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Article

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EIB Papers

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European Investment Bank (EIB), Luxembourg

Suggested Citation: Helm, Dieter (2010) : Infrastructure and infrastructure finance: The role of the government and the private sector in the current world, EIB Papers, ISSN 0257-7755, European Investment Bank (EIB), Luxembourg, Vol. 15, Iss. 2, pp. 8-27

This Version is available at:

<https://hdl.handle.net/10419/45368>

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ABSTRACT

Europe faces major investment in infrastructure in the coming decade in the context of the credit crisis and the broader economic crisis that followed.

The article considers what the core market failures in infrastructure are, focussing on the gap between marginal and average costs, the system nature of infrastructures, and the time inconsistency problem. The difficulty for government in providing credible commitments to investors in respect of the fixed and sunk costs is the classic problem in contract and institutional design. The roles of government and the private sector are defined, and the article proposes that the concept of regulatory asset bases (RABs) developed in privatised-utility models provides a way of cementing in commitment and hence ensuring that regulatory and political risk is appropriately allocated. As a consequence, the financial structure of infrastructure investments can be determined, with debt playing the primary role in respect of the RABs, and equity in respect of the creation of new infrastructure.

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Infrastructure and infrastructure finance: The role of the government and the private sector in the current world

1. Introduction

It is widely acknowledged that major investment is required in European infrastructure. This is partly as a result of the historical investment cycles, with replacement now a priority. It is also due to technical change, changes in demand patterns and the need to decarbonise in the face of the climate change challenge.

To these are added the challenges of integrating networks and competitiveness: Europe lacks integrated electricity and gas networks, and its transport and communication networks are fragmented. The result is higher costs as network capacity margins are required in each country to meet unanticipated demand, scale economies remain unexploited, and transactions costs between the networks are high.

For historical reasons, Europe's infrastructure networks have been developed largely in a piecemeal and bottom-up fashion, with a multitude of standards and technologies. Even in those countries which have centralised nationally (like France and Britain after the Second World War), the systems have a distinctive national flavour in a European context.

Europe's piecemeal approach has also been a feature of the institutional framework for infrastructure development. Though all countries have had some state involvement, the spectrum is a wide one, between the centralised state provision through ministries and state-owned companies, local municipalities and private provision. This spectrum of provision is matched by a spectrum from public to private-finance, and from franchises to asset ownership.

From the late twentieth century, increasingly the ownership as well as the finance of infrastructure assets were transferred to the private sector. Privatisation reduced the role of the state to one primarily of regulation, and investors sought out the security of more stable and predictable rates of return, supported by the ownership of the assets. A "new" model emerged of regulated privately-owned and privately-financed infrastructure utilities.

Yet not all infrastructure assets fit into the utilities class, and alongside the privatisation model, a host of project-specific institutional arrangements were developed. These were given names like "public private partnerships" (PPPs) and "private finance initiatives" (PFIs). Numerous variants emerged as projects tended to be treated on a case-by-case basis.

Much of the impetus for the greater involvement of the private sector came from cash-strapped governments trying to raise monies and reduce their capital expenditures. It was, in effect, an attempt at off-balance sheet financing. But there were efficiency motives, too: the idea was that private provision and private finance would improve efficiency and, where possible, user charges would create better incentives between providers and customers. Though it was widely assumed that the cost of capital would be higher, this extra cost would be offset by lower capital expenditure costs and better design.

These moves towards private provision, private ownership and private finance pre-date the latest economic crisis. In the booming debt and equity markets of the 1990s, capital flows to infrastructure and privatisations were relatively easy to pull off. After the stock market crash in 2000, the loose



Dieter Helm

monetary and fiscal policies – especially the low interest rates – provided a debt-based flow of funds, and gearing levels increased, with infrastructure funds coming into the markets on the back of the acquisition of debt-based assets.

In 2006, real interest rates started to rise back toward their longer-term averages, and the credit crunch reflected the problems of asset valuations which had been driven by debt at close to zero real interest rates. Interest rates were again lowered, and quantitative easing added a new dimension to infrastructure finance, as central banks bought up government bonds (a close substitute for utility debt) and indeed, in the UK's case, the central bank directly purchased utility bonds.

In the recent recession, debt for existing assets became very cheap while finance for new infrastructure did not.

The credit crunch led on to the economic recession. Demand fell – including for infrastructure services. The supply of credit remained constrained although the cost of debt ironically became even cheaper. Utilities provided a relatively safe haven, with the ability to pass through inflation as well. Yet the cost of equity did not fall correspondingly and financial markets made a strong distinction between debt finance for existing assets in regulated utilities, and the finance for new capital expenditure, especially that outside the explicit regulated-utility frameworks. Hence the irony: never had the cost of debt been lower and risk-averse investors so willing to accept very low returns on bonds; and yet the problems of financing new infrastructure assets have gone up significantly, especially where there is a requirement for equity.

This article considers why there is this strong distinction between the cost of debt for existing regulated assets and the cost of debt and equity for new infrastructure. It explains why and how regulation can address the core economic problems which infrastructure brings – the nature of long-term fixed and sunk costs in a context where average and marginal costs sharply diverge and where political and regulatory incentives to expropriate the sunk costs are strong (Section 2). The article then considers the implications for the respective roles of government (Section 3) and the private sector (Section 4). The specific problems of private finance are considered next (Section 5), and a model for extending the concept of regulated asset bases across the wider infrastructure space is set out (Section 6). The immediate and longer-term effects of the credit crunch and the resulting economic crisis on infrastructure provision and finance are then considered (Section 7) and a number of policy implications and conclusions are drawn (Section 8).

2. The infrastructure problem: Public goods, credibility and commitment

Part of the confusion over the design and implementation of infrastructure policy is a lack of clarity about what the problem is to which the various instruments are supposed to provide solutions. There is much discussion about access to and cost of finance, but little by way of explanations as to why these financing problems arise.

Infrastructure poses multiple market failures – and intervention poses multiple government failures. The primary failures are related to public-goods properties, sunk costs, market power and externalities.

Most infrastructure forms part of networks and systems. These systems tend to be public goods: once they are in place, the marginal costs of another consumer tend towards zero. Hence economic welfare is maximised by providing the public good to as many consumers as possible, with marginal incentives which reflect the marginal and not the average costs. This, however, raises the obvious public-goods problem – how to recover the fixed (and sunk) costs without creating distortions to consumption?

A number of “solutions” to this cost recovery problem have been proposed and many have been tried in practice. Amongst these there is an inherent tension between economically efficient mechanisms which relate the fixed costs to the (inverse of) demand elasticities and those which take account of distributional considerations. Fuel and water poverty are significant problems, whilst transport to rural and poorer groups of customers have typically received priority in charging the marginal rather than average cost.

The determination of prices and the allocation of the fixed costs inevitably involve governments. This is in addition to the point that the optimal scale and design of a system needs to be determined at the system level. It cannot be the aggregation of a series of disaggregated market choices. Hence the choice and provision of the system itself have a core political element – with inevitable consequences for the level and allocation of risk in the context of government failures.

The most important context in which this political and regulatory dimension arises is in respect of the fixed and sunk costs. It follows from the above that a very large gap between the average and marginal costs exposes investors to the problem that their *ex ante* investments may be subject to *ex post* expropriation as there will be a political and regulatory incentive to drive prices to marginal costs in the full knowledge that owners will operate the assets up to the point where only their marginal costs are covered. Where the assets are long lived, the exposure of these fixed and sunk costs is particularly important. In response, investors will seek long-term contracts and/or fast depreciation to recover these costs. As we shall see below, these long-term contracts are at the heart of the regulatory design of infrastructure policy. The problem is how to design credible political and regulatory commitments to the recovery of the sunk costs – in other words how to overcome the inherent *time inconsistency problem*. During much of the twentieth century, the inability to credibly commit on the part of governments undermined investment incentives so seriously, that nationalisation was required with the state doing the investing which the private sector was reluctant to deliver.

Governments are tempted to drive prices to marginal costs knowing that owners will operate as long as their marginal costs are covered.

Historically, one solution has been to recognise that the provision of much infrastructure has monopoly or market power elements. The investor can in principle therefore rely on their monopoly to exploit customers so as to recover the sunk costs. Road and bridge tolls played this part in the early development of roads, for example.

Monopoly, however, brings two problems: first, it may not last; and second, it leads to political and regulatory intervention. With long-lasting assets, investors would need long-lasting market power to match their sunk costs. The problem with monopoly is, however, that it provides the seed of its own destruction – what Schumpeter famously called “creative destruction” of entry and technological change induced by the presence of monopoly rents. For most network systems, cherry-picking of customers is an attractive option. Entrants choose to service only those parts of the market where marginal costs are lowest, and to cream off correspondingly high-value customers. This, in turn, drives the incumbent to charge greater proportions of their fixed costs to those customers less attractive to entrants. Where network competition is deliberately encouraged, this can cut quickly into broader distributional considerations. Provision of rural postal and telecommunications services fits into this category. At the limit, duplicating networks helps core attractive customers get better deals, but raises the costs of the incumbent networks.

Market power may not last for a further reason: technical progress may cut away the market. In almost all major network systems this is a real threat. In electricity, smart grids and meters threaten existing assets. In communications, copper wires face threats from new transmission mechanisms, including wireless ones. For nuclear and wind technologies, over the next decade or two, both may face new cheaper rivals. The longer the lives of the assets, the greater is the risk of stranding. Long-term contracts and regulatory regimes are again parts of the solutions.

Externalities are pervasive in infrastructure. These fall into two broad categories – environmental and social. Environmental externalities are multiple – in terms of greenhouse gases, other forms of air pollution, water pollution and runoff, noise and land use and biodiversity. For example, a new runway or airport will raise greenhouse gas emissions, increase local air pollution, result in significant water runoff, create significant noise affecting local people and their house prices, and take up land which can often include areas with considerable biodiversity value, such as marshes and open spaces.

In theory, the “correct” solution is to price each and every externality. In practice, this is impractical and politically impossible. The result is that decisions are based on politics and planning, and very much open to political and regulatory failures.

Social aspects of infrastructure arise not only in the allocation of the fixed costs between customer groups discussed above, but also in respect of wider concerns about inclusiveness and access to essential services. Infrastructure is a core aspect of the provision of basic social goods which are essential to participate in society. Infrastructure lies behind the provision of health, education, heating, lighting, transport and communications. No civilised country can be indifferent to these dimensions. Indeed, at the limit, people freeze to death through fuel poverty, and die if they do not have access to hospitals and transport to them. For these reasons, it is inevitable that governments will want to influence the design, provision and pricing of infrastructure.

3. The role of government

The role of the government is to make main infrastructure choices, facilitate planning and licensing, and credibly commit to the efficient sunk costs.

Given the market failures, it is inevitable that the role of government lies at the heart of infrastructure policy, and that its finance depends on how that role is designed and implemented. Government failures in turn raise the costs of provision and finance, and in particular affect the cost of capital and the optimal mix of debt and equity.

The role of government is: to provide for the over-arching choice of networks and infrastructure; to facilitate planning and licensing; and to provide a credible commitment to the efficient sunk costs of the investment, whilst ensuring that market power is not exploited.

3.1 Decisions about infrastructure

Deciding about the overall shape of infrastructure is for most governments a fraught process. It does not occur in an efficient political vacuum, but rather, given the size and scale of infrastructure decisions, it is almost always set within wider budgetary constraints. With governments faced with significant constraints on spending, and with little practical differentiation between capital and current spending, most governments will be tempted to reduce capital expenditure (CAPEX) to protect operating expenditure (OPEX), and to respond to short-term macroeconomic constraints.

In part this is a response to the inadequacy of government accounts and the failure to distinguish between consumption and investment. Most government accounts are in cash terms – there have been few serious attempts to create national balance sheets, reflecting asset values and, in particular, depreciation. GDP growth in particular, a primary aim of most governments, takes little account of the state of infrastructure assets, and indeed, spending on consumption rather than on meeting depreciation tends to increase GDP in the short run. As a result, major projects are almost always subject to stop-go interventions.

The “correct” way to think of the government’s position in respect of infrastructure is to consider the national balance sheet in current cost terms (Helm 2010a). Arguably, the job of government is to be

indifferent between generations and to maintain an infrastructure through time capable of meeting the needs of the economy and society. It is a general set of public goods. It therefore makes little sense to depreciate the assets. Rather, an infrastructure renewal charge is the appropriate way to maintain the operational value of the assets intact. It is operational in the sense that the precise mix of assets is likely to change over time as technology changes and as wealth varies. For example, broadband and smart grids now play a prominent role, whereas once fixed telecommunications and conventional electricity networks were sufficient.

Once assets have to be maintained intact – in effect asset lives are treated as infinite and infrastructure maintenance and renewal replaces depreciation – national accounts need to make provision for the necessary infrastructure spending. This “charge” is determined not by the short-term macroeconomic requirements, but by the condition that the assets must be maintained in at least as good a state. The implication is radical: consumption is the residual item, not investment, and when macroeconomic constraints bite, then it is consumption that has to adjust. In the current economic crisis, this points away from attempts to boost demand through consumption, and towards more investment.

These considerations set the current estimates of the infrastructure spending requirements within Europe (and indeed the US) into context. For the last two decades (with some notable exceptions like Germany after reunification), assets have been allowed to deteriorate. They have, in effect, been depreciated. Furthermore, the combination of a “new” problem – climate change – and new technologies – like broadband and the application of information technology (IT) to transport and energy networks – have together necessitated a major change in the composition of infrastructure. The energy and transport systems in Europe are predominantly based upon fossil fuels at a time when policy is to radically decarbonise, rendering much of the existing assets redundant, and whole new infrastructures have emerged as system public goods.

Climate change can be considered as a classic failure to take account of depreciation: the atmosphere as an asset has been degraded without compensating investments. Biodiversity and the pollution of fresh and marine water environments provide additional examples.

Government’s role is therefore to provide not just the choices over infrastructures and infrastructure systems – to decide how much broadband, smart grids, electric trains and roads should be provided – but also to ensure that existing assets are maintained at least operationally intact. The latter requirement is wholly absent across European national accounting, and the former is seriously impaired as a result of the latter. Decisions about infrastructure and infrastructure systems become driven by short-term macroeconomic considerations.

3.2 Planning and licensing

The next task is to facilitate infrastructure investment by providing for planning permissions and licences. Almost all infrastructure requires the acquisition of land and imposes significant externalities on local populations. New roads tend to go through countryside and houses, airports impose additional noise and pollution, and electricity transmission lines blight the landscape. Wind farms, nuclear power stations and major buildings like hospitals and schools impose significant costs. Almost all have also knock-on consequences for other networks and infrastructures.

Gaining the permissions to build and the licences to operate is necessarily a political matter. Only political frameworks can allocate such rights (and damage others’ interests). Property right allocation is never a matter purely of economic efficiency, and indeed attempts to make such decisions technocratic tend to lack legitimacy and hence, open up decisions to *ex post* reappraisal.

There have been a number of attempts to make planning “independent” – notably Britain’s Infrastructure Planning Commission. Like the Monetary Policy Committee’s decisions (and the European Central Bank’s) on interest rates, and the Competition Commission’s decisions (and the European Commission’s) on mergers, the idea is to remove politicians’ assumed short-termism and responsiveness to capture by narrow interests, and instead replace this with independent experts who decide what is in the public interest.

The objections are numerous and overwhelming. The idea of a purely publicly-interested technocrat adjudicating on economic efficiency is a fantasy of economic theory and textbooks: given a social welfare function, the technocrat chooses the efficient outcome. Yet there are two overwhelming problems: first, there is no clear and unambiguous social welfare function; and second, “experts” are human and may be prone to having interests and being vulnerable to capture, too. The difference between the two approaches – planning within a political context, and planning by technical experts – is that the former has significantly greater legitimacy. The latter can inform the former, but not replace it, if investors are to have faith in the credibility of the decision and, crucially, its robustness against *ex post* revisions. As we shall see, this matters greatly for the determination of the cost of capital and hence, the efficiency of private finance.

3.3 Credible commitments and sunk costs

Investors demand that the government – on behalf of future customers – commit to paying the sunk costs.

The third role of government is to credibly commit future customers and taxpayers to paying for the fixed and sunk costs of infrastructure investments. The time inconsistency problem identified above bedevils infrastructure investment. Future customers want the services provided by future infrastructure. Investors know that once the costs are sunk, they can be expropriated *ex post*. They therefore demand that future customers commit to paying the sunk costs which they, the investors, provide.

But a contract between future customers and current investors in the infrastructure space almost always involves government because government implicitly or explicitly determines the price, because government is the only agent capable of acting on behalf of future customers, and because future customers are also voters and therefore have an incentive to lobby politicians to renege on the sunk costs.

These difficulties tend, surprisingly, to be recognised in the detail rather than the generality. As a result, in the literature, too, little attention has been paid to how to organise infrastructure contracts in a credible way, and in particular to how government should optimally contract and what institutions are necessary to ensure that contracts are enforced. The framework for PFI, PPP and utility regulation are all attempts to resolve the time inconsistency problem, as are models for more direct governmental procurement.¹

Below we consider how well these mechanisms work and how the concepts of regulated assets and regulatory asset bases might improve on the mechanisms for commitments. The point to establish here is that failure to credibly commit has a direct financial consequence – the cost of capital is determined by the degree to which risk has been efficiently allocated. Credibility is a political and regulatory risk, not a business problem.² Hence, the allocation of that risk to the private sector is, in effect, the allocation of exogenous risk to private investors. Since it is exogenous – investors cannot manage it – the relative cost is likely to be high, and higher than if it remains in the public sector, where in principle that risk is endogenous.

¹ For a range of examples and the implications for commitment, see Hogan and Sturzenegger (2010).

² On its relation to price caps, see Helm (2010b).

In practice, whether the political and regulatory risk is endogenous – whether the public sector can manage it – is debateable, and it depends upon which bits of the public sector it is imposed upon. For example, local government may have little control over central government, and particular public bodies like hospitals and transport authorities may similarly have to treat the credibility risk as exogenous.³

The reason this matters is that political and regulatory risk is *equity risk*, and risk allocation is all about settling the equity risk appropriately. If equity risk is placed upon private investors to whom it is exogenous, then it will raise the equity cost of capital. Put simply, the greater the risk that *ex post* political and regulatory interventions will undermine the recovery of the sunk costs – the drive towards marginal cost pricing – the higher the private equity cost of capital.⁴

The greater the risk that regulatory interventions undermine the recovery of the sunk costs, the higher the cost of private equity capital.

This higher cost of capital in effect telescopes future returns back towards the present. It is similar to a high depreciation charge. Investors want their money back sooner rather than later, the greater the chances of *ex post* intervention.

The standard response is that investors can diversify this risk – which the Capital Asset Pricing Model (CAPM) will reflect in the beta coefficient as the volatility to the market of the project, not the inherent risk in the project itself. Putting aside the obvious reply that this is not what project appraisers tend to do in practice, the broader issue is whether political and regulatory risk can in fact be easily diversified. It is not obvious who the beneficiaries of an *ex post* intervention in a time-inconsistent way would be.

The practical way in which these questions have been addressed is through institutional design – through the legal framework and through the development of arms' length regulatory bodies.

Legal protections for investors are obviously extremely important, and in countries with a legal tradition based upon the protection of property rights, the courts are the natural way in which time inconsistency is addressed. In the US, this is particularly apparent. It is also a developing trend in European legislation, where the rights-based framework has increasingly been used to defend private property rights against expropriation by public bodies and governments.

In other countries (like Britain), the public interest tends to dominate the primacy of property rights – and where piecemeal pragmatism lends discretion to public officials. Here the focus is on mechanisms outside the courts to fetter the discretion to *ex post* intervention. A broad-based public interest test for intervention is typically a greater risk from a time inconsistency perspective: conditions and circumstances change, and the pliability of the public-interest test allows this to be reflected in decisions about pricing and cost recovery.

In these sorts of countries where pragmatism about the public interest dominates over courts and legal constraints, the emphasis has been on creating independent institutions as intermediaries between the government and the investors. Unlike planning – where decisions are made about the systems and specific projects and licences granted – the sunk cost issue arises from the capital expenditure, not the granting of permission to carry out the project. The intermediary is the guarantor that the government will honour its commitment and regulators will have due regard to investor

3 In the case of the London Underground, for example, it is far from obvious that the political and regulatory risk has been reduced by the recent transfer of the private-sector company Tube Lines to the public-sector company Transport for London. Neither company had much control over HM Treasury nor, hence over the determination of the capital budget for the upgrade of the London Underground or indeed the related project Crossrail.

4 On the role of risk in capital structure, see De Fraja and Stones (2004), Dewatripont and Tirole (1994) and more generally, Hart (1995).

protection. In the utility sector, a host of new regulatory bodies has been created, partially with this purpose in mind. Such measures – not only in the UK, but also across Europe through Directives requiring independent regulators – have not, however, generally been extended to PFI and PPP contracts and, as we shall see below, this has had a number of impacts. It has tended to result in higher costs of capital, but also the use of other mechanisms to give investors security, including claims on the assets and further contracts on maintenance and ancillary revenue streams.

4. The role of the private sector

Faced with the political dimensions of infrastructure systems and projects, an obvious question to ask is whether the private sector has *any* role to play. For much of the twentieth century in Europe, the answer has been “very little”, and largely as a contractor to projects, rather than as an investor in projects. Governments could not commit to making timely decisions, providing for planning decisions without the desire to maintain the flexibility to change and alter the decisions *ex post*, and above all commit to the sunk costs. The preferred model was state-owned companies and departmental investments. The great post-Second World War nationalised industries played this role in Europe, alongside notionally private national champions who were in many regards implicit agents of the state.

This internalisation within the public sector was not without merit: it put the political and regulatory risk where there was at least some scope to manage it. Taxpayers and customers shared the risks, and governments could typically borrow at lower rates than the private sector.⁵ Yet it became gradually apparent that the failure to disaggregate the various types of risk, and the failure to take account of the incentive structure of the public sector could lead to sub-optimal outcomes.

4.1 Private production

The role of the private sector has gradually increased: from carrying out the physical investment...

The easy bit was to focus on public versus private production – the differences between private and public asset operations (OPEX) and carrying out the physical investment (CAPEX). Public incentives arguably encouraged operating cost bias towards labour (reflecting upon influences on governments) and a tendency to over-invest (notably in areas like electricity transmission and power stations’ capacity margins).⁶ In other areas, resistance to reflecting changes in demand and technology were witnessed in a reluctance to prune rail networks as car transport grew. The idea was that in the public sector there would be a tendency to “predict and provide” in a context in which there were strong incentives to over-predict and hence over-provide.

The important point here is that the perceived problem for which the private sector was deemed to be the solution was over- and not under-investment. The corollary is that as the role of the private sector has grown, the result is a tendency towards under-investment. Some would argue that – as predicted at the privatisation of many core infrastructures – that is what has happened.⁷

Though the constraints of public finances have now, in effect, curtailed this concern, the response is that it is not the job of the private sector to decide on the appropriate level of infrastructure investment. This, as argued above, is for government. It is government that should determine the bundle of public

5 In the current context, with negative real interest rates, this lower borrowing cost cannot be ignored.

6 The classic framework for looking at incentives and regulation is Averch and Johnson (1962). For a recent survey of the relation between efficiency and privatisation, see Cavaliere and Scabrosetti (2008).

7 Examples include the debates about the privatisation of British Airports Authority and electricity privatisation in Britain.

infrastructure goods for the economy. Thus, the current state of Europe's infrastructure is as much a consequence of the failure of governments to set the frameworks and decide about the public goods as it is a perceived failure of the private sector to invest.

If the private sector's role is to carry out decisions ultimately made by governments on behalf of customers and taxpayers, then it is ultimately all about contracting. The private sector can operate assets and build assets. Construction risk and operational risks are risks which can be endogenised to the private management.

The advantages of the private sector in operating and building is that their incentives are simpler (profits) as opposed to the complexity of the public sector (maximise social welfare) and that the private sector is less open to lobbying and capture by vested interests.

The private sector brings this simplicity of objectives to bear through a competitive bidding market. Rival companies compete for contracts. Provided that the outputs are clearly defined and provided that there is no corruption (implicit or explicit), costs of both operation and build should be more efficient.

The provisos are, however, important. Corruption tends to arise where the public and private sectors interact and large construction projects in Europe have a long history of associated corruption scandals. Here the issue is the design of the competitive bidding process and the legal framework of fines and penalties for corruption.

4.2 Private asset ownership

Contracting out operations and build are incremental steps: they are all about defining limited-period contracts, and leave aside the problems of finance to which we return in the next section. A further more radical step is the transfer of the ownership of infrastructure assets to the private sector – either for existing assets through privatisations or through the retention in the private sector of new assets which are built.

Privatisation transferred the assets as well as the licences in respect of OPEX and CAPEX to the private sector (see Helm and Tindall 2009). The asset transfers were attractive to governments concerned with general government finance, but they also provided a security against which future investment is made. In setting prices, regulators were typically required to pay attention to the “financing of functions” and this in turn meant not only a return to CAPEX and the appropriate provision for OPEX, but also a return on the existing assets. In the process, and more by accident than design, the concept of a “regulated asset base” (RAB) was developed, and this in turn led to a mechanism by which the creation of new assets (CAPEX) could migrate into old assets once completed and then transferred into the RAB.⁸ The crucial point here is that the RAB represented the sunk costs – and the RAB mechanism thereby became a means to addressing the time inconsistency problem. It was not that the assets needed to be owned by the private sector to facilitate private building of new assets: it was rather that the ownership of old assets was the collateral against new CAPEX and the mechanism for recovering the sunk costs. Giving a return on RAB assets meant that pure *ex post* marginal cost pricing could not be applied and thus limited time inconsistency expropriation of sunk costs.⁹

...to outright ownership and operation of existing and new infrastructure assets.

8 It was a modern restatement of the pervasive concept of a “rate base” required in rate-of-return regulation and developed extensively in US post-Second World War regulation. To provide a calculation of the actual returns, the question “on what?” had to be answered.

9 See Helm (2009a and b) for a more comprehensive exposition of the RAB concept.

4.3 PFI and ownership

Discussion of PFI projects has tended to focus on the finance bit, to which we turn in Section 5 below. However, the important dimension from the perspective of time inconsistency is the assets themselves and how the revenue is generated to remunerate the sunk costs. In this regard, PFI projects vary greatly. A project can be built and then transferred at a variety of subsequent dates. There can be a fixed contract period (for example, the 30-year contracts for the London Underground) or a transfer on completion. In some cases, the PFI contractor gets to build and then operate the asset, with charges for the asset's use covering the build and the operations costs. In effect, the user charges cover all the costs of the contractor – and at the limit these are equivalent to mini-utilities for single assets like hospitals and schools.

In PFI projects, there is typically a fixed period for the contract and then a transfer to the public sector.

More typically, there is a fixed period for the contract and then a transfer to the public sector. The period can be designed to fit with the depreciation in life of the asset, so that the investor recovers the full capital costs through depreciation in charges against users. This is, however, likely to be equivalent to the public sector's current cost approach discussed above. If, for example, the government wants to provide a service of say, education, and it needs schools to achieve this, then the current cost approach is to provide for infrastructure renewal through user charges (in this case to the taxpayer). As a result, there is a distinction between paying the contractor to build the school and the subsequent treatment of the building. Buying the completed project as a capital asset at completion does, however, run into a government accounting issue: whether the cost can be spread over the life of the asset or must be taken as a cash payment in a specific year. This is, however, a consequence of inappropriate accounting rules, not of efficient contract design.

5. Private finance

All finance is ultimately private: governments derive all their income from individuals – either through intermediaries such as companies (ultimately owned by private individuals) or directly through taxes on individuals. For infrastructure assets, the revenues come from taxpayers and customers. The question is not, therefore, whether individuals or governments should finance infrastructure: the question is whether individuals should do it directly, through their intermediaries like pension funds, or through the intermediary of government.

The conventional argument for government finance of infrastructure has been that the government can borrow at lower rates than private individuals. Why? The answer conventionally given is that the government is lower risk for two reasons: because it has the biggest portfolio and, hence the CAPM-type diversification of risk favours big entities like government; and because it is debt rather than equity.

This argument is superficially attractive. Why, for example, finance a new fleet of nuclear power stations at a private sector cost of capital to large energy companies of, say, 10 percent real when the government can borrow at, say, 2 percent real? Or, indeed, in the current context, at negative real interest rates? It is extremely unlikely that for capital-intensive projects the CAPEX efficiency savings could be equal to 8 percent in this example, especially when spread over a very long period.

Furthermore, a low cost of capital leads to a low discount rate, which in turn puts greater value on the future over the present and therefore introduces a degree of intergenerational equity. Private investors, the argument runs, tend to be myopic, whereas society should be indifferent up to the point at which consumption takes place.¹⁰

¹⁰ For a broader consideration of these intergenerational effects of discounting, see Guo *et al.* (2006).

The confusion at the heart of this pro-public-sector finance argument is in the second part – between debt and equity. The reason governments can borrow at lower rates is twofold: first, that they have a monopoly on force – they can compel taxpayers to contribute through legislation and ultimately, force; and second, that taxpayers absorb the equity risk.

But equity risk never goes away. Thus, the true cost of capital to the public sector is the cost of debt plus the implicit cost of equity which is absorbed (and disguised) by taxpayers. The comparison between the 2 percent and the 10 percent in the example above is therefore bogus.

What, then, is the equity risk absorbed in the public sector by taxpayers? It comprises at least three elements: the risk of bankruptcy; the risk of the *ex post* CAPEX costs versus the *ex ante* competitive rate; and the political and regulatory risks of renegeing on the sunk costs and hence, of time-inconsistent behaviour.

5.1 Bankruptcy

Investors in equity run the risk that the company goes bust and thus, that they lose their money as debt holders have a prior claim. Taxpayers run the risk that government defaults on its debt and that it raises taxes. There is less of a direct link to the government's investment projects, and the costs are spread over all taxpayers. In some countries – like Greece and Portugal in the recent financial crisis – the risk of government defaults is greater than those of individuals and lending to utilities can be at lower costs than to government. In the end, governments can, directly or indirectly, print the money, and renege in that way. Owning the asset is a safer bet: whatever macroeconomic policy is pursued, the pipes and wires and buildings will still be there and have an intrinsic value, as long as their services are demanded.

For the private sector, bankruptcy is a greater threat. Here the ownership of the assets matters, and in particular if the assets are directly tied to the projects that are being financed. If investors in infrastructure CAPEX continue to own the asset once built, even for a limited period of time, there is then some collateral in the event of bankruptcy. Ownership therefore matters if bankruptcy is a potential problem. On balance, however, the government has an advantage over private finance regarding the effect of potential bankruptcy on the cost of capital.

5.2 The CAPEX risk

CAPEX risk pervades infrastructure asset creation. These are typically large projects, requiring complex project management. They tend to have unique features, and they tend to need to be integrated into networks and systems, so their costs depend on coordination. Rebuilding a railway line (like the West Coast Mainline) may need to be coordinated with continuing to operate the system. New offshore electricity transmission assets need to be joined up with wind farm development and onshore systems.

The difference between private and public finance in the CAPEX risk management arises because of the different incentives on public and private-sector project managers that come from private investors. Public-sector managers face a complex objective function and are subject to political and lobby pressures. They are also more likely to be influenced by union interests. These influences extend to the choice of suppliers, the supply chain and to the openness to *ex post* re-design and budget changes.

There are a number of public-sector examples of the different incentive structures. Perhaps the most dramatic in post-war Europe has been the Advanced Gas Reactor (AGR) nuclear programme in Britain.

Government debt looks much cheaper than private equity because the government has a monopoly on force and taxpayers absorb the equity risk.

The initial investment decisions were distorted by a “buy British” reactor choice. Then each design was altered. Then budget pressures came to bear. The result was a very significant cost over-run.¹¹

Yet this example illustrates that there is nothing inevitable in public-sector CAPEX inefficiencies. The French nuclear programme has a very different history, and reflects a different approach to public-sector decision making and project direction.

5.3 The sunk-cost risk

Apart from bankruptcy and CAPEX risks, the cost-of-capital difference reflects the extent to which the private sector bears political and regulatory risk.

The third aspect in explaining the cost of capital differences between private and public finance lies with political and regulatory risk, and specifically with the allocation of political and regulatory risk. The simple argument elucidated above is that risk should be allocated to those best able to manage it and hence, that political and regulatory risk should be allocated to the public rather than private sectors.

The obvious way to do this in private finance is through rate-of-return type regulation. Costs are passed through to customers, and investors are entitled to a fair return on their assets, provided the CAPEX is efficiently carried out. This indeed has been the approach in the US for much of the period since the Second World War, notably in electricity utilities. Backed up by a legal system which focuses on individual property rights, it solved the sunk cost problem. As a result, the cost of capital to US utilities tended to be very low, approximating the return on bonds.

Yet this is simply a reclassification: the equity risk in relation to the sunk costs has not gone away. It has simply been transferred to customers. The equity risk in respect of CAPEX remains as long as there is an efficiency test. Bankruptcy is close to impossible, since there is a rate-of-return guarantee.

This opens up a further cost-of-capital consideration: who has the best incentives to minimise the deadweight welfare costs of political and regulatory risk? The answer turns out to be complex. First, the deadweight loss is not simply the prospect that there may be *ex post* intervention. Flexibility may be a good thing: committing to a project over a long period covers times over which there can be unanticipated changes in demand, cost conditions and technology. For example, a government might commit to a private programme of offshore wind development (say through the Renewables Directive) and then discover that the costs are higher than anticipated, new technologies become available, and fossil fuels turn out to be much cheaper than anticipated. In such circumstances, it would be inefficient not to change its mind.

So flexibility can be valuable, but the sorts of fixed-price, fixed-period contracts which typify PFI-type initiatives, tend to limit its scope. What matters, then, is not flexibility in general, but flexibility in particular: the exercise of discretion *ex post* to expropriate rather than to adapt to changed demand, cost and technological conditions. This turns out to be about contract design – and about separating-out and allocating the different types of equity risks.

6. Regulation, the RAB and private finance

Having identified the roles of the state and the private sector, and having considered how to allocate the equity risk between taxpayers, customers and shareholders, how, then, might the regulatory

¹¹ See Helm (2004), chapters 2 and 5, for the history.

framework be designed to enable private finance to be efficiently provided and hence, to facilitate the large-scale infrastructure investment now required?

The key issue is the sunk costs, and the RAB provides a mechanism for first identifying the sunk costs and then giving a commitment to ensure that these sunk costs are remunerated.

In the standard utility model, the RAB comprises the initial value of the assets privatised and then completed CAPEX which has not been paid for out of current customers' bills. In effect, the completed project is "bought" by the RAB at the agreed efficient price. Once inside the RAB, there is no additional requirement on management to do anything to maintain what is a financial number (the agreed "purchase" price). The residual risk is that the regulator will renege on the payments, change the number or not force customers to pay. This political and regulatory risk is the only equity risk left. Hence, the utility can, in principle, finance the RAB entirely from debt, with the equity risk transferred from the investor to the political and regulatory domain.

The Regulated Asset Base (RAB) comprises the initial value of the privatised assets plus the CAPEX not yet recovered out of bill revenues.

This approach has some obvious advantages. It places the equity risk with those best able to manage it, and in thereby facilitating debt finance, the cost of capital for the RAB to the investors is the cost of debt. In practice, this is a small premium over the risk-free rate, and given that the RAB is technically owned by investors, they have the collateral of these assets, which provides additional investor protection.

The credibility of the commitment to the sunk costs is further reinforced by the design of the regulatory institutional framework. "Independent" regulators, created by statute, have a duty to "ensure that the functions are financed", which in practice means that the regulator must make sure there is sufficient revenue to cover the OPEX and CAPEX, and a return on the RAB.

In order to ensure continuity of service provision, there is also typically a ring fence created around the regulated and licensed utility. This ring fence is financial and physical: there must be monies to finance the business, and there must be assets to deliver the services. In the event of failure, the licensed entity can be placed under "special administration", and then sold on. Since the RAB must be financed, the ring fence essentially protects the value of the RAB, and therefore investors can be assured that they should be able to gain the value of the RAB when the licence is sold on (though they may face losses in respect of OPEX and CAPEX failures).

This model has the potential for a much wider application across the infrastructures. It is, in effect, a contractual guarantee to the sunk costs, and it provides an equity exit for investors. This is represented by refinancing. The CAPEX itself is typically financed by equity and project finance, and this reflects the fact that there is equity risk in doing the CAPEX. When it is completed, this CAPEX equity risk is extinguished. The project did or did not come in below budget. At completion this equity gain or loss is crystallised.

An important regulatory dimension, at this juncture, is to make sure that investors get their cost of capital, but not ongoing excess returns. Up to completion, the possibility of excess returns is core to the incentives to out-perform on the costs side. After completion, managers cannot outperform because there is nothing they can do to alter the number that goes into the RAB. They should receive only the marginal cost of debt, since there is no equity risk.¹²

¹² A residual risk is the one between price setting intervals and inflation. It can be mitigated through index-linking the debt (see Brearley and Franks 2009).

A further lesson from the experience of British utility regulation is that if a Weighted Average Cost of Capital (WACC) is applied across both the OPEX and CAPEX, and the RAB, then the result will be to give too low a return to the CAPEX (and OPEX) and too high a return to the RAB. The result will be to blunt the incentives on CAPEX – because the equity risk is not properly rewarded – and to encourage financial arbitrage on the RABs. If the marginal cost of debt is, say 3 percent real, the marginal cost of equity, say 10 percent real, and the WACC is set at, say 5 percent (allowing for gearing over 50 percent), then there is an incentive to exploit the margin between the cost of equity and debt in respect of the RAB. Indeed, this is precisely what has happened: leverage has been applied to gear up the utilities, with the capitalised value of the difference going to shareholders. Customers have therefore not only absorbed the equity risk of the RAB (through the cost pass-through) but also paid for that equity risk to be transferred from shareholders to themselves.

Owners of utility assets have, as a result, made an unwarranted (and typically very large) excess return through financial engineering. But they have also been under-rewarded on the CAPEX. This has not mattered much to date, since the companies have been in transition to higher gearing and have not had to raise fresh equity. This is now changing, and recent rights issues have demonstrated the (dis)incentive implied by the difference between the cost of capital in the CAPEX and the WACC.

The above RAB model is, of course, idealised. In practice, there are a number of uncertainties and imperfections. The relation between the duty to finance functions and the RAB has not been made completely explicit and it has not been tested in the courts. In many infrastructure cases, there is no certainty that customers will pay where there is demand risk. There is also uncertainty about whether the incentives are robust. Governments have engaged in explicit windfall taxes on utilities, in *ex post* claw-backs, and there have been a number of examples of implicit interventions, changing the obligations where higher returns have emerged. Notoriously in the water industry, companies in one period were encouraged to “voluntarily” share profits with customers.

A Green Infrastructure Bank (GIB) would act as an intermediary between the completion of climate-related CAPEX and guaranteed sunk cost recovery.

Nevertheless, the model is pregnant with possibilities for extensions across the infrastructure space, particularly in respect of climate change infrastructure measures, like energy efficiency and renewables. One possible mechanism is for the creation of a national green RAB (gRAB), through a Green Infrastructure Bank (GIB)¹³. The idea would be for a new institution to act as intermediary between the completion of CAPEX and the guarantee of sunk cost recovery. Take the example of a wind farm development. At the CAPEX stage, this is largely equity risk, and equity and project finance. When completed, the returns to the wind farm are determined by the returns allowed to such green projects through renewables support programmes, and the operating efficiency of the wind turbines. The latter can be contracted out – to an equity player, since it is an equity risk. But the rest is largely a sunk-cost issue, and for the project developer a question of exit. There is nothing the developer can do about the renewables support regime – it is pure political and regulatory risk. The assets, too, are what they are: the project developer cannot significantly change them.

Thus, a GIB could “buy” the completed wind farm, net of the operating and maintenance contracts and the power purchase contracts for the electricity sales to suppliers, put a RAB structure around the completed and purchased assets, and then sell them on to pension, life and other investors interested in longer term low-risk bond-type investments.¹⁴ The GIB thereby commits the government to the political and regulatory risk, and thus the sunk costs are protected from *ex post* expropriation.

¹³ See on the GIB, Green Investment Bank Commission (2010).

¹⁴ For a discussion of the role of pension funds in infrastructure investment, see Inderst (2009).

There are obvious problems with this extension of the RAB to wider infrastructure provision. Foremost amongst these is the guarantee to the gRAB which the government would be making through the GIB. Yet this is less an obstacle than it might seem. The British government is committed to a Renewables Obligation (RO) and to the Renewables Obligation Certificates (ROCs) regime. All the RAB guarantee does is guarantee that the government means what it says – that it will honour investors’ faith in the continuity of its existing renewables support scheme. The government has the possibility to change this support regime in the future, but the guarantee means it cannot do this retrospectively. That is, the government must guarantee to grandfather.

This might seem a strong demand, but consider the consequence of not doing so. Uncertainty about the future of the RO/ROCs scheme transfers regulatory and political risk to wind farm owners after completion. That raises the cost of capital. Apply say, a 3 to 5-percent premium across, say GBP 100 billion of investment in offshore wind, and the implications for the total cost of these investments outweigh almost any other variable.

The model can be extended across the infrastructure space beyond the green zone and across Europe. There could reasonably be a transport RAB, incorporating road projects (there already is a rail RAB). Housing projects, schools and hospitals could follow a similar path – with again an infrastructure bank playing the role of the intermediary.

There are two further policy considerations: the financing of the infrastructure bank itself and its capital requirements; and the relation of the guarantees to public finances.

The intermediary role in theory requires no capital. The infrastructure bank is an intermediary, bringing pension funds together with the sellers of completed CAPEX. In practice, the transactions may involve timing issues and elements of bundling, and the infrastructure bank may need to hold assets for short periods on its balance sheet. But it would not involve itself in equity finance or leverage and hence would not resemble an investment bank or indeed a direct investor. This is not a project finance role. In times of major fiscal constraints, the fact that an infrastructure bank would need little or no capital is a distinct advantage.

As an intermediary, the GIB would require little own capital.

That advantage may, however, be tempered by the treatment of the guarantees in respect of the RAB in public finances. Were national accounts to include a balance sheet, with assets and liabilities properly represented, then the infrastructure finance would be incorporated. The large-scale infrastructure debts would be aggregated into national liabilities, to be placed against the infrastructure assets.

This, however, is not the case. There is no national balance sheet. Instead, a somewhat arbitrary principle is applied to distinguish what is and what is not “on the government’s books”. This is the distinction between debt and equity which is backed by customer bills and that which is remunerated from taxpayers. Thus, if water bills are ultimately paid by water customers, this is outside the government’s fiscal accounts, but if trains are subsidised from taxpayers, this bit is inside.

The tricky question arises in respect of the guarantee. Ultimately, this is a responsibility of government: it is government that has to ensure that, for example, electricity customers pay for wind-generated electricity. There is then a residual taxpayer risk – it may be that customers cannot pay (there are already many millions in fuel poverty), or that voters do not support politicians who commit to forcing customers to pay. But this is inherent in the existing arrangements, too: and, as noted above, if it is not credible, there is a deadweight welfare loss from the cost-of-capital premium that investors demand in compensation for taking an equity risk they cannot manage.

It is also not unique to these non-utility infrastructure investments. The duty to finance functions is ultimately a government guarantee, too: investors who find that the regulator is unable or unwilling to force customers to pay would have recourse to the government, since the agents of the state (the regulator) would have failed to fulfil their legal duties.

7. The impact of the credit crunch and the changed macroeconomic circumstances

In most respects, the issues discussed above are independent of the economic crisis which followed from the credit crisis. Utilities have gone on investing, the utilities' share prices have remained robust and, if anything, core asset-backed infrastructure has provided a safer haven for investors.

7.1 Macro-policy impacts

Reinforcing this stability, the macroeconomic response to the credit crisis has been to lower interest rates to levels well below their long-run real rates. Given inflation, real interest rates in Europe and the US are negative. Further macroeconomic stimuli via Quantitative Easing have also benefited infrastructure and utilities. As noted above, central banks have even bought up utility debt, notably in Britain. Finally, in terms of fiscal stimuli, a number of countries have encouraged infrastructure spending as part of a wider "public works" programme, given that infrastructure tends to support domestic jobs rather than imports. Across Europe, "green growth" has been advocated as a way out of the crisis and to create new industries.

Much of this has been political rhetoric rather than delivered policy and much of the rationale (especially in respect of green growth) has been weak. The actual impact of the economic crisis has been altogether more complex, in changing a number of the market fundamentals.

The economic crisis has lowered current aggregate demand and expected future demand substantially.

The first impact has been to lower demand and to change the future expectations of demand. If the recession reduced GDP by about 6 percent, and then resulted in a year of very low growth, and if the underlying expectation has been for 2 to 3 percent growth *per annum*, then GDP after two years would be at least 10 percent lower than what was predicted for this period back in 2005 or 2006. This is an enormous demand shock to investors in infrastructure (and anything else).

The impact of this demand shock on infrastructure finance depends on the discount rate and the cost of capital. If this number is low – say for RAB-based completed infrastructure – then investors expect returns over a longer period and this is just a sharp cycle. But consider *new* CAPEX aimed at returns in the short run, with a high cost of capital and hence a rapid pay-back period. A house builder might fall into this category. The effects are very much more substantial.

In one respect the economic crisis is good news for stretched infrastructure. If there is a backlog of investment required – in other words, if capacity is fully utilised – then a fall in demand buys time. There is a bigger capacity margin than anticipated and hence, a breathing space in which to meet the infrastructure challenge.

7.2 The demand shock

The demand shock does, however, have more profound consequences. Households are faced with adjusting their own balance sheets and their current and future incomes are lower. They may not be able to pay the bills for all the infrastructure which governments have deemed desirable. The low-carbon transition is particularly at risk: households may not be able to provide the revenue streams to

pay for the renewables and energy efficiency measures. Investors know this and so they perceive higher political and regulatory risk, and this in turn raises their cost of capital.

Government might resort to the backstop of taxpayers to finance the required infrastructure. But taxpayers are also consumers: if consumers cannot pay the bills, then they will not have the surplus to pay the taxes. Thus, the policy implication is that infrastructure investment is ultimately limited by the ability to pay, and this in turn has been adversely affected by the economic crisis. In consequence, the only way to go beyond existing ability to pay is to lower living standards, cream off the resulting additional savings and turn these into investments in infrastructure assets. It is an approach that has been tried elsewhere – notably in China where the savings rates are much higher. But it is unlikely to work in Western democracies.

7.3 Government capital spending

The other demand impact is on governments' fiscal positions. These are widely under stress, and a number of countries are committed to substantially reducing public expenditures. Inevitably, it is easier to cut capital rather than current expenditures and indeed, the evidence from past fiscal consolidations is that this is precisely what happens. Public spending on roads, railways, schools, hospitals and other core infrastructure is being reduced across Europe.

Public spending on core infrastructure is being reduced across Europe.

The implication is that infrastructure will continue its trend from the public to the private sector. There will be little alternative, short of simply not investing. Thus, the public sector option – the twentieth century route discussed above of state infrastructure provision – is practically not available. Instead, privatisation is likely to be pushed further, for example into roads, hospitals and schools.

This puts the emphasis heavily on solving the credibility problem so that the private sector has assurance over the sunk costs. A necessary condition is therefore to urgently address the RAB-type models discussed above and to consider new institutions – like intermediary infrastructure banks – which may play a significant role in gaining credibility.

7.4 Finance

For core utilities and for RABs, there appears to be little impact from the economic crisis. Indeed, it might even be benign. But this is less convincing when it comes to project finance and the cost of equity for CAPEX development. Here there is evidence of capital constraints and higher costs. The support services and construction companies involved in these types of activities have found the going (much) harder.

In part, this re-rating of risk has been a return to what might be regarded as more typical financial markets after the boom years. In part too, it reflects a more critical analysis of the project risks. Yet even here the economic crisis has had complex implications. The costs of labour and materials have fallen relative to the boom. Construction costs should therefore have come down, and project completions should be easier to fit into timetables as the economy has more flexibility within it due to spare capacity and softer labour markets.

In this context, an important element of the re-rating of risks has been the exit value of projects. The overall demand impacts and the reduced household budgets from expected levels make the selling-on of the assets on completion harder. In house building, the effects have been dramatic as house prices have softened. Any infrastructure facing demand risk on completion is particularly exposed – and

this is risk the investors can do little about. The policy implication is therefore to concentrate on these exit terms – and hence the RAB concept above and the role of an infrastructure bank are particularly important.

8. Policy implications and conclusions

The challenge is to match the need for a major expansion in infrastructure investment across Europe with the constraints of a post-crisis economy. The green agenda has added to the investment demands, but without providing a sufficiently credible policy framework which can deliver at reasonable costs.

At the heart of the infrastructure problem is the relation between the public and private sectors. Governments are intimately involved in infrastructure provision. They decide on the systems and the frameworks, and they control the planning. The private sector typically does the work (the CAPEX) and all finance is ultimately private. Private finance is either via the intermediary of government or direct.

Infrastructure is riddled with government and market failures. A core economic characteristic is that infrastructure involves the creation of long-lived assets with high sunk costs. Once completed, the difference between the marginal and average costs is typically very large. Indeed, the marginal costs are often effectively zero. For investors, this creates a problem: politicians and regulators might be tempted *ex post* to drive prices to marginal costs, having promised *ex ante* to honour the sunk (average) costs. The solution is a contract or bargain between government and private investors. The latter will do the investing for the benefit of future customers only if the government credibly commits to making sure they get their sunk costs back.

It is this problem of credible commitment that lies at the heart of infrastructure policy. As the privatisation process got underway at the end of the last century, the concept of RABs developed to provide a mechanism for a credible commitment, backed up by new regulatory institutions.

The crisis has compounded the need for new RABs and new intermediary institutions able to offer an exit strategy for new infrastructure CAPEX.

This concept can and should be extended to infrastructure more generally – and across Europe, but it requires the creation of new RABs and new intermediary institutions. An infrastructure bank buying completed CAPEX projects, putting a guarantee around them to create RAB assets, and then selling them on to pension funds in a debt-financed package, provides one way forward – at the national level and perhaps even at the European level.

The urgency of providing an exit strategy for new infrastructure CAPEX has been compounded by the economic crisis. The impacts have been ambivalent. For completed CAPEX in formal RABs the impacts have probably been benign. These are relatively safe assets, protected by the duty to finance functions. Quantitative Easing has even involved the state buying RAB-backed utility bonds. In contrast, for CAPEX itself, the impacts have been largely negative, especially where there is demand risk for the services the infrastructure is intended to provide. Providing a broader RAB-based exit through an infrastructure bank is an obvious way to greatly alleviate the position.

Whether these suggested measures are adopted will have a major impact on the delivery of the infrastructure ambitions of European governments. The fate of the green agenda is in particular at stake. Fortunately there are solutions. The question is whether they will be adopted fast enough to meet the targets.

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