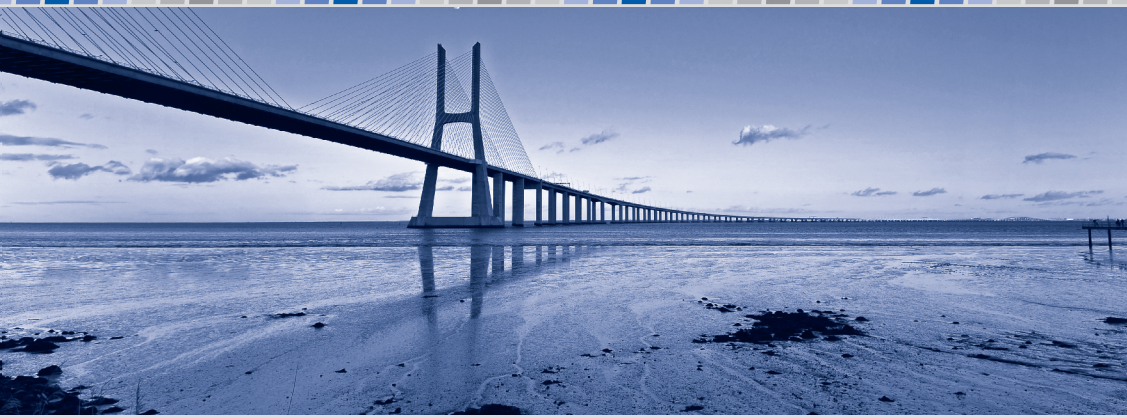

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Financing infrastructure

A review of the 2010 EIB Conference in Economics and Finance

by Kristian Uppenberg, Hubert Strauss and Rien Wagenvoort

January 2011

About the authors

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Preface

by EIB President Philippe Maystadt

Well-functioning infrastructure networks are the backbone of prospering economies. Europe is facing large infrastructure investment needs over the coming decade. A significant part of the existing capital stock comes up for renewal in the old Member States, while the new Member States still have scope for raising the infrastructure capital stock. In addition, new investment needs arise with population ageing and climate change.

This raises the question how infrastructure investment can be financed, at a time when many European countries experience tighter fiscal constraints from the economic and financial crisis. This is also a question of utmost importance for the European Investment Bank, since infrastructure finance has been one of its core responsibilities since its creation in 1958. Financing infrastructure-related projects still accounted for about half of the EIB's total lending in the European Union in the 2005-09 period. Against this background, the Bank has a continuing interest in maintaining a thorough understanding of the economics of infrastructure and its financing.

With this perspective in mind, a number of questions were addressed to the researchers and policy analysts presenting at the 2010 EIB Conference

Plutarchos Sakellaris (EIB Vice President) and Philippe Maystadt (EIB President)

in Economics and Finance. First, how do the economics of infrastructure influence the way it would be optimally financed? In light of current fiscal constraints, is it possible to increase the fraction of infrastructure investment that is privately financed? What regulatory and other institutional changes are needed to make this happen? A second group of questions related to how infrastructure assets are perceived by private institutional investors such as pension funds. Do infrastructure-backed financial instruments represent a unique asset class? Do they have specific characteristics that make them particularly attractive to long-term financial investors? A third group of questions related to the intersection between public policy objectives and private infrastructure finance. Is it possible to increase the share of privately financed infrastructure and still be able to address key public policy issues such as climate change and economic development?

The contributions to the 2010 EIB Conference provided enlightening insights into these policy questions. The main messages are summarised in this conference review. Volume 15 (2010) of the EIB Papers – available on request in hardcopy and also electronically on the EIB web site – contain the complete papers presented at the conference.

1. Key facts and figures on infrastructure finance

The financial and economic crisis of 2008-2009 triggered a fiscal deterioration that caused public debt to rise precipitously in many countries, in Europe and beyond. The need for fiscal retrenchment in coming years will likely put further pressure on governments to find alternative sources of financing for their infrastructure investments. But the crisis has also shown – as is known from previous downturns – that private financing of infrastructure is procyclical. Furthermore, while the need for private infrastructure finance is greater than ever, it will only come forth in sufficient amounts if governments have a solid understanding of the specific incentives, information problems and risks that confront private investors in infrastructure, as well as the will to address them.

Setting the stage at the 2010 EIB Conference, EIB Economist **Rien Wagenvoort** (presenting a paper written together with EIB colleagues Carlo de Nicola and Andreas Kappeler, published as Wagenvoort *et al.* 2010 in the EIB Papers) provided some key facts and figures on infrastructure investment and its financing in Europe. The focus was on the roles of public and private financing of infrastructure and the evolution across time of financial instruments used.

Seen in a longer historical perspective, the balance of financing, owning and operating infrastructure assets has shifted between the public and private sectors in long cycles, lasting decades and even centuries. Private financing of infrastructure occurred already in ancient Greece and Rome, and was given a modern form under the Napoleonic code.

Rien Wagenvoort

The twentieth century saw an expanded role of the public sector in financing and operating infrastructure, including schools, hospitals, and transportation, water and energy networks. A number of known reasons contributed to this. For instance, many infrastructure networks have natural monopolistic properties, which undermine competition as a device to contain prices. In this case, public provision was seen as a means to contain prices. But the problem could also be the opposite. Oftentimes charging users was so difficult that private provision would not be forthcoming in sufficient amounts. Furthermore, governments also maintained public ownership of infrastructure assets on equity grounds.

In the second half of the twentieth century, nevertheless, private financing and operation of infrastructure assets has re-emerged on a large scale. Partly, this can be explained by new technological developments that reduce the transaction costs of introducing user fees. Improved regulatory frameworks were also increasingly seen as an alternative to public ownership in avoiding excessive monopolistic pricing or regulatory capture. Other factors driving this shift include a greater political acceptance of the principle that users rather than tax payers pay for infrastructure, and increased perception that private operation and financing of infrastructure have incentive effects that foster efficiency gains. But perhaps the decisive factor for a growing private role in financing and operating infrastructure has been the fiscal constraints facing governments, even though the actual economic case for this is weak (see Välilä *et al.*, 2005, and Engel *et al.*, 2010).

Shedding light on infrastructure finance is a needed but non-trivial task, complicated by the confusing diversity of definitions and measurements. In the national accounts, one can find public investment. But this is a broader concept, which also includes public goods such as law and order, defence, and environmental protection, as well as redistributive functions such as social protection, public housing and recreation. Infrastructure can be said to consist of two main elements (although exact definitions may vary depending on the source). *Social* infrastructure includes the

education and health sectors (*i.e.*, schools and hospitals). *Economic* infrastructure includes physical structures that serve as common inputs in production, in areas such as transport, communications and energy.[1]

Data on infrastructure investment, let alone its financing sources, are not available in any ready-to-use form. Drawing on a variety of sources, Wagenvoort *et al.* nevertheless succeed in calculating a workable estimate of infrastructure investment on the basis of a consistent methodology. As a starting point, national account statistics from Eurostat are used to construct estimates of *total* and *government* investment in "infrastructure sectors". *Private* investment is then derived as the residual. Infrastructure is not a subset of public investment, since it also contains private infrastructure investment. Further sectoral breakdown is provided using data on gross fixed capital formation in individual "infrastructure sectors", *i.e.* the education, health, transport, and utility sectors (the latter comprising energy, water supply, sewage, and waste management). These aggregates tend to overestimate, however, true infrastructure investment at the sectoral level, since they also cover non-infrastructure investment. Total investment in the transport sector, for instance, includes the acquisition of trucks, and furthermore lumps together the transport sector with storage and communication[2].

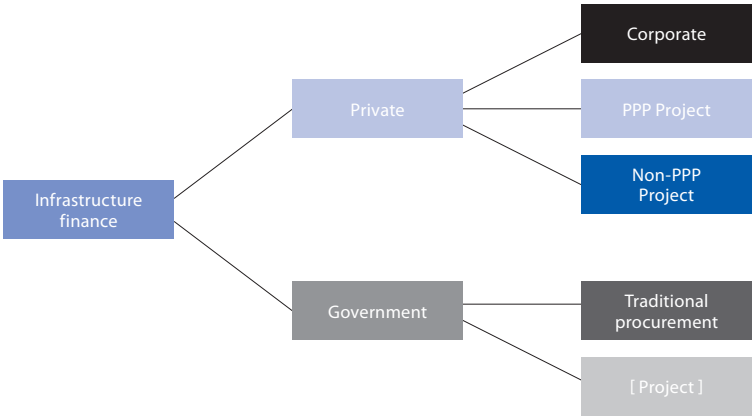
The private infrastructure aggregates are then broken down further with the help of data from Projectware, which allow for the distinction between investments made through Special Purpose Vehicles (SPVs, *i.e.* projects) and direct corporate investment in infrastructure sectors. SPVs allow investors to provide financing against the cashflows of a particular project, while corporate investment also exposes investors to risks associated with non-infrastructure related activities. With the help of these data, *corporate* investment is finally computed as the difference

1 See Chan *et al.* (2009).

2 For a more complete discussion on statistical caveats and data limitations, see Wagenvoort *et al.* (2010).

between *total* private and private *project* investment. Project investment can be further divided into Public-Private Partnership (PPP) projects and non-PPP projects, using data described in Kappeler and Nemoz (2010). Since most PPP finance is entirely private, non-PPP private project finance can be approximated simply as the difference between total private project investment and PPP investment. The resulting infrastructure finance decomposition is summarized in Figure 1. Note that the terms *investment* and *finance* are used interchangeably.

Figure 1. Composition of infrastructure finance



Source: Wagenvoort *et al.* (2010)

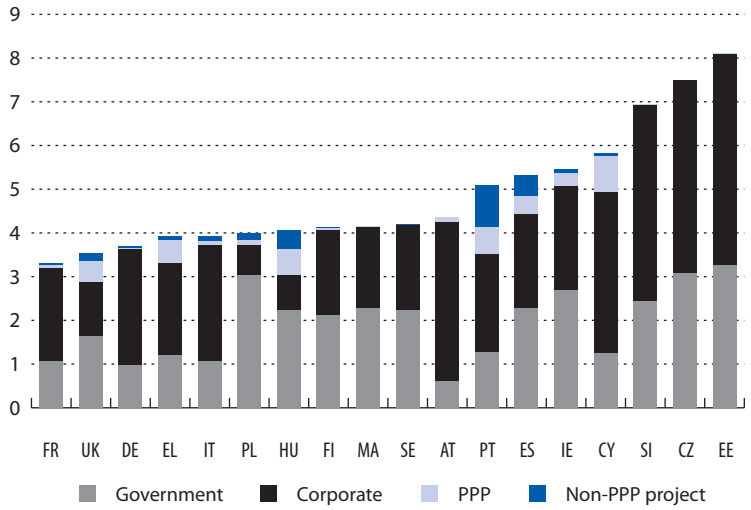
The government and private sectors in turn use several different instruments to finance their investment. Government finance consists mostly of taxes and borrowing. Private finance is made up of loans, bonds, and equity. User fees can be used to reward these financial instruments once the infrastructure is up and running, but are not available during the construction phase.

Figures 2 and 3 provide a breakdown of infrastructure finance by institutional sector and by sector of activity. On average in the EU, government finance accounts for around one-third of total infrastructure

investment, with most of the rest consisting of corporate infrastructure investment. This latter segment includes for example utility and transport companies. Note that infrastructure investment is classified as corporate even when occurring in government-owned businesses. Around one-tenth of infrastructure investment is in the form of project finance.

Transport is the single largest infrastructure sector by investment, accounting for more than half of total investment. Utilities (*i.e.* energy, water, waste and sewage) come second.

Figure 2: Composition of infrastructure finance across institutional sectors (2006-2009 average, in percent of GDP)

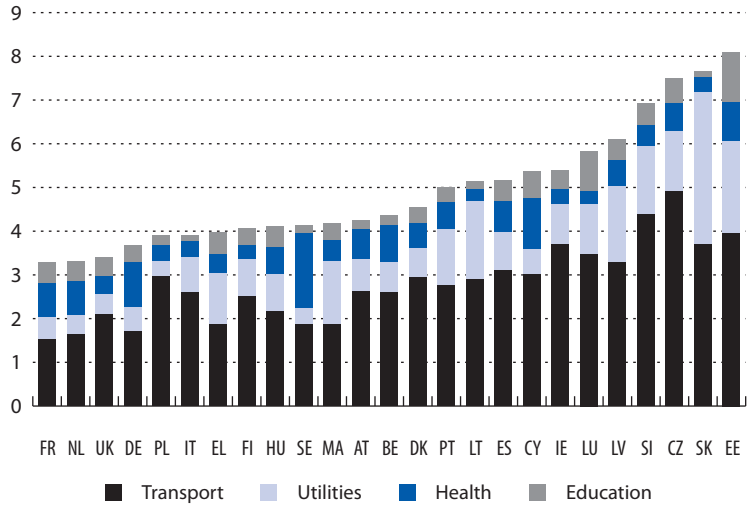


Source: Eurostat, Projectware, EIB/EPEC

The sources of finance differ markedly across sectors (see Figure 4). Public sources dominate education infrastructure finance in most countries. In contrast, private sources provide two-thirds or more of infrastructure finance in the health, transport and utility sectors. Within private finance, corporate finance is the dominant form. PPPs account for 5% of total

finance in the transport sector and 2% in the utility sector. Non-PPP project finance is negligible in all sectors except in utilities, where it accounts for 16% of the total.

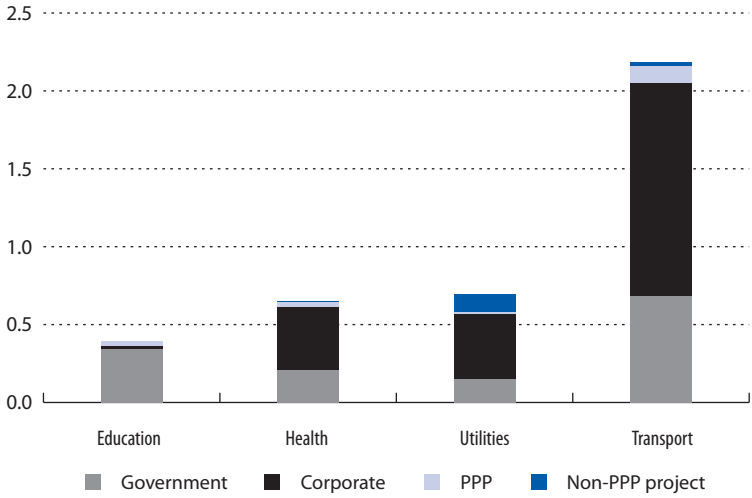
Figure 3. Composition of infrastructure finance across sectors of activity (2006-2009 average, in percent of GDP)



Source: Eurostat, Projectware, EIB/EPEC

As for the evolution over time, total government investment as a ratio to GDP fell from almost 5% in the 1970s to less than 2.5% at the turn of the century. Since the infrastructure share in overall government investment is known to have remained fairly stable over time, it follows that government infrastructure investment has also declined over time, relative to GDP. However, this downward trend has levelled off in the last ten years. While private financing of infrastructure investment has tended to rise over time, this has occurred on too small a scale to offset the decline in public finance. Hence, also the sum total of public and private infrastructure investment has trended down as a share of GDP.

Figure 4. Composition of infrastructure finance across sources, by sector of activity (2006-2009 EU average, in percent of GDP)



Source: Eurostat, Projectware, EIB/EPEC

Wagenvoort *et al.* also explore the evolution of infrastructure investment and finance in recent years and confirm earlier findings of a procyclical pattern. This is particularly visible with respect to private finance. During the latest crisis there has been a pronounced shift back towards publicly financed infrastructure investment. While private sources have fallen precipitously, public funding has been sustained and even slightly increased, partly as a stabilising response to the economic downturn. However, given the need for significant and sustained fiscal consolidation, the medium-term outlook for public infrastructure finance in Europe appears bleak.

2. The economics of infrastructure finance: PPPs vs. public provision

The financing of infrastructure is to a large extent determined by its economic characteristics. Specifically, infrastructure investment tends to involve large up-front fixed costs, followed by a low marginal cost for each additional user once the fixed capital is in place. Combined with the long average lifespan of many infrastructure assets, this poses a challenge both for private investors, who need to recuperate their costs, and for governments, who would like to ensure that essential infrastructure services are made available in sufficient amounts and on equitable terms, while also being produced efficiently.

Eduardo Engel (Yale University, presenting a paper written together with Ronald Fischer and Alexander Galetovic, published as Engel *et al.* 2010 in the EIB Papers) provided key insights on this nexus between the economics and financing of infrastructure. The paper concentrates on the differences between public provision and Public Private Partnerships (PPPs).

Engel *et al.* begin by observing that PPPs have in recent years become increasingly popular as an alternative to traditional public provision of infrastructure. Projects that require large upfront investments, such as highways, light rails, bridges, seaports and airports, water and sewage, hospitals and schools are now often provided via PPPs. The basic set-up of a PPP contract is that it bundles investment and service provision of infrastructure into a single long-term contract. A group of private investors finances and manages the construction of the project, then maintains and operates the facilities for a long period of usually 20 to 30 years. There is a stark contrast between PPPs and privatisation. Under a PPP, the government typically

Eduardo Engel

bears some of the demand risk during the operation phase, and the assets are returned to the government at the end of the contract. In the case of privatisation, the link between the project and the government budget is permanently severed, as the project is sold for a one-time payment and all risk is transferred to the firm.

The growth and spread of PPPs around the world is closely linked to the development of project finance, a financial technique based on lending against the cash flow of a project that is legally and economically self-contained. Engel *et al.* explain why project – as opposed to corporate – finance is often the appropriate financial arrangement for PPPs. PPP projects are usually large enough to require independent management. There are also few synergies to be realised by building or operating two or more projects together. Infrastructure projects are often geographically fixed and far apart, and their assets immobile. This makes economies of scale site specific and project assets illiquid, limiting the residual value of assets if the project fails. Similarly, since production processes are usually subcontracted, economies of scale and scope are internalised by the subcontractees. It is efficient to bundle construction and operation. This generates incentives to design the project from the outset so that it both provides the service standards required by government and minimises life cycle costs.

The sources of finance change over the life cycle of a PPP project, matching its evolving pattern of risks and incentives. Bank loans have the advantage of bringing direct bank oversight of the project company during the construction phase, which is the riskiest phase of the project. In contrast, bond holders face high transaction costs in trying to monitor borrower behaviour. They are better suited to replace bank loans only once the project is operational.

A recurrent criticism of PPPs is that they cost more per dollar of financing than government debt – the so-called PPP premium. The numbers that have been quoted for this difference in costs vary widely. According to

Yescombe (2007) the cost of capital for a PPP is usually 200-300 basis points higher than the cost of public funds. Hence, it would seem that when governments decide between public provision and PPPs, they trade off a lower cost of funds under public provision against the supposedly higher efficiency of a PPP (leading to lower life cycle costs). But there are those who argue that there is no PPP premium, for instance because default risk under public provision is borne by taxpayers without being priced. In this case, the higher financing cost of PPPs reflects a just reward for carrying those risks.

Engel *et al.* examine three possible explanations for the PPP premium: (1) diversification of exogenous risk under PPPs vs. public provision; (2) endogenous risk and incentives in PPPs; (3) differences in financial and other transaction costs, which may make PPP finance more expensive.

(1) With frictionless, perfect capital markets, the diversification that can be achieved through the tax system is also achievable through the capital market. Hence no PPP premium would exist. The fact that a PPP premium exists points to capital market imperfections that give an edge to diversification through the tax system. But a diversification advantage of the public sector is not in itself an argument against PPPs, since there are risk sharing PPP contracts where the public sector bears most, if not all, exogenous risks. Thus, if lack of diversification in the private sector is behind the PPP premium, then this may be a reflection of faulty contract design rather than an inherent disadvantage of PPPs.

(2) A PPP may have greater incentives for efficiency improvements compared with public provision. Under a PPP the same firm builds and operates the project. When service quality is contractible, then the firm has incentives to internalise life cycle costs during the construction phase. These incentives are not present under public provision. Hence the bundling of construction and operation provides an argument in favour of PPPs (Engel *et al.* 2008). Under a PPP, firm ownership of infrastructure assets during the life of the contract creates incentives for

innovation and more effective risk management. A final efficiency gain under PPPs may arise by avoiding agency costs associated with disbursing government funds. In order to avoid these costs, a PPP contract which relies on user fees may be preferable to society even if this moves risk to the firm (see Engel *et al.* 2007). In all these cases, imposing more risk on the firm translates into a PPP premium. To the extent that these risks are endogenous, however, they also give the sponsor firm incentives to reduce life cycle costs. In the words of Klein (1997): "[...] the cost of funds cannot be considered independently of the incentive system under which intermediaries collect them." Achieving equivalent incentives with public provision would not necessarily be cheaper.

(3) A third possible explanation for the PPP premium is that financing through PPPs has higher financial transaction costs. The complexity of the relationship between the sponsor, who owns the SPV, and the procurement agency, which oversees the contract and certifies compliance, creates transaction costs. These could potentially be so high that they negate the other advantages of PPPs. Complexity surrounding incentives and uncertainty has to be addressed with the help of legal, technical and financial advisors, along with estimation of demand risk. It has been estimated that these costs can reach 10% of the total cost of the project (Dos Santos Senna and Dutra Michel 2008; Yescombe 2007). But such expenses may be warranted, given that they provide a check on the potentially over-optimistic numbers provided by the government and the sponsor of the project. The more detailed nature of the contract – as compared to simpler contracts under public provision – limits the possibilities of costly *ex post* contract renegotiations.

On balance, Engel *et al.* are not convinced that PPP financing is inherently more costly than public provision financed with government debt. With adequate contracting, PPPs can replicate the intertemporal risk profile of public provision. This suggests that the so-called PPP premium may reflect faulty contractual schemes, which inefficiently assign exogenous risks to the private partner. In addition, the PPP premium may reflect

endogenous risks that cannot be meaningfully separated from the cost-cutting incentives embedded in PPPs, which lead to efficiency gains under PPPs. For these reasons, the higher cost of finance of PPPs is thus not in and of itself an argument in favour of public provision. In the case of a correctly designed PPP contract, the higher cost of capital may be the price to pay for the efficiency advantages of PPPs.

While Engel *et al.* conclude that the higher costs of PPP financing may well be justified on efficiency grounds, another common argument in favour of PPPs seems to withstand scrutiny less well: saving money for credit-constrained governments. One of the reasons for PPPs has been the desire of governments to indulge in public works even when restricted by budgetary constraints (see Engel *et al.* 2009 and also House of Lords Select Committee on Economic Affairs 2010, p. 16). The fiscal savings from using PPPs instead of government borrowing to finance infrastructure investment disappear once proper intertemporal fiscal accounting is adopted. Although the government is able to reduce its borrowing thanks to the private financing of the PPP, it also has to forego user fee income in the future if it is to attract private investors. The government may also have to take on demand risk and guarantee the future income flow to the sponsor. Furthermore, it is sometimes argued that the use of PPPs avoids having to finance the infrastructure project with distortionary taxes and therefore should be preferred to public provision. But this "lower cost of public funds" argument in favour of PPPs is faulty as well. Under a PPP arrangement the government foregoes user fee revenue which could have been used to substitute for distortionary taxes. As demonstrated formally in Engel *et al.* (2007), this makes the choice between PPPs and public procurement fiscally irrelevant. The temptation of governments to use PPPs to alleviate their fiscal burden is partly the result of Eurostat rules. Unless construction risk *or* both demand and availability risk remain with the government, Eurostat rules allow governments to take PPPs off-balance sheet. But Engel *et al.* argue that these rules reflect a static view of risk allocation. From an intertemporal risk perspective the discounted budget still is the residual

risk claimant, even if the firm bears all the demand risk during the life of the contract. Also, to the extent that taxpayers bear exogenous risk at a lower cost than the firm, the optimal contract eliminates that risk for the firm. Such a PPP contract increases the fiscal effect on the government budget relative to public provision.

To conclude, once an intertemporal view of government finances is adopted, PPP contracts have similar – sometimes identical – fiscal implications as public provision. This argues for giving PPP investments the same treatment as government investment on the government balance sheet.

3. Infrastructure: A new asset class for investors?

Whatever reasons governments may have to engage the private sector in financing and operating infrastructure assets, they depend on the interest of private investors. Such interest clearly exists. Demand for infrastructure assets has been part of a broader diversification process of institutional and other investors in recent years, partly triggered by the bursting of the technology bubble at the beginning of the last decade.

The first presenter at the EIB Conference to take a closer look at infrastructure from the point of view of private investors was **Georg Inderst** (independent adviser, presenting a paper subsequently published as Inderst 2010 in the EIB Papers).

From the investors' point of view, infrastructure holds the promise of being an entirely new asset class, which was unavailable to private investors while under public ownership. Whether in the form of

Georg Inderst

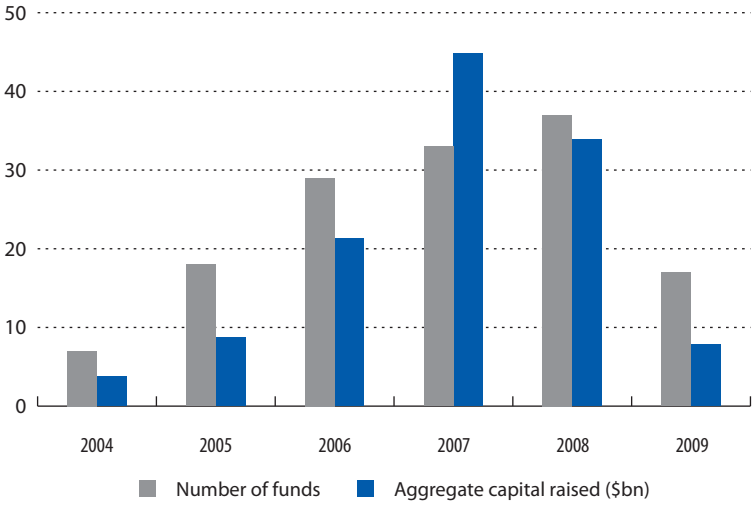
direct investment or indirectly through funds, infrastructure investments are widely believed to possess unique characteristics in terms of its risk-return trade-off, inflation protection properties, time horizon or correlation with other assets. However, there is no proper financial theory to back the proposition of infrastructure as a separate asset class. Nor is there strong empirical evidence to support such a conjecture. One reason for this is that infrastructure assets are heterogeneous, with different types of infrastructure having very different economic characteristics. The traditional sector approach (*e.g.* energy, utility, transport) may well be more meaningful than a high-level aggregation to an 'infrastructure asset class'. Empirical evidence suggests an alternative proposition, of either treating infrastructure simply as sub-asset class, or as particular sectors, within the conventional financing vehicle used (*e.g.* listed stocks, private equity, bonds).

As shown earlier by Wagenvoort, the bulk of private infrastructure finance still takes the shape of corporate finance. Financial investors with an eye on infrastructure may, however, find securities issued in the investing firm's name a poor substitute, since these pool the underlying infrastructure activities with the rest of the firm's activities. Project-financed infrastructure, in contrast, links the resulting securities exclusively to the underlying infrastructure assets.

A growing number of specialised products have been launched by the financial industry to meet the demand from investors, presenting infrastructure as one of the new "alternative" asset classes (*i.e.* alternative to mainstream equities and government bonds). One key development in recent years is the emergence of infrastructure funds, which make infrastructure investment available to a larger set of financial investors that may not have the ability to invest directly in infrastructure projects. As reported by Inderst, according to Preqin (a data provider), the number of infrastructure funds have more than quadrupled in the past decade. According to a recent survey of infrastructure funds conducted by Towers Watson (2010), the top 20 surveyed infrastructure managers reported

having US$185 bn in listed and unlisted infrastructure funds under management at the end of 2009, 59% of which were invested by pension funds. The survey also points to the growing share of infrastructure in the alternative investment segment, rising from 5% in 2007 to 12% in 2009. In the regional distribution of infrastructure assets, Europe leads with 43%, followed by North America (36%), Asia Pacific (16%) and other regions (5%).

Figure 5: Unlisted infrastructure fundraising (2004-2009)



Source: Preqin

There are two types of infrastructure funds: listed and unlisted. Existing studies show that listed infrastructure funds have a very high correlation (around 80%) with the general stock market. This reduces the diversification benefits of including listed infrastructure funds separately in an investor portfolio. Unlisted infrastructure funds seem to be a different story. Inderst presents new results on the risk-return profile of unlisted infrastructure funds around the world, on the basis of the Preqin database. He finds that returns on unlisted infrastructure funds were comparable to overall private-equity returns (9%) in the decade up to the

mid-2000s. Returns have since fallen steeply, though less for infrastructure than for non-infrastructure funds. Correlation analysis suggests that investment in unlisted infrastructure funds does present some scope for portfolio diversification. But this analysis also confirms that infrastructure assets are quite heterogeneous, which limits the scope for interpreting them as a separate asset class. Infrastructure appears to be simply a sub-asset class within the conventional set of financing vehicles (*e.g.* listed and private equity, bonds).

How large a share of total financial investments by funds can infrastructure eventually attract? A starting point for answering this question are the target allocations to unlisted infrastructure funds by all investors, including the various financial firms, as recorded in the Preqin database. Three-quarters of investors indicate a range of 1 to 10%, but actual investment levels tend to be much lower. Drawing on various sources, Inderst finds that the asset allocation of institutional investors to specialist infrastructure vehicles is growing, but remains below 1% globally. If one includes their exposure to infrastructure via listed company shares (dominated by traditional utility stocks), the total infrastructure share of institutional investors is somewhat higher, but nevertheless remains below 5% globally.

On the basis of stated intentions, the share of infrastructure funds in investors' portfolios may rise in the future, and there are already signs that the cooling of interest in infrastructure amidst the financial crisis was temporary. According to Preqin, in August 2010, 43% of investors were planning new commitments to infrastructure funds during the next 12 months, higher than a year earlier. Similarly, a survey by bfinance (2010) in May 2010 shows infrastructure as the most attractive asset class in the alternative segment. Around one-third of respondents consistently report a longer-term intention of increasing the asset allocation to infrastructure assets. Actual numbers are notably smaller, however. In the past year only 4-6% of respondents claim to have actually increased their infrastructure allocations.

If the upbeat intentions were realised, there would be massive new demand for infrastructure assets. To illustrate this point, Inderst calculates that a 3% asset allocation shift into infrastructure assets by pension funds globally would result in an additional demand of around US$ 700 bn.

It is not clear what exactly inserts the large wedge between desired and actual allocations, but what is obvious is that there remains a substantial gap in our understanding of how infrastructure funds perform. There are several reasons for this. Some are related to data availability and quality. For instance, the history of unlisted infrastructure vehicles is still rather short. In addition, data are often proprietary and not made public. Independent evaluators have not begun to collect data independently on any scale. Infrastructure funds and investors use different benchmarks and there are no agreed performance and risk reporting standards. The performance uncertainty is also related to some inherent characteristics of infrastructure assets, including the combining of infrastructure assets that have very different characteristics. This in turn may explain why different infrastructure funds have displayed very different historical performance.

There have been a number of efforts aiming to improve our knowledge of past performance of infrastructure assets, using different data sources. Many researchers have relied on listed infrastructure indices to construct historical performance records of infrastructure as an asset class. But such indices are based on publicly traded shares of utility, transport, energy and other infrastructure companies, whose performance may be very different from pure infrastructure assets. Alternatively, one can deduct historical performance from listed infrastructure funds, such as those listed on the Australian Stock Exchange. But performance of the various listed funds displays a very high degree of dispersion.

Another approach to assess historical performance is to draw on results as reported by investors. The limited evidence that exists on this suggests that performance varies substantially both across investors and across

time. Some work has been done to produce historical time series and performance figures for unlisted infrastructure funds. Analysing quarterly returns of five unlisted Australian infrastructure and utilities funds over a ten-year period, Peng and Newell (2007) found that both risks and returns compare very favourably to other asset classes, with an average annual return for unlisted infrastructure funds of 14%, double that of bonds and somewhat higher than that of stocks. In a follow-up study that also incorporates the early stages of the crisis, Newell *et al.* (forthcoming) find that the performance of these unlisted infrastructure funds have withstood the crisis well and more generally display much less variation across time than other asset classes. Finkenzeller *et al.* (2010) analyse similar data over a longer time period. They find that unlisted infrastructure and utility have had similar returns as equities and bonds, but below those of property and listed infrastructure. However, they also find that unlisted infrastructure comes out with the lowest returns volatility. On balance, the Australian performance studies of unlisted funds find relatively high risk-adjusted returns and relatively strong resilience in the market downturn, although these results need to be viewed cautiously in view of the relatively narrow sample and short time period covered. In particular, most of the data used pertains to the period after 2000, during which it may have been the case that infrastructure assets enjoyed a sustained cyclical upswing.

Further exploring the scope for private financing of infrastructure, **Christoph Kaserer** (Technische Universität München, presenting a paper written together with Florian Bitsch and Axel Buchner, published in the EIB Papers as Bitsch *et al.* 2010) provided an analysis of the risk, return and cash flow characteristics of infrastructure investments and compare them to non-infrastructure investments. It is generally argued in the literature that infrastructure investments offer typical characteristics such as

Christoph Kaserer

long-term, stable and predictable, inflation-linked returns with low correlation to other assets (Inderst 2009). Drawing on a unique data set of global infrastructure and non-infrastructure investments done by (private equity-like) unlisted funds (CEPRES database), the authors put a number of these "conventional wisdoms" to the test. To some extent, their findings corroborate the established view, but some of the results do not.

Although addressing broadly similar questions, there are two important differences between Bitsch *et al.* and Inderst (2010), which add to their complementarity. The first is that Inderst uses fund-level data, while Bitsch *et al.* draw on data from individual deals involving funds. The focus is on the equity participation of portfolio funds. The second difference is that, unlike Inderst, Bitsch *et al.* only look at completed transactions, with no fund capital left in the portfolio. This means for instance that the calculated rates of return are final.

The main results are as follows. First, in terms of risk differences between infrastructure and non-infrastructure deals, results are mixed. The authors do not find evidence supporting the hypothesis that infrastructure investments offer more stable cash (out-) flows than non-infrastructure investments. It appears to be true, however, that default risk – or downside risk more generally – is significantly lower in infrastructure investments than in non-infrastructure investments.

Second, as far as returns are concerned, infrastructure deals have higher average and median returns, as measured by the investment multiples and internal rates of return. This result also holds when separating the sample into venture capital and private-equity deals, and most differences are statistically significant. This is an interesting finding as it contradicts the traditional view that infrastructure investments exhibit low levels of risk and, consequently, provide only moderate returns.

Third, there is some evidence that the higher average returns reflect higher market risk. For one thing, the data sample contains only equity investments, and leverage ratios of infrastructure portfolio companies are higher than for their non-infrastructure counterparts. For another, returns to infrastructure fund investments are more strongly correlated with the performance of public-equity markets than returns to non-infrastructure fund investments.

Fourth, European infrastructure investments are found to have consistently higher returns than their non-European counterparts. Bitsch *et al*. hypothesize that this might be related to the fact that Europe has seen the largest volume of privatisations, especially in the infrastructure sectors. It could well be that the *ex ante* return expectation in privatization transactions is higher, either because of defective privatization mechanisms or because of higher political risk. Concerning the latter, there is some evidence that the regulatory environment has an impact on returns. Specifically, deals in the transportation sector have significantly higher returns than those in other infrastructure sectors, probably reflecting less independent regulation and hence, higher political risk in transportation as compared to the utilities or energy sectors.

Fifth, the empirical evidence does not support some other claims made in the literature. In particular, returns to infrastructure funds are not strongly linked to inflation and seem little influenced by management experience, and their cash flow durations are not any different from those of non-infrastructure deals. It is also interesting to see that, unlike venture capital and private-equity transactions at large, infrastructure investments do not appear to be subject to the so-called "money chasing deals" phenomenon.

Thus, the allegedly bond-like characteristics of infrastructure deals have not been confirmed. This is shown by the fact that infrastructure investments do not offer longer-term or more stable cash flows than

non-infrastructure investments. The returns showing a positive correlation to public-equity markets and no strong inflation linkage also point to equity-like rather than bond-like characteristics.

Nevertheless, this study does support the perception that infrastructure investments have some special characteristics that are of interest for institutional investors. Lower downside risk is certainly an important feature in this context. However, it is unlikely that the infrastructure market offers a free lunch. Even though it is true that returns have been attractive in the past, it cannot be ruled out that these returns are driven by higher market risk.

4. How to encourage the expansion of private infrastructure finance

Previous presenters hinted at the notable gap between the potential and the actual roles that private investors play in infrastructure finance. **Dieter Helm** (University of Oxford, presenting a paper published as Helm 2010 in the EIB Papers) delved deeper into the likely sources of this gap. He also stressed the need to address this gap in light of the fiscal constraints facing governments in the wake of the financial crisis. The challenge is to match the need for a major expansion in infrastructure investment across Europe with the constraints of a post-crisis economy.

As explained by Helm, the difficulties of expanding private infrastructure finance are inseparable from the economics of infrastructure. Many infrastructure assets form part of networks and

Dieter Helm

systems, which is what gives infrastructure assets the characteristics of a public good. Because of these characteristics, governments are intimately involved in infrastructure provision. They decide on the systems and the frameworks from a social optimisation perspective. They also control the planning. The private sector typically does the work (the capital expenditures, or CAPEX) and all finance is ultimately private, either directly or through the tax system.

Infrastructure involves the creation of long-lived assets with high sunk costs, followed by low marginal costs for each additional user. Once completed, the difference between the marginal and average costs is thus very large, as only the latter takes the sunk cost into account. Private investors can only recover their initial sunk costs if they enjoy a sufficiently large cash flow, reflecting average rather than marginal cost. Historically, one solution has been to recognise that the provision of much infrastructure has monopoly powers. A private investor can in principle rely on monopoly rents to recover sunk costs. Road and bridge tolls played a part in the early development of roads, for example.

Such market power may not last long enough for the investor to recuperate the up-front costs, however. One problem with monopoly rents is that these attract new entrants and the development of alternative technologies that may chip away at the monopoly rents. In almost all major network systems, technological progress 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 thus necessary to provide some income guarantees to the investors.

Predictable regulation and long term contracts are also needed to prevent governments from reneging on their promises to the private

investors. The temptation to do so is the result of a fundamental time inconsistency problem that characterises much infrastructure. The government has to promise prices based on average cost for private investors to come forward (otherwise the investors will not be able to recuperate their initial fixed costs); yet once the asset or network is up and running, the government is tempted to break the promise and drive prices down to marginal costs to increase the number of users and hence, consumer welfare. This problem of credible commitment lies at the heart of infrastructure policy. If governments cannot credibly commit to not expropriate the assets once they are in place, there will be little incentive for investors to build them in the first place.

Efforts to address the basic time inconsistency problem have tended to center on a transfer of ownership of infrastructure assets to the private sector, combined with the creation of arms' length regulatory frameworks to provide mechanisms for credible commitment. 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. In countries such as the UK, 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 licenses granted – the sunk cost issue arises from the capital expenditure, not the granting of permission to carry out the projects. The regulator is an intermediary that guarantees that the government will honour its commitment. Thus, regulators are supposed to have due regard to investor protection. In the utility sector, a host of new regulatory bodies have been created, partially with this purpose in mind. Such measures have not typically extended to private finance initiatives (PFIs) and PPP contracts. This 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.

In setting prices, regulators have typically been required to respect the need for a return both on new and existing assets. The guiding principle of price regulation was to ensure a minimum return on assets for investors, but to do this, the question "on what" had to be answered. In the process of ensuring that private investors would recuperate their past sunk costs, the concept of a "regulated asset base" (RAB) was developed. 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 to the RAB. The crucial point here is that the RAB represents the sunk costs, and the RAB mechanism thereby became a means to addressing the time inconsistency problem.

The RAB 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 such as the proposed UK Green Investment Bank. Such an infrastructure bank would buy completed projects, put a guarantee around them to create RABs and sell the assets to investors (*e.g.* pension funds) in a debt-financed package. This activity would require little own capital.

Helm also stresses that the urgency of providing an exit strategy for new infrastructure CAPEX has been compounded by the economic crisis. The impact of the crisis has been ambivalent. For completed CAPEX in formal RABs, the impact has probably been benign. Quantitative Easing has even involved the state buying RAB-backed utility bonds. In contrast, for CAPEX itself, the impact has 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.

If these suggested measures were adopted, they would according to Helm 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.

As a discussant of the second session, **Nicolás Merigó** (Marguerite Fund) emphasised that the "private" financial investors in infrastructure are a very heterogeneous group, spanning pension funds, banks, insurance companies and sovereign wealth funds. Each of these investor types face different sets of goals, incentives and requirements. As regards equity investment in project finance deals, Merigó stressed that non-financial investors (corporate developers) dominate the market. In the first half of 2010, such non-financial investors accounted for nearly 90% of global equity invested in project finance deals (or roughly USD15 bn out of USD17 bn). Finally, Merigó recognized that analysis of infrastructure assets, investors and markets remain in early stages, and that there is plenty of scope for further empirical research. In light of the observed importance of equity investment by non-financial corporates, this is an area that in particular warrants further study.

5. Infrastructure finance and public policies

The UK has long been in the forefront in terms of private financing of infrastructure. Yet the need for private participation has increased even further because of necessary fiscal consolidation, in the UK as elsewhere. **James Stewart** (Infrastructure UK – HM Treasury) provided an overview of the UK National Infrastructure Plan 2010. The UK National Infrastructure Plan for the first time sets out a broad, integrated, cross-sectoral vision and plan for the substantial infrastructure investment required to underpin the UK's economic growth. This plan will act as a common reference point for the public and private sectors to achieve more effective infrastructure development. It will be updated on an annual basis.

Nicolás Merigó, James Stewart

Stewart pointed to research demonstrating the favourable economic effects of past infrastructure investment in the UK. There is a clear correlation between investment in infrastructure and long-term growth. The OECD found that, between 1970 and 2005, investment in UK roads, rail and electricity generating capacity had a stronger positive effect on the level of GDP per capita, and on short term growth, than other types of capital investment (Égert *et al.* 2009). Failing to make the right choices risks slowing down economic growth and ultimately jeopardises the UK's international competitiveness.

To meet the growing requirements for spending on infrastructure, there is a need to use limited public funds wisely and unlock every possible source of private sector investment. The National Infrastructure Plan 2010 sets out a broad vision of the infrastructure investment required to underpin the UK's growth (HM Treasury 2010), embracing the options opened up by new technology – for example, in the roll out of super fast broadband, in offshore wind arrays and in high-speed rail. The role of a Government in this work is clear. It is to specify what infrastructure we need, identify the key barriers to achieving investment and mobilise the resources, both public and private, to make it happen.

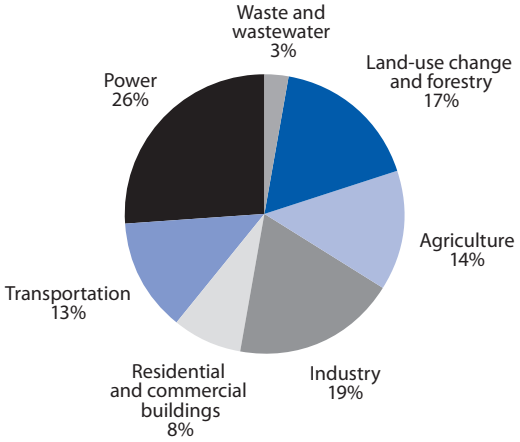
According to Stewart, the UK is today one of the most expensive countries in which to build infrastructure. For example, civil engineering works cost some sixty percent more than in Germany. To address this issue, there is a need to improve the UK planning system, bring down construction costs, improve the quality of data to inform decision taking, and initiate programmes to look at cross-sectoral independencies, resilience and engineering innovation.

Infrastructure UK are investigating -- in collaboration with wider UK government -- how to reduce the cost of delivery of civil engineering works for major infrastructure projects. Initial findings indicate a range of reasons for higher costs of UK infrastructure. In particular, there are issues in the commissioning, early project formulation and pre-construction

phases. In these early phases, policy-related factors, for example the UK planning and consents regime, and regulatory standards, impact on the whole infrastructure sector, including public and private-sector investments.

Infrastructure needs are changing in the face of several megatrends that will affect the economy in coming decades. Clearly, with current transport, energy and other economic infrastructure contributing a non-negligible share to greenhouse gas emissions (Figure 6), global warming has far-reaching implications for infrastructure investment going forward. **Marianne Fay** (World Bank, presenting a paper co-authored with Atushi Iimi and Baptiste Perissin-Fabert, which has been published as Fay *et al.* 2010 in the EIB Papers) spoke on "the greening of infrastructure – challenges and opportunities".

Figure 6: Infrastructure accounts for some 41% of global greenhouse gas emissions



Source: IPCC (2007)

Marianne Fay

While the link from infrastructure to climate change has received a fair amount of attention in the literature, this has not been the case for the reverse relationship. By investigating also the impact of climate change on infrastructure (with a focus on developing countries), Fay and her collaborators thus bring valuable insight to a previously under-researched area.

As a starting point, Fay thus began by stressing that indeed the relationship between climate change and infrastructure goes in both directions. First, since infrastructure (defined here as transport, power, water and sanitation) is a major *contributor* to greenhouse gas emissions, a greening of infrastructure is needed to slow the pace of climate change. Second, and especially in developing countries, there is a need to make infrastructure less vulnerable to the *effects* of global warming. The paper by Fay *et al*. argues that both mitigation and adaptation concerns will increase the costs of infrastructure. Estimates of the additional costs associated with adaptation are modest but this is due to the way they are calculated: as the incremental costs of adapting new infrastructure rather than the costs of improving resilience. The latter would require first and foremost addressing the large infrastructure deficit that characterizes most developing countries. In fact, adaptation and mitigation costs pale in comparison to the unmet infrastructure funding needs.

Because infrastructure is long-lived, the need to put in place greener infrastructure is urgent. But the long lead time also introduces substantial uncertainty into the decision-making process. There is for instance substantial uncertainty with respect to the geographical distribution of climate change impacts. Other uncertain factors include the pace and direction of technological progress and the size of future carbon prices, both of which affect the optimal design of infrastructure. Increased uncertainty calls for more robust decision-making. Rather than selecting a single "optimal" strategy, it may be better to opt for the one that is the most likely to generate a consensus among stakeholders and/or to minimize the impacts of a bad surprise. Robust decision-making does

not help decision makers predict what will happen but to design better choices and improve the ability to cope with low-probability, undesirable events.

While climate change may have several negative consequences for infrastructure finance in developing countries, not all is negative. One positive side effect of climate change might be that it helps bring attention to the need to better address environmental issues in infrastructure design at the same time as it increases the value of environmental co-benefits. Climate change increases the already high returns to maintenance (and to operational management more broadly), hitherto relatively neglected in developing countries. If the foreseen effects of climate change elevate the awareness of high returns to maintenance, it could possibly trigger action that would be economically sound also in the absence of climate change. Further, high-income countries have pledged resources to assist developing countries both in adapting to and in mitigating climate change. It is reasonable to expect that a share of these resources will constitute a net addition to domestic and concessional resources available for infrastructure funding.

Unfortunately climate finance for developing countries remains modest relative to needs. Adaptation funding needs to increase at the same time as it moves away from a narrow focus on incremental costs. The experience of the EU accession funds, which also had to tackle the question of additionality, offers some useful lessons. Mitigation funds suffer from the absence of agreement that could generate more certainty and stability around a carbon price and around the potential size of the offset markets. Several ideas are offered that could help raise additional funding but these require some commitments by high-income countries.

One issue that is not tackled in this study and requires further research is the extent to which climate change may affect private participation in infrastructure (PPI) – currently the source of around one-fifth of developing-

country infrastructure finance. As climate change increases uncertainty, it should increase the cost of capital and hence, make PPI more costly and possibly more difficult to attract at least in the most affected countries. We can also expect that climate change and the need for new environmental regulations will affect the optimal regulatory regimes that govern PPPs.

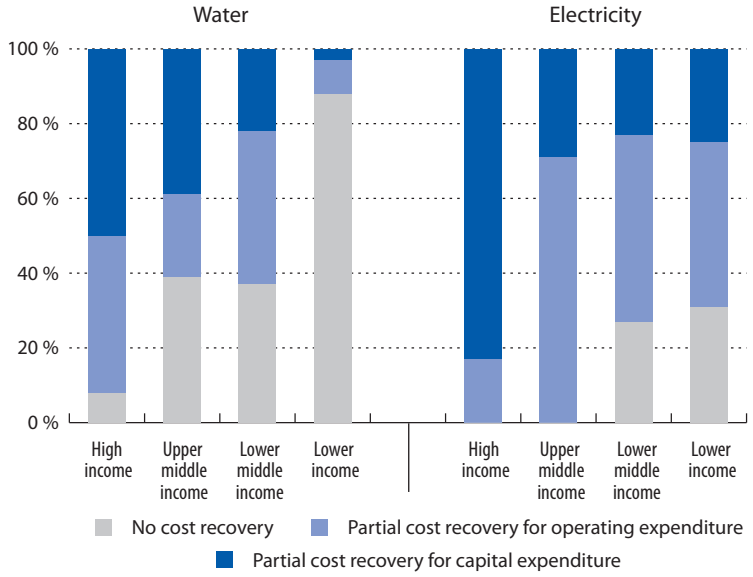
Antonio Estache (Université libre de Bruxelles, presenting a paper published in the EIB Papers as Estache 2010) expanded on this policy discussion to address efficiency, equity and fiscal consequences of public and private infrastructure financing options in developing countries. His overview of the main dimensions of infrastructure finance in developing countries shows that quite a bit has been learned on these issues since the mid-1990s. For developing countries, infrastructure investment is a much longer-term concern than a short-term bet on recovery from a crisis. In many areas, the need for basic infrastructure investment is substantial. Many people in developing countries lack access to electricity, water, telecommunication facilities as well as common transport infrastructures such as roads and ports. Better access to health and education are similarly essential policy goals in their own right. But infrastructure also plays an instrumental role in fostering long-term economic growth. Recent surveys of the literature on the infrastructure-growth nexus confirm that the poorer the country, the more infrastructure matters for growth.

The private sector remains a limited source of infrastructure finance in developing countries. Estache points to both efficiency and equity arguments for a substantial continued government role in financing infrastructure. Regarding efficiency, private provision and financing of infrastructure depends on the quality of competition and regulation, which is often found wanting outside the advanced countries.

Antonio Estache

As regards equity, Estache cautions against the wide underestimation of the public-sector financing support needed to serve the poorest and ensure that services are offered at prices consistent with their ability to pay. In its support to the reform of regulation, the international community needs to learn from widespread past experience with inequitable provision, pricing and subsidisation of infrastructure services. Limited ability to pay is a major obstacle to private financing and provision of infrastructure, as illustrated by the large difference in infrastructure cost recovery between high and low income countries (Figure 7). Full cost recovery would require the average citizen of South Asia and Sub-Saharan Africa to spend 25 to 35 percent of income on infrastructure services, which would be impossible. The optimal financing approach therefore cannot be made independently of an analysis of the population's ability to pay.

Figure 7: Infrastructure cost recovery across country income groups average 1999-2004)



Source: Estache (2010)

International donors and financiers play a large role in realising needed infrastructure in developing countries where neither public nor private funding is available in sufficient quantities. In recent years, China has become a major international source of infrastructure finance in developing countries. Over time, pension funds and other institutional investors could also emerge as major sources of international financing. For the time being, however, it is hard to overestimate the role of development agencies in the financing of infrastructure. There is a need for more effective coordination between different external donors and financiers so as to reduce the fragmentation of financing sources of large infrastructure projects. Improved coordination should also be reflected in the collective efforts to deal with major policy challenges, including the greening of the sector, corruption, improvements in monitoring the performance of the use of resources, and governance of the sector. As network externalities extend across borders, many electricity, telecom and transport projects also require international coordination allowing transnational infrastructure needs to be addressed jointly among groups of countries.

Data limitations remain a major obstacle to better understand the infrastructure needs in developing countries, and to the policy and institutional changes needed to meet them. It will be challenging to get the data and the models to assess the direction that the international community and national governments in developing countries need to follow to identify win-win situations in the sector. But it is a reasonable way of making sure that the scarce international and national financial resources allocated to the sector deliver cost-effective infrastructure at a greater speed.

6. Concluding remarks

by EIB Vice President Plutarchos Sakellaris

The starting point for the conference was that Europe faces large and indeed growing infrastructure needs in coming years and decades. These reflect both the need of replacing ageing existing infrastructure stock and the need for new infrastructure brought on by emerging megatrends, such as ageing and climate change. Meeting these infrastructure needs in an environment where public finance in Europe is constrained by fiscal consolidation will require a greater contribution from private financial sources.

As pointed out by several speakers at the conference, private finance has up to now not been forthcoming in the amounts needed to fill the gap between available public funds and investment needs. The conference suggested several critical elements where action is needed.

As shown by Rien Wagenvoort, infrastructure finance remains dominated by government and corporate finance. Although theoretically the case for project financing of infrastructure is strong, in practice this source has so far accounted for a small fraction of overall financing.

One bottleneck to more private finance was stressed by Eduardo Engel, who showed that the higher observed cost of private infrastructure finance was partly the result of faulty contract design, especially as regards the allocation of risk between the public and private sectors. Improved contract design is essential to attract private investors to the kind of long-term investments that characterise most infrastructure.

Dieter Helm pointed to another critical bottleneck. According to Helm, regulatory failure needlessly introduces uncertainties for private investors

Plutarchos Sakellaris (EIB Vice President)

as regards the future return on infrastructure investment. The uncertainty is partly propelled by the temptation of governments to renege *ex post* on the promises made to the investor *ex ante* that it would be allowed to charge sufficiently high user charges to recuperate the up-front fixed costs.

Georg Inderst presented evidence suggesting that a lack of reliable information may also impede higher private sector financing of infrastructure. We need to understand better the characteristics of infrastructure assets so that they can find their right place in investor portfolios. Two pioneering empirical studies were presented at the conference (one by Inderst and the other by Christoph Kaserer) that brought us closer to this end, but clearly this is an area where more work is needed. On the basis of existing evidence, the pooling of quite different infrastructure assets seems to contribute to the difficulty in identifying any robust financial properties in existing infrastructure-linked financial assets.

Antonio Estache brought home the important message that developed and developing countries are worlds apart when it comes to infrastructure finance. In developing countries, private financing of infrastructure remains very limited, for several reasons. One critical issue is that dependence on user fees becomes unviable when large portions of the users lack the ability to pay. Furthermore, the legal and regulatory environment is often too underdeveloped to attract private investors into long-term contracts.

Developing countries are expected to be the most severely affected by climate change. As discussed by Marianne Fay, climate change affects future infrastructure investment in two ways. First, there is a need for investment in infrastructure that is more resilient to the effects of climate change. Second, since infrastructure is a major source of greenhouse gas emissions, a greener infrastructure needs to be put in place in coming decades, in developed and developing countries alike. On a positive side,

however, widespread awareness of climate change has also increased the willingness of advanced countries to contribute to the financing of infrastructure in developing countries.

A last but not least message to highlight from the conference is that of James Stewart, who showed that infrastructure is more than just an issue of finding the fiscal space for governments or an asset allocation decision for the private sector. Fundamentally, infrastructure is a public policy issue, which requires long-term planning regardless of how it is ultimately financed. It is thus up to the government to decide what infrastructure the economy needs, and where.

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Annex: Infrastructure finance and the EIB - Three illustrative examples

by the EIB Directorate for Operations in the EU and Candidate Countries

1. 2020 European Fund for Energy, Climate Change and Infrastructure (the Marguerite Fund)

Infrastructure projects need both debt and equity: therefore, in addition to its significant infrastructure lending activity, EIB has, together with partners, invested in a series of equity funds for infrastructure. These funds are an important source of equity finance for infrastructure asset creation.

Recently, in response to the conclusions of the European Council of December 2008, the European public financial institutions, the European Investment Bank, Caisse des Dépôts et Consignations, Cassa Depositi e Prestiti, Kreditanstalt für Wiederaufbau, Insituto de Crédito Oficial and Powszechna Kasa Oszędności ("Core Sponsors"), in collaboration with the European Commission launched the 2020 European Fund for Energy, Climate Change and Infrastructure, the so called Marguerite Fund. The Fund is designed to contribute to the development of the Infrastructure market as well as the European Economic Recovery Plan by financing the implementation of strategically important European Policy objectives in Energy/Climate, Renewables and Transport sectors.

The Fund's investment policy will focus on asset creation (green field investments) throughout the European Union in three priority sectors: Trans-European Transport Networks (TEN-T), Trans-European Energy Networks (TEN-E) and renewable energy. The Fund is managed by an independent and exclusive advisory team based in Luxembourg with a branch office in Paris. The Fund operates on private sector principles with market standard return targets, while retaining specific public sector features. Representatives of the Core Sponsors sit in the Supervisory and

Management Boards of the Fund, while the investment decisions are made by an Investment Committee that has no such representatives. The Supervisory Board cannot interfere with the management of the Fund and will focus on overall supervision and strategic orientation of the Fund.

The Fund raised more than EUR 700m in its first closing and will target final closing with EUR 1.5 bn commitments from both public and private investors by then end of 2011. The Fund has also an associated Debt Co-financing Initiative, under which the Core Sponsors and other interested parties have expressed interest to provide debt-financing to projects the Fund invests in.

The Fund invests in minority positions in project companies implementing infrastructure investments. It has standard portfolio diversification requirements ensuring that the Fund is not disproportionally investing in any one EU member state nor projects sponsored by the same counterpart. The Fund has a four-year (extendable by two one-year periods) investment period and has a term of 20 years.

The Marguerite Fund is expected to be a model in the future for other similar public and private funds in the EU: both at regional and national level for different infrastructure sectors in view of the approach taken to combining market principles while still supporting public policy objectives.

2. Autobahn A5 PPP Ten

The successful closing of A5 sent a crucial signal, amidst economic turmoil, for future A-Model projects, when the German government was launching its second batch of projects. LGTT (Loan Guarantee Instrument for Trans-European Transport Network Projects) made the project bankable in difficult economic conditions and was the first time the guarantee has been employed in Germany.

Scope of the A5 project

The project is a part of the Trans-European Transport Network (TEN-T) and is located on a strategic road corridor in the south–west of Germany in the western part of the state Baden-Württemberg between Karlsruhe and Offenburg. The autobahn runs parallel to the French border and the French Region Alsace, *i.e.* Département du Bas-Rhin.

This Project's concession has a duration of 30 years (2009-2039) and covers 59.8 km, including 40km of construction/upgrade plus the operation and maintenance of an adjoining already widened 20km section. It involves the design, construction, operation and maintenance and financing of the works to be carried out. The concessionaire will gain revenues from the "Toll Collect" truck toll system, based on real HGV traffic numbers on the concession.

The Concessionaire

In February 2009, the German authorities awarded the €600m A5 PPP contract to the consortium led by Vinci. The successful "Via Solutions Südwest" SPV includes:

- Vinci Concessions
- Meridiam Infrastructure
- Kirchhoff (subsidiary company of Strabag)

Via Solutions Südwest, was able to close the funding for the project on 30 March 2009, only two months after the contract was awarded.

Financial Structure

Due to the economic environment, the main challenge was to raise the required amounts of senior debt while maintaining reasonable financial costs. A number of particularities influenced the development of the project's funding structure, including:

- The project revenues will fully rely on tolls collected from heavy goods vehicles, there is no availability payment component;
- The project does not include up-front grants as per the previous A-Model projects.
- The discount amount on toll revenues (Abzugsbetrag) is constant in nominal terms over the whole concession period, thus having a higher impact on the earlier years;
- The project generates unsecured traffic revenues from the outset, thus requiring contingent funds to cope with possible traffic downsides during construction;

The funding structure was therefore based on three pillars:

- a 28-year long-term financing from the EIB, for close to 50% of the senior funding requirement;
- a commercial facility structured as a "soft" 11 years mini-perm, with refinancing risk for the remainder of the concession period;
- a series of credit enhancement measures through stand-by lines provided by the sponsors
- a LGTT stand-by mezzanine facility provided by EIB (Loan Guarantee for TEN-T Projects)

LGTT[3]

The LGTT instrument was introduced by the EIB to facilitate bank funding for Trans European Network (TENs) transport projects subject to a revenue risk.

The LGTT was made available as a one-off drawdown at a fixed point in time to partially repay the senior debt in the case where a certain traffic

3 LGTT is the acronym for Loan Guarantee Instrument for Trans-European Transport Network Projects. It is an innovative financial instrument set up and developed jointly by the European Commission and the European Investment Bank (EIB) which aims at facilitating a larger participation of the private sector involvement in the financing of Trans-European Transport Network infrastructure ("TEN-T").

downside threshold is met. This is designed to a) facilitate a refinancing in a downside scenario and b) improve the senior lender's position throughout loan life by improving the cover ratios on the outstanding senior debt.

If the LGTT guarantee is called upon, then the EIB becomes a subordinated lender to the project, ahead of any payment to the equity providers and related financings. The EIB, by taking such subordinated risk through the LGTT guarantee, helps the project to cope with the revenue risk of the early years of operation while relying on the long-term perspective of the project to recover its loan.

The LGTT is a replicable structure, with bespoke elements adapted to the particulars of each project. The sponsors recognized the benefit of LGTT as a substitute to expensive contingent equity and, at the same time, LGTT benefits to senior lenders providing a AAA rated contingent security reducing default risk.

Conclusion

- A5 proved to be a particularly challenging project with extensive traffic risk and no availability payment element;
- The procurement process was impacted by the onset of the financial crisis;
- A major constraint was the public sector pressure to hold the bidders to their original bid price, in changed market conditions;
- The project eventually benefits from a robust financial structure, through a reduced gearing, subordinated funding features for both equity and debt and the introduction of LGTT to cope with downside scenarios;
- Relatively attractive funding terms were obtained as a result of the above risk mitigants.

3. Cape Verde Wind Power PPP

The Bank has provided EUR 30m to design, construct and operate onshore wind farms on four islands in the Cape Verde archipelago. It is one of the largest wind projects in Africa and the first renewable energy public private partnership in sub-Saharan Africa. The project will provide over 28MW of electricity generating capacity and help the archipelago reach an ambitious target of ensuring that 25% of local power needs are provided by renewable energy by 2012 and 50% by 2020.

Cape Verde has outstanding wind resources, but the country relies heavily on expensive imported fossil fuel for power generation. The wind power project will reduce that reliance substantially. Alongside significantly reducing greenhouse gas emissions the project will also increase access to electricity in Cape Verde and help establish wind energy as a reliable source of non-polluting renewable power on the islands.

The project has been developed in a public-private partnership between the government of Cape Verde, local power utility Electra, and Infraco, a privately managed donor-funded infrastructure development company.

The EIB was appointed lead financier to the Project and has used it's experience and expertise in the renewables sector to help develop and implement the project. The financial structure is typical project finance, with a long-term finance facility of 15 years provided by EIB. The project will be build on a full engineering, procurement and construction contract with a 12-year service agreement with wind turbine manufacturer Vestas.

The project will increase the national utility's total installed generation capacity from 66 to 94 megawatts. The first plant on the island of Santiago is expected to be tested and commissioned by June 2011 with all four plants scheduled to become operational by the fourth quarter of 2011.

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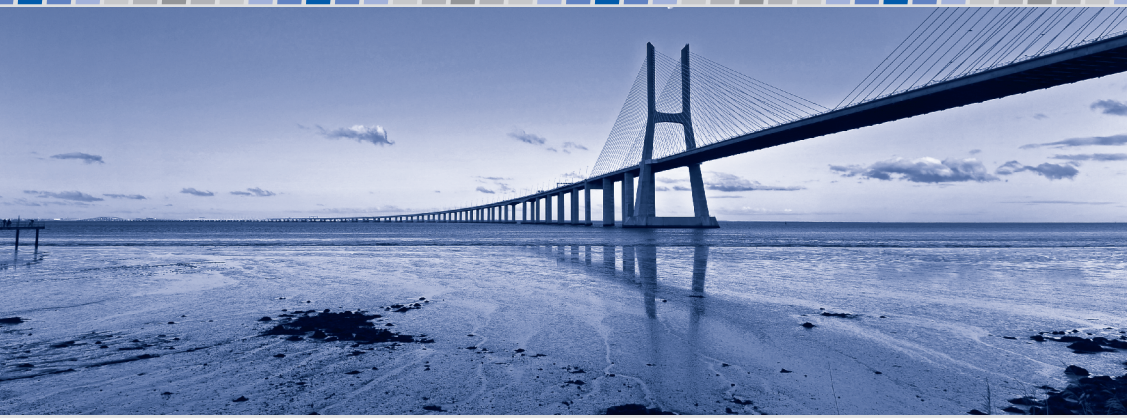

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