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Policy brief

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Public finance considerations in infrastructure planning, budgeting and financing

Preamble

Before reviewing options for financing an infrastructure project, it is necessary to clarify the economic and social purpose it is intended to serve and how it will be paid for. Without clarity about who pays, how and over what period (including repayment of debt), financing or funding proposals cannot properly be assessed.

Considerations of both efficiency and fairness come into play in determining tariffs or fees for recovering costs from users. There are similarly important efficiency and fairness considerations in the design of subsidy or cost-sharing arrangements through which taxpayers contribute to paying for infrastructure.

Questions of public or private ownership and operation of infrastructure relate, in part, to the scope for competition and operational efficiencies associated with market incentives. A wide range of private participation arrangements can be described, and there are several options for blended public and private finance or co-funding. These can contribute to lower costs of finance, risk-sharing and effective project management and oversight. Private participation in infrastructure networks needs to be carefully regulated and overseen, and is more likely to be beneficial if it is introduced through competitive processes and if a competitive market structure is developed.

Large infrastructure projects typically carry substantial risks of cost overruns, implementation delays, revenue shortfalls and other uncertainties. Where these risks relate to government decisions or processes, private investors will need appropriate government assurances. Guarantees and project assurance arrangements can assist in reducing the cost of finance, but cannot substitute for careful and detailed planning, analysis, contract negotiation and project management.

Introduction

Africa's infrastructure investment requirements are very large, and there is limited scope for boosting already-stretched budget resources.

A recent estimate puts sub-Saharan Africa's infrastructure financing needs at US$90 billion a year for the decade ahead,[1] or about double the current spending level. Power and roads account for the bulk of the projected funding requirement, but water, communication and social infrastructure demands are also substantial.

It might seem obvious that greater private financing is needed to meet Africa's infrastructure deficit, but this must be carefully unpacked. Finance can be raised from many sources, either as debt or equity and through either public or private sector arrangements. In this paper, 'finance' means funding that is expected to earn a return, either as dividends or as interest on debt.[2]

Projects can also be funded through donor grants or on-budget allocations that do not earn a return and are not repaid. However, there are opportunity costs of donor finance or budget allocations that, in principle, should be compared with the cost of raising debt. If finance is raised from lenders or investors, it is important to be clear that this is an intermediary arrangement and that the 'payment' for infrastructure financed in this way is deferred and, in due course, will fall on users or taxpayers.

How infrastructure is paid for is discussed briefly below, before options for financing investments and their operationalisation are explored.

Paying for infrastructure

When charges for electricity or water, telecommunications, transport or other services reflect their full cost, this includes an economic return on invested capital. The 'weighted cost' of capital is calculated typically to reflect the mix of equity and debt in a project's investment, either as liabilities in the recorded accounts of an entity or as a notional cost if the project is undertaken within the ambit of a government appropriation.

1 'Planning to deliver', *EY Dynamics*, Issue 8, December 2013.

2 Sometimes the terms 'finance' and 'financing' are used broadly to cover both direct spending on projects or programmes and funding raised from investors through debt instruments or equity rights. We use a narrower concept of 'finance' in this paper to refer to funding arrangements that reflect as liabilities on the balance sheet of institutions undertaking infrastructure investments.

In general, a recovery of costs through charges or tariffs paid by users is appropriate if utilisation approximates the distribution of benefits. The costs of electricity or telecommunications are generally recovered from users, for example. Considerations of both fairness and efficiency argue for cost recovery from benefiting users, although the appropriate structure of tariffs across users is not straightforward.

However, it is not always sensible or practical to recover the full costs of infrastructure from consumers and business users. Large capital investments in ports or roads, or water and sanitation systems, are often funded directly by the government; hence, costs are at least partially passed on to taxpayers. If there are substantial 'external benefits' to society at large, a case can be made for costs to be met through the broader distribution of the burden implicit in the overall tax structure. Taxes can sometimes serve as a good approximation for appropriately targeted user charges. A fuel tax might serve as a proxy for road-use charges, for example. Some categories of infrastructure are best thought of as 'pure' public goods – street lights and paved roads and water treatment plants are 'non-rival' in their use,[3] at least until the roads or sanitation works become congested. Municipal rates and standard household charges can straightforwardly meet the costs of these services, without the complexity of determining usage levels.

Where infrastructure such as ports or rail lines brings wide social and economic benefits, a budget contribution to the initial capital costs might be appropriate, effectively distributing a cost share across the overall tax base. Up-front budget contributions to large infrastructure projects bring down the cost to be recovered from users, and reduce the risks to investors associated with uncertain future revenues.

An important economic argument for contributions to infrastructure projects from general government revenue relates to their cost structure. The textbook case is a large capital project, say a dam or transport network, characterised by high infrastructure investment costs and low per-user operating costs – as illustrated in Figure 1.[4] There is little or no additional cost associated with another connection to the water distribution network or another vehicle on the road. However, if water consumers or road users are charged the full average cost of the infrastructure, then some potential users will not be able to afford access, representing a loss in social efficiency.

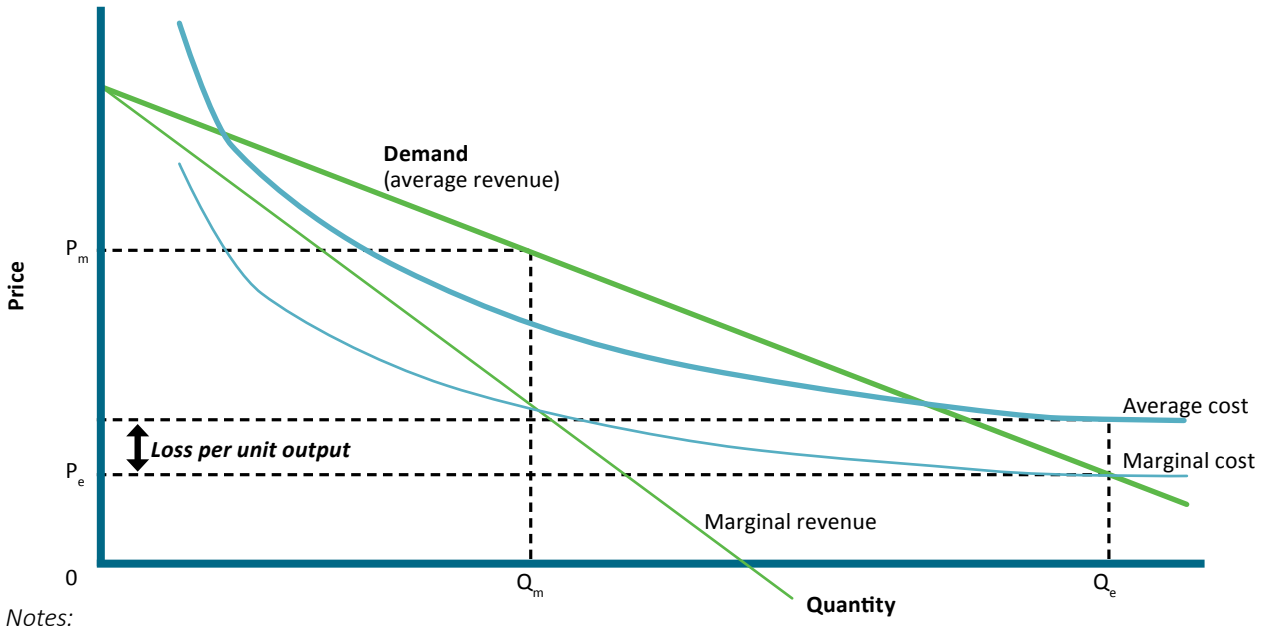
An on-budget capital contribution is one way of achieving lower end-user tariffs. Socially efficient outcomes can also be obtained through well-structured price discrimination. If the capital costs of a power plant or water system are largely recovered from industrial users and higher income households, for example, then tariffs for low-income household users can be kept below the average cost.

Supply of water or electricity or access to transport services is never infinitely elastic, however, and so the optimal marginal tariff is not zero. When demand reaches the capacity limits of the water or electricity or road network, then pricing can assist as a demand management

3 A 'non-rival' good is a product or service that can be used by additional consumers without reducing its availability to others.

4 'An industry is said to be a natural monopoly if it is characterised by large capital outlays that give rise to internal economies of scale in the form of diminishing average cost over the entire range of its output'. A monopolist maximises profits at a higher price and a lower level of output than the socially optimal level. If supply is increased to meet demand at the point where marginal revenue equals marginal cost, a loss is incurred, as the price is below the full average cost of production. See Philip Black in Black, Calitz and Steenekamp (eds), *Public economics*, 2015, p. 69.

Figure 1: Monopoly industry – economies of scale and falling costs



Notes:
Monopolist maximises profit at output Q_m and price P_m
Socially efficient output is Q_e at P_e

instrument (peak-hour road charges, for example, or higher water tariffs during drought conditions).

While good arguments can often be made for keeping tariffs low and meeting costs in part through budget contributions, there are three important offsetting considerations:

- the first is that there are many competing pressures on the budget, tax capacity is limited and there is an opportunity cost associated with subsidisation of services directly supplied to households or businesses;
- the second is the indirect discipline of users paying for services that are delivered (water and electricity networks are more likely to be maintained and trains are more likely to run on time if their managers are accountable to users who pay the bills for service provision); and
- the third is that transparency about costs contributes to better decision-making and, consequently, there is merit in publicly accounting for the full costs of projects, including debt-financed expenditure, even if the full costs are not passed on to users.

Recovery of costs is more complex than merely determining the balance between taxpayers and users. Infrastructure is built for the long term, and the distribution of cost recovery between current and future beneficiaries should be considered. Tariffs are sometimes set higher in the near term to assist in bringing project debt down, but efficiency in use often implies that real tariffs should rise as demand increases and utilisation approaches the capacity threshold, or congestion limits, of the initial project design. There are frequently also alternative distributions of cost between businesses and households, agriculture and industry and large- and small-scale consumers. Some of the complexities of tariff-setting are discussed further below.

These considerations begin with a very simple 'first question' to be asked of infrastructure project proposals: Who is going to pay, how and when? Note that 'who pays' should not be confused with the question of how infrastructure investments are financed.

Ownership, operations and regulation

Alongside clarity about who should pay, a clear view of the ownership and regulation of infrastructure assets and operations is essential.

Although we are accustomed to think of the government and markets as separate spheres of economic activity, operating through different decision processes and disciplines, modern infrastructure services frequently involve overlaps and interaction between public and private sector players. These are not straightforward, and differ considerably between sectors and from one jurisdiction to another.

Infrastructure can be publicly or privately owned, irrespective of who pays for services. Costs can be partially or fully met through tariffs, or partially or fully paid by taxpayers.

Infrastructure can be publicly or privately owned, irrespective of who pays for services

A state-owned power plant or water system can fully recover costs from users; a privately owned transport service might be largely subsidised by taxpayers. In many public–private partnership (PPP) arrangements, ownership is initially located in a special-purpose private entity and is transferred to public sector control at the end of the agreed concession period.

Both regulation and ownership should be determined in law. Legal certainty is important for several reasons, not least of which is that it reduces political and institutional risk, and thereby contributes to lower costs and the greater likelihood of successful implementation.

There are many regulatory aspects of infrastructure development – planning and environmental requirements, design standards, safety considerations, licensing conditions, competition issues and pricing of services, amongst others.

Economic regulation is primarily concerned with industry structure and pricing. In network industries such as water, electricity and telecommunications, market conditions are unlikely to be competitive; therefore, regulatory oversight of investment decisions and price determinations is necessary.

Where there are opportunities for competition within networks – for example, in the licensing of bus service operators, the assignment of supply contracts to independent electricity producers, or the allocation of telecommunications spectrum rights – the design and management of the procurement or allocation process is the critical governance function. These transaction processes typically lead to major investments and long-term operating contracts of up to 20 or 25 years, which limits subsequent regulatory discretion.

Between state ownership of integrated infrastructure systems and competing private suppliers in interconnected networks, there are many possible variations of ownership and operations. While there are numerous other permutations, it is helpful to distinguish four broad industry configurations.

- State-owned networks – vertically and horizontally integrated, often organised in a corporate form but established in law and reporting to government ministers or local councils – were the dominant arrangement until the 1980s. State-owned electricity, water, transport and telecommunications utilities are typically protected from competition through regulatory or licensing provisions and can often raise debt on favourable terms under state guarantee.
- There is a long history of state 'concessions' awarded on a sole supplier basis to private companies to provide or operate infrastructure services, such as local water supply, transport services or port operations. These are

usually fixed-term contracts, protected from competition but awarded by way of a competitive process.
- Public ownership of the infrastructure network can be retained, while associated supplies and services are 'concessioned' or privately provided. Road and rail networks can be maintained by the state, while transport operations are privately run; the electricity transmission grid can remain state-owned, while power plants or distribution services are independently managed.
- Partly in response to technological change in telecommunication and electricity generation, governments have opened some infrastructure markets to competition in recent decades, either through licensing competing operators or, in some cases, through open access arrangements. The transition to a competitive market structure sometimes involves some form of protection; for example, electricity or transport suppliers might be offered purchase agreements or restricted competition for initial periods.

Regulatory requirements vary, depending on the form of infrastructure ownership and operations. Where competition is introduced, instead of state monopoly structures, economic regulators need to align their oversight and approaches with the broader competition law and processes. Economic regulation can be organised sectorally, with little overlap of responsibility between regulators, or there might be shared oversight responsibilities between sectoral bodies and a competition authority.

Project appraisal

Budget officials know that many project proposals will be presented, but not all can be afforded or financed.[5] Which projects should go ahead? Answers depend on national priorities and the rigorousness of plans and complementary capabilities. Formal cost–benefit analyses or project appraisal procedures are important tests of the economic feasibility of project proposals.

Infrastructure requirements are huge and resources are constrained. Planning and budgeting are about making choices between well-articulated options. Thus, it is desirable for there to be more projects under consideration than can be accommodated within medium-term budgets and implementation programmes. In the ideal infrastructure department, the chief engineer or head of planning will have project proposals on file, including detailed plans, engineering designs and cost estimates, many years in advance of their likely implementation. The planning office of the treasury or finance ministry should be familiar with these plans, and should reassess from time to time the possible scheduling of project implementation over a 10 to 20-year period ahead.

Objective and compelling criteria come into play in these assessments: as urbanisation proceeds, water supply must be expanded; as electricity consumption grows, new power capacity has to be added; as traffic volumes increase, roads and public transport must be improved. However, analysis of the evidence is not enough – prioritisation also involves negotiation and political choices, often between many feasible alternatives.

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Cost-benefit analysis is seldom as rigorous in practice as the underlying theory might suggest. It unavoidably relies on assumptions and projections, often long into the future. Costs and benefits are difficult to quantify or value. Whereas projects are typically presented as complete take-it-or-leave-it designs, in practice there are often many choices or options in both the design and phasing of implementation.

A formal review of options is often a good idea, ahead of detailed planning and project appraisal. There are always options to consider – rail or road transport; alternative locations of dams or pipelines; different technologies for power generation or communication networks. If a transport link is needed, it is easy to show that a proposal passes a cost–benefit test, but there might be better options that have not been disclosed by the project sponsors.

Individual projects might have special intrinsic merits, sometimes with considerable political appeal, but the planning or finance ministry also has to take into account linkages with broader growth and development plans, and potential for 'crowding in' private investment. Where projects form part of a coherent overall investment programme, including provision for future operations and maintenance costs, they are more likely to constitute good value.

Sometimes, it is right to say 'no' even after substantial 'sunk capital' has gone into design and preliminary works. This is often politically challenging, but if there is a well-regarded process of consultation and review, including careful assessment of the desired sequencing of major projects, then difficult issues are more likely to be rationally addressed.

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An annual (or regular) publication on long-term infrastructure plans and proposals, and progress with implementation, is a good way of monitoring progress and promoting understanding and the consideration of options. This also

5 See Anand Rajaram, Tuan Minh Le, Kai Kaiser, Jay-Hyung Kim and Jonas Frank, *The power of public investment management*, World Bank Group, 2014, for an overview of public investment planning, project appraisal and procurement issues.

provides an opportunity to review progress in broader national development plans and programmes. Greater transparency and public debate can contribute both to the quality of the decision process and to the avoidance of wasteful prestige projects.

Public or private goods: taxpayers or user charges

Infrastructure networks have 'natural monopoly' attributes, but there are typically public and private goods' aspects to infrastructure services.

- Large water supply dams are near-permanent collective goods, but the reticulation of services to households and businesses involves attributable costs. As consumption rises towards the system's capacity, user charges serve an important demand management function.
- Road and rail networks are 'non-rival'[6] – until traffic volumes lead to congestion and the rising external costs of additional users. Maintenance, operations and damage associated with heavy vehicle usage are user costs that should be recovered.
- The electricity transmission grid is a natural monopoly, but the maintenance and operation of power plants and distribution lines are costs associated with supply to users.
- Public hospitals, clinics, schools and colleges are community resources in which local citizens have shared interests, but there is also an important sense in which they provide rival individual services – there are costs associated with serving each patient or student.

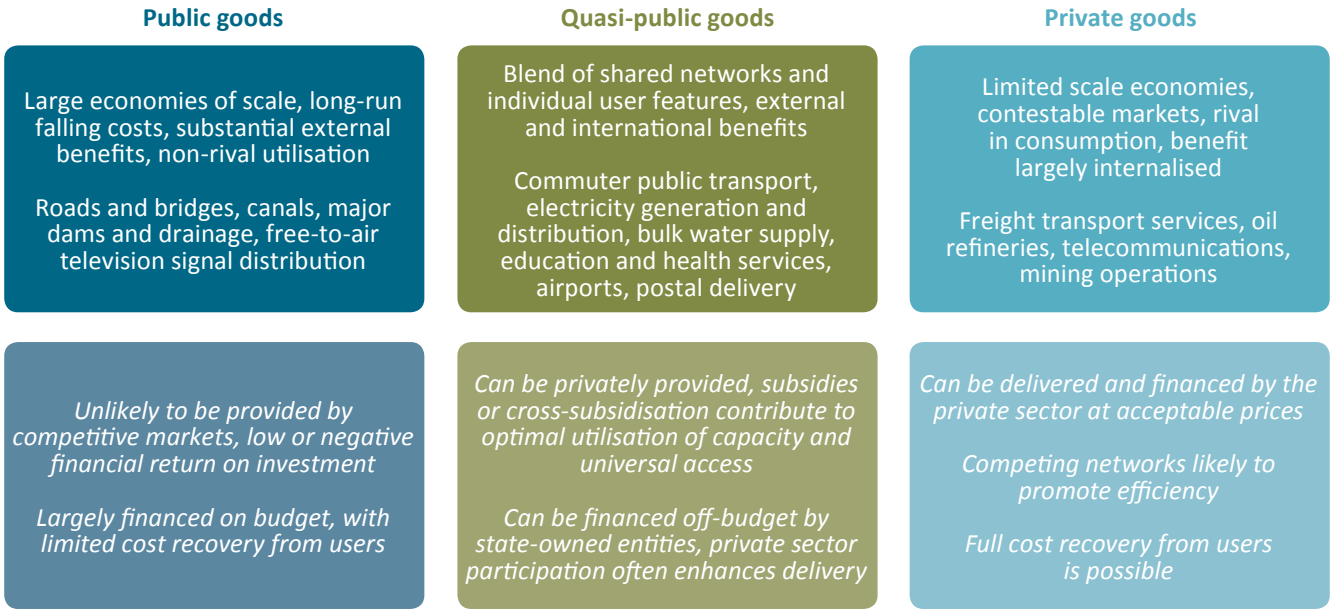
Varying blends of public and private, or non-rival and rival, aspects of infrastructure networks and services are illustrated in Figure 2.[7] It follows that various combinations of public and private funding or cost-recovery arrangements can be described. It is no surprise that there is considerable diversity internationally in the funding arrangements for infrastructure services. That several alternatives are possible, however, does not mean that the choices do not matter. Greater reliance on collective tax-funding might lead to demand exceeding supply capacity, and resource rationing or congestion problems; greater reliance on user charges will mean that affordability constrains utilisation by some households or businesses.

Taxes or levies can be designed to approximate user charges, increasing in line with the 'benefits' enjoyed by users. Departments or agencies often argue that levies targeted for specific purposes – taxes on alcohol and tobacco products, or environmental levies – should be dedicated or earmarked for expenditure on associated programmes. Budget officials are typically reluctant to agree to such ring-fencing of revenue flows, as their effect in raising prices of undesirable products or activities is not a good reason for spending an equivalent amount of money on a specified programme. A quasi-user charge to cover identified costs should be allocated for that purpose; a levy that relates to diffuse externalities or broader social costs should not be narrowly assigned. In some cases, a 'soft earmarking' approach might be considered, in which specific levies go into general revenue and are disclosed as the proximate source of funding for identified programme appropriations, but without any statutory entitlement to the revenue flows.

6 See footnote 3.

7 Adapted from Richard Goode, *Options for financing infrastructure*, CABRI Policy Dialogue Presentation, 24–26 August 2017.

Figure 2: Infrastructure networks – public and private good characteristics



Innovative approaches to funding local or regional projects have been tried in many jurisdictions in recent years, building on the principle of 'betterment charges'. Rates or levies can be imposed that reflect, for example, the increase in property values in the neighbourhood of infrastructure improvements. These might be temporary or permanent, and might be statutory charges or collaborative arrangements between participating businesses or property owners. More generally, urban development and industrial improvement programmes are more likely to succeed and prosper if they incorporate customised funding arrangements negotiated between municipal authorities, business representatives and other stakeholders.

Public or private ownership

The case for public ownership of infrastructure is that management of networks and long-lived assets in the public interest brings lower costs and broader access than would be achieved by a profit-maximising monopoly. The case for private ownership is that the discipline of private equity and the profit motive lead to more efficient infrastructure management, investment and operations.

There is merit in both arguments, and they are reconciled in different ways in different countries. There is considerable variety in the structure of infrastructure industries and services internationally.

In recent decades, network industries in many advanced economies have evolved from integrated monopolies to embrace private participation and competition in various ways. The underlying trend is often described as a *deregulation* or *liberalisation* of infrastructure markets. However, it is really the emphasis and focus of the regulatory environment that shifts as these transitions proceed. In the European Centre for Economic Policy's analysis, 'In the early stage [of liberalisation] much attention will focus on preventing monopoly abuses by incumbents, whereas in the latter stage, the emphasis will be more about policing competition'.[8] Therefore, the role of regulators in protecting the public interest has broadened in recent years in many countries, with regard to both public and private operators in network industries.

The status of infrastructure networks as 'natural monopolies' has been eroded by technological change. In telecommunications, competition between service providers is possible both in fixed-line networks and in spectrum allocation and management. Alternative technologies have challenged the dominance of large power plants in the energy sector, now including 'distributed' electricity generation through solar units on rooftops of households and businesses. As electricity grids, oil and gas pipelines, transport networks and telecommunications systems have become more integrated across Europe and elsewhere, governments have shifted from protecting their national utilities to promoting co-operation and more competitive arrangements.

Competition is the key to realising the potential benefits of private sector participation in infrastructure sectors. Where privatisation has contributed substantially to improved efficiency and better infrastructure services, it has typically been accompanied by the break-up of established state monopolies and their replacement by competitive industry structures.

Competitive markets do not emerge spontaneously in network industries; where there is a history of statutory monopolies, it is changes in the law, licensing provisions, allocation of rights and obligations and official decision-making processes that must shape a new competitive architecture.

Competition is also possible between state-owned or state-funded service providers, and between state-controlled companies and private providers. However, the regulatory framework governing such arrangements is not straightforward – it is hard to counter the presumption that state providers should enjoy market preference and concessionary finance.

The natural boundaries of infrastructure networks seldom correspond exactly with the boundaries of local, regional or national jurisdictions. This means that optimisation of network design and management requires co-operation or partnerships between jurisdictions, perhaps through jointly owned enterprises and cost-sharing agreements. Careful attention to governance, joint decision-making processes and burden-sharing is needed, but the gains from effective co-ordination are considerable.

The logic of public participation in infrastructure services is extended most fully in formal PPPs, in which competitive contracting procedures follow an intensive design and transaction advisory phase. PPPs can assume several forms, with private investors taking on varying combinations of ownership, investment, financing, maintenance and operations, for extended contractual periods, subject to detailed specification of technical and service delivery obligations, costs, delivery milestones and penalties for implementation shortcomings.

PPPs can assist in achieving delivery targets on time and on budget. They are complex, however, and require careful preparatory design and negotiation phases, and a robust institutional framework capable of sustaining long-term contractual commitments.[9]

Utility pricing

We are accustomed to thinking of profit-maximising behaviour by firms in competitive markets as efficient, but in most infrastructure sectors there are no such market-clearing

8 Centre for Economic Policy Research, *Europe's network industries: Conflicting priorities. Telecommunications*. London, 1998, p. 95.

9 For an in-depth perspective on project finance, public–private partnerships and associated risks and design issues, see Jeffrey Delmon, *Private sector investment in infrastructure*, published by The World Bank and Kluwer Law International (2nd edition), 2009.

socially optimal outcomes.[10] In water, power and transport services there are large up-front capital costs, with the result that average costs exceed the marginal user cost, at least until demand reaches the limits of supply or capacity. If capital and operating costs are to be recovered from users, the average price needs to be higher than the marginal cost.

There are several ways in which this can be addressed. The aim is to ensure that price-sensitive marginal users are not excluded – that low-income households or small businesses still have access to services at prices they can afford.

If the benefits of infrastructure capacity are diffuse, or economy-wide, and the fiscus can carry all or part of the burden of initial capital costs, then user charges need not exceed the marginal cost. This is a sound reason for governments to carry part of the initial capital costs of bulk water storage capacity, roads, ports and rail networks, for example.

However, it is not always fair or feasible to recover capital costs from taxpayers. There are other options. Costs can also be recovered from users in ways that avoid excessive tariffs being charged to marginal users.

- 'Block tariff' structures are frequently used by distributors of water and electricity to households, in effect charging high-volume users a higher average price than low-volume users. This is not a perfect solution, but it is widely accepted as fair and reasonable.
- An acceptable distribution of costs can sometimes be achieved through price discrimination between businesses and households, or between geographic localities or communities. The structure of tariffs between different commodities in freight rail services can also assist in meeting fairness and efficiency considerations, particularly where commodity exporters are effectively price-takers in buoyant markets.

The 'Ramsey Rule' is a useful point of departure in considering price discrimination options in infrastructure services.[11] The rule requires prices to be set in inverse relation to the price elasticity of demand; for example, the price charged to bulk ore exporters with no alternative to using rail wagons should be higher than the price charged to grain or farm produce transporters who might substitute road for rail haulage. However, distributional objectives – ensuring access and affordability for small-scale businesses or households that do not have the option of opting out of a water or electricity grid, for example – might offset the implications of price elasticity considerations.

Particular vigilance is needed where private investors are awarded rights or concessions in a monopoly or quasi-monopoly sector. If licences are the outcome of a competitive process, then prices should be set through this process, although rules may be needed to govern variations and adjustments to input prices or exchange rates, for example. If a regulator oversees prices, the price-determination process and policy are critical. There might be times when the fiscus is required to assist.

Utility pricing is not a perfect science, and the underlying theory does not yield exact results

A sensible goal is for prices to be stable in real terms, unless demand management considerations come into play. Debt management, including consideration of the term of debt over the life of the asset and refinancing options, can contribute to price-smoothing. In the case of near-permanent assets, debt can be rolled over and carried, provided operations and debt service costs are covered.

In thinking about the distribution of either user charges or taxes, both current and future payers must be considered. Information about current demand for services and willingness to pay might be readily available, but future payment flows will depend on economic growth, changing demand patterns and other factors that cannot be predicted with certainty. Simplifying assumptions have to be made, which allow infrastructure decisions to be based on reasonable and prudent revenue projections, while recognising that tariffs or taxes might need to be adjusted over time.

Utility pricing is not a perfect science, and the underlying theory does not yield exact results. Careful analysis is needed of costs and demand factors, and a reasonable balance has to be sought between considerations of efficiency, cost-recovery and fairness, amongst others.

Commitment, certainty and flexibility

Investors and funders can take on risks that they can manage, but policies and decisions that fall within the authority of the government are not in this domain. Certainty about policy, and consistency in plans and commitments, are essential elements in investors' trust and confidence and, therefore, in the price of capital and terms of debt agreements.

It is important to be clear about the certainties and assurances that should be provided to investors, and the scope for retaining flexibility to adjust to changing circumstances.

In contracting for improvements to a national highway route, for example, there would typically be certainty about the initial works and associated time frame, whereas the future addition of lanes or exit-ramps might be contingent on growth in traffic volume.

Investors in power generation plants for supply to a national grid will need certainty about the future price path and offtake

10 See footnote 4.

11 When a supplier of services has monopoly power, social welfare is optimised when prices are set according to the inverse elasticity rule, attributed to Frank Ramsey. In this system of pricing, mark-ups above the supplier's marginal cost are lower for purchasers whose demand is more sensitive to price (more price elastic) and greater for purchasers with more inelastic demand. See http://regulationbodyofknowledge.org/tariff-design/economics-of-tariff-design/ramsey-pricing/

agreements – perhaps a full offtake commitment ('take-or-pay'), or a guaranteed purchase volume.

Behind these contractual commitments is the certainty investors require that debt will be covered by revenue, and that users will pay for services. The terms and conditions of major infrastructure projects typically provide for 'step-in rights' of lenders in the event of default by project implementing parties, and compensation in the event of a material default by the government affecting the project's implementation and viability.

> It is important to be clear about the certainties and assurances that should be provided to investors, and the scope for retaining flexibility to adjust to changing circumstances

The government, on the other hand, seeks assurance that projects will not overrun the agreed costs or exceed planned time schedules. Penalties for failure to meet project commitments can be included in the terms of a contract. However, it is difficult to anticipate all costs fully, and major projects are often agreed to before complete conclusion of the design and planning phases. For this reason, project agreements typically include provisions for 'contingencies' and unanticipated costs. Projects involving imported components, for example, might need to make allowance for cost adjustments associated with exchange rate movements.

The contractual treatment of inflation-related price increases is an important feature of large multi-year projects. It is helpful to distinguish between costs that are under the control of project implementers and those that are not. It is sensible to allow price adjustments for the general rate of inflation in the economy, or for industry-wide trends in labour and material costs. However, it is important that contractual price adjustments should be linked to independent measures of the relevant prices (indices published by an official statistics agency or a representative industry body, for example), and not to increases in wages or management or supply costs that the contractor controls.

Large projects that involve PPPs over a long concession period require a high degree of detailed specification if contractual disagreements are to be avoided and intended outcomes are to be achieved within budget. It is better for design revisions or adjustments to fall within available budget limits to be negotiated ahead of financial close and project initiation.

It is, however, possible to provide, in advance, for re-contracting or later decision points during project implementation. Some flexibility in the scheduling of agreed phases of major projects, associated with predetermined milestones, is often sensible.

It is also important to recognise that detailed specification of outputs and deliverable services is not always possible. Health services and training programmes, for example, respond in part to changing needs that cannot fully be anticipated. Large information technology projects generally evolve through many reviews and revisions. In such cases, it is important to ensure that the government or client authorities bring appropriate and sufficient expertise to their contract management responsibilities.

Co-funding and blended finance options

Large projects generally require several sources of finance.

In the long-term, PPPs, where the private concessionaire builds a water or transport system or a power plant, and operates the facility over an agreed term, a combination of equity and debt finance will be raised.

A larger debt share is normal, because this moderates the overall cost of finance. A significant equity portion is required, nonetheless, so that project implementers are effectively incentivised to meet targets and keep within budget.

Once the initial construction has been completed and a period of operation has been achieved, project risks are usually much diminished and a 're-financing' transaction, in which the equity share is reduced, may be possible. Typically, there are financial gains in the re-financing transaction, and the contractual terms of well-designed PPPs should include an agreed government share of such gains.[12]

Large projects frequently include two or more 'tranches' of debt, with different levels of seniority in the event of project failure and, hence, different rates of interest earned.

In considering options for shared or complementary funding arrangements, it is helpful to think about the different kinds of oversight and risk-sharing that might contribute to the project's prospects for success. If a water storage and waste treatment plant is intended to serve a mining or industrial user, in addition to a town or residential community, then it might be sensible for the businesses involved and the local municipality to be part of the project funding and governance arrangements.

Before finalising large project commitments, it is essential that the required funding is secured. If funding is on budget, formal approval of multi-year allocations will be needed. If project finance has to be secured, this can be done in various ways – through a PPP transaction in which finance is raised by the private party, or through negotiated commitments from financial institutions, for example – but, of course, it is assurance about how the PPP unitary charge is to be met or how debt is to be repaid that really counts.

Multilateral development finance institutions (DFIs), such as the African Development Bank, can play a critical role both in project financing and in providing transaction advisory expertise. State-owned DFIs sometimes have the capacity to contribute to project funding and to offer advice, though the track record of national DFIs in funding infrastructure and utilities has been unsatisfactory in many countries.

12 See Delmon, op. cit. p. 71, who suggests a 50-50 split of the refinancing gains between the project company and the grantor or official sponsor.

In considering options for shared or complementary funding arrangements, it is helpful to think about the different kinds of oversight and risk-sharing that might contribute to the project's prospects for success

Funders and private investors typically seek to finance the full costs of projects, passing on their costs of finance to users and the fiscus, over time. It is often preferable to combine an on-budget capital contribution with project finance raised in PPPs or other public infrastructure projects. If this can be accommodated in the budget, it represents a more efficient fiscal contribution and a lower cost of capital than ongoing budget allocations to repay private finance.

As in the engineering, design and service delivery aspects of infrastructure project development, specialist transaction advice is essential, together with a lead funding arranger in respect of large multi-year initiatives.

Guarantees and off-budget liabilities

In the case of a loan in respect of a long-term project or a state utility, risks and uncertainties contribute to raising the cost of finance, particularly where they relate to government policies and actions over which project sponsors have no control.

Historically, large infrastructure investments have been undertaken by governments because the required finance had to be raised on the strength of recourse to the national tax base. Sovereign guarantees still serve to mitigate risk and lower the cost of finance, either for state companies or public utilities or for private enterprises undertaking infrastructure investment under licence or concession agreements. The language of guarantee commitments is important; partial assurances limited to specific events or responsibilities are often sufficient, and multilateral institutions or reinsurance arrangements can sometimes serve the purpose more effectively.

A strong fiscus can lower the cost of finance for a project or state-owned company by providing debt or revenue guarantees, but the risk of a call on the guarantee is a contingent liability on the state's balance sheet and may compromise the creditworthiness of the government and its own cost of raising finance. Some countries' treasuries charge a fee for the provision of a guarantee, in recognition of the contingent liability.

For small countries, alternatives such as the World Bank's Multilateral Investment Guarantee Agency should be explored.

The absence of explicit guarantees, in so-called 'non-recourse' finance structures, does not necessarily eliminate fiscal risk. Governments all too often find it necessary to rescue infrastructure utilities, state-owned companies and even private enterprises in difficulties, even where no formal guarantee is in place.

Summing up: fiscal and budgetary considerations in infrastructure finance

- There are several critical considerations in deciding how to finance infrastructure projects: how costs will be covered, the regulatory framework, who owns and operates, public and private sector options for raising finance, who takes on which risks and provides assurance.
- Clarity about who pays, over time, is the most important element, and is a different question from how infrastructure investment is financed.
- Project appraisal – careful evaluation of costs and benefits – is the key to more rational prioritisation and decision-making, but it cannot provide exact answers and should be complemented by transparent consultation processes. Saying 'no' is also an option – even after initial costs have been 'sunk' – if the evidence and analysis indicate that a project is not worthwhile.
- Taxpayers or users ultimately pay for infrastructure, not the investors who provide finance – but the burden of taxes, tariffs and debt can be distributed in many ways.
- Pricing is a complex balance between users and taxpayers, across generations and industries.
- Private ownership of infrastructure assets, or PPP concession arrangements, can contribute to investment management and operational efficiency, especially under competitive conditions. The benefits of competition cannot be assumed, however – they require an appropriate legal and regulatory environment.
- Infrastructure investment requires commitment and certainty, enabling investors and funders to proceed with confidence, but also flexibility to adjust to changing circumstances.
- Large projects need a diversity of funding sources and terms.
- Guarantees and appropriate project assurances can lower costs and enable larger or more risky projects to be financed by private investors, but account must be taken of the associated contingent risks to the fiscus and taxpayers.

Conclusion

There is considerable diversity in the infrastructure requirements of an economy, and countries differ widely in their approaches to provision, management and financing of infrastructure services. Infrastructure commitments are political choices with immense economic significance. These choices should be supported by in-depth technical and economic analysis. Technical project appraisal is not enough, however – planning systems should be accompanied by effective consultation, negotiation and social decision-making processes.

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