.4	2.0%	50%
2014	0.3	1.5%	62.5%

Source: Moody’s, Regulated Electric and Gas Networks – Rating Methodology (2014).

In 1999, when the regulatory regime was ten years old, the allowed asset beta was 0.4, implying an overall risk premium of 2%. In 2014 the asset beta as determined by the regulator had fallen to 0.3

reducing the risk premium to 1.5%. The system of regulation and the business risks faced by the sector were largely unchanged, so the reduction could be considered to reflect the additional credibility of the institutional framework after 15 more years of experience. Greater investor confidence in the regulatory system also supported higher gearing levels in the sector, allowing financing and tax efficiencies to be achieved.

Conclusions

It is evident that the explicit investor protections under a RAB based model are relatively limited, compared to the contractual protection of PPP. Nevertheless, RAB-regulated operations, especially in the United Kingdom, have attracted a low and falling risk premium and have been able to operate with relatively high, tax-efficient levels of gearing.

The presence of user charges does not appear to be the defining factor in facilitating this outcome. Indeed, the control over maximum (average) user charges remains the primary instrument by which regulatory authorities control for the effects of market power and encourage operating and investment efficiency under the RAB regime. For that reason, operators rarely if ever have the opportunity to mitigate the adverse effects of public funding decisions by recourse to increased user charges. Indeed, the opposite is more likely to be the case if regulatory authorities are seeking an “easy win” in terms of consumer benefit, the RAB regime presents a regulator with sufficient levers to achieve this effect.

That said, the freedom for authorities to “under fund” a RAB-based regime is materially reduced in the presence of full user charges (i.e. user charges as the only source of funding) because this arrangement necessarily forces the regime to link charges to overall costs and the necessity that a well-run regulated company can finance its functions.

This need not be true if the RAB-regulated company is only partially funded by user charges. Taking the United Kingdom’s Network Rail as an example, it is funded approximately half by direct government funds and half by the collection of track access charges. Government, in the guise of the Department for Transport, determines the service that Network Rail is expected to deliver for the coming regulatory period and the value of the grant that it will receive. The remaining income derived from track access charges is determined largely by the rail regulator Office of Road and Rail (ORR), which determines maximum access charges. Network Rail therefore has no scope whatsoever to offset a change to the direct funding part of the equation by choosing to levy higher track access charges. Both are essentially subject to public control. In fact, the “incompleteness” of the regulatory contract implied by the RAB system is as clear in this case for user charges as it is for direct funding.

In our view, the main contributory factor to the efficient financing of RAB-based entities has been the consistency and credibility of the institutional framework under which this regulation is applied. In the United Kingdom, established precedent about the interpretation of the “financing of functions” obligation and protection of established RAB values gives investors substantial reassurance that their investment will be adequately remunerated over time. This is underpinned by the private ownership of the regulated entities, which provides a very strong incentive for the regulated companies to hold the regulator to account.

In principle, therefore, there should be no barrier to the application of the RAB model without user charges, for instance as has been proposed for funding road networks. But the effectiveness of such a scheme is likely to be more limited if the regulated entity is not itself a private entity.

The factors that would be required to ensure the success of such an approach are the same as in the presence of user charges:

- an established institutional framework
- a track record of agencies operating without political interference
- a credible appeals process
- a commitment to ongoing use of model to promote good behaviours.

In our view, these factors are more important than the specific source of funding. Hence the same argument would apply if we were to compare funding from general taxation with the use of “ring fenced” dedicated public funds. It is the institutional framework that provides the necessary reassurance to markets that funds that are available today will be free from political interference and will continue to be available for the life of the investment.

In principal one could derive a similar list of criteria required for successful contracting under PPP. For instance, ITF (2017) details the role that institutional credibility plays in establishing stable PPP contracts and avoiding opportunistic renegotiations (with examples of opportunism on both sides). However, the conditions of credibility and the value of stability and predictability may be particularly strong for RAB-based models in the absence of contractual disciplines.

The role of the credible appeals process perhaps deserves repeating here. In the context of the United Kingdom, the role of the Competition and Markets Authority (CMA, formerly Competition Commission, CC) should not be underestimated. Most regulated entities have a right of appeal over periodic price determinations to the CMA. The terms of these appeals vary somewhat from sector to sector, some permitting appeals over specific details of the determination while others require the CMA to re-review the decision in the round. As shown in the Phoenix Gas case, the CMA/CC places a very high value on the maintenance of the integrity and predictability of the RAB regime in the round, not simply limited to the specific case under investigation.

Applying an appeals process based on an established expert panel⁷ with continuity and a professional staff, rather than either an ad hoc expert panel convened for the purpose or a court-based approach restricted to the letter of the contract under dispute, allows the appeals process to take in the wider context and objectives of the economic regulations, to reflect the externalities in one sector of inconsistent decision making in another, and so to establish the predictable track record which is key to the effective functioning of RAB based regulation in general.

Notes

1 For example the attempt by the state of California to build new road infrastructure in competition to SR91: see Gifford, et al. (2014) “Renegotiation of Transportation Public-Private Partnerships: The US Experience”, in ITF (2017).

2 For instance, in the wake of the 2008 financial crisis many PPP contracts were renegotiated because of the dramatic worsening of government finances that had nothing directly to do with the performance of those contracts.

3 Of these steps, privatisation is usual but not ubiquitous. The United Kingdom applied this model at various times to privatise water, electricity, gas, telephone and rail network companies. But it has also applied it to publicly-owned water companies in Scotland and Northern Ireland and continued to apply it to the rail infrastructure provider, Network Rail, after it was taken back into public ownership in 2002.

4 For instance, when the water Industry was privatised in 1989, no RAB was defined, or even discussed. It was only during the first “Periodic Review”, which took effect in 1994, that the regulator Ofwat derived RAB values that subsequently formed part one of the regulatory building blocks in subsequent reviews.

5 This finding is broadly supported by more recent evidence. For example, the Thames Tideway project is subject to a very low risk regulatory model and the regulator Ofwat has suggested that it would merit an asset beta of around 0.2 (implying a risk premium of around 1.0%). This lower value compared to the results in Table 3 may reflect the additional maturity and confidence in the UK regulatory system now compared to the mid-1990s.

6 Note this description fits the situation of traditional utilities, like water networks, with little or no possibility for substitution, and can also apply to transport infrastructure like road networks as a whole. But it applies less to individual elements of a transport infrastructure, e.g. a single toll road, where the existence of alternative routes, or transport modes, may make bypass a simple option, substantially raising the price elasticity of demand.

7 In the case of the CMA the specific panel for a particular investigation is convened on an ad hoc basis, but drawn from a wider established group of CMA Panel members, and supported by a full-time professional staff of lawyers and economists

References

ITF (2017), *Public Private Partnerships for Transport Infrastructure: Renegotiation and Economic Outcomes*, ITF Roundtable Reports, No. 161, OECD Publishing, Paris, <https://doi.org/10.1787/9789282108130-en>.

Alexander, I., A. Estache and A. Oliveri (1999), “A Few Things Transport Regulators Should Know About Risk and the Cost of Capital”, <http://documents.worldbank.org/curated/en/172821468766830373/A-few-things-transport-regulators-should-know-about-risk-and-the-cost-of-capital>.

Alexander, I., C. Mayer and H. Weeds (1996), “Regulatory Structure and Risk and Infrastructure Firms,” *World Bank Policy Research Working Paper*, No. 1698. <http://documents.worldbank.org/curated/en/845941468739569300/Regulatory-structure-and-risk-and-infrastructure-firms-an-international-comparison>.

Moody’s (2014), *Regulated Electric and Gas Networks – Rating Methodology*, 2014.

Appendix 1. Research questions and outputs of the Working Group on Private Investment in Infrastructure

Introduction: Getting the basics right

What are the economic characteristics of infrastructure? What is infrastructure and what are operations? What are the models of private participation in infrastructure and through which significant private investment actually takes place?

Makovšek, D. (2019), “What is Private Investment in Transport Infrastructure and Why is it Difficult?”, Working Group Paper, International Transport Forum, Paris.

Can private investment improve productive efficiency? Improve project selection? Close the infrastructure funding gap? Have other positive effects when it is private?

Makovšek, D. (2019), “The Role of Private Investment in Transport Infrastructure”, Working Group Paper, International Transport Forum, Paris.

What have the private investment trends in transport infrastructure been over the last 20 years? How much of that was foreign private investment?

Mistura, F. (2019), “Quantifying Private and Foreign Investment in Transport Infrastructure”, Working Group Paper, International Transport Forum, Paris.

Defining the challenge: How uncertainty in contracts matters

How does uncertainty affect risk pricing? Beyond investors, do suppliers in PPPs also have issues with risk pricing? How does its transfer to the private sector affect competition? What does uncertainty mean for the public vs. private cost of financing?

Makovšek, D. and Moszoro, M. (2018), “Risk pricing inefficiency in public–private partnerships”, *Transport Reviews*, 38(3), 298-321.

Is uncertainty also an issue in long-term services/operations contracts?

Beck et al. (forthcoming), “Uncertainty in Long-term Service Contracts: Franchising Rail Transport Operations”, Working Group Paper, International Transport Forum, Paris.

What is the competition for large transport infrastructure projects in the EU Market? Is there a difference between traditional procurement and PPPs?

Roumboutsos, A. (forthcoming), “Competition for Infrastructure Projects: Traditional Procurement and PPPs in Europe”, Working Group Paper, International Transport Forum, Paris.

Addressing uncertainty for suppliers: the construction phase as example

<i>Adversarial vs. collaborative procurement – is collaborative contracting the future?</i>	Eriksson et al. (forthcoming), “Collaborative Infrastructure Procurement in Sweden and the Netherlands”, Working Group Paper, International Transport Forum, Paris.
<i>What lessons in dealing with risk and uncertainty were learnt in Danish mega projects from Storebaelt to Femernbaelt?</i>	Vincentzen, L. and K. S. Andersson (2018), “Risk Allocation in Mega-Projects in Denmark”, Working Group Paper, International Transport Forum, Paris.
<i>What can governments do in the short run to reduce inefficient pricing of risk by construction contractors?</i>	Kennedy et al. (2018), “Risk Pricing in Infrastructure Delivery: Making Procurement Less Costly”, Working Group Paper, International Transport Forum, Paris.

Addressing uncertainty in long-term contracts in the absence of continuous pressure for efficiency

<i>What is the public sector organisational counterfactual on which private investment should seek to improve?</i>	Holm, K.V. and T.H. Nielsen (2018), “The Danish State Guarantee Model for Infrastructure Investment”, Working Group Paper, International Transport Forum, Paris.
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Partial fixes to the Private-Public Partnership approach

<i>How would an organisational structure consisting of PPPs come close to a network-wide management approach? What benefits would it yield?</i>	Vasallo, J. (forthcoming), “Public-Private Partnerships in Transport: Unbundling Prices from User Charges”, Working Group Paper, International Transport Forum, Paris.
<i>Should the public or the private side bear the cost of long-term uncertainty? How could we design a PPP contract to avoid hold-up due to incomplete contracts?</i>	Engel et al., (forthcoming), “Dealing with the Obsolescence of Transport Infrastructure in Public-Private Partnerships”, Working Group Paper, International Transport Forum, Paris.

Long-term strategic approach

<i>How do the PPP and regulated utility model (RAB) compare in terms of efficiency incentives?</i>	Makovšek, D. and D. Veryard (2016), “The Regulatory Asset Base and Project Finance Models”, International Transport Forum Discussion Papers, No. 2016/01, Paris.
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What basic considerations underlie the choice between a PPP and RAB approach?

Hasselgren, B. (forthcoming), “Risk allocation in Public-Private Partnerships and the Regulatory Asset Base Model”, Working Group Paper, International Transport Forum, Paris.

Which are the preconditions a country would need to take to establish a RAB model on a motorway network? Is user-charging a must?

Alchin, S. (forthcoming), “A Corporatised Delivery Model for the Australian Road Network”, Working Group Paper, International Transport Forum, Paris.

From the investors’ point of view, does a RAB need to be fully reliant on user-charging?

Francis, R. and Elliot, D. (2019), “Infrastructure Funding: Does it Matter Where the Money Comes From?”, Working Group Paper, International Transport Forum, Paris.

Incentive regulation can also yield perverse incentives. Can the capex bias be managed?

Smith et al. (2019), “Capex Bias and Adverse Incentives in Incentive Regulation: Issues and Solutions”, Working Group Paper, International Transport Forum, Paris.

Does it make sense to pursue hybrid solutions between PPP and RAB?

Zhivov, N. (2018), “The Thames Tideway Tunnel: A Hybrid Approach to Infrastructure Delivery”, Working Group Paper, International Transport Forum, Paris.

Uncertainty and private investment mobilisation in transport infrastructure

What lessons can we draw from recent attempts to mobilise private investment in infrastructure in the aftermath of the global financial crisis?

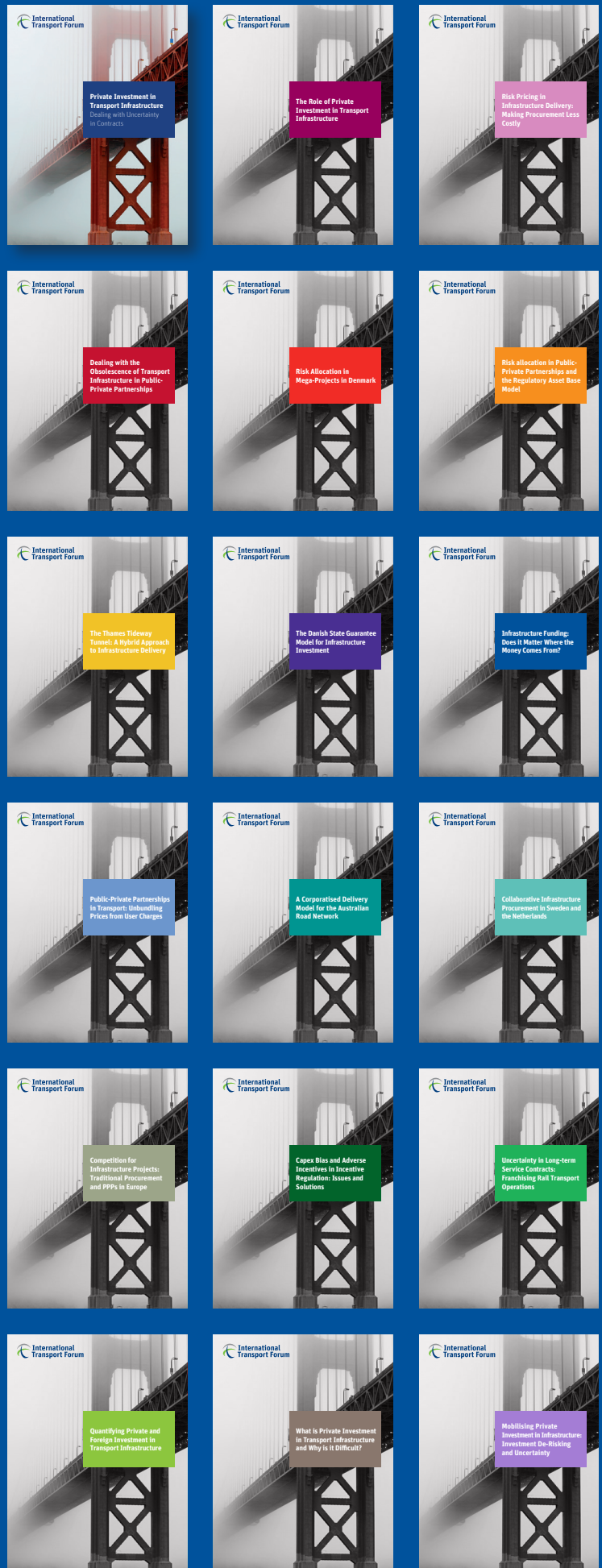
Makovšek, D. (2018), “Mobilising Private Investment in Infrastructure: Investment De-Risking and Uncertainty”, Working Group Paper, International Transport Forum, Paris.

Synthesis

ITF (2018), *Private Investment in Transport Infrastructure: Dealing with Uncertainty in Contracts*, Research Report, International Transport Forum, Paris

Infrastructure Funding: Does it Matter Where the Money Comes From?

This paper compares the Public Private Partnership model for funding of infrastructure projects with an alternative approach, the Regulatory Asset Base model. It considers whether the ability to levy user charges is necessary to ensure low financing costs, or whether these stem from other factors. The paper is part of a series of 19 papers and a synthesis report produced by the International Transport Forum's Working Group on Private Investment in Transport Infrastructure.



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